TORONTO HYDRO®

Executive Summary and Investment Plan Overview

2025-2029 CUSTOM RATE APPLICATION

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1. OVERVIEW

Toronto Hydro-Electric System Limited ("Toronto Hydro" or the "utility") is proud to present its 2025-2029 Investment Plan (the "Investment Plan"), which proposes investments of approximately $5.9 billion in expanding, modernizing and sustaining the foundations of a safe and reliable grid to serve the current and future electricity needs of the homes, businesses and institutions of Toronto.

A fundamental shift – known as the energy transition – is underway. There is broad societal, academic and policy consensus that the demand for electricity will roughly double over the coming decades.[1] Customers are adopting new technologies powered by electricity at unprecedented rates as part of a societal-wide and international movement to reduce reliance on fossil fuels in order to mitigate the worst existential and economic impacts of climate change. Toronto Hydro needs to get ready for this electrified future now by preparing its grid and operations to serve increases in customer demand and offer customers greater choice with respect to their energy use, while also addressing other major challenges that persist: deteriorating infrastructure, a complex operating environment, rapid population growth, an evolving workforce, more frequent extreme weather events, and the rise of cyber threats.

As the trusted steward of the distribution system in Toronto, the utility recognizes that customers and stakeholders expect it to make the necessary investments to confront these challenges while also balancing price and service quality outcomes in both the near and long term. Toronto Hydro places paramount importance on fulfilling this responsibility. The Investment Plan makes the minimum investments necessary (the "least regrets" investments) to maintain key outcomes in the near-term while also making paced and deliberate progress in readying the grid and utility operations for the future, irrespective of the path the energy transition takes. Investments with long lead times (e.g. infrastructure and human capital) must be made now to provide customers and policymakers a full range of options and choices for a decarbonized future, and the utility must have the flexibility to adapt plans as needed to be responsive to the varying degrees of uncertainty that still remain as to exactly when and how future demand will manifest.

Toronto Hydro developed the Investment Plan through an integrated and iterative planning process that considered customer feedback from start to finish, along with sophisticated system performance analysis, and other technical information produced by subject matter experts who have deep expertise in managing the electrical grid and its enabling operating systems. A record number of energy consumers – over 33,000 residential and business customers – reviewed the Investment Plan, and 84 percent supported the plan as presented or one that does even more to advance key outcomes.[2]

The Investment Plan builds on past improvements in safety, reliability and customer service outcomes, ensuring that this foundation of high-performance continues to be maintained while building a modern, resilient grid for the decades to come.[3] It is organized around four investment priorities: (a) sustainment and stewardship (maintaining the foundations of a safe and reliable grid); (b) modernization (adopting new technology to improve system performance and reduce costs); (c) growth and electrification (connecting and serving growing demand for electricity); and (d) general plant (decarbonizing and keeping the business running efficiently).

Delivering customer value through performance is Toronto Hydro's ethos. To demonstrate its unwavering commitment, the utility is holding itself financially accountable for achieving key outcomes that matter to customers and deliver long-term value to ratepayers and stakeholders. The utility intends to track and transparently report its performance across 41 unique performance measures annually through its scorecards and regulatory filings, and introduced an innovative performance incentive mechanism which provides customers with an upfront rate reduction benefit of $65 million that the utility only earns back upon achievement of targeted objectives. Toronto Hydro understands that this is the level of accountability that customers and stakeholders deserve and expect.[4]

Toronto Hydro believes that it has struck the appropriate balance between maintaining the reasonable prices and reliable service levels that customers value while making the minimum necessary investments to respond to the imperatives of the ongoing energy transition so that the local grid can safely, reliably and efficiently serve customers for decades to come.

2. BACKGROUND & OPERATING CONTEXT

2.1 Corporate Overview

Toronto Hydro distributes electricity to Canada's largest – and North America's second fastest growing – city.[5] The utility serves over 3 million residents, 28 million visitors annually, approximately 100,000 businesses,[6] more than 35 hospitals and post-secondary institutions,[7] and the financial centre of Canada. Toronto has a dense urban core with approximately 11.5 million trees,[8] and it takes approximately 15,000 circuit kilometres of overhead wires and 13,800 circuit kilometres of underground wires[9] to serve the city's 630 square kilometres.[10] That is enough cable to cross the entire country of Canada nearly six times.

Toronto Hydro takes seriously the duty of serving such a complex service territory. The utility proudly confronts the associated challenges and does so in the safe and reliable manner that customers expect. In order to keep pace with these challenges, Toronto Hydro has spent the last decade renewing its aging and deteriorating grid, hardening the system against increasingly frequent and severe extreme weather, renewing its aging workforce, and investing in key areas such as customer service, cyber security and city growth to meet evolving customer requirements and external pressures.

These investments have lived up to customer and stakeholder expectations for fewer and shorter outages, better customer service and faster problem resolution, more self-serve and information-on-demand tools, an industry-leading safety performance record, and sustained efficiency benefits of a utility mature in its productivity journey.[11]

2.2 Energy Transition and Electrification

While Toronto Hydro is proud of its recent achievements, there is a paradigm shift underway. For nearly two decades, Toronto Hydro's demand has been largely flat, as investments in conservation and energy efficiency helped offset significant growth in Toronto. However, market evolution and public policy are changing this trajectory, driving customers to adopt advanced electrified technologies – such as electric vehicles (EVs), solar panels, home energy storage, heat pumps and electric water boilers – which are increasing customer demand and expectations for outcomes. The utility must evolve and invest in grid-side and operational technologies to address new imperatives flowing from these fundamental shifts in public policy objectives related to climate change, technological advancement, and customer needs and priorities.[12]

In light of these cultural shifts, all levels of government have adopted greenhouse gas (GHG) emission targets and incentives for fuel switching to clean energy sources.[13] The City of Toronto has declared a climate emergency requiring immediate and sustained action. TransformTO – the City's ambitious plan to achieve net zero community-wide emissions by 2040 – recognizes that most emissions come from two sources: buildings (approximately 58% of community-wide emissions, mostly from natural gas used for space and water heating) and transportation (approximately 33% of community-wide emissions, mainly from car and passenger trucks),[14] and has adopted strategies including:

- the Net Zero Existing Building Strategy,[15] which targets decarbonizing existing homes and business, including establishing emissions targets; and
- the Electric Vehicle Strategy, which targets having 30 percent of all registered vehicles in Toronto be electric by 2030, necessitating increased access to EV charging infrastructure across the city (primarily installed by Toronto Parking Authority with support from Toronto Hydro). [16]

The City of Toronto intends to reduce these sources of emissions through by-laws, policy and standards encouraging customer uptake of electrified technologies, including:

- the Toronto Green Standard, which sets sustainable design and performance requirements for new developments, with the goal of all new buildings being near zero emissions after 2030;[17]
- the Home Energy Loan Program,[18] Energy Retrofit Loans,[19] and Green Will Initiative,[20] which provide financial incentives and support services; and

- proposed implementation of a mandatory emissions performance standard that would require all existing buildings to reduce their emissions over time.[21]

These critical climate change mitigation and adaptation efforts demand a bigger, more efficient and more resilient system that will serve customers for generations to come. The grid must be ready when people plug in to decarbonize their lives, and these decarbonization imperatives are driving a fundamental transformation of the energy ecosystem within which Toronto Hydro operates.

However, this transformation introduces a new tension in the utility's planning process. How and when decarbonization and electrification materializes has degrees of uncertainty; whether the pace of change is faster or slower and which technologies customers and policymakers choose exist on a continuum of possible paths.[22] To fulfill its core mandate, Toronto Hydro must ensure that the grid and its operations are capable of serving Torontonians when and where they require electricity. This, by definition, requires the utility to invest ahead of demand materializing – whether that be demand in terms of load or service quality requirements. Hard asset investments and human capital investments both require a long lead time. Just as it can take years to build a new transformer station or complete an overhead rebuild project, it takes years to train and develop new employees, especially with advanced digital skill sets and capabilities.

In order to reconcile the tension between long-lead-time investments and uncertainty, Toronto Hydro has oriented itself around the principle of "least regrets investments" in designing its 2025-2029 Investment Plan to identify investments that can be made in the 2025-2029 period with a high degree of confidence that they will provide value to ratepayers irrespective of what the future holds.[23] This principle is discussed in more detail in the Business Planning & Customer Engagement section below.

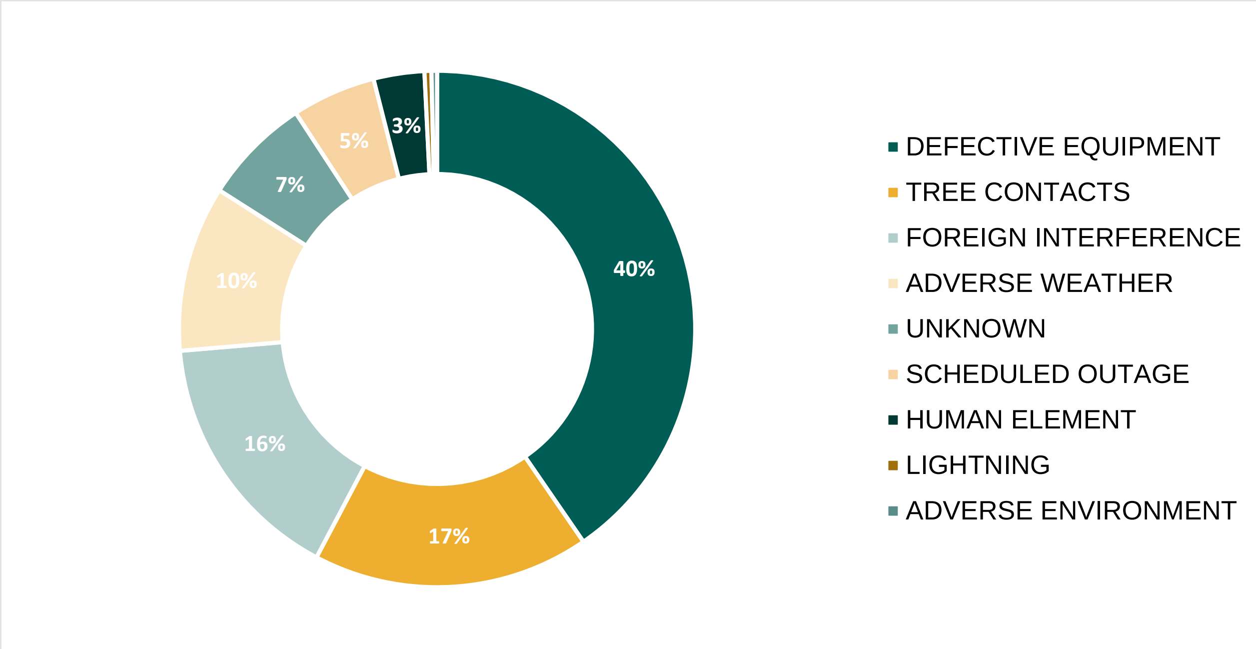
2.3 Material Challenges

At the same time that Toronto Hydro is responding to this paradigm-shifting change, the challenges of the past persist, and continued investments in the foundations of utility stewardship are still necessary to maintain the table stakes of a safe and reliable grid, supported by responsive customer service. Toronto Hydro faces a number of distinct challenges in upkeeping, expanding and modernizing its distribution system. Each of the challenges discussed below exacerbate the energy transition discussed above and are explained in further detail throughout the 39 capital and operations programs that form the 2025-2029 Investment Plan.

2.3.1 Deteriorating Infrastructure

Toronto Hydro owns and operates a mature distribution system. Despite notable achievements in renewing the grid and improving reliability over the last decade, defective equipment continues to be a leading contributor to the duration of outages on the grid, representing approximately 40% of annual power interruptions experienced by customers based on duration (excluding Loss of Supply and Major Events).[24]

Figure 1: SAIDI (Excluding Loss of Supply & Major Events) Breakdown by Outage Cause 2018-2022



Approximately a quarter of the utility's grid equipment continues to operate past useful life. An additional 11 percent is expected to reach that point by 2030, unless the utility invests in upkeeping system infrastructure in the 2025-2029 period. Allowing the number of assets past useful life to grow increases the likelihood of power outages due to equipment failure (which are costlier and take longer to resolve), puts public and employee safety at risk, and leads to negative environmental outcomes. To manage these risks, Toronto Hydro must regularly inspect equipment to maintain its condition, and replace equipment that is in bad condition or performing poorly, before a failure occurs.[25]

2.3.2 Complex Operating Conditions

Toronto Hydro operates in a complex urban environment based on the dense nature of the city's population, the age of the city's infrastructure, and the nature of its customer makeup. These each pose material challenges in the utility's day-to-day operations.

Toronto is an urban service territory with a population density of 4,428 people per kilometer.[26] Table 1 below compares Toronto's population density with the five largest cities in Ontario:

Table 1: Ontario Cities Population Density[27]

Ontario's 5 Largest Cities by Population	Population (People)	Land Mass (km^2)	Population Density (People/km)
Toronto	2,794,356	631.1	4,428
Ottawa	1,017,449	2788.2	365
Mississauga	717,961	292.74	2,453
Brampton	656,480	265.89	2,469
Hamilton	569,353	1118.31	509

Based on Census Subdivision data from 2021 Census

The density of Toronto Hydro's service territory is unique even within an international context due to the ever-increasing number of high-rise buildings. As seen in the table below, New York City is the only urban centre in the world with more high-rise buildings than Toronto:

Table 2: International Cities High-Rise Buildings[28]

Rank	City	Country	High-Rise Buildings
1	New York City	United States	6,223
2	**Toronto**	**Canada**	**2,598**
3	Seoul	South Korea	2,578
4	Dubai	United Arab Emirates	2,360
5	Hong Kong	China	1,916
6	Tokyo	Japan	1,533
7	Busan	South Korea	1,311
8	Kyiv	Ukraine	1,275
9	Chicago	United States	1,247
10	Shanghai	China	1,236

As a dense and old city by North American standards, Toronto also suffers from a challenging combination of legacy standards, limited availably of rights of way for locating distribution equipment, underground congestion which drives a need for increased co-ordination with other utility providers (e.g. water, transit, natural gas, telecommunications), complex permitting and approval processes, longer drive times due to traffic congestion, limitations on the size and scale of distribution assets, and disruptions related to large-scale local events. All of these considerations translate into significant planning and coordination requirements, adding both time and costs to system maintenance, renewal and enhancement investments.[29]

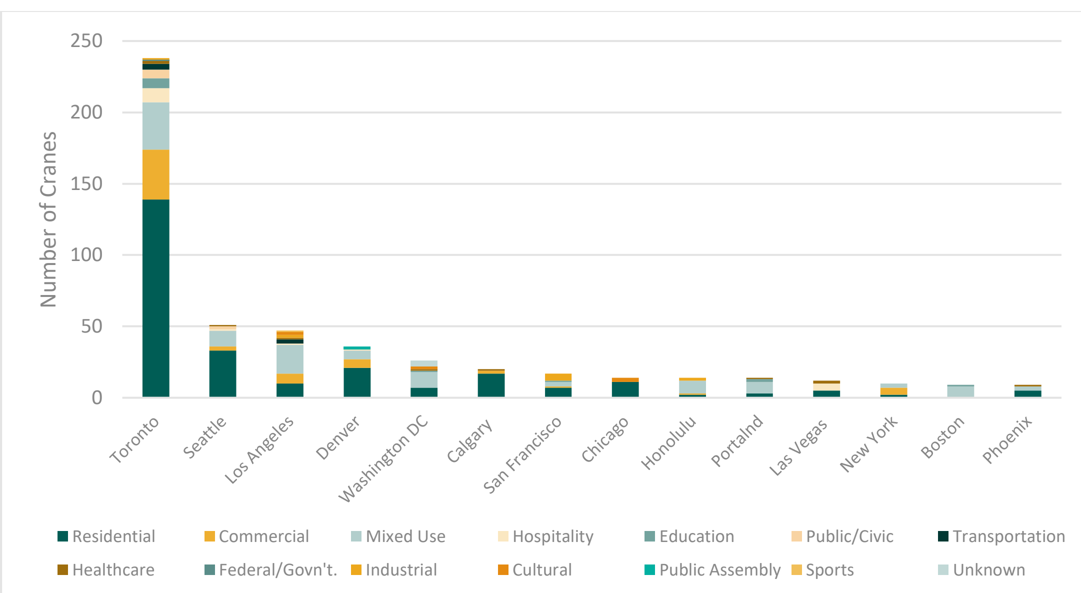
Beyond challenges created by service territory density and asset vintage, the unique customer make-up in Toronto's downtown core also places additional weight on Toronto Hydro's responsibility as a system operator. This customer composition – which includes major hospitals, the provincial legislature, and headquarters of banks, businesses and other critical financial institutions – necessitates elevated requirements for reliability and continuity of service to customers whose operations are critical to the sound functioning of the provincial and federal economy. As a result, Toronto Hydro's downtown system is designed and operated with a high-level redundancy, which in turn requires that additional prudent costs be incurred.[30]

2.3.3 A Growing City

The population of Toronto is also booming and expected to grow by approximately 23.8 percent between 2021 and 2031, a marked increase from the 6.8 percent growth over the prior decade (from 2011 to 2021).[31] The growth is concentrated in certain pockets, namely the downtown core and along transit corridors, and is oriented vertically with a continuing trend of high-rise developments. This has resulted in a marked need for new housing, transit solutions and infrastructure, all of which must be serviced by Toronto Hydro in the years to come.[32]

A salient data point that bears out this staggering growth is that Toronto has led the North American crane count since 2015 by a margin that is almost equivalent to the rest of the cities combined.[33]

Figure 1: RLB Crane Index - Q1 2023



In addition to high-rise buildings, this growth is also driving the development of sustainable new housing communities through the redevelopment of areas such as Downsview, the Golden Mile and the Port Lands, some of which are planned as net zero communities and to meet the highest performance measures of the Toronto Green Standard.[34]

The significant expansion of transit networks is also needed to support this population growth, and there are numerous new projects under construction in the city, including the Yonge North Subway Extension, Finch West LRT, Scarborough Subway Extension, Eglinton Crosstown West Extension, and the Ontario Line.[35]

Finally, this growth is also putting additional stress on the system through the incremental loads associated with technology and digitalization. In addition to organic growth, Toronto has become Canada's largest data center market, with 107 MVA of incremental demand load connected during the 2020-2024 period and 207 MVA forecasted to come online from 2025-2029.[36]

2.3.4 Extreme Weather

Extreme weather amplifies the challenge of distributing electricity to a mature, dense and rapidly growing urban city. Heat, high winds, heavy rainfall, freezing rain and heavy snowfall can cause major system damage and result in prolonged power outages. As evidenced by recent events (outlined in Table 3 below), extreme weather has become a regular operating condition that the utility must consider and manage in its day-to-day operations and long-term planning activities. With the frequency and intensity of adverse weather increasing due to climate change, Toronto Hydro's grid and operations must become more resilient to this challenge.

Table 3: Extreme Weather (January 2020 through May 2022)

Event	Description of Impact
High Winds Storm (May 2022)	• 142,052 customers impacted at its peak • 5 days to restore power to all customers
Flash Storm (August 2021)	• 20,000 customers impacted at peak • 2 days to restore power to impacted customers
Thunderstorm High Volume Event (July 2021)	• A line of thunderstorms with windspeeds in excess of 75 km/h • 12,000 customers were impacted at its peak • Service restored for the majority of customers within 2 days

Event	Description of Impact
High Wind Event (April 2021)	• Wind expected to reach ~95km/h • 22,000 customers impacted at its peak • 1 day to restore power to impacted customers
High Wind Event (November 2020)	• Winds in excess of 100 km/h • Estimated 8,000 customers impacted and 101 outages at its peak
Flash Storm (July 2020)	• Approximately 50-70mm of rain • 50,000 customers impacted at peak • Impacted customers restored within 2 days
Adverse Weather (January 2020)	• Approximately 60mm of rain, 5-15mm of ice and 90 km/h winds • 4,900 customers impacted at its peak • Impacted customers restored within 3 days

Adverse weather affects the distribution system in different ways. The underground system is vulnerable to flooding from extreme rainfall, while the overhead system is susceptible to extreme winds, freezing rain and wet snow, resulting in damage and outages. Broken trees and the weight of ice and snow accretions can bring lines, poles and associated equipment to the ground. For instance, in May 2022, an extreme wind event known as a derecho storm struck Southern Ontario and Quebec with 120+km/h winds. These extreme winds caused substantial damage to vegetation, which in turn took down overhead distribution wires and equipment, leaving approximately 142,000 customers (18% of Toronto Hydro's total customer base) without power at the peak of the storm. While the majority of customers were restored within 48 hours, it took approximately five days and cost approximately $2.35 million to restore power to all customers.[37]

2.3.1 Technology Advancements

Technology and innovation are also driving the need for a more dynamic system that is transitioning away from usual patterns of supply and demand towards more complex interactions and inputs in electricity generated and consumed. The role of the utility continues to evolve to support the a smart grid ecosystem, comprising renewable and other distributed energy resources (DER) such as electric vehicles, solar panels and battery energy storage systems.

Customers are showing a continued interest in participating in the electricity system as both consumers and producers of power. DER connections have grown in recent years as a result of government policies and declining costs of technologies such as solar panels. By the end of the decade, Toronto Hydro expects to have over 4,400 DER connection projects representing a total installed capacity of approximately 517 MW, an increase of approximately 67 percent compared to 2022.[38]

Integrating DERs into the grid provides customers more tools to actively manage their energy needs and enables the grid to be supplied by locally-generated renewable electricity resources. To advance these outcomes, Toronto Hydro must address the significant challenge of accommodating electrons that flow bi-directionally within a grid that was not built for this type of supply and demand. Equipment that has a high number of DER connections is more likely to experience unstable conditions that pose significant reliability and safety risks to the system and its users. Toronto Hydro monitors all DER connections closely for these factors to ensure that the grid remains safe and reliable for customers, and is building advanced grid capabilities to mitigate against these risks and enable DER adoption by customers in the future.[39]

Technological advancement also poses the challenge of managing a heightened risk of digital security threats, as cybercrime intensifies across Canada due to changing geopolitical dynamics. While smart grid systems, infrastructure automation, and other technological advancements being used by the utility and its customers offer many benefits, they also increase the exposure of the grid (and those connected to it) to greater risk of attack by hostile actors. This intensifying global challenge is particularly acute in major economic centers such as Toronto. Electric utilities are targets for security attacks because of the critical role they play in enabling essential services (e.g. hospitals, public transit, water treatment systems, communications and traffic management) and the databases of sensitive information they possess.[40]

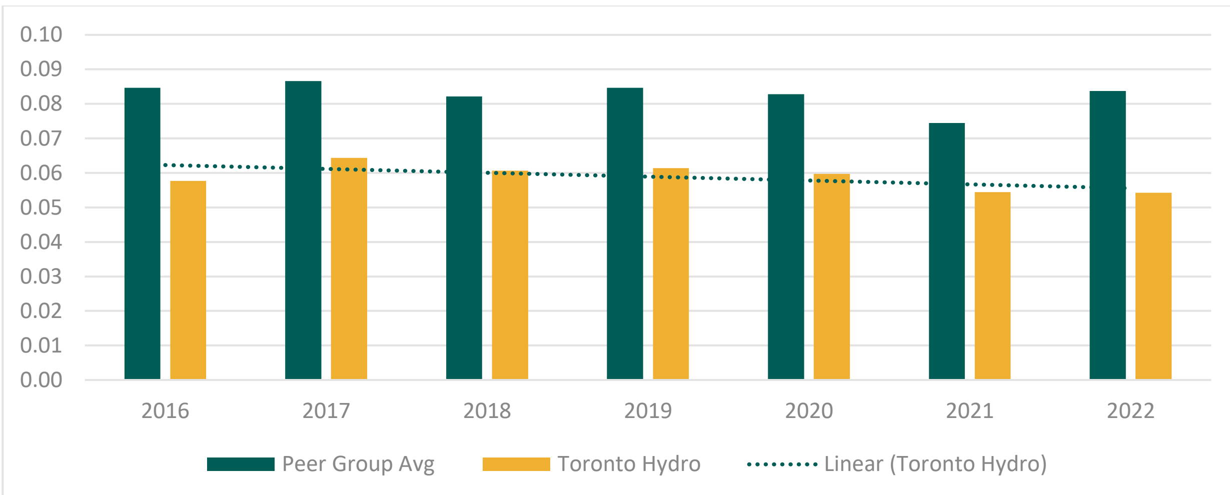
Toronto Hydro needs to prepare itself to assist customers in taking advantage of technological innovation and advancements while also protecting itself and its customers from the risks they introduce.

2.3.2 Workforce Challenges

Toronto Hydro relies on its highly-skilled and dedicated workforce to deliver safe, reliable and efficient electricity services to its customers. This workforce consists of approximately 70 distinct roles including: dispatchers that run a 24/7 year-round control center to enable power to be restored as quickly as possible during unplanned events;[41] skilled trades that inspect, maintain and replace assets to remediate critical deficiencies; engineers and other technical experts that diligently plan, design, manage and optimize the grid's performance; information technology experts that keep critical systems reliable for operations and secure against intensifying cyber threats;[42] and customer service and other professionals with expertise in areas such finance, human resources, law and regulation that deliver positive customer experience and ensure the company operates in a compliant, safe and environmentally responsible manner.[43]

Since 2015, Toronto Hydro has served the needs of a growing city, evolving customer and policy demands, and an aging system while addressing intensifying challenges identified above, with a staffing complement that is essentially flat from 2015 to 2024. Over this period, as Toronto Hydro's replenished a large wave of retirements, it also right-sized its workforce through continuous improvements in productivity, including harmonizing key jobs to create a more agile compliment of staff, and automating manual processes to increase employee output levels.[44] As shown below, compared to its Ontario peers, Toronto Hydro's workforce reflects the utility's past efforts to increase resource throughput and utilization.[45]

Figure 6: FTE per GWh of Load Served



As the utility takes least-regrets actions to expand and modernize the grid to be ready and equipped for a once-in-a century transformation of the energy system, it similarly needs to invest in resources with new and enhanced skill sets to get the work done safely and cost-effectively. Just as it takes years to build new transformer stations or convert an area of the city served by legacy infrastructure to modern standards, human capital investments require long lead times, with the average employee undergoing multiple years of training and development to acquire the specialized skills and experience necessary to become a fully competent contributor. Due to the long lead time required for investment in both grid and human capital, Toronto Hydro must begin work today to be prepared to handle increased demand and consumption, bi-directional power flows, increased societal reliance on electricity, and enhanced customer expectations that naturally flow from these evolutions.

After nearly a decade of managing with a headcount plan that is essentially flat from 2015 to 2024, it is no longer possible for Toronto Hydro to meet its obligations without additional resources. Workforce levels need to grow by approximately 25 percent over the coming years for the utility to have the required resourcing capacity and capabilities to sustain foundations of a safe and reliable grid and meet the imperatives of an urban city and customers who are increasingly relying on electricity to expand, digitize and decarbonize their footprint.[46]

As a result of past achievements in right-sizing its workforce and establishing dynamic partnerships with colleges and universities for direct recruiting and collaborative curriculum building, Toronto Hydro is ready to bring on the additional talent needed to meet the challenges of the next decade and prepare the grid and its operations to serve Toronto's growth and net zero objectives.

3. BUSINESS PLANNING & CUSTOMER ENGAGEMENT

While the preceding discussion sets the operating context for the current challenges facing Toronto Hydro, the utility recognizes that customers and stakeholders expect it to prepare a responsible multi-year plan that balances the need to confront those challenges with price and service quality outcomes. Accordingly, Toronto Hydro has a robust customer engagement program and planning process that ensures customer feedback is incorporated into its investment priorities, plans and projects.

Customer engagement is deeply embedded in the utility's planning process, ensuring that customer feedback informs Toronto Hydro's multi-year investment priorities and draws alignment with needs and expectations. The utility starts with an assessment of customer needs and preferences. Toronto Hydro then develops an initial capital plan that targets certain short and long-term performance goals for the system. From this point, an iterative planning process, including additional customer engagement, refines pacing and other assumptions until the right balance between price and service quality outcomes is met.[47]

The following sections discuss the stages of that engagement and planning process in further detail.

3.1 Assessing Customer Needs and Priorities

Toronto Hydro began the planning process by engaging its customers with a survey to understand their needs and preferences for the 2025-2029 period. The feedback from customers centered around the following core themes:

- **Price and Reliability** – Price and reliability continue to be top customer priorities, with reliability having become more important to residential customers over the last five years. Customers prioritize reducing the length of outages, with a particular focus on outages related to adverse weather. Key Account customers are more sensitive to power interruptions and prioritize reducing the total number of outages, including momentary interruptions.
- **New Technology** – Almost equally to price and reliability, customers expect the utility to invest in new technology that will reduce costs and make the system better in the future, as long as the costs and benefits are clear.
- **System Capacity** – Finally, customers expect Toronto Hydro to invest proactively in system capacity to ensure that high growth areas do not experience a decrease in service levels. It is

worthy of note that the majority of Key Account customers surveyed have goals to reduce their net GHG emissions to zero, and expect Toronto Hydro to support them in meeting their climate objectives by ensuring that the system has capacity for growth and by providing them advisory services to support their decarbonization-through-electrification journey.[48]

These core themes then formed the basis of the planning work to come.

3.2 Integrated Planning

Toronto Hydro began integrating planning by adopting four strategic priorities for the plan, informed by customer feedback: (a) sustainment and stewardship (maintain the foundations of a safe and reliable grid); (b) modernization (adopt new technology to improve system performance and reduce costs); (c) growth and electrification (connect and serve growing demand for electricity); and (d) general plant (decarbonize and keep the business running efficiently). For each of these strategic priorities, Toronto Hydro set performance objectives aligned with customer feedback that provide value for customers and are meaningful to its operations, including to:

- invest enough in the sustainment of asset health and other leading indicators of asset risk to maintain reliability performance;
- prioritize investments in technology to modernize the grid and develop advanced operational capabilities to make the system better for the future; and
- invest proactively in system capacity to ensure that the grid is able to support future growth without compromising other outcomes like safety and reliability.

Through an iterative process that spanned over a year, Toronto Hydro system planners and experts worked diligently to identify the minimum investments necessary to meet these objectives and balance near-and long-term service quality performance with price impacts for customers.[49] Achieving this important balance entailed both top-down direction with respect to price constraints and budget limits, and bottom-up analysis of system requirements and performance levels.

In this process, Toronto Hydro employed the principle of least regrets investment. Through the use of a new tool – the Future Energy Scenarios model – the utility modelled the grid impacts of a range of possible future peak demand scenarios based on the interaction between different policy, technology and consumer behaviour assumptions. Looking at these scenarios, Toronto Hydro was able to test whether the plan: (a) maintains reasonable rates without jeopardizing longer-term system performance outcomes; (b) provides value to customers regardless of what particular technologies are adopted to decarbonize key sectors of the economy; and (c) is able to accommodate a range of possible energy transition scenarios in the next decade so that the local grid can facilitate any path that customers or policymakers choose.[50]

Toronto Hydro also retained external experts to conduct assessments of its current performance, including performing studies on how Toronto Hydro compares to other peers on total cost productivity, reliability performance, compensation and benefits, unit costs, and information technology cost and maturity. The results, which are filed with this application, show that Toronto Hydro's cost performance is comparable to, and in many cases fares better than, its peers when key considerations, such as the density and congestion of its urban operating environment, are considered.[51]

3.3 Plan Validation and Finalization

In the spring of 2023, Toronto Hydro went back to customers for feedback on its draft plan to ensure that the utility met the right balance between price and progress towards outcomes that customers value. Through the use of a comprehensive online survey, more than 33,000 customers (representing roughly 4.3 percent of the total customer base) reviewed the draft plan and provided valuable input. Toronto Hydro was pleased to see such a high level of engagement by its customers. Nearly three times more people completed the workbook compared to the similar study conducted in the lead up to the last major rate application.

To help customers understand the investment priorities and express their preferences, Toronto Hydro broke down the draft plan into seven choices:

- **Modernization** – investments to build a smarter, more efficient and resilient grid for the future.
- **Growth** – investments to increase the grid's capacity to serve customers' growing electricity needs.
- **Sustainment: Reliability** – investments to manage reliability risk due to equipment failure.
- **Sustainment: Stewardship** – investments in the paced upkeep of equipment at or near end of life.
- **Sustainment: Standardization** – investments to standardize outdated equipment.
- **General Plant** – investments in fleet, facilities and IT infrastructure to run the business efficiently
- **Decarbonization** – investments to reduce GHG emissions from Toronto Hydro's operations by electrifying fleet and facilities assets.

For each investment choice, customers were provided with the option of spending more or less for faster or slower progress towards key outcomes such as reliability, system health, customer service, efficiency and environment. This approach made it more accessible for customers to understand the key priorities of the plan and express trade-offs between price and other key outcomes. The feedback provided Toronto Hydro valuable insights into customer preferences, which was applied to refine and finalize the 2025-2029 Investment Plan.[52]

Table 2 below presents the rate impacts of the finalized 2025-2029 Investment Plan. For a typical residential customer, the proposal results in an average monthly distribution rate increase of $3.44 per month, per year, starting in 2025 through 2029. These rate impacts were considered by customers of all rate classes through the online survey, 84 percent of which on average supported the draft plan and its associated rate impacts.

Further, 18 percent of these customers supported a plan that does even more to advance key outcomes. These results validate that Toronto Hydro's 2025-2029 Investment Plan strikes the right balance between price and progress towards outcomes that customers value.[53]

Table 4: Summary of 2025-2029 Proposed Distribution Rate Change[54]

	2025	2026	2027	2028	2029	Monthly Average
Residential	$3.24	$3.40	$3.72	$3.97	$2.86	$3.44
Competitive Sector Multi-Unit Residential	-$1.27	$1.84	$2.18	$2.27	$1.64	$1.33
General Service <50 kW	$14.18	$9.24	$9.61	$10.67	$7.29	$10.20
General Service 50-999 kW	$235.35	$166.42	$175.01	$192.67	$150.45	$183.98
General Service 1,000-4,999 kW	$1,993.46	$1,466.61	$1,516.65	$1,599.65	$1,381.30	$1,591.53
	2025	**2026**	**2027**	**2028**	**2029**	**Monthly Average**
Large Use	$10,124.44	$5,874.70	$8,564.26	$9,530.78	$7,560.71	$8,330.98
Street Lighting	$15,917.30	$12,277.10	$20,691.10	$12,135.60	$15,226.00	$15,249.42
Unmetered Scattered Load	$2.96	$2.41	$2.49	$3.11	$2.01	$2.60

4. CAPITAL INVESTMENT PRIORITIES

Toronto Hydro considered the material challenges outlined above, the feedback received from customers, and the principle of least regrets investment to establish the following four strategic investment priorities for its capital plan:

- **Sustainment and Stewardship:** Risk-based investments in the renewal of aging, deteriorating and obsolete distribution equipment to maintain the foundations of a safe and reliable gird.
- **Modernization:** Developing advanced technological and operational capabilities that enhance value and make the system better and more efficient over time.
- **Growth & City Electrification:** Necessary investments to connect customers (including Distributed Energy Resources ("DERs") and build the capacity to serve a growing and electrified local economy.
- **General Plant:** Investments in vehicles, work centers and information technology (IT) infrastructure to keep the business running and reduce Toronto Hydro's greenhouse gas emissions.

These investment priorities are driven by critical needs that, if not adequately addressed, could impair Toronto Hydro's ability to deliver the outcomes that customers value. In some cases, these risks will materialize in the near term, such as lack of capacity to support urban intensification and economic development. However, in many cases, the risks will materialize in the medium to long term as the grid becomes more heavily utilized and more susceptible to longer and more frequent outages that are complex and costly to resolve. Toronto Hydro must invest in following priorities to manage these risks.[55]

4.1 Sustainment & Stewardship

Sustainment investments to renew aging and deteriorating infrastructure and standardize outdated equipment continue to be the largest part of the 2025-2029 Investment Plan. These investments must be made to maintain system performance, mitigate reliability, safety and environmental risks, and enhance the grid's capability to serve electrified technologies such as electric vehicles, solar panels, energy storage batteries, and electric heat pumps and boilers.

Past investments in the grid and operations have resulted in improvements in reliability, safety and environmental outcomes: the average duration of outages customers experience now compared to a decade ago was reduced by 26 percent over the last decade; the injury rate for employees has decreased by 60 percent; oil spills have been avoided; and the utility is on track to eliminate at-risk PCB transformers from its system by 2025. [56] [57] Investing in the performance and long-term stewardship of an aging, deteriorated and more highly-utilized system remains an urgent priority for the utility, alongside getting the grid ready to serve Toronto's growing electricity needs.

System health is a leading indicator of a safe and reliable grid. Allowing system health metrics – age and condition – to deteriorate would lead to the gradual but steady degradation of system performance. As an example, underground cables are the largest contributor to defective equipment outages and continue to present significant demographic challenges in the coming years, with approximately 73 percent of direct buried cables in the horseshoe area expected to be past their serviceable life by the end 2022.[58] Proactive investment in the replacement of these assets is a key part of sustaining the short and long-term performance of the grid.

Recognizing that customers are generally satisfied with current levels of reliability, and expect the utility to invest in new technology for the future,[59] Toronto Hydro right-sized the sustainment objectives of the Investment Plan to maintain (rather than improve) the overall health of the grid over the 2025-2029 period.[60] Maintaining system health metrics is necessary to sustain grid performance and prevent the accumulation of a backlog of equipment at risk of failure, or otherwise needing to be upgraded. Renewal investment backlogs are problematic not only because they greatly heighten system reliability risk; they also result in rate instability for customers, as well as high-inefficiencies in work execution. Such inefficiencies stem in part from performing more work reactively – which is typically higher cost – and in part because planned work becomes more expensive due to surges in material and labour needs that could otherwise be smoothed out through paced proactive investment. [61]

Keeping pace on renewal is also important for hardening the grid against more frequent extreme weather events, and standardizing outdated equipment that poses barriers to electrification. For example, legacy 4 kilovolt stations and feeder equipment, restricts the connection of large electrified loads and distributed energy resources. To prepare the grid for electrification these assets must be gradually converted to new standards, and that work is being done in a paced way through sustainment investments that also deliver safety, reliability and environmental outcomes.[62]

The table below provides a summary of Toronto Hydro's sustainment capital programs:

Table 5: Sustainment Capital Programs

Capital Program/Segment	Investment ($M)
Area Conversions[63]	**$237**
Underground Renewal – Horseshoe[64]	**$476**
Underground Renewal – Downtown[65]	**$165**
Network System Renewal[66]	**$123**
Overhead Renewal[67]	**$273**
Stations Renewal[68]	**$218**
Reactive and Corrective Capital[69]	**$328**
Sustainment Capital	**$1,820**

4.2 Growth and City Electrification

The obligation to serve customers who want to connect to the grid is at the heart of Toronto Hydro's mandate as an electricity distributor. What accompanies that core obligation is the responsibility to make reasonable investments to prepare for future growth. This responsibility is more important than ever, as customers, communities and governments at all levels are actively embarking on an unprecedented transformation of the energy system to mitigate the worst impacts of climate change.

It is clear from studies that have been done locally, provincially and internationally that decarbonization-through-electrification imperatives are expected to drive demand for electricity in the next two decades. Experts indicate that demand could increase up to 2 to 3 times depending on the range of technologies and policy tools that are adopted.[70]

The particular drivers of demand are subject to dynamic forces of technological advancement, public policy imperatives and consumer behaviour. As an example, the decarbonization of existing housing and industrial buildings remains a policy puzzle, and a number of options are being considered to find suitable paths.[71] To manage this uncertainty and the cost-consequences for customers, the utility must be measured-but-proactive in its investment plan (as both asset and human capital investments are long lead-time), and must be deliberate in sustaining and modernizing its grid and operations to ensure that it is ready to serve and enable customer choice in all scenarios.

As outlined above, Toronto Hydro has embraced this uncertainty by prioritizing investments that can provide value under all scenarios under the "least regrets" approach. This enables the utility to meet emerging challenges without having to wait for all unknown variables to stabilize. Based on its least regrets investment philosophy, the 2025-2029 Investment Plan accommodates an increase of 23 percent in system peak demand, which includes electrification of transportation (EVs) across residential, industrial and commercial sectors, as well as major transit projects like the Ontario Line and Scarborough Subway Extension, and redevelopment plans for the Downsview, The Port Lands and Green Mile communities.[72]

The 2025-2029 Investment Plan anticipates a material increase to the customer connection portfolio (consistent with the trend observed in recent years) and expands stations capacity to alleviate future load constraints due to growth resulting from EV uptake, digitalization of the economy (e.g. data centers and digital transformations of existing sectors), and city growth and redevelopment (e.g. urban densification and transit expansion). The 2025-2029 Investment Plan also optimizes near-term system capacity through active management measures such as load transfers and balancing, equipment upgrades, and the targeted use of non-wires solutions – both demand-side measures that leverage customer DERs as well as grid-side technologies such as renewable enabling energy storage systems.[73]

By the end of this decade, DER capacity is expected to increase by approximately 67 percent.[74] Getting these resources safely connected to the grid is necessary to enable greater choice and support customers in achieving their electrification objectives (e.g. ESG, net zero, environmental conscientiousness, home/business resiliency). Moreover, integrating these resources into the system is critical to right-sizing system expansion investments, and developing a grid that is more resilient in the future as a result of greater levels of local power supply. To accommodate increasing volumes of connections in this area, the 2025-2029 Investment Plan ensures control and monitoring capabilities for all distributed generation and addresses constraints on restricted feeders through traditional investments such as station bus-ties and alternative technologies such as energy storage.[75]

While there is certainty that fundamental change is ahead, there are still degrees of uncertainty about how that change will unfold. For example, government incentives or market evolution could further accelerate customer adoption of electric vehicles or other fuel switching technologies. Similarly, provincial procurement programs could create expanded role for DERs in the deployment of coordinated infrastructure solutions to meet Ontario's energy needs.[76] As a result of such external factors, the pacing and level of certain demand-driven expenditures and revenues can change and materially deviate from the forecast. To that end, Toronto Hydro proposes a flexibility mechanism (known as a variance account) to reconcile differences between forecasted and actual demand-driven costs and revenues. During a time of unprecedented change and transformation in the economy and energy system, it is key to protect both ratepayers and the utility from structural unknowns that could have a material impact on the plan.[77]

The table below outlines the programs that enable growth and city electrification:

Table 6: City Growth and Electrification Capital Programs

Capital Program	Investment ($M)
Customer Connections[78]	$476
Externally Initiated Plant Relocations & Expansions[79]	$76
Load Demand[80]	$236
Generation Protection, Monitoring, and Control[81]	$35
Non-Wires Solutions[82]	$23
Stations Expansion[83]	$173
Growth Capital	**$1,020**

4.3 Grid Modernization

Toronto Hydro's grid modernization strategy focuses on accelerating the deployment pace of digital field and operational technologies that can deliver future benefits to customers. These benefits include better outage restoration capabilities to improve grid resilience, and enhanced operational flexibility to manage a more heavily utilized system with increasing bi-directional power flows. Grid modernization investments, once fully implemented and integrated in the next decade, are expected to yield a material step-change improvement in reliability and operational efficiency, to help offset the added reliability and cost pressures associated with electrification.[84]

The modernization plan lays the groundwork for grid automation (commonly known as the self-healing grid) in the horseshoe area of the system starting in 2030 to provide the enhanced levels of reliability and resilience that customers will expect as they electrify their homes and business at a lower cost compared to traditional alternatives. To improve resiliency against major disruptions (e.g. extreme weather; loss of supply) for vulnerable parts of the system, the modernization plan also includes investment in: (a) the targeted undergrounding of equipment to harden vulnerable areas of the overhead system against more frequent and extreme weather events, and (b) enhanced configuration options for the downtown network which serves critical loads such as major hospitals and financial institutions.

Toronto Hydro's journey towards an intelligent self-healing grid is being implemented through an Advanced Distribution Management System (ADMS), a multi-faceted software platform with advanced capabilities and connected applications that integrate analytics, real-time data and control algorithms to optimize distribution network operation. The system provides a holistic view of the grid and encompasses advanced applications such as Outage Management System (OMS), Fault Location Isolation and Service Restoration (FLISR), Volt/Var Optimization, which allow swift detection and response to outages and grid disturbances, and enable reliable and efficient management of DERs by optimizing voltage levels and reactive power flows throughout the distribution system. [85]

Through operational technology such as sensors, switches and software, Toronto Hydro can better monitor, predict and control the flow of electricity across the system. These capabilities enable the utility to reduce the number and length of outages customers experience, and also pave the way for a more interactive, bi-directional grid that enables customers to choose various technologies to produce, store and sell power back to the grid.[86] In addition, Toronto Hydro plans to invest in overhead and underground line sensors and other condition monitoring and control equipment that provide the utility real-time information about critical assets in the field, and enable more cost-effective system planning and operational decisions.[87]

Modernization investments also create a foundation for the kinds of advanced, real-time and predictive analysis that would be fundamental to Toronto Hydro's evolution toward Distribution System Operator (DSO) model, if and when such a model is either imposed or offered to distributors in an effort to further enable energy transition outcomes. In such a model, Toronto Hydro would be expected to safely and reliably coordinate, dispatch, and optimize thousands of behind-the-meter generators and flexible loads in order to help maximize the value created by the local energy system for customer, including maximizing the penetration and utilization of non-emitting energy sources. While the policy environment surrounding the role of DERs in the energy transition remains unsettled, the grid modernization capabilities advanced by the 2025-2029 Investment Plan create the foundation for this possible future while also delivering many other tangible benefits to customers irrespective of the DSO policy framework.[88]

The table below outlines Toronto Hydro's modernization capital programs:

Table 7: Modernization Capital Programs

Capital Program/Segment	Investment ($M)
System Enhancement[89]	$151
Network Condition Monitoring and Control[90]	$6
Metering[91]	$248
Overhead Resiliency[92]	$86
Stations Control and Monitoring[93]	$65
IT Cyber Security & Software Enhancements[94]	$95
Modernization Capital	**$651**

In addition, to the modernization capital investments summarized above, Toronto Hydro proposed to establish a $16 million 2025-2029 Innovation Fund to support the design and execution of pilot projects focused testing of innovative technologies, advanced capabilities, and alternative strategies that enable electrification grid readiness and facilitate DER integration. The Innovation Fund supports utility investment in innovation work that is more early stage, exploratory and developmental in nature, where the outcomes are less certain, but the potential benefits for the system and customers could be significant. While the benefits of individual projects may not be immediate or certain, and some initiatives may prove to be more or less fruitful than others, this type of work is nevertheless critical to achieving real innovation during a time of transformation in the energy sector. [95]

4.4 General Plant

Toronto Hydro needs to maintain facilities, fleet and information technology (IT) assets and infrastructure to enable efficient business operations. To get maximum value out of its work centers, stations buildings, physical security systems, and fleet, the utility monitors and manages asset age and condition with a view to optimizing total lifecycle costs.

In addition to four work centers that provide the necessary conditions for employees to work effectively, Toronto Hydro manages a broad portfolio of approximately 185 stations which house and protect critical equipment such as cables and transformers. Like electrical equipment, facilities assets that are in poor condition pose an increased risk of failure putting key outcomes such as safety, reliability, customer service and productivity at risk. For example, if a station building has a leaking roof or foundation that allows water to infiltrate, there could be permanent damage to distribution equipment leading to lengthy and costly power interruptions and posing hazards to workers and the public.[96]

Investments in the renewal and maintenance of facilities assets enable the utility to deliver its services in a safe, reliable, and sustainable manner. In addition to these table stakes, Toronto Hydro must also address emerging needs to provide greater resilience against physical threats such as vandalism and natural threats such as extreme weather. The utility plans to address these needs through targeted investments in renewing stations buildings and work centres (e.g. exterior cladding, windows, and roofs where critical equipment is housed), and physical security systems (e.g. network-based cameras and access card readers).

Toronto Hydro crews also need safe and reliable vehicles to execute a wide-range of system capital and operations and maintenance work programs. Toronto Hydro's fleet investments include heavy duty and light duty vehicles and equipment (e.g. forklifts and trailers). These vehicles transport employees and materials to and from job sites, perform distribution work onsite, and serve as working space for field employees. Fleet vehicles must be available to support these operations in a safe and efficient manner. Toronto Hydro's fleet investments aim to optimize vehicle operating costs, minimize fleet downtime due to repairs, increase vehicle efficiency and safety, and importantly reduce emissions.[97]

Toronto Hydro is committed to reducing its direct GHG emissions (referred to as Scope 1 emissions) in order to mitigate the impacts of climate change and reach "net zero" by 2040. The utility intends to reduce the emissions produced by its fleet by gradually increasing the complement of electric and hybrid vehicles. Similarly, Toronto Hydro has a paced plan to reduce its buildings emissions by decreasing its natural gas consumption using a combination of energy efficiency measures and fuel switching projects to replace natural gas fueled heaters with electric heating systems.[98]

Finally, General Plant includes investments in information and operational technology (IT/OT) assets that support a number of business applications and systems which are essential to conducting day-to-day operations such as managing field crews, responding to outages and enabling customer self-serve tools. When these systems are not available, customers service levels decrease, power outages and operational disruptions take longer to fix, and safety of the public and employees is put at risk. Toronto Hydro must invest in upkeeping its IT/OT assets to ensure they remain highly reliable and available for conducting critical operations.[99]

The table below outlines Toronto Hydro's general plant capital programs:

Table 8: General Plant Capital Programs

Capital Program/Segment	Investment ($M)
Enterprise Data Centre[100]	$72
Facilities Management and Security[101]	$145

Capital Program/Segment	Investment ($M)
Fleet and Equipment Services[102]	$44
Information and Operational Technology[103]	$206
General Plant Capital	**$467**

5. OPERATING INVESTMENT PRIORITIES

The capital investment priorities outlined above are enabled by a suite of operational programs that work together with the capital programs to achieve the key objectives of the 2025-2029 Investment Plan and deliver the outcomes that customers value. This part of the plan is comprised of 19 operational programs summarized in Table 9 below that, among many other things, support the execution of an expanded capital program, address a wide-range of legal and regulatory requirements, enable the delivery of timely and satisfactory customer services, and maintain the grid in good working order.

These programs are executed by high-skilled and knowledgeable Toronto Hydro employees and effective third-party resources. As mentioned previously, after nearly a decade of managing operations with a headcount plan that is essentially flat from 2015 to 2024, the utility needs to expand its workforce capacity by approximately 25 percent to sustain foundations of a safe and reliable grid and meet the imperatives of an urban city and customers who are increasingly relying on electricity to expand, digitize and decarbonize their footprint.[104]

The execution of increased volumes of work is a key driver of the workforce requirements across a number of functions and roles within the utility's operations, as summarized below and further detailed in the underlying evidence. The challenge of increasing volumes of work is further compounded by more complex workloads. Priorities such as grid modernization, increased receipt and use of data, pursuit of non-wires solutions to defer or displace the need for traditional infrastructure, intensifying cybersecurity threats, and increased connection and management of DERs all add to the complexity of work completed by Toronto Hydro's devoted staff.

Higher volumes and more complex connection projects necessitate incremental resources in the system planning and work execution functions, as well as back-end support functions such as finance and legal to ensure that project costs are properly accounted, review connection agreements, maintain compliance with regulatory requirements, and resolve customer inquiries in a timely manner.

As traditional energy consumer models evolve to a paradigm where customers are plugging in electrified technologies and are more actively participating in energy management through the use of DERs, Toronto

Hydro's customer-interfacing operations must also follow suit to address emerging needs and requirements, such as: connecting electric vehicles, heat pumps and DERs of varying size and scale; accessing energy data and analytics; and new channels of digital customer information, communication and interaction.[105]

In addition to attracting and retaining the minimum resources necessary to carry out the work and deliver customer outcomes in next rate period and beyond, the OM&A plan addresses other key operational requirements, including:

- integrating cloud computing and non-wires solutions into operations;
- protecting customers' data and the grid against intensifying cybersecurity threats driven by rapid technology advancements and changing geopolitical dynamics;
- complying with new or expanded legal and regulatory requirements, including customer service, safety and environmental obligations;
- maintaining safe, reliable and effective operations across a multitude of key utility functions, including Emergency Response, Supply Chain, Fleet, Facilities and Information Technology ("IT");
- addressing a variety of externally-driven costs, including insurance premiums, bad debt expenses and regulatory costs; and
- keeping up with asset maintenance requirements to ensure the grid remains safe and reliable for customers.

The table below provides a summary of Toronto Hydro's OM&A programs.

Table 9: OM&A Programs

OM&A Programs	Costs ($M)
Preventative and Predictive Overhead Line Maintenance	46.8
Preventative and Predictive Underground Line Maintenance	34.6
Preventative and Predictive Station Maintenance	40.7
Corrective Maintenance	156.8
Emergency Response	136.0
Disaster Preparedness Management Program	10.1
Control Centre Operations	47.3
Customer Operations	68.2
Asset and Program Management	83.2
Work Program Execution	88.6
Fleet and Equipment Services	49.0
Supply Chain Services	122.5

OM&A Programs	Costs ($M)
Facilities Management	145.1
Customer Care	263.2
Human Resources, Environment and Safety	121.6
Finance	138.7
Information Technology	344.6
Public, Legal and Regulatory Affairs	160.2
Charitable Donations and LEAP	8.5
Common Costs and Adjustments	(4.2)
Allocations and Recoveries	(205.2)
Total Operational Plan	**1,856.3**

5.1 Operational Priorities

The utility's operations programs enable critical grid and customer service functions, such as: responding to emergency events and managing planned outages; planning, designing and executing work programs to keep the grid safe and reliable; procuring the necessary materials and services to get work done; and leveraging technology solutions such as non-wires and cloud-based software to displace capital investments.

Responding to emergency events and managing planned outages

The Control Centre Operations program facilitates the safe and reliable operation of the utility's distribution grid through real-time system control and monitoring activities on a 24/7 year-round basis. [106] This program coordinates system switching and restoration work through the utility's control center to mitigate the effects of power outages and enable safe equipment to be de-energized for capital and maintenance work execution.

In the event of an emergency, the utility has a 24/7 Emergency Response program which carries out activities such as dispatching specialized field crews to respond and restore power after severe weather-related events, or other emergencies reported by Toronto EMS or members of the public. [107] This program works together with the Disaster Preparedness Management program to ensure that Toronto Hydro is well-prepared to respond to and recover from larger-scale incidents, such as the recent COVID-19 pandemic, at both the distribution system and corporate levels. Leveraging its pandemic readiness plans and robust incident management framework, Toronto Hydro was able to rapidly adapt its operations when the COVID-19 pandemic suddenly hit, in order to continue to serve customers reliably while protecting the safety of its employees, third-party resources and the public. [108]

Planning, designing and executing capital and maintenance work projects

Toronto Hydro's Asset and Program Management function supports the planning and designing of capital and maintenance work projects. Through this program, Toronto Hydro monitors and analyzes the performance of the distribution system, asset condition and system capacity, and identifies system needs. This analysis forms the basis of Toronto Hydro's capital and maintenance plans, and contributes to individual projects that together enable the utility to achieve its investment objectives.[109]

Toronto Hydro's Finance program oversees the development of the utility's annual and long-term budgets and financial projections. This includes providing regular reports and analysis to maintain compliance with external reporting and audit requirements. By providing these reports, Toronto Hydro is able to track and monitor the execution of its capital plan in accordance with professional standards. The team also collaborates with operational groups to develop, implement and optimize internal controls and processes to maintain the integrity of financial data and improve operational efficiency. These services are essential to Toronto Hydro's ability to comply with legal and regulatory obligations, to produce accurate financial statements, and to successfully deliver the utility's capital work plans.[110]

The oversight, administrative training and other functions performed in the process of executing Toronto Hydro's capital and maintenance work programs are performed by the Work Program Execution program. This program includes administration, planning and execution for the portion of Toronto Hydro's capital and maintenance programs completed by third-party resources. It also includes administrative and support costs for work completed by internal labour – including training costs for employees and apprentices as part of the utility's trade school.[111]

Through its Community Relations functions, Toronto Hydro has comprehensive processes and protocols for communicating information to customers concerning planned capital work, in order to provide a better understanding of the capital program and to help prepare customers for work at or near their property.[112]

Procuring the necessary materials and services to complete work projects

The Supply Chain Services program undertakes procurement and warehousing activities that support the execution of Toronto Hydro's capital and operating programs. This includes facilitating the timely and cost-effective acquisition of services, materials and equipment, maintaining sufficient inventory to ensure uninterrupted work execution, and managing material handling costs.[113]

Procurement activities are supported by the Legal Services function, which provides commercial law advice relating to the purchase of goods and services and other transactions with external vendors.[114] Legal Services assists with review, negotiation and drafting of commercial contracts, including purchase agreements, agreements for professional services, master contractual arrangements for long-term vendors, and other bespoke agreements as may be required to give effect to the utility's intentions in the applicable commercial transaction.

Leveraging technology solutions to address system needs

Technological advancements offer new digital tools and smart grid solutions to address system needs and deliver cost-effective customer services. Taking advantage of these opportunities requires investment in both capital assets (hard infrastructure like sensors, switches and reclosers, and intangibles like software systems) and in resources (human capital) with new and enhanced skill sets to install and integrate field technology (and analyze the valuable data it provides) into day-to-day operations and system planning functions.

For example, under the Asset and Program Management program, Toronto Hydro staff facilitates the development, integration and implementation of the Grid Modernization Strategy and associated roadmaps. This strategy includes advanced asset analytics that depend on cloud-enabled software solutions and grid readiness activities that leverage technology such as DER management systems to enable non-wires solutions and optimize existing grid capacity. [115]

Non-wires solutions refer to operating practices, activities or technologies that enable the utility to defer the need for specific distribution capital projects (at a lower total cost to ratepayers) by reducing system constraints at times of maximum demand in specific grid areas. Typically, these solutions leverage the use of DERs, often in partnership with utility customers or enabling third-parties. Local Demand Response (established in 2015) is the utility's mature non-wires solutions program to alleviate capacity constraints in high-growth areas of the grid by identifying opportunities where flexible demand response capacity can be procured from customers and third-parties to address system needs cost-effectively.[116]

Further, Toronto Hydro is adopting cloud-based software solutions to address business needs and requirements, such as implementing advanced digital tools needed to enable the utility's Grid Modernization Strategy. These subscription-based services provide access to software applications and other IT systems through an internet connection and shared cloud computing framework. As IT vendors move towards offering more (or exclusively) cloud-based solutions, Toronto Hydro must keep pace with these industry trends.[117]

5.2 Maintenance Priorities

The utility's maintenance programs enable upkeep of distribution and general plant assets by: inspecting and maintaining distribution equipment on routine cycles; remediating asset deficiencies and safety risks; maintaining general plant equipment in good working order; and protecting the grid against intensifying cyber threats.

Inspecting and maintaining distribution equipment on routine cycles

Toronto Hydro's preventative and predictive maintenance programs perform critical work to sustain the integrity of overhead line, underground system, stations and metering infrastructure. This includes inspection and maintenance of equipment for signs of potential failure. These programs are focused on preserving and maximizing the performance of assets over their expected useful life while mitigating a number of key risks. These programs are also designed to minimize overall asset lifecycle costs, maintain safety outcomes for Toronto Hydro work crews and the public, and ensure environmental stewardship and compliance with legal and regulatory obligations.[118]

Remediating asset deficiencies and safety risks

Through its Corrective Maintenance Program, the utility undertakes actions to address deficiencies or substandard conditions across the entire distribution system. This includes signs of potential failure or other risks identified through activities undertaken as part of the Preventative and Predictive Maintenance programs in the course of responding to emergencies. Corrective Maintenance activities are generally higher priority, cover short planning horizons (given the risks that deficiencies and substandard conditions can pose if left unaddressed), and involve repairing and restoring assets to their normal operating conditions through maintenance or refurbishment. Toronto Hydro's primary objective in this program is to uphold safety, environmental integrity and reliability by correcting or repairing deficiencies or substandard conditions on the distribution system.[119]

Maintaining general plant equipment in good working order

Toronto Hydro relies on its fleet,[120] facilities,[121] and IT assets to keep the business running efficiently so the utility can perform its work and deliver customers services safely and reliably.[122] Through its Fleet and Equipment Services Program,[123] Facilities Management Program[124] and IT program,[125] the utility aims to ensure that its vehicle, facilities and IT assets are maintained in good working order. The Fleet and Equipment Services Program ensures that the utility's fleet of 456 vehicles and other work equipment operate safely and reliably at the lowest overall lifecycle cost. The Facilities Management program provides workspace and property management services that enable Toronto Hydro's employees and dedicated third-party resources to perform their work in optimally configured, safe and structurally sound surroundings. For IT hardware and software assets, the IT program maintains the reliability and availability of critical IT systems and infrastructure that the utility relies on to carry out its daily operations.

Protecting the grid against intensifying cyber threats

IT infrastructure and systems must be kept secure to mitigate the risks of cyber-attacks that can disrupt distribution operations, compromise sensitive data, or result in other types of customer interruptions. Cybersecurity controls and software applications are periodically refreshed and enhanced to protect IT systems that support core operations, mitigate emerging digital threats and vulnerabilities, and minimize the risks of system failure.[126] These investments take the form of asset maintenance, licensing and subscription fees, and resources with the specialized skills needed to support and maintain IT infrastructure security.

5.3 Administrative Priorities

The utility's administrative programs enable the execution of critical grid functions and timely customer service functions, including: connecting customers to the grid in a timely and efficient manner; providing quality customer service and satisfaction; maintaining proactive compliance with legal and regulatory requirements; and ensuring a safe and productive workforce and environmentally responsible operations.

Connecting customers to the grid in a timely and efficient manner

The Customer Operations program ensures that customers are able to obtain timely connections to the grid and provides a consistent and efficient customer experience in that regard. This work includes handling customer requests and communications relating to connection and service upgrade requests, and managing these projects from intake through to completion via a single point of contact to offer customers an effective experience.[127]

The Public, Legal and Regulatory Affairs program facilitates third-party coordination with public infrastructure agencies and partners, and enables capital projects and relocation projects to move forward efficiently. In particular, for customers connections requiring expansion, the Legal Services team drafts, reviews and negotiates connection agreements to maintain compliance with the Distribution System Code and support effective connection processes. The Legal Services function also works closely with the construction, asset management, stations and facilities operational units to address the requirements of the utility and its counterparties related to property access, occupancy, and equipment maintenance and repair. New access and occupancy rights are obtained where necessary, in particular for new infrastructure builds or connections. [128]

Through Asset and Program Management, Toronto Hydro ensures that the grid has sufficient capacity to accommodate customers' growing demand for electricity and the capability to connect to DERs in Toronto Hydro's service area.[129] In addition, the Standards and Policy function develops the utility's design and construction standards, manages the utility's Conditions of Service, and supports the offer to connect process.

Providing quality customer service and satisfaction

Toronto Hydro's customer service programs respond directly to the needs of the utility's large and diverse customer base. The Customer Care program oversees the utility's mobile and digital self-service portal known as the Customer Self Service (CSS) portal, which offers customers 24/7 online access to their account, including the ability to download bills, switch electricity price plans and chat with a customer care representative.[130] In addition, the program manages a Contact Centre that handles approximately 343,000 telephone calls and 70,000 written (paper mail, fax and email) inquiries per year.[131]

Toronto Hydro's Key Accounts function engages with larger business and institutional customers, such as priority loads (such as hospitals and financial institutions), essential public services and developers. The Key Accounts team manages relationships with these customers and acts as a single point of contact to serve the distinct needs of Key Account customers, including facilitating planning and coordination for major capital and maintenance projects and addressing reliability and power quality issues and concerns.[132]

Toronto Hydro's Media and Public Relations team communicates with customers and other stakeholders through a number of different channels (including the utility's website and social media channels) to ensure that customers receive timely information about programs, services and operations, including power outages.[133]

Maintaining proactive compliance with legal and regulatory requirements

The Public, Legal and Regulatory Affairs program addresses Toronto Hydro's extensive legal and regulatory requirements. The objective of this program is to maintain proactive compliance with these oblications through expert management of the ongoing and evolving external demands and expectations of the legal, regulatory and public policy environment within which Toronto Hydro operates.[134] Similarly, the Finance Program provides robust governance and controls over financial processes to maintain compliance with applicable statutory and regulatory financial reporting requirements.[135]

The Human Resources and Safety Program facilitates Toronto Hydro's compliance with applicable legislative and regulatory requirements such as the Utility Work Protection Code, Electrical Utility Safety Rules, and Occupational Health & Safety Act and Regulations ("OHSA").[136] In addition, the Environmental, Health, & Safety Management System ("EHSMS") mitigates risks and achieves the company's objectives relating to health, safety and environmental performance.[137]

Finally, Toronto Hydro's Customer Care program ensures ongoing functionality and compliance with legislative and regulatory requirements of the meter-to-cash process through a system of robust internal controls and procedures that are reviewed on an annual basis. These safeguards enable the utility to identify any billing errors or irregularities in a timely manner and promptly take corrective actions.[138]

Ensuring a safe and productive workforce and environmentally responsible operations

Toronto Hydro's Human Resources, Environment and Safety ("HRE&S") program provides broad human resource management services to the utility. This includes managing the employee lifecycle through the processes of recruitment, compensation and benefits, onboarding, performance management, training and leadership development, labour relations, and employee communications and engagement. All of these activities are carried out within a culture of preserving employee wellness, health and safety, and ensuring environmental sustainability.[139]

6. PERFORMANCE ACCOUNTABILITY AND REPORTING

Toronto Hydro holds itself accountable to customers through its performance and transparent reporting of the outcomes that matter most. Over the last decade, the utility improved its performance on a number of key service quality measures, including customer first contact resolution, telephone calls answered on time, new residential and small business services completed on time, and billing accuracy.[140] At the same time, Toronto Hydro achieved the following notable improvements in cost-efficiency:

- the reduction of square footage per employee by 40% through a facilities consolidation strategy that is expected to return more than $200 million to customers by the end of this decade, resulting in an annual credit of approximately $132 on the average residential customer's bill from 2016 to 2029;
- the reduction of its fleet by 163 vehicles (since 2017), resulting in avoided total lifecycle vehicles costs of $26 million (a net 27% reduction);[141]
- increasing the number of customers on eBills by nearly 500% (since 2013), reducing paper that stacks up taller than the CN Tower, and avoiding mailing and postages costs of $4.4 million as of the end of 2022[142]; and
- the delivery of over 30 distinct productivity initiatives which yield material benefits for customers, including over $23 million in costs the utility expects to avoid or reduce by the end of 2024.[143]

The 2025-2029 Investment Plan maintains Toronto Hydro's strong record of performance against 29 service quality measures tracked by the Ontario Energy Board – the independent regulator that sets electricity distribution rates for customers and oversees the utility's performance. The plan also extends accountability to emerging areas of importance for customers through 12 custom metrics that measure results, such as strengthening the utility's defense against physical and cyber-attacks, reducing the company's GHG emissions, providing customer satisfaction in key interactions with the utility, and procuring flexible system capacity to address distribution system needs more cost-effectively and develop DER integration capabilities for the future.

Overall to track its effectiveness in achieving the plan's objectives and continuing to deliver high service quality value to customers, Toronto Hydro intends to measure its results through a performance outcomes framework that reports on 41 distinct measures annually.[144]

In addition to reporting performance on these measures through its public website and regulatory filings, Toronto Hydro intends to link its 2025-2029 Custom Scorecard to an innovative performance incentive mechanism that holds the utility financially accountable for delivering results across four key areas of focus: (1) System Reliability and Resilience; (2) Customer Service and Experience; (3) Environment, Safety and Governance; and (4) Efficiency and Productivity.

Inspired by similar mechanisms being used in other leading jurisdictions such as New York and the U.K, the PIM provides customers an upfront rate reduction benefit of approximately $65 million that the utility can earn back by achieving set objectives. This proposal is part of Toronto Hydro's ongoing commitment to transparency and accountability for outcomes that provide value to customers and stakeholders now and into the future.[145]

Table 10: 2025-2029 Custom Scorecard Measures

Performance	Measures
System Reliability & Resilience	Outage Duration
	Outage Frequency
	System Security Enhancements
Customer Service & Experience	New Services Connected on Time
	Customer Satisfaction (Post Transactional)
	Customer Escalations Resolution
Environment, Safety and Governance	Total Recordable Injury Frequency (TRIF)
	Emissions Reductions
	ISO Compliance and Certification
Efficiency & Financial Performance	Efficiency Achievements
	Grid Automation Readiness
	System Capacity (Non-Wires)

[1] Exhibit 2B, Section D4
[2] Exhibit 1B, Tab 5, Schedule 1
[3] Exhibit 1B, Tab 3, Schedule 2
[4] Exhibit 1B, Tab 3, Schedule 1
[5] Toronto Metropolitan University, Toronto Second Fastest Growing Metropolitan Area, City of Toronto the Fastest Growing Central City, in the United States/Canada in 2022" (May 23, 2023) <https://www.torontomu.ca/centre-urban-research-land-development/blog/blogentry7311/>
[6] City of Toronto, Toronto at a Glance https://www.toronto.ca/city-government/data-research-maps/toronto-at-a-glance/
[7] City of Toronto, Hospital – Toronto & GTA & long-term care – rehabilitation facilities https://www.toronto.ca/home/311-toronto-at-your-service/find-service-information/article/?kb=kA06g000001cvj8CAA; City of Toronto, Education https://www.toronto.ca/business-economy/industry-sector-support/education/#:~:text=Toronto%20is%20home%20to%20five,universities%20and%20one%20private%20university
[8] City of Toronto, CanopyTO (revised October, 2021) https://www.toronto.ca/legdocs/mmis/2021/ie/bgrd/backgroundfile-173552.pdf
[9] Exhibit 2B, Section D2
[10] City of Toronto, Toronto at a Glance https://www.toronto.ca/city-government/data-research-maps/toronto-at-a-glance/
[11] Exhibit 1B, Tab 3, Schedule 2
[12] Exhibit 2B, Section D4
[13] The Government of Canada passed the *Canadian Net-Zero Emissions Accountability Act*, SC 2021, c. 22 establishing a legally binding requirement for the federal government to establish a GHG emissions reduction plan for achieving net zero emissions in Canada by 2050. The Province of Ontario has established a target of reducing GHG by 30% below 2005 levels by 2030: Government of Ontario, Target to reduce GHG emissions to 30% below 2005 levels by 2030.
[14] City of Toronto, TransformTO 2022 Annual Report (April 19, 2023) https://www.toronto.ca/legdocs/mmis/2023/ie/bgrd/backgroundfile-235849.pdf
[15] City of Toronto, Net Zero Existing Buildings Strategy (March 2021) https://www.toronto.ca/wp-content/uploads/2021/10/907c-Net-Zero-Existing-Buildings-Strategy-2021.pdf
[16] City of Toronto, Electric Vehicle (December 9, 2019) Strategy https://www.toronto.ca/wp-content/uploads/2020/02/8c46-City-of-Toronto-Electric-Vehicle-Strategy.pdf
[17] City of Toronto, Toronto Green Standard https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/toronto-green-standard/
[18] City of Toronto, Home Energy Loan Program https://www.toronto.ca/services-payments/water-environment/environmental-grants-incentives/home-energy-loan-program-help/
[19] City of Toronto, Energy Retrofit Loans https://www.toronto.ca/services-payments/water-environment/environmental-grants-incentives/energy-retrofit-loans/
[20] City of Toronto, The Green Will Initiative https://greenwillto.ca/
[21] City of Toronto, Update on the Net Zero Buildings Strategy and Implementation of Mandatory Emissions Performance Standards (September 6, 2023) https://www.toronto.ca/legdocs/mmis/2023/ie/bgrd/backgroundfile-239097.pdf
[22] Exhibit 2B, Section D4
[23] Exhibit 2B, Section D4
[24] For more information on Toronto Hydro's historic reliability performance see Exhibit 2B, Section C
[25] Exhibit 2B, Section E2
[26] The City of Toronto is home to approximately three million people within a land mass of 631.1km per Statistics Canada, Canada's Large Urban Centres Continue to Grow and Spread (February 9, 2022) https://www150.statcan.gc.ca/n1/daily-quotidien/220209/dq220209b-eng.htm; Statistics Canada, Defining Canada's Downtown Neighbourhoods: 2016 Boundaries (May 11, 2021)
[27] Statistics Canada, Table 98-10-0002-01 Population and dwelling counts: Canada and census subdivisions (municipalities) https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=9810000201

[28] Highrise building categorized as a multi-floor building at least 12 stories or 35m in height. As per data from SkyscraperPage, Global Cities & Buildings Database https://skyscraperpage.com/cities/#notes
[29] Exhibit 1B, Tab 3, Schedule 3
[30] Exhibit 1B, Tab 3, Schedule 3
[31] City of Toronto, Toronto's Population Health Profile (February 2023) https://www.toronto.ca/wp-content/uploads/2023/02/940f-Torontos-Population-Health-Profile-2023.pdf
[32] Exhibit 2B, Section D2
[33] Urbanize Toronto, RLB Crane Index Records 238 Cranes in Toronto During Q1 2023 (April 15, 2023) https://toronto.urbanize.city/post/rlb-crane-index-records-238-cranes-toronto-during-q1-2023#:~:text=According%20to%20the%20latest%20report,%2C%20Chicago%20(14)%2C%20Honolulu
[34] Exhibit 2B, Section D4
[35] Exhibit 2B, E5.2
[36] Exhibit 2B, E5.1
[37] Exhibit 2B, D2
[38] Exhibit 2B, Section E5.1
[39] Exhibit 2B, Section A
[40] Exhibit 2B, Section D8; Exhibit 2B, Section E8.4
[41] Exhibit 4, Tab 2, Schedule, 7
[42] Exhibit 4, Tab 2, Schedule 17
[43] Exhibit 4, Tab 2, Schedules 15, 16 and 18
[44] Exhibit 4, Tab 1, Schedule 1
[45] Exhibit 4, Tab 1, Schedule 1
[46] Exhibit 4, Tab 4, Schedule 1
[47] For more information on Toronto Hydro's planning process see Exhibit 2B, Section E2.
[48] Exhibit 1B, Tab 5, Schedule 1
[49] Exhibit 2B, Section E2
[50] Exhibit 2B, Section D4, Appendix A
[51] Exhibit 1B, Tab 3, Schedule 3
[52] Exhibit 1B, Tab 5, Schedule 1
[53] Exhibit 1B, Tab 5, Schedule 1
[54] Exhibit 8, Tab 1, Schedule 1
[55] Exhibit 2B, Section E2
[56] Exhibit 1B, Tab 3, Schedule 2
[57] Exhibit 4, Tab 4, Schedule 1
[58] Exhibit 2B, Section E6.2
[59] Exhibit 1B, Tab 5, Schedule 1, Appendix A
[60] Exhibit 2B, Section E2
[61] Exhibit 2B, Section E2
[62] Exhibit 2B, Section E2
[63] Exhibit 2B, Section E6.1
[64] Exhibit 2B, Section E6.2
[65] Exhibit 2B, Section E6.3
[66] Exhibit 2B, Section E6.4
[67] Exhibit 2B, Section E6.5
[68] Exhibit 2B, Section E6.6 – includes HONI Switchgear renewal costs of $29M.
[69] Exhibit 2B, Section E6.7
[70] Toronto Hydro's own Future Energy Scenarios forecast a doubling in Toronto's electricity demand by the year 2050 across multiple scenarios (for more information please refer to Exhibit 2B – Section D4, Appendix A). The IESO's Pathways to Decarbonization report forecasts that demand could more than double by 2050 (https://www.ieso.ca/en/Learn/The-Evolving-Grid/Pathways-to-Decarbonization), while Enbridge's Pathways to Net Zero forecasts an increase in demand of over three times in its electrification scenario (https://www.enbridgegas.com/en/sustainability/pathway-to-net-zero). In the US, utilities such as National Grid (https://www.nationalgridus.com/media/pdfs/our-company/massachusetts-grid-modernization/future-grid-full-

plan-sept2023.pdf), Eversource (https://www.mass.gov/doc/gmacesmp-drafteversource/download?_gl=1%2Ako8zfs%2A_ga%2ANzUwNDI5MDE3LjE2NTA5ODEyMjQ.%2A_ga_SW2TVH2WBY%2AMTY5MzkyMDE2OS4zNi4xLjE2OTM5MjM1NzQuMC4wLjA.), and Unitil (https://unitil.com/ma-esmp/en) all published modernization plans forecasting demand increases of over 2 times by 2050. ISO New England also completed a study which forecasts a doubling in system peak by 2050 (https://www.iso-ne.com/static-assets/documents/100004/a05_2023_10_19_pspc_2050_study_pac.pdf). National Grid ESO (Great Britain's system operator), also forecasts in an increase of about 2 times across many of it's future energy scenarios (https://www.nationalgrideso.com/document/283101/download).

[71] City of Toronto, Net Zero Existing Buildings Strategy (March 2021) https://www.toronto.ca/wp-content/uploads/2021/10/907c-Net-Zero-Existing-Buildings-Strategy-2021.pdf

[72] Exhibit 2B, Section D4
[73] Exhibit 2B, Section D4
[74] Exhibit 2B, Section E5.1
[75] Exhibit 2B, Section E3
[76] Exhibit 2B, Section D4
[77] Exhibit 1B, Tab 4, Schedule 1
[78] Exhibit 2B, Section E5.1
[79] Exhibit 2B, Section E5.2
[80] Exhibit 2B, Section E5.3
[81] Exhibit 2B, Section E5.5
[82] Exhibit 2B, Section E7.2
[83] Exhibit 2B, Section E7.4
[84] Exhibit 2B, Section D5
[85] Exhibit 2B, Section E8.4, Appendix A
[86] Exhibit 2B, Section D5
[87] Exhibit 2B, Section E7.1
[88] Exhibit 2B, Section D5
[89] Exhibit 2B, Section E7.1
[90] Exhibit 2B, Section E7.3
[91] Exhibit 2B, Section E5.4
[92] Exhibit 2B, Section E6.5
[93] Exhibit 2B, Section E6.6
[94] Exhibit 2B, Section E8.4
[95] Exhibit 1B, Tab 4, Schedule 2
[96] Exhibit 2B, Section E8.2
[97] Exhibit 2B, Section E8.3
[98] Exhibit 2B, Section D7
[99] Exhibit 2B, Section E8.4
[100] Exhibit 2B, Section E8.1
[101] Exhibit 2B, Section E8.2
[102] Exhibit 2B, Section E8.3
[103] Exhibit 2B, Section E8.4
[104] Exhibit 4, Tab 4, Schedule 1
[105] Exhibit 4, Tab 4, Schedule 1; Exhibit 4, Tab 4, Schedule 3
[106] Exhibit 4, Tab 2, Schedule 7
[107] Exhibit 4, Tab 2, Schedule 5
[108] Exhibit 4, Tab 2, Schedule 6
[109] Exhibit 4, Tab 2, Schedule 9
[110] Exhibit 4, Tab 2, Schedule 16
[111] Exhibit 4, Tab 2, Schedule 10
[112] See Communications and Public Affairs Segment – Public Legal and Regulatory Affairs program at Exhibit 4, Tab 2, Schedule 18

[113] Exhibit 4, Tab 2, Schedule 13
[114] Exhibit 4, Tab 2, Schedule 18
[115] Exhibit 4, Tab 2, Schedule 9
[116] Exhibit 4, Tab 2, Schedule 9
[117] Exhibit 4, Tab 2, Schedule 19
[118] Exhibit 4, Tab 2, Schedules 1-3
[119] Exhibit 4, Tab 2, Schedule 4
[120] Exhibit 4, Tab 2, Schedule 11
[121] Exhibit 4, Tab 2, Schedule 12
[122] Exhibit 4, Tab 2, Schedule 17
[123] Exhibit 4, Tab 2, Schedule 11
[124] Exhibit 4, Tab 2, Schedule 12
[125] Exhibit 4, Tab 2, Schedule 17
[126] Exhibit 4, Tab 2, Schedule 17
[127] Exhibit 4, Tab 2, Schedule 8
[128] Exhibit 4, Tab 2, Schedule 18
[129] Exhibit 4, Tab 2, Schedule 9
[130] Exhibit 4, Tab 2, Schedule 14
[131] Exhibit 4, Tab 2, Schedule 14
[132] Exhibit 4, Tab 2, Schedule 8
[133] Exhibit 4, Tab 2, Schedule 18
[134] Exhibit 4, Tab 2, Schedule 18
[135] Exhibit 4, Tab 2, Schedule 16
[136] RSO 1990, c. O.1
[137] Exhibit 4, Tab 2, Schedule 15
[138] Exhibit 4, Tab 2, Schedule 14
[139] Exhibit 4, Tab 2, Schedule 15
[140] Exhibit 1B, Tab 3, Schedule 2
[141] Exhibit 1B, Tab 3, Schedule 3
[142] Exhibit 1B, Tab 3, Schedule 2
[143] Exhibit 1B, Tab 3, Schedule 3
[144] Exhibit 1B, Tab 3, Schedule 1
[145] Exhibit 1B, Tab 3, Schedule 1

TORONTO HYDRO

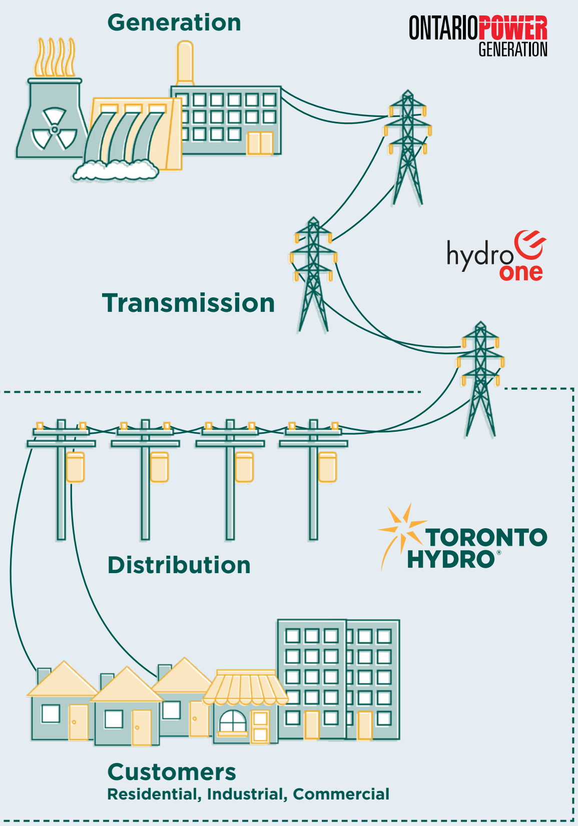
Powering Forward, Together: Our 2025–2029 Investment Plan

As the local electricity distributor for the city of Toronto, Toronto Hydro is responsible for delivering electricity to more than 3 million people across Canada's largest city. We've owned and operated the poles, wires and other equipment that have powered homes and businesses safely and reliably for more than a century. But the way we power our city is evolving.

PREPARING OUR NEXT FIVE-YEAR PLAN

As Toronto continues to grow, digitize and electrify, we've developed a **five-year investment plan for 2025 to 2029** to get the grid ready to serve the city's evolving electricity needs. Our plan will help ensure that our grid and operations will continue to be safe, reliable and environmentally responsible as we power our customers through this decade and beyond.

OUR ROLE IN THE ELECTRICITY SYSTEM



Key facts and figures*

3 million
people across the city

790,000
customers

37
terminal stations

17,060
primary switches

61,300
distribution transformers

139
municipal stations

183,620
poles

13,765km
underground wires

15,393km
overhead wires

* Numbers are approximate.

INVESTMENT NEEDS AND CHALLENGES

Our 2025–2029 investment plan is focused on responding to the needs and challenges of delivering safe, reliable and clean electricity in Toronto, including:

Powering a mature and growing urban city: We serve Canada's largest and North America's second fastest growing city (by population). We also operate in a dense urban environment, which makes it more complicated and more expensive for us to plan and build infrastructure. As Toronto continues to grow, we need to prepare the grid to power new condo towers, residential communities and businesses.

FACT: Toronto has **238 cranes** in operation* — more than any other city in North America.

* As of Q1 2023.

Fixing and replacing equipment in poor condition: A large percentage of our grid was installed in the 1950s and 60s. We need to continue monitoring the condition of our grid and replace equipment most at risk to keep it safe and reliable for customers.

FACT: **40% of power outages** are caused by defective equipment.

Keeping up with how customers use electricity: Customers are increasingly adopting electrified technologies like electric vehicles and heat pumps for their day-to-day energy needs, and using new technologies like solar panels and battery storage to manage their energy usage. We need to upgrade our equipment and modernize our grid to keep up with these changes.

FACT: Did you know that when an EV is charging, it can use as much electricity as **two average homes**?

Responding to extreme weather and cyber security threats: Extreme weather events such as high heat, high winds, flooding and ice storms are becoming more common due to climate change. In addition, cybercrime is on the rise across Canada. We need to invest in making our grid and operations more resilient against these emerging threats.

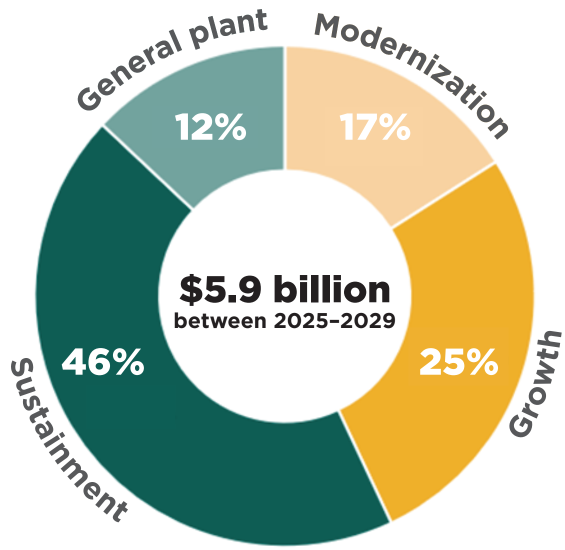
FACT: Between 2018 and 2022, Toronto Hydro experienced **seven major event days**,* impacting a total of **624,000 customers**.

* A major event day is a day when an unforseeable, unpredictable, unpreventable or unavoidable event occurs that disrupts normal business operations, potentially affecting our services for a substantial number of customers.

OUR STRATEGIC PRIORITIES

In order to help ensure the delivery of safe, reliable and clean electricity now and into the future, we need to focus on four strategic priorities:

1. **Modernization:** Develop advanced technological capabilities to make the system and our operations more reliable, resilient and efficient over time.
2. **Growth:** Connect customers on time and get the grid ready to serve the city's growing need for electricity.
3. **Sustainment:** Upkeep and renew aging, deteriorating and outdated equipment to maintain reliability, reduce safety risks and enhance our grid's capacity to serve customers.
4. **General plant:** Keep our business running efficiently with safe and reliable vehicles, work centres and IT equipment, and reduce our emissions.

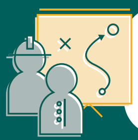


HOW CUSTOMER FEEDBACK SHAPED OUR PLAN

Customer engagement is an essential part of our investment planning and rate application process. Before we prepared our plan, we asked our customers for feedback about their needs and priorities for electricity services.

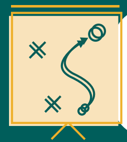
Customer engagement process

1. Identify customer needs, preferences and priorities.



2. Use customer feedback to guide development of draft plan.

3. Collect customer feedback on draft plan.



4. Use customer feedback to finalize plan.

5. Submit plan to the Ontario Energy Board (OEB).

Customer feedback

The feedback from customers centred around three core areas:

- **Price and reliability**
- **New technology to reduce costs and improve the system**
- **System capacity to serve high-growth areas**

Our draft plan was developed with these needs and priorities in mind and put back to customers through an interactive online survey.

Rate class	Survey participation	Support for our draft plan*
Residential	32,187	80%
Small business	695	77%
Commerical and industrial	264	82%
Key accounts	52	96%
Total	33,198	84%

*Includes customers who supported a plan that does even more to improve services.

RATE IMPACTS

To fund our proposed investment plan, we're seeking approval from the Ontario Energy Board (OEB) for 2025–2029 distribution rates and charges (Toronto Hydro's portion of the bill). The OEB and various consumer groups will review and test our plan in a rigorous, transparent public process known as a rate application.

Under our proposed plan, the average distribution charges for a **typical residential customer** (who uses 750 kWh per month) would increase by **$3.44 per month**, annually from 2025 to 2029.

Proposed bill impacts

Rate class	Typical usage	Monthly bill impacts	2025	2026	2027	2028	2029	Average annual change (per month)
Residential	750 kWh	Distribution charges	$45.93	$49.33	$53.05	$57.02	$59.88	**$3.44**
		$ change	$3.24	$3.40	$3.72	$3.97	$2.86	
Residential suite-metered service*	300 kWh	Distribution charges	$34.22	$36.06	$38.24	$40.51	$42.15	**$1.33**
		$ change	-$1.27	$1.84	$2.18	$2.27	$1.64	
Small business (General service < 50 kW)	2,000 kWh	Distribution charges	$132.67	$141.91	$151.52	$162.19	$169.48	**$10.20**
		$ change	$14.18	$9.24	$9.61	$10.67	$7.29	

* Refers to customers in the Competitive Sector Multi-Unit Residential Service rate class.

ACCOUNTABILITY TO CUSTOMERS

Our 2025–2029 investment plan is focused on delivering results that matter to customers and stakeholders. To help ensure we achieve these outcomes, we'll be holding ourselves financially accountable through a performance management framework that tracks and reports our performance on 12 distinct measures across four areas:

System reliability and resilience
- Outage duration
- Outage frequency
- System security enhancements

Customer service and experience
- New services connected on time
- Customer satisfaction
- Customer escalations resolution

Efficiency and financial performance
- Efficiency achievements
- Grid automation readiness
- System capacity (non-wires)

Environment and safety
- Total Recordable Injury Frequency (TRIF)
- Emissions reductions
- ISO compliance and certification

OUR PRODUCTIVITY AND PERFORMANCE

Toronto Hydro strives to provide value for money for customers through continuous improvements in productivity and performance.

We've generated **$2.2 billion** in savings for our customers since the company was formed in 1999, through activities such as improved asset management, efficient material handling and workforce optimization.

We resolve **92%** of customer issues on first contact.

We connect new residential and small business customers to the grid on time more than **99%** of the time.

We completed a facilities consolidation strategy that reduced our square footage per employee by approximately 40% and is expected to return more than **$200 million** to customers by the end of this decade.

APPLICATION SUMMARY

This schedule provides a summary of Toronto Hydro's 2025-2029 Custom Rate Application, in accordance with section 2.1.2 of the Filing Requirements.[1]

1. BILL IMPACTS

Table 1 below provides a summary of the proposed change in the monthly total bill impacts for typical customers in all rate classes.[2] Total bill impacts for all classes are below the 10 percent threshold, therefore mitigation measures are not required.

Table 1: 2025-2029 Total Bill Impacts – Proposed Change in Monthly Bill

	Change	2025	2026	2027	2028	2029
Residential	$/30 days	$0.91	$3.44	$3.77	$3.61	$2.90
	%	0.7%	2.5%	2.6%	2.4%	1.9%
Competitive Sector Multi-Unit Residential	$/30 days	-$2.10	$1.86	$2.21	$1.88	$1.66
	%	-2.8%	2.6%	3.0%	2.5%	2.1%
General Service <50 kW	$/30 days	$7.34	$9.36	$9.73	$10.39	$7.38
	%	2.0%	2.5%	2.5%	2.6%	1.8%
General Service 50-999 kW	$/30 days	-$73.44	$188.05	$197.76	$217.72	$170.01
	%	-0.5%	1.3%	1.4%	1.5%	1.2%
General Service 1,000-4,999 kW	$/30 days	-$1,565.72	$1,657.27	$1,713.81	$1,807.60	$1,560.87
	%	-1.0%	1.1%	1.1%	1.2%	1.0%
Large Use	$/30 days	-$7,459.85	$6,638.41	$9,677.61	$10,769.78	$8,543.60
	%	-1.1%	1.0%	1.4%	1.6%	1.2%
Street Lighting	$/30 days	$13,867.36	$13,873.12	$23,380.94	$13,713.23	$17,205.38
	%	4.4%	4.2%	6.8%	3.7%	4.5%
Unmetered Scattered Load	$/30 days	$1.88	$2.44	$2.52	$3.15	$2.04
	%	3.0%	3.7%	3.7%	4.5%	2.8%

[1] OEB Filing Requirements for Electricity Distribution Rate Applications, Chapter 2 (December 15, 2022).
[2] Includes all rate riders and holding commodity rates and regulatory charges constant.

Table 2 below provides the proposed monthly distribution bill impacts per sub-total A of Tariff Schedule and Bill Impacts spreadsheet model for: (i) a typical residential customer using 750 kWh per month and for (ii) a General Service < 50kW customer using 2,000 kWh per month on time-of-use pricing, as well as other customers in all rate classes.

1 **Table 2: Proposed Distribution Bill Impacts (Per Sub-Total A of Tariff Schedule)**

	Change in Bill	2025 Proposed	2026 Proposed	2027 Proposed	2028 Proposed	2029 Proposed
Residential	$/30 days	$3.24	$3.40	$3.72	$3.97	$2.86
	%	7.6%	7.4%	7.5%	7.5%	5.0%
Competitive Sector Multi-Unit Residential	$/30 days	-$1.27	$1.84	$2.18	$2.27	$1.64
	%	-3.6%	5.4%	6.0%	5.9%	4.0%
General Service <50 kW	$/30 days	$14.18	$9.24	$9.61	$10.67	$7.29
	%	12.0%	7.0%	6.8%	7.0%	4.5%
General Service 50-999 kW	$/30 days	$235.35	$166.42	$175.01	$192.67	$150.45
	%	13.0%	8.1%	7.9%	8.1%	5.8%
General Service 1,000-4,999 kW	$/30 days	$1,993.46	$1,466.61	$1,516.65	$1,599.65	$1,381.30
	%	13.4%	8.7%	8.3%	8.0%	6.4%
Large Use	$/30 days	$10,124.44	$5,874.70	$8,564.26	$9,530.78	$7,560.71
	%	13.1%	6.7%	9.2%	9.4%	6.8%
Street Lighting	$/30 days	$15,917.30	$12,277.10	$20,691.10	$12,135.60	$15,226.00
	%	11.0%	7.6%	11.9%	6.3%	7.4%
Unmetered Scattered Load	$/30 days	$2.96	$2.41	$2.49	$3.11	$2.01
	%	9.5%	7.1%	6.8%	8.0%	4.8%

2. REVENUE REQUIREMENT

Table 3 below summarizes Toronto Hydro's 2025 forecasted revenue requirement.

Table 3: 2025 Forecast Revenue Requirement ($ Millions)

Revenue Requirement Component	2025 Test Year
OM&A Expenses (incl. property taxes)	343.0
Amortization/Depreciation	285.3
Income Taxes (grossed up)	27.9
Deemed Interest Expense	143.2
Return on Deemed Equity	220.9
Service Revenue Requirement	**1,020.3**
Revenue Offsets	(47.9)
Base Revenue Requirement	**972.4**

Table 4 below summarizes the service revenue requirement variances between the last OEB-approved year (2020) and the proposed 2025 test year. For more information about Toronto Hydro's revenue requirement, please see Exhibit 6, Tab 1.

Table 4: 2020 versus 2025 Service Revenue Requirement ($ Millions)

	2020 Approved	2025 Forecast	Variance ($)	Variance (%)
OM&A	266.7	343.0	76.3	28.6%
Depreciation	263.7	285.3	21.6	8.2%
Deemed Interest Expense	98.5	143.2	44.7	45.4%
Return on Equity	153.9	220.9	67.0	43.5%
PILs	9.7	27.9	18.2	187.6%
Total Service Revenue Requirement	**792.5**	**1,020.3**	**227.8**	**28.7%**

The main drivers for the proposed increase in the 2025 service revenue requirement are:

(i) additions to rate base from capital investments undertaken in the current 2020-2024 rate period (driving increases in depreciation, deemed interest expense, and return on equity) as summarized in Exhibit 2A, Tab 2, Schedule 1 and detailed in the Distribution System Plan at Exhibit 2B, and

(ii) an increase in OM&A expenses as summarized in Exhibit 4, Tab 1, Schedule 1 and detailed in the programmatic evidence at Exhibit 4, Tab 2.

3. LOAD FORECAST SUMMARY

Table 5 below summarizes Toronto Hydro's customer and load growth changes from 2018 to 2029. Please see Exhibit 3, Tab 1 for more information about the utility's customer and load forecast.

Table 5: Customer and Load Growth Changes for 2018-2029

Year		Total Normalized GWh	Total Normalized GWh (% Change)	Total Normalized MVA	Total Normalized MVA (% Change)	Total Customers	Customer Count Change (%)
2018	Actual	24,701.0		39,823.2		770,333	
2019	Actual	24,429.6	-1.1%	39,126.0	-1.8%	777,369	0.9%
2020	Actual	23,674.7	-3.1%	36,813.7	-5.9%	781,374	0.5%
2021	Actual	23,575.0	-0.4%	36,638.0	-0.5%	786,258	0.6%
2022	Actual	23,990.1	1.8%	37,648.0	2.8%	790,699	0.6%
2023	Bridge	23,678.6	-1.3%	37,199.3	-1.2%	794,025	0.4%
2024	Bridge	23,676.2	0.0%	36,993.9	-0.6%	797,318	0.4%
2025	Forecast	23,458.7	-0.9%	36,384.5	-1.6%	800,374	0.4%
2026	Forecast	23,416.5	-0.2%	36,063.4	-0.9%	803,344	0.4%
2027	Forecast	23,389.6	-0.1%	35,698.8	-1.0%	806,017	0.3%
2028	Forecast	23,498.8	0.5%	35,507.1	-0.5%	808,731	0.3%
2029	Forecast	23,458.5	-0.2%	35,093.4	-1.2%	811,245	0.3%

Notes:
1. Total Normalized GWh are purchased GWh (before losses) and are weather normalized to the Test Year heating and cooling degree day assumptions.
2. Total Normalized MVA are weather normalized MVA.
3. Total Distribution Revenue is weather normalized and includes an adjustment for the Transformer Allowance.
4. Total Customers are an annual average and exclude street lighting devices and unmetered load connections.

4. RATE BASE AND DISTRIBUTION SYSTEM PLAN

4.1 Distribution System Plan

Toronto Hydro forecasts $2,787.4 million in net capital expenditures over the current 2020-2024 period, which is approximately three percent higher than the $2,710.7 million 2020-2024 Distribution System Plan approved by the OEB fur the purposes of setting rates in the last application. In the 2025-2029 Distribution System Plan (the "DSP"), the utility forecasts net capital expenditures of $4,001.8 million, which is $1,291.1 million or 44 percent higher than the 2020-2024 Distribution System Plan that the utility expects to deliver. Table 6 below summarizes the capital expenditures by investment category for the 2025-2029 rate period. Investments in System Access and System Service to expand and modernize the utility's grid are the biggest drivers of the 2025-2029 DSP (on a percentage basis). For more information about the utility's capital expenditures over the current and the future rate period please refer to Exhibit 2B, Section E4.

Table 6: Capital Investment Expenditures by Categories ($ Millions)

Category	Total 2020-2024 Forecast	Total 2025-2029 Forecast	Var. ($)	Var. (%)
System Access	630.0	1,071.7	441.7	70%
System Renewal	1,458.2	1,970.3	512.1	35%
System Service	225.6	353.0	127.4	56%
General Plant	418.6	562.5	143.9	34%
Other	55.1	44.3	(10.8)	(20%)
Total	**2,787.4**	**4,001.8**	**1,214.4**	**44%**

4.2 Rate Base

Table 7 below summarizes Toronto Hydro's 2020 approved and 2020 actual rate base, and presents the utility's forecasted rate base for the current 2020-2024 period. Table 8 presents the rate base for the 2025 to 2029 period.

The requested rate base for the 2025 test year is $5,901.2 million, representing an increase of approximately $1,386.4 million, or 30.7 percent from the 2020 rate base of $4,514.8 million approved by the OEB in the utility's last rebasing application.

Rate base variances are primarily driven by changes in Property Plant & Equipment ("PP&E") and Net Book Value ("NBV") due to in-service additions derived from the utility's actual and forecasted capital investments per the DSP. These changes are discussed in Exhibit 2A, Tab 1, Schedule 1. Other major drivers of rate variances, namely depreciation and working capital allowance ("WCA"), are discussed in Exhibit 2A, Tab 2, Schedule 1, and Exhibit 2A, Tab 3, Schedule 1, respectively.

Table 7: 2020-2024 Rate Base Summary ($ Millions)

	OEB Approved	Actuals			Bridge	
	2020	**2020**	**2021**	**2022**	**2023**	**2024**
Opening PP&E NBV	4,229.4	4,233.2	4,419.2	4,628.1	4,893.9	5,244.3
In-Service Additions	527.4	447.9	485.2	554.4	607.9	606.3
Depreciation[1]	(265.4)	(262.0)	(276.2)	(288.7)	(257.4)	(271.8)
Closing PP&E NBV	4,491.3	4,419.2	4,628.1	4,893.9	5,244.3	5,578.8
Monthly Avg PP&E NBV	**4,298.6**	**4,284.3**	**4,457.7**	**4,686.3**	**4,954.3**	**5,348.5**
Working Capital Allowance	216.2	249.8	217.2	220.7	240.6	248.0
Rate Base	**4,514.8**	**4,534.1**	**4,674.9**	**4,907.0**	**5,194.9**	**5,596.5**

Table 8: 2025-2029 Rate Base Summary ($ Millions)

	Forecast				
	2025	**2026**	**2027**	**2028**	**2029**
Opening PP&E NBV	5,578.8	5,937.9	6,335.9	6,809.6	7,234.4
In-Service Additions	645.9	699.4	795.6	769.2	875.4

	Forecast				
	2025	**2026**	**2027**	**2028**	**2029**
Depreciation[1]	(286.8)	(301.4)	(321.9)	(344.3)	(357.1)
Closing PP&E NBV	5,937.9	6,335.9	6,809.6	7,234.4	7,752.7
Monthly Avg PP&E NBV	**5,669.8**	**6,047.4**	**6,472.2**	**6,927.1**	**7,352.5**
Working Capital Allowance	231.5	237.1	242.5	250.8	255.6
Rate Base	**5,901.2**	**6,284.5**	**6,714.7**	**7,177.9**	**7,608.2**

5. OPERATIONS, MAINTENANCE AND ADMINISTRATION ("OM&A") EXPENSE

Toronto Hydro forecasted OM&A expenses for the future 2025-2029 rate period are $1,856 million, representing an increase of $383.3 million or 26 percent from the actual and forecasted OM&A expensed of $1,473 million in the current 2020-2024 rate period.

Table 9 below provides a summary of the overall drivers and cost trends for operating expenditures over the current and future rate period. For more information please refer to Exhibit 4, Tab 1 and the supporting evidence at Tabs 2 through 5 of this Exhibit.

Table 9: OM&A 2020-2029 Cost Drivers ($ Millions)

Programs	Actual			Bridge		Forecast				
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Reporting Basis	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS
Opening Balance	266.7[3]	288.1	277.5	280.4	301.5	325.5	343.0	358.0	370.2	385.5
Distribution Operations	4.1	(1.4)	1.8	5.0	9.5	13.9	7.4	6.0	6.6	7.0
Customer Care	17.2	(16.4)	-	5.6	3.5	0.2	3.0	0.9	1.9	1.7
Human Resources, Environment and Safety	-	2.1	(0.9)	2.2	2.4	1.3	0.6	1.0	1.1	1.0
Information Technology	-	2.6	2.9	4.0	3.6	2.2	2.5	2.9	3.0	3.4
Common Corporate Costs	-	(0.1)	(0.7)	(0.1)	0.2	-	-	0.1	-	-
Facilities Management	-	1.7	(1.0)	1.0	1.9	-	0.5	0.5	0.7	0.7
Other Various	0.1	0.9	0.8	3.4	2.9	(0.1)	1.0	0.8	2.0	0.3
Closing Balance	**288.1**	**277.5**	**280.4**	**301.5**	**325.5**	**343.0**	**358.0**	**370.2**	**385.5**	**399.6**

Note: Toronto Hydro confirms that no costs for dedicated conservation and demand management ("CDM") staff to support IESO programs funded under the 2021-2024 CDM Framework are included in the revenue requirement.

[3] In EB-2018-0165, the OEB approved a 2020 OM&A budget of $272.2 million and directed Toronto Hydro to amend the presentation of shared services within Other Revenue, under USoA Accounts 4375 and 4380 for revenues and expenses of non-rate regulated utility operations. Normalized for this change, the 2020 OEB-approved OM&A budget was $266.7 million.

Toronto Hydro proposes a 2025-2029 LEAP funding allocation of 0.15 percent of its service revenue requirement, resulting in a total LEAP amount of $8.5 million. Please refer to Exhibit 4, Tab 2, Schedule 19 for more information.

6. COST OF CAPITAL

Table 10 below outlines the proposed capital structure and cost of capital parameters in accordance with the OEB's cost of capital parameters. The 2025 return on equity forecast, which was derived in accordance with the OEB's Cost of Capital Report (EB-2009-0084) methodology, was applied to determine the 2025-2029 revenue requirement presented in Exhibit 6, Tab 1. Toronto Hydro intends to update the return on equity forecast during the Draft Rate Order ("DRO") process to align with the return on equity approved by the OEB in the final quarter of 2024. For more information please refer to Exhibit 5, Tab 1.

Table 10: Proposed Capital Structure and Cost of Capital Parameters

Capital Structure			Cost Rate
Debt			
Long-term Debt	56.00%	$3,304,672,000	3.95%
Short-term Debt	4.00%	$236,048,000	5.25%
Total Debt	60.0%	$3,540,720,000	4.04%
Equity			
Common Equity	40.00%	$2,360,480,000	9.36%
Preferred Shares	0.00%	$ -	
Total Equity	40.0%	$2,360,480,000	9.36%
Total / WACC		$5,901,200,000	6.17%

7. COST ALLOCATION AND RATE DESIGN

7.1 Cost Allocation

Toronto Hydro's revenue requirement, as detailed in Exhibit 6, is allocated to rate classes in order to calculate distribution rates for the 2025 rebasing year. This is performed using the OEB's latest cost allocation model, including the OEB's policy related to the Street Lighting class[4] and subject to the adjustments noted in the Cost Allocation evidence.[5]

Consistent with the methodology relied upon in the utility's last two custom rate application (EB-2014-0116 and EB-2018-0165), Toronto Hydro completed a cost allocation study for 2025 test year, and extended the results to allocate the 2026 to 2029 revenue requirement to rate classes.

Table 11 below shows the revenue to cost ratios calculated prior to and after the proposed test year rate design in comparison with the OEB's "target ranges" (all ratios exclude revenues and costs related to transformer ownership allowance). The proposed revenue to cost ratios for all Toronto Hydro rate classes are within the OEB's guideline ranges. For more information about cost allocation, please refer to Exhibit 7, Tab 1.

Table 11: Revenue/Cost Ratios (%)

Rate Class	2020 OEB Approved	2025		OEB's Guideline Ranges
		Model	Proposed	
Residential	100.0%	102.1%	100.0%	85-115
Competitive Sector Multi-Unit Residential	100.0%	111.7%	100.0%	n/a
General Service <50kW	93.7%	97.4%	99.2%	80-120

[4] Ontario Energy Board, Issuance of New Cost Allocation Policy for Street Lighting Rate Class (June 12, 2015), "online", https://www.oeb.ca/oeb/_Documents/EB-2012-0383/LTR_CostAllocation_Streetlighting_20150612.pdf
[5] Exhibit 7, Tab 1, Schedule 1.

Rate Class	2020 OEB Approved	2025		OEB's Guideline Ranges
		Model	Proposed	
General Service 50-999kW	105.6%	96.4%	98.9%	80-120
General Service 1000-4999kW	94.8%	94.4%	98.3%	80-120
Large Use	93.6%	97.2%	99.2%	85-115
Street Lighting	111.3%	119.4%	119.4%	80-120
Unmetered Scattered Load	120.0%	121.7%	120.0%	80-120

7.2 Rate Design

In this application, Toronto Hydro requests approval of new base distribution rates and new rate riders effective January 1, 2025. Toronto Hydro calculated the rebased distribution rates for 2025 using the OEB's standard revenue requirement methodology as set out in the Filing Requirements.[6]

For the 2026-2029 rate period, Toronto Hydro calculated distribution rates using a Custom Revenue Cap Index ("CRCI").[7] For each of these years, base revenue requirements will be brought forward for final approval in Toronto Hydro's annual rate update applications, inclusive of actual inflation factors applicable to those years. In each annual rate update application, Toronto Hydro will propose new distribution rates based on the escalated base revenue requirement resulting from application of the CRCI, in accordance with the OEB's Decision in this proceeding.

Toronto Hydro proposes that for the years 2026 to 2029, the final approved base revenue requirements be allocated to each rate class based on the same allocations to rate classes established in this proceeding for 2025. Toronto Hydro will hold constant the fixed/variable revenue split for each rate class determined in 2025 for the purpose of designing rates from

[6] OEB Filing Requirements for Electricity Distribution Rate Applications, Chapter 2 (December 15, 2022), section 2.8.
[7] See Exhibit 1B, Tab 2, Schedule 1 for more information on the CRCI.

2026 to 2029. Subsequently, the utility will calculate rates in each year relying on Toronto Hydro's five-year customer and load forecast as approved in this application.

Please see Exhibit 1B, Tab 4, Schedule 1 for more information about the proposed CRCI, and Exhibit 8, Tab 1 fore more information about rate design.

7.3 Specific Service Charges

For this application, Toronto Hydro proposes to leave its specific service charges unchanged, with the exception of the wireline pole attachment charge, which Toronto Hydro will update at the draft rate order stage and annually in accordance with the latest OEB rate orders. Please refer to Exhibit 8, Tab 2, Schedule 1 for more information about specific service charges.

8. DEFERRAL AND VARIANCE ACCOUNTS ("DVA")

The total net DVA balances proposed for clearance are $163.7 million (credit/refund) to customers beginning January 1, 2025. With the exception of the Lost Revenue Adjustment Mechanism Variance Account ("LRAMVA"),[8] the amounts proposed for clearance include the balances as reflected in the audited financial statements for the fiscal year ended December 31, 2022. The amounts also include the forecasted principal activity and carrying costs calculated to December 2024.

Toronto Hydro proposes to allocate the DVA balances to the customer classes based on the methodologies described in the OEB's Deferral and Variance Account Review ("EDDVAR").[9]

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[8] Toronto Hydro notes that the balances in the LRAMVA were not reported in RRR or AFS filings because, as the OEB Decision noted in EB-2022-0065, the utility did not have sufficient information at the time those filings to estimate the balances in the account.

[9] EB-2008-0046, Ontario Energy Board Deferral and Variance Account Review Initiative.

For accounts where the EDDVAR report indicated allocation was to be determined on a case-by-case basis, Toronto Hydro has proposed an allocator. The allocation between customer classes is set out in Table 12 below.

Table 12: Proposed Allocators for Rate Classes

Allocators	Total (%)	Residential (%)	CSMUR (%)	GS < 50kW (%)	GS – 50-999 kW (%)	GS > 1,000 to 4,999 kW (%)	Large User =>5,000 kW (%)	Street Lighting (%)	USL (Connections) (%)	USL (Customer) (%)
Distribution Revenue (2022)	100.0	38.9	4.8	15.5	26.1	8.3	3.9	2.0	0.5	0.0
Revenue Offsets (2025)	100.0	35.9	4.4	15.0	17.4	4.8	1.8	20.5	0.3	0.0
LRAMVA	100.0	-0.9	-0.1	-23.9	60.4	15.6	48.9	0.0	0.0	0.0
Distribution Revenue GS>50 kW (2022)	100.0	0.0	0.0	0.0	64.0	20.3	9.6	5.0	1.1	0.0
# of RPP Customers (2022)	100.0	78.8	11.9	8.8	0.4	0.0	0.0	0.0	0.1	0.0

Toronto Hydro proposes various recovery periods for specified DVA accounts, beginning January 2025, in order to minimize the bill impacts to all affected customers set out in Table 13 below.

Table 13: Proposed Rate Rider Allocators and Recovery Periods

Rate Riders	Allocators	Proposed Recovery Period (years)	Rate Rider Start Year	Rate Rider End Year
PILs and Tax Variance	Distribution Revenue (2022)	1.00	2025	2025
Wireline Pole Attachments Rev	Revenue Offsets (2025)	1.00	2027	2027
Gain on Property Sale	Distribution Revenue (2022)	1.00	2027	2027
Impact for USGAAP (Actuarial loss on OPEB)	Distribution Revenue (2022)	1.00	2025	2025
Customer Choice Initiative	# of RPP Customers (2022)	1.00	2027	2027
External Driven Capital	Distribution Revenue (2022)	1.00	2026	2026
Operations Center Consolidation Plan	Distribution Revenue (2022)	1.00	2025	2025
Excess Expansion Deposits	Distribution Revenue GS>50 kW (2022)	5.00	2025	2029
Change in Useful Life of Assets (2025-2026)	Distribution Revenue (2022)	2.00	2025	2026
Lost Revenue Adjustment Mechanism (LRAMVA)	LRAMVA	5.00	2025	2029
Innovation Fund	Distribution Revenue (2022)	1.00	2029	2029
Ultra-Low Overnight Rate Costs	# of RPP Customers (2022)	1.00	2025	2025
Green Button Initiative Costs	Distribution Revenue (2022)	4.00	2025	2028
Wireless pole attachments Rev	Revenue Offsets (2025)	3.00	2026	2028
50/60 Eglinton Proceeds of Sale Deferral Account	Distribution Revenue (2022)	4.00	2026	2029
Change in Useful Life of Assets (2026-2029)	Distribution Revenue (2022)	4.00	2026	2029
Change in Useful Life of Assets (2025-2027)	Distribution Revenue (2022)	5.00	2025	2029

Toronto Hydro seeks approval for the following four new Deferral and Variance Accounts: (1) the 50/60 Eglinton Proceeds of Sale Deferral Account, (2) the Performance Incentive

Mechanism Deferral Account, (3) Demand Related Variance Account, and (4) the Innovation Fund Variance Account.

Toronto Hydro requests discontinuation of the following accounts:

- Account 1508- subaccount -Capital-Related Revenue Requirement ("CRRVA")
- Account 1508 – subaccount - Customer Choice Initiative Costs
- Account 1508 - Subaccount - Externally Driven Capital Variance Account ("EDCVA")
- Account 1508 - subaccount - Wireline Pole Attachment Revenue Variance
- Account 1508 - subaccount - Useful Life Changes
- Account 1508 - subaccount - Ultra-Low Overnight Rate Costs
- Account 1508 - subaccount - Green Button Initiative Costs

For more information about Toronto Hydro's DVA accounts and amounts proposed for clearance, please refer to Exhibit 9, Tab 1.

RATE FRAMEWORK

This schedule outlines Toronto Hydro's 2025-2029 custom incentive rate-setting framework: an evolved rate framework (rooted in the Renewed Regulatory Framework (the "RRF"), the Rate Handbook (the "Handbook"), and performance-based regulation principles) that enables the utility to deliver customer outcomes in the context of an energy transition driven by imperatives to electrify key sectors of economy (2025-2029 Custom Rate Framework).

Toronto Hydro followed a principled approach in developing the 2025-2029 Custom Rate Framework. In this approach the utility was guided by the following principles:

- deliver customer outcomes and advance public policy objectives;
- maintain rate stability and funding predictability to enable effective multi-year utility and customer planning and decision making,
- provide flexibility to execute multi-year plans in increasingly dynamic circumstances;
- protect customers and the utility from structural forecasting risks in times of uncertainty; and
- balance the interests of customers, the utility and its shareholder.

Toronto Hydro's framework is informed by enhanced performance-based regulation ("PBR") approaches employed in other leading jurisdictions that are undergoing an energy transition. To that end, Toronto Hydro retained a third-party expert (Scott Madden) to review the 2025-2029 Custom Rate Framework against a set of elements that were derived from a jurisdictional scan. A copy of this evidence is attached as Appendices A and B to this schedule to assist the OEB in evaluating the proposed framework.

The current custom rate framework, which was established in the 2015-2019 Rate Application (EB-2014-0116), provided stability and flexibility as Toronto Hydro grappled with the significant challenge of renewing a rapidly deteriorating distribution system.

The 2025-2029 Custom Rate Framework detailed in this schedule is structurally consistent with the rate framework approved by the OEB in past applications, with purposeful evolutions to achieve the objectives summarized below.

1. Provide multi-year funding certainty and flexibility for Toronto Hydro to:
   (i) continue to sustain a reliable grid and safe and effective operations; and
   (ii) address current and emerging (externally-driven) needs and challenges that the utility faces in delivering its services and preparing the grid for the energy transition.
2. Establish an appropriate balance between customer benefit and risk to the utility and its shareholder to:
   (i) protect consumers with respect to price and service quality outcomes in the next rate period and beyond, as consumers increase their reliance on the Toronto Hydro's grid for day-to-day energy needs; and
   (ii) maintain the utility's financial integrity with sufficient funding to deliver capital and operations programs to achieve outcomes that customers need and value now, and in an electrified future.

The following elements, as further described in this schedule, make up the comprehensive 2025-2029 Custom Rate Framework:

- A cost of service rebasing in 2025, the first year of a five-year rate term.

- A Custom Revenue Cap Index ("CRCI"), applied in years two through five (i.e. 2026 to 2029), to set rates for each year based on: (i) the expected growth in revenue that is required to fund the utility's investment plan, taking into account (ii) inflation minus productivity ("I-X") escalators and (iii) expected annual growth in billing determinants in each rate class per the five-year load forecast.
- The CRCI includes a Revenue Growth Factor ("RGF") to fund Toronto Hydro's incremental capital and operational investment needs in the outer years of the rate period (i.e. 2026-2029) so that the utility can make necessary investments in the grid and its operations to deliver outcomes that customers need and value.
- Base Revenues are adjusted annually by inflation and incentive factors (I-X):
    - The inflation factor ("I") is aligned with the OEB methodology, but includes an alternative Toronto-based salary and wages index to establish the labour component of the inflation factor to better reflect the real cost drivers of attracting and retaining talent in the Toronto labour market.
    - The incentive factor ("X") includes a 0.15 percent efficiency-factor supported by empirical total cost benchmarking evidence, and a pro-active 0.6 percent performance factor that balances risk and reward by providing:
        - customers a significant upfront rate reduction benefit of approximately $65 million over the 2025-2029 rate term; and
        - Toronto Hydro the opportunity to earn back this revenue in the next rate period through an innovative Performance Incentive Mechanism ("PIM") if the utility achieves set objectives.
- The PIM shifts cost and performance risk to the utility, ensuring greater accountability to customers for outcomes, while maintaining the utility's financial integrity by providing Toronto Hydro the opportunity (not the guarantee) to make its full rate of return by delivering performance outcomes in the areas of: (i) reliability

and resilience, (ii) customer service and experience, (iii) environment, safety and governance, and (iv) efficiency and financial performance. These performance outcomes are measured through twelve custom metrics with set targets on the utility's 2025-2029 Custom Scorecard.

- An Innovation Fund to further the OEB's objectives set out in the Framework for Energy Innovation ("FEI"), and enable Toronto Hydro to overcome practical challenges of pursuing innovation during the 2025-2029 rate period, including:
    - a prudence standard of review that requires a higher level of certainty in proving beneficial outcomes,
    - a rate term that generally requires investment plans to be developed far in advance, and
    - a revenue requirement approach that requires spending to be classified either as a capital or operating expense, with limited flexibility during the rate period to trade-off between these types of expenditures.
- A Demand-Related Variance Account ("DRVA") to protect ratepayers, the utility and its shareholder, from structural unknowns in forecasted costs and revenues related to demand growth in a time of unprecedented change and transformation in the economy and energy system.

For ease of reference, Table 1 below compares the key elements of the current 2020-2024 Custom Rate Framework and the proposed 2025-2029 Custom Rate Framework.

Table 1: Comparison of Current and Proposed Custom Rate Frameworks

	2020-2024 Custom Rate Framework	2025-2029 Custom Rate Framework
Year 1	Standard COS rebasing	Standard COS rebasing
Year 2	Custom Price Cap Index (“CPCI”): $I_n – X + C_n – S_{cap} * (I + X_{cap}) - g$	Custom Revenue Cap Index (“CRCI”): $I_n – X + RGF_n$
OM&A	One-year plan escalated by inflation less productivity (I-X)	Five-year plan funded through the Revenue Growth Factor (“RGF”)
Capital	Five-year plan funded through a capital factor (“C-Factor”)	Five-year plan funded through the Revenue Growth Factor (“RGF”)
Inflation	OEB Inflation Factor	OEB Inflation Factor methodology with an alternative labour index for Toronto Salary & Wages
X-Factor	0.6 percent reduction on non-capital related revenue requirement, and 0.9 percent reduction on capital related revenue requirement, resulting in a blended X-factor of 0.81-0.82 percent over the rate term	0.75 percent reduction on all revenue requirement with the opportunity to earn-back up to 0.6 percent of the X-factor through a Performance Incentive Mechanism (“PIM”) by achieving results measured through custom metrics with set targets on the utility’s 2025-2029 Custom Scorecard
Growth	Growth factor added to CPCI derived from five-year load and customer forecast	CRCI sets rates annually based on projected growth in billing determinants in each rate class
Deferral and Variance Accounts (DVAs)	Capital-Related Revenue Requirement Variance Account[1]	Demand-Related Variance Account
		Performance Incentive Mechanism Deferral Account
	Externally Driven Capital Variance Account[1]	Innovation Fund Variance Account
		Getting Ontario Connected Act Variance Account[2]
	Earning Sharing Mechanism	Earning Sharing Mechanism
	Property Sales	Property Sales[2]

[1] Toronto Hydro proposes to discontinue these accounts. For more information about these accounts, please see Exhibit 9, Tab 1, Schedule 1 at sections 4.2 and section 5.3.
[2] For more information about these accounts, please see Exhibit 9, Tab 1, Schedule 1 at sections 4.4 and 4.16.

Toronto Hydro's proposal evolves the existing custom rate-setting approach in a manner that is consistent with the RRF and aligned with the OEB's guidance in the 2016 Rate Handbook. Specifically:

- The custom index is derived from five-year forecasts and includes financial incentives for continuous improvement, including efficiency targets.
- The proposed X-Factor is higher than the OEB-approved X-Factor under standard Price Cap Incentive Regulation.
- The framework is supported by empirical evidence of the utility's productivity, as well as internal and external benchmarking.
- Annual updates are limited to updating the inflation factor.
- The inflation factor adjusts Toronto Hydro's rates and revenues annually to reflect the prevailing economic conditions, ensuring the utility has necessary funding to execute its multi-year investment plans.
- The framework includes a comprehensive scorecard with performance metrics that are aligned with the outcomes identified in the Application.
- The framework includes an Earning Sharing Mechanism ("ESM") to protect customers in the event of utility overearning in excess of 100 basis points of its OEB-approved regulated rate of return.

The sections that follow provide context and further explanation for the evolutions that Toronto Hydro proposes in the 2025-2029 Custom Rate Framework to address the needs and challenges that the utility faces, while maintaining its financial integrity and protecting customers with respect to service quality, reliability, and price outcomes both in the near- and longer-term.

1. THE PLANNING IMPERATIVES

Over the 2025-2029 rate period, Toronto Hydro's operations and capital investment needs are growing by approximately 37.5 percent due to a number of distinct and interrelated drivers. In particular:

- Responding to the extraordinary inflationary pressures experienced over the 2020-2024 rate period, wherein the Non-Residential Construction Index in the Toronto Census Metropolitan Area rose 37.7 percent from Q1 2020 through Q2 2023.[3]
- Toronto Hydro's asset base continues to age and deteriorate requiring significant sustained investment to maintain system health during the next rate period and beyond – especially since the importance of a safe and reliable grid is only increasing as customers rely on electricity for more of their daily energy needs.[4]
- Asset maintenance requirements are increasing due to (i) evolving legal and regulatory requirements, (ii) a growing level of corrective maintenance issues that need to be rectified, and (iii) increased volumes of assets that the utility must inspect and maintain.[5]
- Investment is required to prepare Toronto Hydro's grid and operations for the energy transition to ensure customers will not be underserved or unserved when demand materializes, including investments to expand and modernize the distribution system and increase operational capacity and capabilities to:[6]
    - serve customers' growing and changing electricity needs,
    - execute higher volumes of capital and operational work,
    - meet rising customer expectations with respect to service levels,[7]

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[3] Exhibit 1B, Tab 3, Schedule 3.
[4] Exhibit 2B, Sections D2.2, E2.2, E2.4.2, E4.2.2, and E6.
[5] Exhibit 2B, Section D3.1.1.3; Exhibit 4, Tab 2, Schedules 3 and 4.
[6] For more information please refer to Exhibit 2B, Sections D4 and D5 and Exhibit 4, Tab 1, Schedule 1.
[7] For more information please refer to Exhibit 1B, Tab 5, Schedule 1.

  - plan and execute more complex work in a dense, mature and urban operating environment,[8] and
  - leverage technology and pursue innovation to modernize utility operations, increase operational efficiency, optimize the use of new and existing assets, and support the integration of distributed energy resources ("DERs").[9]
- Technological changes are shifting certain types of investments such as demand-side non-wires solutions and cloud-based software solutions from capital to operational program expenditures.
- Environmental, social and governance ("ESG") imperatives are driving key account customers to pursue zero plans that will require investment in grid expansion and modernization, as well as services to support these customers in their decarbonization-through-electrification journey.

In addition to addressing grid and operational needs and laying the foundation for the unfolding energy transition in a paced manner, Toronto Hydro's 2025-2029 investment plan aims to deliver key objectives with respect to four key areas of performance: (i) reliability and resilience, (ii) customer service and experience, (iii) environment, safety and governance, and (iv) efficiency and financial performance outcomes. These outcomes are measured through custom metrics with set targets on the utility's 2025-2029 Custom Scorecard which is filed at Exhibit 1B, Tab 3, Schedule 1.

The investment priorities and associated outcomes are aligned with customers' needs and preferences, as demonstrated by the results of Toronto Hydro's two-phased customer engagement process detailed in Exhibit 1B, Tab 5, Schedule 1 whereby:

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[8] For more information about these challenges please refer to Exhibit 1B, Tab 3, Schedule 3, section 1 at page 2.
[9] For more information about please refer to the Grid Modernization Strategy at Exhibit 2B, Section E5.

- over 33,000 customers reviewed Toronto Hydro's draft plan, and
- an average of 84 percent of the customers surveyed supported the rate increase associated with the draft plan, or one that does even more to advance outcomes.

Toronto Hydro is the steward of a mature, diverse and complex distribution system serving a dense urban territory powering Canada's largest, and North America's second fastest growing city. The last two custom rate applications, and Toronto Hydro's 2012-2014 Incremental Capital Module ("ICM") application, were marked by the need for significant multi-year capital funding in excess of what can be funded through base rates under the OEB's Price Cap Incentive Rate-Setting Mechanism ("IRM") approach.

Past rate applications predominately focused on addressing significant system renewal needs and keeping up with the City's growth and densification. These investments delivered reliability improvements and many other service quality benefits to customers, as detailed in Exhibit 1B, Tab 3, Schedule 2.

Despite these achievements, Toronto Hydro continues to face asset condition and demographic pressures across all parts its system, which necessitate continued proactive investments over the next rate period to maintain a safe and reliable grid for customers.[10] At the same time, an energy transition is gradually unfolding across key sectors of the economy with residents, businesses and institutions adopting electrified technologies such as electric vehicles ("EVs"), heat pumps, solar panels and energy storage systems. Toronto Hydro must sustain, expand and modernize the grid to be ready and equipped to serve customers' growing demand for safe and reliable electricity during this transition.

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[10] For more information please refer to Exhibit 2B, Section E2.2.2.1.

While the pace and nature of electrification required to decarbonize the economy remains unsettled, there is broad societal and public consensus that an energy transition is required to mitigate the existential and economic impacts of climate change. In order to continue to serve the needs of the customers in an electrified future, Toronto Hydro is oriented around taking responsible, least-regret and paced actions in the 2025-2029 rate period to prepare the local grid and its operations for a fundamental shift in how customers rely on electricity in the decades to come.

To gain insight into the challenge posed by the energy transition, Toronto Hydro commissioned an industry leading consumer-choice modelling Future Energy Scenarios study to assess the impacts of different energy transition scenarios on Toronto Hydro's distribution system.[11] The Future Energy Scenarios study reveals that over time, a significant increase in peak demand across all scenarios is expected to occur, including the least ambitious steady progression scenario that falls short of meeting Net Zero 2050 objectives. This outlook is consistent with other leading studies, such as the Independent Electricity System Operator's ("IESO") Pathways to Decarbonization ("P2D") report, which estimates that in a high-growth scenario, in less than 30 years, Ontario could need more than double its electricity generating capacity.[12,13]

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[11] Exhibit 2B, Section D4, Appendix A and Appendix B.

[12] Toronto Hydro's own Future Energy Scenarios forecast a doubling in Toronto's electricity demand by the year 2050 across multiple scenarios (for more information please refer to Exhibit 2B – Section D4, Appendix A). The IESO's Pathways to Decarbonization report forecasts that demand could more than double by 2050 (https://www.ieso.ca/en/Learn/The-Evolving-Grid/Pathways-to-Decarbonization)

[13] Enbridge's Pathways to Net Zero forecasts an increase in demand of over three times in its electrification scenario (https://www.enbridgegas.com/en/sustainability/pathway-to-net-zero). In the US, utilities such as National Grid (https://www.nationalgridus.com/media/pdfs/our-company/massachusetts-grid-modernization/future-grid-full-plan-sept2023.pdf),Eversource(https://www.mass.gov/doc/gmacesmp-drafteversource/download?_gl=1%2Ako8zfs%2A_ga%2ANzUwNDI5MDE3LjE2NTA5ODEyMjQ.%2A_ga_SW2TVH2WBY%2AMTY5MzkyMDE2OS4zNi4xLjE2OTM5MjM1NzQuMC4wLjA.), and Unitil (https://unitil.com/ma-esmp/en) all published modernization plans forecasting demand increases of over 2 times by 2050. ISO New England also completed a study

The Future Energy Scenarios reveal that system peak demand could grow significantly, or more moderately, depending on technology, policy and consumer choices that will be made in the future. Toronto Hydro must both ensure that the grid is ready ahead of when demand increases (to avoid under-served or unserved customers), and also be reasonably cautious in building new capacity for the future. Building too much too soon could result in stranded assets and high rate impacts for customers, and building too late would result in the grid not being available to meet customer needs and expectations related to electrification.

To manage this uncertainty and the cost-consequences for customers, the utility must be: (i) measured-but-proactive in its investment plan (as both asset and human capital investments have long lead-times), (ii) deliberate in sustaining and modernizing its grid and operations to ensure that it is ready to serve and enable customer choice in a range of electrification scenarios, and (iii) oriented around a base of least-regret investment choices (i.e. investments that are required under most or all of the possible futures outlined in the *Future Energy Scenarios* study). Striking this important balance is at the heart of the 2025-2029 investment plan and the proposed Custom Rate Framework. In this regard, Toronto Hydro's Plan is aligned with the expanded priorities and expectations articulated by the Minister of Energy in the 2022 *Letter of Direction to the OEB*, and the recent *Powering Ontario's Growth* report.[14,15]

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which forecasts a doubling in system peak by 2050 (https://www.iso-ne.com/static-assets/documents/100004/a05_2023_10_19_pspc_2050_study_pac.pdf). National Grid ESO (Great Britain's system operator), also forecasts in an increase of about 2 times across many of it's future energy scenarios (https://www.nationalgrideso.com/document/283101/download). Electricity North West, *Distribution Future Electricity Scenarios* (December 2022) online: <https://www.enwl.co.uk/globalassets/get-connected/network-information/dfes/current/distribution-future-electricity-scenarios-2022.pdf>; National Grid ESO, *Future Energy Scenarios* (July 2023) online: <https://www.nationalgrideso.com/document/283101/download>.

[14] Ministry of Energy, *Letter of Direction from the Minister of Energy to the Chair of the OEB* (October 21, 2022) online: <https://www.oeb.ca/sites/default/files/letter-of-direction-from-the-Minister-of-Energy-20221021.pdf>.

[15] Ministry of Energy, *Powering Ontario's Growth: Ontario's Plan for a Clean Energy Future* (July 10, 2023) online: <https://www.ontario.ca/page/powering-ontarios-growth>.

2. THE FUNDING NEED

As illustrated in Figure 1 below, the continuation of a custom-rate setting approach is necessary for Toronto Hydro as funding derived from the OEB’s standard Price Cap and IRM framework is insufficient to fund the plan’s imperatives of system stewardship, growth and electrification, and modernization. Furthermore, Toronto Hydro’s ability to deliver its investment plan and advance the public policy objectives and customer benefits is dependent on a rate-setting approach that builds on, and necessarily evolves the current approved custom-rate setting approach.

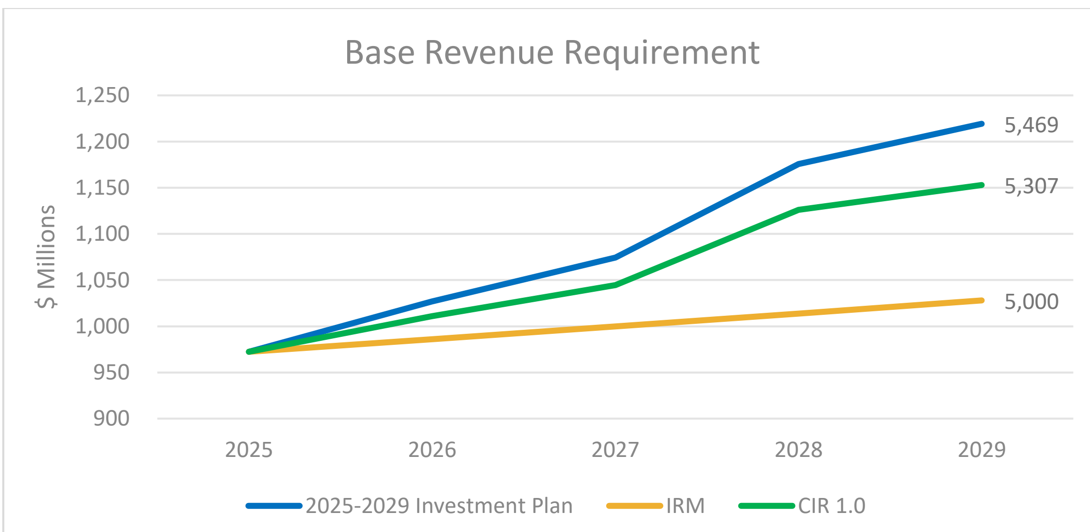

Figure 1: Cumulative 2025-2029 Base Revenue Requirement

Left unmitigated, the funding gaps depicted in Figure 1 above between IRM (the orange line), the existing custom rate-setting approach (the green line) and Toronto Hydro’s 2025-2029 investment plan (the blue line) would result in hundreds of millions of dollars of underinvestment in Toronto Hydro’s grid and operations. In these scenarios, system performance and customer outcomes would be adversely affected and energy transition objectives would be compromised or unmet. For the reasons detailed in the paragraphs that follow, Toronto Hydro submits that these scenarios do not serve the public interest or align with the OEB's statutory objectives.[16]

Under a standard IRM scenario, Toronto Hydro's 2025-2029 capital investment plan would be underfunded by approximately 35 percent or $1.5 billion. Adoption of a plan constrained by this funding envelope would force the utility into a sustainment plan that would be almost entirely reactive in nature, resulting in roughly an 8 percent deterioration in system reliability by the end of the rate period, along with increases in safety and environmental risks and reactive replacement costs due to increasing numbers of asset failures.[17] Such deterioration in system performance would: (i) put Toronto Hydro out of alignment with good utility practice, (ii) delay or prohibit the advancement of energy transition objectives that must be met over the 2025-2029 rate period in preparation for increasing peak demand and transition in the next decade, and (iii) harm ratepayers' interest with respect to long-term service quality and affordability outcomes.

While the gap between what standard IRM can fund and the revenue that the utility needs to execute its 2025-2029 investment plan is best addressed by a custom rate-setting approach, the needs of Toronto Hydro's 2025-2029 investment plan remain unmet under the current custom framework. Specifically, under the current framework, Toronto Hydro's 2025-2029 investment plan would be underfunded by approximately $450 million (i.e. approximately $360 million in capital expenditures and $90 million in OM&A expenses) due to a 0.9 percent stretch-factor on capital-related revenue requirement, and an approach to funding OM&A where operational budgets are rebased in the first year of the rate period

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[16] Section 1(1) of the *Ontario Energy Board Act*, 1998, SO 1998, c. 15, Sched. B.
[17] For more information please review the SAIDI custom metric in Exhibit 1B, Tab 3, Schedule 1.

and then adjusted annually by a rate that is less than inflation. Table 2 presents the return on equity ("ROE") implications of the existing framework.

Table 2: ROE Implications of the Existing Custom Framework ($ Millions)

	2025	2026	2027	2028	2029
2025-2029 Investment Plan Revenue Requirement (A)	972	1,027	1,074	1,176	1,219
2025-2029 funding under the existing custom framework (B)	972	1,011	1,044	1,126	1,153
Variance (A) – (B)	-	16	30	50	66
ROE Impact (basis points) *	-	59.6	110.8	183.5	245.6

*Estimated where $27 million per year equals approximately 100 basis points.

Since 2012, Toronto Hydro has been operating under high stretch factors and has achieved significant productivity gains by harvesting operational efficiencies such as fleet and facilities consolidation, job harmonization and process automation that have delivered significant benefits to customers. While the utility remains committed to productivity and efficiency and intends to continue on a path of achievement in this area, Toronto Hydro has already targeted and adjusted the most significant areas for productivity improvements. The various benchmarking studies filed in this application show that Toronto Hydro is a good cost performer relative to its peers, and in many cases exceeds the performance of its peers when the appropriate operating conditions (e.g. dense urban environment) are taken into consideration.[18]

After more than a decade of living under a top-down constrained funding model serving a growing urban service territory that poses significant operational challenges and material cost drivers, Toronto Hydro cannot eliminate the funding gap identified above through

[18] For more information about productivity and benchmarking, please refer to Exhibit 1B, Tab 3, Schedule 3.

productivity efforts such as absolute cost reductions or reprioritizing capital and operational work. While deferral of work may have been a viable strategy in past periods, it is not in the current circumstances where the utility must tackle both persisting and new challenges and requirements, and prepare the grid and its operations for a major transformation in how customers use electricity.

A choice to defer work planned within the 2025-2029 Distribution System Plan found at Exhibit 2B does not serve the interests of ratepayers. For example, a deferral of work contained within the Grid Modernization Strategy at Exhibit 2B, Section D5 would mean that customers can expect a deterioration in reliability performance over the next rate period, higher customer interruption costs and much higher costs in the next decade as the system becomes more heavily utilized by customers. Similarly, investments to increase grid capacity to connect new or expanded loads in a timely and efficient manner, and enable customers to adopt DERs could be compromised – jeopardizing customer choice and impeding progress towards energy transition goals.

Similarly, deferring investment in OM&A to manage within the funding provided by the current framework, would lead to attrition of up to 200 employees by the end of the rate period, putting Toronto Hydro's staffing complement at precariously low level, and setting the utility back with respect to a multitude of outcomes and risks which are summarized in section 2.1 below and further detailed in Exhibit 4, Tab 1, Schedule 1.

The funding challenges depicted above are already being felt in the current rate period given the capital and operational needs that the utility is managing, and notwithstanding the productivity achieved through various initiatives detailed in Exhibit 1B, Tab 3, Schedule 3. For example, from 2020 to 2022, Toronto Hydro's achieved regulatory ROE averaged at 6.81

percent, which is 1.71 percent lower than its deemed ROE of 8.52 percent. The funding deficiency in the current rate period is due to multiple factors including the load-related impacts of COVID-19,[19] and the need to invest in prudent operational expenditures (above what base rates can fund under the current framework) in order to: (i) to implement the 2020-2024 workforce plan and (ii) address various incremental requirements summarized in the OM&A Overview schedule at Exhibit 4, Tab 1, Schedule 1 and detailed throughout the programmatic evidence in Exhibit 4, Tab 2.

Toronto Hydro proposes a number of evolutions to the existing custom-rate setting approach that are purposefully designed to address the funding challenges described above, re-balance utility and ratepayers' risk and reward, and critically – continue to pursue outcomes that matter to customers including achieving efficiency gains. To that end, the Performance Incentive Mechanism ("PIM") and the Custom Revenue Cap Index ("CRCI") outlined in section 3 are key elements of the proposed Custom Rate Framework.

2.1 Operational Funding Needs

The paradigm of a single rebased OM&A year subject to a growth rate that is less than inflation over the rate term (i.e. an I-X approach) is incompatible with Toronto Hydro's evolving operational needs, as the utility must expand and modernize the grid and its operations to facilitate the energy transition that customers and stakeholders expect. The key drivers behind the operational need in the current period are summarized in Exhibit 4, Tab 1, Schedule 1, and throughout the programmatic evidence at Exhibit 4, Tab 2.

[19] For more information please see Exhibit 3, Tab 1, Schedule 1 and Exhibit 1B, Tab 3, Schedule 3 at section 2.1.

After a decade of realizing sustained operational efficiencies to be able to manage its operations with a workforce complement that is essentially flat from 2015 to 2024, it is no longer possible nor prudent for Toronto Hydro to meet its obligations without hiring additional resources. From 2024 through to 2029, Toronto Hydro's workforce must grow by roughly 25 percent to support the execution of an expanded capital program as detailed in Exhibit 2B, while also addressing the policy, technology and customer imperatives of a changing energy landscape. Greater volumes of capital work require more skilled trades working in the field and operating the distribution system, as well as staff executing a broad range of support functions, such as corporate services professionals administering the utility's financial processes and accounting records, and legal and regulatory professionals negotiating contracts (e.g. offers to connect) and maintaining compliance with legal and regulatory requirements in the face of increasing volumes and complexity of work outlined in the plan. Furthermore, as traditional energy consumer models evolve to a paradigm where customers are using more electricity and actively participating in energy management through new technologies such as DERs, Toronto Hydro's customer-interfacing operations must also follow suit. Customer-related utility functions need to be expanded and enhanced to successfully address emerging customer needs and requirements such as: connecting EVs, heat pumps and DERs of varying size and scale; accessing energy data and analytics and new channels of digital customer communication and interaction.

It is not possible for the utility to meet these requirements, and in particular its workforce needs, with the operational funding levels provided by the current framework. As noted in the OM&A Overview evidence at Exhibit 4, Tab 1, Schedule 1, managing workforce-related costs downwards to live within a standard IRM funding paradigm would put Toronto Hydro's staffing complement at a precariously low pre-2015 level. Since the utility already has a demonstrably lean workforce compared to other distributors in the province (as evidenced by benchmarking) such a reduction would compromise the utility's performance with respect to a multitude of outcomes and risks, including safety, customer service and efficiency.

Under a constrained operational plan, the utility would also face a reduced absorption rate of the Certified and Skilled Trades such as Distribution System Technologists ("DSTs") that are critical to the execution of Toronto's capital and operations programs. DSTs operate, install, commission, construct, repair, maintain, and decommissions all types of protective relay and control systems, distribution automation equipment, and SCADA systems that are integral to implementing key components of the utility's Grid Modernization Strategy outlined in Exhibit 2B, Section D5. Other consequences of not having the operational funding that is necessary to attract and retain the level of resourcing outlined in Toronto Hydro's workforce plan, include:

- Less efficient and effective system and capacity planning compromising:
    - (i) the execution of the 2025-2029 Distribution System Plan ("DSP") and the development of future DSPs,
    - (ii) the optimization of investments to meet future load growth and connection capacity, including the identification of non-wires solutions opportunities,
    - (iii) the integrity of regional planning and coordination efforts, and
    - (iii) the implementation of grid modernization and innovation initiatives that can provide long-term value and significant future benefits to customers;
- Safety, reliability, and poor customer service outcomes if distribution system records and data updates cannot be maintained and synchronized with equipment or system configuration changes;

- Lack of skill sets necessary to support evolution of control centre operations, including to undertake the data modelling and system analysis required to enable the self-healing grid and other distribution automation functions;
- Insufficient cyber security capacity and expertise to manage the widespread threat of advanced cyber attacks against critical infrastructure;
- Insufficient staffing levels and skill sets to meet customers service expectations, including knowledge management expertise to ensure accurate and timely responses to increasingly complex customer inquiries, as well as, data analytics to deploy and fully optimize automated quality management powered by artificial intelligence and machine learning technologies;
- Reduced governance and oversight of financial planning activities that can limit the organization's ability to maintain financial integrity outcomes;
- Ineffective or unfavourable negotiation of contract terms, resulting in substandard performance by contracted parties or foregone recourse to appropriate remedies, reducing the value to ratepayers;
- Non-compliance or incorrect implementation of new requirements, policies or programs resulting in increased customer complaints, potentially compromising the advancement of public policy objectives;
- Increased frequency of inaccurate or delayed information resulting in customer confusion and dissatisfaction; and
- A reduced ability to successfully recruit and develop the skilled and specialized resources that Toronto Hydro requires to execute its current and future investment plans.

The operational consequences highlighted compromise Toronto Hydro's ability to execute the 2025-2029 investment plan, deliver the performance results detailed in Exhibit 1B, Tab

3, Schedule 1, and advance energy transition objectives that are important to its customers and stakeholders. For these reasons, Toronto Hydro 2025-2029 Custom Rate Framework includes a mechanism (the Revenue Growth Factor further described in section 3.1.3.1 below) to fund operational investments over the rate period that exceed what can be funded under a standard IRM approach.

3. 2025-2029 CUSTOM RATE FRAMEWORK

This section describes the elements of Toronto Hydro's proposed 2025-2029 Custom Rate Framework. The information is organized to first describe the components of the rate formula known as the Custom Revenue Cap Index (the "CRCI"), followed by the non-CRCI elements of the Custom Rate Framework.

3.1 Custom Revenue Cap Index ("CRCI")

3.1.1 Revenue Cap Approach

In the last two custom rate applications (EB-2014-0116 and EB-2018-0165) Toronto Hydro proposed, and the OEB approved, a rate-setting approach centered around a modified price-cap rate model. This approach established rates in the rebasing year (2015 and 2020, respectively) after which established rates were escalated annually by an index known as the Custom Price Cap Index ("CPCI"). On completion of the rebasing year, no further consideration was given to customer billing determinants (i.e. customer count, kWh and kVa) or changes in these determinants over the rate plan.

In EB-2014-0116, where the current custom framework was first proposed and adjudicated, a growth adjustment was added to Toronto Hydro's CPCI to ensure that capital costs were not over-collected. This took the form a 0.3 percent factor – termed the growth-factor or "g-factor" – derived from the top-line of the utility's five-year customer and load forecast. A g-factor of 0.2 percent was carried forward for inclusion in the utility's current rate framework based on 2020-2024 load and customer forecast.[20]

The g-factor translates billing determinant growth across customer count, kWh, and kVa in all rate classes into a simplistic top-line figure that is applied formulaically to base rates. In doing so, it lacks specific consideration of the details embedded in the five-year customer and load forecast. In particular, it does not recognize different patterns of growth amongst the rate classes and their billing determinants.

The g-factor was adopted in 2015 at a time where the growth in billing determinants was more stable and linear. However, in the current period and looking ahead to the end of the decade, growth in demand is becoming more dynamic due to a multitude of factors (e.g. a more volatile housing market and supply mix, shifting immigration policies, and electrification-related policies, technology and consumer preferences). A more nuanced mechanism is suitable to capture billing determinant growth within this changing and more dynamic environment to ensure that rates for each of the customer classes continue to be just and reasonable.

Toronto Hydro proposes a shift in its rate-setting approach from price-cap to a revenue-cap model. Rather than escalate rates themselves each year, and use a simplistic g-factor to account for expected billing determinant growth, Toronto Hydro proposes to escalate revenue requirement each year, and design rates for each revenue requirement on the basis of forecasted customer and load growth over the rate term. This approach captures expected billing determinant growth in a more precise manner, considering shifting

[20] EB-2014-0116, Decision and Order (December 29, 2015) at pages 28-29 and EB-2018-0165, Decision and Order (December 19, 2019) at pages 41-42.

customer make-up and changes to energy usage patterns as amongst kWh and kVa in a period of energy transition.

It is also worth noting that Toronto Hydro's proposal is a true revenue cap as the utility proposes a sub-account within its Demand-Related Variance Account ("DRVA") to record revenue differences as a result of variances in weather normalized billing determinants at the rate class level. The DRVA is further described in section 3.2.3 of this schedule.

3.1.2 Year 1: Standard Rebasing

The first year of the proposed rate application is a cost of service rebasing year, consistent with the OEB's standard IRM approach. The rebasing is derived from Toronto Hydro's 2025 forecasted revenue requirement based on its capital and operational plans for the year, as further detailed in its Distribution System Plan ("DSP") at Exhibit 2B and the OM&A evidence in Exhibit 4. The revenue requirement resulting from these projections is presented in Exhibit 6, Tab 1.

With the 2025 revenue requirement established, Toronto Hydro used the OEB's cost allocation model to allocate the revenue requirement to its rate classes, maintaining revenue-to-cost ratios for each class within the guidelines set out in the OEB's 2011 Review of Electricity Cost Allocation Policy.[21] For more information about Toronto Hydro's Cost Allocation and Rate Design, please refer to Exhibits 7 and 8, respectively.

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[21] EB-2010-0219, EB-2012-0383 and OEB letter issued June 12, 2015 Issuance of New Cost Allocation Policy for Street Lighting Rate Class.

3.1.3 Years 2-5: Custom Index

In year two through five of the rate period (i.e. 2026 to 2029), rates are set by the implementation of the Custom Revenue Cap Index ("CRCI"). The CRCI produces a percentage factor by which base revenue requirement must be escalated from one year to the next during the rate term in order to fund Toronto Hydro's investment plan.

The CRCI formula to be applied in years 2 through 5 (2026 to 2029) is: **CRCI =** $\mathbf{I_n - X + RGF_n}$

Where,

- **I** = an Inflation-factor to be updated annually as per the OEB's standard methodology with an alternate labour index for Toronto salary and wages.
- **X** = an X-Factor of 0.75 percent which consists of (i) a 0 percent productivity-factor, plus (ii) a 0.15 percent efficiency-factor, supported by total cost benchmarking, plus (iii) a proactive 0.6 percent performance factor that enables the PIM.
- **RGF** = a Revenue Growth Factor which represents the amount by which base revenue requirement must increase each year to fund the utility's proposed investment plan, and is adjusted as outlined in Table 3 to remove a forecast of the inflation factor so that the base revenue requirement can be escalated by the actual inflation-factor through a mechanistic annual rate update process.
- **n =** the rate year in question.

The following sections describe the components of the CRCI.

1. *<u>Revenue Growth Factor</u>*

The OEB's decision in EB-2014-0116 marked the establishment of a new mechanism to account for multi-year capital needs in excess of what base rates can fund under standard IRM – this mechanism is known as the Capital or "C-factor". The C-factor is an attrition relief mechanism that implements additional rate escalations each year, beyond those provided for through base rates escalated at inflation less productivity, to account for the utility's growing capital-related revenue requirement as a result of implementing the multi-year capital investment plan known as the DSP. Over the last two custom rate applications, the C-factor provided a means to fund multi-year capital investment plans beyond what could be achieved under a standard IRM approach.

As noted in this schedule and detailed in Exhibit 4, Toronto Hydro's operational funding needs are growing due to a number of distinct and interrelated factors, including the need to hire and retain more resources to deliver a larger and more complex work program, which is necessary to sustain, expand, and modernize the grid, and deliver key outcomes that customers and stakeholders value. To address the emerging need for multi-year operational funding in excess of what can be achieved under standard IRM, Toronto Hydro proposes a Revenue Growth Factor ("RGF"). The RGF, similar to the existing C-factor, enables year-over-year rate increases to fund incremental revenue requirement related to both capital and OM&A investments. As further described below, the RGF escalates revenue requirement annually by a factor that accounts for the difference between one year's revenue requirement and the next.

In Exhibit 6, Toronto Hydro submitted the revenue requirement resulting from its capital and OM&A programs and other revenue forecasts over the 2025 to 2029 rate period. To calculate the RGF, the difference between each subsequent year's revenue requirement is determined as a percentage by which revenue requirement must escalate to fund the investment plan for the upcoming year.

The forecasted capital and OM&A expenditures presented in Exhibits 2B and 4, and the resulting revenue requirement presented in Exhibit 6, include inflationary assumptions with respect to the underlying cost inputs (i.e. labour, materials, and other costs). To allow updates of the annual inflation factor in rates without double-counting the impact of inflation, Toronto Hydro adjusted the RGF by removing a 2 percent forecasted annual inflation factor for the 2026 to 2029 period, thereby presenting the RGF as an increase in revenue requirement on an inflation-adjusted basis for rate-setting purposes.

Table 3 below outlines the proposed RGF values for years two through five (2026-2029) before and after the inflation adjustment.

Table 3: 2026-2029 Revenue Growth Factor ($ Millions)

	2025	2026	2027	2028	2029
Base Revenue Requirement (BRR)	972	1,027	1,074	1,176	1,219
Difference	-	55	47	101	44
RGF before Inflation Adjustment	**-**	**5.61%**	**4.62%**	**9.43%**	**3.71%**
Forecast Inflation Factor (%)	-	(2.00%)	(2.00%)	(2.00%)	(2.00%)
RGF after Inflation Adjustment	**-**	**3.61%**	**2.62%**	**7.43%**	**1.71%**

The RGF value for each year, as determined and approved by the OEB in this application, is applied to the prior year base revenue requirement to set rates from 2026 to 2029 through the implementation of the CRCI in annual rate applications. Aside from achieving the objective of providing funding certainty and stability in rates which is necessary to enable effective multi-year planning and operations, the RGF offers the added benefit of simplicity relative to the current C-factor since the entire revenue requirement is being escalated by the same inflation and productivity factors as further detailed below.

2. Inflation Factor

An annual inflation adjustment based on objective economic factors is an important element of establishing just and reasonable rates under standard OEB policy.[22] This element is even more important in light of the current volatility in national and global inflation, which may or may not subside over the 2025 to 2029 rate period.

Toronto Hydro's proposed approach to account for inflation in annual rate setting is consistent with standard OEB policy, with one distinction. Toronto Hydro proposes to replace the Ontario Average Weekly Earnings ("ON-AWE") inflation index within the OEB's inflation factor methodology with a custom Toronto Hourly Salary and Wages Index. This index can either be derived by the Conference Board of Canada ("CBC") economic data subscription service, or can be reproduced by purchasing relevant tax data from Statistics Canada. For efficiency purposes, Toronto Hydro proposes to rely on the Conference Board of Canada index.

Substituting the labour component of the inflation factor with a Toronto-specific index is responsive to the consideration that labour is a key cost driver within the utility's plan, and a Toronto-specific labour index could be more suitable to account for the localized inflationary cost pressures that the utility faces in the 2025-2029 rate period. While it is not possible to predict what these pressures would be, or how they would differ regionally, the historical trend over the last six years (i.e. 2016 to 2022) suggests that regional differences may be a factor. As shown in Table 4 below, on a multi-year average basis, Toronto Hydro's average blended salary increase rate (derived from salary and wages per employee as shown

[22] EB-2010-0379, Rate Setting Parameters and Benchmarking under the Renewed Regulatory Framework for Ontario's Electricity Distributors (updated December 4, 2013).

in Appendix 2-K) outstripped the ON-AWE index, and tracked with the Conference Board of Canada Toronto Hourly Salary and Wages index.

Table 4: 2016-2022 Labour Inflation

	Statistics Canada Average Weekly Earnings (AWE) Ontario	Toronto Hydro Average Blended Salary Increase (Appendix 2-K)	Conference Board of Canada Toronto Hourly Salary & Wages
2016	2%	1.2%	4.9%
2017	2.6%	2.5%	3.3%
2018	1.1%	3.2%	0.2%
2019	1.9%	3.7%	3.4%
2020	2.9%	3.9%	5.4%
2021	2.8%	3.8%	1.5%
2022	7%	4.6%	4.3%
2016-2022 Average	**2.9%**	**3.3%**	**3.3%**

3. X-Factor

Toronto Hydro proposes an X-Factor of 0.75 percent which consists of:

- 0 percent productivity-factor consistent with OEB policy, plus
- 0.15 percent efficiency-factor supported by empirical evidence, plus
- 0.6 percent proactive performance incentive mechanism factor.

The study prepared by Clearspring Energy Advisors at Exhibit 1B, Tab 3, Schedule 3, Appendix A supports an efficiency-factor of 0.15 percent based on empirical total cost benchmarking against relevant peers accounting for known and accepted operational differences between utilities which require adjustment.[23] By the end of the rate period (i.e. in 2029) the 0.15

[23] In the 2020-2024 Rate Application (EB-2018-0165), OEB Staff's expert Pacific Energy Group (PEG) accepted the appropriateness of a variable that accounts for urban congestion. The OEB Panel presiding over that case echoed the comment in the Decision and Order (December 19, 2019) at page 29. Similarly, in Hydro One's 2023 Joint Rate

percent efficiency-factor yields an approximate annual revenue reduction of $6.9 million relative to Toronto Hydro's forecasted revenue requirement set out in Exhibit 6.

This revenue reduction represents the annual value of the efficiency benefits that customers would reasonably expect to receive through the utility's productivity efforts over the rate term. As is customary within IRM, Toronto Hydro takes the risk of this efficiency gain upfront giving customers the benefit of the rate reduction during the rate period – a benefit that amounts to approximately $16.4 million over the entire rate period by adding up the values in the last row of Table 5 below.

Table 5: Efficiency Factor (0.15%) Revenue Reduction ($ Millions)

	2025	2026	2027	2028	2029
Revenue Requirement based on the 2025-2029 Investment Plan	972.4	1,027.0	1,074.4	1,175.7	1,219.2
Revenue Collected after 0.15% Efficiency Factor	972.4	1,025.5	1,071.3	1,170.9	1,212.2
Revenue Reduced by 0.15% Efficiency Factor	-	1.5	3.1	5.0	6.9

Note: There could be minor differences due to rounding.

Furthermore, as part of the 2025-2029 Custom Scorecard outlined in Exhibit 1B, Tab 3, Schedule 1, the utility set a goal through the Efficiency Achievements metric to sustain these benefits for customers into the next rate period by achieving quantified efficiency gains of at least $6.9 million per year by 2029. These gains can be achieved through cost avoidances, reductions or other efficiency gains that result in a lower revenue requirement at the next rebasing, than would otherwise be put forward if the efficiency gains were not achieved.

Application (EB-2021-0110), PEG through an OEB-ordered conferral process with Clearspring Energy Advisors accepted the inclusion of a substation variable within the custom total cost benchmarking study.

In addition to the efficiency-factor, Toronto Hydro's rate framework proposes a proactive 0.6 percent performance incentive factor that further reduces revenues by approximately $65 million over the rate term, providing customers an additional upfront rate reduction. This proposal (i) demonstrates Toronto Hydro's commitment to be held financially accountable to customers for key outcomes of the proposed investment plan, and (ii) gives effect to an innovative Performance Incentive Mechanism ("PIM") that provides the utility the opportunity to earn-back the foregone revenue, if it delivers the target performance results on the Custom Scorecard. The PIM proposal is further detailed in the section 3.2.1 below.

3.2 Key Custom Elements (Non-CRCI)

The following sections discuss three key elements of the 2025-2029 Custom Rate Framework that enable an evolved approach to custom incentive rate-setting: (1) the Performance Incentive Mechanism ("PIM"); (2) the Innovation Fund; and (3) the Demand Related Variance Account ("DRVA"). Together with the CRCI rate formula described above in section 3.1, and the existing Earning Sharing Mechanism ("ESM"), Off-Ramp and Z-Factor mechanisms summarized below in section 3.3, these elements form a balanced custom rate framework that is integral to the utility being able to function effectively within the operating context that it faces – a transition that is expanding the role of electricity within the energy system, and customers, communities and stakeholders who expect the utility to enable this future-state in a paced and deliberate manner.

3.2.1 Performance Incentive Mechanism (PIM)

As noted above, the PIM is a key enhancement and regulatory innovation within Toronto Hydro's 2025-2029 Custom Rate Framework. This section describes the mechanics of the PIM in further detail.

The custom total cost benchmarking study performed by Clearspring Energy Advisors supports an efficiency-factor of 0.15 percent. This reflects Toronto Hydro's productivity achievement and ordinarily should be used for purposes of setting rates. However, instead of the empirically-derived efficiency-factor of 0.15 percent, Toronto Hydro proposes the adoption of a higher factor of 0.75 percent that is composed of the 0.15 percent efficiency-factor and a proactive performance incentive of 0.6 percent. The former drives continuous improvement in efficiency consistent with benchmarking expectations, and the latter functions as an incentive mechanism to achieve outcomes and deliver customer benefits associated with the 2025-2029 investment plan.

Any combination between the empirical efficiency-factor and the performance incentive that make-up the total X-factor should be capped at 0.75 percent in order to maintain balance between the utility risk and customer reward derived from the PIM. The balance is assessed by the cost of the incentive to be paid by customers over the 2030-2034 rate period relative to the value of the direct benefits to ratepayers over that period derived from meeting the targets proposed in the 2025-2029 Custom Scorecard. This analysis is presented in Exhibit 1B, Tab 3, Schedule 1 at section 3.

Toronto Hydro carries the risk of achieving the performance outcomes since, if the targets are not achieved, Toronto Hydro cannot earn its approved return on equity ("ROE"). As such, the PIM is an asymmetrical incentive to the benefit of customers in that it provides Toronto Hydro with the opportunity (not the guarantee) to earn the approved ROE and make a fair return for its shareholder. It is aligned with the RRF, and responsive to the OEB's feedback in Toronto Hydro's 2020-2024 decision encouraging the utility to consider an alternative approach in the future that meets RRF requirements and improves the balance of risk between customers and the utility.[24]

The PIM balances efficiency and other important performance outcomes within an incentive mechanism that places greater accountability on the utility for delivering value for money and benefits to ratepayers. In the event that some (or all) of the outcomes are not achieved, the PIM is not met, which means that ratepayers keep some (or all) of the incentive that was credited to them during the 2025-2029 rate period. This approach protects ratepayers and shifts risk onto the utility to manage the funding challenge described in this schedule while balancing grid performance and service quality outcomes that are important to customers and stakeholders now and in the future.

The PIM is linked with the 2025-2029 Custom Scorecard detailed in Exhibit 1B, Tab 3, Schedule 1. The scorecard includes weighted metrics and proposed targets which capture key objectives and outcomes of Toronto Hydro's plan, including but not limited to efficiency. As it is tied to a comprehensive five-year plan, the Custom Scorecard is established on a five-year basis, covering the entire 2025-2029 rate period. Though Toronto Hydro has proposed a continuation of annual reporting against the scorecard, the targets on the scorecard are set on a five-year basis, and do not include annual targets as Toronto Hydro's application is based on an integrated five-year investment plan and not five annual plans. This is important since Toronto Hydro requires the flexibility to execute its multi-year plan and adapt to externally-driven changes and more complex operating dynamics that it may face in that regard.[25]

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[24] EB-2018-0165, Decision and Order (December 19, 2019) at page 24.

[25] For a summary of the operational and work execution challenges that the utility faces operating in a dense urban environment please refer to Exhibit 1B, Tab 3, Schedule 3 at pages 3 to 9.

The targets proposed in Exhibit 1B, Tab 3, Schedule 1 are carefully calibrated to Toronto Hydro's proposed plan, as outlined in this application. To the degree final approval of Toronto Hydro's 2025 to 2029 investment plan and rate-setting approach varies materially from what the utility proposed in pre-filed evidence, the performance results identified in the targets must be reviewed and recalibrated to align with the implications of the OEB's decision. Further, given the careful establishment of proposed targets, their relationship with top-line capital and OM&A funding in rates is dynamic and multi-dimensional, which means that a simple pro-ration of proposed targets would not yield appropriate outcomes. For these reason, Toronto Hydro proposes to defer the finalization of the targets to a second phase of this proceeding that can be run in parallel with the Draft Rate Order process. Putting in place a dedicated process to consider updated targets, armed with full knowledge of approved funding and other OEB Decision parameters, enables Toronto Hydro, intervenors and the OEB to finalize PIM targets which appropriately balance incentives, risk, achievability, and difficulty.

To implement the PIM, Toronto Hydro proposes a new deferral account – the Performance Incentive Mechanism Deferral Account (PIM-DA) – to record the PIM earnings. This account would be brought forward for review and disposition in the utility's next rebasing application, based on known (or forecasted) performance results for the 2025-2029 rate period. Only if the set performance targets are achieved (or forecasted be achieved with a high degree of confidence) by the end of the rate term would the incentive be recovered from customers in the next decade. As such, Toronto Hydro confirms that that there would be no rate recovery associated with the PIM in the 2025-2029 period.[26]

[26] Please refer to Exhibit 9, Tab 1, Schedule 1, Appendix C for a Draft Accounting order for the PIM-DA.

The earnings under the PIM, if targets are fully achieved, allow Toronto Hydro to earn its foregone revenue associated with the proactive 0.6 percent reduction provided to customers upfront through the X-factor. Earning this amount back is only sufficient to enable the utility to achieve its approved ROE. In other words, the PIM is an asymmetrical mechanism to the benefit of customers, as meeting the performance targets set out in 2025-2029 Custom Scorecard does not give rise to the possibility of utility overearnings.

3.2.2 Innovation Fund

In alignment with the OEB's statutory objective to facilitate innovation in the electricity sector, Toronto Hydro proposes to establish an Innovation Fund to support the design and execution of innovative pilot projects over the 2025-2029 rate period.[27] The pilot projects undertaken through the Innovation Fund would be focused on testing new technologies, advanced capabilities and alternative strategies that enable electrification grid readiness and are responsive to the OEB's expectations with respect to facilitating DER integration, as expressed in the Framework for Energy Innovation (FEI*)* report.[28]

The proposed Innovation Fund is an important part of Toronto Hydro's 2025-2029 Custom Rate Framework because it addresses needs that are not adequately met by existing funding mechanisms which favour investment where the beneficial outcomes are proven or certain. The Innovation Fund supports important utility work that is more early stage, exploratory and developmental in nature, and as such where the outcomes are less certain, but the potential benefits for the system and customers could be significant. While the benefits of individual projects may not be immediate or certain, and some initiatives may prove to be

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[27] Please refer to Exhibit 1B, Tab 4, Schedule 2 for more information about the Innovation Fund proposal.
[28] Ontario Energy Board, Framework for Energy Innovation: Setting a Path Forward for DER Integration (January 2023) https://www.oeb.ca/sites/default/files/FEI-Report-20230130.pdf

more or less fruitful than others, this type of work is nevertheless critical to achieving real innovation during a time of unprecedented change and transformation in the energy sector.

The Innovation Fund would also assist Toronto Hydro in overcoming the challenges of pursuing innovation in the context of a rate cycle that generally requires investment planning to be carried out far in advance and that requires spending to be classified either as a capital or operating expense. It provides Toronto Hydro with operational flexibility to identify and pursue the research, development and piloting of new technologies, capabilities and strategies throughout the rate period, and to determine the types of expenditures (i.e. capital or operating) in real time based on project specific details. For these reasons, the Innovation Fund would enable the utility to be more responsive to emerging needs and technologies as they arise during the rate period, and to scope, design and implement pilot projects and other exploratory initiatives more effectively.

Toronto Hydro carefully considered the amount of funding requested for this proposal. Based on research, the utility decided to allocate 0.3 percent of the proposed revenue requirement to the Innovation Fund, which amounts to approximately $16 million over the 2025-2029 rate period. This is the low end of a range found in research of comparable ratepayer-funded initiatives aimed at facilitating innovation by utilities and regulatory bodies in other jurisdictions, as well as general data on utility spending for research and development activities.

Toronto Hydro proposes to collect the amount allocated to the Innovation Fund through a rate rider (rather than through base rates) in order to provide transparency to ratepayers on the bill and flexibility to the utility to determine how the funds should be allocated across capital and operational expenditures on the basis of the selected pilot projects. Toronto

Hydro proposes to establish a new variance account to record variances between the amounts collected by the rate rider and the actual costs incurred to execute the selected pilot projects as part of the Innovation Fund.

For more information about the Innovation Fund proposal, please refer to Exhibit 1B, Tab 4, Schedule 2, which (i) outlines the Governance Framework to administer the proposed Innovation Fund, (ii) discusses the areas of innovation targeted by the fund, and (iii) describes various pilot project concepts that are being considered as part of this proposal.

3.2.3 Demand Related Variance Account (DRVA)

This application is being filed during a time of unprecedented change and transformation, as customers, communities and governments at all levels are actively embarking on an energy transition to mitigate the existential and economic impacts of climate change. Decarbonization is expected to create new roles for electricity, including as an energy source for transportation and building heating systems. While there is certainty that fundamental change is ahead, there are degrees of uncertainty about how that change will unfold (e.g. the pace and adoption of electrified technologies such as EVs and heat pumps; the role of low-emission gas; and the scale of local vs. bulk electricity supply). To address this uncertainty within its 2025-2029 Custom Rate Framework, Toronto Hydro proposes a symmetrical variance account that protects both ratepayers and the utility from structural unknowns in forecasted costs and revenues, during this time of change and evolution with respect to the role of electricity in the energy system.

Subject to OEB approval, Account 1508 – Demand-Related Variance Account (DRVA) would record: (i) the demand-driven revenue requirement impacts arising from variances in actual versus forecast capital and operational expenditures for certain demand-based programs (the Expenditure Variance Sub-Account); and (ii) the revenue impacts arising from variances in forecast versus actual billing determinants over the rate period (the Revenue Variances Sub-Account). To that end, the account will consist of two subaccounts:

1. The Expenditure Variances subaccount would record the symmetrical revenue requirement impacts, including PILs, arising from the variance between 2025-2029 planned and actual expenditures related to the following capital and operations programs: Customer Connections, Customer Operations, Stations Expansion, Load Demand, Non-Wires Solutions, Generation Protection Monitoring and Control and Externally-Initiated Plant Relocations and Expansions (collectively the "Demand-Related Investments").
2. The Revenue Variance subaccount would record the revenue impacts resulting from weather-normalized variances in billing determinants (i.e. customer count, kWh and kVA).

The DRVA satisfies the OEB's eligibility criteria of causation, prudence and materiality.

- **Causation**: The amounts to be captured in the DRVA are outside of the base upon which the rates proposed in the current application are derived, as they relate to variances driven by external factors (e.g. customer demand, public policy and technology changes) that are clearly outside of the utility's control.
- **Prudence**: With respect to prudence, the incremental costs that would be captured in the DRVA are presumptively prudent in that they are necessary to ensure that Toronto Hydro is able meet its obligation to serve customers and provide non-discriminatory access to the grid.
- **Materiality**: While Toronto Hydro makes significant efforts to forecast cost and revenues, as discussed below and throughout the evidence, the pacing and level of

demand can deviate from the levels forecasted.[29] Given the breadth, scale and potential variability of the demand drivers considered in the plan, Toronto Hydro believes that the amounts recorded in the proposed account could be material and over time, exceed the utility's $1 million materiality threshold.

1. DRVA: Expenditure Variance Subaccount

The need for the Expenditure Variance Subaccount arises from Toronto Hydro's statutory obligation to serve and provide non-discriminatory access to the grid, together with the compounding effect of potential variability in Demand-Related Investments due a multitude of factors outside the utility's control that can affect the pace and type of demand growth over the period. These factors include:

- public policy changes mandating or encouraging customers to decarbonize-through-electrification,
- customer adoption rates of electrified technologies such as EVs, heat pumps, solar panels and energy storage systems, and
- technology market advancements providing customers and/or the utility access to new or more cost-effective demand-management tools.

Demand-Related Investments are tied to factors that are external to Toronto Hydro causing the need, pacing and prioritization of these investments to be externally-driven by third-parties or other factors outside of Toronto Hydro's control. For example, policy objectives related to decarbonization-through-electrification could accelerate customer adoption of EVs or other fuel switching technologies. Similarly, government policies or procurement programs could create an expanded role for Distributed Energy Resources ("DERs") in the deployment of coordinated infrastructure solutions to facilitate electrification, or other

[29] See Capacity Planning evidence in Exhibit 2B, Section D4 and the Load Forecast evidence in Exhibit 3, Tab 1.

policy objectives. As a result of such external factors, the pacing and level of certain expenditures can unexpectedly change and materially deviate from forecasted investment levels ultimately approved for recovery in base rates. The utility risk is that, over the rate period, these investment needs could be materially higher than the forecast embedded in rates. The pace and magnitude of potential change due to the combination of organic growth volatility observed in the current rate term, and the acceleration of an unprecedented energy transition renders this risk outside of tolerance from a forecasting perspective. [30]

Toronto Hydro faced a similar, albeit less pervasive risk, a decade ago related to externally-driven plant relocations to enable major infrastructure projects including the development of new and expanded transit lines across the Greater Toronto Area. To manage this risk in the context of a multi-year plan, in the 2015-2029 rate application Toronto Hydro requested (and the OEB approved) the Externally-Driven Capital variance account recognizing that "[*a]s these projects are completely outside Toronto Hydro's control as to both need and timing, they are appropriate for a variance account*."[31] This account continued in the 2020-2024 rate period. For the 2025-2029 period, Toronto Hydro proposes to consolidate this account into the DRVA in order to improve regulatory efficiency by reduce the number of Group 2 accounts that the utility needs to manage.

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[30] For example, in the current rate period capital in-service additions related to System Access investments where approximately $153 million (32.5 percent) greater than the amounts included in base rates in the 2020-2024 rate period primarily due to increased expenditures in demand-driven programs such as Customer Connections (Exhibit 2B, Section E5.1) and Load Demand (Exhibit 2B, Section E5.3). Toronto Hydro had to make additional investments in these programs in order to fulfil its core obligation to connect new and expanded services to the grid, including a higher than anticipated volume of system access requests for large projects (greater than 5 MVA demand) over this period.

[31] EB-2014-0116, OEB Decision and Order (December 29, 2016) at page 50.

In the current rate period, Toronto Hydro saw a significant increase in the volume and complexity of load connections. From 2020 to 2022, high voltage connections (which often require expansion work) increased by 27.6 percent, with a substantial increase in larger commercial and multi-use projects requiring greater than 10 MVA of demand load per project, as well data centers with larger loads (e.g. 30-50 MVA) than ever before. These circumstances resulted in gross expenditures in the 2020-2024 Customer Connections program that are expected to be approximately 1.75 times greater than initially planned in order to meet these requirements and preserve other key outcomes of the 2020-2024 plan (e.g. maintain reliability, remove transformers at risk of containing PCBs from the grid by 2025).

The trend in Customer Connections is expected to continue in the 2025-2029 rate period. Projects in the City of Toronto's development pipeline from 2017 through 2022 established a new five-year record with over 717,327 residential units and 14,484,961 square meters of non-residential gross floor area planned for completion in the next rate period, or shortly thereafter. This pace could increase further as a result of *Ontario's More Homes Built Faster Act, 2022* which is intended to expedite development approvals and encourage development with tax incentives and funding mechanisms.[32] This likewise impacts the Customer Operations program which includes activities such as field work and support functions to safely, efficiently, and promptly meet customer connections related requests.

In addition to the foregoing, the City is experiencing a shift to clean energy and electrification through the adoption of technologies such as EV charging, electric heat pumps and water heaters. Immediate growth areas being supported by Toronto Hydro's distribution system

[32] *More Homes Built Faster Act*, 2022, S.O. 2022, c. 21 - Bill 23; Ontario, Backgrounder More Homes Built Faster Act, 2022 (November 28, 2022) https://news.ontario.ca/en/backgrounder/1002525/more-homes-built-faster-act-2022.

include EV charging for public streets, City fleet vehicles (including TTC), Toronto Parking Authority parking lots, residential homes, commercial and residential developments. Ongoing and other evolving areas include heating and cooling systems (i.e. heat pumps) and complete home electrification at single-family residential home and residential complex levels.

On August 24, 2023, for example, the OEB issued a Staff Bulletin on Residential Customer Connections and Service Upgrades to provide guidance as a result of OEB staff receiving questions and complaints regarding residential customer connection practices pertaining to cost responsibility.[33] Within this bulletin, OEB staff noted that with the shift to electrification currently underway in Ontario, an increasing number of prospective homeowners will likely seek residences that can readily support electrical service that can accommodate the demands of equipment such as EV chargers and heat pumps. Observing this change in consumer preferences and attitudes, OEB staff highlighted the need for distributors to ensure their distribution systems will support the increasing demand for residential electrification. OEB staff expressed that "*it is good practice for distributors to provide new residential customers with capacity (both transformation and conductor) to accommodate a 200-amp service under their Basic Connection policy*."[34] Toronto Hydro recognizes that similar policy guidance may be forthcoming requiring quick response and effective implementation to help enable decarbonization-through-electrification public policy objectives.

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[33] OEB Staff Bulletin *RE: Residential Customer Connections & Service Upgrades* (August 24, 2023): https://www.oeb.ca/sites/default/files/OEB-Staff-Bulletin-Residential-Customer-Connections-20230824.pdf
[34] *Ibid* at page 2.

When faced with incremental distribution investment needs as a result of external drivers, Toronto Hydro must typically defer necessary expenditures in other investment priority areas, such as System Renewal, System Service and General Plant. Yet, to the extent Toronto Hydro does not carry out the planned investments in these areas, there could be significant reliability, safety or environmental risks that remain unmitigated, or customer needs and outcomes that are unmet.[35] The proposed Expenditure Variance Subaccount, if approved, would enable Toronto Hydro to respond to unforeseeable increases in demand-related investment needs without having to defer other priority work within the plan and put customer outcomes at risk.

Although Toronto Hydro does not expect that demand-related investments would be lower than forecast, it is possible that material changes in economic conditions, such as a recession, could slow down the pace of forecasted demand, or that a change in geopolitical dynamics affecting global supply chains could hinder the availability of electrified technologies such as EVs and heat pumps. In circumstances where demand-related investments are lower than planned, the subaccount would protect ratepayers by ensuring that (i) they do not pay for demand-driven work that can be deferred, and (ii) funds are not repurposed to manage variances in other aspects of the plan that are not driven by demand.

Unanticipated demand changes can impact the plan in different ways. The paragraphs that follow explain the nature of the Demand Related Investments programs and provide context

[35] For example, in the current rate period, Toronto Hydro decided to defer planned investments in Underground System Renewal (Exhibit 2B, Section E6.2 and E6.3) and Overhead System Renewal (Exhibit 2B, Section E6.5) programs to balanced capital funding pressures driven by the 0.9 percent capital stretch factor and by higher than forecasted expenditures in Demand-Related Investments in Customer Connections (Exhibit 2B, Section E5.1), Load Demand (Exhibit 2B, Section E5.3) and Stations Expansion (Exhibit 2B, Section E7.2). For more details please refer to Exhibit 2B, Section E4.1.2.

with respect to the unanticipated demand changes and factors that can impact actual expenditures in these programs.

a. Load Demand Program

The Load Demand program (Exhibit 2B, Section E5.3) alleviates emerging capacity constraints to ensure that there is sufficient capacity available to connect customers to Toronto Hydro's distribution system in a timely and efficient manner. To satisfy connection obligations, Toronto Hydro must maintain adequate capacity on its system to keep pace with load growth and to ensure that its assets are not overloaded. The rapid influx of dense load in the downtown core and horseshoe areas of the City pose a challenge to Toronto Hydro's ability to meet its service requirements. Over the 2025-2029 rate period, Toronto Hydro expects multiple station buses to reach their rated capacity. The forecasted growth in the distribution system is based on the System Peak Demand Forecast outlined in Exhibit 2B, Section D4. However, actual demand will vary by the actual realization of load in the system. This can depend on the above noted factors, including emerging trends such as EV uptake and pacing of heating electrification. To meet these requests in a timely and cost-effective manner and maintain reliability and service quality for existing customers, Toronto Hydro has to invest in infrastructure upgrades and load transfers to alleviate localized capacity constraints.

b. Stations Expansion Program

The Stations Expansion program (Exhibit 2B, Section E7.4) is driven by capacity constraints at the station or regional level, which can no longer be effectively managed by the Load Demand program. Uncertainty regarding increased and continued densification, population growth, and electrification could driver further need to relieve the station loading and expand system capacity. Depending on policies implemented by different levels of government, changes in customer behaviour, and ongoing societal decarbonization efforts, there are a wide range of potential impacts on Toronto Hydro's distribution system. For example, using the Future Energy Scenarios model, the impact of the high electrification/low efficiency scenario ("NZ40 – Low") projects a large increase in system load which would translate into additional investment in the Stations Expansion Program in order to meet system capacity needs in this scenario, as shown in Table 6 below.

Table 6: Incremental Stations Expansion Investment under NZ40-Low Scenario

Rate Period	Additional Investments ($ Million)[36]
2025-2029	44
2030-2034	186
2035-2039	527

c. Regional Planning Process

Another variable that could affect demand-related investments is the regional planning process described in Exhibit 2B, Section B3. While the investments planned in the Stations Expansion program are aligned to meet the needs identified in the most recent Needs Assessment at the regional planning level, Toronto Hydro is currently in the middle of a regional planning cycle that will not conclude until 2025. This process will draw from a number of options to meet the electricity needs identified in Toronto, including conservation and demand management ("CDM"), distributed generation, non-wires solutions, and traditional wires-only solutions. Outputs of this process, or additional updates during the rate term, could modify planned investments under the Stations Expansion program, or other Demand Related Investment programs, resulting in the need to change or increase the level of investment.

[36] This is the additional investment needed incremental to the 2025-2029 investment proposed in this Program, and incremental to the 2030-2034 expenditures forecasted for the Downsview TS and Scarborough TS expansion projects.

d. Connection and Integration of Distributed Energy Resources (DER)

As of 2022, Toronto Hydro connected 2,424 DERs to its grid totaling 304.9 MW in capacity. The utility forecasts DER connections (including energy storage) to reach an estimated 516.7 MW by the end of 2029.[37] Policy, economic conditions and consumer preferences, could facilitate growth in DERs beyond anticipated levels. These changes can be spurred by existing or forthcoming government action at the global, national and local levels, such as the federal clean electricity tax credit, or recent provincial regulatory changes enabling third-party ownership of net-metered generation facilities.[38]

The Generation Protection, Monitoring, and Control (Exhibit 2B, Section E5.5) program enables Toronto Hydro to fulfill its regulatory obligations to connect DER projects to its grid in a safe manner, and alleviate restrictions on the grid such as short circuit capacity constraints to enable the connection of DERs. Depending on the system location and extent of the unanticipated demand change, and the penetration of DER including renewable electricity generation ("REG") projects, Toronto Hydro could also explore additional Non-Wires Solutions ("NWS") investments in either demand-side Flexibility Services or grid-side Renewable-Enabling Battery Energy Storage Systems (Exhibit 2B, Section E7.2) as alternatives to conventional poles and wires solutions.

e. Customer Operations

Toronto Hydro receives a high volume of requests for connections and upgrades for residential and commercial developments each year, which are address through the

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[37] Exhibit 2B, Section E3 at pp. 1-3.
[38] Government of Canada, Budget 2023, *Chapter 3: A Made-In-Canada Plan: Affordable Energy, Good Jobs, and a Growing Clean Economy* (March 28, 2023) online: <https://www.budget.canada.ca/2023/report-rapport/chap3-en.html#m17>.; O. Reg. 386/22: Net Metering under *Ontario Energy Board Act*, 1998, S.O. 1998, c. 15, Sched. B

Customer Operations program (Exhibit 4, Tab 2, Schedule 8). Toronto Hydro may be required to undertake expansion and enhancement work to enable certain connections particular in the dense downtown core or rapidly growing transit corridors. Over the past three years, both the volume and average complexity of expansion work has remained high. Toronto Hydro's Key Account customers (i.e. the largest customers and those customers who have critical loads like hospitals, financial institutions, essential public services and developers), have unique needs in relation not only to complex connections and expansions, but also other priorities like power quality, resilience, ESG objectives and behind-the-meter energy solutions. A material increase in the volume or complexity of Customer Connections as described above, yields a corresponding increase in the need for operational support to address customer needs and expectations.

f. Externally Initiated Plant Relocations and Expansions

The City is experiencing a period of significant infrastructure renewal, neighbourhood revitalizations, commercial development and large transit expansions. The Externally Initiated Plant Relocations and Expansion (Exhibit 2B, Section E5.2) program captures work that the utility must undertake to relocate its infrastructure in response to third-party relocation requests and to enable third-party construction projects to proceed in a timely manner. Relocation requests by third parties are usually received from those required to maintain, upgrade, expand and improve existing public infrastructure such as roads, bridges, highways, transit systems, transmission stations and rail crossings. The timing, pace and expenditures under this program are driven by third-party projects that are entirely outside of Toronto Hydro's control, which is why in the last two rate applications the utility requested and the OEB approved the Externally-Driven Capital variance account.[39] For the

[39] EB-2014-0116, Decision and Order (December 29, 2016) at page 50 and EB-2018-0165, Decision and Order (December 19, 2019) at page 198.

2025-2029 rate period, Toronto Hydro proposes to consolidate this account into the DRVA in order to reduce the number of Group 2 accounts that the utility needs to manage and improve regulatory efficiency.

2. <u>Demand-Related Revenue Variance Subaccount</u>

The same external factors (i.e. policy, technology and consumer behaviour) that drive variances in expenditures can also yield variances in billing determinants (i.e. kVa, kWh and customer count) relative to the load and customer forecast set out in Exhibit 3, Tab 1. Such variances in billing determinants can result in lower or higher revenues than forecasted when setting base rates for 2025-2029 that can pose a risk to both ratepayers and the utility. This is a structural forecasting risk that emanates from entering a period of energy transition that results in greater uncertainty and the potential for greater variability with respect to how demand manifests in terms of revenues. To hold the utility and ratepayers harmless from this risk, Toronto Hydro proposes the Revenue Variance subaccount to symmetrically record revenue variances resulting from differences between forecasted and actual billing determinants on a weather normalized basis. The revenue variances recorded in the Revenue sub-account would be tracked at a rate class level so that they can be properly disposed to the same rates classes at the next rebasing.

With this subaccount, Toronto Hydro's CRCI becomes a true revenue cap model (subject to weather-driven variances), rather than a revenue requirement cap, with the revenue variance sub-account operating similar to a decoupling true-up mechanism.[40] Whereas in the past the merits of revenue decoupling were explored through the lens of declining use and resulting earnings attrition due to energy efficiency, Toronto Hydro sees equal merit to

[40] EB-2010-0060, Review of Distribution Revenue Decoupling Mechanisms, (March 19, 2010) at page iv: <https://www.oeb.ca/oeb/_Documents/EB-2010-0060/Report_Revenue_Decoupling_20100322.pdf>.

using revenue decoupling as a means to address energy transition forecasting challenges, including but not limited to the role of energy efficiency measures. As the pace of change in the 2025 to 2029 period remains subject to degrees of uncertainty, Toronto Hydro believes this mechanism is an appropriate means to ensure that neither ratepayers nor the utility or its shareholder are unduly burdened or rewarded by billing determinant variances during this transitional time.

3.3 Other Aspects of the Framework

3.3.1 Earnings Sharing Mechanism (ESM)

In the 2020-2024 rate application (EB-2018-0165), the OEB approved an asymmetrical earnings sharing mechanism ("ESM") with a 100-basis point dead band on a cumulative five-year basis.[41] The approved ESM represented a transition from Toronto Hydro's previous ESM over the 2015 to 2019 period; transitioning away from a symmetrical ESM to an asymmetrical ESM, and calculating ESM amounts based on ROE as opposed to a comparison of Non-Capital Related Revenue Requirement variances.[42]

Toronto Hydro proposes to continue the ESM as approved by the OEB in EB-2018-0165, including the OEB's finding that "*certain adjustments will be required for a ROE-based ESM calculation in order to account for out-of-period items and to ensure there is no double counting*."[43] Where such adjustments are required, Toronto Hydro intends to make them when evaluating ESM entries (or non-entries) at the end of the next rate term. All of the above is consistent with the methodology presented in Exhibit 9, Tab 1, Schedule 1 as it relates to Toronto Hydro's current ESM.

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[41] *Supra* note 26 at page 193.
[42] *Ibid*.
[43] *Ibid.*

With respect to the PIM Deferral Account ("PIM-DA"), under Toronto Hydro's proposal there is no interaction between the PIMDA and ESM. Earnings under the PIM (only if targets are fully achieved) allow Toronto Hydro to earn the foregone revenue associated with the 0.6 percent portion of the X-factor that was proactively reduced from the utility's revenue and given to customers upfront as a rate reduction. Earning this amount back is only sufficient to enable the utility to achieve its approved ROE. As such, it would not be suitable for the 2025-2029 ESM proposed in this application to include the PIM earnings associated with earning back the 0.6 percent.

To the degree Toronto Hydro's 2030 to 2034 rate-setting approach incorporates a continuation of the ESM, or a similar ESM, Toronto Hydro expects ROE for the purpose of determining any ESM amounts would be adjusted for out-of-period transactions, consistent with the OEB's standard practice for determining Regulated ROE.[44] Such adjustments would include earnings associated with 2025-2029 PIM amounts, as these earnings relate to investments made during the 2025 to 2029 rate period.

3.3.2 Off-ramps and Z-factor

Toronto Hydro proposes to continue to apply the OEB's generic policy with respect to off-ramps for the 2025-2029 rate term (as outlined in the Rate Handbook), and proposes that it continue to be allowed to have Z-factor relief available based on the OEB's generic criteria for such relief (as set out in the Report of the Board on 3rd Generation Incentive Regulation).[45]

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[44] Ontario Energy Board, *Electricity Reporting and Record Keeping Requirements* (March 8, 2023) at Section 2.1.5.6.

[45] Ontario Energy Board, *Handbook to Utility Rate Applications* (October 2016) at page 28; see also Ontario Energy Board, *Report of the Board on 3rd Generation Incentive Regulation for Ontario's Electricity Distributors* (July 14, 2008) at pp. 35-36 and Appendix A at pp. 4-6.

Review of Rate Framework

Submitted On Behalf of

Toronto Hydro-Electric System Limited

d/b/a Toronto Hydro

November 17, 2023

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MANAGEMENT CONSULTANTS

TABLE OF CONTENTS

I. INTRODUCTION

Q. Please state your name and business address.

A. My name is Timothy S. Lyons. My business address is 3 Speen Street, Suite 150, Framingham, Massachusetts 01701.

Q. What is your current position?

A. I am a Partner at ScottMadden, Inc. ("ScottMadden").

Q. Please describe your work experience and educational background.

A. I have more than 30 years of experience in the energy industry. I started my career in 1985 at Boston Gas Company, eventually becoming Director of Rates and Revenue Analysis. In 1993, I moved to Providence Gas Company, eventually becoming Vice President of Marketing and Regulatory Affairs. Starting in 2001, I held management consulting positions in the energy industry first at KEMA and then at Quantec, LLC. In 2005, I became Vice President of Sales and Marketing at Vermont Gas Systems, Inc. before joining Sussex Economic Advisors, LLC ("Sussex") in 2013. Sussex was acquired by ScottMadden in 2016.

I hold a bachelor's degree from St. Anselm College, a master's degree in economics from The Pennsylvania State University, and a master's degree in business administration from Babson College.

A summary of my qualifications is attached as Appendix A.

Q. Are you sponsoring other appendices in connection with your testimony?

A. Yes. I am sponsoring Appendix B 'Jurisdictional Review of Performance-Based Regulation Mechanisms'.

II. EXECUTIVE SUMMARY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present our review of Toronto Hydro's (the "Company") proposed changes to its Custom Rate Framework ("Rate Framework"). The testimony describes how the Company's proposed changes are appropriate in the context of how other electric utility ratemaking practices have responded to developments in the energy industry.

The review relied on a jurisdictional scan of performance-based regulation conducted by ScottMadden. The jurisdictional scan is attached as Appendix B of this testimony.

Q. What is the principal conclusion of ScottMadden's review?

A. The principal conclusion presented in this testimony is that the Company's proposed changes to the Rate Framework are generally consistent with how other electric utilities have responded to developments in the energy industry, recognizing there are differences in service areas and jurisdictional requirements.

The energy industry is going through a period of significant change driven by new technologies, policy goals, and consumer expectations. These changes are driving significant utility investments and related costs to support an increasingly decarbonized, decentralized, and digitalized electric grid while maintaining safe and reliable service. For example, capital spending across the electric industry has increased significantly over the past decade, with capital spending increasing from $32.1 billion in 2011 to $70.4 billion in 2021, or a

Compound Annual Growth Rate ("CAGR") of 8.17 percent. Capital spending is expected to continue to increase in the future.[1]

Toronto Hydro has also projected significant investment needs in its five-year plan. As discussed in Toronto Hydro's application, these investments are informed by customer expectations and priorities, such as reliable service, support for new technologies, and support for system capacity infrastructure.

Given these developments in the energy industry, many regulatory jurisdictions have implemented changes to ratemaking frameworks and practices. These changes are designed to incorporate expanded objectives and priorities, such as clean energy goals, affordability, reliability, emission reduction, and utility financial integrity. The changes also include revisions to rate setting mechanisms (such as 'I-X' indexing mechanisms) to ensure adequate cost recovery, flexibility in cost recovery to address uncertainties, performance incentives, and funding for innovative projects.

Q. Please elaborate on how other electric utilities have modified ratemaking practices in response to developments in the energy industry.

A. The changing energy industry has prompted various modifications to ratemaking frameworks and practices. These changes are generally designed to provide cost recovery flexibility and stability to help address challenges related to the changing grid needs. Specifically, multi-year rate plans and performance-based regulation ("PBR") frameworks and practices have been modified as follows:

[1] EEI, Statistical Yearbook of the Electric Power Industry (Published August 2023). Investments reflect nominal dollars.

1. **Attrition Relief Mechanisms ("ARMs")** modified to reflect the scale and timing of investments.
   - For example, regulatory jurisdictions, such as the United Kingdom ("UK"), Australia, Philippines, and Malaysia, utilize a "building blocks" approach that reflects forecasted capital investments and operations, maintenance, and administration ("OM&A") expenditures within multi-year ratemaking frameworks.[2] This approach better aligns cost recovery with the scale and timing of capital and OM&A needs.
2. **Alternative Cost Recovery Mechanisms** to reflect uncertainties including technology adoption, policy developments, customer demands, and cost forecasts.
   - For example, the UK RIIO[3] framework includes uncertainty mechanisms that provide investment flexibility regarding the timing and adoption of low-carbon technologies. The UK regulating agency Ofgem recognized the importance of such mechanisms, stating: "…[uncertainty mechanisms ensure that] if the uptake of EVs or HPs [heat pumps] is faster than expected, then investment can track these changes and flex quickly and efficiently in response".[4]
3. **Performance incentive mechanisms ("PIMs")** to align utility priorities with policy objectives.

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[2] London Economics International, Study of Retail Rates of Kansas Electric Public Utilities, January 8, 2020, at p.156
[3] Revenues = Incentives + Innovation + Outputs
[4] Ofgem, RIIO-ED2 Draft Determinations – Core Methodology Document, June 29, 2022, p. 32

- For example, jurisdictions, such as Hawaii, New York, and UK have PIMs in place. The Hawaii Public Utilities Commission ("HPUC") noted that PBR mechanisms offer a way to "restructure utility financial incentives to achieve specific, identified desirable or beneficial outcomes, such as meeting renewable energy targets, reducing greenhouse gas emissions, or improving reliability and resilience."[5]

4. **Separate funding for innovative projects** that provide lessons learned on new technologies and cost-saving initiatives that support the energy transition.
   - For example, New York and UK jurisdictions have created separate cost recovery mechanisms for utilities to fund innovative projects and have developed processes to share lessons learned across the utilities.

Q. How is Toronto Hydro's proposed changes to the Rate Framework consistent with the changes in ratemaking frameworks and practices discussed above?

A. Toronto Hydro is facing similar changes in the energy industry as other electric utilities. The changes drive the scale and timing of Toronto Hydro's investment priorities that in turn drive an evolution of Toronto Hydro's ratemaking framework and practices, similar to other electric utilities.

Changes to the Company's proposed Rate Framework and how these align with other electric utilities are summarized in Figure 1 (below):

[5] Docket No. 2018-0088, Order No. 35411 Proceeding to Investigate Performance-Based Regulation, Hawaii Public Utilities Commission, April 18, 2018, p. 14

Figure 1: Comparison of Toronto Hydro's Proposed Changes

Proposed Rate Framework Modifications	Comparison with Industry Ratemaking Practices
1. Revenue Growth Factor – Reflects Company's forecasted capital and OM&A needs	▪ UK, Australia, and other jurisdictions utilize "building blocks" approach that includes forecasted capital and OM&A ▪ New York electric utilities utilize a "stair-step" approach to forecast capital and OM&A for each year of their rate plan ▪ This approach helps ensure adequate cost recovery for both capital and OM&A needs.
2. Modified Inflation Factor – Reflects Toronto Salary and Wage Index	▪ California utilizes utility-specific cost indices to more accurately align cost recovery with costs
3. Demand-Related Variance Account – Provides flexible investment recovery to address uncertainties	▪ UK RIIO framework includes uncertainty mechanisms that provide investment flexibility based on the timing and adoption of low-carbon technologies
4. Performance Incentives – Aligns utility and customer interests	▪ Hawaii, New York, and UK have PIMs in place ▪ These help align policy objectives and Company incentives ▪ PIMs have been recognized as important to achieve desired policy outcomes
5. Innovation Fund – Provides funding for innovative projects that provide lessons learned for new technologies and initiatives	▪ New York and UK have created separate cost recovery mechanisms for utilities to fund innovative projects and developed processes to share lessons learned across utilities

The Figure summarizes how the Company's proposed changes to the Rate Framework align with the industry ratemaking practices.

First, Toronto Hydro proposes a revenue growth factor ("RGF") that reflects year-over-year increases in its forecasted revenue requirements. The RGF captures the Company's projected needs in both capital and OM&A expenditures. Jurisdictions, such as UK and New York, have recognized the need to ensure adequate cost recovery of both capital and OM&A costs by including forecasted revenue requirements in their multi-year revenue requirements.

Second, Toronto Hydro proposes an updated inflation factor that better reflects its labor costs. There is also recognition in jurisdictions, such as California, that indexing factors (such as inflation) should closely align with the underlying cost drivers.

Third, Toronto Hydro proposes a Demand-Related Variance Account ("DRVA") intended to provide investment flexibility to address uncertainties related to external drivers such as scale and pace of technology adoption, policy changes, macro-economic drivers, and global events. These variance accounts are similar to uncertainty mechanisms in place for UK utilities as part of the RIIO framework, which provide investment flexibility to address uncertainties related to the pace of electrification adoption.

Fourth, Toronto Hydro proposes performance incentives that better align utility interests with public policy goals and customer expectations. These have been recognized in the industry (such as in Hawaii, New York, and UK) as important tools to achieve desired policy outcomes.

Finally, Toronto Hydro proposes a separate funding mechanism for innovative projects. Innovative projects provide lessons learned on new technologies and cost-saving initiatives that support the energy transition. Jurisdictions, such as New York and UK, have created separate cost recovery mechanisms for utilities to fund innovative projects and have developed processes to share lessons learned across the utilities.

In conclusion, Toronto Hydro's proposed Rate Framework aligns with recent industry changes in ratemaking frameworks and practices that provide for increased investment flexibility, stable cost recovery, performance incentives that align utility performance with customer priorities, and funding for innovative projects.

Q. How is the remainder of your testimony organized?

A. The remainder of this testimony is organized into the following sections:

Section III – Discussion of Toronto Hydro's proposed changes to the Rate Framework

Section IV – Comparison of the proposed Rate Framework in context of industry ratemaking practices

Section V – Summary and Conclusions

III. OVERVIEW OF RATE FRAMEWORK

Q. Please briefly describe Toronto Hydro.

A. Toronto Hydro is a wholly owned subsidiary of Toronto Hydro Corporation, whose sole shareholder is the City of Toronto. The Company delivers electricity to approximately 790,000 residential, commercial, and institutional customers. Toronto Hydro serves the largest city in Canada and distributes approximately 18% of the electricity consumed in Ontario. Toronto Hydro serves its customers using approximately 30,000 kilometers of wire and cable, 180,000 poles, and over 200 stations and substations.

Q. Please provide an overview of Toronto Hydro's currently approved 2020-2024 rate framework.

A. The Ontario Energy Board ("OEB") approved Toronto Hydro's Custom Incentive Rate-Setting ("CIR") framework to establish the Company's distribution rates over 2020-2024 period. Distribution rates for 2020 were established on a cost-of-service basis using a forecasted test year, whereas rates for 2021-2024 were established using a Custom Price Cap Index ("CPCI") formula.

The CPCI formula includes an inflation ("I") factor, a productivity ("X") factor, a capital growth factor ("C_n") offset for incremental funding from inflation and productivity factor ("S_{cap}*(I+X)"), and a growth ("g") factor.

$$\mathbf{CPCI = I - X + C_n - S_{cap} \times (I + X_{cap}) - g}$$

Capital investments in the Company's approved plan are based on forecasts for the plan term, adjusted for inflation and productivity stretch factors. The OM&A expenses are forecasted for the first year (2020) and then adjusted for inflation and productivity factors over the course of the rate period. The inflation factor represents OEB's two-factor Input Price Index ("IPI") for electricity distributors, which is a weighted average of labour (30%) and non-labor (70%) annual price changes.

Q. Is Toronto Hydro proposing modifications to the currently approved rate framework?

A. Yes. Toronto Hydro proposes modifications that are intended to align the currently approved rate framework with the Company's evolving needs.

1. Introduce a Revenue Growth Factor ("RGF") to reflect Company's forecasted capital and OM&A needs
2. Modify the Inflation Factor to reflect changes in Toronto-specific Salary and Wages
3. Introduce a Demand-Related Variance Account to provide flexibility in investments to address uncertainties
4. Introduce Performance Incentives to align customer priorities and policy objectives
5. Introduce an Innovation Fund to provide a separate funding mechanism for innovative projects

Q. What is the purpose of the RGF?

A. The RGF more accurately reflects forecasted changes in capital and OM&A expenses over the term of the plan. Toronto Hydro projects substantial capital and OM&A expenses to sustain, expand, and modernize its network in alignment with customer and policy objectives.

The Company's rationale for RGF is discussed in further detail in the Company's application.

Q. What is the purpose of the modified inflation index?

A. The modified inflation index includes a custom labor index for Toronto Salary and Wages that better reflects Toronto Hydro's labor costs. The Company's rationale for the modified inflation factor is discussed in further detail in the Company's application.

Q. What is the purpose of the DRVA?

A. The DRVA is a two-way variance account mechanism that reflects uncertainties related to the energy transition, including the scale, pace, and location of technology adoption, policy developments, demand patterns, and cost forecasts. The DRVA is intended to ensure flexibility in cost recovery for demand-related investments. These investments are intended to address customer demands, which can vary depending on external factors.

The Company's rationale for DRVA is discussed in further detail in the Company's application.

Q. What is the purpose of the proposed performance incentives?

A. The proposed PIMs are intended to better align the Company's operating performance and its financial benefits. Specifically, the PIMs measure customer priorities and policy objectives, such as system reliability and resilience, efficiency and financial performance, customer service and experience, and environment, safety, and governance.

The Company's rationale for performance incentives is discussed in further detail in the Company's application.

Q. What is the purpose of the innovation fund?

A. The innovation fund provides funding for innovation projects that provide lessons learned on new technologies and cost-saving initiatives that support energy transition. Separate funding for these projects is necessary as there is inherent uncertainty in the benefits, costs, and timing of these projects.

The Company's rationale for the innovation fund is discussed in further detail in the Company's application.

Q. Are the Company's proposed changes to the Rate Framework generally aligned with how electric utilities are evolving their ratemaking frameworks and practices?

A. Yes. The Company's proposed changes to the Rate Framework are generally consistent with how other electric utilities have responded to developments in the energy industry, recognizing that there are differences in service areas and jurisdictional requirements. A comparison of the Company's proposed changes to industry ratemaking practices is discussed in the next section (below).

IV. COMPARISON WITH INDUSTRY RATEMAKING PRACTICES

Q. As an initial matter, are the Company's Rate Framework's objectives consistent with other ratemaking frameworks in the industry?

A. Yes. Ratemaking objectives have expanded within industry frameworks beyond traditional requirements of providing safe, reliable, and affordable service to better align with changing customer expectations and regulatory requirements.[6] Since 2018, U.S. jurisdictions have cited as many as 17 different policy goals for PBR frameworks, with reliability, emissions reductions, and cost control among the most commonly cited.[7] Common objectives, such as in Hawaii and UK, include a desire to advance policy objectives using administratively efficient frameworks that preserve utility financial integrity, provide flexibility, and protect customer interests.[8]

The Company's objectives in its Rate Framework are generally consistent with other electric utility ratemaking objectives. These include:[9]

- Deliver customer outcomes and advance public policy objectives.
- Balance the interests of customers and utilities/ shareholders.
- Ensure stability and predictability to facilitate effective multi-year planning and decision making.
- Provide flexibility to execute multi-year plans in dynamic circumstances.

[6] Rocky Mountain Institute, States Move Swiftly on Performance-Based Regulation to Achieve Policy Priorities, March 31, 2022, at: https://rmi.org/states-move-swiftly-on-performance-based-regulation-to-achieve-policy-priorities
[7] *Ibid.*
[8] Docket No. 2018-0088, Decision and Order No.36326, Hawaii Public Utilities Commission, May 23, 2019, p. 6. Ofgem, RIIO-2 Framework Decision, at p.4
[9] OEB File No. EB-2023-0195, Toronto Hydro Pre-Filing Stakeholder 2025-2029 Rate Application Engagement (October 4, 2023) at 20

- Protect customers and the utility from forecasting risk in times of uncertainty.

Specific changes to the Company's proposed Rate Framework and how these align with the industry ratemaking frameworks are discussed below.

A. Revenue Growth Factor

Q. Is the proposed Revenue Growth Factor consistent with other electric utility mechanisms?

A. Yes. The RGF, which includes forecasted capital and OM&A expenditures, is generally consistent with 1) the 'building blocks' approach used in jurisdictions, such as the UK, Australia, Philippines, and Malaysia, and 2) the 'stair-step' approach utilized by New York utilities.

Q. What is the building blocks method?

A. The building blocks method includes establishing revenues based on forecasted capital and OM&A expenditures for each year of the rate period. Forecasted costs are assessed using historical performance metrics, unit cost comparison, and industry-wide benchmarks.[10] Once the forecasted capital and OM&A costs are established, these form the basis for revenue requirements for the rate period.[11] The revenue requirements may be updated annually to account for performance incentives, tax impacts, inflation, or other supplementary funding mechanisms.

Q. What is the stair-step approach?

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[10] London Economics International, Study of Retail Rates of Kansas Electric Public Utilities, January 8, 2020, at p.157
[11] *Ibid.*

A. The stair-step approach consists of predetermined increases in rates or revenues based on cost forecasts. This approach is also referred to as a "multiple forward test year approach".[12]

New York utilities, such as Consolidated Edison, utilizes the stair-step adjustment mechanism within their three-year gas and electricity distribution plans. The revenue escalation within the rate plan is based on detailed capital and OM&A forecasts for each of the three years. The detailed forecasts include sales, property taxes, depreciation expenses, capital additions, OM&A expenses, and other anticipated investments and expenditures.[13]

Q. Why is it important to forecast both capital and OM&A costs?

A. Forecasting both capital and OM&A, as demonstrated in the building blocks method, presents several advantages.

For example, the building blocks method provides greater alignment between costs and revenue recovery.[14] An indexed approach to OM&A funding during attrition years, for example, may result in inadequate OM&A funding relative to costs incurred.

In addition, the building blocks approach allows for the implementation of a clearly defined planning process for multi-year grid investment.[15] The approach considers both current and future system development when determining a price path.[16]

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[12] LBNL, State Performance-Based Regulation Using Multiyear Rate Plans, July 31, 2017, at p.4.2
[13] New York Public Service Commission (NYPSC), "Order Approving Electric and Gas Rate Plans," Dockets 16-E-0060, 16-G-0061, and 16-E-0196, January 25, 2017, p. 3-5
[14] London Economics, Case Studies: Comparator Industry Design and Regulation, prepared for the Department of Energy of Nova Scotia, at p.18
[15] Id., at p.153
[16] Australian Energy Market Commission, Perspectives on the building block approach, July 30, 2009, at p.5

B. Modified Inflation Factor

Q. Is Toronto Hydro's proposed change to the inflation factor consistent with other electric utility ratemaking practices?

A. Yes. There is recognition in industry ratemaking practices to align index factors (such as inflation) more accurately with underlying utility cost drivers.

For example, the California Public Utilities Commission ("CPUC") allows for utility-specific cost indices rather than a general inflation index such as Consumer Price Index ("CPI"), noting that "[t]he CPI reflects consumer retail price changes, not the escalation in wholesale purchase of utility goods and services."[17]

C. Demand-related Variance Account

Q. Is the DRVA consistent with similar mechanisms employed by electric utilities?

A. Yes. Similar to Toronto Hydro, electric distribution companies in the UK[18] face uncertainties relating to policy developments, demand patterns, cost forecasts, and the scale, pace, and location of technology adoption.

Similar to the DRVA, the UK RIIO framework includes uncertainty mechanisms that provide investment flexibility based on the timing and adoption of low-carbon technologies.

For example, the volume-driven uncertainty mechanism employed in RIIO ED-2 allows for adjustments in revenue allowances to accommodate changes in

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[17] PG&E 2023 GRC. Exhibit-11, at p. 1-16
[18] Also referred to as 'Network Companies'.

volume (e.g., new connections, low carbon technology uptake).[19] The mechanism allows utilities to be flexible to a range of potential scenarios.

The UK regulating agency Ofgem recognized the need for mechanisms that provide investment flexibility to address uncertainty, stating that " …[uncertainty mechanisms ensure that] if the uptake of EVs or HPs [heat pumps] is faster than expected, then investment can track these changes and flex quickly and efficiently in response".[20]

D. Performance Incentive Mechanism

Q. Are Toronto Hydro's performance incentive mechanisms consistent with similar mechanisms employed by other electric utilities?

A. Yes. Certain jurisdictions, such as Hawaii, New York, and the UK, have noted the importance of performance incentives and have adopted mechanisms to support earnings opportunities aligned with policy objectives and customer interests.

For example, Hawaii Public Utilities Commission noted that PBR mechanisms offer a way to "restructure utility financial incentives to achieve specific, identified desirable or beneficial outcomes, such as meeting renewable energy targets, reducing greenhouse gas emissions, or improving reliability and resilience".[21] In addition, the New York Public Service Commission ("NYPSC") stated that outcome-based incentives are "the most effective approach to address the mismatch between traditional revenue methods and modern electric system

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[19] Ofgem, Handbook for Implementing the RIIO Model, October 4, 2010, at p.92
[20] Ofgem, RIIO-ED2 Draft Determinations – Core Methodology Document, June 29, 2022, p. 32
[21] Docket No. 2018-0088, Order No. 35411 Proceeding to Investigate Performance-Based Regulation, Hawaii PUC, filed April 18, 2018, p. 14

needs".[22] Lastly, Ofgem emphasized the importance of performance incentives, placing "strong emphasis on the need for [distributors] to develop suitable network output measures and to commit to delivering against these measures".[23]

Q. Do other electric utility performance incentive mechanisms address similar objectives as Toronto Hydro's proposed mechanisms?

A. Yes. Certain jurisdictions are using performance incentive mechanisms to drive outcomes beyond traditional service obligations such as utilizing distributed energy resources, ensuring resilience, and reducing greenhouse gas emissions.[24]

For example, both Hawaii and UK have adopted a portfolio of incentives, that include metrics related to reliability, customer service, system efficiency and emissions reductions.[25]

E. Innovation Fund

Q. Is funding for innovation projects consistent with other electric utility mechanisms?

A. Yes. Jurisdictions, such as UK and New York, have created separate cost recovery mechanisms and funds for innovative projects and created processes to share lessons learned across the utilities.[26] These projects inform decisions regarding developing new revenue streams, scaling new technologies, measuring customer

[22] Case 14-M-0101, Order Adopting a Ratemaking and Utility Revenue Model Policy Framework, Reforming the Energy Vision Proceeding, New York Public Service Commission, May 19, 2016, p. 62

[23] Ofgem, Electricity Distribution Price Control Review Methodology and Initial Results Paper, May 8, 2009, p. 107

[24] RMI, PIMs for Progress, at p.10

[25] Docket No. 2018-0088, Decision and Order No. 37507 Instituting a Proceeding to Investigate a Performance-Based Regulation, Hawaii Public Utilities Commission, p. 15; Ofgem, RIIO-ED2 Final Determinations Overview Document, p.22-23

[26] Ofgem, Regulating Energy Network for the Future RPI-X@20 Emerging Thinking, January 20, 2010, at p.34; NY PSC, Memorandum And Resolution On Demonstration Projects, December 12, 2014, at p.10

response to new programs and price strategies, and determining the most effective implementation of distributed energy resources.[27]

V. SUMMARY AND CONCLUSION

Q. Please summarize your findings and conclusions?

A. Our principal conclusion is that the Company's proposed changes to the Rate Framework are generally consistent with how other electric utilities have responded to developments in the energy industry (recognizing that there are differences in service areas and jurisdictional requirements).

Q. Does this conclude your testimony?

A. Yes, it does.

[27] New York PSC, Case 14-M-0101, Memorandum and Resolution on Demonstration Projects, December 12, 2014, at p.6-10

Qualifications

Tim Lyons is a partner with ScottMadden with more than 30 years of experience in the energy industry. Tim has held senior positions at several gas utilities and energy consulting firms. His experience includes rates and regulatory support, sales and marketing, customer service and strategy development. Prior to joining ScottMadden, Tim served as Vice President of Sales and Marketing for Vermont Gas. He has also served as Vice President of Marketing and Regulatory Affairs for Providence Gas Company, Director of Rates at Boston Gas Company, and Project Director at Quantec, LLC, an energy consulting firm.

Tim has sponsored testimony and evidence before more than 25 state regulatory commissions and 3 Canadian regulatory boards. Tim holds a B.A. from St. Anselm College, an M.A. in Economics from The Pennsylvania State University, and an M.B.A. from Babson College.

Areas of Specialization

- Regulation and Rates
- Retail Energy
- Utilities
- Natural Gas

Capabilities

- Regulatory Strategy and Rate Case Support
- Strategic and Business Planning
- Capital Project Planning
- Process Improvements

Articles and Speeches

- "Country Strong: Vermont Gas shares its comprehensive effort to expand natural gas service into rural communities." ***American Gas Association***, June 2011 (with Don Gilbert).
- "Talking Safety With Vermont Gas." ***American Gas Association***, February 2009 (with Dave Attig).
- "Consumers Say 'Act Now' To Stabilize Prices." ***Power & Gas Marketing***, September/ October 2001 (with Jim DeMetro and Gerry Yurkevicz).
- "Rate Reclassification: Who Buys What and When." ***Public Utilities Fortnightly***, October 15, 1991 (with John Martin).

Sponsor	Date	Docket No.	Subject
Regulatory Commission of Alaska			
Cook Inlet Natural Gas Storage Alaska, LLC	7/21	Docket No. U-21-058	Sponsored testimony supporting the lead-lag study/cash working capital requirement for a general rate case proceeding.
ENSTAR Natural Gas Company	06/16	Docket No. U-16-066	Adopted and sponsored testimony supporting a lead-lag study for a general rate case proceeding.
Arizona Corporation Commission			
Southwest Gas Corporation	12/21	Docket No. G-01551A-21-0368	Sponsored testimony supporting class cost of service, rate design and bill impact analysis for a general rate case proceeding.
Arkansas Public Service Commission			
Liberty Utilities (The Empire District Electric Company)	2/23	Docket No. 22-085-U	Sponsored testimony supporting the class cost of service, rate design, bill impact studies, and revenue decoupling for a general rate case proceeding.
Liberty Utilities (Pine Bluff Water)	10/18	Docket No. 18-027-U	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding.
California Public Utilities Commission			
Bear Valley Electric Service, Inc.	10/22	Application No. 22-08-010	Sponsored testimony supporting marginal cost study, rate design and bill impact analysis for a general rate case proceeding.
Liberty Utilities (CalPeco Electric)	5/21	Application No. 21-05-017	Sponsored testimony supporting the lead-lag study/cash working capital, marginal cost study, rate design and bill impact analysis for a general rate case proceeding.
Southwest Gas Corporation (Southern California, Northern California, and South Lake Tahoe jurisdictions)	8/19	Application No. 19-08-015	Sponsored testimony on behalf of three separate rate jurisdictions supporting revenue requirements, lead-lag/ cash working capital, and class cost of service, rate design and bill impact analysis for a general rate case proceeding.
Connecticut Public Utilities Regulatory Authority			
Yankee Gas Company	07/14	Docket No. 13-06-02	Sponsored report and testimony supporting the review and evaluation of gas expansion policies, procedures and analysis.
Delaware Public Service Commission			
Artesian Water Company	04/23	Docket No. 23-0601	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding.
Illinois Commerce Commission			
Ameren Illinois Company d/b/a Ameren Illinois	1/23	Docket No. 22-0487	Sponsored testimony supporting a Multi-Year Integrated Grid Plan (Grid Plan). Prepared research and analysis evaluating the reasonableness of the Grid Plan through comparison to how other electric utilities have responded to the changing energy landscape.
Liberty Utilities (Midstates Natural Gas)	07/16	Docket No. 16-0401	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new commercial classes and a decoupling mechanism.
Iowa Utilities Board			
Liberty Utilities (Midstates Natural Gas)	07/16	Docket No. RPU-2016-0003	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new commercial classes.
Kansas Corporation Commission			
The Empire District Electric Company	12/18	Docket No. 19-EPDE-223-RTS	Sponsored testimony supporting cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding.
Kentucky Public Service Commission			

Sponsor	Date	Docket No.	Subject
Bluegrass Water Utility (Central States Water Company)	02/23	Case No. 2022-00432	Sponsored testimony supporting the rate design and bill impact studies for a general rate case proceeding.
Maine Public Utilities Commission			
Northern Utilities, Inc. d/b/a Unitil	05/23	Docket No. 2023-00051	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding.
Maine Water Company	03/21	Docket No. 2021-00053	Sponsored testimony supporting a proposed rate smoothing mechanism.
Northern Utilities, Inc. d/b/a Unitil	06/19	Docket No. 2019-00092	Sponsored testimony supporting a proposed capital investment cost recovery mechanism.
Northern Utilities, Inc. d/b/a Unitil	06/15	Docket No. 2015-00146	Sponsored testimony supporting the proposed gas expansion program, including a zone area surcharge.
Maryland Public Service Commission			
The Potomac Edison Company (FirstEnergy)	03/23	Case No. 9695	Sponsored testimony supporting the class cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding.
Sandpiper Energy, a Chesapeake Utilities company	12/15	Case No. 9410	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new residential and commercial classes.
Massachusetts Department of Public Utilities			
Berkshire Gas Company, Eversource Energy, Liberty Utilities, National Grid, and Unitil	03/22	Docket No. DPU 20-80	Sponsored report that summarizes research, findings, and recommendations for regulatory mechanisms, methodologies, and policies that support Massachusetts's achievement of its net zero climate goal by 2050. The regulatory designs were informed by the results of quantitative and qualitative analysis of decarbonization pathways to achieve the Commonwealth's climate goals.
Liberty Utilities (New England Gas Company)	08/20	Docket No. DPU 20-92	Sponsored the Long-Range Forecast and Supply Plan filing for the five-year forecast period 2020/2021 through 2024/2025.
Eversource Energy, National Grid, and Unitil	02/20	Docket No. DPU 19-55	Sponsored report that summarizes research and evaluation of funding approaches for infrastructure modifications that interconnect Distributed Generation (DG) projects.
Liberty Utilities (New England Gas Company)	07/18	Docket No. DPU 18-68	Sponsored the Long-Range Forecast and Supply Plan filing for the five-year forecast period 2018/2019 through 2022/2023.
Liberty Utilities (New England Gas Company)	07/16	Docket No. DPU 16-109	Sponsored the Long-Range Forecast and Supply Plan filing for the five-year forecast period 2016/2017 through 2020/2021.
Boston Gas	10/93	Docket No. DPU 92-230	Sponsored testimony describing the Company's position regarding rate treatment of vehicular natural gas investments and expenses.
Boston Gas	03/90	Docket No. DPU 90-55	Sponsored testimony supporting the weather and other cost of service adjustments, rate design and customer bill impact studies for a general rate case proceeding.
Boston Gas	03/88	Docket No. DPU 88-67-II	Sponsored testimony supporting the rate reclassification of commercial and industrial customers for a rate design proceeding.
Michigan Public Service Commission			
Lansing Board of Water & Light and Michigan State University	04/23	Docket No. U-21308	Sponsored testimony evaluating Consumer Energy's class cost of service and rate design proposals.
Lansing Board of Water & Light and Michigan State University	04/20	Docket No. U-20650	Sponsored testimony evaluating Consumer Energy's class cost of service and rate design proposals.

Sponsor	Date	Docket No.	Subject
Lansing Board of Water & Light and Michigan State University	04/19	Docket No. U-20322	Sponsored testimony evaluating Consumer Energy's class cost of service and rate design proposals.
Midland Cogeneration Ventures, LLC	09/18	Docket No. U-18010	Sponsored testimony evaluating Consumer Energy's class cost of service and rate design proposals.
Minnesota Public Utilities Commission			
Northern States Power Company (XcelEnergy)	10/21	Docket No. E002/GR-21-630	Sponsored testimony supporting a Return on Equity (ROE)adjustment mechanism that would allow the Company to symmetrically adjust its ROE to reflect significant changesin financial market conditions.
Missouri Public Service Commission			
Confluence Rivers Utility Operating Company	12/22	Case No. WR-2023-0006/ SR-2023-0007	Sponsored testimony supporting the rate design and bill impact studies for a general rate case proceeding.
The Empire District Gas Company	08/21	Docket No. GR-2021-0320	Sponsored testimony supporting the class cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding.
The Empire District Electric Company	05/21	Docket No. ER-2021-0312	Sponsored testimony supporting the class cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding.
Spire Missouri, Inc.	12/20	Docket No. GR-2021-0108	Sponsored testimony supporting class cost of service, rate design, and lead-lag study proposals for a general rate case proceeding. The testimony also included support for a proposed revenue adjustment mechanism.
The Empire District Electric Company	08/19	Docket No. ER-2019-0374	Sponsored testimony supporting the class cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding. The testimony also included proposals for a weather normalization mechanism.
Liberty Utilities (Midstates Natural Gas)	09/17	Docket No. GR-2018-0013	Sponsored testimony supporting the class cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding. The testimony also included proposals for a revenue decoupling/ weather normalization mechanism as well as tracker accounts for certain O&M expenses and capital costs.
Missouri Gas Energy	04/17	Docket No. GR-2017-0216	Sponsored testimony supporting the class cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding. The testimony included support for a decoupling mechanism.
Laclede Gas Company	04/17	Docket No. GR-2017-0215	Sponsored testimony supporting the class cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding. The testimony included support for a decoupling mechanism.
Nevada Public Utilities Commission			
Southwest Gas Corporation	09/23	Docket No. 23-09012	Sponsored testimony supporting the class cost of service,rate design, bill impact and Lead/Lag studies for a general rate case proceeding.
Southwest Gas Corporation	09/21	Docket No. 21-09001	Sponsored testimony supporting the class cost of service,rate design, bill impact and Lead/Lag studies for a general rate case proceeding.
Southwest Gas Corporation	02/20	Docket No. 20-02023	Sponsored testimony supporting the class cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding.
New Hampshire Public Utilities Commission			
Unitil (Northern Utilities, Inc.)	8/21	Docket No. DG 21-104	Sponsored testimony supporting a revenue decoupling mechanism.
Unitil Energy Systems, Inc.	4/21	Docket No. DE 21-030	Sponsored testimony supporting a revenue decoupling mechanism.

Sponsor	Date	Docket No.	Subject
Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities	11/17	Docket No. DG 17-198	Sponsored testimony supporting a levelized cost analysis for approval of firm supply and transportation agreements.
Liberty Utilities d/b/a Granite State Electric Company	04/16	Docket No. DE 16-383	Adopted testimony and sponsored Lead/Lag study for a general rate case proceeding.
New Jersey Board of Public Utilities			
Jersey Central Power and Light Company (FirstEnergy)	03/23	Docket No. ER23030144	Sponsored testimony supporting the class cost of service and Lead/Lag studies for a general rate case proceeding.
South Jersey Gas Company	04/22	Docket No. GR22040253	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Elizabethtown Gas Company	12/21	Docket No. GR21121254	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
South Jersey Gas Company	03/20	Docket No. GR20030243	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Elizabethtown Gas Company	04/19	Docket No. GR19040486	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Pivotal Utility Holdings, Inc. d/b/a Elizabethtown Gas Company	08/16	Docket No. GR16090826	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
New Mexico Public Regulation Commission			
New Mexico Gas Company, Inc.	9/23	Case No. 23-00255-UT	Sponsored testimony supporting the class cost of service, rate design, bill impact and weather normalization adjustment mechanisms for a general rate case proceeding.
Corporation Commission of Oklahoma			
The Empire District Electric Company	02/21	Cause No. PUD 202100163	Sponsored testimony supporting the class cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding. The proposed rate design included a three-year phase-in of the proposed rate increase.
The Empire District Electric Company	03/19	Cause No. PUD 201800133	Sponsored testimony supporting the class cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding.
The Empire District Electric Company	04/17	Cause No. PUD 201600468	Adopted direct testimony and sponsored rebuttal testimony supporting the revenue requirements for a general rate case proceeding. The testimony included proposals for alternative ratemaking mechanisms.
Rhode Island Public Utilities Commission			
Providence Gas Company	08/01 09/00 08/96	Docket No. 1673	Sponsored testimony supporting the changes in cost of gas adjustment factor related to projected under-recovery of gas costs; Filed testimony and witness for pilot hedging program to mitigate price risks to customers; Filed testimony and witness for changes in cost of gas adjustment factor related to extension of rate plan.
Providence Gas Company	08/00	Docket No. 2581	Sponsored testimony supporting the extension of a rate plan that began in 1997 and included certain modifications, including a weather normalization clause.
Providence Gas Company	03/00	Docket No. 3100	Sponsored testimony supporting the de-tariff and deregulation of appliance repair service, enabling the Company to have needed pricing flexibility.
Providence Gas Company	06/97	Docket No. 2581	Sponsored testimony supporting a rate plan that fixed all billing rates for three-year period; included funding for critical infrastructure investments in accelerated replacement of mains and services, digitized records system, and economic development projects.

Sponsor	Date	Docket No.	Subject
Providence Gas Company	04/97	Docket No. 2552	Sponsored testimony supporting the rate design, customer bill impact studies and retail access tariffs for commercial and industrial customers, including redesign of cost of gas adjustment clause, for a rate design proceeding.
Providence Gas Company	02/96	Docket No. 2374	Sponsored testimony supporting the rate design, customer bill impact studies and retail access tariffs for largest commercial and industrial customers for a rate design proceeding.
Providence Gas Company	01/96	Docket No. 2076	Sponsored testimony supporting the rate reclassification of customers into new rate classes, rate design (including introduction of demand charges), and customer bill impact studies for a rate design proceeding.
Providence Gas Company	11/92	Docket No. 2025	Sponsored testimony supporting the Integrated Resource Plan filing, including a performance-based incentive mechanism.
Railroad Commission of Texas			
Texas Gas Service Company – West Texas, North Texas, and Borger/ Skellytown Service Areas	06/22	Case No. 00009896	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – Central Texas and Gulf Coast Service Areas	12/19	GUD No. 10928	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – Beaumont/ East Texas Division	11/19	GUD No. 10920	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – Borger/ Skellytown Service Area	08/18	GUD No. 10766	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – North Texas Service Area	06/18	GUD No. 10739	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – South Texas Division	11/17	GUD No. 10669	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – Rio Grande Valley Service Area	06/17	GUD No. 10656	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Atmos Pipeline – Texas	01/17	GUD No. 10580	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – Texas Gulf Division	11/16	GUD No. 10567	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Public Utility Commission of Texas			
CenterPoint Energy Houston Electric, LLC	04/19	Docket No. 49421	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Vermont Public Utilities Commission			
Vermont Gas Systems	12/12	Docket No. 7970	Sponsored testimony describing the market served by $90 million natural gas expansion project to Addison County, VT. Also described the terms and economic benefits of a special contract with International Paper.
Vermont Gas Systems	02/11	Docket No. 7712	Sponsored testimony supporting the market evaluation and analysis for a system expansion and reliability regulatory fund.
Virginia State Corporation Commission			
American Electric Power - Appalachian Power Company	3/23	Case No. PUR-2023-00002	Sponsored testimony supporting the Lead/Lag study for the 2023 triennial review of base rates, terms, and conditions.

Sponsor	Date	Docket No.	Subject
Rappahannock Electric Cooperative	10/22	Case No. PUR-2022-00160	Sponsored report and studies related to revenue requirements, class cost of service, rate design, and bill impact analysis for a streamlined application to increase base rates.
American Electric Power - Appalachian Power Company	3/20	Case No. PUR-2020-00015	Sponsored testimony supporting the Lead/Lag study for the 2020 triennial review of base rates, terms, and conditions.
West Virginia Public Service Commission			
Monongahela Power Company and The Potomac Edison Company (FirstEnergy)	06/23	Case No. 23-0460-E-42T	Sponsored testimony supporting the class cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding.
Nova Scotia Utility and Review Board			
Nova Scotia Power	01/22	Matter No. M10431	Sponsored evidence supporting the cash working capital requirement and lead/Lag study for a general rate case proceeding.
Ontario Energy Board			
Ontario Energy Association	01/21	Docket No. EB-2020-0133	Sponsored evidence regarding policies and ratemaking treatment related to COVID-19 costs in U.S. and Canadian regulatory jurisdictions. The evidence was used to support Ontario Energy Association's response to Staff's proposals
Commission of Canada Energy Regulator			
Trans-Northern Pipelines, Inc.	06/23	Docket No. RH-001-2023	Sponsored evidence related to application for approval of incentive tolls.

Toronto Hydro-Electric System Limited
EB-2023-0195
Exhibit 1B
Tab 2
Schedule 1
Appendix B
ORIGINAL
(49 Pages)

Smart. Focused. Done Right.®

Jurisdictional Review of Modernized Performance-Based Regulation

Prepared for Toronto Hydro

August 2023

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1.0 Executive Summary

Energy Transition

The changing energy landscape is driving new investments and priorities, while continuing to focus on safe and reliable service

- Utilities continue traditional investments in electric system, such as replacing aging infrastructure and implementing new technologies
- At the same time, utilities invest in new initiatives (e.g., grid modernization) to support energy transition including increased electrification and development of DER

The changing energy landscape is leading to industry enhancements, including ratemaking reforms

- Distributed energy resources, beneficial electrification, public policy mandates, and increased use of information technologies are driving changes within the energy industry
- Enhancements include safety protocols, reliability considerations, and customer protections for affordability
- Ratemaking reforms address certain limitations, such as limits on utility revenue and return opportunities that create challenges for utilities adapting to the changing energy landscape

Various jurisdictions have developed ratemaking approaches that provide cost recovery flexibility to help address challenges related to changing grid needs

- Hawaii's EPRM, for example, provides cost recovery flexibility for eligible projects (primarily, clean energy-related infrastructure and grid modernization investments) placed in service between rate cases
- UK RIIO framework developed uncertainty mechanisms that provide flexibility regarding the timing and adoption of low-carbon technologies

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1.0 Executive Summary (Cont.)

Need for a 'Modernized' PBR Mechanism

PBR mechanisms have been "modernized" to reflect energy transition

- Modernized PBR mechanisms address cost recovery uncertainties that facilitate meeting policy objectives and utility financial health

PBR objectives have been expanded to address changes related to energy transition

- Hawaii Public Utilities Commission (PUC) recognized that "factors driving [the] energy transition were of sufficient breadth and magnitude that [its] regulatory framework must evolve to enable the State's electric utilities to meet these new challenges, maintain safety and reliability, offer new opportunities to create value for customers, and produce affordable rates"

PBR mechanisms have been enhanced to align utility financial health with consumer interests

- The Hawaii PUC noted, "The PBR Framework approved in this D&O has been carefully designed to include multiple safeguards and review opportunities to protect the Companies' financial health from extreme hardship"
  - In the proceeding, the Consumer advocate stated: "If inadequate consideration in the implementation of PIMs and/or PBR results in the increase of capital costs needed to build that infrastructure and/or downgrades in the utility credit rating, those results would be contrary to the public interest"

PBR mechanisms have been enhanced to provide for cost recovery of clean energy investments

- UK RIIO framework developed uncertainty mechanisms to help manage uncertainty over the timing and adoption of low-carbon technologies
- Separate funding mechanisms have been approved for costs related to achieving clean energy goals, such as:
  - New York adopted cost trackers for separate treatment and cost recovery to help achieve public policy goals, such as clean energy initiatives
  - Hawaii created Exceptional Project Recovery Mechanism (EPRM) that enables cost recovery of approved "eligible projects" that are not otherwise provided for during the PBR rate period

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1.0 Executive Summary (Cont.)

Elements of Modernized PBR Mechanism

1. Expanded Objectives: Include public policy objectives, such as emissions reduction, affordability, and clean energy goals
2. Modified Attrition Relief Mechanisms (ARMs): Re-evaluate the role of attrition relief mechanisms, such as the I-X framework
3. Alternative Cost Recovery Mechanisms: Allow cost recovery of clean energy initiatives through alternative separate mechanisms such as cost trackers
4. Performance Incentives: Align utility performance incentives and public policy objectives such as clean energy goals
5. Funding for Demonstration Projects: Cost recovery of innovative programs through separate funding mechanisms

1. Expanded Objectives

- Energy transition
  - Hawaii Public Utilities Commission (PUC): "factors driving [the] energy transition were of sufficient breadth and magnitude that [its] regulatory framework must evolve to enable … utilities to meet these new challenges, maintain safety and reliability, offer new opportunities to create value for customers, and produce affordable rates"
- Reduction of carbon emissions and enhanced customer knowledge and tools
  - New York Reforming the Energy Vision (REV) policy objectives include system reliability and resiliency, reduction of carbon emissions, system wide efficiency, and enhanced customer knowledge and tools
- Reliability, emissions reductions, and cost controls
  - Rocky Mountain Institute (RMI) study found 17 different policy goals related to PBR, including reliability, emissions reductions, and cost control
- Financial health of the utility
  - Hawaii PUC: "The PBR Framework … has been carefully designed to include multiple safeguards and review opportunities to protect the Companies' financial health from extreme hardship"
  - Hawaii Consumer Advocate: "If inadequate consideration in the implementation of PIMs and/or PBR results in the increase of capital costs needed to build that infrastructure and/or downgrades in the utility credit rating, those results would be contrary to the public interest"

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1.0 Executive Summary (Cont.)

Elements of a Modern PBR Mechanism (Cont.)

2. Modified Attrition Relief Mechanisms

- Attrition Relief Mechanisms (ARMs) modified to ensure adequate cost recovery of investments
- Revenue index mechanisms (such as I-X) create cost recovery challenges for major capital expenditures
  - Hawaii PUC stated that certain projects represent "lumpy" investments with costs not manageable under annual revenues derived from an index-driven revenue formula
  - Maine Public Utilities Commission (PUC) moved away from revenue indexed mechanisms to traditional cost of service cost recovery for large capital projects
- UK RIIO framework adjusts distributor revenue allowances for uncertainties including the scale, pace, and location of technology adoption, policy developments, demand patterns, and cost forecasts

3. Alternative Cost Recovery Mechanisms

- Alternative Cost Recovery Mechanisms, such as cost trackers, provide cost recovery related to certain public policy goals
  - Regulatory Rationales for Cost Trackers: Largely outside the control of a utility, unpredictable and volatile, substantial and recurring
- Cost trackers for traditional utility projects and emerging cost categories (such as clean energy programs)
  - PECO (PA) Distribution System Improvement Charge for aging infrastructure replacement costs (~17% of distribution CapEx)
  - AEP (OH) Enhanced Service Reliability Program (ESRP) Rider for vegetation management costs (~13% of distribution O&M)
  - Con Edison (NY) System Benefit Charge for clean energy programs
- Cost trackers recognized for certain large capital investments do not fit within the traditional PBR construct and require special treatment
  - Hawaii's Exceptional Project Recovery Mechanism enables cost recovery of "eligible projects" that are not provided for during multi-year rate period
- Aligned treatment of capital and operating expenses
  - UK RIIO's TOTEX model allows capitalization of operating expenditures

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1.0 Executive Summary (Cont.)

Elements of a Modern PBR Mechanism (Cont.)

4. Performance Incentives

- Align utility performance incentives and policy objectives
  - Review of selected U.S. financial rewards and penalties show magnitude up to ~1-3% of base revenues
  - UK RIIO model has incentives up to 5% of base revenues
- Certain jurisdictions (such as New York, Hawaii, UK) stated that performance incentives are necessary to achieve desired outcomes
  - Hawaii Commission: "incentive mechanisms can achieve … objectives, such as incenting cost reduction, incenting achievement of policy goals, improving performance, integrating technological advances, supporting new types of customer choice, and encouraging a low-cost, customer-centric future"
  - New York Commission: "outcome-based incentives are the most effective approach to address the mismatch between traditional revenue methods and modern electric system needs, while aligning utility shareholder interests with consumer interests"
  - UK RIIO includes performance incentives tied to outputs that include customer satisfaction, reliability, interconnection, and environmental impact
  - California provides 4.0 percent pre-tax incentives for integrating DERs that provide valuable grid services, including voltage support, reliability, and resiliency
- Certain jurisdictions have also provided incentives to achieve cost efficiencies
  - UK RIIO's Totex Incentive Mechanism (also called the efficiency incentive) encourages distributors to improve their efficiency and shares efficiency benefits between customers and utility

5. Funding for Demonstration Projects

- Funding of innovative projects (or demonstration projects) provide lessons learned on new technologies and cost-saving initiatives that support energy transition
- Certain jurisdictions created separate cost recovery to fund innovative projects and created processes to share lessons learned across the utilities
  - New York utilities recover REV demonstration project costs outside of multi-year rate plans
  - UK RIIO framework includes dedicated funding for innovation, comprising the Network Innovation Allowance (NIA), the Network Innovation Competition (NIC) and the Innovation Roll-Out Mechanism (IRM)

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1.0 Executive Summary (Cont.)

Conclusion

Modernized PBR mechanisms provide utilities with flexibility to address changing grid needs while maintaining safe and reliable service

- Address cost recovery challenges of achieving policy objectives
- Fund traditional and new investments to meet clean energy transition
- Align utility performance incentives and policy objectives

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2.1 Energy Transition Implications

New Investments and Priorities

The changing energy landscape is driving new investments and priorities, while maintaining focus on safe and reliable service

- Utilities continue traditional investments in replacing aging infrastructure and implementing new technologies
- In addition, utilities invest in new initiatives (e.g., grid modernization) to support energy transition including increased electrification and development of DER

Energy transition leads to enhancements in traditional utility responsibilities of providing safe, reliable, and affordable service[1]

- Safety
  - New technologies and increased connection of distributed assets affect safety protocols
- Reliability
  - Probabilistic resource adequacy methods to account for new resources and the changing nature of risk to the system
  - Consideration of reliability services provided by DERs
- Affordability
  - Customer protections (financial protections, expanded choices, cost-benefit analyses)

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2.1 Energy Transition Implications

New Investments and Priorities (Cont.)

In addition, utilities are focusing on achieving environmental goals, ensuring a resilient grid, addressing customer needs, and driving innovation in clean energy technologies and programs[2]

- **Environmental Goals**: Utilities operate under various public policy mandates to achieve decarbonization and other environmental goals
- **Resilience**: Cyber security threats and increased extreme weather events have placed a heightened focus on resilience
- **Customer Choice**: Customers have evolving preferences over energy sources, desire for control over energy usage, and levels of engagement
- **Innovation**: Given uncertainty and change being experienced in the energy sector, utility regulators are promoting innovation programs and funding to enable experimentation of new business models and technologies

Given the evolving industry dynamics, uncertainties exist regarding the costs of new technologies and the pace of their adoption

- There is recognition (such as in UK RIIO) that investment flexibility addresses the uncertainties

Ratemaking reforms (such as New York, Hawaii, UK) have addressed structural limitations that challenge utilities' ability to meet policy and customer requirements and expectations[3]

- Structural limitations include misaligned incentives, limits on utility revenue and profit opportunities, and risk imbalances
- There is recognition that policy objectives cannot be achieved without ensuring cost recovery for necessary investments
- Absent changes, challenges in balancing traditional ("business-as-usual") investments (reliability, resilience, safety) vs. new investments (such as related to clean energy transition)

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2.1 Energy Transition Implications (Cont.)

Need for Investment Flexibility to Address Uncertainty

Various jurisdictions have developed mechanisms that provide investment flexibility to address uncertainty related to changing grid needs while maintaining safe and reliable service

- UK RIIO framework includes uncertainty mechanisms to help manage the uncertainty over the scale, timing, and adoption of low-carbon technologies
- The uncertainties recognized by UK RIIO include scale, pace, and location of technology adoption, policy developments, demand patterns, and cost forecasts[4]
- The UK regulator (Ofgem) noted that its five-year price control period spans a critical time in which “network companies cannot wait for everything to become clear but must proactively manage those uncertainties”[5]

Jurisdictions have implemented cost trackers for traditional utility projects and emerging cost categories (such as clean energy programs)

- PECO (PA) Distribution System Improvement Charge for aging infrastructure replacement costs (~17% of distribution CapEx)[6,7]
- AEP (OH) Enhanced Service Reliability Program (ESRP) Rider for vegetation management costs (~13% of distribution O&M)[8,9]
- Con Edison (NY) System Benefit Charge for clean energy programs[10]

Jurisdictions have recognized that certain large capital investments do not fit within the traditional PBR construct and require special treatment

- Hawaii’s Exceptional Project Recovery Mechanism (EPRM) provides cost recovery certainty for eligible projects (primarily clean energy-related infrastructure and grid modernization investments) placed in service between rate cases[11]
- The Commission has taken a broad approach to eligible projects, noting that “limiting eligible projects to pre-determined plans made in other dockets may limit the flexibility to address unforeseen events or take advantage of unexpected opportunities (e.g., improvements in technology, changes in consumption behavior, etc.)”[12]

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2.2 Need for a 'Modernized' PBR Mechanism

Need for a 'Modernized' PBR Mechanism

Industry review shows that PBR mechanisms have been "modernized" to reflect energy transition

- Addressing cost recovery results in customer savings as the utility's financial integrity may improve resulting in lower cost of capital
- Challenges in meeting policy objectives without cost recovery mechanisms for necessary investments

Jurisdictions have expanded PBR objectives to address changes related to energy transition

- Hawaii Public Utilities Commission (PUC) recognized that "factors driving [the] energy transition were of sufficient breadth and magnitude that [its] regulatory framework must evolve to enable the State's electric utilities to meet these new challenges, maintain safety and reliability, offer new opportunities to create value for customers, and produce affordable rates"[13]

Jurisdictions have recognized that financial integrity of the utility aligns with consumer interests

- The Hawaii PUC noted, "The PBR Framework approved in this D&O has been carefully designed to include multiple safeguards and review opportunities to protect the Companies' financial health from extreme hardship"[14]
  - In the proceeding, the Consumer advocate stated: "If inadequate consideration in the implementation of PIMs and/or PBR results in the increase of capital costs needed to build that infrastructure and/or downgrades in the utility credit rating, those results would be contrary to the public interest"[15]

Jurisdictions have approved separate cost recovery for clean energy investments, recognizing that these can be volatile

- UK RIIO framework developed uncertainty mechanisms to help manage uncertainty over the timing and adoption of low-carbon technologies
- Separate funding mechanisms have been approved for costs related to achieving clean energy goals, such as:
  - Jurisdictions (such as New York) have adopted cost trackers for separate treatment and cost recovery to help achieve public policy goals, such as clean energy initiatives
  - Jurisdictions (such as Hawaii) have created Exceptional Project Recovery Mechanism (EPRM) that enables cost recovery of approved "eligible projects" that are not otherwise provided for during the PBR rate period

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2.2 Need for a 'Modernized' PBR Mechanism (Cont.)

Elements of a Modern PBR Mechanism

Changing Energy Landscape

- **Replacement of aging infrastructure and investment in new technologies to ensure**
  - Safety
    - New technologies, digitalization, and increased grid connections require new safety protocols
  - Reliability
    - New considerations for resource adequacy and reliability as DERs expand
  - Resilience
    - Increased costs due to cybersecurity threats and extreme weather events
- **Growth in building and transportation electrification**
  - Driven by customer demands and policy goals
  - Increased investments required to accommodate electrification
- **Growth in distributed energy resources**
  - Driven by lower cost technologies and policy support for non-carbon-emitting resources

PBR Implications

1. **Expanded Objectives**
   - Prioritize achieving public policy objectives, such as emissions reduction, affordability, and clean energy goals
2. **Modified Attrition Relief Mechanisms**
   - Develop hybrid cost recovery treatment methods
   - Evaluate mechanisms to manage uncertainty
3. **Alternative Cost Recovery Mechanisms**
   - Allow recovery of clean energy initiatives through separate mechanisms
   - Align treatment of capital and operating expenditures enabling the pursuit of the most cost-effective solutions
4. **Performance Incentives**
   - Focus on measuring and incentivizing outcomes rather than program-based performance
   - Align with public policy objectives such as clean energy goals

6. **Funding for Demonstration Projects**
   - Allow recovery of innovative programs through separate funding mechanisms

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3.1 Expanded Objectives

PBR objectives expanded to address changes related to energy transition

- Rocky Mountain Institute (RMI) study found 17 different policy goals related to PBR, including reliability, emissions reductions, and cost control[16]
- New York Reforming the Energy Vision (REV) policy objectives include system reliability and resiliency, reduction of carbon emissions, system wide efficiency, and enhanced customer knowledge and tools[17]
- Hawaii Public Utilities Commission (PUC): "factors driving [the] energy transition were of sufficient breadth and magnitude that [its] regulatory framework must evolve to enable … utilities to meet these new challenges, maintain safety and reliability, offer new opportunities to create value for customers, and produce affordable rates"[18]

Recognition that traditional PBR mechanisms may not result in achievement of customer interests (such as clean energy objectives) without alternative rate mechanisms

- Challenge to achieve policy objectives without cost recovery for necessary investments.

Hawaii, for example, recognized financial integrity of the utility aligns with consumer interests

Policy Goals in PBR Enabling Legislation

The most commonly cited policy goals enumerated in PBR statutes since 2018.

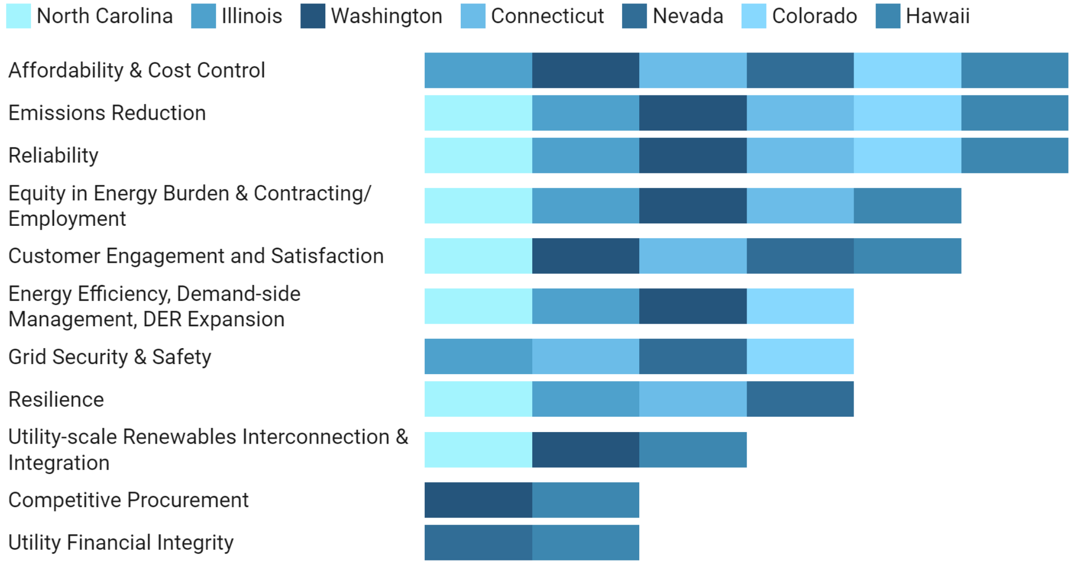

Chart: RMI • Created with Datawrapper

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3.1 Expanded Objectives (Cont.)

Various jurisdictions have introduced or modified performance based ratemaking objectives to address changing conditions and customer needs

- Hawaii
  - In 2018, the PUC recognized that "factors driving [the] energy transition were of sufficient breadth and magnitude that [its] regulatory framework must evolve to enable the State's electric utilities to meet these new challenges, maintain safety and reliability, offer new opportunities to create value for customers, and produce affordable rates"[19]
  - The Commission adopted three overarching regulatory goals and 12 priority outcomes that served as guideposts for PBR design
- Connecticut
  - Regulatory goals include public policy achievement and empowering customer to take greater control of their energy services (e.g., deploying DERs and other grid-edge technologies, reducing emissions, etc.) and expenditures (e.g., lowering their monthly utility bill)[20]
- New York Reforming the Energy Vision (REV)
  - New York REV policy objectives included, but were not limited to, system reliability and resiliency, reduction of carbon emissions, system wide efficiency, and enhanced customer knowledge and tools[21]
  - The PSC noted the "combination of large impending infrastructure needs, decreasing system efficiency, environmental demands, and an increasing ability for customers to choose other options, presents challenges to utilities and regulators"[22]

Hawaii Regulatory Goals and Priority Outcomes*

Goal	Priority Outcome	
Enhance Customer Experience	Traditional	Affordability
		Reliability
	Emergent	Interconnection Experience
		Customer Engagement
Improve Utility Performance	Traditional	Cost Control
	Emergent	DER Asset Effectiveness
		Grid Investment Efficiency
Advance Societal Outcomes	Traditional	Capital Formation
		Customer Equity
	Emergent	GHG Reduction
		Electrification of Transportation
		Resilience

Source: Hawaii PUC, Summary of Phase 1 Decision & Order Establishing a PBR Framework, May 23, 2019

*Traditional outcomes refer to those which have been ingrained in utility regulation for many years, while emergent outcomes refer to those which in been more recently developed in response to changes in Hawaii's electric industry

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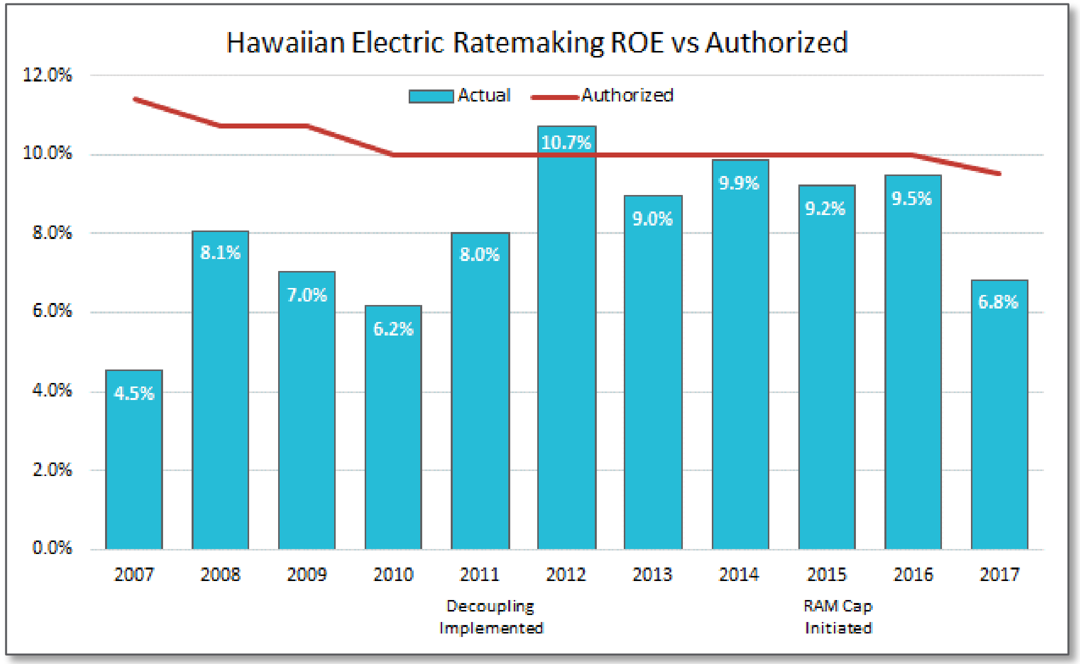
3.1 Expanded Objectives (Cont.)

Balancing Financial Integrity and Public Policy Goals

Jurisdictions (such as Hawaii) have recognized that financial health of the utility aligns with consumer interests

- The performance-based regulation framework in Hawaii ensures that the financial integrity of utility aligns with consumer interests
  - In Hawaii, the Consumer Advocate urged the Commission to ensure that the PBR framework being developed included “reasonable opportunities to recover the cost of investments and a return on those investment”[23]
  - “If inadequate consideration in the implementation of PIMs and/or PBR results in the increase of capital costs needed to build that infrastructure and/or downgrades in the utility credit rating, those results would be contrary to the public interest”[24]
  - In the Commission’s Phase 1 decision, it outlined utility financial integrity, including access to low-cost capital, as one of the three guiding principles to inform the PBR framework[25]
  - The Commission noted, “The PBR Framework approved in this D&O has been carefully designed to include multiple safeguards and review opportunities to protect the Companies’ financial health from extreme hardship”[26]



Source: Hawaii PUC, Docket No. 2018-0088, Exhibit 7, p.11, filed October 25, 2018

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3.2 Modified Attrition Relief Mechanisms

Attrition Relief Mechanisms (ARMs) need to be modified to ensure adequate cost recovery of necessary future investments

- Revenue index mechanisms (such as I-X) create challenges in the ability of utilities to recover costs from major capital expenditures
  - Hawaii PUC stated that certain projects represent "lumpy" investments with costs not manageable under annual revenues derived from an index-driven revenue formula[27]
  - Maine Public Utilities Commission (PUC) moved away from revenue indexed mechanisms to traditional cost of service cost recovery for large capital projects[28]

Recognition to develop mechanisms that provide investment flexibility to address uncertainty

- UK RIIO includes uncertainty mechanisms to adjust distributor revenue allowances
- Uncertainties include scale, pace, and location of technology adoption, policy developments, demand patterns, and cost forecasts[29]

ARMs Cost Forecasting Methodologies

- **Rate Freeze**
  - Rates remain fixed throughout MYRP term
- **Forecasted/ "Stairstep"**
  - Establishes revenues/ rates based on pre-determined levels
  - Based on forecasted revenue requirements
  - Widely used in U.S., e.g., California, Florida, and New York
- **Indexed ("I-X")**
  - Establishes revenues/ rates based on approved methodology that is indexed to inflation and other cost drivers
  - Methodology based on industry cost trend research
  - Provides for revenue/ rate adjustments using a form of inflation (I) less a productivity factor (X)
  - Some utilities apply "I-X" factor after the first year of MYRP (e.g., ATCO utilities);
  - Others define cost forecasts for entire term and apply a "smoothing" mechanism to define rates for the first year (e.g., Ausgrid)
  - Used in Massachusetts, Hawaii, Alberta, Ontario, and Quebec
- **Hybrid**
  - Establishes revenues/ rates based on combination of methods, such as indexing for O&M expenses and stairstep for Capex
  - Used by Southern California Edison

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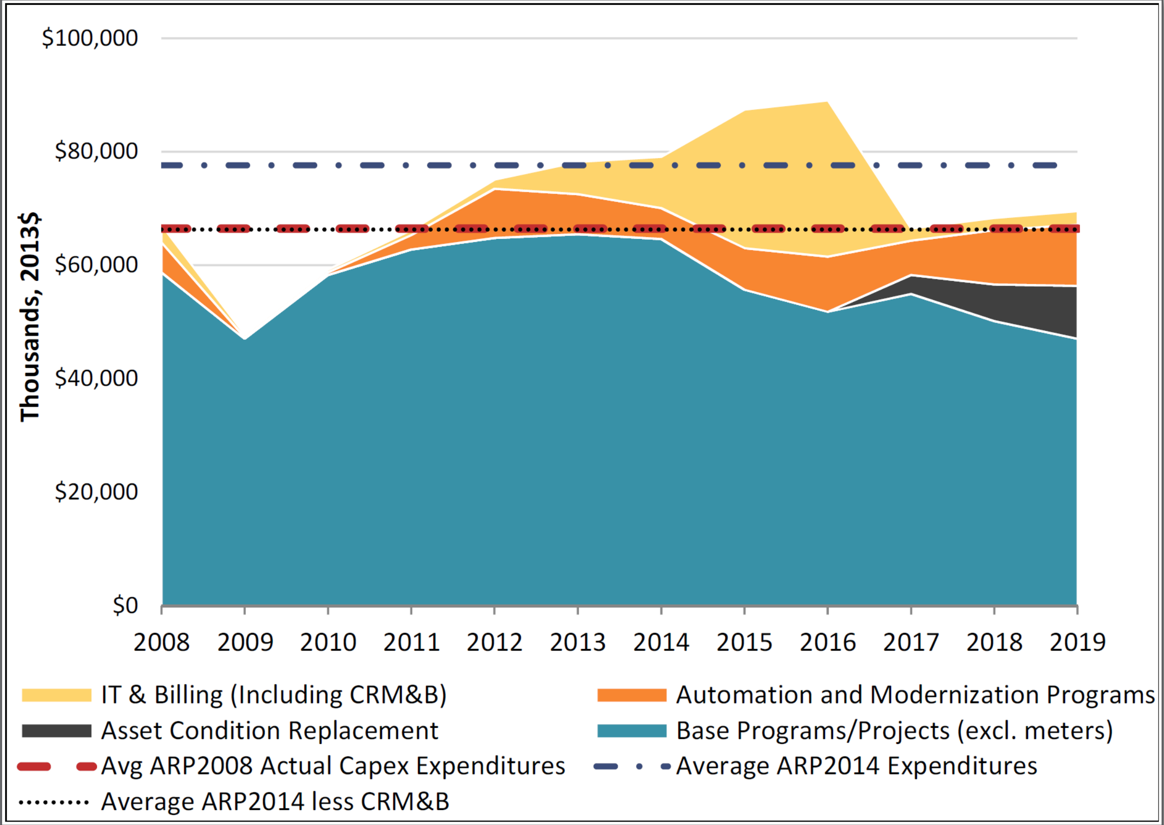
3.2 Modified Attrition Relief Mechanisms (Cont.)

Revenue index mechanisms can challenge the ability of utilities to recover costs from major capital expenditures

- Maine Public Utilities Commission (MPUC)
  - MPUC moved away from revenue indexed mechanisms to traditional cost of service (COS) cost recovery for large capital projects[30]
  - Commission Staff recommended PBR to take a "hiatus" and allow Central Maine Power (CMP) to operate under COS ratemaking[31]
  - Staff stated COS ratemaking allows CMP to address its system and spending needs consistent with the shareholder and ratepayer interests[32]
- Alberta
  - In a 2012 filing, Alberta utilities argued they were experiencing cost pressures on capital expenditures, requiring special treatment[33]
    - ATCO Electric stated its capital investments would result in 10% rate base growth, while its I-X mechanism supported 4.5% growth[34]
  - Commission permitted capital tracking mechanisms to recover specific types of capital outside of the I-X mechanism[35]
- Hawaii
  - In its PBR proceeding, the Hawaii PUC stated that certain projects represent "lumpy" investments with costs not manageable under annual revenues derived from an index-driven revenue formula[36]



Source: Maine Public Utilities Commission, Docket No. 2013-168, Direct Testimony of Tim Woolf, filed December 12, 2013

Central Maine Power requested separate capital cost treatment to recover significant investments in distribution system modernization projects, asset condition projects, and a new IT system

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3.2 Modified Attrition Relief Mechanisms (Cont.)

Mechanisms that provide investment flexibility to address uncertainty

UK RIIO includes uncertainty mechanisms to adjust distributor revenue allowances

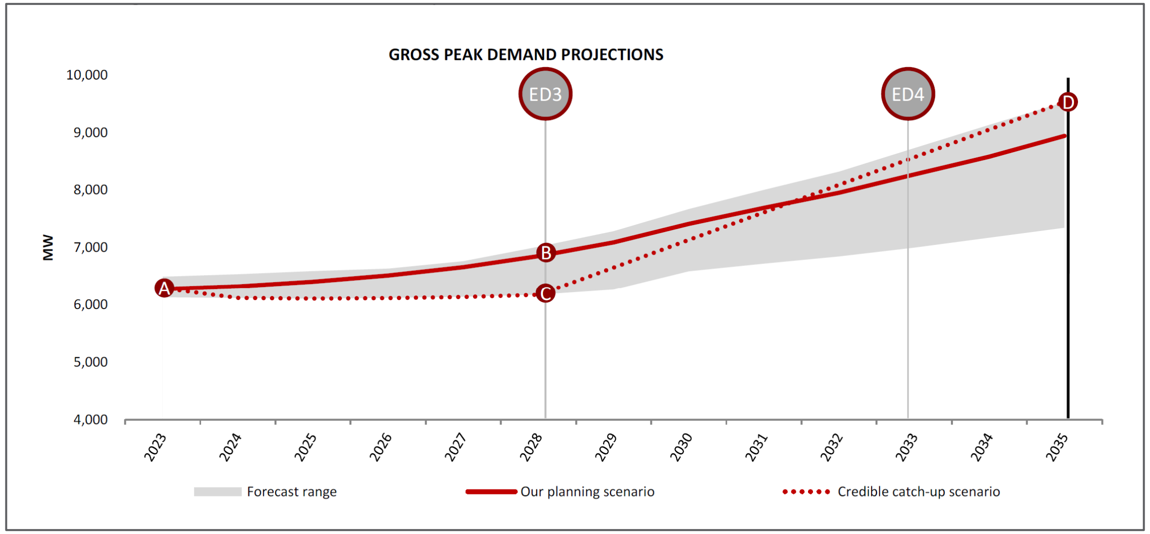
- Revenue adjustments may be made at the price control review, during the price control period, or after actual expenditure has occurred[37]

Uncertainties include scale, pace, and location of technology adoption, policy developments, demand patterns, and cost forecasts

Select quotes from Ofgem:

- "The economic and decarbonization landscape will evolve within the RIIO-ED2 period, and it is vital that networks can invest to avoid [blocking] decarbonization targets" while also "protecting consumers by avoiding investment in networks upgrades that are not required"[38]
- "EV rollout is market-led, and the pace, location, and local network impact is challenging to predict"[39]
- "There is still a degree of uncertainty about the extent to which electricity will be the prime source of heating for most homes. In addition, our requirements for energy may change as we adapt to new patterns of work and life"[40]
- " …[uncertainty mechanisms ensure that] if the uptake of EVs or HPs [heat pumps] is faster than expected, then investment can track these changes and flex quickly and efficiently in response"[41]

Northern Powergrid Gross Peak Demand Projections



Point on chart	No of EVs	No of HPs	Total
A – 2023	125,000[2]	59,000[2]	184,000[2]
C – 2028 (low)	419,000	172,000	592,000
B – 2028 (planning scenario)	941,000	309,000	1,250,000
D – 2035 (high)	3,222,000	1,585,000	4,807,000

Source: Northern Powergrid, Annex 7.4, Decarbonisation Uncertainty and Ofgem Uncertainty Mechanisms, Business Plan 2023-2028

Northern Powergrid projections highlight the uncertainty within forecasting demand over future price controls periods

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3.2 Modified Attrition Relief Mechanisms (Cont.)

RIIO framework evolved to provide uncertainty mechanisms that include greater flexibility for investments

- The RIIO ED-1 framework included mechanisms to help manage the uncertain costs that exceeded a 'fixed materiality' threshold (20% greater or less than original allowances for high-value projects)[42]
- RIIO ED-2 provides more flexible uncertainty mechanisms that avoid delaying investments[43]
  - Distributors argued that the 20% materiality threshold did not provide sufficient flexibility to manage increased market uncertainties[44]

Categories of uncertainty mechanisms within RIIO ED-2

- Automatic Adjustments
  - Volume Driven: adjusts allowances to accommodate changes in volume (e.g., new connections, low carbon technology uptake)
  - Pass Through: adjusts allowances for costs incurred outside the distributor's control (e.g., bad debt, pension funding)
  - Indexation: adjusts allowances in cases where the evolution of prices is unknown, such as for inflation or cost pressures
  - Use-It-Or-Lose-It Allowance: funding is not available unless an expenditure is incurred in delivering a specific output (e.g., improving network reliability for worst served customers)
- Administrative Adjustments
  - Reopener: mechanisms to decide on additional allowances to deliver a project or activity when the needs case, timing, or scope is unclear

Types of Uncertainty Mechanisms with RIIO ED-2

Adjustment Type	Mechanism	Purpose	Examples
Automatic	Volume Driven	Adjusts allowances to accommodate changes in volume (e.g.,new connections, low carbon technology uptake)	Load-Related Expenditures
	Pass-Through	Adjusts allowances for costs incurred outside the distributor's control	Bad Debt, Pension Funding
	Indexation	Adjusts allowances in cases where the evolution of prices is unknown	Inflation, Debt
	Use-it or Lose-it Allowances	Funding is not available unless an expenditure is incurred in delivering a specific output	Improving network reliability for worst-served customers; Cyber Resilience Operation Technology
Administrative	Reopener	Mechanisms to decide on additional allowances to deliver a project or activity when the needs case, timing, or scope is unclear	Net Zero, Digitalization, Street Works

Source: Ofgem, RIIO-ED2 Final Determinations Core Methodology Document, November 30, 2022

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3.3 Alternative Cost Recovery Mechanisms

Alternative Cost Recovery Mechanisms, such as cost trackers, provide recovery of costs related to achieving public policy goals

- Regulatory rationales for cost trackers include:
  - Largely outside the control of a utility
  - Unpredictable and volatile
  - Substantial and recurring

Jurisdictions have implemented cost trackers for traditional utility projects (reliability investments, vegetation management) and emerging cost categories (clean energy programs)

- PECO (PA) Distribution System Improvement Charge for aging infrastructure replacement costs (~17% of distribution CapEx)[45,46]
- AEP (OH) Enhanced Service Reliability Program (ESRP) Rider for vegetation management costs (~13% of distribution O&M)[47,48]
- Con Edison (NY) System Benefit Charge for clean energy programs[49]

Recognition that certain large capital investments do not fit within the traditional PBR construct and require special treatment

- Hawaii's Exceptional Project Recovery Mechanism enables cost recovery of "eligible projects" that are not provided for during multi-year rate period

Aligned treatment of capital and operating expenses

- UK RIIO's TOTEX model allows capitalization of certain operating expenditures

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3.3 Alternative Cost Recovery Mechanisms (Cont.)

Common Regulatory Rationales for Cost Trackers[50]

A. Extraordinary Circumstances

- Regulators have traditionally approved cost trackers only under "extraordinary circumstances"
  - Largely outside the control of a utility
  - Unpredictable and volatile
  - Substantial and recurring
- Regulators have recently approved cost trackers when costs do not meet all three conditions, particularly finding that the criteria relating to substantial and recurring costs is restrictive
  - Bad debt cost trackers are typically not substantial but are difficult to incorporate in base rates due to unpredictability

B. Severe financial consequences

- Historically, regulators have approved cost trackers to avoid the possibility of a utility suffering a financial problem due to costs unforeseen during the last rate case

C. Special Circumstances

- Other costs, such as those relating to fuel and purchased power, are considered "special circumstances" that justify recovery outside of a rate case

Ontario Energy Board Criteria for Capital Trackers

Criteria	Description
Causation	The expense must be clearly outside of the base upon which revenue requirement(s) were derived
Materiality	Amounts must exceed the OEB-defined materiality threshold ($3 million for Hydro One) and have a significant influence on distributor operation
Prudence	The amount must have been prudently incurred. The distributor's decision to incur the amount must represent the most cost-effective option for ratepayers

Based on Decision and Order EB-2017-0049, Hydro One Networks, Application for electricity distribution rates beginning January 1, 2018 until December 31, 2022, filed March 7, 2019

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3.3 Alternative Cost Recovery Mechanisms (Cont.)

Cost trackers across jurisdictions have included traditional utility projects and emerging cost categories

Utility	Rider	Description	Budget
PECO (PA)	Distribution System Improvement Charge[51,52]	• Accelerates investment in new utility plant to replace aging distribution infrastructure • Recovers fixed costs (depreciation and pre-tax return) of certain non-revenue producing, non-expense reducing infrastructure improvement costs place into service between base rate cases	$320M budget from 2016-2020 ($270M for reliability projects and $50M for facility relocation) Budget represented ~17% of distribution capex spending from 2016-2020
AEP Ohio	Enhanced Service Reliability Program (ESRP) Rider[53,54]	• Commission found that AEP faces increased costs for vegetation management, and costs related to a new vegetation initiative were prudent to support reliability and were incremental to costs embedded in distribution rates • Commissions found that the new vegetation initiative was a reasonable program that advanced state policy and approved an ESRP rider to recover costs, subject to review and reconciliation on an annual basis	2020 Annual Revenue: $21.8M Annual recovery represented ~13% of 2020 distribution O&M spending
San Diego Gas & Electric	AMI Balancing Account[55]	• Preapproved multiyear cost forecasts • SDG&E permitted to recover 100% of forecasted costs and 90% of overspends up to a $50M cap without further prudence review. It is permitted to keep 10% of underspends. • Records O&M and capital-related AMI costs against the monthly authorized revenue requirements adjusted for benefits	$358M of capital expenditures from 2007-2011

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3.3 Alternative Cost Recovery Mechanisms (Cont.)

Cost trackers across jurisdictions have included traditional utility projects and emerging cost categories

Utility	Rider	Description	Budget
Con Edison	System Benefit Charge[56]	• Recovers costs associated with clean energy programs conducted by NYSERDA, energy efficiency programs, and costs of the Integrated Energy Data Resource program to collect and integrate energy-related data onto a single statewide platform	$219.6M in 2020-21
PSEG	Energy Strong[57]	• Provides recovery for costs related to storm damage and reinforcing the resiliency of the grid (sample projects include electric station flood mitigation, ADMS systems, expanded system communication and data collection technologies, and redundant distribution investments) • Includes AFUDC, depreciation, income taxes, but excludes O&M related to capital investments	Total electric plant additions: $641M from 2020 to 2023
Xcel Energy (Minnesota)	Renewable Energy Standard Rider[58,59]	• Designed to allow for the automatic adjustment of charges to recover prudently-incurred investments, expenses, or costs associated with facilities constructed, owned, or operated by a utility to satisfy the Renewable Energy Standard Statute	Authorized to recover $101.8M for costs incurred in 2019 and 2020 (represents ~8% of production capex over same time period)

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3.3 Alternative Cost Recovery Mechanisms (Cont.)

Hawaii's Exceptional Project Recovery Mechanism (EPRM)

Hawaii's EPRM enables cost recovery of approved "eligible projects" that are not otherwise provided for during a multi-year rate period[60,61]

- EPRM Context
  - Hawaiian Electric uses a five-year control period with an externally-indexed revenue cap
  - The Hawaii Commission noted that the difficulty of recovering large, lumpy capital or expense-based projects through an externally-indexed attrition relief mechanism formula

- EPRM Cost Recovery Mechanics
  - EPRM recovery is based on actual recorded costs and the depreciation, tax, and authorized return rates in place
  - Recovery of on-going incremental O&M costs are based on actual recorded costs for the previous year
  - Target revenues are recovered through the utility's Revenue Balancing Account tariff
  - Any approval of recovery of costs of an eligible project through the EPRM adjustment mechanism shall continue until new rates become effective that provide cost recovery for the eligible project

EPRM Criteria for Commission Approval

- EPRM relief should be sought sparingly, and shall be reserved for projects which are extraordinary in nature and do not reflect "business as usual" investments or expenses
- In certain instances, EPRM relief may be appropriate for projects or programs previously reviewed by the Commission and prospectively found to be extraordinary or worthy of EPRM relief
- EPRM relief should not perpetuate bias toward capital expenditures

Exceptional Project Recovery Mechanism (EPRM)

Eligible EPRM Projects

- Projects that encourage clean energy choices and/or customer control to shift or conserve their energy use
- Infrastructure that is necessary to connect renewable energy projects
- Projects that make it possible to accept more renewable energy
- Approved or accepted plans, initiatives, and programs
- Utility scale generation and energy storage
- Grid Modernization projects
- Service contracts

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3.3 Alternative Cost Recovery Mechanisms (Cont.)

Hawaii's Exceptional Project Recovery Mechanism (EPRM) (Cont.)

In June 2022, Hawaiian Electric filed an application for $189.7 million in cost recovery through the EPRM[62]

- $156.6 million in capital expenditures and $33.1 million in O&M expenses
- The application was focused on approval for investments over a 5-year period to adapt the Companies' transmission and distribution systems to the changing climate and growing resilience threats
- Guiding Principles of Application
  - **Pragmatism**: Protect against climate change and associated extreme weather events, the Companies note the need to move forward with resilience investments before every project and initiative can be scoped and costed in detail
  - **Flexibility**: Address uncertainty with regard to project scope, timing, and cost
  - **Transparency and Accountability**: Transparency with regard to 1) the initiation, conduct, and progress of projects and initiatives, and 2) accountability for spending
- Projects Specified in Application
  - Projects include: 1) hardening critical transmission lines, 2) hardening and mitigating risks to critical overhead poles, 3) hardening circuits serving critical customers, 4) flood monitoring of substations, 5) upgrading distribution circuits to provide redundant transformer capacity, 6) undergrounding select overhead distribution lines, 7) hazard tree removal, 8) resilience modeling, and 9) wildfire prevention and mitigation

EPRM provides utilities flexibility to address system needs without any potential impact on utility returns

> *"Since incremental revenues are fixed by the ARA formula, there is an incentive for the Companies to reduce project investments and other costs to maintain adequate returns during the five-year multi-year rate plan. However, the Companies continue to invest in needed infrastructure because of the obligations as public utilities to provide electrical service to all customers on a non-discriminatory basis and to implement state energy policy consistent with state statute and Commission orders. [There is] a need to recover large, lumpy capital or expense-based project through the EPRM that would be difficult to recover through an index-based ARA."*
>
> *- Hawaiian Electric Companies, EPRM Application, 2022*

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3.3 Alternative Cost Recovery Mechanisms (Cont.)

CapEx-OpEx Alignment

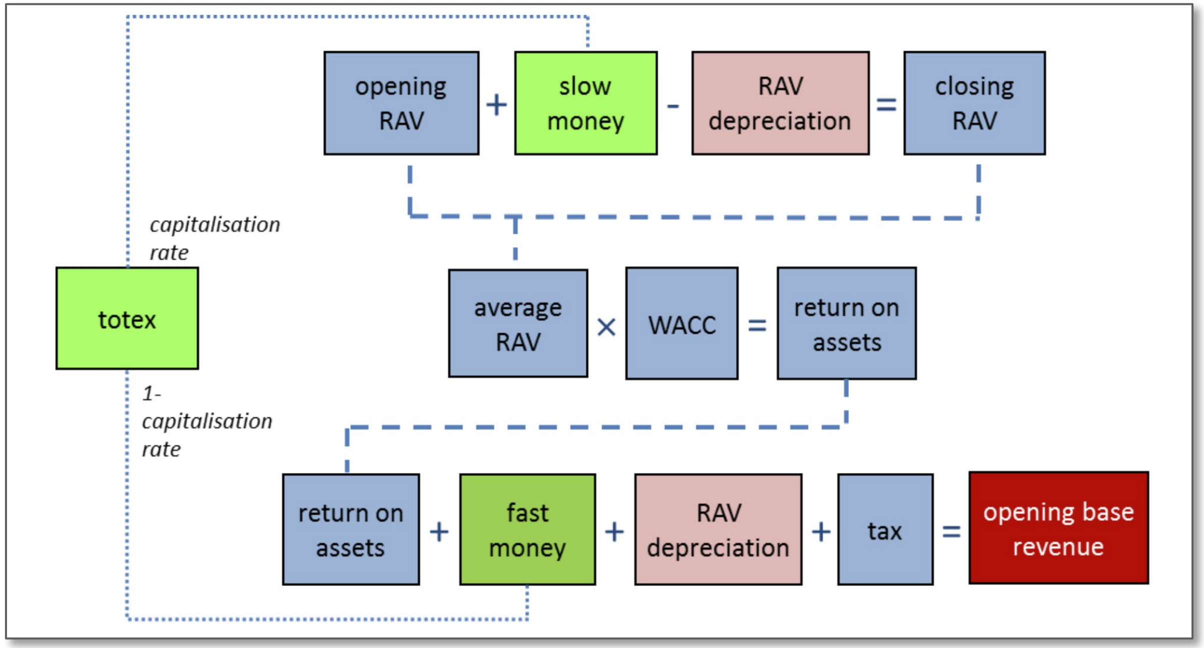
UK RIIO's TOTEX model allows for capitalization of operating expenditures

- Total expenditures ("Totex") consists of "fast" money and "slow" money
  - Fast money represents expenses funded in the year incurred, similar to traditional operating expenses
  - Slow money represents expenses added to the rate base, similar to traditional capital expenditures
  - A capitalization ratio is set to determine the proportion of fast money and slow money, based on the historical and forecasted CapEx-OpEx split
- The Totex Incentive Mechanism (also called the efficiency incentive) encourages distributors to improve their efficiency and shares efficiency benefits between customers and utility

Similar initiatives

- Capitalization of non-wires alternatives expenditures in New York[63]

UK TOTEX: Components of Base Revenues



Source: Ofgem Guide to the RIIO-ED1 Electricity Distribution Price Control

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3.4 Performance Incentives

Performance or earnings incentives align policy objectives and shareholder and customer interests

- Review of selected U.S. financial rewards and penalties show magnitude up to ~1-3% of base revenues[64]
- UK RIIO model has incentives up to 5% of base revenues[65]

Jurisdictions (such as New York, Hawaii, UK) stated that performance incentives are necessary to achieve desired outcomes

- Hawaii Commission: “incentive mechanisms can achieve … objectives, such as incenting cost reduction, incenting achievement of policy goals, improving performance, integrating technological advances, supporting new types of customer choice, and encouraging a low-cost, customer-centric future”[66]
- New York Commission: “outcome-based incentives are the most effective approach to address the mismatch between traditional revenue methods and modern electric system needs, while aligning utility shareholder interests with consumer interests”[67]
- UK RIIO includes performance incentives tied to outputs that include customer satisfaction, reliability, interconnection, and environmental impact
- California provides 4.0 percent pre-tax incentives for integrating DERs that provide valuable grid services, including voltage support, reliability, and resiliency[68]

Jurisdictions have also provided incentives to achieve cost efficiencies

- UK RIIO’s Totex Incentive Mechanism (also called the efficiency incentive) encourages distributors to improve their efficiency and shares efficiency benefits between customers and utility

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3.4 Performance Incentives

Performance or earnings incentives have expanded to prioritize outcome-based achievements (e.g., expansion of DER, overall system efficiency, beneficial electrification), better aligning utility shareholder and customer interests

- Performance incentives provide additional earning opportunities for achieving policy objectives (e.g., environmental, reliability, clean energy)
- Traditionally, performance incentives have been established for utilities to achieve reliability metrics and program-based performance (e.g., achieved kWh savings, kW reduction)

For example, UK RIIO includes performance incentives tied to outputs that include customer satisfaction, reliability, interconnection, environmental impact, and social obligations

- In 2010 prior to RIIO, the UK electricity regulatory, Ofgem, acknowledged they had, “no measures of what customers gain from investment in network assets, which can account for a high proportion of network costs”[69]
- As a result, for RIIO, Ofgem place a “strong emphasis on the need for [distributors] to develop suitable network output measures and to commit to delivering against these measures”[70]

RIIO-II Output Categories

Output Category	Policy Objectives	Example Incentive
Customer Focused	Aimed at securing high-quality customer service, quality service for consumers seeking a connection, and support to consumers in vulnerable situations	Customer Satisfaction Survey – General Inquiries (+/-0.2% of base revenue)
Safety and Resilience Focused	Maintaining reliability, and ensuring the long-term safety and resilience of the network	Interruptions Incentive Scheme (+/- 250 RORE basis points)
Environmental	Aimed at taking appropriate steps to mitigate the environmental impacts of electricity distribution	DSO Incentive (+/-0.2% of RoRE per year)

Source: Ofgem, RIIO-ED2 Final Determinations Overview Document, p.18

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3.4 Performance Incentives (Cont.)

Traditional performance incentives primarily focus on energy efficiency and reliability

- Penalty only incentives are common for essential outcomes, like reliability
  - In 2012, the Alberta Utilities Commission rejected providing utilities with a positive PIM for exceeding service quality[71]
- Four broad categories of EE performance incentives[72]
  - Shared Net Benefits: Incentives based on the net benefits from the energy efficiency programs
  - Energy-Savings-Based: Incentives for meeting pre-established energy savings goals
  - Multi-factor: Incentives for meeting pre-established goals based on multiple metrics, such as energy savings, demand savings, local job creation, improved customer service, and low-income bill savings
  - Rate-of-return incentives: Utilities earn a return on efficiency spending, sometimes with requirements for energy savings performance
- Various jurisdictions express maximum incentives in terms number of basis points of the return on equity
  - In New York, incentives are capped at 100 basis points[73]
  - In Illinois, if Ameren achieves greater than 100% of its energy efficiency goal, it can achieve 8 basis points per percentage above the goal[74]

Incentive amounts relative to total costs by mechanism type

Net benefits		Multifactor		Savings-based	
Xcel electric (MN) 2011	68%	NSTAR (MA) 2013	6%	Consumers 2012 (MI)	15%
Xcel electric (MN) 2012	62%	NGRID (MA) 2013	6%	Consumers 2013 (MI)	15%
Otter Tail Power (MN) 2011	60%	NGRID (MA) 2012	6%	DTE Energy 2012 (MI)	15%
Georgia Power 2013	58%	Efficiency VT 2008	4%	DTE Energy 2013 (MI)	15%
Otter Tail Power (MN) 2012	56%	Efficiency VT 2011	3%	IPL (IN) 2013	8%
Georgia Power 2012	42%	PBFA (HI) 2014	2%	PSNH 2013	8%
AEP Texas Central 2013	36%	PBFA (HI) 2013	2%	PSNH 2012	9%
Xcel Energy (CO) 2012	29%	DC SEU 2012	1%	CT UI 2013	6%
SWEPCO (TX) 2012	26%	DC SEU 2013	1%	CT CL&P 2013	7%
PSO (OK) 2012	25%	WI FOE 2010-14	0.2%	CT UI 2012	6%
Xcel Energy (CO) 2013	22%			CT CL&P 2012	7%
PSO (OK) 2013	21%			RI NGRID 2013	5%
DEC (SC) 2014	18%			RI NGRID 2012	5%
OGE (OK) 2012	18%			NY all IOUs	4%
DEC (SC) 2013	18%				
OGE (OK) 2011	17%				
APS (AZ) 2012	14%				
SCE&G 2013	14%				
APS (AZ) 2013	9%				
SWEPCO AR	8%				
SWEPCO AR	8%				
Entergy Arkansas 2013	7%				
Entergy Arkansas 2012	6%				
SCE&G 2014	6%				

Source: ACEEE 2015 Survey based on Questionnaires completed by State Commission Staff

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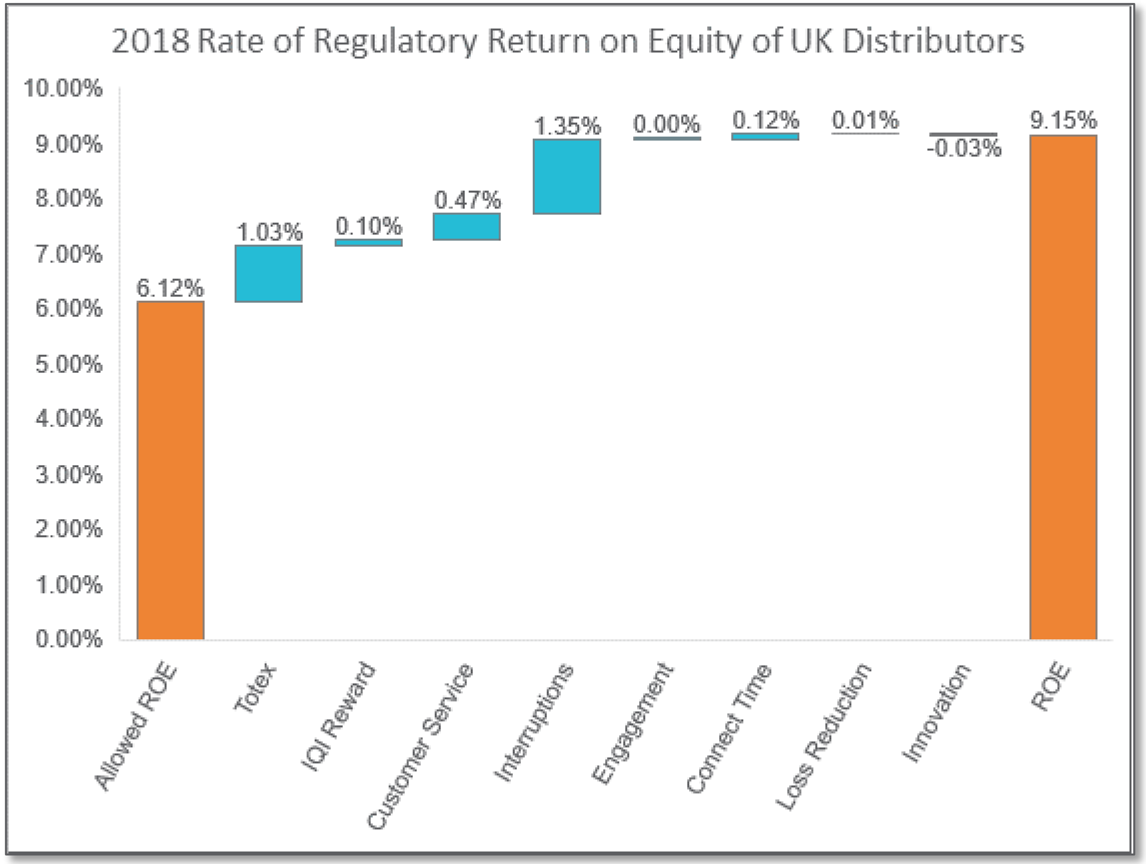
3.4 Performance Incentives (Cont.)

Emerging objectives are increasing earnings opportunities for utilities

- In the United States, the total maximum of all financial rewards / penalties has often been set at approximately 1-3% of base revenues[75]
  - Prior to New York's REV proceeding, incentives for New York electric utilities ranged between 2.77% to 5.69% of delivery revenues on the negative side and between 1.33% to 2.49% on the positive side[76]
- In the UK, the RIIO model could have an impact greater than 5% of base revenues[77]
  - Average return on equity for electricity distributors over the last four years has ranged from 2% to 3% above allowed returns[78]



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3.4 Performance Incentives (Cont.)

Performance incentives to align with desired outcomes

- Hawaii Commission Guidance for Performance Incentive Mechanisms
  - The Commission noted that to focus utilities on performance and alignment with public policy goals, an incentive structure is needed[79]
  - The Commission stated that incentive mechanisms can achieve overarching objectives, such as incenting cost reduction, incenting achievement of policy goals, improving performance, integrating technological advances, supporting new types of customer choice, and encouraging a low-cost, customer-centric future[80]
  - Hawaiian Electric Companies stated that positive incentive mechanisms should be developed to balance and support efforts to achieve desired outcomes that do not involve capital investment[81]
- New York Commission Guidance for Earning Adjustment Mechanisms
  - The Commission stated that if cost-of-service calculations are to remain the basis of utility rates then creating new earning adjustment opportunities are a fair and necessary means of promoting change[82]
  - "Drawing from an exhaustive analysis of trends in technology, markets, and environmental policy, the Commission has concluded that its core statutory duties can no longer be met with the utility regulatory model of the previous century"[83]
  - The Commission stated that outcome-based incentives are the most effective approach to address the mismatch between traditional revenue methods and modern electric system needs, while aligning utility shareholder interests with consumer interests[84]

Objective	Industry Examples	Description	Potential Reward / Penalty
Network Support Services	Hawaii Grid Services PIM	Incentives expedited acquisition of grid service capabilities from DERs	$1.5 million reward (over 2 years) No penalty
	UK RIIO Time to Connect PIM for Small Connections	Measures time taken from quotation acceptance to connection completion	Up to 0.4% of annual base revenue (reward). No penalty
Energy Efficiency and Demand Response	Rhode Island System Efficiency PIM	Cash reward based on achievement of peak demand reduction, structured as a shared savings mechanism	45% of net benefits
	New York (ConEd) Deeper Energy Efficiency Lifetime Savings EAM	Based on deeper lifetime energy efficiency savings, including LMI savings, over three years.	13 basis points (ROR based)
Environmental Goals	Hawaii RPS-A	Incentivizes accelerated achievement of RPS goals	$10-$20/MWh reward MWh above RPS $20/MWh penalty for MWh below RPS
	National Grid (NY) Beneficial Electrification EAM	Based on GHG reductions provided by EVs and heat pumps.	$2.7 million max reward (2020) No penalty
	National Grid (NY) DER Utilization EAM	Based on solar PV, storage and wind adoption rate by customers	$2.3 million max reward (2020) No penalty

Sources: Docket No. 2018-0088, D&O No. 37507, Hawaii Public Utilities Commission; National Grid, Earnings Adjustment Mechanisms, 2020 Annual Report; ACEEE, Climate-Forward Efficiency Performance Incentives, 2022; Synapse Energy Economics, Utility Performance Incentive Mechanisms Handbook

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3.4 Performance Incentives (Cont.)

California provides incentives for integrating distributed energy resources that provide valuable grid services

- California's Integrated Distributed Energy Resources Pilot[85]
  - In 2016, the CPUC adopted an Integrated DER regulatory incentive mechanism pilot to encourage the cost-effective deployment of DERs that defer or displace traditional distribution infrastructure
  - The incentive pilot applies a 4% pre-tax incentive to the annual payment for the DERs that are procured
    - The pilot allowed the utilities to record the value of the incentive in a balancing account for later recovery
  - Utilities were required to identify at least one project for the pilot; however, each utility could identify up to 3 additional projects
    - The optional nature of the additional projects was designed to test how the incentive mechanism affected utilities' energy resources sourcing behavior
  - Potential projects are screened for the value they provide to the grid, as outlined in the distribution services screening criteria

Distribution Services Screening Criteria

Projects must provide value in accordance with at least one of the four screening criteria:

- **Distribution Capacity Services:** Load-modifying or supply services that DERs provide via the dispatch of power output for generators or reduction in load that is capable of reliably and consistently reducing net loading on desired distribution infrastructure
- **Voltage Support Services:** Substation and/or feeder level dynamic voltage management services provided by an individual resource and/or aggregated resources capable of dynamically correcting excursions outside voltage limits as well as support conservation voltage reduction strategies
- **Reliability (Back-Tie) Services**: Load-modifying or supply service capable of improve local distribution reliability and/or resiliency
- **Resiliency (Microgrid) Services:** Load-modifying or supply service capable of improve local distribution reliability and/or resiliency

Source: California PUC, Rulemaking 14-10-003, Decision 16-12-036, filed December 15, 2016

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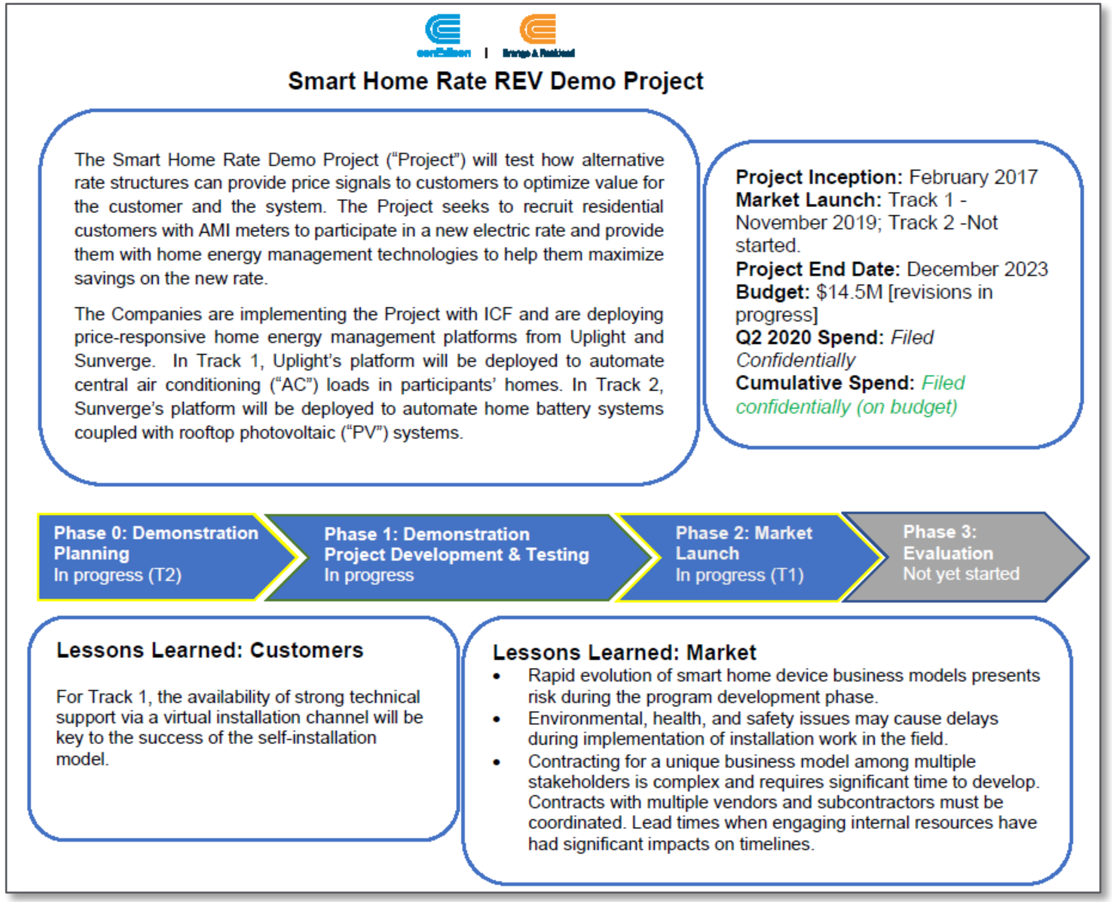
3.5 Funding for Demonstration Projects (Cont.)

Jurisdictions (such as UK and New York) have created separate cost recovery mechanisms and funds for innovative projects and created processes to share lessons learned across the utilities

- Innovative projects (or demonstration projects) provide lessons learned on new technologies and cost-saving initiatives
- Traditionally, utilities have not had cost recovery for innovative projects within PBR mechanisms

For example, New York utilities can recover REV demonstration project costs outside of multi-year rate plans[86]

- Demonstration projects inform decisions regarding developing new revenue streams, scaling new technology approaches, measuring customer response to new programs and price strategies, and determining the most cost-effective implementation of distributed energy resources
- Utilities are authorized to spend up to a specified percentage of their delivery service revenue requirement on REV projects. Spending is typically split between non-capital and capital investment solutions
- Utilities are allowed to recover total program costs over a rolling 10-year period for both non-capital and capital investment solutions through the monthly adjustment clause (MAC)
  - MAC is updated semi-annually to reflect the prior six months actual costs
- Utilities are entitled to earn a return on any deferred REV project costs



Smart Home Rate REV Demo Project

The Smart Home Rate Demo Project ("Project") will test how alternative rate structures can provide price signals to customers to optimize value for the customer and the system. The Project seeks to recruit residential customers with AMI meters to participate in a new electric rate and provide them with home energy management technologies to help them maximize savings on the new rate.

The Companies are implementing the Project with ICF and are deploying price-responsive home energy management platforms from Uplight and Sunverge. In Track 1, Uplight's platform will be deployed to automate central air conditioning ("AC") loads in participants' homes. In Track 2, Sunverge's platform will be deployed to automate home battery systems coupled with rooftop photovoltaic ("PV") systems.

Project Inception: February 2017
Market Launch: Track 1 - November 2019; Track 2 -Not started.
Project End Date: December 2023
Budget: $14.5M [revisions in progress]
Q2 2020 Spend: *Filed Confidentially*
Cumulative Spend: *Filed confidentially (on budget)*

Lessons Learned: Customers

For Track 1, the availability of strong technical support via a virtual installation channel will be key to the success of the self-installation model.

Lessons Learned: Market

- Rapid evolution of smart home device business models presents risk during the program development phase.
- Environmental, health, and safety issues may cause delays during implementation of installation work in the field.
- Contracting for a unique business model among multiple stakeholders is complex and requires significant time to develop. Contracts with multiple vendors and subcontractors must be coordinated. Lead times when engaging internal resources have had significant impacts on timelines.

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3.5 Funding for Demonstration Projects (Cont.)

Regulators have identified cost recovery mechanisms related to innovative investments by utilities

- Nova Scotia Innovation Justification Criteria[87]
  - Utility commission provides a unique cost recovery mechanism (rider) for projects that meet specific criteria for innovative projects
  - Criteria is justified based on the expectation the projects will provide customer value in some or all of the following areas:
    - Reducing upward pressure on revenue requirement
    - Reliability and grid stability
    - Environmental and other government policy compliance
    - Customer experience improvements
  - Approved projects include AMI deployment, community solar, battery storage, and intelligent feeders

- California Electric Program Investment Charge (EPIC)
  - Uses funds from a rider to sponsor research and development efforts related to electric sector transformation and decarbonization[88]
  - EPIC project categories include renewables and DER integration, grid modernization and optimization, customer focused products and services enablement, and foundation strategies and technologies[89]

The Intelligent Feeder Project

The Project involves the installation of residential energy storage batteries (Tesla Powerwalls) at 10 homes in the Elmsdale community and a much larger grid-sized battery (Tesla Powerpack) at the Elmsdale substation. These batteries will be connected and feed into an electrical line powered, in part, by the nearby Hardwood Lands wind turbines. Sensors on the powerline monitor and gather data about local system activity and are fed back to our control centre for analysis and planning of Nova Scotia's future energy needs.

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4.0 Conclusion

Modernized PBR mechanisms provide flexibility to utilities to address changing grid needs while maintaining safe and reliable service

- Address cost recovery challenges of achieving policy objectives
- Fund traditional investments to meet safety, reliability, and resilience standards while funding investments to meet clean energy transition

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2025-2029 PERFORMANCE OUTCOMES FRAMEWORK

Toronto Hydro's 2025-2029 performance management framework consists of: (1) utility outcomes and measures consistent with the OEB's Renewed Regulatory Framework ("RRF"), and (2) a custom scorecard that is tied to a Performance Incentive Mechanism ("PIM") as part of the utility's 2025-2029 Custom Rate Framework, which is set out in the evidence at Exhibit 1B, Tab 2, Schedule 1.

In respect of the first component – RRF outcomes – Toronto Hydro intends to continue delivering high performance on the Electricity Distributor Scorecard ("EDS") and the Electricity Service Quality Requirements ("ESQR") consistent with the historical results presented in Exhibit 1B, Tab 3, Schedule 2. To that end, each capital and operational program outlined in Exhibit 2B (capital) and Exhibit 4, Tab 2 (operations) includes a performance outcomes table that explains how the program advances specific RRF outcomes. In addition, Exhibit 2B, Section D1 identifies the asset management objectives that the utility set for its Distribution System Plan, and key performance measures that track to the stated objectives.

In respect of the second component of the framework – the 2025-2029 Custom Scorecard and related PIM – this schedule sets out:

- an overview of the PIM and its functioning, including a brief description of the process for developing the proposed Custom Scorecard and metrics;
- the 2025-2029 Custom Scorecard with a detailed explanation of each metric including historical results (where available), the rationale for featuring the metric on the Custom Scorecard and for adopting the proposed target, and a summary of the key investments in the plan that enable the utility to achieve the targets.

- A benefits analysis to demonstrate the value proposition of the PIM for customers based on benefits that can be quantified from the Custom Scorecard.

1. PERFORMANCE INCENTIVE MECHANISM (PIM) OVERVIEW

As described in the Rate Framework evidence at Exhibit 1B, Tab 2, Schedule 1, the PIM holds Toronto Hydro financially accountable for achieving key objectives of its plan, which are informed by and aligned with customers' needs and priorities. In doing so, the PIM provides ratepayers a significant $65 million upfront benefit and shifts risk to the utility for delivering key outcomes that matter to customers.

The PIM begins with approval of the 2025-2029 custom rate-setting formula known as the Custom Revenue Cap Index ("CRCI"). Like all rate-setting methodologies under the RRF, the CRCI relies on an X-factor based on productivity and efficiency (stretch-factor) determinations. As outlined in Exhibit 1B, Tab 2, Schedule 1, Toronto Hydro's proposed X-factor consists of three components:

1. A 0% productivity-factor consistent with OEB policy;
2. A 0.15% efficiency factor, determined by empirical total cost benchmarking; [1] and
3. A 0.6% pro-active performance factor that is linked to the 2025-2025 Custom Scorecard and PIM discussed herein.

The net result is a custom X-factor of 0.75%, which is 0.6% greater than the X-factor supported by the empirical total cost benchmarking. Through the proactive assumption of the 0.6% performance factor, Toronto Hydro provides customers an upfront rate reduction of approximately $65 million over the 2025-2029 term, in addition to the $16.4 million revenue and rate reduction resulting from the 0.15% efficiency factor. In totality, the X-

[1] Exhibit 1B, Tab 3, Schedule 3, Appendix A.

factor constrains the utility's revenue relative to its forecasted costs (i.e. the revenue requirement in Exhibit 6, Tab 1) by approximately $81.4 million over the rate term.

The proposed PIM outlined in this schedule provides Toronto Hydro the opportunity to 'earn-back' the $65 million revenue cut by the 0.6% pro-active performance factor, only if the utility delivers key outcomes, as measured by specific metrics and targets on the balanced Custom Scorecard outlined in section 2 of this schedule.

The achievement of the proposed performance targets provides customer value across multiple aspects of utility performance, not all of which can be quantified. For the benefits that can be quantified however, the Investment Plan and Custom Scorecard that underpin the PIM, yields nominal customers benefits that range from approximately $90 million and $216 million over the 2025 to 2029 period, and lifetime benefits in the range of $890 million to over $1.23 billion, as detailed in section 3 below.

As explained above, the PIM operates in a manner that enables Toronto Hydro to earn back its OEB-approved rate of return on equity ("ROE") by achieving the set performance targets. In other words, the PIM being an asymmetrical mechanism means that awarding Toronto Hydro the proposed incentive at the end of the rate term does not give rise to incremental utility earnings for strong performance. To the degree the utility does not achieve the scorecard targets, customers retain some (or all) of the upfront benefit of the $65 million reduction to 2025-2029 rates. If the utility achieves the targets, the analysis in section 3 below demonstrates that ratepayers get more benefits than the cost of the incentive to be collected at the next rebasing application, in addition to many other valuable benefits that cannot be quantified but are nonetheless important to customers.

The 2025-2029 Custom Scorecard includes 12 metrics across four performance categories: (1) System Reliability and Resilience; (2) Customer Experience and Service; (3) Environment, Safety and Governance; and (4) Efficiency and Financial Performance. These areas of performance were presented to customers in broad terms as part of the Phase 2 customer engagement survey described in Exhibit 1B, Tab 5, Schedule 1, whereby over 33,000 customers (representing more than 4 percent of the utility's total customer base) completed a detailed survey reviewing Toronto Hydro's draft plan and its key outcomes including price. The survey results indicated that an average of 84 percent of customers' surveyed support Toronto Hydro's draft plan or one that does even more to advance key outcomes.[2] From there, the utility created the four categories identified above and identified a suite of relevant metrics within each category to measure performance in a manner that aligns with customer feedback, and also reflects key objectives and underpinnings of the plan.[3]

In the process of developing the 2025-2029 Custom Scorecard, Toronto Hydro was guided by a series of principles as follows:

- focus on long-term goals and accomplishments;
- choose unambiguous and clearly defined metrics;
- focus on actions and outcomes within the utility's control;
- demonstrate customer value through cost-benefit analysis;
- focus on metrics that have strong linkages to the investment plan;
- incorporate stakeholder intelligence and feedback where possible;
- quantify targets using historical data where possible;
- set realistic targets that can be verified against historical data where possible, and account for uncertainty and variability where appropriate; and,

[2] Exhibit 1B, Tab 5, Schedule 1.
[3] For more information about the key objectives of the plan please refer to Exhibit 2B, Sections D1 and E2.

- set continuous improvements targets where possible, taking into consideration both incremental investments as well as higher volumes and complexity of work involved in delivering performance on specific objectives.

Each metric on the 2025-2029 Custom Scorecard includes a five-year target that must be achieved by the end of the rate term (i.e. 2029) in order for the utility to have the opportunity to earn-back the incentive. Toronto Hydro set the targets for each metric with regard to: (i) historical baselines (where available), (ii) 2025-2029 planned investments, and (iii) business conditions expected over the next rate.

The targets established for each metric reflect challenging, but achievable, outcomes based on Toronto Hydro's plan as-filed in this application. To the degree final approval of Toronto Hydro's proposed investment plan and rate-setting approach varies materially from what the utility outlined in the pre-filed evidence, the performance targets in the 2025-2029 Custom Scorecard must be reviewed and recalibrated to align with the funding implications and other parameters of the OEB's decision. Further, given the careful establishment of the proposed targets, their relationship with top-line capital and OM&A funding in rates is dynamic and multi-dimensional, which means that a simple pro-ration of the targets would not yield appropriate outcomes. For these reason, Toronto Hydro proposes to defer the finalization of the targets to a second phase of this proceeding that can be run in parallel with the Draft Rate Order process.

The proposed phased approach would allow the utility and interested parties to calibrate and validate targets (and the weightings if applicable based on the OEB decision) to align with the 2025-2029 investment plan and rate-setting approach approved by the OEB. Toronto Hydro envisions this second phase being a settlement-like process, providing interested parties the opportunity to collaborate in finalizing the targets. If an agreement cannot be reached on one or more metrics, this process would also provide parties the opportunity to make submissions to the OEB. The OEB would review any potential settlement and/or approve the final targets with regard to parties' submissions.

The recovery of the incentives approved and earned through performance under the PIM are enabled by a Performance Incentive Mechanism Deferral Account ("PIM-DA"), as proposed in Exhibit 1B, Tab 2, Schedule 1 and detailed in Exhibit 9, Tab 1, Schedule 1. This account would be brought forward for review and disposition in the utility's next rebasing application, based on known (or forecasted) performance results for the 2025-2029 rate period. Only if the set performance targets are achieved (or forecasted be achieved with a high degree of confidence) by the end of the rate term would the incentive be recovered from customers in the next decade. As such, Toronto Hydro confirms that that there would be no rate recovery associated with the PIM in the 2025-2029 period.

2. 2025 TO 2029 CUSTOM SCORECARD

As part of 2025-2029 Custom Scorecard, the utility proposes 12 custom measures across four performance categories: (1) System Reliability and Resilience; (2) Customer Experience and Service; (3) Environment, Safety and Governance; and (4) Efficiency and Financial Performance. Table 1 below identifies the outcomes and measures within each performance area, and provides a target and proposed weighting for each measure.

Table 1: 2025 – 2029 Performance Incentive Scorecard Measures

Performance	Weight	Measures	Five-Year Target
System Reliability & Resilience	**15%**	**Outage Duration:** System Average Interruption Duration Index (SAIDI) excluding Major Event Days (MEDs), Loss of Supply (LoS) and Scheduled Outages	46.2 minutes (five-year average)
	10%	**Outage Frequency:** System Average Interruption Frequency Index (SAIFI) - Defective Equipment	0.38 – 0.45 (five-year average)
	5%	**System Security Enhancements:** Deliver initiatives that enhance Toronto Hydro's physical and cyber security posture against the NIST framework	100% by 2029
Customer Service & Experience	**10%**	**New Services Connected on Time:** Percentage of new connections and service upgrades completed on time consisting of Low Voltage Connections (70%), High Voltage Connections (20%) and DER Connections (10%)	99% (five-year average)
	5%	**Customer Satisfaction:** Post-transactional customer satisfaction surveys for Customer Inquiries (Phone & Email), Key Accounts Engagements, Customer Connections, and Communications (Outages & Construction Projects)	Maintain historical baselines
	5%	**Customer Escalations Resolution:** Percentage of customer escalations resolved within 10 business days.	98% (five-year average)
Environment, Safety and Governance	**10%**	**Total Recordable Injury Frequency (TRIF):** Injuries per 100 employees (or 200,000 hours worked) per year.	0.83 (five-year average)
	5%	**Emissions Reductions:** Tonnes of CO2e emissions produced by Toronto Hydro's fleet and facilities.	2.5 kilo tonnes CO2 emissions in 2029
	5%	**ISO Compliance and Certification:** Achieve and maintain certification with select ISO governance standards, specifically achieve ISO 55001 (60%), and maintain ISO14001 (20%) and ISO45001 (20%).	100% by 2029
Efficiency & Financial Performance	**15%**	**Efficiency Achievements:** Sustained efficiency benefits for customers that will produce a lower revenue requirement in the next rebasing application.	$6.9 million per year by 2029
	10%	**Grid Automation Readiness:** Completion of milestones to enable the automation of the overhead system in the horseshoe areas of the grid starting in 2030.	100% by 2029
	5%	**System Capacity (Non-Wires):** Flexible system capacity procured through demand response offerings.	30 MW by 2029

In the detailed sections below, Toronto Hydro provides: (i) thorough explanations of each metric including historical performance baselines (where available), (ii) the rationale for including the measure on the Custom Scorecard and for adopting the proposed target, and (iii) a summary of key investments in the 2025-2029 plan that enable the utility to achieve the proposed performance target.

2.1 System Reliability & Resilience

Table 2: System Reliability & Resilience Measures

Performance	Weight	Measures	Historical Performance	Target (2025-2029)
System Reliability & Resilience	15%	Outage Duration	48.2 min	46.2 minutes (five-year average)
	10%	Outage Frequency	0.42	0.38 – 0.45 (five-year average)
	5%	System Security Enhancements	94% (Cyber Security)	100% by 2029

2.1.1 Outage Duration

Outage Duration is measured by the 5-year rolling average of System Average Interruption Duration Index ("SAIDI") performance, excluding Major Event Days, Loss of Supply and Scheduled Outages. SAIDI tracks the number of minutes the average customer is without power in a year. It is the quotient obtained by dividing the total customer minutes of interruption (for all outages longer than one minute, i.e. sustained interruptions) by the total number of customers served.

Toronto Hydro proposes to remove the Scheduled Outages cause code from its 2025-2029 custom SAIDI performance measure for two reasons: (1) major forecasting uncertainty caused by the ongoing implementation of Oracle's Utility Analytics ("OUA"), and (2) the utility expects Scheduled Outages to increase in the 2025-2029 period as the result of a larger work program.[4] Toronto Hydro further submits that excluding the Scheduled Outages cause code will provide more transparency and visibility into reliability performance as it relates to unforeseen interruptions for customers.

For the 2025-2029 period, Toronto Hydro intends to improve Outage Duration performance as measured by the custom SAIDI metric compared to historical performance. This objective aligns with customer needs and priorities based on the Phase 1 Customer Engagement survey results which revealed that when it comes to reliability performance all customers (except Key Accounts) prioritize reducing the overall length of outages rather than the overall number of outages.[5]

Toronto Hydro set a target of 46.2 minutes by 2029 on a 5-year rolling average basis (i.e. the five-year average of 2025-2029 results), consistent with OEB's approach for measuring reliability performance on the EDS. This target is informed by the utility's reliability projection methodology, which is built up from projected performance across various cause codes. Toronto Hydro modeled Defective Equipment outages by projecting failures and outage impacts at an asset class level based on asset demographics and the expected benefits of the utility's 2025-2029 planned sustainment investments. The utility assumed a historical five-year average for other cause codes (e.g. tree contacts). Toronto Hydro also included projections for expected benefits of the reliability-related Grid Modernization investments (i.e. switches and reclosers). The teal blue line in Figure 1 below shows the combined projection for all of these drivers.

[4] Please refer to Exhibit 2B, Section C for more information on the impacts of upgrades to outage tracking systems.
[5] For more information about customer needs and preferences, please refer to Exhibit 1B, Tab 5, Schedule 1.

While the projection suggests that Toronto Hydro's investment plan is sufficient only to maintain Outage Duration as measured by the custom SAIDI metric over the 2025-2029 period, the utility challenged itself to set a modest improvement target, recognizing the importance of outage duration to customers when it comes to reliability performance. To set an achievable improvement target, Toronto Hydro calculated the statistical variability of the historical rolling five-year average (relative to the historical trendline), and on this basis applied two standard deviations to the most recent five-year historical reliability (48.2 min), resulting in an improvement target of 46.2 min.

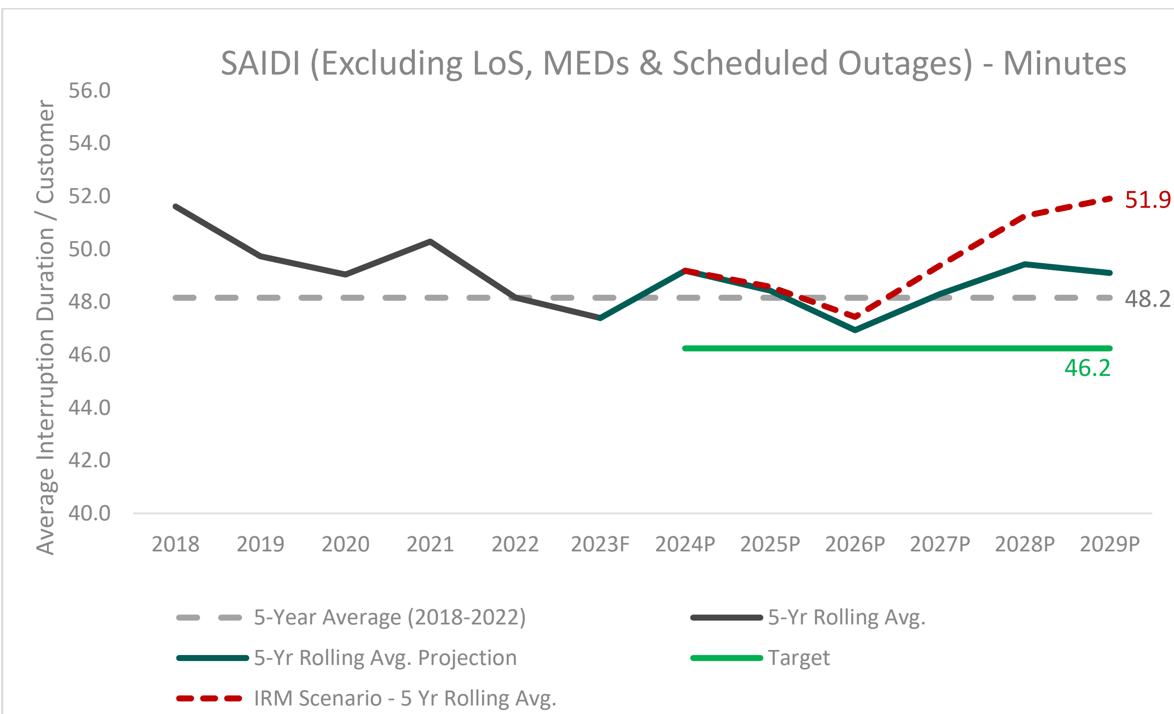

Figure 1: Historical and Projected SAIDI (excluding LoS, MEDs and scheduled outages)

As seen in Figure 1, although Toronto Hydro's SAIDI performance improved over the historical period, in more recent years (2020 through 2022) performance plateaued as the utility had to balance numerous considerations and constraints on its capital program, importantly including price and financial integrity outcomes.[6] Without sufficient investment, reliability performance is expected to deteriorate as shown in the red line "IRM scenario" in Figure 1. The IRM scenario projects the performance that the utility would expect in circumstances where available rate funding during the outer years of the next rate period is limited to an increase that is less than inflation, as provided under the OEB's standard incentive rate-setting mechanism (IRM) approach.[7] Under this scenario, Toronto Hydro would be able to fund a capital plan of approximately $2.4 billion. Assuming that Toronto Hydro would continue to invest capital in demand-driven programs to be able to meet its obligation to serve customers, the utility expects that an IRM-funded capital plan would remove the entire grid modernization strategy from the Distribution System Plan ("DSP") and reduce proactive investments in sustainment capital programs (i.e. System Renewal) by nearly 75 percent, resulting in a plan that would be almost entirely reactive in nature.

The 2025-2029 DSP includes the minimum level of investment required in the Sustainment and Stewardship category to maintain recent reliability performance for defective equipment related outages. The plan also includes accelerating investments in the Modernization category to modestly improve performance on the custom SAIDI metric in the next rate period, and set the stage for longer-term improvements in overall SAIDI by developing an intelligent and self-healing grid as set out in the Grid Modernization Strategy (Exhibit 2B, Section D5). For further details about historical reliability performance please refer to Exhibit 2B, Section C and Section E2.2.1 which explains how reliability performance and asset risk trends and analyses informed Toronto Hydro's planning process.

[6] Please refer to Section E4 for a summary of the 2020-2024 capital expenditure plan.
[7] Please refer to Exhibit 1B, Tab 2, Schedule 1 for more information about the funding challenges under this IRM scenario.

Key investments that contribute to achieving the performance target on Outage Duration as measured by the custom SAIDI metric are summarized in Table 3 below.

Table 3: Key Enabling Investments to Manage Outage Duration

Program	Description of Key Enabling Investments to Manage Outage Duration
Overhead System Renewal	Investments in the Overhead System Renewal program allows Toronto Hydro to manage the deteriorating population of its overhead assets such as poles, overhead transformers, and overhead switches to reduce the overall associated reliability risks. The utility expects overall wood pole condition demographics to slightly worsen by 2029, but will manage failure risk by prioritizing assets near or at "end-of-serviceable" life condition. Rebuild projects also allow the utility to bring legacy equipment and designs to current distribution standards, resulting in improved reliability performance. Investments in Overhead Infrastructure Resiliency allows Toronto Hydro to manage increasing reliability pressures on the system due to climate change and improve accessibility to assets in difficult to access locations, improving response times especially during adverse weather events (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.5).
Underground System Renewal (Horseshoe & Downtown)	Sustainment investments within the underground system through the Underground System Renewal - Horseshoe and Underground System Renewal - Downtown programs allow Toronto Hydro to manage the deteriorating population of its underground assets such as transformers, switches, cable chambers and cables. Toronto Hydro will continue to reduce obsolete cable populations, such as direct buried cable and lead cables, to maintain reliability within its underground system. Underground cables continue to be the single greatest contributor to outages caused by defective equipment. Rebuild projects also allow the utility to bring legacy equipment and designs to current distribution standards, resulting in improved reliability performance (Exhibit 2B, Section E2.4.2, Section E6.2, and Section E6.3).
Network System Renewal	Flooding within network vaults can pose significant failure risks due to the potential for catastrophic failure of network units contained within the vaults, especially for non-submersible units. Toronto Hydro will prioritize replacement of deteriorated network units (including non-submersible units) and network vaults or roofs in a paced manner to address this risk and maintain the reliability of its secondary network system. Reconfiguring networks also reduces average restoration time within the network system (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.4).

Program	Description of Key Enabling Investments to Manage Outage Duration
Stations Renewal	Investments required to address the failure and obsolescence risk posed by station assets such as power transformers, switchgears, circuit breakers, and associated ancillary equipment which are highly critical to system performance. Toronto Hydro is planning to invest at a higher pace than in the 2020-2024 period within its Stations Renewal program to address a significant backlog of aging and deteriorating assets and ensure the long-term reliability performance of station assets. Renewal of assets allow the utility to address legacy equipment and designs, resulting in improved reliability performance. Improving control and monitoring capabilities and replacing obsolete electromechanical relays with modern digital relays will allow Toronto Hydro to reduce the duration of outages (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.6).
Areas Conversions	Removal of aged, deteriorated, and obsolete 4.16 kV construction types including rear lot construction and box construction support reliability performance. Customers supplied by these construction types tend to experience below-average reliability. Investments in this program allow Toronto Hydro to convert customers to the latest distribution standards and reduce longer outage durations (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.1).
Reactive and Corrective Capital	Investments for the replacement of failed and defective major assets. This program also allows for near-term corrective actions on high risk asset deficiencies identified through planned inspection or the course of day-to-day work, including deficiencies on Toronto Hydro's worst performing feeders. Investment in this program is required to eliminate failure risks from the system promptly (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.7).
Network Condition Monitoring and Control	System Control and Data Acquisition ("SCADA")-enabled monitoring and control capabilities within Toronto Hydro's secondary network system allow for monitoring of key system parameters and remote switching capabilities. This in turn enables early detection of unfavorable conditions such as flooding or conditions that can lead to vault fires, and the ability for controllers to see real-time loading information to minimize customers impacted during outage events or contingency scenarios (Exhibit 2B, Section E2.4.3 and Exhibit 2B, Section E7.3).

Program	Description of Key Enabling Investments to Manage Outage Duration
System Enhancements	Investments in this program allow for the installation of SCADA switches, tie-points and reclosers on targeted feeders to improve outage response capabilities and reduce fault isolation times. In addition, upgrading undersized cables and improving the ability to respond to contingency events within the downtown system will also contribute to improved SAIDI performance. This program will form the system configuration required for Toronto Hydro's self-healing grid in 2030 and beyond, contributing to long-term reliability benefits (Exhibit 2B, Section E2.4.3 and Exhibit 2B, Section E7.1).
Load Demand	Investments in this program alleviate emerging capacity constraints within the system to minimize the impact of load growth on asset performance and improve restoration capabilities through targeted load transfers or cable upgrades. Offloading overloaded equipment reduces the risk of failures and improves flexibility for load transfers, thereby improving reliability (Exhibit 2B, Section E2.4.1 and Exhibit 2B, Section E5.3).
Metering	Next generation smart meters, with last gasp functionality installed through this program, improve system observability and enable grid operators to identify outage locations and dispatch repair crews to more precise locations, which results in a quicker and more accurate response. Enhancing data granularity also results in improved reliability by enabling the development of analytical tools to help reduce the likelihood of unexpected equipment failure (Exhibit 2B, Section E2.4.3 and Exhibit 2B, Section E5.4).
General Plant	Investments in Fleet, Facilities and IT equipment that enable TH employees to have access to safe, reliable equipment and tools needed to deliver the services required to manage reliability effectively. Investments to maintain and upgrade critical systems such as the Advanced Distribution Management System ("ADMS") are critical to provide the functionality for Toronto Hydro staff to prevent or respond to outages on the system efficiently, including the critical infrastructure for monitoring and control of Toronto Hydro's grid (Exhibit 2B, Section E8).

Program	Description of Key Enabling Investments to Manage Outage Duration
Operational Investments	Investments in operational programs that support SAIDI include: • Preventative and Predictive Overhead Line Maintenance (Exhibit 4, Tab 2, Schedule 1) and Underground Line Maintenance (Exhibit 4, Tab 2, Schedule 2): Promptly identifying potential asset failure or assets in substandard conditions before failure occurs, through planned inspections. • Corrective Maintenance (Exhibit 4, Tab 2, Schedule 4): Repairing and restoring assets through corrective maintenance to acceptable operating conditions. • Emergency Response (Exhibit 4, Tab 2, Schedule 5): Ensuring crews are available 24/7/365 to respond to power system events and minimizing outage restoration times. • Control Centre Operations (Exhibit 4, Tab 2, Schedule 7): Responding to system disruptions on a 24/7/365 basis and, in conjunction with field crews, taking the necessary actions to restore service in a safe and expedient manner and ensuring compliance with all legislative and regulatory requirements related to grid emergency preparedness and business continuity. • Asset and Program Management (Exhibit 4, Tab 2, Schedule 9): Ensuring ongoing stewardship of the distribution system and its ability to safely and reliably function in the long-term by maintaining asset records, scheduling maintenance activities, and developing capital investment scopes of work. • Work Program Execution (Exhibit 4, Tab 2, Schedule 10): Undertaking oversight, administrative training and other functions performed in the process of executing Toronto Hydro's capital and maintenance work programs. • Corporate Services (Exhibit 4, Tab 2, Schedule 15 [HR and Safety], Schedule 16 [Finance], and Schedule 18 [Public, Legal and Regulatory Affairs]): Corporate services provides organization-wide support in the areas of Finance, Public, Legal and Regulatory Affairs, and Human Resources, Environment and Safety to enable the safe and effective execution of Toronto Hydro's capital programs.

2.1.2 Outage Frequency

Outage Frequency is measured by the five-year rolling System Average Interruption Frequency Index ("SAIFI") for Defective Equipment, which tracks the number of interruptions in a year experienced by the average customer due to failed equipment. It represents the quotient obtained by dividing the total number of customer interruptions caused by Defective Equipment (for outages longer than one minute – i.e. sustained interruptions) by the total number of customers served.

For the 2025-2029 period, Toronto Hydro intends to maintain SAIFI Defective Equipment compared to its historical performance at a target ranging from 0.38 to 0.45 by 2029 on a five-year rolling average basis.[8] Toronto Hydro's projection indicates that the investment plan is roughly sufficient to maintain Outage Frequency as measured by the custom SAIFI Defective Equipment metric over the 2025-2029 period, with some risk of deterioration relative to the five-year historical baseline (2018-2022). The target to maintain (rather than improve) Outage Frequency recognizes that customers in all classes (except Key Accounts) prioritize outage duration over frequency, and expect the utility to balance reliability performance with price and other key outcomes.[9]

To set a reasonable target while accounting for the inherent volatility of system reliability performance from year to year, Toronto Hydro calculated the variability of the historical rolling five-year average (relative to the historical trendline), and applied two standard deviations on either side of the most recent five-year historical reliability (0.42), resulting in a maintain target of 0.38 to 0.45.[10]

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[8] Toronto Hydro modelled SAIFI Defective equipment using the same reliability projection model as discussed above under section 3.1 Outage Duration with respect to the custom SAIDI metric.
[9] Please see Exhibit 1B, Tab 5, Schedule 1 for more information about application-specific customer research.
[10] In effect, this results in a performance target of 0.45, as Toronto Hydro is not proposing an additional incentive for improving beyond the threshold of 0.38.

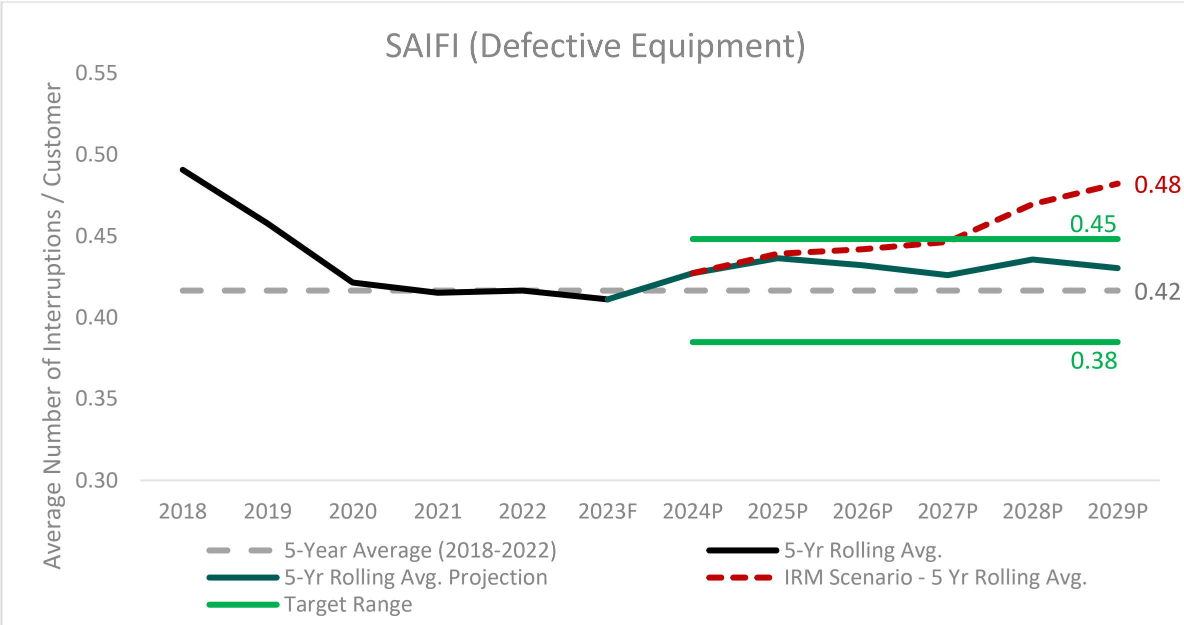

Figure 2: Historical and Projected SAIFI (Defective Equipment)

As seen in Figure 2, although Toronto Hydro's SAIFI Defective Equipment performance improved over the historical period as a result of ongoing investments in Sustainment and Stewardship programs, in more recent years (2020 through 2022) performance plateaued as the utility had to balance numerous considerations and constraints on its capital program.[11]

Asset condition and age demographics are important leading indicators of reliability. Toronto Hydro expects comparable, if not slightly more pronounced, deterioration in its asset demographics between 2023-2029. Given these challenges, Toronto Hydro expects that considerable incremental investment would be required to improve SAIFI performance at a rate that is comparable to historical improvement levels.[12] Through risk-balanced

[11] For further details about historical reliability performance please refer to Exhibit 2B, Section C and Section E2.2.1 which explains how reliability performance and asset risk trends and analyses informed Toronto Hydro's planning process.
[12] These dynamics are further discussed in Exhibit 2B, Section E2.2.1.

investments in Sustainment-related programs, Toronto Hydro proposes to invest the minimum level necessary to manage asset condition and age demographics while minimizing customer rate impacts. Without sufficient investment in this area of the plan, the utility expects performance to degrade, as depicted by the IRM scenario in Figure 2.

Investments that contribute to achieving the performance target on Outage Frequency as measured by the SAIFI Defective Equipment metric are summarized in the Table 4 below.

Table 4: Key Enabling Investments – Outage Frequency

Program	Description of Key Enabling Investments to Manage Outage Frequency
Overhead System Renewal	Investments in the Overhead System Renewal program allows Toronto Hydro to manage the deteriorating population of its overhead assets such as poles, overhead transformers, and overhead switches to reduce the overall associated reliability risks. The utility expects overall wood pole condition demographics to slightly worsen by 2029, but will manage failure risk by prioritizing assets near or at "end-of-serviceable" life condition. Rebuild projects also allow the utility to bring legacy equipment and designs to current distribution standards, resulting in improved reliability performance. Investments in Overhead Infrastructure Resiliency allows Toronto Hydro to manage increasing reliability pressures on the system due to climate change and improve accessibility to assets in difficult to access locations, minimizing elevated failure risks and improving response times especially during adverse weather events (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.5).
Underground System Renewal – Horseshoe and Downtown	Sustainment investments within the underground system through the Underground System Renewal - Horseshoe and Underground System Renewal - Downtown programs allow Toronto Hydro to manage the deteriorating population of its underground assets such as transformers, switches, cable chambers, and cables. Toronto Hydro will continue to reduce obsolete cable populations, such as direct buried cable and lead cables, to maintain reliability within its underground system. Underground cables continue to be the single greatest contributor to outages caused by defective equipment. Rebuild projects also allow the utility to bring legacy equipment and designs to current distribution standards, resulting in improved reliability performance (Exhibit 2B, Section E2.4.2, Exhibit 2B, Section E6.2, and Section E6.3).

Program	Description of Key Enabling Investments to Manage Outage Frequency
Network System Renewal	Flooding within network vaults can pose significant failure risks due to the potential for catastrophic failure of network units contained within the vaults, especially for non-submersible units. Toronto Hydro will prioritize replacement of deteriorated network units (including non-submersible units) and network vaults or roofs in a paced manner to address this risk and maintain the reliability of its secondary network system. Reconfiguring networks also reduces outage impacts within the network system (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.4).
Stations Renewal	Investments to address the failure and obsolescence risk posed by station assets such as power transformers, switchgears, circuit breakers, and associated ancillary equipment which are highly critical to system performance. Toronto Hydro is planning to invest at a higher pace than in the 2020-2024 period within its Stations Renewal program to address a significant backlog of aging and deteriorating asset population and ensure the long-term reliability performance of station assets. Renewal of assets allows the utility to address legacy equipment and designs, resulting in improved reliability performance. Improving control and monitoring capabilities and replacing obsolete electromechanical relays with modern digital relays will allow Toronto Hydro to reduce associated reliability risks (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.6).
Area Conversions	Removal of aged, deteriorated, and obsolete 4.16 kV construction types including rear lot construction and box construction supports reliability performance. Customers supplied by these construction types tend to experience below-average reliability (Exhibit 2B, Section E2.4.2 and Exhibit 2B, Section E6.1).
Reactive and Corrective Capital	Investments in the replacement of failed and defective major assets. This program also allows for near-term corrective actions on high risk asset deficiencies identified through planned inspection or in the course of day-to-day work, including deficiencies on Toronto Hydro's worst performing feeders. Investment in this program are required to promptly eliminate failure risks from the system (Exhibit 2B, Section E2.4.2 and E6.7).
Network Condition Monitoring and Control	System Control and Data Acquisition ("SCADA")-enabled monitoring and control capabilities within Toronto Hydro's secondary network system allow for monitoring of key system parameters and remote switching capabilities. This in turn enables early detection of unfavorable conditions such as flooding or conditions that can lead to vault fires, and the ability for controllers to see real-time loading information to minimize customers impacted during outage events or contingency scenarios (Exhibit 2B, Section E2.4.3 and Exhibit 2B, Section E7.3).

Program	Description of Key Enabling Investments to Manage Outage Frequency
System Enhancements	Investments in this program allow for the installation of SCADA switches, tie-points and reclosers on targeted feeders to improve outage response capabilities and reduce fault isolation times. The introduction of reclosers will reduce the number of customers impacted by an outage event on a feeder. In addition, this program will form the system configuration required for Toronto Hydro's self-healing grid in 2030 and beyond, contributing to long-term reliability benefits (Exhibit 2B, Section E2.4.3 and E7.1).
Load Demand	Investments alleviate emerging capacity constraints within the system to minimize the impact of load growth on asset performance and improve restoration capabilities through targeted load transfers or cable upgrades. Offloading overloaded equipment reduces the risk of failures and improves flexibility for load transfers, thereby improving reliability (Exhibit 2B, Section E2.4.1 and Exhibit 2B, Section E5.3).
Metering	Next generation smart meters with last gasp functionality installed through this program improves system observability and enables grid operators to identify outage locations and dispatch repair crews to more precise locations, which results in a quicker and more accurate response. Enhancing data granularity also results in improved reliability by enabling the development of analytical tools to help reduce the likelihood of unexpected equipment failure (Exhibit 2B, Section E2.4.3 and Exhibit 2B, Section E5.4).
General Plant	Investments in Fleet, Facilities and IT equipment that enable TH employees to have access to safe, reliable equipment and tools needed to deliver the services required to manage reliability effectively. Investments to maintain and upgrade critical systems such as the Advanced Distribution Management System ("ADMS") is critical to provide the functionality for Toronto Hydro staff to prevent or respond to outages on the system efficiently, including the critical infrastructure for monitoring and control of Toronto Hydro's grid (Exhibit 2B, Section E8).
Operational Investments	• Preventative and Predictive Overhead Line Maintenance and Underground Line Maintenance (Exhibit 4, Tab 2, Schedules 1 and 2): identify potential asset failure or assets in substandard condition before failure occurs, through planned inspections. • Corrective Maintenance (Exhibit 4, Tab 2, Schedule 4) - repairing and restoring assets through corrective maintenance to acceptable operating condition. • Emergency Response (Exhibit 4, Tab 2, Schedule 5) - ensuring crews are available 24/7/365 to respond to system events and minimizing outage restoration times.

Program	Description of Key Enabling Investments to Manage Outage Frequency
	• Control Centre Operations (Exhibit 4, Tab 2, Schedule 7) - responding to system disruptions on a 24/7/365 basis and, in conjunction with field crews, taking the necessary actions to restore service in a safe and expedient manner and ensuring compliance with all legislative and regulatory requirements related to grid emergency preparedness and business continuity. • Asset and Program Management (Exhibit 4, Tab 2, Schedule 9) - ensuring ongoing stewardship of the distribution system and its ability to safely and reliably function in the long-term by maintaining asset records, scheduling maintenance activities, and developing capital investment scopes of work. • Work Program Execution (Exhibit 4, Tab 2, Schedule 10) - Undertaking oversight, administrative training and other functions performed in the process of executing Toronto Hydro's capital and maintenance work programs. • Corporate Services provide organization-wide support in the areas of Human Resources, Environment and Safety, Finance, and Public, Legal and Regulatory Affairs (Exhibit 4, Tab 2, Schedule 15, 16 and 18, respectively) to enable the safe and effective execution of Toronto Hydro's capital programs.

2.1.3 System Security Enhancements

System Security Enhancements measures performance on the key objectives of: (1) continual improvement and maintenance of Toronto Hydro's cybersecurity posture in the face of an evolving digital threat landscape; and (2) protecting the physical safety and security of employees, assets, and the public. This metric tracks the completion of key initiatives aimed at improving Toronto Hydro's cybersecurity and physical security posture in a manner that aligns with the National Institute of Standards and Technology ("NIST") Cyber Security Framework and OEB's Cyber Security Framework ("CSF").[13] The selected initiatives are responsive to the cyber and physical security threat landscape that the utility faces, and reflect the utility's cybersecurity roadmap and program maturity.

[13] Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1 (National Institute of Standards and Technology, 2018)< https://nvlpubs.nist.gov/nistpubs/cswp/nist.cswp.04162018.pdf> ; Ontario Cyber Security Framework, Version 1.0 (Ontario Energy Board, 2017) < https://www.oeb.ca/sites/default/files/Ontario-Cyber-Security-Framework-20171206.pdf> .

For the 2025 – 2029 period, Toronto Hydro plans to increase the total number of initiatives that enhance the utility's physical and cyber security posture against the NIST framework by delivering 100 cyber security projects and integrating 10 stations into the Physical Security Operations Centre by the end of the rate period. Completion of these milestones make up the target of 100% on the System Security Enhancements custom metric.

As shown in Figure 3, below, Toronto Hydro implemented 17 projects to date in 2023 out of a possible 18, setting a baseline of 94% for the cybersecurity portion of this measure.

Function	Category (Toronto Hydro Roadmap)	NIST / OEB CSF Category Alignment	2023 Actuals
Identify	**Threat Awareness**	Asset Management (ID.AM), Business Environment (ID.BE)	0
	Response Readiness	Risk Management Strategy (ID.RM), Awareness and Training (PR.AT)	0
	External Audits	Governance (ID.GV)	1
	Security Posture Validation	Risk Assessment (ID.RA)	2
Protect	**External Security**	Information Protection Processes and Procedures (PR.IP)	1
	Perimeter Security	Protective Technology (PR.P)	3
	Identity & Access Management	Access Control (PR.AC)	2
	Endpoint & Application Protection	Protective Technology (PR.P), Data Security (PR.DS)	1
	OT Protection	Protective Technology (PR.P), Access Control (PR.AC)	1
Detect	**Logging**	Anomalies and Events (DE.AE), Security Continuous Monitoring (DE.CM)	0
	Monitoring & Alerting	Anomalies and Events (DE.AE), Security Continuous Monitoring (DE.CM)	2
	Advanced Detection Capabilities	Detection Processes (DE.DP)	0
	Operational Processes	Security Continuous Monitoring (DE.CM)	3
Respond	**Response Processes**	Response Planning (RS.RP), Communications (RS.CO)	0
	Containment	Analysis (RS.AN), Mitigation (RS.MI)	1
	Eradication	Mitigation (RS.MI), Improvments (RS.IM)	0
Recover	**Recovery Processes**	Recovery Planning (RC.RP)	0
	Recovery Mechanisms	Protective Technology (PR.P), Improvements (RC.IM)	0
	Clean-up	Communications (RC.CO)	0
Total			17
Attainment Target			18
KPI Baseline			**94%**

Figure 3: Toronto Hydro's Cyber Security NIST/OEB CSF Roadmap

Investments that contribute to achieving the performance target on the System Security Enhancement metric are summarized in Table 5 below.

Table 5: Key Enabling Investments – System Security Enhancement

Program	Description of Key Enabling Investments to Enhance System Security
Facilities Management and Security program	Key investments in physical security measures to prevent unauthorized access to stations, while also keeping them accessible for authorized personnel, and to improve response times in the event of breaches of physical security. These initiatives enhance the utility's security posture in the NIST/CSF frameworks categories of physical access, technology and network measures (Exhibit 2B, Section E8.2).
Facilities Management	Operational investments to maintain the building systems of the utilities offices, work centers and buildings housing the utility's transformer and municipal stations, as well as maintain the elements that secure and mitigate the risk of damage to critical infrastructure (e.g. sump pumps, building envelopes) (Exhibit 4, Tab 2, Schedule 12).
Information and Operational Technology	Operational (Exhibit 4, Tab 2, Schedule 17) and capital (Exhibit 2, Section E8.4) investments to protect the security of IT infrastructure and software applications, and enhance cybersecurity preventative and reactive controls. These investments include projects that renew the utility's IT hardware and software assets to maintain a robust cybersecurity posture and mitigate against potential vulnerabilities and threats that may jeopardize the safe and effective functioning of IT/OT assets. These investments are necessary to ensure that existing systems receive support from vendors, keep pace with technology changes in the industry, remain integrated with other relevant hardware and software systems, and are protected against future cyber security threats. When IT systems have surpassed the period of extended vendor support, the vendor and the marketplace do not guarantee availability of qualified resources and expertise needed to resolve any potential issues. As a result, the failure of these systems may result in prolonged downtime, which can significantly affect the utility's operations and its ability to execute planned work programs and deliver services to its customers.
Legal Services and Supply Chain	Operational investments to support procurement (Exhibit 4, Tab 2, Schedule 18) and negotiation of complex IT contracts (Exhibit 4, Tab 2, Schedule 18).

2.2 Customer Service & Experience

Table 6: Customer Service & Experience Custom Performance Measures

Performance	Weight	Measures	Historical Performance	Target (2025-2029)
Customer Service & Experience	10%	**New Services Connected on Time**	99%	99%
	5%	**Customer Satisfaction**	84% Phone and Email Inquiries	Maintain historical baselines
	5%	**Customer Escalations**	98.74%	98%

2.2.1 New Services Connected on Time

The measure of New Services Connected on Time tracks the percentage of new connections and service upgrades completed on time across three categories of connections: Low Voltage, High Voltage and Distributed Energy Resources ("DER") weighted at 70 percent, 20 percent, and 10 percent, respectively. This metric aligns with Toronto Hydro's fundamental obligation to serve and ongoing commitment to provide timely access to the grid for new and existing customers, by measuring the utility's effectiveness in connecting customer services within set performance standards as summarized in Table 7 below.

Table 7: Performance Standard by Connection Type

Connection Type	Performance Standard	Number of Service Requests	Weighting
Low Voltage (LV)	5 business days	5700/year (or more)	70%
High Voltage (HV)	10 business days	120/year (or more)	20%
DERs	5 business days	180/year (or more)	10%

Figure 4 below illustrates Toronto Hydro's five-year historical performance (2018 to 2022) on the New Services Connected on Time composite metric.

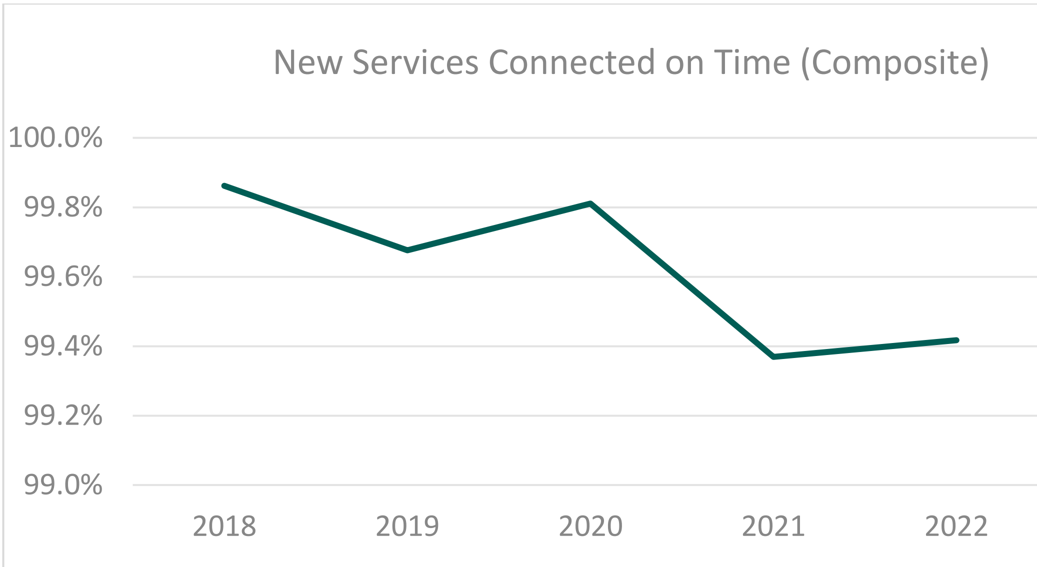

Figure 4: 2018-2022 New Services Connected on Time (Composite)

For the 2025-2029 plan period, Toronto Hydro set the performance target of 99 percent for the composite New Services Connected on Time metric. This target considers Toronto Hydro's forecast of a significant 23 percent increase in system peak demand by the next decade, driven by continued increases in load connections, including larger connections as observed in recent years.[14] It also considers, the forecast of a 56 percent increase in DER connections over the next rate period.[15] Overall, the target reflects the utility's expectation that higher volumes and increasing complexity of connections-related work as customers electrify previously non-electric energy uses (i.e. transportation and building systems) will make it more challenging to maintain performance on this metric.

The investments that contribute to achieving the performance target on the New Services Connected on Time metric are summarized in Table 8 below.

[14] Exhibit 2B, Section D4.
[15] Exhibit 2B, Section E5.1 at page 15.

Table 8: Key Enabling Investments – New Service Connected on Time

Program	Description of Key Enabling Investments for Timely New Service Connections
Customer Connections Capital	Capital investments required to provide new and existing customers with timely, cost-efficient, reliable, and safe access to the distribution system for both load and generation connection requests. Investments in this program allow Toronto Hydro to meet regulatory requirements and account for anticipated growth in the 2025-2029 period (Exhibit 2B, Section E2.4.1 and Exhibit 2B, Section E5.1).
Customer Connections OM&A	Operational investments to ensure sufficient planning staff and required tools and resources are available to efficiently plan and design service connections and meet service request volumes (Exhibit 4, Tab2, Schedule 8).
Load Demand	Investments to alleviate emerging capacity constraints to ensure the availability of sufficient capacity to efficiently connect customers to Toronto Hydro's distribution system. Targeted capacity upgrades alleviate highly loaded parts of the system through load transfer or equipment upgrades (Exhibit 2B, Section E2.4.1 and Exhibit 2B, Section E5.3).
Stations Expansion	This program addresses medium to long-term system capacity needs, informed by its Stations Load Forecast. Investment in this program is required to reduce the number of stations unable to connect new large customers effectively, alleviating feeder position limitations, and enabling DER connections by providing increased short circuit capacity (Exhibit 2B, Section E2.4.1 and Exhibit 2B, Section E7.4).
Generation Protection Monitoring and Control	This program allows Toronto Hydro to fulfill its regulatory obligations to connect Distributed Energy Resource ("DER") projects to its distribution system. Investments in this program alleviates technical barriers to connecting DERs. It also improves monitoring and control to ensure safe DER operation (Exhibit 2B, Section E2.4.1 and Exhibit 2B, Section E5.5).
Non-Wires Solutions	Investments in this program, especially in the Energy Storage System segment, target areas with constraints to improve the grid's capacity to connect and integrate Renewal Energy Generation (REG) connections (Exhibit 2B, Section E7.2).
Externally Initiated Plant Relocations and Expansion	This program increases the capacity of Toronto Hydro's system, where efficiencies can be achieved, by integrating expansion work of the electrical system with the required relocation work, supporting Toronto Hydro's ability to connect new customers efficiently (Exhibit 2B, Section E5.2).

Program	Description of Key Enabling Investments for Timely New Service Connections
Asset & Program Management	Operational investments to ensure sufficient staff to process and execute, in a timely manner, customer connection requests and offers to connect for both load and generation customers (Exhibit 4, Tab 2, Schedule 9).
Legal Services	Operational investments in legal professional services to advise on real property matters, including customer connection agreements (Exhibit 4, Tab 2, Schedule 18, Section 5).
Work Program Execution	Operational investments in internal and external resources to complete necessary distribution system work to facilitate customer connections (Exhibit 4, Tab 2, Schedule 10).
General Plant	Investments in Fleet, Facilities and IT equipment that enable TH employees to have access to safe, reliable equipment and tools needed to deliver the services (Exhibit 2B, Section E8).

2.2.2 Customer Satisfaction

The Customer Satisfaction measure reflects Toronto Hydro's ongoing commitment to deliver a positive customer experience and build trust by reaching customers at the right time, with the correct information, and through the right channel to meet their evolving needs. Complimentary to the EDS Customer Satisfaction measure, this custom metric tracks customer satisfaction at a more operational level, using post-transactional customer surveys (across a number of interaction points along the customer journey) to gain actionable insights about customer experience.

Specifically, this proposed metric tracks satisfaction across the following types of customer interactions: Phone and E-Mail Inquiries; Key Account engagements; Customer Connections process; and Customer Communications regarding Outages and Construction Projects. Toronto Hydro conducts post-transactional surveys with respect to the first three type of interactions listed above (i.e. Phone, Email and Key Accounts), and is in the process of establishing surveys related to the other areas of customer experience noted above (i.e.

Customer Connections process, Customer Communications regarding Outages and Construction Projects).

For the 2025-2029 plan period, Toronto Hydro intends to maintain post-transactional customer satisfaction levels in each of the areas noted above as measured against three-year historical baselines. This target is informed by careful consideration and balance of the following factors:(i) increasing volumes and complexity of customer interactions as the city grows and customers turn to electricity for new uses (e.g. transportation and heating); (ii) increasing customer expectations with respect to communications and service levels in an era of greater digital interaction and access to information on demand; and (iii) balancing price and service quality outcomes in light of the above.

Figure 5 illustrates the three-year historical baseline for phone and email inquires. For Key Account engagements, the performance baseline is in the process of being established from 2022-2024, whereas for the other areas of interaction (i.e. Customer Connections process, Customer Communications regarding Outages and Construction Projects), Toronto Hydro intends to (i) establish the performance baselines in 2024 through 2026, and (ii) measure its performance in 2027 through 2029 relative to the target of maintaining these baselines.

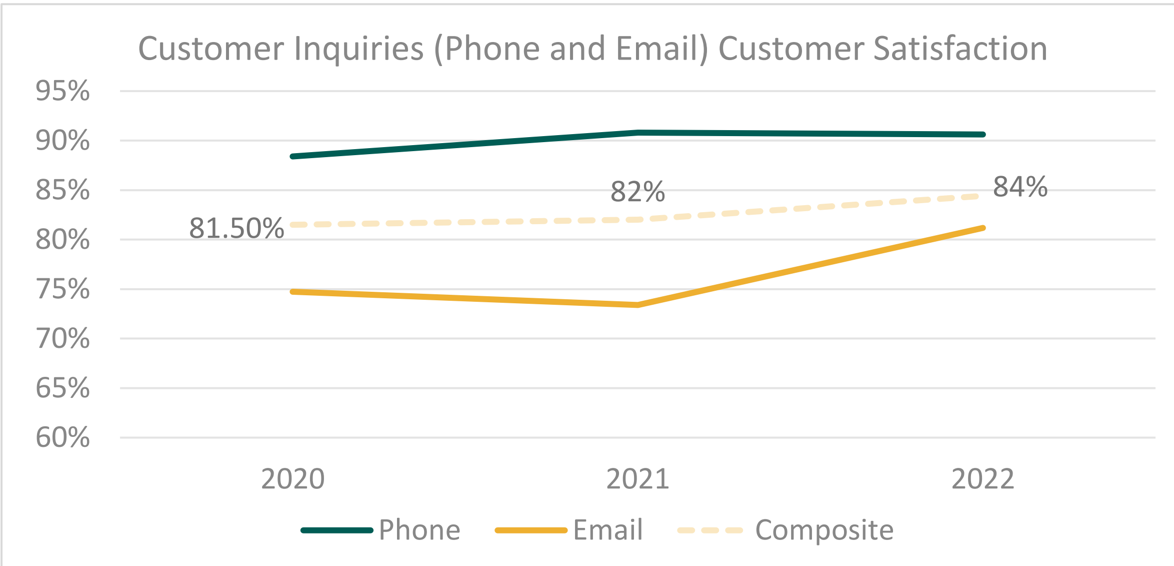

Figure 5: Customer Inquiries (Phone and Email) Customer Satisfaction (2020 – 2022)

Table 9 below summarizes the proposed weighting for this composite custom measure.

Table 9: Customer Satisfaction (Post-Transactional) Composite Measure Weightings

Element	2025 - 2026	2027-29
Customer Inquires (Phone & Email)[16]	80%	70%
Key Account Engagements	20%	20%
Customer Connections	0%	5%
Communications (Outages & Construction Projects)[17]	0%	5%

The investments that contribute to achieving the performance target on the proposed custom Customer Satisfaction metric are summarized in Table 10 below.

[16] Toronto Hydro proposes to weigh phone and email customer inquiries volumetrically. In 2022, approximately 83 percent of customer inquiries were received via phone and 17 percent were received via email.
[17] Toronto Hydro proposes to weigh customer communications related to outages and construction projects volumetrically.

Table 10: Key Enabling Investments to Deliver Customer Satisfaction

Program	Description of Key Enabling Investments to Deliver Customer Satisfaction
Customer Care Program	Operational investments to ensure sufficient staffing to provide timely responses to customer inquiries through multiple channels, including interactive voice response, email, Toronto Hydro's mobile application and the Customer Self Service portal (Exhibit 4, Tab 2, Schedule 14).
Demand-Related Investments	Investments in Customer Connections, Externally Initiated Plan Relocation, Load Demand, Station Expansion, Generation Protection Monitoring and Control, and Non-Wires Solutions programs allow Toronto Hydro to provide new and existing customers with timely, cost-efficient, reliable, and safe access to the distribution system for both load and generation connections. Investments address short- and long-term capacity limitations at the feeder, bus, station, or regional levels proactively as well as alleviate technical barriers to connections (e.g. DERs) to ensure that customer expectations can be met on a consistent basis, thereby impacting the customer experience and resulting satisfaction (Exhibit 2B, Section E5 and E7).
Public, Legal and Regulatory Affairs	Operational investments in Community Relations to enable proactive communications to notify customers of planned work, construction and outages. Operational investments in legal professional services to advise on real property matters, including customer connection agreements (Exhibit 4, Tab 2, Schedule 18).
Asset and Program Management	Operational investments in internal and external resources to process and execute, in a timely manner, customer connection requests and offers to connect (both load and generation customers) (Exhibit 4, Tab 2, Schedule 10).
Control Center Operations	Operational investments in staffing levels to facilitate the safe and reliable operation of the utility's distribution grid through real-time system control and monitoring activities on a 24/7, 365-day basis, including the coordination of system switching and restoration work through the utility's Control Centre to mitigate the effects of outages on customers and to enable safe load transfers for capital and maintenance work. (Exhibit 4, Tab 2, Section 7).
General Plant	Investments in Fleet, Facilities and IT equipment that enable TH employees to have access to safe, reliable equipment and tools needed to deliver the services.

2.2.3 Customer Escalations Resolution

Toronto Hydro is committed to addressing customer inquiries in a prompt manner. As reported in Exhibit 1B, Tab 3, Schedule 2, the utility resolves approximately 92 percent of customer inquiries upon first contact and intends to maintain this performance over the next period if there is sufficient funding available for its operations.

In addition, Toronto Hydro recognizes that some customer inquiries are more complex. To that end, the Customer Escalations Resolution measure tracks the utility's effectiveness in resolving inquiries that are referred from front-line contact center agents, or through the OEB E-Portal, within 10 business days per escalation.[18] This measure provides accountability for the timely resolution of more complex customer inquiries related to matters such as: energy and bill management, financial assistance and payment challenges, and service disruptions. Importantly, this metric drives a continued focus on a customer service culture as customer needs and expectations continue to evolve in the next rate period.

For the 2025-2029 plan period, Toronto Hydro set a performance target of 98 percent for this measure. The target is informed by: (1) the 2019 to 2022 historical results presented in Figure 6 below, and (2) the utility's recent experience and ongoing expectation that the volume and complexity of inquires will continue to increase as customers electrify previously non-electric energy usages (e.g. transportation and heating systems), and as technology and policy evolves to offer customers greater choice and more tools to participate in the production and management of their electricity usage.

[18] Total number of escalations resolved within 10 business days divided by the total number of resolved contacts.

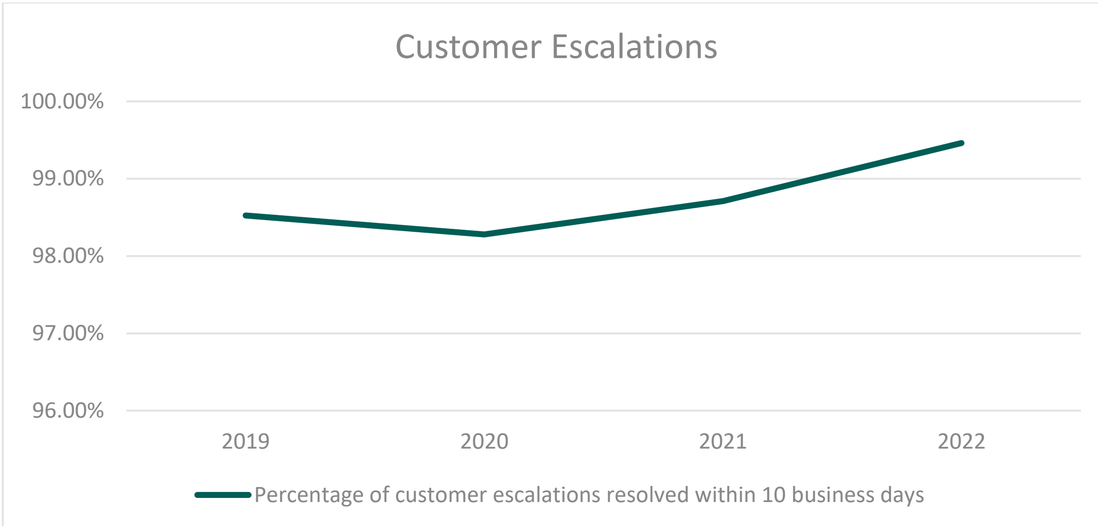

Figure 6: Customer Escalations Performance (2018-2022)

The investments that contribute to achieving the performance target on the Customer Resolutions metric are summarized in Table 11 below.

Table 11: Key Enabling Investments – Customer Escalations Resolution

Program	Description of Key Enabling Investments for Timely Resolution of Customer Escalations
Customer Care	Through the Customer Care program (Exhibit 4, Tab 2, Schedule 16) Toronto Hydro is investing in upskilling its workforce and enhancing its businesses processes and tools to meet evolving customer expectations and address an increasing volume of complex and diverse inquiries.
Public, Legal and Regulatory Affairs	Resource capacity and capabilities of the Regulatory Affairs segment to support the increased volume and complexity of work pertaining to Customer Escalations, notably including escalation through OEB processes. (Exhibit 4, Tab 2, Schedule 18).
Asset and Program Management	Robust records management, enhanced asset analytics and a sufficient compliment of designated technical and professional resources (e.g. engineers and technologists) in the Asset and Program Management area (Exhibit 4, Tab 2, Schedule 9) supports the timely resolution of more complex customer inquiries.

Program	Description of Key Enabling Investments for Timely Resolution of Customer Escalations
Customer Operations	Customer Operations (Exhibit 4, Tab 2, Schedule 8) supports the resolution of customer inquiries related to services provided in the Customer Connections segment of this program, as well as the Public Safety and Damage Protection segment which provides customers access to services such as isolations and underground locates.

2.3 Environment, Safety & Governance

Table 12: Environment, Safety & Governance Custom Performance Measures

Performance	Weight	Measures	Historical Performance	Target (2025-2029)
Environment, Safety and Governance	10%	Total Recordable Injury Frequency (TRIF)	0.83	0.83
	5%	Emissions Reductions	3.6kt/year	2.5kt/year by 2029
	5%	ISO Compliance & Certification	ISO14001 & 45001	100%

2.3.1 Total Recordable Injury Frequency (TRIF)

TRIF performance underlies the utility's commitment to ensuring the health and safety of its workforce by measuring the number of recordable injuries per 200,000 exposure hours, where a recordable is defined as any occupational injury or illness that results in an employee experiencing a fatality, lost-time injury, medical treatment injury beyond first aid, restricted work, or any other injury or illness which results in significant occupational injury or illness, or loss of consciousness.

TRIF is not only a measure of safety, but it also reflects productivity as strong TRIF performance yields numerous efficiency benefits including avoided costs related to employee lost-time, avoided costs related to higher Workplace Insurance Safety Board ("WSIB") premiums, and avoided costs related to employee accessing benefits such as physiotherapy and other paramedical services in order to manage the impacts of the safety incident. Although these benefits are difficult to quantify, they are nonetheless an output of an exceptional safety record.[19] Toronto Hydro is proud to have an industry-leading safety performance record, as compared to the Electricity Canada industry average, and to have been recognized with the 2022 Electricity Canada President's Award of Excellence for Employee Safety - Distribution and the Canadian Occupational Safety Magazine 2022 5-Star Energy and Resource Company award.[20]

Figure 7 below illustrates Toronto Hydro's TRIF performance over the last ten years since the utility increased its capital work program to address infrastructure renewal needs. For the 2025 to 2029 plan period, the utility intends to maintain TRIF performance at an average of 0.83 based on its historical performance over the last ten years (excluding 2013 as the results in this particular year are a clear outlier in the data set). This target is mindful that safety is a shared responsibility across the organization and there are incremental safety risks and considerations that the utility must manage over the 2025-2029 period as it expands and renews its workforce across a number of programs, segments and functions.[21]

[19] EB-2018-0165, Exhibit 1B, Tab 2, Schedule 1 at page 9.
[20] Exhibit 1B, Tab 3 at page 15.
[21] Please see Exhibit 4 at Tab 1, Schedule 1 and Tab 4, Schedule 3 for more information about the utility's workforce plan.

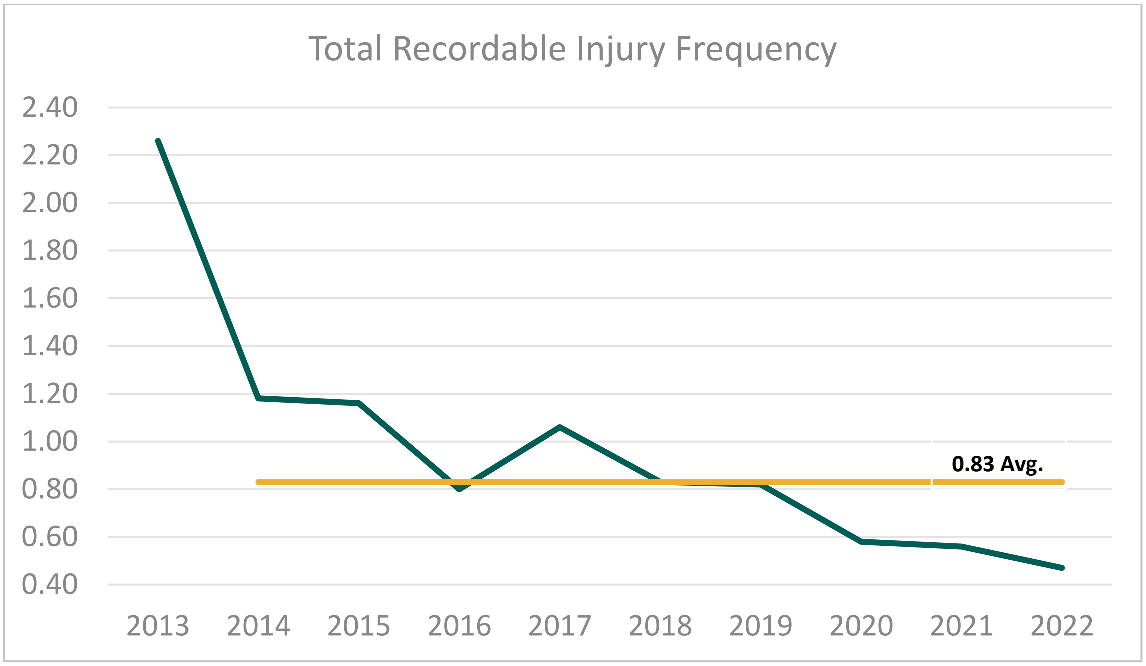

Figure 7: Total Recordable Injury Frequency Rate (2013-2022)

The complex, diverse and legacy configurations of operating a mature system that was amalgamated in 1999 from six different utilities, increases the likelihood of safety-related risks. Examples of operational risks inherent in the execution of Toronto Hydro's DSP are discussed in various programs,[22] and include notable challenges, such as deteriorated cables running through cable chambers that can fail, and potentially cause arcing and igniting gases, which then creates a powerful shockwave, as described in the Underground System Renewal – Downtown (Exhibit 2B, Section E6.3) program. Furthermore, the Area Conversions (Exhibit 2B Section E6.1) program details the increasing risk of equipment failure from obsolete rear lot and box construction systems that pose safety issues arising from crew access and public exposure to rear lot access. The risk and impact of overhead distribution asset failures due to accelerated asset condition degradation resulting from factors such as sustained exposure

[22] Network System Renewal, Exhibit 2B, Section E6.4; Corrective Maintenance, Exhibit 4, Tab 2, Schedule 4; Control Centre Operations, Exhibit 4, Tab 2, Schedule 7; Human Resources, Environment and Safety, Exhibit 4, Tab 2, Schedule 15

to dirt, salt, dust, and assets approaching the end of their useful life presents an operational risk inherent in the Overhead System Renewal (Exhibit 2B Section E6.5) program.

To mitigate these safety risks, investments are planned in a number of areas, including addressing high-risk assets approaching imminent failure, eliminating safety hazards such as poor structural integrity, cable congestion, and cable chambers lid ejections, relocating assets to improve accessibility, and technical training and development programs customized to address the specific needs and challenges of Toronto Hydro's distribution system, and a continued emphasis on safety among the utility's internal and external resource complements.

Organizational safety is managed by the Human Resources, Environment and Safety program outlined in Exhibit 4, Tab 2, Schedule 15. Ensuring that the utility is able to hire and retain the necessary resources with the appropriate skills to execute work safely is paramount to maintaining an industry-leading TRIF-record in the next rate term.

2.3.2 Emissions Reduction

The Emissions Reduction measure reflects Toronto Hydro's commitment to climate action and environmental performance through prudent paced investment in electrification and energy efficiency initiatives. This custom measure tracks Toronto Hydro's progress towards reducing greenhouse gas ("GHG") emissions from its fleet and facilities' operations in accordance with the utility's Net Zero 2040 strategy outlined in Exhibit 2B, Section D7 and in alignment with the City of Toronto's TransformTO Net Zero Strategy.[23]

[23] Transform TO Net Zero Strategy, November 2021, Attachment B at page 8 https://www.toronto.ca/legdocs/mmis/2021/ie/bgrd/backgroundfile-173758.pdf.

Figure 8, below, presents Toronto Hydro's actual (2018 to 2022) and projected (2023 to 2029) GHG emissions related to fleet and facilities, in accordance with the investment plan as filed. As of 2022, GHG emissions from Toronto Hydro's fleet and facilities assets represent approximately 49 percent of the utility's direct (Scope 1) emissions.

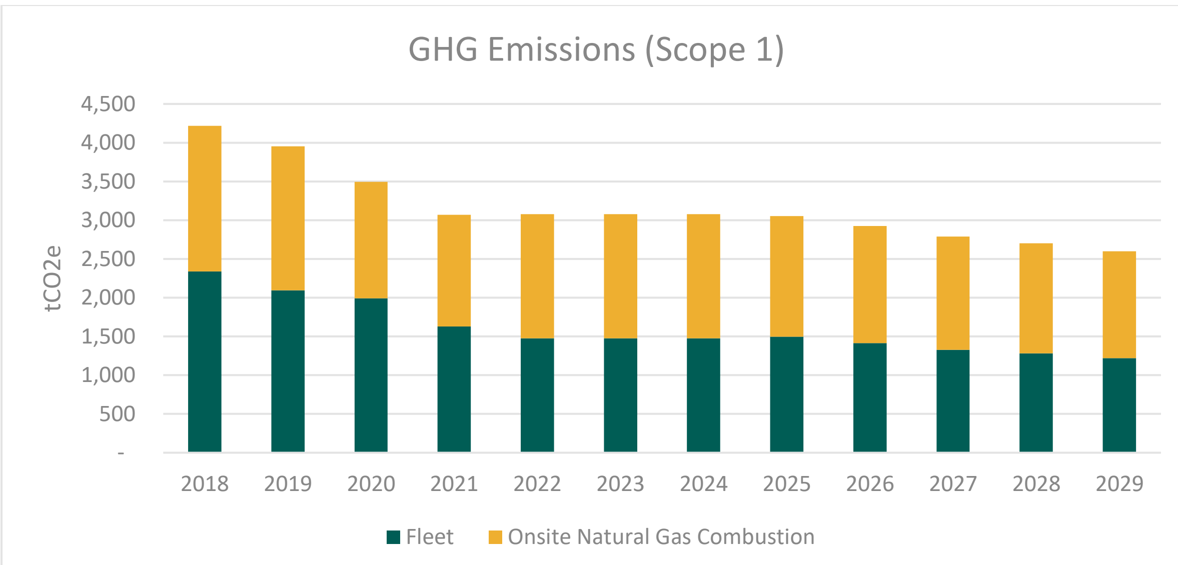

Figure 8: Toronto Hydro's Fleet and Facilities GHG Emissions (2018 – 2029)

Historical results identified in Figure 8 above include a 26 percent reduction of direct GHG emissions as a result of increasing buildings' energy efficiency with the use of building automation, minimizing fleet vehicle idling time, and electrifying light-duty fleet vehicles (i.e. 13 electric and 20 plug- in hybrid-electric).

Over the next rate period, Toronto Hydro intends to sustain historical emissions reductions achievements and further reduce its fleet and facilities emissions to 2.5kt of (Scope 1) CO2e by 2029. The utility plans to achieve this target by: (i) electrifying 50 percent of its fleet by the end of the rate term, and (ii) reducing GHG emissions produced at its work centers by 3 percent annually through fuel switching, conservation and energy efficiency measures. This target enables paced and prudent progress towards the utility's Net Zero 2040 goal, and delivers financial benefits associated with avoided costs of the federal carbon tax as summarized in section 3.5 below.

Investments that contribute to achieving the Emissions Reductions performance target are summarized in Table 13 below.

Table 13: Key Enabling Investments – Emissions Reductions

Program	Description of Key Enabling Investments to Reduce GHG Scope 1 Emissions
Fleet and Equipment	Toronto Hydro's Fleet and Equipment programs (Exhibit 2B, Section E8.3; Exhibit 4, Tab 2, Section 11) outlines investments to reduce Scope 1 emissions. Toronto Hydro plan to reconfigure the composition of its fleet to gradually increase its complement of electric and hybrid operation vehicles using a paced approach, prioritizing EV options as they better meet the requirements necessary for users to carry out distribution work and other day-to-day activities.
Facilities Management and Security	The utility plans to make additional investments in decarbonizing work centers through promoting conservation and improving the energy efficiency of its facilities, as noted in Toronto Hydro's Facilities Management program (Exhibit 4, Tab 2, Section 12) and Facilities Management and Security program (Exhibit 2B, Section E8.2). Decarbonization investments include: (i) fuel-switching projects to replace selected fossil fuel-powered assets with electric assets, (ii) converting to energy-efficient lighting, and the (iii) the implementation of building automation system controls for existing spaces, and retrofitting activities when feasible.

2.3.3 ISO Compliance and Certification

Toronto Hydro is committed to continual improvement and following best-in-class practices with respect to key management systems. The utility is currently certified to ISO14001 for its Environmental Management System ("EMS") and ISO45001 for its Occupational Health & Safety ("OH&S") Management System, and plans to achieve ISO55001 certification for its Asset Management System ("AMS") by the end of the next rate period. The ISO Compliance and Certification custom measure tracks Toronto Hydro's commitment to achieving and maintaining certification with these international governance standards.

Toronto Hydro became registered with ISO14001 and 45001 standards in 2012 and 2019,[24] respectively. Maintaining compliance with these standards requires ongoing effort and commitment to continuous improvement to successfully complete annual third-party audits of Toronto Hydro's systems vis-à-vis ISO requirements. Over the course of any given year, Toronto Hydro needs to maintain the integrated management systems in question, and pursue many activities that prepare the utility for the audit including, but not limited to:

- Review and update, where required, Toronto Hydro's Occupational Health and Safety as well as Environmental policies on a regular basis to make sure they continue to apply and are in line with goals.
- Find areas for improvement, continually evaluate the effects that activities, assets, and services have on the environment and the safety of the workforce.
- Observe and abide by occupational safety and environmental procedures and regulations that are relevant to the operations of Toronto Hydro.
- Evaluate the effectiveness of the integrated management systems and pinpoint areas for improvement, while conducting routine periodic reviews.
- Closely track and measure important occupational safety and environmental performance metrics to monitor the utility's progress.
- Update and adhere to occupational safety and environmental goals and targets to promote ongoing enhancements in environmental performance.

In addition to maintaining ISO certification for the EHMS and OH&S, this measure tracks Toronto Hydro's objective to achieve certification with the ISO 55001 standard in its AMS. In

[24] Prior to 2019 the utility was registered with OHSAS 18001 since 2012.

putting forward this commitment, Toronto Hydro is holding itself accountable for continuous improvement in its asset management system by aligning to an international best practice benchmark. Organizations like Toronto Hydro that have implemented ISO55001 have reported benefits including:[25]

- A formal AMS resulting in a more effective, efficient, and transparent decision-making process applied consistently across the business;
- Demonstrable alignment between asset performance, risks, costs, level of service delivered to customers, and asset decision making;
- Streamlining efforts in downstream processes such as investment plan development, documentation, or project management;
- Continuous review, governance, and improvement of relevant processes and systems through regular external surveillance audits;
- More effective communication across business units and greater awareness of how assets support business objectives; and
- Maximizing value from assets through informed lifecycle management decisions leading to better asset performance and risk management.

The ISO Compliance and Certification measure is a weighted measure with three parts: (1) achieving ISO55001 certification is weighted at 60 percent due to the incremental effort involved in becoming certified, and maintaining certification with (2) ISO14001 for the EMS and (3) with ISO45001 for the OH&SMS are weighted at 20 percent, respectively.

Investments that contribute to achieving the ISO Compliance and Certification performance target are summarized in Table 14 below.

[25] International Organization for Standardization (ISO), Understanding the Benefits of an ISO 55001 Asset Management System (April, 2019) at page 5; Union Internationale des Chemins de fer (UIC), UIC Railway Application Guide – Practical Implementation of Asset Management through ISO 55001 (November, 2016) at page 12.

Table 14: Key Enabling Investments – ISO Compliance and Certification

Program	Description of Key Enabling Investments
HR, Environment & Safety	Investments in the Human Resources, Environment and Safety program supports the coordination of Health and Safety activities, as well as Environmental, Social and Governance activities, with recognized ISO standards (Exhibit 4, Tab 2, Schedule 15).
Asset and Program Management	Investments in the System Planning and Standards segment support the continuous improvement of the AMS, aligning to relevant ISO standards and developing the long-term asset management strategy (Exhibit 4, Tab 2, Schedule 9).
Finance	Operational investments in resources to enable financial reporting and processes that support ISO certification (Exhibit 4, Tab 2, Schedule 16).
Work Execution	Investments in Internal and External Work Program Execution to undertake oversight, administrative training and other functions performed in the process of executing Toronto Hydro's capital and maintenance work programs, ensuring processes follow the relevant management system, for example the collection and timely return of asset data to support the AMS (Exhibit 4, Tab 2, Schedule 10).

2.4 Efficiency & Financial Performance

Table 15: Efficiency & Financial Performance Custom Performance Measures

Performance	Weight	Measures	Historical Performance	Target (2025-2029)
Efficiency & Financial Performance	**15%**	**Efficiency Achievements**	$5.6 million per year by 2024	$6.9 million per year by 2029
	10%	**Grid Automation Readiness**	N/A	100%
	5%	**System Capacity (Non-Wires)**	4 MW to date	30 MW by 2029

2.4.1 Efficiency Achievements

As outlined in the evidence in Exhibit 1B, Tab 3, Schedule 2, Toronto Hydro is an efficient organization committed to providing value for its customers through continuous improvement in productivity. The Efficiency Achievements metric tracks this commitment over the next rate period by holding the utility accountable for delivering sustained (and quantifiable) efficiency benefits to customers in the next rebasing application. Such benefits include avoided or reduced costs, or other efficiency gains, that would yield a lower base revenue requirement for customers in the next rebasing application.

In the current rate period, Toronto Hydro expects to achieve efficiencies of approximately $5.6 million per year by 2024, consisting of approximately $1.5 million of cost reductions and $4.1 million cost avoidances, as outlined in Figure 9 below. These achievements stem from continued investments in process automation and technological innovation, as detailed in the utility's productivity narrative at Exhibit 1B, Tab 3, Schedule 3.

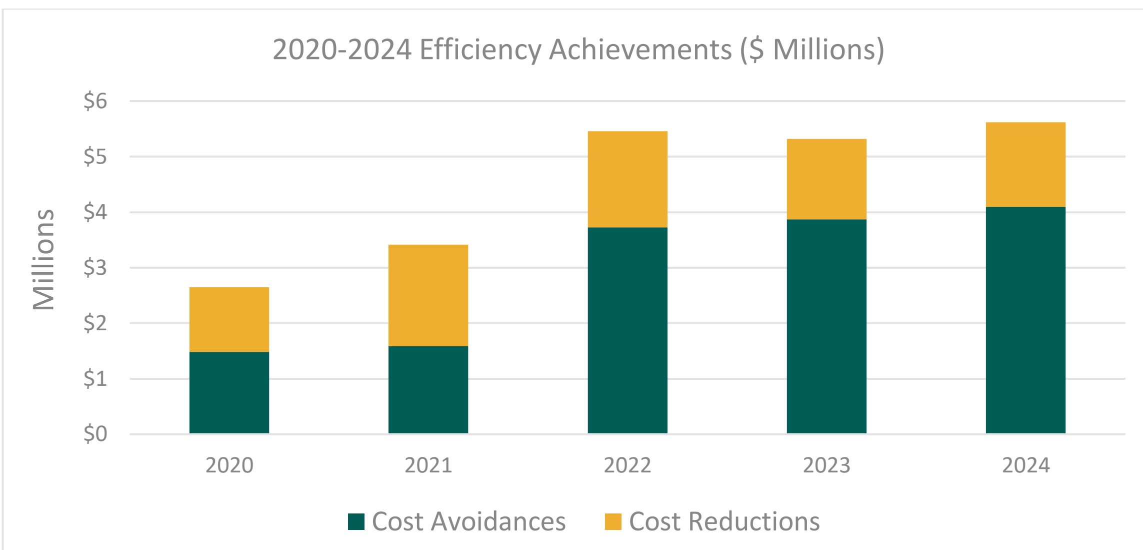

Figure 9: 2020 – 2024 Efficiency Achievements (Actual and Forecast)

Over the next rate term, Toronto Hydro set a target to achieve approximately $6.9 million in sustained and quantified efficiency benefits per year by 2029. As shown in section 3.4 below, this target is based on the 2029 forecasted revenue requirement impact of the empirically-derived efficiency (stretch) factor included in the Custom Revenue Cap Index at Exhibit 1B, Tab 2, Schedule 1.

Investments that contribute to achieving the Efficiency Achievements performance target are summarized in Table 16 below.

Table 16 – Key Enabling Investments – Efficiency Achievements

Program	Description of Key Enabling Investments to Achieve Efficiency
Grid Modernization Strategy	Grid Modernization Strategy (Exhibit 2B, Section D5) encompasses a suite of investments needed to accelerate the transformation of existing infrastructure to a more technologically advanced distribution system. There are three categories of investments under the Grid Modernization Roadmap, consisting of • Intelligent Grid: investments aimed at expanding observability and controllability of the distribution system using automated tools. • Grid Readiness: Investments in grid readiness to build capabilities to support decentralization with platforms such as the Distributed Energy Resource Management System ("DERMS") and leveraging DER connections for grid operations such as through the use of Demand Response. • Asset Analytics: leverages technology that is being deployed under the intelligent grid and grid readiness programs in order to have an integrated process for governance using tools such as predictive and prescriptive analytics.
Information Technology	Toronto Hydro relies on IT assets and systems to pursue efficiencies and innovation. Toronto Hydro develops Enterprise Technology Portfolio Roadmap of investments in IT/OT based on solutions for applications across the operations, engineering, metering, and customer care areas of the company (Exhibit 1B, Tab 4, Schedule 1). Investments in IT Software (Exhibit 2B, Section E8.4) to enable continued process automation and technological innovation, including upgrades to the SAP Enterprise Resource Planning System, investments in IT Hardware to ensure that software applications remain available and operational investments to carry out this work (Exhibit 4, Tab 2, Schedule 17).
Human Resources, Environment & Safety	Human Resources, Environment and Safety supports recruitment and development of resources such as engineers and analysts with progressive data analytics and coding skillsets that are necessary to unlock efficiency benefits provided by process automation and grid modernization investments (Exhibit 4, Tab 2, Schedule 15).

Program	Description of Key Enabling Investments to Achieve Efficiency
Innovation Fund	Proposal for Innovation Fund (Exhibit 1B, Tab 4, Schedule 2) to support the design and execution of innovative pilot projects that focus on testing new technologies, advanced capabilities, and alternative strategies in the areas of DER integration and inventive solutions (aligned with section 2.17 of Chapter 2 of the OEB's Filing Requirements for Distribution Rate Applications).

2.4.2 Grid Automation Readiness

Toronto Hydro is committed to improving long-term reliability and resilience outcomes for customers while unlocking safety and efficiency benefits by reducing manual work efforts related to switching operations in the field. The utility has been steadily modernizing its distribution system in the Horseshoe areas of the city (i.e. the u-shaped area outside of the downtown core) through sustainment investments in planned renewal work and complementary investments in modernization programs such as Contingency Enhancement (Exhibit 2B, Section E7.1). A primary focus of these efforts has been the deployment of SCADA-operated switches which allow control room operators to remotely transfer load and isolate feeder sections under fault conditions or on a planned basis. These investments have contributed to Toronto Hydro's improving reliability performance as discussed in Section E7.1.3.1, and have enabled the utility to manage its operational costs efficiently over the last decade as outlined in Exhibit 4, Tab 1, Schedule 1.

In the next rate period, the utility intends to make the necessary installations and provisions to prepare the overhead system in the Horseshoe area of the grid for the implementation of distribution automation (self-healing grid) beginning in 2030. This is a key objective of the utility's 2025-2029 Grid Modernization Strategy, and a least regret investment to ensure that the Horseshoe distribution system is ready and equipped to meet the reliability and resilience challenges and expectations in the next decade as more customers adopt electrified technologies such as electric vehicles, heat pumps, solar panels and energy storage systems.

Once implemented, Toronto Hydro expects self-healing grid capabilities to deliver high-customer value in the form of substantial reliability improvements and more efficient fault location and restoration efforts. For a complete discussion of the need for, and benefits of, Toronto Hydro's Fault Location, Isolation, and Service Restoration ("FLISR") strategy, as well as the broader Intelligent Grid strategy, please refer to the 2025-2029 Grid Modernization Strategy in Exhibit 2B, Section D5.

The Grid Automation Readiness custom measure tracks Toronto Hydro's progress towards achieving the distribution automation component of the utility's 2025-2029 Grid Modernization Strategy presented at Exhibit 2B, Section D5. This includes: (1) ensuring that 90 percent of feeders have a minimum of two SCADA sectionalizing switches and at least one SCADA tie point (or 2.5 switches per feeder), and the achievement of (2) technology milestones related to the implementation of FLISR in all horseshoe distribution station areas, and necessary enhancements to core IT systems to enable fully automated FLISR operation. More specifically, the Grid Automation Readiness custom measure tracks the attainment of the following milestones:

- Increasing the number of horseshoe feeders with a minimum of 2.5 switches from 78 percent (230 feeders) in 2022 to 90 percent (264 feeders) by 2029.
- Achieving 23 operational technology milestones related to FLISR implementation. Specifically, the utility intends to enable "manual FLISR" – an important and necessary step toward fully automated FLISR – for all 20 transformer stations in the horseshoe area, and to achieve three critical software milestones related to the Advanced Distribution Management System ("ADMS"); 1) SCADA software

enhancement release, 2) Network Management System ("NMS") software enhancement release and 3) NMS software enhancement - Auto-FLISR release.

Investments that contribute to achieving the milestones above enabling Grid Automation Readiness are summarized in Table 17 below.

Table 17: Key Enabling Investments – Grid Automation Readiness

Program	Description of Key Enabling Investments for Grid Automation Readiness
System Enhancements	Investments in this program allow for the installation of SCADA switches, tie-points and reclosers on targeted feeders to improve outage response capabilities and reduce fault isolation times. These switches will form the system configuration required for Toronto Hydro's self-healing grid in 2030 and beyond (Exhibit 2B, Section E2.4.3, Exhibit 2B, Section D5, and Exhibit 2B, Section E7.1).
IT/OT Systems and Operations	Investment in hardware, software, and communication infrastructure, as well IT resources to carry out the work planned, are key to Grid Automation Readiness. This includes enabling manual FLISR at Horseshoe stations and ADMS software release milestones which will enable fully automated FLISR operations beginning in 2030. Please see Exhibit 2B, Section E2.4.3 and Section E8.4, as well as Exhibit 4, Tab 2, Schedule 17 for more details.
Asset and Program Management	Investments in the System Planning segment which includes the Grid Modernization function, responsible for facilitating the development, integration, and strategic oversight of Toronto Hydro's long-term Grid Modernization Strategy and associated roadmaps, in addition to providing market intelligence and strategic forecasting of future electricity system needs and opportunities, and change-management support capacity to help accelerate innovation initiatives (Exhibit 4, Tab 2, Schedule 9).
Work Execution	Operational investments to enable oversight, administrative training and other functions performed in the process of executing Toronto Hydro's capital and maintenance work programs **(**Exhibit 4, Tab 2, Schedule 10).

2.4.3 System Capacity (Non-Wires)

The System Capacity (Non-Wires) measure reflects Toronto Hydro's proposal to integrate non-wires incentives into its Custom Scorecard and related PIM for the 2025-2029 rate term, in a manner that is responsive to emerging policy objectives and aligned with the OEB Filing Guidelines for Non-Wires Incentives, namely the option to set a "*Performance Target or Scorecard-Based Incentive [that] allows a distributor to earn a fixed incentive payment, based on its performance against an established target or scorecard metrics.*"[26] To that end, this section is expanded relative to other metrics canvassed above to explain in greater detail how the System Capacity (Non-Wires) custom measure, and the proposed incentive associated with meeting the target on this measure, aligns with the OEB Filing Guidelines, including an analysis and consideration of how the proposed incentive compares with other incentive options outlined in the OEB Filing Guidelines.

<u>Local Demand Response ("LDR") – Flexible System Capacity</u>

Toronto Hydro plans to invest approximately $5.7 million over the next rate term to deploy an expanded version of its non-wires Local Demand Response ("LDR") initiative to address system capacity constraints. More specifically, Toronto Hydro intends to procure 30MW of flexible system capacity through the LDR program to displace and defer the need for load transfers in the Horseshoe North area over the 2025-2029 period. Load transfers in this area are necessary to alleviate constraints at a number of stations including Finch TS and Bathurst TS. Load transfers address capacity challenges by moving load from one station to another in order to free up available system capacity to connect and serve customers. While load transfers can be effectively deployed to mitigate near-term capacity needs in areas of the grid that are experiencing high or rapid growth, they do not necessarily obviate the need for a broader system expansion in these areas. They can, however, provide the utility with the flexibility to prioritize work and address capacity challenges in the high-growth areas while larger-scale investments, such as stations expansion, are considered, planned or constructed.

[26] OEB, Filing Guidelines for Incentives for Electricity Distributors to Use Third-Party DERs as NWA (March 28, 2023)

LDR can defer or avoid certain load transfer capital investments in Toronto Hydro's service territory by procuring flexible system capacity from third-party or customer-owned DERs. In the optimal use case, LDR can indefinitely avoid the need for a load transfer in a given area. In these instances, capital that would have been spent on load transfers is avoided. This results in significant long-term savings for ratepayers, stemming from the avoided revenue requirement related to the capital assets. In other cases, where there is uncertainty with respect projected demand, LDR can be used to defer load transfers for a period of time until there is greater certainty that the load transfer will be needed. In these circumstances, although the net savings to customers are lower, LDR provides system value as a flexibility tool, enabling planners to better allocate capital when demand is uncertain. This ability to be flexible is increasingly important as capacity planning evolves in response to changes in policy, technology and consumer preferences.

In the current 2020-2024 rate period, Toronto Hydro set out to procure up to 10 MW of demand response capacity. The utility contracted 4 MW for the summer of 2023, and 6 MW for summer 2024, in the vicinity of two transformer stations (TS): Manby TS and Horner TS.[27] Manby TS has been reaching capacity on two busses for several years and overloading at Horner TS has been forecasted in the near-to-mid term. Some load transfers north to the Richview TS have been completed but further transfers would be difficult due to capacity constraints at neighbouring stations, the distance between the stations, geographic barriers, different voltages and a lack of remaining overhead corridors. Work has been undertaken to expand capacity at Horner TS which will be used to relieve Manby TS in 2025. In the meantime, while the expansion work is undertaken, LDR has been leveraged to provide increased flexibility in the Manby TS and Horner TS area. As a result, some transfers from

[27] Exhibit 2B, Section E7.2 at page 11.

Manby and Horner TS were avoided pending the permanent transfer of load from Manby to Horner TS in 2025.

<u>Performance Target/ Scorecard-Based Incentive</u>

In the 2025-2029 Custom Scorecard, Toronto Hydro proposes a System Capacity (Non-Wires) metric that measures the amount of flexible system capacity (MW) procured through the non-wires LDR program, summarized above and outlined in Exhibit 2B, Section E7.2. Toronto Hydro set an ambitious target to procure 30 MW of flexible system capacity through LDR in order to avoid or defer approximately $10 million of load transfer projects in the Horseshoe North area of the city. The target draws on Toronto Hydro's leadership and experience leveraging LDR as a non-wires solution to address distribution system needs, and challenges the utility to triple the amount of non-wires system capacity procured through this program.

Associated with this target, Toronto Hydro proposes a scorecard incentive of approximately $3.3 million, derived from a proposed weighting of the System Capacity (Non-Wires) custom metric at five percent of the total available incentive ($65 million) under the PIM. In adopting a proposed weighting of five percent of the overall PIM for this measure, Toronto Hydro was informed by the net ratepayer benefits, and other incentive options offered under the OEB Filing Guidelines, both of which are discussed below.

However, it is important to note that the scorecard incentive proposal, while having been informed by these inputs, stands on its own merits as an integrated proposal within a broader performance outcomes framework that Toronto Hydro is putting forward in this application. As further outlined in section 3 of this narrative, this framework recognizes that while quantified distribution system benefits are an important aspect of evaluating an innovative proposal, they must be viewed as part of a suite of broader, upstream benefits that stem from pursuing non-wires solutions. The distributor plays a key role in finding cost-effective ways to leverage DERs to meet its system needs, and in doing so, creating opportunities for these DERs to be leveraged for bulk-system, customer, and societal value and benefits.

These benefits entail the potential for massive curtailment of system peak demand increases associated with decarbonization-through-electrification, depicted in the Consumer Transformation and Net Zero 2040 scenario worlds in the Future Energy Scenario study filed at Exhibit 2B, Section D4. If they can be successfully unlocked, future benefits in this respect include:

- Avoided or deferred upstream transmission and generation investments;
- Lower delivery costs associated with reduced system losses;
- Energy cost reductions, either expressed as a benefit to end-use customers or as a variable generation cost reduction;
- Economic and societal benefits associated with increased reliability and resilience offered by a more diverse and localized supply mix;
- Economic and societal benefits associated with reduced greenhouse gas (“GHG”) emissions, and in particular anticipated GHG emission reductions resulting from the avoidance of marginal gas-fired electricity generation; and
- Other economic benefits associated with enhanced distribution system planning where Toronto Hydro can increasingly rely on non-wires solutions to optimize the size and the timing of system capacity expansions, and improve key outcomes such as reliability.

Benefit Cost Analysis (BCA)

Toronto Hydro prepared a benefit-cost analysis ("BCA") to approximate the distribution value to ratepayers of pursuing flexible non-wires solutions to address capacity constraints in the Horseshoe North over the next rate term.

The BCA evaluates net present value ("NPV") of the reduced distribution costs by comparing the costs to ratepayers in rates (i.e. using revenue requirement) of the traditional load transfer capital investments and the flexible non-wires LDR solutions, as the basis for determining the net benefits of the latter option. In this analysis, Toronto Hydro applied the estimated useful life ("EUL") of the capital assets that are typically constructed in a load transfer project as the period over which net benefits to customers are assessed, recognizing the long-term benefits of capital investment avoidance. To that end, and recognizing that some load transfers may only be deferred, the BCA calculates the net benefits of capital deferral and capital avoidance separately. Based on Toronto Hydro's knowledge of the targeted area (Horseshoe North), and experience with the LDR program over the past seven years, the utility assumes that approximately 75 percent of the load transfer projects in scope can be avoided entirely, while 25 percent can be deferred for at least five years until 2030.

In Table 18 below, Toronto Hydro outlines the NPV of the benefits of capital deferral and avoidance based on the LDR program facts outlined above.

Table 18: Toronto Hydro 2025-2029 LDR Flexible System Capacity BCA

	Deferred Capital	Avoided Capital
Parameters	$2.50 million in load transfer capital investment deferred for 5 years at an operational cost of $0.71 million	$7.50 million in load transfer capital investment avoided over the life of the assets (48 years) at an operational cost of $4.99 million
Costs	NPV of the operational costs of the non-wires solution (2025-2029): **$0.57 million**	NPV of the operational costs of the non-wires solution (2025-2029): **$4.00 million**

	Deferred Capital	Avoided Capital
	+ NPV of the revenue requirement associated with the load transfer capital investment to be made in 2030: **$1.80 million** **=** **$2.37 million** NPV Costs	
Benefits	NPV of revenue requirement associated with capital investment deferred from 2025-29: **$2.42 million** *Less (-)* NPV Costs: **$2.37 million** *Equals (=)* **$55.07 thousand NPV Benefits**	NPV of revenue requirement associated with capital investment avoided in 2025 over the 48-year EUL: **$7.27 million** *Less (-)* NPV Costs: **$4.00 million** *Equals (=)* **$3.27 million NPV Benefits**
Total NPV Benefits =$3.32 million		

The following assumptions underpin the calculation of the NPV benefits presented above:

- Deferred / avoided assets are load transfer projects with 48-year EUL, with a Capital Cost Allowance ("CCA") rate of eight percent. 2024 phase out of Accelerated Investment Incentive Program is assumed, which suspends the half-year rule for calculating CCA.
- 2025 ROE and interest rates are held constant per the parameters in Exhibit 5.
- Assumed that five years of LDR is sufficient to avoid the capital investment.
- NPV of five-year deferral assumes that the same asset would be installed five years later, devaluing costs relative to status quo due to future discounting.
- Discount rate based on Weighted Average Cost of Capital ("WACC") utilizing OEB's Toronto Hydro's Cost of Capital Parameters, resulting in WACC of 6.17 percent.[28]

[28] Exhibit 5, Tab 1, Schedule 2.

Comparative Analysis of Other Incentive Options

In this section Toronto Hydro presents a comparative analysis of other incentive options available under the OEB Filing Guidelines: Shared Savings Mechanisms ("SSM") and Margin on Payment. To determine a suitable Margin on Payment incentive amount Toronto Hydro evaluated the disincentives associated with pursuing non-wires solutions under the status quo. More specifically, Toronto Hydro assessed the foregone opportunity to earn a regulated rate of return ("ROE") on the capital investments avoided and deferred, using an NPV approach. The resulting analysis presented in Table 18 below indicates that Toronto Hydro's LDR proposal results in foregone utility ROE of approximately $3.2 million due to the deferral and avoidance of load transfer capital expenditures.

Table 19: Margin on Payment Incentive Approach based on Foregone ROE

	Deferred Capital	Avoided Capital
Approach	Quantify the net present value (NPV) of the foregone ROE associated with the deferred and avoided capital investments.	
Parameters	$2.50 million in load transfer capital investment deferred for 5 years (i.e. from 2025 to 2030)	$7.50 million in load transfer capital investment avoided over the estimated useful life (EUL) of the assets (48 years)
Lost NPV of ROE	NPV of foregone ROE: **$0.99 million** *Less (-)* NPV of ROE associated with capital investment in 2030: **$0.73 million** *Equals (=)* **$0.26 million NPV of Foregone ROE**[29]	NPV of Foregone ROE: **$2.97 million**
Total NPV of Foregone Revenue: $3.23 Million		

To determine a comparable SSM incentive, Toronto Hydro considered two scenarios. The first entails a 50/50 SSM in which the utility is permitted to keep 50 percent of the NPV of

[29] The loss of ROE associated with deferred capital is limited to the reduced/discounted net present value of ROE for the same asset installed in 2030 (deferred) as opposed to 2025 (status quo).

benefits associated with capital investments that are avoided and deferred. Based on the calculated NPV of benefits associated with LDR ($3.3 million) outlined above, a 50/50 SSM yields an incentive of approximately $1.7 million. The second scenario entails a higher incentive of 75/25 SSM in which the utility is permitted to keep 75 percent of the NPV of benefits. This scenario produces an incentive of $2.5 million. In both of these scenarios, Toronto Hydro observed that the SSM framework is not sufficient to level the playing field between the non-wires solution (LDR) and the conventional option (load transfers).

Concluding Remarks re Toronto Hydro's Non-Wires Incentive Proposal

Leveraging DERs as non-wires to defer or avoid conventional capital solutions is a developing strategy in Ontario and other jurisdictions that have embarked on an energy transition.[30] The OEB, industry stakeholders and policy-makers recognize that distribution utilities like Toronto Hydro are essential in enabling this strategy to unlock potential future economic and societal benefits for customers.[31] Distributors must have appropriate incentives to dedicate the resources and develop the operational capabilities that are necessary to enable proliferation of non-wires strategies.

The scorecard incentive proposal aligns with these policy objectives in a manner that is balanced and integrated with the utility's broader performance framework. The proposed weighting of five percent to this metric produces an incentive of approximately $3.3 million, which Toronto Hydro can only earn in the next rate term (i.e. 2030-2034) if it delivers on its

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[30] OFGEM, Transition to a net zero energy system, Smart Systems and Flexibility Plan 2021 (July 2021) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003778/smart-systems-and-flexibility-plan-2021.pdf; REV Connect – Grid-Edge Flexibility, https://nyrevconnect.com/grid-edge-flexibility/ https://nyrevconnect.com/non-wires-alternatives/

[31] OEB, Framework for Energy Innovation: Setting a Path Forward for DER Integration (January 2023) at pages 11-13; Minister of Energy, Letter of Direction from the Minister to the Chair of the OEB Board of Directors (October 21, 2022) at page 4.

ambitious goal of procuring 30 MW of non-wires system capacity over the 2025-2029 period. This proposal protects ratepayers, as demonstrated by the BCA above,[32] and provides the utility an appropriate incentive to continue maturing in its journey of developing non-wires capabilities to help unlock broader and more significant long-term benefits that are not yet captured in the BCA.

Investments that contribute to achieving the System Capacity (Non-Wires) performance target and more generally enable Toronto Hydro to advance its non-wires capabilities are summarized in Table 20 below.

Table 20: Key Enabling Investments – System Capacity (Non-Wires)

Program	Description of Key Enabling Investments re Non-Wires Solutions
Non-Wires Solutions	Investments in this program help address short-to-medium term capacity constraints at targeted transformer stations where local demand response ("LDR") can be leveraged to support the broader distribution system cost-effectively, thereby expanding the planning toolbox for the utility (Exhibit 2B, Section E7.2).
Generation Protection Monitoring and Control	This program allows Toronto Hydro to fulfill its regulatory obligations to connect Distributed Energy Resource ("DER") projects to its distribution system. Investments in this program alleviates technical barriers to connecting DERs. It also improves monitoring and control to ensure safe DER operation (Exhibit 2B, Section E2.4.1 and Exhibit 2B, Section E5.5).
Customer Operations	The Customer Connections and Key Accounts segments provide customer support for DER connections. The Customer Connections segment is responsible for handling all communications with customers relating to connection (both load and generation) and upgrade requests. The team manages a project from intake through to closure providing a single point of contact for all customer requests and communications related to a connection. This ensures a consistent and efficient customer experience. The Key Accounts team assists Key Account customers (i.e. customers with critical loads, including large customers, hospitals,

[32] The 2025 NPV savings of $3.3 million shown in the BCA compare to a 2025 NPV utility incentive of approximately $2.3 million assuming the incentive is recovered over the 2030-2034 rate term.

Program	Description of Key Enabling Investments re Non-Wires Solutions
	financial institutions, essential public services, and developers) with complex connections and by discussing opportunities for behind-the-meter energy solutions to meet customer goals (Exhibit 4, Tab 2, Schedule 8).
Control Centre Operations	Operational investments to ensure sufficient resources to meet increase in workload associated with growth of DERs and expansion of Flexibility Services (Exhibit 4, Tab 2, Schedule 7).
Legal Services and Procurement	Operational investments to support procurement (Exhibit 4, Tab 2, Schedule 18) and negotiation of capacity contracts (Exhibit 4, Tab 2, Schedule 18, Section 5) are critical to the success of LDR.
Asset and Program Management	Operational investments to support the capacity planning and grid innovation functions including, planning the requisite connection capacity to accommodate current and forecasted levels of DERs in Toronto Hydro's service area, as well as, identifying opportunities for adopting non-wires alternatives to maximize the use of existing distribution system assets. Investments also support the grid modernization function, including the development and execution of the Grid Modernization Strategy and its grid readiness component which will build capabilities to support decentralization with platforms such as the Distributed Energy Resource Management System ("DERMS") and leveraging DER connections for grid operations such as through the use of Demand Response Exhibit 4, Tab 2, Schedule 9).
Innovation Fund	Proposal for Innovation Fund (Exhibit 1B, Tab 4, Schedule 2) to support the design and execution of innovative pilot projects over the 2025-2029 rate period. The pilot projects to be deployed through the Innovation Fund would focus on testing new technologies, advanced capabilities, and alternative strategies in the areas of DER integration and inventive solutions (aligned with section 2.17 of Chapter 2 of the OEB's Filing Requirements for Distribution Rate Applications).

3. BENEFITS ANALYSIS

Toronto Hydro's PIM incentivizes the utility to achieve meaningful and valuable outcomes for customers across a wide set of objectives that: (i) are responsive to fundamental shifts taking place in the external environment as a result of the energy transition, and (ii) align with customer feedback and the strategic underpinnings of the plan. Many of the metrics included in Toronto Hydro's PIM yield significant but difficult-to-quantify benefits for customers. Nonetheless, where possible, Toronto Hydro took steps to quantify the benefits to customers of achieving the identified performance targets.

The benefit analysis presented in this section illustrates the minimum economic value of the PIM for customers should the utility achieve its proposed targets. While Toronto Hydro recognizes that quantified benefits are an important aspect of evaluating innovative proposals, the utility underscores the practical reality that quantified benefits cannot paint a full picture of the value proposition for customers. The benefits summarized in Table 21 below should be regarded in a comprehensive context with thoughtful consideration of all the other benefits in the performance framework for this application, which although cannot be quantified, nonetheless provide high value to customers.

Table 21: PIM Quantified Benefits Analysis ($ Millions)

Metric	2025-29	Lifetime[33]	Approach
Outage Duration	$32.5M	$605.2M	Customer Interruption Cost Avoidance,[34] Target vs IRM scenario
Outage Frequency	$6.5M - $21.6M	$182.5M - $413.4M	Customer Interruption Cost Avoidance, Target vs IRM scenario
New Services Connected on Time	$31.7M - $142.6M	$31.7M - $142.6M	Value of energy delivered to customers without delaying new connections. Target performance vs a range of typical performance levels
System Capacity (Non-Wires)	$3.1M	$21.0M	Avoided capital-related revenue requirement costs through LDR[35]

[33] Benefits are considered over the applicable asset life. For Efficiency Achievements, this analysis assumes that benefits are likely to be achieved primarily through technology investment (software) that have an average useful life of 5 years.
[34] Based on the values in Tables 1-3 and 1-5 of the Value of Service Study found at Exhibit 2B, Section D3, Appendix D.
[35] Based on nominal benefits resulting from avoidance and deferral of capital investment through non-wires solutions. A full net present value cost-benefit analysis is provided in section 2.4.3 above.

Metric	2025-29	Lifetime[33]	Approach
Efficiency Achievements	$16.4M	$50.7M	Efficiency-factor expectations for 2025-29 are sustained into the next rate term by achieving the target.
Emissions Reductions	$0.2M	$1.5M	Sustained carbon emission reduction vs current emission level
Total Benefits (Nominal)	**$90.3M - $216.3M**	**$892.5M - $1,234.4M**	
Total Benefits (Present Value)	**$74.7M - $180.2M**	**$266.7M - $419.6M**	

Based on the analysis in Table 21 above, the nominal sum of benefits expected in the next period ranges between approximately $90 million and $216 million. The low end of the range of nominal benefits to ratepayers over 2025 to 2029 – $90.3 million – includes $16.4 million resulting from Toronto Hydro's empirically-derived 0.15% efficiency factor, and $0.2 million relating to reduced federal carbon tax payments from emission reductions. The former represents the efficiency benefits customers would normally receive in rates under RRF incentive regulation based on empirical total cost benchmarking, and the latter represents cost reductions which would not be reflected in rates until Toronto Hydro's next rebasing application for 2030 rates. As such, an appropriate calculation of minimum benefits relative to Toronto Hydro's proposed $65 million incentive would remove these amounts. The result is a minimum direct benefit of approximately $74 million over the 2025 to 2029 period.

The analysis supports that customers are better off in all scenarios where the PIM is approved. Customers may receive benefits at the high-end of the estimate ranges that well exceed any potential PIM incentives over the 2025 to 2029 rate term, in addition to significant lifetime benefits that range between approximately $890 million to over $1.23 billion on nominal basis. While achievement of the targets and underlying benefits represents the optimal outcome for ratepayers, if Toronto Hydro does not achieve the targets no incentive (or only a partial incentive) would be rewarded. The result is that customers are protected upfront, and significant risk is shifted to the utility to deliver value through performance outcomes that customers prioritize in order to earn-back the incentive.

The following sections detail the methodologies that Toronto Hydro relied on to quantify the benefits presented in Table 21 above.

3.1 Outage Duration & Outage Frequency

The System Average Interruption Duration Index ("SAIDI") and System Average Interruption Frequency Index ("SAIFI") are well established metrics to assess key dimensions of grid reliability performance. While SAIDI quantifies the annual average duration (in minutes) of power outages that customers experience, SAIFI calculates the average annual instances of power disruptions per customer. As described in section 2.1, Toronto Hydro's 2025-2029 Custom Scorecard includes a subset of these reliability metrics, namely:

- **Outage Duration**: SAIDI excluding scheduled outages, LoS and MEDs; and
- **Outage Frequency**: SAIFI measuring the interruption frequency index for outages caused by defective equipment only.

3.1.1 Benefits of Outage Duration and Frequency

To quantify the reliability benefit of its 2025-2029 Investment Plan, Toronto Hydro utilized the Customer Interruption Cost ("CIC") methodology, which is also referred to as Value of Service ("VOS") or Value of Lost Load ("VoLL"). These methods are widely used to evaluate the benefits of various programs, reliability improvements included. Toronto Hydro relied on the 2018 Customer Interruption Cost ("CIC") study[36] to determine the value of reliability

[36] Please see Exhibit 2B, Section D3, Appendix D.

to customers in its service area, and used a historical and forecasted Toronto Consumer Price Index (CPI)[37] to adjust these values for the relevant time periods.

Table 22: Outage Duration and Outage Frequency Inputs

	2025	2026	2027	2028	2029
Cost per Average kW Estimates – Event ($/kW)	$15.50	$15.81	$16.12	$16.45	$16.78
Cost per Unserved kWh Estimates – Duration ($/kWh)	$24.53	$25.02	$25.52	$26.03	$26.55
Toronto Consumer Price Index	2.0%	2.0%	2.0%	2.0%	2.0%
Customers	800,374	803,344	806,017	808,731	811,245
Average Load per Customer[38]	3.35	3.33	3.31	3.32	3.30

For assessing the broad benefits accruing to Toronto Hydro's diverse customer base, the utility relied on a "blended" cost from the study; relying on the one-minute or more interruption blended cost per average kilowatt (kW) and average unserved kilowatt-hour (kWh) per customer, where:

- **Cost per Average kW Estimates** is included in the Outage Duration benefit calculation, representing the reduced time when energy is unavailable to customers;
- **Cost per Unserved kWh Estimates** is included into SAIFI Defective Equipment Outage Frequency benefit calculation, indicative of fewer sustained outage events experienced by customers.

[37] For historical values Toronto Hydro relied on the Statistics Canada Consumer Price Index, and for future values the utility relied on the Conference Board of Canada, Major City Insights – Toronto (Released September 13, 2023).
[38] Historical and projected average loads are based on total normalized energy consumption and total number of customers in accordance with Exhibit 3, Tab 1, Schedule 1.

To measure improvements in grid reliability, Toronto Hydro compared its targeted average five-year reliability metrics for 2025-2029 against estimated reliability performance under an IRM scenario as explained above in section 2.1.1 and 2.1.2. Tables 23 and 24 present the reliability benefits that Toronto Hydro's 2025-2029 investment plan offers to customers over this period compared to the IRM base case.

Table 23: Outage Duration Customer Benefits for 2025-2029 ($ Millions)

	2025	2026	2027	2028	2029
Target	$50.6	$51.5	$52.5	$53.8	$54.8
Base Case	$56.8	$57.9	$58.9	$60.4	$61.5
Reliability Benefits	**$6.2**	**$6.4**	**$6.5**	**$6.6**	**$6.8**

Table 24: Outage Frequency Customer Benefits for 2025-2029 ($ Millions)

	2025	2026	2027	2028	2029
Target [39]	$15.8 - $18.7	$16.1 - $19.0	$16.4 - $19.4	$16.8 - $19.9	$17.1 - $20.2
Base Case	$19.9	$20.3	$20.7	$21.2	$21.6
Reliability Benefits	**$1.2 - $4.2**	**$1.3 - $4.2**	**$1.3 - $4.3**	**$1.3 - $4.4**	**$1.3 - $4.5**

The reliability benefits of Toronto Hydro's investments in the 2025-2029 plan extend well beyond this rate period. To quantify these benefits from a longer-term perspective, the present value of avoided CICs for both duration-based and event-based metrics were calculated, based on an average life of 45 years for distribution assets, weighted average

[39]This range reflects the Outage Frequency target set out in section 2.1.2.

cost of capital,[40] and long-term inflation projections.[41] Table 25 presents the lifetime reliability benefits that the 2025-2029 investment plan offers for the utility's customers.

Table 25: Lifetime Value 2025-2029 Outage Duration and Frequency Customer Benefits[42]

Lifetime Value (2025-2070)	
Outage Duration (SAIDI) Benefits	$605.2M
Outage Frequency (SAIFI) Benefits	$182.5M - $413.4M

3.2 New Services Connected on Time

Similar to the Outage Duration and Outage Frequency metrics, the benefits of timely New Services Connected are calculated using adjusted CICs, under the assumption that delayed connection results in loss of service hours, yielding associated economic losses. This approach illustrates the value of the higher level of service that Toronto Hydro has committed to maintain by evaluating the benefit to High Voltage ("HV") and Low Voltage ("LV") customers who are connecting or upgrading their services to the grid.

3.2.1 Benefits of New Services Connected on Time

The benefits of New Services Connected on Time are measured by contrasting the value of energy delivered to the customer on time, against a scenario where service is delayed. This analysis predominantly reflects the needs of HV customers – typically large businesses where delayed connections directly translate to revenue losses. The CIC study calculates CIC as direct losses for commercial and industrial customers indicating acute cost and revenue

[40] Weighted Average Cost of Capital of 6.17% as per Exhibit 5, Tab 1, Schedule 2.
[41] 2% inflation based on the 2025-2027 annual inflation projection by Conference Board of Canada, Major City Insights – Toronto (released September 13, 2023).
[42] The base case scenario estimates the Outage Duration reaching 53.2 min and Outage Frequency reaching 0.51 events in 2029, the last year of the rate term. Toronto Hydro applied an improvement delta between the targeted reliability levels and the base case reliability in the final year to calculate the benefits beyond 2029.

implications of unsupplied energy. In contrast, residential customers typically have lower electricity consumption and the interruptions often mainly affect personal comfort and convenience. Therefore, the methodology to calculate CICs for residential customers is based on estimating the customer's willingness to pay to avoid the outage.

HV customers (connected to High Voltage lines >750kVA) typically fall into the General Service >5MW, General Service 1-5MW, and General Service 50kW -1000kW rate classes. LV customers (connected to lines <750kVA) generally include smaller business and residential customers under the Residential, General Service <50kW and Competitive Sector Multi-Unit Residential rate classes. With small businesses included, the General Service <50kW category would also face tangible costs from connection delays.

To calculate the benefits of timely connections, Toronto Hydro relied on the data shown in Tables 26 and 27, which provide:

- Number of forecasted connections to HV and LV customers[43]
- Average load per HV and LV customers, based on division of total consumption by number of customers, based on rate class
- Average delay time in days/hours
- CIC duration, reflecting the 24 hours cost per unserved kWh for Large Business as HV customers, and a weighted average cost for Residential and Small-Medium Business as LV customers.

As noted above in section 2.2.1, Toronto Hydro's target performance against the New Services Connected on Time metric is 99 percent relative to the OEB's service quality requirement of 90 percent of new connections completed on time. Where connection delays

[43] See section 2.2.1 above.

do occur, the average delay runs 21 days (504 hours) for HV customers and 13.5 days (325 hours) for LV customers. To quantify the value of the higher level of service that Toronto Hydro has committed to maintain over 2025-2029 rate term, the utility compared targeted performance against both the OEB's minimum service quality requirement and the average five-year (i.e. 2018 to 2022) performance of a peer group of Ontario distributors.[44]

Tables 26, 27 and 28, below show that meeting the performance target with respect to New Service Connected on Time custom measure yields a total benefit in the range of $31.7 to $142.6 million over the 2025-2029 period.

Table 26: High-Voltage Connections Customer Benefits for 2025-2029

	2025	2026	2027	2028	2029
Number of HV Customer Connection	120	120	120	120	120
Performance Target	99%	99%	99%	99%	99%
OEB Minimum Service Quality Requirement	90%	90%	90%	90%	90%
Average LDC Performance	97%	97%	97%	97%	97%
Additional Customers Connected on Time relative to Average LDC Performance and OEB Standard[45]	2.4 - 10.8	2.4 - 10.8	2.4 - 10.8	2.4 - 10.8	2.4 - 10.8
Average Delay Time (Hours)	504	504	504	504	504
Average Load (kW)	214	212	210	209	206
CIC Duration ($/kW)	$22.78	$23.23	$23.70	$24.17	$24.65
Benefits ($ Millions)[46]	**$5.9 - $26.5**	**$5.9 - $26.7**	**$6.0 - $27.0**	**$6.1 - $27.4**	**$6.1 - $27.7**

[44] Hydro One, Hydro Ottawa, Alectra Utilities, Elexicon Energy, London Hydro, EnWin Utilities, and Enova Power.
[45] The LDC average performance of 98% that applies to Low Voltage connections is assumed for High Voltage as well.
[46] High-Voltage Customer benefits range given a threshold performance of 90% (OEB minimum service quality requirement) and 98% (2018-2022 Ontario LDC average performance).

1 **Table 27: Low-Voltage Connections Customer Benefits for 2025-2029**

	2025	2026	2027	2028	2029
Number of LV Customer Connection	5,573	5,714	5,859	6,008	6,161
Performance Target	99%	99%	99%	99%	99%
OEB Minimum Service Quality Requirement	90%	90%	90%	90%	90%
Average LDC Performance	97%	97%	97%	97%	97%
Additional Customers Connected on Time relative to Average LDC Performance and OEB Standard	111.4 - 501.5	114.2 - 514.2	117.1 - 527.3	120.1 - 540.7	123.2 - 554.4
Average Delay Time (Hours)	325	325	325	325	325
Average Load (kW)	1	1	1	1	1
CIC Duration ($/kW)	$7.28	$7.38	$7.48	$7.59	$7.68
Benefits ($ Millions)[47]	**$0.3 - $1.3**	**$0.3 - $1.4**	**$0.3 - $1.4**	**$0.3 - $1.5**	**$0.4 - $1.6**

2

3 **Table 28: Total HV & LV Connection Customer Benefits for 2025-2029 ($ Millions)**

2025	2026	2027	2028	2029	2025-2029
$6.2 - $27.8	$6.2 - $28.1	$6.3 - $28.5	$6.4 - $29	$6.5 - $29.2	$31.7 - $142.6

[47] Low-Voltage Customer benefits range given a threshold performance of 90% (OEB minimum service quality requirement) and 98% (2018-2022 Ontario LDC average performance).

3.3 System Capacity (Non-Wires)

As noted above in section 2.4.3, in the 2025-2029 rate term Toronto Hydro plans to expand its LDR program to avoid and defer capital expenditures associated with load transfers, which become necessary when serving customers in areas of the grid that experience capacity constraints due to high-growth.

3.3.1 Benefits of Non-Wires Solutions

Toronto Hydro assessed the reductions to distribution costs as a result of deferring or avoiding load transfer projects through the use of LDR as a non-wires solution. The results of this analysis yield nominal ratepayer benefits of approximately $3.1 million in the 2025-2029 rate period, and nominal lifetime benefits of $21 million.[48]

3.4 Efficiency Achievements

As explained above in section 2.4.1, Toronto Hydro's approach to realizing efficiency gains is based on achieving a top-down target equivalent to the 2029 revenue requirement value of the proposed efficiency (stretch) factor within the Custom Revenue Cap Index set out at Exhibit 1B, Tab 2, Schedule 1. This section outlines the methodology used to calculate the annual benefits of these efficiency achievements for the forthcoming years, and explains how these gains align with other performance metrics.

3.4.1 Benefits of Efficiency Achievements

By the end of the rate term, the 0.15 percent efficiency (stretch) factor results in cumulative stretch of 0.6 percent relative to the 2029 revenue requirement, and yields a 2029 revenue reduction of approximately $6.9 million – the target on the Efficiency Achievements metric.

[48] These benefits are based on the BCA in section 2.4.3 but presented on a nominal basis for comparability with the other metrics in the analysis.

A core function of the $6.9 million target, and its associated benefits, is the requirement that efficiencies must persist into the next rate term, which is assumed to be 2030 to 2034. As such, through this metric, Toronto Hydro is incented to pursue sustained efficiencies that will be realized in base rates starting in 2030. To calculate the 2030 to 2034 benefits, the 2029 target of $6.9 million was multiplied by five years. Table 29 below presents the calculation. Overall, from 2025 to 2034, the Efficiency Achievement metric, in combination with the 0.15 percent efficiency factor over the 2025-2029 rate period, yields a total customer benefit of approximately $50.7 million on a nominal basis.

Table 29: 2025-2034 Efficiency Customer Benefits ($ Millions)

	2025	2026	2027	2028	2029	2030-34	Total
Base Revenue Requirement	972.4	1,027.0	1,074.4	1,175.7	1,219.2		
Revenue Requirement with 0.15% efficiency factor	972.4	1,025.5	1,071.3	1,170.9	1,212.2		
Efficiency Factor		0.15%	0.30%	0.45%	0.60%		
Efficiency Benefits		**1.5**	**3.1**	**5.0**	**6.9**	**34.3**	**$50.7**

3.5 Emissions Reductions

As noted in section 2.3.2 above, Toronto Hydro emissions reduction benefit is based on Scope 1 emissions from vehicle fleet and buildings emissions. Table 30 highlights the buildup of the emissions reduction benefits throughout 2025-2029 period. Utilizing the increase in Canada's federal cost of CO2 from $95/ton in 2025 to $155/ton by 2029,[49] Toronto Hydro's Emissions Reductions target would yield $221,510 in savings benefits within the 2025-2029 period. To calculate life-time benefits a value of $170/ton was used for 2030 and beyond over the useful of the assets which is 11 years for fleet and 22 years for facilities. This

[49] Greenhouse Gas Pollution Pricing Act SC. 2018, c. 12, s. 186 at Schedule 4

calculation results in a lifetime quantified benefit from Emissions Reductions of approximately $1.5 million.

Table 30: Emissions Cost Reductions (tCO2e)

	2025	2026	2027	2028	2029
Fleet and Buildings Scope 1 Emissions	2,892	2,782	2,684	2,576	2,478
Annual Savings Relative to 2024[50]	120	230	328	436	534
Canada CO2 price ($/tCO2e)[51]	$85	$110	$125	$140	$155
Annual Emissions Reduction Savings	$11,400	25,300	$41,000	$61,040	$82,770
Emissions Reductions Cumulative Savings	**$11,400**	**36,700**	**$77,700**	**138,740**	**$221,510**

Toronto Hydro notes the obvious, but key observation, that the emissions reductions quantified benefits above do not consider the inherent value of achieving net-zero targets to mitigating the existential and economic impacts of climate change. This observation applies directly to the Emissions Reductions metric and more broadly to this performance incentive framework, and the 2025-2029 investment plan that underpins it. Among other many important objectives, this plan reflects Toronto Hydro's commitment to enable climate action by readying its grid and operations ready to serve Toronto residents, businesses and institutions who want plug-in electrified technologies safely, reliably and efficiently in this rate period and decades to come.

[50] For 2024 Fleet and Buildings Scope 1 emissions are projected at 3,012tCO2e.
[51] https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information/federal-benchmark-2023-2030.html

HISTORICAL PERFORMANCE RESULTS

Toronto Hydro is a performance-driven organization focused on delivering value to its customers through outcomes. The utility tracks and reports its performance annually on 45 distinct measures aligned with outcomes in the OEB's Renewed Regulatory Framework for Electricity Distributors. Over the last decade, Toronto Hydro improved its performance on a number of key service quality measures, as detailed throughout this schedule, and summarized in Table 1 below.

Table 1: Toronto Hydro's Performance Improvements over the Last Decade

OEB Outcomes	Categories	Performance Measures	2013	2022	% Change
Customer Focus	Customer Service	Billing Accuracy	96.6[1]	99.11	3%
		Rescheduling a Missed Appointment	98.4	100	1.6%
		Customer Satisfaction Survey Results (%)	91.0[1]	94	3%
		First Contact Resolution (%)	77.0	92	19%
		New Residential/Small Business Services Connected on Time	94.2	99.89	5%
		Customers on eBills (total)	64,163	381,490	495%
Operational Effectiveness	Safety	Total Recordable Injury Frequency (per 100 workers)	2.26	0.47	-60%
	System Reliability	SAIDI - Defective Equipment (hours)	0.46	0.34	-26%
		SAIFI - Defective Equipment	0.53	0.46	-13%
		FESI-6 Large Customers (# feeders)	22	12	-45%
		Emergency Urban Response	74.4	86.5	16.3%

This schedule presents and explains Toronto Hydro's performance results reported in the:

(1) Electricity Distributor Scorecard ("EDS"),

(2) OEB's electricity service quality requirements ("ESQRS"), and

(3) 2020-2024 Custom Scorecard approved in EB-2018-0165.

[1] The OEB started tracking Billing Accuracy and Customer Satisfaction Survey results in 2014.

1. ELECTRICITY DISTRIBUTOR SCORECARD (EDS) PERFORMANCE

Table 2 below summarizes and compares Toronto Hydro's recent five-year (2018-2022) results with its performance over the previous five-year period (2013-2017).[2] The sections that follow the table explain the utility's historical performance for each EDS measure.

Table 2: Toronto Hydro EDS Performance Results (2013-2022)

Performance Measures		2013-2017 (5-year avg)	2018-2022 (5-year avg)
New Residential/Small Business Services Connected on Time		95.72%	99.80%
Scheduled Appointments Met on Time		99.63%	99.68%
Telephone Calls Answered on Time		74.66%	76.15%
First Contact Resolution		83.00%	91%
Billing Accuracy		98.07%[3]	99.15%
Customer Satisfaction Survey Results		87%[3]	94%
Level of Public Awareness		70.33%	69%
Compliance with O. Reg 22/04		C	C
Serious Electrical Incidents	Number of General Public Incidents	1.2	17.6
	Rate per 10, 100, 1000 km of line	0.106	0.608
SAIDI		0.96	0.846
SAIFI		1.26	1.3
DSP Implementation		n/a	n/a
Efficiency Assessment		5	5
Total Cost per Customer		$995	$1,189
Total Cost per km of Line		$53,287	$32,073
Renewable Generation CIA Completed on Time		95.64%	100%[4]
New Micro-embedded Generation Facilities Connected on Time		98.48%	96.71%
Liquidity: Current Ratio		0.68	0.76
Leverage: Total Debt to Equity Ratio		1.47	1.17
Profitability: Regulatory ROE	Deemed	9.41%	8.83%
	Achieved	9.30%	7.64%

[2] This information is derived from Toronto Hydro's 2018-2022 and 2013-2017 EDS which are filed at Appendix A to this schedule.
[3] The OEB started tracking Billing Accuracy and Customer Satisfaction Survey results in 2014.
[4] Value displayed represents the average from 2018 until the first quarter of 2021, as the filing requirement was subsequently removed from the Reporting and Record-keeping Requirements (RRR).

1.1 Service Quality: New Residential/Small Business Services Connected on Time

Toronto Hydro connected new residential and small business services (i.e. new connections less than 750 volts) on time at average of 99.80 percent over the 2018-2022 period, consistently exceeding the OEB's performance standard of 90 percent. In 2022, Toronto Hydro achieved its best result to date, connecting 99.89 percent of the 5,260 new residential and small business connections on time.

Serving one of the fastest growing cities in North America, Toronto Hydro receives high volumes of connections and upgrade requests for residential and commercial developments each year. To meet these challenges, the utility strives for continuous improvement in its planning and execution processes. For instance, in 2017, Toronto Hydro consolidated its connection design teams to enable the allocation and distribution of work across design team members in a more effective and efficient manner. In addition, Toronto Hydro provided electronic means for customers to complete their connections inquiries. These process improvements enabled customer inquiries to be handled efficiently and expeditiously.

The utility's performance under this measure is enabled by a number of programs including Customer Connections and Customer Operations.[5] Provided that sufficient funding is available for these and other supporting programs, the utility intends to maintain high performance on this metric over the 2025-2029 rate period, despite increasing volumes and complexity of customer connections work. Moreover, as part of the 2025-2029 Custom Scorecard outlined in Exhibit 1B, Tab 3, Schedule 1, Toronto Hydro intends to augment its performance on this metric with a custom (composite) measure that includes high voltage and Distributed Energy Resource ("DER") connections.

[5] Exhibit 2B, Section E5.1 and Exhibit 4, Tab 2, Schedule 8.

1.2 Service Quality: Scheduled Appointments Met on Time

Toronto Hydro met an average of 99.68 percent of all requested appointments on time over the 2018-2022 period, consistently exceeding the performance standard set by OEB of 90 percent. In 2021 and 2022, Toronto Hydro achieved its best performance under this measure, successfully meeting 99.92 percent of all requested appointments on time for both years.

Toronto Hydro receives a high volume of appointment requests every year. Customers request, and the utility offers, appointments for a broad variety of services including, disconnections and reconnections for maintenance or service upgrades, connections, underground infrastructure locates, inspections, and other site visits. An increase in the volume of construction, and in particular of larger residential and commercial development projects in the city, has led to an increase in the complexity of requests received by Toronto Hydro during the 2020-2022 period. Specifically, there has been an increase in the number of connections requiring main distribution system expansions, as well as an increase in complex multi-unit segment locates. To mitigate the cost impacts from these conditions, Toronto Hydro continues to work on streamlining its processes. For example, Toronto Hydro is working with the Locate Alliance Consortium to streamline and share costs for the delivery of locates with other infrastructure owners.

The utility's performance under this measure is enabled by a number of programs including Customer Connections and Customer Operations.[6] Provided that sufficient funding is available for these and other supporting programs, the utility intends to maintain high performance on this metric over the 2025-2029 rate period.

[6] *Supra* note 5.

1.3 Service Quality: Telephone Calls Answered on Time

Toronto Hydro answered an average of 76.15% percent of telephone calls on time over the 2018-2022 period, exceeding the OEB performance standard of 65 percent. In 2017, Toronto Hydro extended its Call Centre weekday business hours from 8:00 a.m. to 4:30 p.m. to 8:00 a.m. to 8:00 p.m. The extended Call Centre hours resulted in more manageable call volumes, contributing to improving results.

The utility's performance under this measure is enabled primarily by the Customer Care program.[7] While some year-over-year volatility is to be expected, if sufficient funding is available for Customer Care program, the utility intends to maintain high performance on this metric over the 2025-2029 rate period.

1.4 Customer Satisfaction: First Contact Resolution

First Contact Resolution tracks the successful resolution of a customer's concern or needs the first time they contact the utility. This measure reflects the proportion of telephone enquiries related to a residential or commercial account where the issue was resolved in the first call. Toronto Hydro's performance on this measure averaged 87 percent over the 2013-2022 period.

Toronto Hydro's First Call Resolution performance improved from 77 percent in 2013 to 92 percent in 2022, the best result to-date. This trend demonstrates that Toronto Hydro's customer response model is becoming more efficient at understanding and responding to customer inquiries faster and improving the overall customer service experience. The results are attributed to continuous improvement efforts to create positive customer experiences, including targeted process improvements, resource upskilling and leveraging technology

[7] Exhibit 4, Tab 2, Schedule 14.

(such as the Customer Self-Serve portal and mobile application) to offer customers better tools to engage with the utility.

The utility's performance under this measure is enabled by the Customer Care program,[8] and other supporting areas of Toronto Hydro's operations such as the Asset and Program Management and the Public, Legal and Regulatory Affairs which oversee asset standards and policies, regulatory requirements and customer communications. While some volatility can occur as the nature of customer inquiries evolves, if sufficient funding is available for Toronto Hydro's operations, the utility intends to maintain high performance on the First Contact Resolution metric over the 2025-2029 rate period. Moreover, as part of the 2025-2029 Custom Scorecard, the utility intends to complement this metric with a custom measure that tracks the timely resolution of customer inquiries that are escalated beyond first contact.

1.5 Customer Satisfaction: Billing Accuracy

Billing inaccuracies may be caused by a variety of factors including incomplete or inaccurate meter data, incorrect account or move-in/move-out information, or misapplication of rates. Toronto Hydro issued an accurate bill 99.15 percent of the time on average over the 2018-2022 period, exceeding the OEB's performance target of 98 percent. Over the past decade, Toronto Hydro invested in process improvements and hardware enhancements that enabled it to achieve billing accuracy performance consistently above to the OEB standard since 2016. Process improvements included streamlining the meter to cash process, implementing preventative measures to monitor and reduce billing errors and exceptions, improving training and standard operating procedure documents, and proactively integrating relevant controls in new projects. Replacements of defective meters, increased

[8] *Supra* note 7.

engagement with vendors, enhancements to field service and metering data exception management processes, and investments in metering and meter data collection technologies also contributed to reductions in billing inaccuracies.

Toronto Hydro's performance on this measure is enabled by a number of programs including the Customer Care program,[9] and the Metering program.[10] Regarding the latter, Toronto Hydro intends to upgrade its residential and small commercial meters, under the Advanced Metering Initiative ("AMI") 2.0 deployment. The new meters will allow for improved network range resulting in fewer errors and less manual meter reads enabling the utility to maintain a high degree of billing accuracy even as customer consumption patterns shift and evolve. Provided that sufficient funding is available for these programs, the utility is committed to maintaining high performance on the Billing Accuracy metric over the 2025-2029 rate period.

1.6 Customer Satisfaction: Customer Satisfaction Survey Results

Toronto Hydro first reported this measure in 2014 and surveyed customer satisfaction in the following key areas: (a) power quality and reliability, (b) price, (c) billing and payment, (d) communications, and (e) the customer service experience. In the 2022/2023 survey, Toronto Hydro achieved an overall score of 94 percent. As part of the 2025-2029 Custom Scorecard, the utility intends to complement this EDS metric with a custom measure aimed at measuring customer satisfaction using post-transactional surveys at various points of interaction (e.g. phone and email inquiries, key accounts engagements, customer communication related to outages and construction projects).

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[9] *Ibid.*
[10] Exhibit 2B, Section E5.4.

1.7 Safety: Level of Public Awareness of Electrical Safety

Toronto Hydro values safety and proactively ensures awareness and importance of safety in the vicinity of its distribution equipment. These activities include proactive contact voltage scans on street-level assets, taking prompt corrective action where potential safety issues are identified, and fostering a robust corporate safety culture including comprehensive internal safety course work.

Distributors are required to report the results of a standard safety awareness survey of the general public residing within their service territory, who may or may not be direct customers, at least once every two years. The survey is designed by the Electrical Safety Authority ("ESA") and tests the respondents' electrical safety awareness across several topics, including power line clearance distances, emergency procedures related to vehicular collisions with utility equipment and safety precautions related to excavation work. The average Public Safety Awareness Index over the 2018-2022 period was 69 percent. The results remain stable, and within the 4 percent margin of error, given the sample size of 600 customers.

For the 2025 rate period, Toronto Hydro intends to continue to monitor the level of public safety awareness relating to the distribution system. The utility's performance on this measure is enabled by effective customer communications part of the Communications and Public Affairs segment of the Public, Legal and Regulatory Affairs program.[11]

1.8 Safety: Compliance with Ontario Regulation 22/04

[11] Exhibit 4, Tab 2, Schedule 18.

Ontario Regulation 22/04 – Electrical Distribution Safety ("the Regulation") establishes the requirements for electrical distribution safety related to the design, construction, and maintenance of electrical distribution assets owned by the utility.[12] This includes making sure appropriate procedures are in place to prevent general public accidents or incidents, keeping the system in safe working condition, etc. The ESA deemed Toronto Hydro to be compliant with the requirements of the Regulation over the 2018-2022 period. These results were achieved through successful due diligence inspections, resolution of public safety concerns, compliance investigations, and annual compliance audits conducted by the ESA and a declaration of compliance. Toronto Hydro intends to remain in compliance with the Regulation through the 2025-2029 rate period.

1.9 Safety: Serious Electrical Incident Index

The overall number of serious public electrical incidents increased over 2018-2022 due to changes in the ESA's guideline for reporting serious electrical incidents, which broadened the scope of qualifying events under this measure as of 2020. For 2018-2019, Toronto Hydro reported an average of 7 incidents, with an average ratio of 0.227 incidents per 1,000 km of line. Due to more incidents qualifying thereafter, this number increased to an average of 25 incidents and average ratio of 0.862 incidents per 1,000 km of line for the years 2020, 2021 and 2022.

For the 2025-2029 rate period, Toronto Hydro continues to invest in a number of capital and maintenance programs that aim to prevent incidents relating to equipment failures, for instance through the Overhead and Underground System Renewal Program, Tree Trimming Program, Insulator Washing Program, Overhead Infrared Scan Program/Overhead Line

[12] Ontario Regulation 22/04 – Electrical Distribution Safety, under the *Electricity Act, 1998, S.O. 1998, c. 15, Sched. A.*

Patrol and Cable Chamber Inspection and Infrared Scan. The mitigation of public safety risk is enabled by a number of programs included in Exhibit 2B, Section E6 and Exhibit 4, Tab 2.

1.10 System Reliability: SAIDI / SAIFI

Over the last decade, Toronto Hydro's investments to renew the system delivered demonstrable reliability improvements by reducing the average duration of power outages due to defective equipment by 30 percent over the 2013-2022 period, and the frequency of outages due to defective equipment by 13 percent. Over the same period, the average duration of outages – SAIDI excluding Loss of Supply ("LoS") and Major Event Days ("MEDs") – reduced by 26 percent, while the frequency – SAIFI excluding LoS and MEDs – remained steady.

The utility's SAIDI performance improved over the last five years (2018-2022), averaging 0.85 and exceeding the OEB's distributor target of 0.87. The utility's SAIFI performance is slightly worse than the OEB's distributor target of 1.20, averaging at 1.30 during the 2018-2022 period. Please see Exhibit 2B, Section C for a comprehensive discussion on the underlying causes of system interruptions captured by SAIDI and SAIFI.

The utility's performance under the measure is enabled through a number of planned sustainment and modernization work programs in the Distribution System Plan filed at Exhibit 2B, as well as numerous operational programs detailed in Exhibit 4, Tab 2 including Corrective and Preventative and Predictive maintenance programs, Asset and Program Management, Control Center, and Emergency Response.[13] As part of the 2025-2029 Custom Scorecard, Toronto Hydro intends to augment its reliability performance commitments with

[13] Exhibit 4, Tab 2, Schedules 1-5 and 7.

two custom measures: SAIDI excluding LoS, MEDs and scheduled outages, and SAIFI Defective Equipment.

1.11 Asset Management: Distribution System Plan ("DSP") Implementation Progress

The DSP Implementation Progress measure reflects the effectiveness of the utility in implementing its DSP. This measure tracks the ratio of the actual cumulative capital expenditures to the aggregate approved five-year capital expenditure amount.

Toronto Hydro undertakes hundreds of individual capital projects each year, and the selection and timing of those projects varies with dynamic customer and system needs, as well as weather, field conditions, permitting, site access, third party co-ordination, and other factors. A regular part of Toronto Hydro's operations is rebalancing the mix and timing of capital projects to adjust for these factors. As of 2022, the DSP implementation progress was 59 percent and is forecast to be 103 percent by the end of 2024. See Exhibit 2B, Section E4 for more detailed information about the implementation of the utility's 2020-2024 DSP.

1.12 Efficiency Assessment

Efficiency is determined using an econometric benchmarking model that compares actual total costs to average total costs predicted by an econometric model based on Ontario utilities. Utilities' total costs are evaluated to produce an efficiency ranking based on the magnitude of the difference between each utility's actual and predicted costs. For the period 2013-2022, Toronto Hydro's efficiency ranking remained at a "5" as a result of ongoing capital investment needs to sustain a safe and reliable grid, connect and serve customer demand in a growing city, and standardize and modernize legacy equipment.

While Toronto Hydro endorses the importance of an empirical assessment of distributor cost efficiency, it submits that the methodology underlying the reported results for this measure does not adequately assess the efficiency performance of an urban utility with Toronto Hydro's operating characteristics (e.g. density, system configurations and customer make-up). In previous rate applications, econometric experts agreed that an expanded data set including U.S. utilities along with urban variable is more appropriate to benchmark Toronto Hydro's cost performance.[14] To that end, in this application the utility commissioned and filed a custom econometric total cost benchmarking study which can be found at Exhibit 1B, Tab 3, Schedule 3, Appendix A. The study found that Toronto Hydro's total costs from 2020 through 2022 were 28 percent below the predicted benchmark which would place the utility at an efficiency ranking of 1.

1.13 Total Cost per Customer and Total Cost per km of Line

From 2018 to 2022, Toronto Hydro's total cost per customer increased by $189 and total cost per kilometer increased by $5,367 as a result of Toronto Hydro's ongoing investment in prudent and necessary capital and operational work programs to (i) inspect, maintain and renew aging and deteriorating assets that pose safety, environmental and reliability performance risks, (ii) maintain and improve service quality performance on a number of metrics as detailed through this schedule, (iii) serve customer demand in Canada's largest and fastest growing city, (iv) comply with a multitude of existing and evolving legal and regulatory obligations; and (v) address incremental requirements driven by evolving customer preferences and technology advancements. Over the 2018-2022 period, this increase represents a cumulative average growth rate of 4 percent in total cost per customer and 4.3 percent in total cost per kilometer of line, compared to an average inflation rate of 2.68 percent over the period using OEB parameters.

[14] EB-2018-0165, Exhibit 1B, Tab 4, Schedule 2; Exhibit M1; OH Volume 10 (July 15, 2019) at page 116, lines 7-12.

However, as noted in Exhibit 4, Tab 1, Schedule 1, a key observation to highlight when evaluating the utility's cost performance on per customer metrics is that serving Canada's densest and fastest (vertically) growing city, Toronto Hydro serves far more end-use customers through bulk-metering and competitive sub-metering arrangements than its actual customer count would otherwise indicate. Based on self-declarations submitted by multi-unit residential buildings for the purposes of Regulated Price Plan elections and the Ontario Energy Rebate ("OER") program, Toronto Hydro estimates that it serves approximately 340,000 end-consumers or more behind bulk meters. As the sub-metering market has become more mature in Toronto over the last decade, a greater share of new multi-unit buildings is opting for bulk-metering service connections. The practical effect of operating in this urban environment with a deregulated sub-metering market is a slower rate of formally reported customer growth from 2013 to 2022, which is putting artificial upward pressure on cost performance metrics like Total Cost Per Customer and Total Cost per km of Line.

1.14 Generation Connections: Renewables and Micro-Embedded Facilities

As of the end of 2022, Toronto Hydro connected nearly 2,400 distributed generation projects of various sizes totalling approximately 305 MW in capacity. The utility averaged 96.71 percent for New Micro-embedded Generation Facilities Connected on Time over the 2018-2022 period, consistently exceeding the OEB's industry target of 90 percent. Toronto Hydro also completed 100 percent of Renewable Generation Connection Impact Assessments ("CIA") on time over this period. Over the 2025-2029 period, Toronto Hydro intends to include these measures as part of an expanded custom measure for New Service Connected on Time.

The utility's performance on these measures is enabled by the Customer Connections,[15] Generation Protection, Monitoring, and Control,[16] Asset and Program Management,[17] and Non-Wires Solutions.[18]

1.15 Liquidity: Current Ratio (Current Assets/Current Liabilities)

The ratio of current of current assets and current liabilities reflects the company's ability to repay its current liabilities with its current assets. The average liquidity ratio for regulated operations over the 2018-2022 period was 0.76.

Toronto Hydro's "Current Assets" and "Current Liabilities" are determined in accordance with the requirements of the OEB's *Electricity Reporting and Record Keeping Requirements for Electricity Distributors* ("RRR") and the *Accounting Procedures Handbook* ("APH"), and not by reference to *International Financial Reporting Standards* ("IFRS"). As a result, the "Liquidity Ratio" expressed in the EDS may differ from similarly-termed financial ratios or information presented in documents that the utility's parent company, Toronto Hydro Corporation, is required to file under securities laws, and which are available on System for Electronic Document Analysis and Retrieval ("SEDAR").

1.16 Leverage: Total Debt-to-Equity Ratio

The debt-to-equity ratio reflects the relative proportion of shareholders' equity and debt used to finance a company's assets. The average leverage ratio for regulated operations over the 2018-2022 period was 1.17.

[15] Exhibit 2B, Section E5.1.
[16] Exhibit 2B, Section E5.5.
[17] Exhibit 4, Tab 2, Schedule 9.
[18] Exhibit 2B, Section E7.2.

Toronto Hydro's "Total Debt" and "Equity" are determined in accordance with the requirements of the OEB's RRR and APH, and not by reference to IFRS. As a result, the "Leverage Ratio" expressed in the EDS may differ from similarly-termed financial ratios or information presented in documents that Toronto Hydro is required to file under securities laws and which are available on SEDAR.

1.17 Profitability: Regulatory ROE

Toronto Hydro's average achieved regulatory Return on Equity ("ROE") over the 2018-2022 period was 7.64 percent compared to an average deemed ROE of 8.83 percent. As of the end of 2022, Toronto Hydro's average achieved regulatory ROE over the first three years of the current rate period (i.e. 2020-2022) was 6.81 percent, which is 1.71 percent lower than its deemed ROE of 8.52 percent due to funding challenges experienced in the current rate period, including the impacts of COVID-19 in 2020 and 2021 which were reported to the OEB during the pandemic. [19,20]

The regulatory ROE is calculated on the same basis as the methodology used to establish Toronto Hydro's base rates for a year, which is prescribed by the OEB. The Regulatory ROE is not determined in accordance with IFRS. As such, the EDS' "Profitability" performance measures ("Deemed" and "Achieved" Regulatory ROE) may differ from similarly-termed expressions of profitability and return on equity presented in documents that Toronto Hydro Corporation, the utility's parent company, is required to file under securities laws and which are available on SEDAR.

[19] Exhibit 1B, Tab 2, Schedule 1.

[20] Ontario Energy Board, *Temporary Monthly Reporting Requirement Related to the Impact on Distributors Arising from the COVID-19 Emergency* (May 12, 2020) online:<https://www.oeb.ca/sites/default/files/letter-LDC-Liquidity-Reporting-Requirement-20200512-rev.pdf>. For more information about COVID-19 impacts please refer to Exhibit 1B, Tab 3, Schedule 3.

2. ELECTRICITY SERVICE QUALITY REQUIREMENTS PERFORMANCE

Toronto Hydro monitors and reports ESQRs annually to the OEB's RRR and the EDS. In accordance with section 2.1.6 of the OEB's Chapter 2 Cost of Service Filing Requirements, this section discusses the reported ESQRs performance for the last five years (2018-2022). A completed Appendix 2-G, documenting both Service Quality and Service Reliability Indicators, is provided in Exhibit 1B, Tab 2, Schedule 2, Appendix B.

Table 2 below shows that over the last five years (2018 to 2022) the utility met or exceeded the OEB's ESQR standards on all the measures, except Appointment Scheduling for the reasons explained below.

Table 2: 2018-20222 Toronto Hydro ESQR Performance Results

ESQR	OEB Standard	2018	2019	2020	2021	2022	5-Year Avg.
Connection of New Services – Low Voltage ("LV") (EDS)	90	99.8	99.7	99.7	99.9	99.9	99.8
Connection of New Service – High Voltage ("HV")	90	100	99.3	99.7	99.3	99.2	99.5
Connection of Micro-Embedded Generation Facilities (EDS)	90	100	100	100	92.3	91.3	96.7
Appointment Scheduling	90	81.6	91.8	94.1	90.7	81.2	87.9
Scheduled Appointments Met on Time (EDS)	90	99.7	99.0	99.9	99.9	99.9	99.7
Rescheduling a Missed Appointment	100	100	100	100	100	100	100
Telephone Accessibility (EDS)	65	80.2	74.8	69.9	76.9	79.1	76.2
Telephone Call Abandon Rate	10	1.4	3.5	2.7	1.1	1.1	1.96
Written Response to Enquires	80	98.4	99.4	96.3	98.3	99.7	98.4
Billing Accuracy (EDS)	98	99.3	99.2	99.2	99.0	99.1	99.2
Emergency Response (Urban)	80	86.6	92.4	88.3	88.5	86.5	88.5
Reconnection Performance Standard	85	99.7	99.9	99.5	NA	99.5	99.7

The following subsections discuss performance trends on specific ESQRs, excluding metrics where performance is steady over the period (i.e. Rescheduling a Missed Appointment, and Reconnection Performance Standard) or metrics that already are addressed in the EDS section above.[21]

2.1 Appointments Scheduling

Toronto Hydro offers customer appointments for a broad variety of services including disconnections and reconnections for maintenance or service upgrades, connections, underground infrastructure locates, inspections, and other site visits. Of these many different types of appointments, underground infrastructure locates, are the highest volume and the biggest driver of performance on the Appointment Scheduling metric.

Over the 2018-2022 period, Toronto Hydro scheduled 87.9 percent of appointments within five business days, falling slightly below the OEB standard of 90 percent. The performance did not meet the OEB standard over this period because in recent years Toronto Hydro experienced a shift in locate work mix and volumes due to legislative changes and more complex "multi-unit segment" locates relating to projects with large geographic footprints. In light of these developments, Toronto Hydro took numerous steps to improve its locates processes and improve performance on this metric, including:

- Working with Ontario One Call ("OOC") and other utilities to take steps to streamline locate requests to improve performance, including reducing the amount of unjustified locate requests;

[21] Specifically, the metrics for Connection of New Services – Low Voltage, Connection of New Micro-Embedded Generation Facilities, Scheduled Appointments Met on Time, Telephone Accessibility, and Billing Accuracy.

- Working with government and other utilities to transition large projects into the dedicated locator model and potentially create an alternate project stream for large projects separate from standard/residential locates;
- Working with the Locate Alliance Consortium ("LAC") to coordinate locate services with other infrastructure and sharing costs accordingly, which allows a single locate service provider to perform locates on behalf of all participating utilities in a certain area, streamlining the quality, timing and efficiency of the process;
- Establishing alternate locate agreements that enable excavators that meet Toronto Hydro-specified requirements to excavate without the requirement of a utility locate; and
- Expanding the locate request screening process which involves reviews by a trained worker in office, eliminating the need for a site visit (and an appointment) where there is no underground infrastructure owned by Toronto Hydro.

These utility's efforts summarized above led to increase in Appointment Scheduling performance from 2019 to 2021. Over these years, Toronto Hydro scheduled an average of 92.2 percent of all appointments within five business days, exceeding the OEB standard. However, in 2022, performance once again decreased due to execution challenges in the provincial locate industry a result of resourcing shortages and increased demand.

In addition, in April 2022, Bill 93*, Getting Ontario Connected Act, 2022*, received royal assent and resulted in major changes to the *Ontario Underground Infrastructure Notification System Act, 2012* ("OUINSA"), which governs the provision of locates. [22] The new legislative framework is significantly more onerous on utilities and other infrastructure owners due to mandatory, penalty-backed, and increased compliance obligations, intended to impose

[22] SO 2012, Ch 4. ["*Ontario Underground Infrastructure Notification System Act, 2012*"].

stricter performance standards with respect to the timeliness and accuracy of locates. These developments have greatly increased the demand for locate services and relevant input costs, such as wages for workers with appropriate qualifications. There remains a great degree of uncertainty with respect to the volumes of locates in the 2025-2029 rate period, as the Government of Ontario signalled that it will consult on additional enhancements to locate delivery requirements under the OUINSA, which may result in future legislative and regulatory changes affecting demand for locate services.

The utility's performance for Appointments Scheduling is enabled by programs such as Customer Operations.[23] To ensure the availability of funding for locates work necessary to meet performance standards on this metric, without jeopardizing other outcomes and while protecting ratepayers from potential over-recovery of costs in base rates, Toronto Hydro requests the continuation, throughout the 2025-2029 rate period, of the recently approved generic, sector-wide Getting Ontario Connected Act ("GOCA") variance account.[24] Please refer to the Customer Operations program evidence, and the Deferral and Variance Accounts evidence at Exhibit 9, Tab 1, Schedule 1 for more information about this proposal.[25]

2.2 Telephone Call Abandon Rate

The Toronto Hydro's Contact Centre receives approximately 343,000 telephone calls per year. Despite this significant volume of calls, over the 2018-2022 period, Toronto Hydro consistently exceeded the OEB standard for this measure with an average call abandonment rate of 1.96 percent compared to an OEB standard of 10 percent. In 2019 and 2020, call abandonment rates slightly increased to 3.5 percent and 2.7 percent respectively due to a

[23] Exhibit 4, Tab 2, Schedule 8.
[24] EB-2013-0143, OEB Decision and Order (October 31, 2023).
[25] *Supra* note 23.

combination of record high call volumes and resource shortages resulting in less tenured staff for call handling. However, in recent years (2021 and 2022) the call abandonment rate dropped down to 1.1 percent. The improvement is attributed to a more consistent availability of resources for call handling throughout 2021 versus 2020, improved forecasting methodologies and scheduling techniques to better align staffing levels with call arrival patterns, and a higher abandon rate in 2020 resulting from a surge of calls related to launch of the Customer Choice for Regulated Price Plan (giving customers choice to pick between Time of Use or Tiered pricing plans) creating short duration challenges.

For the 2025-2029 rate period, Toronto Hydro intends maintain high performance on this measure, provided that the Customer Care program which incorporates the Contact Centre function is adequately funded and resourced. [26]

2.3 Written Response to Enquiries

A significant portion of customers continue to demonstrate a preference to communicate via email versus telephone and expect shorter response times due to the electronic medium. To be responsive to this evolving customer preference and expectation, over the last decade Toronto Hydro invested in improving its performance in responding to written inquiries. These efforts produced strong results. Over the 2018-2022 period, Toronto Hydro responded to written enquiries within ten business days 98.4 percent of the time, consistently exceeding the OEB standard of 80 percent.

Notably, in 2022, Toronto Hydro responded to over 90 percent of emails within one business day. The utility achieved this result by implementing a number of training and process improvements, including enhancements to internal email routing algorithms, to quickly identify and contact the most appropriate resource to assess the customer enquiry and

[26] *Supra* note 7.

respond to the email. Toronto Hydro found that responding more quickly to customers reduced the total volume of emails annually by 25 percent (approximately 23,000 emails) from 2020 to 2022, and resulted in a 15 percent increase in customer satisfaction in this area, as measured by post-transactional surveys.[27]

For the 2025-2029 rate period, Toronto Hydro intends to maintain high performance on this measure provided that key programs such as Customer Care, and Public, Legal and Regulatory Affairs within the OM&A plan can be adequately funded and resourced. [28,29]

2.4 Emergency Response

Over the 2018-2022 rate period, Toronto Hydro responded to emergency calls within 60 minutes 88.5 percent of the time, consistently exceeding the OEB standard of 80 percent for urban areas. Over the last decade, the utility invested in strengthening its Emergency Response function to be better prepared to respond to more frequent extreme weather events such as storms and high-wind days. These efforts resulted in improved performance on this measure of 16 percent.

For the 2025-2029 rate period, Toronto Hydro intends maintain performance on this measure provided that the Emergency Response program within the OM&A plan can be adequately funded.[30]

3. 2020-2024 CUSTOM PERFORMANCE MEASURES

[27] Exhibit 1B, Tab 3, Schedule 1.
[28] *Supra* note 7.
[29] *Supra* note 11.
[30] Exhibit 4, Tab 2, Schedule 5.

This section presented the results of Toronto Hydro's performance on the 2020-2024 custom scorecard approved by the OEB in the utility's last rebasing application (EB-2018-0165).[31]

Table 3: 2020-2022 Custom Measure Performance

Toronto Hydro Outcome	OEB Reporting Category	Toronto Hydro's Custom Measures	2020 Results	2021 Results	2022 Results
Customer Service	Customer Satisfaction	Customers on eBills	317,341	350,993	381,490
Safety	Safety	Total Recordable Injury Frequency	0.58	0.56	0.47
		Network Units Modernization	61%	63%	65%
Reliability	System Reliability	SAIDI - Defective Equipment	0.36	0.36	0.34
		SAIFI - Defective Equipment	0.40	0.46	0.46
		FESI-7 System (# of feeders)	9	10	27
		FESI-6 Large Customers (# of feeders)	10	5	12
		MAIFI	3.18	3.39	3.36
	Asset Management	System Capacity (# of Stations)	11	11	12
		System Health (Asset Condition) – Wood Poles[32]	11%	14%	9%
		Direct Buried Cable Replacement	729 km	697 km	679 km[33]
		In-Service Additions (Cumulative)	17%	35%	56%
Financial	Cost Control	Average Wood Pole Replacement Cost	$7,779	$7,847	$7,973
		Vegetation Management Cost per Km	$2,158	$2,213	$2,175
Environment	Environment	Oil Spills Containing PCBs (# of spills)	0	0	1
		Waste Diversion Rate	90.3%	91.5%	92.4%

3.1 Customers on Electronic Bills ("eBills")

[31] EB-2018-0165, OEB Decision and Order (December 19, 2019) at pages 44-45. Note that in place of some of these measures, Toronto Hydro has proposed 15 Custom Performance Measures for the 2025-2029 plan period in the current Application. Please see Exhibit 1B, Tab 3, Schedule 1 for more details.

[32] As explained in Section 2.10 of this Schedule and Exhibit 2B, Section D3, Appendix A, Toronto Hydro refined its asset condition assessment methodology for wood poles. With this approach, the System Health (Asset Condition) for Wood Poles decreases to 6% in 2020 and decreases to 8% in 2021.

[33] In preparing this evidence, Toronto Hydro identified a data error in the number of km of direct buried cable remaining on the system reported for 2022 actuals. As of the end of 2022, Toronto Hydro has 666 kilometers of cable remaining rather than 679 kilometers. Please refer to Section 2.11 of this Schedule.

The Number of Customers on eBills measure tracks the number of customers who opt-in to receive an eBill, as opposed to a paper bill. From 2020-2022, Toronto Hydro achieved a 20 percent increase in eBill adoption over the 2020-2022 period converting over 64,000 customers to eBills. Since 2013, Toronto Hydro converted approximately 381,000 customers to eBills yielding cumulative savings of $4.4 million from avoided paper, printing, and postage costs. This accomplishment exceeded Toronto Hydro's target of reaching 347,000 customers on eBills by 2024. The utility achieved this result through targeted customer communication campaigns and continuous efforts to drive higher adoption of eBilling. Please refer to Exhibit 4, Tab 2, Schedule 14 for more details.

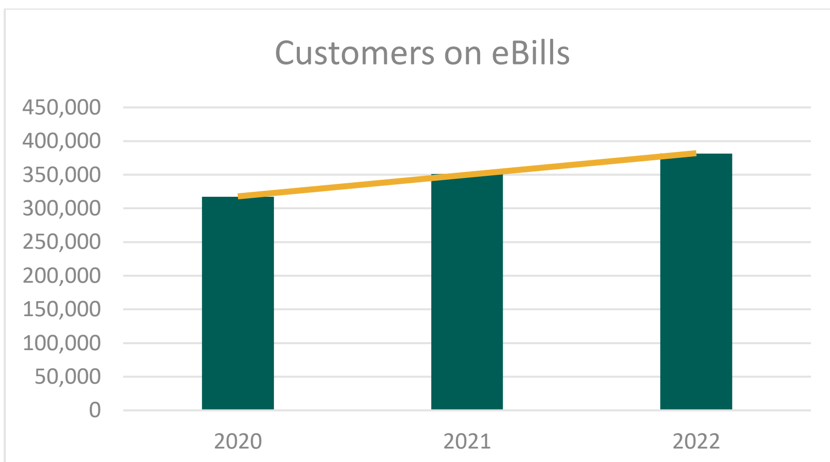

Figure 1: Customer on eBills Performance from 2020-2022

3.2 Total Recordable Injury Frequency ("TRIF")

The TRIF measures tracks the number of recordable injuries per 200,000 exposure hours, where a recordable injury is defined as any occupational injury or illness that results in an employee experiencing a fatality, lost-time injury, medical treatment beyond first aid, restricted work, or any other type of injury or illness associated with a significant injury, illness or loss of consciousness. TRIF performance reflects the utility's commitment to health and safety.

From 2020-2022, Toronto Hydro reduced TRIF from 0.58 in 2020 to 0.47 in 2022, an improvement of approximately 19 percent. Toronto Hydro intends to continue reporting TRIF as a custom measure over the 2025-2029 period. Please refer to Section 1.4.1 of Exhibit 1B, Tab 3, Schedule 2 for more details.

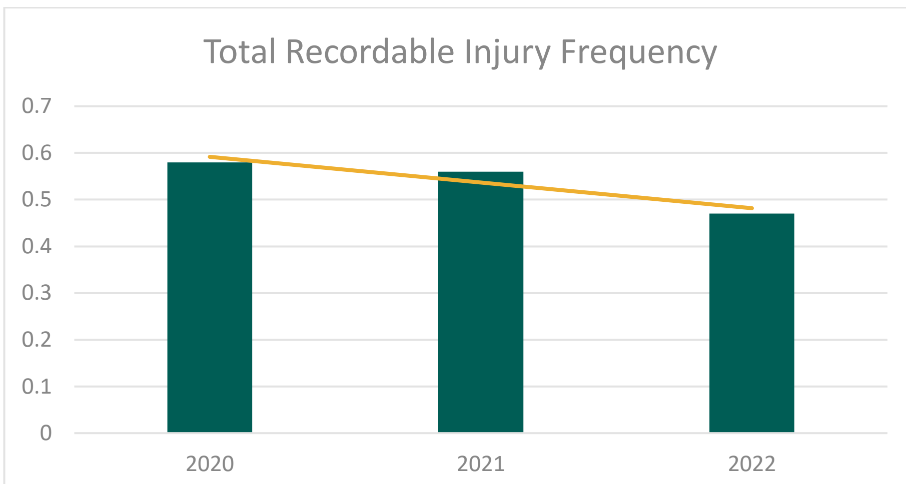

Figure 2: Total Recordable Injury Frequency from 2020-2022

3.3 Network Units Modernization

The Network Units Modernization measure tracks Toronto Hydro's progress in installing network units with resilient submersible protectors. In Toronto's downtown secondary distribution network, there are approximately 1,900 network units that deliver safe and uninterrupted service to customers. Some existing units are not watertight, making them vulnerable to corrosion and rust after prolonged exposure to flooding. To mitigate the safety and reliability risk of this equipment, the utility is actively installing new submersible units –

a more resilient asset that can withstand potential flooding and maintain reliable service to customers.

From 2020-2022, Toronto Hydro increased the percentage of submersible network units from 61 percent in 2020 to 65 percent in 2022 through investments in the Network Unit Renewal program and reactive network unit changeouts. By the end of 2024, the percentage of submersible network units is expected to be 70 percent. This is slightly lower than planned due to emerging needs within the program and cost pressures. For more details, please refer to Exhibit 2B, Section E6.4.

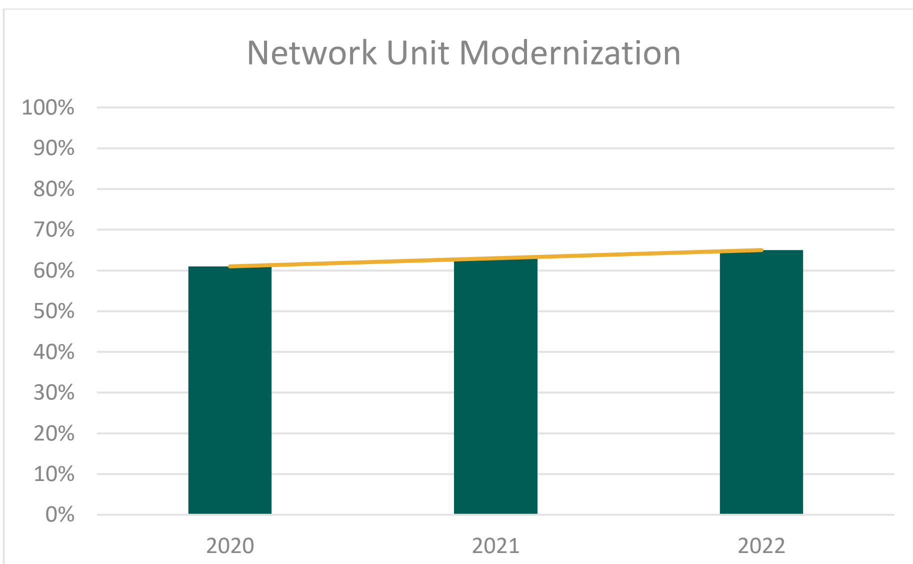

Figure 3: Network Unit Modernization Performance from 2020-2022

3.4 Momentary Average Interruption Frequency Index ("MAIFI")

In the last rebasing application (EB-2018-0165), the OEB required Toronto Hydro to include MAIFI on its custom scorecard to measure the average frequency of momentary interruptions (i.e. less than one minute). The five-year average MAIFI result for 2018 to 2022 is 3.11 compared to the corresponding value of 2.56 reported in the utility's last application (for the period 2013 to 2017). Although it appears from these results that the performance on MAIFI is getting worse, Toronto Hydro notes that its ability to measure MAIFI is affected by SCADA coverage, and that improving SCADA coverage over time (e.g. by converting customers served by 4.16 kV stations without SCADA to 13.8 kV or 27.6 kV ones with SCADA through programs such as Area Conversions) naturally results in capturing a higher proportion of the momentary interruptions that are occurring. Therefore, performance on this metric must be interpreted with a degree of practical caution as it is not necessarily reflective of actual trends with respect to the frequency of momentary interruptions on the system.

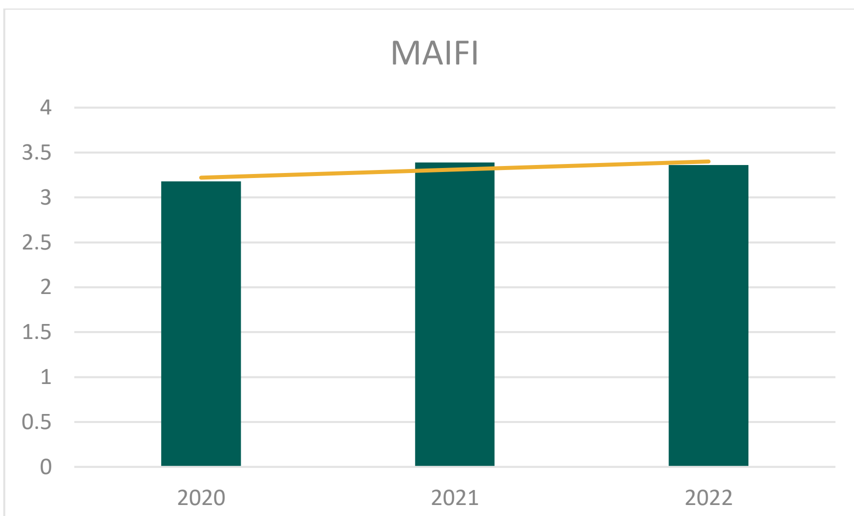

Figure 4: MAIFI Performance from 2020-2022

3.5 System Average Interruption Frequency Index ("SAIFI") – Defective Equipment

SAIFI – Defective Equipment reports the number of sustained customer interruptions caused by equipment failures due to material deterioration from age, utilization or environmental conditions. This particular cause of outages is affected by the health of the distribution system, and the impact of Toronto Hydro's capital and maintenance investments in maintaining health demographics such as age and condition. From 2020-2022, Toronto Hydro performed within a tight range of 0.40 and 0.46, consistent with its expectations and historical performance.

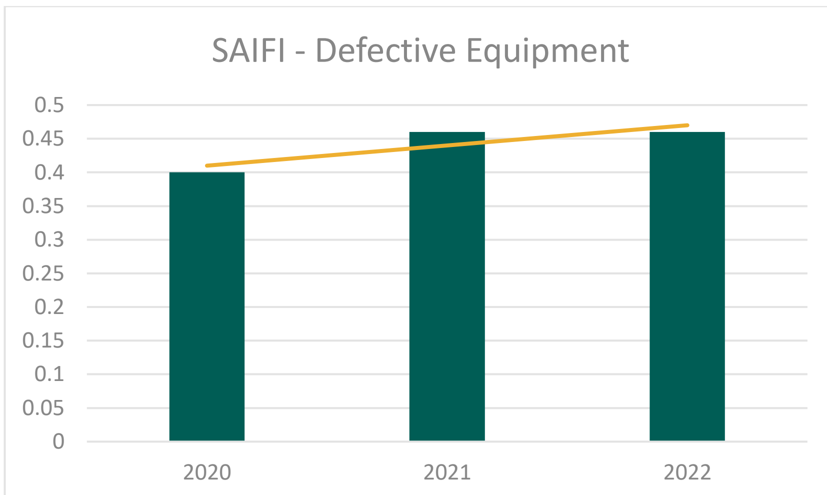

Figure 5: SAIFI – Defective Equipment Performance from 2020-2022

As part of the 2025-2029 custom scorecard, the utility intends to continue reporting on this metric to track customer outages directly attributed to equipment failures. For more details, please refer to Exhibit 1B, Tab 3, Schedule 1.

3.6 System Average Interruption Duration Index ("SAIDI") – Defective Equipment

SAIDI – Defective Equipment reports the average duration of customer interruptions caused by equipment failures due material deterioration from age, utilization or environmental conditions. Toronto Hydro's efforts to renew and modernize the grid affect performance on this metric. From 2020-2022, Toronto Hydro performed within a tight range of 0.32 and 0.36, consistent with its expectations.

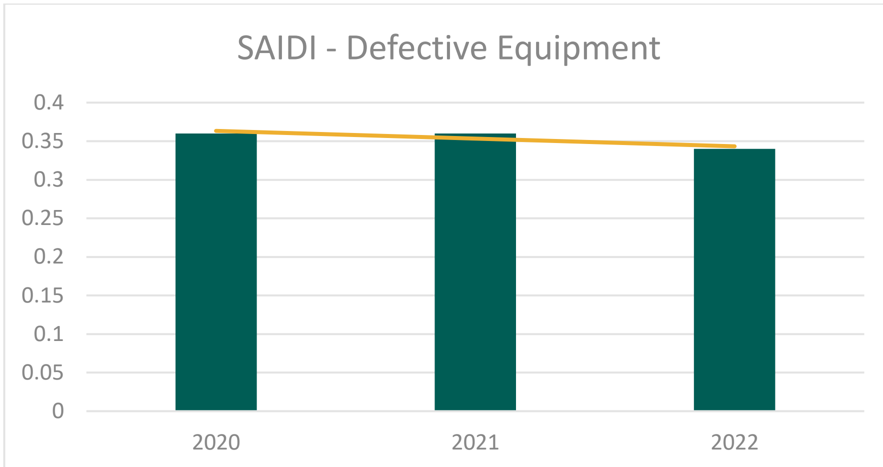

Figure 6: SAIDI – Defective Equipment Performance from 2020-2022

3.7 Feeders Experiencing Seven or More Sustained Interruptions ("FESI-7")

FESI-7 measures the number of feeders on Toronto Hydro's system that experienced seven or more interruptions exceeding one minute within a 12-month period. This measure provides insight into the number of customers experiencing poor reliability service. In the period from 2020-2022, feeders exceeding the threshold have increased from 9 to 27.

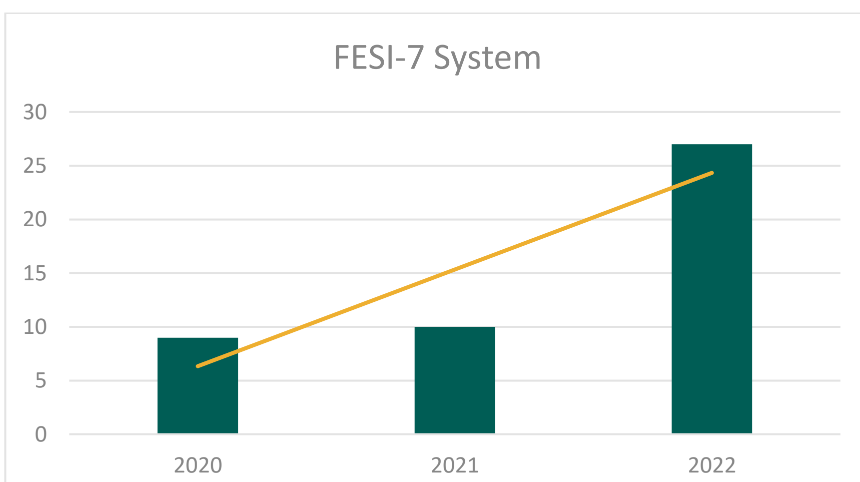

Figure 7: FESI-7 (System) Performance from 2020-2022

This increase is primarily due to implementation of a new commercial software solution, Oracle Utility Analytics ("OUA"), which allows outage data to be captured more accurately. In particular, Toronto Hydro is now benefiting from improved record keeping for very small outages (e.g. outages on the low-voltage secondary side of a transformer, serving only a handful of customers). While the inclusion of these outages had a significant negative impact on the FESI-7 measure (which counts all outages as equal regardless of size), this impact is purely the result of better data quality and does not represent a real-world decline in the customer experience. Furthermore, as many of the incremental outages being recorded are very small (and therefore highly localized), it is less likely that these outages are contributing to an experience of multiple outages per year for a significant number of customers.

This effect is illustrated by Figure 8 below. Over the 2017-2022 period, FESI-7 performance resulted in an average of approximately 14 outages per year, however, when normalized for localized events, FESI-7 performance is an average of about 5 outages per year.

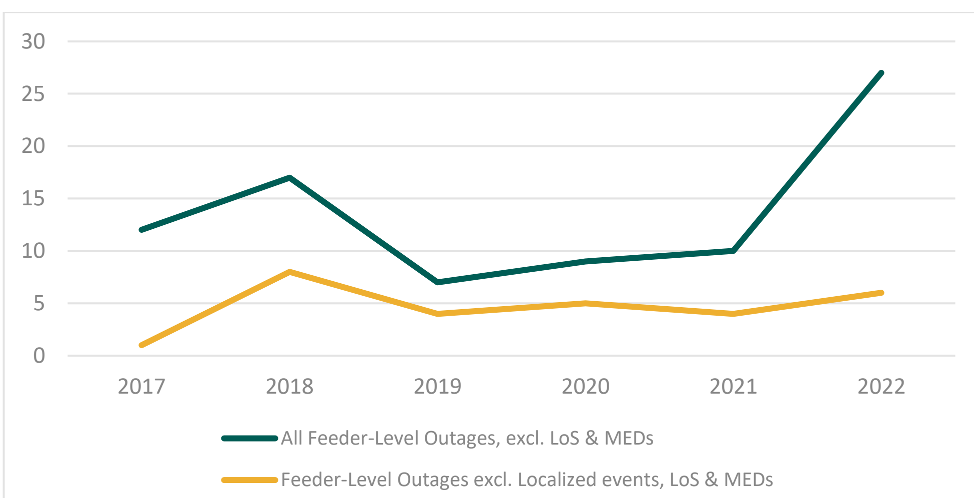

Figure 7: FESI-8 Performance Comparison from 2017-2022

Toronto Hydro continues to perform targeted capital investments and maintenance work, including Worst Performing Feeders investments to reduce the number of FESI-7 feeders.[34]

3.8 Feeders Experiencing Six or More Sustained Interruptions ("FESI-6")

FESI-6 Large Customers tracks the number of feeders serving customers with average monthly peak demand greater than one MW, that experienced six or more interruptions exceeding one minute, excluding Major Event Days and Loss of Supply. Measuring feeders experiencing outages at this threshold enables Toronto Hydro to account for customers with lower tolerance for interruptions and heightened reliability needs such as hospitals, water treatment plants, and commercial manufacturers. In the 2020-2022 period, feeders exceeding the threshold have increased from 10 to 12. This increase is primarily due to implementation of a new commercial software solution, Oracle Utility Analytics ("OUA"), which allows outage data to be captured more accurately (refer to the FESI-7 discussion above for more details).

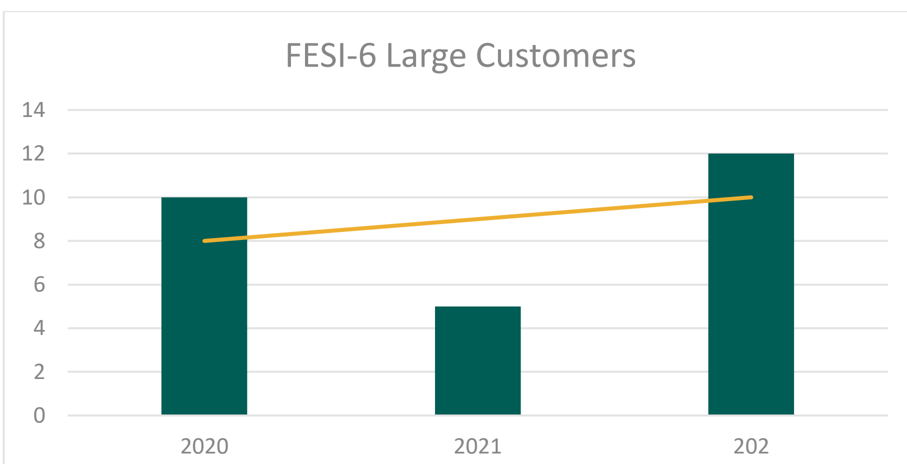

Figure 9: FESI-6 (Large Customers) Performance from 2020-2022

[34] Exhibit 2B, Section E6.7.

3.9 System Capacity

The System Capacity measure tracks potential capacity constraints at the station level by measuring the ability of each station to connect at least one large customer. Focused on transformer stations that supply power to the City of Toronto, this measure considers a variety of factors that contribute to capacity concerns, including bus, transformer and feeder capacity and positions. If any of these factors render the utility unable to connect a large customer to a station, Toronto Hydro will report that particular station as part of this measure. For the period 2020-2022, Toronto Hydro maintained its performance under this measure at 11 to 12 stations.

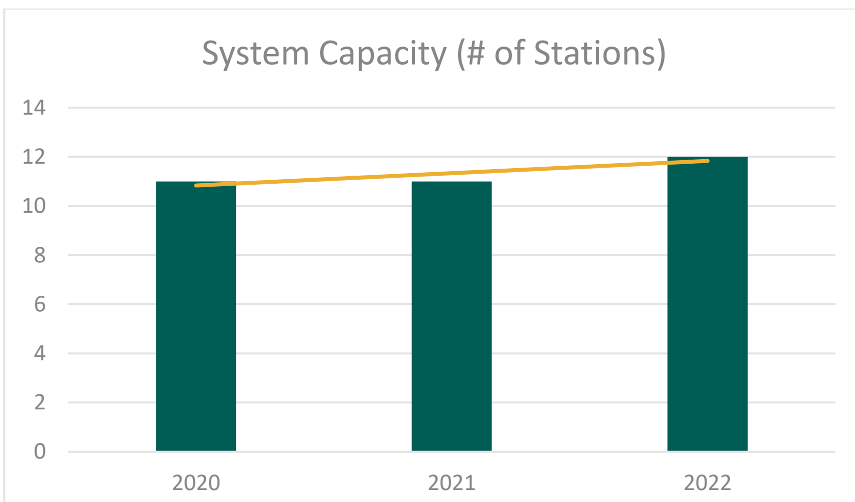

Figure 10: System Capacity Performance from 2020-2022

3.10 System Health (Asset Condition) – Wood Poles

The System Health – Asset Condition (Wood Poles) measure reflects the health of wood poles by tracking the percentage of poles in Health Index ("HI") 4 condition (i.e. "material deterioration"), and in HI5 condition (i.e. "end of serviceable life"). Wood poles are critical assets and serve as an indication of overall distribution system health. This equipment represents a sizeable portion of the utility's assets and is instrumental in ensuring reliability and safety.

In 2022, the utility refined the asset condition assessment model for wood poles based on its field experience to better reflect specific conditions. With this update, the System Health (Asset Condition) for Wood Poles decreased to 6 percent in 2020 from 11 percent and decreased to 8 percent from 14 percent in 2021. The percentage of asset in HI4/HI5 in 2022 is 9 percent which is a slight deterioration relative to 2020. This decrease is attributed to natural changes in conditions of assets based on the latest inspection information as well as changes in asset population due to system investments to manage deteriorating assets. As explained in Exhibit 2B, Section E4, to balance the execution of the 2020-2024 capital plan with a constrained level of funding relative to the needs and cost of the plan, the utility reprioritized investments and reduced program pacing for the Overhead System Renewal program.[35]

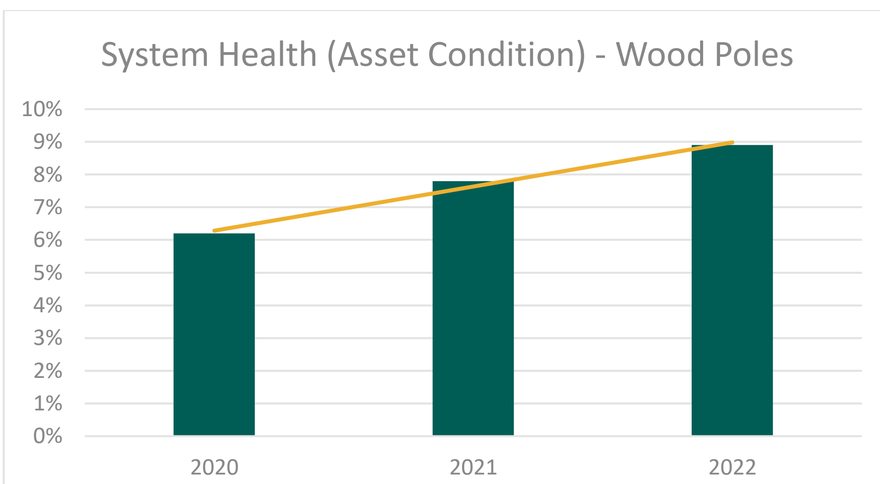

Figure 10: System Health (Asset Condition) – Wood Poles Performance 2020-2022

[35] Exhibit 2B, Section E6.5.

3.11 Direct Buried Cable Replacement

The Direct Buried Cable Replacement measure tracks the number of kilometres of direct buried cable remaining in the distribution system. Customers supplied by feeders containing direct buried cable are more likely to experience lengthy interruptions resulting from increased difficulty in locating and replacing faulty segments. This measure reflects Toronto Hydro's efforts to remove legacy assets from the grid that pose a reliability service risk to customers.

In preparing this evidence, Toronto Hydro identified a data error in the number of kilometers of direct buried cable remaining on the system reported for 2022 actuals. As of the end of 2022, Toronto Hydro has 666 kilometers of cable remaining on the system rather than 679 kilometers. Therefore, for the 2020-2022 period, Toronto Hydro replaced a total of 63 km of direct buried cable, with 666 km of cable still remaining in the system at the end of 2022.

As explained in Exhibit 2B, Section E4, to balance the execution of the 2020-2024 capital plan with a constrained level of funding relative to the needs and cost of the plan, the utility reprioritized investments and reduced the pace of direct buried cables replacement in the Underground System Renewal – Horseshoe.[36]

[36] Exhibit 2B, Section E6.2.

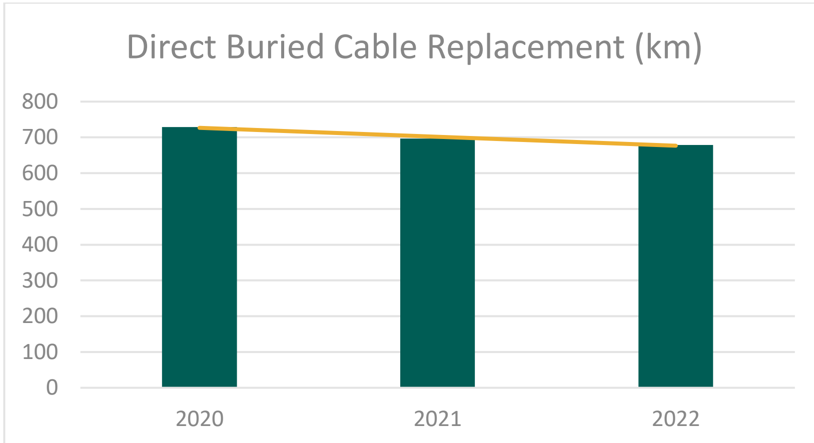

Figure 12: Direct Buried Cable Replacement Performance from 2020-2022

3.12 In-Service Additions (Cumulative)

The In-Service Additions (Cumulative) metric measures the actual cumulative annual in-service additions relative to the total five-year amount approved by the OEB in Toronto Hydro's last major rate application (EB-2018-0165). As of 2022, 56 percent of the total approved amounts were put into service. By the end of 2024, Toronto Hydro expects in-service additions ("ISAs") to be just over 100 percent as outlined in Exhibit 2A, Tab 1, Schedule 1.

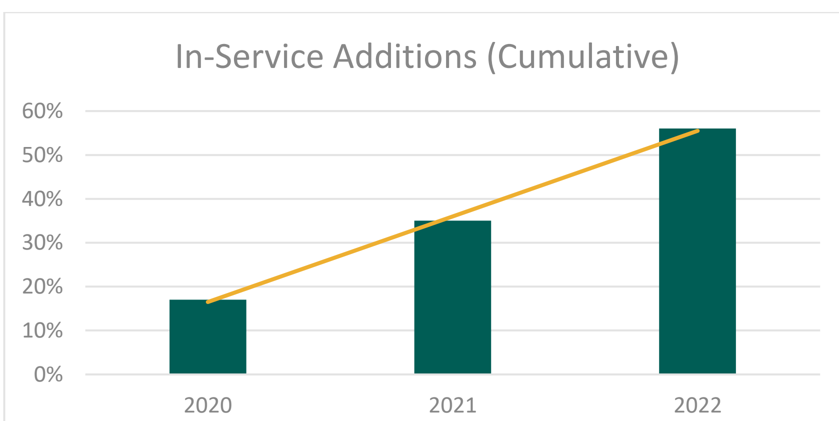

Figure 13: Cumulative In-Service Additions Performance from 2020-2022

3.13 Average Wood Pole Replacement Cost

The Average Wood Pole Replacement Cost measure tracks the unit cost of wooden poles installed in the distribution system using a 3-year weighted average. In 2021, Toronto Hydro refined its unit cost methodology and applied the new methodology retrospectively to ensure year-over-year comparability in the results (i.e. as shown in Figure 14 below). With this approach, the Wood Pole unit cost was $8,101 in 2020, $8,716 in 2021 and $8,317 in 2022. Year-over-year variances are attributed to the mix of programs through which poles are replaced including Area Conversions for both box and rear lot pole configurations, as well as the Overhead System Renewal program.[37,38]

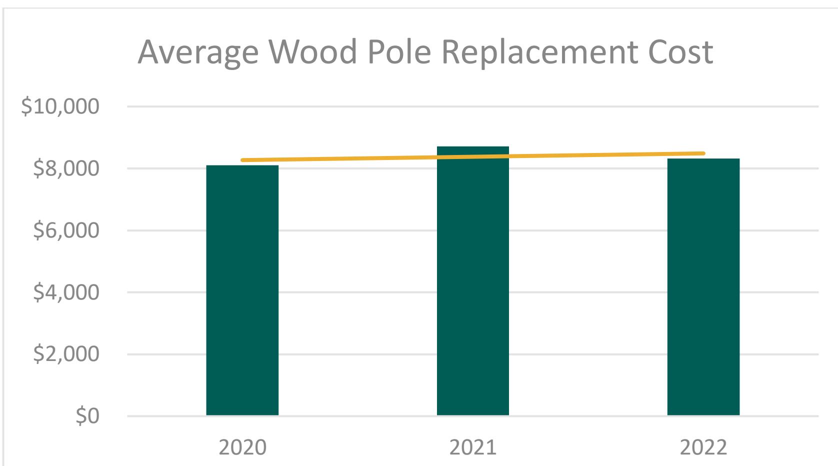

Figure 14: Three-Year Weighted Average Wood Pole Replacement Cost Performance

3.14 Vegetation Management Cost per km

The Vegetation Management Cost per km measure tracks the costs of trimming and clearing of vegetation located near overhead feeders to minimize the risk of power interruptions using a 3-year weighted average. In 2022, the vegetation management cost per km was

[37] Exhibit 2B, Section E6.1.
[38] Exhibit 2B, Section E6.4.

$2,175, which is in line with costs per km in 2020. Toronto Hydro's vegetation management activities are described in Exhibit 4, Tab 2, Schedule 1.

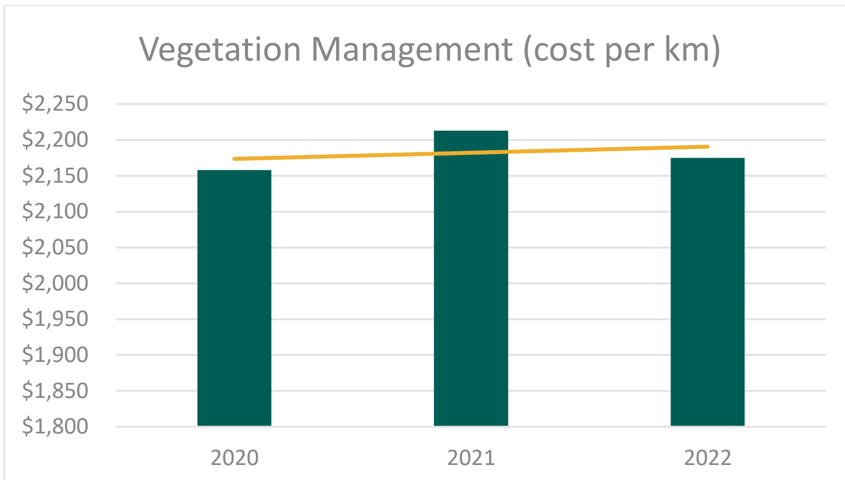

Figure 15: 3-year Weighted Average Vegetation Management Cost Performance

3.15 Oil Spills Containing Polychlorinated Biphenyls ("PCBs")

The Oil Spills Containing Polychlorinated Biphenyls measure tracks the number of oil spills containing PCBs that must be externally reported. Toronto Hydro has various types of transformers (e.g. submersible, pad mounted, vault, pole mounted, network), all of which can potentially contain PCB-contaminated oil. Toronto Hydro reported 1 oil spill containing PCBs in 2022. Toronto Hydro notably reduced the number of PCB spill incidents, from as high as 17 incidents in 2018 to 0 in 2020 and 2021 and 1 incident in 2022.

The decrease in the overall number of PCB spills is attributed to the proactive replacement of transformers at risk of containing PCBs, which was enabled by an improved inspection process put in place in 2018 to identify transformers with the potential to leak (e.g. heavily corroded). These activities mitigate the risk of spills containing PCBs and align with meeting the December 31, 2025 legislative deadline to remove PCBs with a concentration greater than 50 ppm.

3.16 Waste Diversion Rate

The Waste Diversion Rate measures progress on Toronto Hydro's performance on office and work site waste diverted from landfills. Waste diversion promotes recycling and reusing materials and presents a number of environmental benefits including reducing waste and lowering greenhouse gas emissions. For the period 2020-2022, Toronto Hydro consistently reduced the amount of waste sent to the landfill and increased the amount of waste recycled, achieving its highest waste diversion rate so far of more than 92 percent in the year 2022.

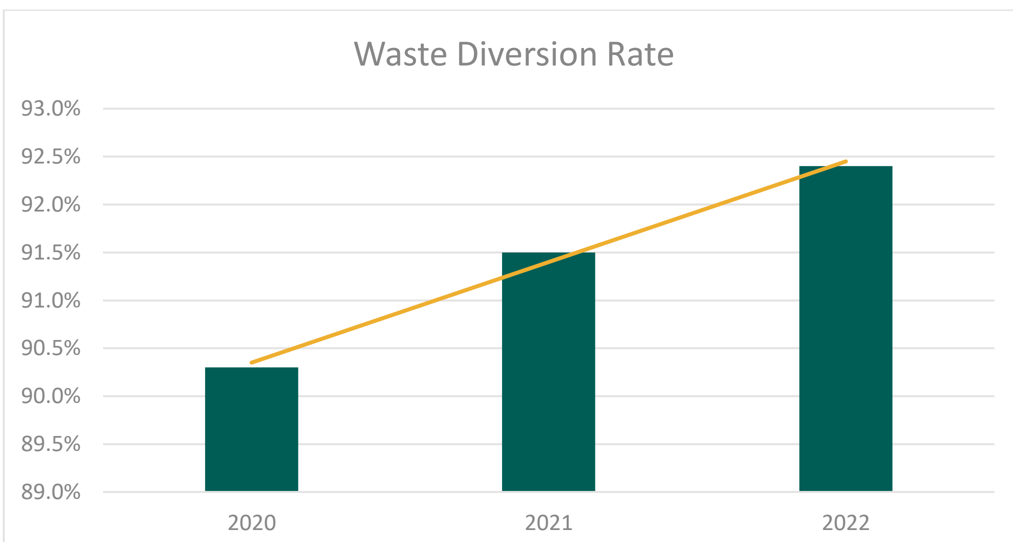

Figure 16: Waste Diversion Rate Performance from 2020-2022

Scorecard - Toronto Hydro-Electric System Limited

8/4/2023

Performance Outcomes	Performance Categories	Measures		2018	2019	2020	2021	2022	Trend	Target: Industry	Target: Distributor
Customer Focus Services are provided in a manner that responds to identified customer preferences.	**Service Quality**	New Residential/Small Business Services Connected on Time		99.80%	99.74%	99.73%	99.86%	99.89%		90.00%	
		Scheduled Appointments Met On Time		99.66%	99.04%	99.85%	99.92%	99.92%		90.00%	
		Telephone Calls Answered On Time		80.15%	74.77%	69.89%	76.87%	79.08%		65.00%	
	Customer Satisfaction	First Contact Resolution		89%	90%	92%	91%	92%			
		Billing Accuracy		99.25%	99.21%	99.20%	99.00%	99.11%		98.00%	
		Customer Satisfaction Survey Results		92%	92%	95%	95%	94%			
Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	**Safety**	Level of Public Awareness		69.00%	70.00%	70.00%	68.00%	68.00%			
		Level of Compliance with Ontario Regulation 22/04 [1]		C	C	C	C	C			C
		Serious Electrical Incident Index	Number of General Public Incidents	6	7	24	22	29			8
			Rate per 10, 100, 1000 km of line	0.209	0.244	0.831	0.758	0.997			0.291
	System Reliability	Average Number of Hours that Power to a Customer is Interrupted [2]		0.81	0.73	0.90	0.97	0.82			0.87
		Average Number of Times that Power to a Customer is Interrupted [2]		1.14	1.09	1.42	1.46	1.39			1.20
	Asset Management	Distribution System Plan Implementation Progress		95%	105%	17%	36%	59%			
	Cost Control	Efficiency Assessment		5	5	5	5	5			
		Total Cost per Customer [3]		$1,123	$1,164	$1,159	$1,189	$1,312			
		Total Cost per Km of Line [3]		$30,210	$31,349	$31,120	$32,110	$35,577			
Public Policy Responsiveness Distributors deliver on obligations mandated by government (e.g., in legislation and in regulatory requirements imposed further to Ministerial directives to the Board).	**Connection of Renewable Generation**	Renewable Generation Connection Impact Assessments Completed On Time [4]		100.00%	100.00%	100.00%	100.00%				
		New Micro-embedded Generation Facilities Connected On Time		100.00%	100.00%	100.00%	92.31%	91.25%		90.00%	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	**Financial Ratios**	Liquidity: Current Ratio (Current Assets/Current Liabilities)		0.53	0.93	0.71	0.95	0.68			
		Leverage: Total Debt (includes short-term and long-term debt) to Equity Ratio		1.20	1.15	1.19	1.13	1.17			
		Profitability: Regulatory Return on Equity	Deemed (included in rates)	9.30%	9.30%	8.52%	8.52%	8.52%			
			Achieved	9.33%	8.44%	5.90%	7.08%	7.44%			

1. Compliance with Ontario Regulation 22/04 assessed: Compliant (C); Needs Improvement (NI); or Non-Compliant (NC).
2. An upward arrow indicates decreasing reliability while downward indicates improving reliability.
3. A benchmarking analysis determines the total cost figures from the distributor 's reported information.
4. Value displayed for 2021 reflects data from the first quarter, as the filing requirement was subsequently removed from the Reporting and Record-keeping Requirements (RRR).

Legend:
5-year trend: up, down, flat
Current year: target met, target not met

Scorecard - Toronto Hydro-Electric System Limited

9/7/2018

Performance Outcomes	Performance Categories	Measures		2013	2014	2015	2016	2017	Trend	Target: Industry	Target: Distributor
Customer Focus Services are provided in a manner that responds to identified customer preferences.	Service Quality	New Residential/Small Business Services Connected on Time		94.20%	91.50%	96.90%	97.70%	98.32%	↑	90.00%	
		Scheduled Appointments Met On Time		99.60%	99.80%	99.90%	99.50%	99.37%	↓	90.00%	
		Telephone Calls Answered On Time		82.00%	71.90%	76.80%	64.70%	77.92%	↓	65.00%	
	Customer Satisfaction	First Contact Resolution		77%	81%	84	86%	88%			
		Billing Accuracy			96.62%	97.54%	98.86%	99.24%	↑	98.00%	
		Customer Satisfaction Survey Results			91%	91%	83%	83%			
Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	Safety	Level of Public Awareness				71.00%	71.00%	69.00%			
		Level of Compliance with Ontario Regulation 22/04 [1]		C	C	C	C	C	→		C
		Serious Electrical Incident Index	Number of General Public Incidents	2	3	0	0	1	↓		2
			Rate per 10, 100, 1000 km of line	0.202	0.295	0.000	0.000	0.035	↓		0.083
	System Reliability	Average Number of Hours that Power to a Customer is Interrupted [2]		1.11	0.89	0.99	0.91	0.91	↓		1.11
		Average Number of Times that Power to a Customer is Interrupted [2]		1.34	1.18	1.31	1.28	1.18	↓		1.36
	Asset Management	Distribution System Plan Implementation Progress		105%	147%	100%	113%	99%			
	Cost Control	Efficiency Assessment		5	5	5	5	5			
		Total Cost per Customer [3]		$924	$967	$1,000	$1,044	$1,042			
		Total Cost per Km of Line [3]		$66,793	$70,688	$73,309	$27,819	$27,825			
Public Policy Responsiveness Distributors deliver on obligations mandated by government (e.g., in legislation and in regulatory requirements imposed further to Ministerial directives to the Board).	Conservation & Demand Management	Net Cumulative Energy Savings [4]				12.51%	34.58%	63.11%			1,556.05 GWh
	Connection of Renewable Generation	Renewable Generation Connection Impact Assessments Completed On Time		100.00%	97.12%	100.00%	100.00%	81.08%			
		New Micro-embedded Generation Facilities Connected On Time		100.00%	100.00%	100.00%	100.00%	92.41%	↓	90.00%	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	Financial Ratios	Liquidity: Current Ratio (Current Assets/Current Liabilities)		0.80	0.68	0.67	0.61	0.64			
		Leverage: Total Debt (includes short-term and long-term debt) to Equity Ratio		1.34	1.65	1.57	1.45	1.34			
		Profitability: Regulatory Return on Equity	Deemed (included in rates)	9.58%	9.58%	9.30%	9.30%	9.30%			
			Achieved	7.10%	7.41%	10.71%	12.18%	9.08%			

1. Compliance with Ontario Regulation 22/04 assessed: Compliant (C); Needs Improvement (NI); or Non-Compliant (NC).
2. The trend's arrow direction is based on the comparison of the current 5-year rolling average to the distributor-specific target on the right. An upward arrow indicates decreasing reliability while downward indicates improving reliability.
3. A benchmarking analysis determines the total cost figures from the distributor's reported information.
4. The CDM measure is based on the new 2015-2020 Conservation First Framework.

Legend:
5-year trend: ↑ up ↓ down → flat
Current year: target met; target not met

APPENDIX B: ANNUALLY REPORTED MEASURES

Outcomes	OEB Reporting Category	Electricity Distributor Scorecard Measures	Electricity Service Quality Requirement Measures	2020-2024 Custom Performance Measures[1]
Customer Service	Service Quality	▪ New Residential/Small Business Services Connected on Time ▪ Scheduled Appointments Met on Time ▪ Tel. Calls Answered on Time	▪ Connection of New Services (LV)[2] ▪ Connection of New Services (HV)[3] ▪ Appointments Met ▪ Telephone Accessibility ▪ Appointment Scheduling ▪ Rescheduling a Missed Appt. ▪ Telephone Call Abandon Rate ▪ Emergency Response - Urban ▪ Reconnection Performance Standards	
	Customer Satisfaction	▪ First Contact Resolution ▪ Billing Accuracy ▪ Customer Survey Satisfaction Results	▪ Written Responses to Enquiries	▪ Customers on eBills
Safety	Safety	▪ Level of Public Awareness ▪ Compliance with Ontario Reg. 22/04 ▪ Number of General Public Incidents ▪ Rate per 10, 100, 1000 Km of Line		▪ Total Recorded Injury Frequency ▪ Network Units Modernization

[1] See Exhibit 1B, Tab 3, Schedule 1 for a detailed discussion of Toronto Hydro's 2025-2029 Custom Performance Measures.
[2] Low Voltage ("LV")
[3] High Voltage ("HV")

Outcomes	OEB Reporting Category	Electricity Distributor Scorecard Measures	Electricity Service Quality Requirement Measures	2020-2024 Custom Performance Measures[1]
Reliability	System Reliability	▪ Average Number of Hours that Power to a Customer is Interrupted (SAIDI) ▪ Average Number of Times that Power to a Customer is Interrupted (SAIFI)		▪ SAIDI - Defective Equipment ▪ SAIFI - Defective Equipment ▪ FESI-7 ▪ FESI-6 - Large Customers ▪ MAIFI
	Asset Management	▪ DSP Implementation Progress		▪ System Capacity ▪ System Health (Asset Condition) – Wood Poles ▪ Direct Buried Cable Replacement ▪ In-Service Additions (Cumulative)
Financial	Cost Control	▪ Efficiency Assessment ▪ Total Cost per Customer ▪ Total Cost per Km of Line		▪ Average Wood Pole Replacement Cost ▪ Vegetation Management Cost per Km
	Financial Ratios	▪ Liquidity: Current Ratio ▪ Leverage: Total Debt to Equity Ratio ▪ Regulated ROE - Deemed vs. Achieved		
Public Policy	Connection or Renewable Generation	▪ Renewable Generation Connection Impact Assessments Completed On Time ▪ Micro-embedded Gen. Fac. Connected on Time	▪ Micro-embedded Gen. Fac. Connected on Time	
Environment	Environment			▪ Oil Spills Containing PCBs ▪ Waste Diversion Rate

PRODUCTIVITY

Toronto Hydro strives to provide value for money to its customers through continuous improvements in productivity and performance. The importance of this principle remains paramount even during the upcoming period of change, growth, and development. As noted in the rate framework evidence filed at Exhibit 1B, Tab 2, Schedule 1, Toronto Hydro believes regulatory evolution is necessary to incent productivity and efficiency alongside other outcomes that are important to customers and stakeholders. Therefore, the utility is proposing a custom rate framework that enables this evolution in a manner that is aligned with the principles of performance-based regulation.

Notwithstanding this view and its proposal to evolve the incentives within the rate framework, the utility took note of the OEB's comments in the 2020-2024 Decision, that "Toronto Hydro needs to be more aggressive in its search for increased productivity."[1] The OEB implemented this finding by increasing the stretch factors built into Toronto Hydro's rate framework to a blended rate of approximately 0.82 percent over the rate period, reducing available funding to execute planned work programs to address system and operational needs. The utility challenged itself to deliver the work programs with reduced funding by finding efficiencies where possible and by rebalancing and reprioritizing its plans where productivity gains could not bridge the funding gap.[2]

Beyond taking additional measures to drive productivity as described herein, Toronto Hydro also recognized the need to more clearly articulate its efforts and outcomes in this area of performance and took the steps outlined below to do so. In this narrative Toronto Hydro outlines specific considerations, achievements, and commitments with respect to its past,

[1] EB-2018-0165, Decision and Order (December 19, 2019) at page 29.
[2] Please refer to Exhibit 2B, Section E4.

current, and future productivity efforts to demonstrate to the OEB that the utility has been and remains firmly committed to continuous improvement in efficiency.

- **Urban Distributor:** An overview of the most pressing challenges and costs that Toronto Hydro faces as a unique urban distributor serving Canada's largest and North America's fastest growing city.
- **2020 to 2024 Plan Execution:** An explanation of how the utility managed through unprecedented pressures within the current rate period, most notably the COVID-19 pandemic, significant increases to inflation, upward pressures in customer connections, and unexpected workforce challenges;
- **2020-2024 Productivity:** A detailed account of notable productivity accomplishment over the current rate period. Where the benefits and outcomes of productivity are qualitative in nature, Toronto Hydro made all reasonable efforts to clearly demonstrate improvements to operational effectiveness and value for customers.
- **Benchmarking:** An overview of expert benchmarking studies and key internal benchmarking analyses filed to assist the OEB in evaluating Toronto Hydro's application. In addition, Toronto Hydro discusses the results of the OEB's Activity and Program-Based Benchmarking ("APB") initiative as it relates to the utility's costs.

1. URBAN DISTRIBUTOR

1.1 Density

In Ontario, both Toronto's downtown core and the broader City of Toronto stand apart with respect to population density. The City of Toronto is home to over 3 million people within a land mass of 630 square kilometers, resulting in a population density of over 4,800 people per square kilometer.[3] Toronto's downtown core saw population growth of 16 percent from

[3] City of Toronto, Toronto at a Glance, "online", https://www.toronto.ca/city-government/data-research-maps/toronto-at-a-glance/

2016 to 2021, and is now home to 275,931 people in an area of approximately 16.6 square kilometers, resulting in a population density of 16,608 people per square kilometer. [2,4]

Table 1 shows the population, land mass, and population density of Ontario's ten largest cities by population.

Table 1: Ontario Cities Population Density[5]

Top 10 Largest Cities in Ontario by Population	Population (People)	Land Mass (km^2)	Population Density (People/km)
Toronto	3,025,647	630	4,803
Ottawa	1,071,868	2790	384
Mississauga	771,891	292	2,640
Brampton	745,557	266	2,799
Hamilton	597,010	1,117	534
London	448,051	420	1,066
Markham	352,404	212	1,660
Vaughan	338,891	274	1,239
Kitchener	282,375	137	2,065
Windsor	236,789	146	1,618

Within the downtown core, Toronto Hydro's working environment is unique even within a global context due to an extremely high proportion of high-rise buildings. As seen in the table below, New York City is the only urban centre in the world with more high-rise buildings than Toronto, which is home to nearly one thousand more high-rise buildings than Montreal and Vancouver combined.

[4] Statistics Canada, Canada's Large Urban Centres Continue to Grow and Spread, "online", https://www150.statcan.gc.ca/n1/daily-quotidien/220209/dq220209b-eng.htm; Statistics Canada, Defining Canada's Downtown Neighbourhoods: 2016 Boundaries, "online", https://www150.statcan.gc.ca/n1/en/pub/91f0015m/91f0015m2021001-eng.pdf?st=DqPr0h-x
[5] City Population, Canada: Ontario, "online", https://www.citypopulation.de/en/canada/cities/ontario/

Table 2: International Cities High-Rise Buildings[6]

Rank	City	Country	Highrise Buildings
1	New York City	United States	6,223
2	**Toronto**	**Canada**	**2,598**
3	Seoul	South Korea	2,578
4	Dubai	United Arab Emirates	2,360
5	Hong Kong	China	1,916
6	Tokyo	Japan	1,533
7	Busan	South Korea	1,311
8	Kyiv	Ukraine	1,275
9	Chicago	United States	1,247
10	Shanghai	China	1,236
11	London	United Kingdom	1,146
12	Mexico	Mexico	1,105
13	Incheon	South Korea	1,041
14	Buenos Aires	Argentina	1,037
15	Bangkok	Thailand	964
16	Vancouver	Canada	824
17	Montreal	Canada	810
18	Sao Paulo	Brazil	595
19	Los Angeles	United States	588
20	Moscow	Russia	561

Both population density and the significant number of high-rise buildings have material implications for Toronto Hydro's costs to operate and sustain the grid, and serve customer demand for electricity. More people occupying less space has implications for available rights of way, congestion with other utility providers, traffic congestion and drive times, the size and scale of distribution assets, and disruptions related to large-scale local events.

[6] Highrise building categorized as a multi-floor building at least 12 stories or 35m in height. As per data from SkyscraperPage: https://skyscraperpage.com/cities/#notes

1.2 Customer Base

Beyond density, Toronto's downtown core creates additional requirements on Toronto Hydro as a system operator due to its unique customer make-up. Toronto Hydro customers in the downtown core include, but are not limited to, the following unique customers and customer groups: several hospitals with internationally recognized research and related facilities, the provincial legislature; a major international shipping port, the Toronto Stock Exchange, and, the headquarters of various banks, trading houses, insurance companies, and other critical financial entities.

One effect of this customer make-up is an elevated requirement for reliability and continuity of service to customers whose operations are critical to the sound functioning of the Province and the Country. As such, Toronto Hydro's downtown system is designed and operated with redundancy beyond that typically necessary for an Ontario electricity distributor, which in turn drives additional prudent costs to be incurred for investments and operation.

1.3 Rights of Way & Underground Congestion

As a dense but old City by North American standards, Toronto suffers from a challenging combination of a high volume of local infrastructure, and legacy standards with respect to rights-of-way and general spacing. Toronto's urban core contains major arterial roads, which in a modern planning context are encouraged to be at the top end of the 20-45-meter range.[7] In Toronto's case however, the age of the City results in many major and minor arterial roads having only a 20-meter right-of-way. Similarly, while some of Toronto's newer major roads have the benefit of 3-meter sidewalks, a significant number of legacy 1.2-meter sidewalks remain.

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[7] City of Toronto, Road Classification System Summary Document (August 2013) at page 9, "online", https://www.toronto.ca/wp-content/uploads/2018/01/950a-Road-Classification_Summary-Document.pdf

The outcome of smaller rights-of-way in an increasingly dense urban environment is underground congestion, as electricity, natural gas, water, sewer, and communications infrastructure compete for a limited amount of space. Each utility within the right-of-way has standards and clearances, which in turn must be known and respected by other utilities installing or maintaining their own infrastructure within the corridor. This underground congestion ultimately leads to significant incremental planning and coordination, adding time and costs to system maintenance, renewal, or enhancement.

1.4 Municipal Consent Requirements & Road Moratoria

An additional consequence of utility congestion and general urban density is a uniquely involved and thorough set of coordinating, permitting, and approval processes overseen by the City of Toronto. Beyond standard permitting requirements for the location and construction of Toronto Hydro assets themselves, additional permissions for completion of work such as road cuts, lane closures, and pedestrian obstructions require additional time and planning resources.

Beyond the processes themselves, construction in the City of Toronto is dynamic, with frequent instances in which Toronto Hydro is required to advance, delay, or otherwise modify construction plans to accommodate projects overseen by the City, other utilities, or private interests. Road moratoria are a common reality for Toronto Hydro to manage as the City undertakes road or pedestrian refurbishments. At any one point in time, there are thousands of active road moratoria in the City of Toronto, which can range from 5 to 15 years in duration. The result of these road moratoria are requirements, which are not always established well in advance, for Toronto Hydro to re-prioritize projects for early completion, significantly delay projects, or re-organize its resources to complete work in truncated timelines or during specific hours of the day.

The pace of external investment and construction congestion show no signs of easing in the City of Toronto. A breakdown of 2021 infrastructure spending reveals significant investments in city infrastructure, indicative of a growth in future projects which will necessitate the need for municipal consent and planning with respect to road closures. In 2021, transportation infrastructure saw $446 million allocated to bridge repairs, sidewalk upgrades, expressway maintenance, and both major and local roadwork. Water infrastructure garnered over $616 million in expenses, channeled towards projects like water mains, sewers, flood protection, and stormwater management.[8] Water projects, infrastructure developments, and residential construction all require proactive and reactive planning on Toronto Hydro's part, with additional administrative burden applied by approval times which can take up to 34 months.

While some version of the above noted challenges exist for most utilities, the density and complexity of the City of Toronto places unique pressures on Toronto Hydro relative to other electricity distributors in Ontario. The net effect is an increased need for flexibility and adaptability in planning and execution, and in some instances increased costs to execute work under conditions which could not reasonably be anticipated.

1.5 Drive Time

Operating in a dense urban service territory has direct implications for the drive time required for Toronto Hydro technicians and contractors to reach job sites to complete inspections, maintenance, repairs or restoration work. Figure 1 below shows the relative drive time across Toronto Hydro's locations at 500 Commissioners (downtown), 71 Rexdale (Etobicoke) and 715 Milner (Scarborough) locations.

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[8] City of Toronto, News Release - Mayor John Tory kicks off more than $1 billion City of Toronto 2021 construction season (March 29, 2021), "online", https://www.toronto.ca/news/mayor-john-tory-kicks-off-more-than-1-billion-city-of-toronto-2021-construction-season/

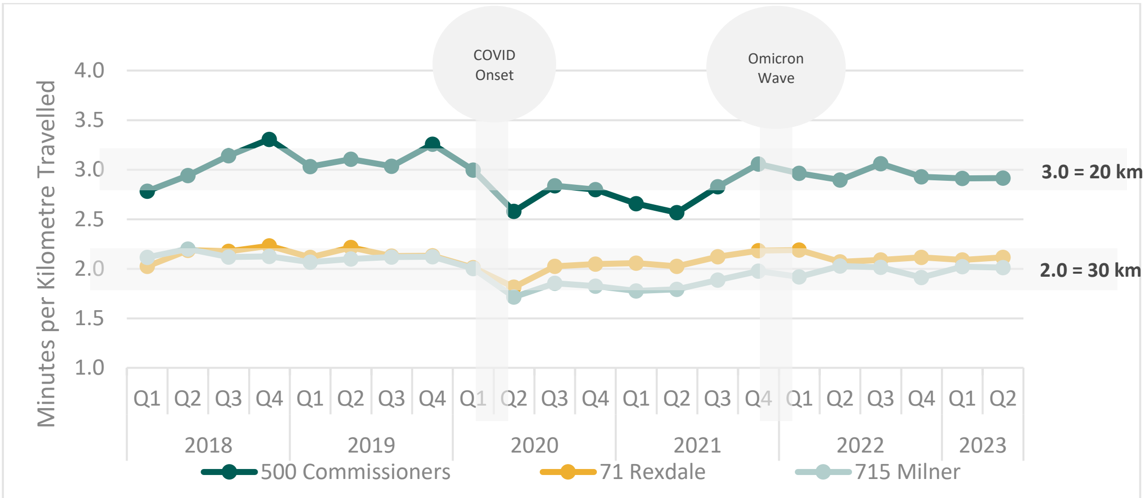

Figure 1: Drive Times Across Toronto Hydro Work Centres

As seen above, drive time for crews operating out of the 500 Commissioners downtown location can be longer by 45 percent or more relative to similar crews operating in less dense areas. Of note, the comparators in this group are not rural or suburban locations, and are themselves urban locations in Etobicoke and Scarborough - highlighting the high levels of congestion inherent to Toronto's downtown core.

Longer drive times increase the amount of time required to complete work, and therefore relative cost of the same work due to extended use of vehicles and labour. Lacking adjustment for this factor, higher drive times inaccurately present an urban utility as less efficient in direct comparison to peers operating in less congested suburban service areas.
In addition to comparing relative drive times, the above figure also demonstrates the impact that COVID-19 had on drive times for crews in Toronto. Notably, the aggressive recovery of drive time at 500 Commissioners in 2021 prior to the Omicron wave in the winter of 2021/2022 indicates that despite some long-term societal changes anticipated to remain post-COVID, lengthy drive times in Toronto's urban core are expected to persist in the future.

As of 2023, drive times in downtown Toronto have stabilized at levels approximating pre-COVID years.

2. 2020 TO 2024 EXECUTION CONSTRAINTS

The following sections addresses three of the most material constraints faced by Toronto Hydro in executing its capital and operational plans over the current rate period.

2.1 Managing the Impacts of COVID-19

Toronto Hydro was deemed an essential service at the onset of the COVID-19 pandemic in March 2020.[9] The pandemic significantly affected normal operating procedures for in-office work and close-contact working conditions in the field. The utility had to rapidly adapt in order to continue reliably distributing electricity to its customers while protecting the safety of its employees, contractors, and the public.

To address these challenges, Toronto Hydro made a Level 2 Emergency Declaration and established an associated Incident Management Team and supporting response infrastructure in March 2020.[10] The utility quickly pivoted to remote and social distancing work for all employees; procured, warehoused, and distributed personal protective equipment to protect working staff; and implemented social distancing rules preventing shared vehicle use so that employees could safely continue to execute their work. These measures increased the utility's fleet mileage and its vehicle utilization.[11]

Toronto Hydro also managed changes to its customer service rules to mitigate the pandemic's financial impacts on its customers.[12] These included reducing the late payment

[9] Ontario Regulation 82.20, section 33.
[10] See Disaster Preparedness Management program at Exhibit 4, Tab 2, Schedule 6.
[11] Exhibit 2B, Section E8.3
[12] Exhibit 4, Tab 2, Schedule 14 at page 27.

charge by 75 percent, waiving the returned cheque charge that is normally collected for payments when customer accounts have insufficient funds, and voluntarily extending its disconnection moratorium for residential and low volume customers. The utility also sent targeted arrears communications to provide its customers with greater payment term flexibility, and promote financial assistance programs.[13] These measures were in effect from March 2020 until July 2022. In 2020, Toronto Hydro recorded an incremental $17.2 million in bad debt expenses as a result of the COVID-19 emergency and related financial pressures.

The pandemic challenged the utility's operations across many areas of the business, including financially. With respect to expenditures, in addition to the incremental bad debt expense noted above, the utility incurred $11.3 million in incremental expenditures from 2020 through 2022 to ensure continued provision of service to customers in a manner which responded to the unique safety needs of the COVID-19 pandemic. With respect to revenues, as of its final COVID-19 reporting to the OEB, Toronto Hydro estimates lost revenues resulting from COVID-19 totalled $45.8 million up to April of 2021.

Social distancing and lockdown measures, in conjunction with a rapidly changing business environment, delayed the implementation of Toronto Hydro's staffing resource plan over the 2020-2021 period.[14] As noted in Exhibit 4, Tab 4, Schedule 3, these measures had a particularly acute impact upon positions requiring specific apprentice-worker ratios and in-person training, such as the Power Line Technician program. In addition, the pandemic gave rise to a spike in retirements in 2020 and 2021 that were expected to occur gradually over the rate period. The combined effect of these pandemic-driven changes to the workforce

[13] LEAP, OESP, the COVID-19 Energy Assistance Program ("CEAP") and COVID-19 Energy Assistance Program for Small Business ("CEAP-SB"), and the Canada Emergency Response Benefit ("CERB").
[14] Exhibit 4, Tab 4, Schedule 3 at pages 19-20.

plan, Toronto Hydro's compensation costs and associated headcount declined to a historically low point of 1,203 FTEs in 2021.

In addition to impacts on the utility's staffing plans, the COVID-19 pandemic disrupted manufacturing capacity and transportation networks, resulting in supply chain challenges that affected Toronto Hydro's capacity to procure materials and equipment in a timely and cost-effective manner.[15] These challenges added another layer of complexity of the capital planning and management process and put upwards pressure on the costs of materials due to higher raw material and labour costs. For example, the cost of padmount transformers increased by approximately 45 to 168 percent (depending on the transformer size) between 2020 and 2022.[16] The utility continues to manage these challenges by updating contract lead times, by reviewing alternative sources of supply for products, and by negotiating forward buys and price increases with suppliers for major components and materials.

2.2 Managing the Impact of Extraordinary Inflation

Over the course of second and third quarters of 2021, COVID-19 vaccines became widely available to the Canadian population, and over the course of late 2021 and 2022, public health measures were gradually relaxed. Though many ongoing COVID-related costs persisted, the passage of time allowed for greater opportunities to accommodate such costs in the course of business planning. Unfortunately, in the second half of 2021, inflation in Canada began to accelerate, and by mid-2022, inflation had reached the highest levels seen in 40 years.[17] Construction cost increases in Toronto were more pronounced than in other urban centers across Canada. From the first quarter of 2020 to the second quarter of 2023, the Non-Residential Buildings Construction Index applicable to the Toronto Census

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[15] Exhibit 4, Tab 2, Schedule 13.
[16] For more information, refer to Exhibit 2B, Section D2.1.3.
[17] Statistics Canada, Consumer Price Index: Annual review, 2022, "online", https://www150.statcan.gc.ca/n1/daily-quotidien/230117/dq230117b-eng.htm

Metropolitan Area ("CMA") rose 37.7 percent, well outpacing the already high increase of 28.6 percent in the same metric across a composite of 11 Canadian CMA's, as shown in Table 3.

Table 3: Non-Residential Buildings Construction Index for Metropolitan Areas[18]

		Toronto		Canada 11 Census Metropolitan Area Composite	
		Qtr to Qtr	Cumulative	Qtr to Qtr	Cumulative
2020	Q1	0.0%	0.0%	0.0%	0.0%
2020	Q2	0.5%	0.5%	0.1%	0.1%
2020	Q3	0.7%	1.2%	0.5%	0.6%
2020	Q4	0.2%	1.4%	0.1%	0.6%
2021	Q1	1.9%	3.3%	1.4%	2.0%
2021	Q2	5.0%	8.4%	3.9%	6.0%
2021	Q3	4.3%	13.0%	2.9%	9.0%
2021	Q4	3.4%	16.9%	2.9%	12.1%
2022	Q1	3.8%	21.3%	3.0%	15.5%
2022	Q2	5.0%	27.4%	4.0%	20.1%
2022	Q3	2.6%	30.7%	2.1%	22.6%
2022	Q4	2.5%	33.9%	1.6%	24.6%
2023	Q1	1.7%	36.2%	1.7%	26.7%
2023	**Q2**	**1.1%**	**37.7%**	**1.5%**	**28.6%**

In contrast, the OEB inflation-factor parameters for electricity distributors were 2.2, 3.3, 3.7, and 4.8 percent over the 2021 to 2024 period resulting in a compound increase of 14.73 percent. What's more is that while the Custom Price Cap Index allowed for annual inflationary adjustments to non-capital-related revenue requirement (less the stretch factor), no such inflationary adjustments were available for capital-related revenue requirement. The net result is that as inflation pressures surged to 40-year highs in 2022,

[18] Statistics Canada, Table 18-10-0276-01 Building construction price indexes, by type of building and division, "online", https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810027601

the inflation assumption underpinning Toronto Hydro's capital expenditure envelope remained static at 2 percent less the impact of capital stretch factor of 0.9 percent.

With significant increases in input prices and limited increases in revenue over the current rate period, Toronto Hydro took necessary steps to manage the financial impacts and adapt its plans to balance these constraints and still deliver key objectives. For example, the utility negotiated a proposed price increase for network protectors and protection accessories, driven by material increases in raw material costs, that was approximately 43 percent lower than the supplier's originally requested increase.[19]

In addition to managing input prices, Toronto Hydro slowed down the pace of work in the Underground Downtown, Underground Horseshoe, and Overheard Renewal programs by approximately 22 percent leading to a $189 million reduction compared to forecasted budgets for these programs in the 2020-2024 rate application. The utility reprioritized its work by conducting greater volumes of targeted replacements directed towards the highest risks on the system, including the removal of at-risk PCB transformers and the conversion of legacy box construction equipment. In other aspects of its work plan, such as the demand-driven Customer Connections and Load Demand programs, the utility had no choice but to spend more than forecasted to maintain its obligation to connect and serve customers. For example, in Customer Connections the utility managed a spike in the budget of approximately $147 million (71 percent) compared to 2020 plan budgets.[20]

[19] *Supra* Note 15
[20] For more information about the execution of the 2020-2024 capital plan please refer to Exhibit 2B, Section E4.

2.3 Workforce Challenges

Over the 2020-2024 rate term, Toronto Hydro successfully managed a series of workforce challenges both related to broader shifts in the Toronto-area labour market and Toronto Hydro-specific issues. Workforce challenges encountered during this time include:[21]

- **Retirements:** Toronto Hydro is in the midst of renewing its workforce and developing new entrants. Over the rate period to-date, Toronto Hydro steered a 7 percent reduction in the average age of its employees, which now averages 40 years of age. The utility also filled over 100 trades and technical positions, with another 100 positions forecast to be filled by the end of 2024.
- **Recruiting:** The COVID-19 pandemic temporarily suspended talent acquisition, training, and development for critical areas and skill sets established during the previous rate period. To manage these challenges, Toronto Hydro implemented a system to facilitate remote and hybrid work and a comprehensive infectious disease response plan to address increased safety risks. Coming out of the pandemic, the utility successfully increased the pace of its recruitment to return its staffing levels to pre-pandemic levels and increase resourcing capacity for the next rate period.
- **Changing Labour Market:** The Toronto area experienced increasing competition and strong demand for workers in a digital economy over the 2020-2024 rate period, with notable shortages of workers trained in science, technology, engineering and mathematics ("STEM").[22] Toronto Hydro managed these challenges by pivoting to hybrid work model in line with employee preferences.

Despite the challenges noted above, Toronto Hydro achieved notable workforce successes over the course of 2018 through 2022, including:

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[21] Exhibit 4, Tab 4, Schedules 1 and 3.

[22] Mahboubi, Parisa. 2022. The Knowledge Gap: Canada Faces a Shortage in Digital and STEM Skills. Commentary 626. Toronto: C.D. Howe Institute, "online", https://www.cdhowe.org/sites/default/files/2022-08/Commentary_626_0.pdf

- Total recordable injury frequency improved by 43 percent;
- Absenteeism decreased by 1.9 percent;
- Consistently ranked as one of the Best Corporate Citizens in Canada by Corporate Knights placing as high as 2nd overall and 1st in the category of Electricity Transmission and Distribution; and
- Received multiple awards from Electricity Canada, including recognition for Leadership in External Collaboration and Partnerships, CEA President's Award of Excellence for Employee Safety – Distribution, 2021 Centre of Excellence for two innovation projects, and the 2022 Canadian Occupational Safety Magazine 5-Star Energy and Resource Company award.
- Toronto Hydro was recognized as a sustainability leader by Canada's 2024 Clean50, in addition to earning a spot on Canada's Clean16 list as a top contributor in the category of Traditional Energy.

3. 2020 TO 2024 PRODUCTIVITY ACHIEVEMENTS

The following section presents an overview of notable productivity improvements over the course of the 2020 to 2024 rate period. These achievements are incremental to:

- more than $2.2 billion of savings generated by the utility – through activities such as improved asset management, efficient material handling and workforce optimization – since Toronto Hydro was created in 1999 through the amalgamation of the six utilities that served former municipalities which now make-up the city of Toronto.
- A facilities consolidation strategy that reduced the square footage per employee by approximately 40 percent and is expected to return more than $200 million to customers by the end of this decade.

Responsive to the OEB's feedback in the 2020 rate application, and continuing on its journey of continuous improvement in efficiency, Toronto Hydro enhanced its efforts in capturing the productivity benefits achieved across the organization. In total, over the current rate period the utility implemented over 30 distinct productivity initiatives which yield material benefits for ratepayers. These benefits include over $23 million in costs that the utility expects to avoid or reduce by the end of the rate term, resulting in a 2025 rebasing revenue requirement that is approximately $5.7 million lower than it otherwise would be if Toronto Hydro had not undertaken these initiatives.

The initiatives are summarized below, organized as follows: 1) Corporate Projects; 2) Divisional & Departmental Initiatives; and 3) Additional Productivity Initiatives. Though reduced or avoided costs cannot accurately be calculated for all initiatives, the combined effect of the projects and processes set out below demonstrate the utility's ongoing commitment to become more efficient and productive in its operations.

3.1 Corporate Projects

The following corporate projects are among the larger productivity initiatives undertaken by Toronto Hydro over the 2020 to 2024 rate period, and are expected to continue to yield operational and productivity benefits into the future.

3.1.1 *Enterprise Resource Planning ("ERP"), Enterprise Connect, and People Connect*

The purpose of Toronto Hydro's ERP Implementation is to replace the former Ellipse, as well as more than thirty other legacy systems, to ensure ongoing effective support of applications and databases, avoid significant increases in systems maintenance costs and deterioration of systems' operational performance, ensure a secure, safe, reliable and efficient operation of Toronto Hydro's core business functions, and generate cash and productivity benefits across all of Toronto Hydro's divisions. This initiative had a go-live date shortly before the current rate period, and is forecast to reduce operational expenditures by $5.93 million from 2020 to 2024, while also avoiding operating costs of $4.64 million over the same time period.

Qualitatively, this initiative yields: (i) improved restoration planning and customer communication; (ii) higher systems reliability and stability with secured service support; (iii) improvement in system availability, increasing productive time for managers and staff; (iv) better business processes supported by increased system functionality and improved operational performance of information technology assets; and, (v) increased security and quality of data through decommissioning of multiple, unsupported legacy systems and implementing a supported ERP system with a central database and robust user-access controls.

3.1.2 *e-Tailboard*

Tailboards are used by Toronto Hydro employees to perform risk assessments before beginning planned, reactive, or responsive work in the field. A tailboard is an important document to reduce the risk of incidents by helping employees develop a safe work plan to identify job steps, hazards, and barriers associated with non-routine work. The e-Tailboard project transitioned tailboards to a digital format, yielding both financial and qualitative benefits. The e-Tailboard project is forecast to yield cost avoidance benefits of $2.28 million and cost reductions of $17,339 during the 2020 to 2024 rate period. Qualitative benefits of this initiative include: (i) ability to leverage existing IT assets by completing tailboards using existing Toughbooks and iOS devices; (ii) improved auditing and record management capability; (iii) improved user experience for field crews with quick access to all relevant safety-related information at the work site; (iv) reduced paper and printing supplies; and, (v) electronic tailboards contributed to a decrease in injuries. Recordable injury performance has improved by 16 percent in the year following the introduction of the electronic tailboard and the utility has not had any critical or fatal injury since the electronic tailboard was launched.

3.1.3 *Streetlighting Management System Project*

The purpose of this project was to implement a new Streetlight Work Management Solution to replace the existing legacy Work Activity Log ("WAL") system which had reached end of life. This initiative had a go-live date of November 2021, and is forecast to yield cost avoidance of $1.98 million from 2022 to 2024. Further, the project is expected to provide the following qualitative benefits: (i) enhanced mobile capabilities to view, manage, and dispatch outage tickets efficiently; (ii) dashboarding capabilities to view all details of outages with the ability to zoom into individual outages, as well as analysis and reporting capabilities; and, (iii) an enhanced customer experience by allowing customers to submit an outage in real time, and be able to view outages that are already reported.

3.1.4 *Non-conformance Reporting*

The Non-Conformance Reporting ("NCR") system tracks and records inspection results. Implementation of the cloud-based Intelex Quality Management module from the Intelex suite of applications allows Toronto Hydro to automate and streamline Quality and Compliance processes, including processes for new materials received in the warehouse, failed equipment return processes, normal return inspection processes, and reporting. This project had a go-live date of February 2022, and is forecast to avoid costs of $1.26 million from 2022 through 2024.

3.1.5 *Electronic Red Construction Folder*

The corrective and reactive maintenance management process, known as Red Construction Folder ("RCF"), was digitized using an OpenText solution under a phase 1 project. While phase 1 of the project focused only on activities performed by office staff, phase 2 is addresses the field crew and contractor portions of the process. This initiative had a go-live date of January 2022, and is expected to yield $773,110 in avoided costs and $125,271 in cost reductions over the 2020 to 2024 rate term. Qualitative benefits of this initiative are expected to include: (i) increased efficiency in searching and retrieving electronic documents; (ii) better compliance with Record Management policy; and, (iii) the ability to attach important supporting documents to the case records.

3.1.6 *Accounts Payable Processing Automation*

The purpose of this project was to provide the Accounts Payable team with an automated solution for the entire invoice process; from receiving, to resolving, to paying and closing invoices, with benefits in IT enablement and controls improvement. This initiative was launched in December of 2020, and is forecast to result in $699,925 in cost reduction from 2020 to 2024. Qualitatively, this initiative enables the reallocation of accounts payable team's time to other more value-added tasks, through reduced burdens in areas such as: (i) time to respond to invoices with problems; (ii) partial elimination of manual processes to troubleshoot invoices with problems; (iii) time to mobilize stakeholders to fix problems on invoices; and, (iv) time to create reports. It also improves analytics leading to better data tracking, fostering better support to decision making, and better records management by storing all data in a centralized system.

3.1.7 *Storm Prediction Impact Tool*

In March of 2021, Toronto Hydro procured an IBM weather dashboard tool to support operational disaster response decision making. The service includes weather forecasts, predictions for number of incidents Toronto Hydro may experience, and meteorologist consultation on demand. This project showed benefits in reliability and controls improvement (i.e. better decision making with corresponding effectiveness and efficiency) as well as data quality improvements. This new tool is forecast to result in over $64,000 in cost reduction from 2020 through 2024. Qualitatively, this initiative is expected to yield the following benefits:

- **Reliability and controls improvements**, including: (i) quantifying the damage and impacts on the distribution system based on forecasted weather conditions, allowing the Emergency Management Team to assess the type and quantity of resources required commensurate to the storm event; (ii) an adaptive model that will increase in accuracy over the coming years as more data points are uploaded in the machine learning algorithms; and (iii) improved accuracy in weather forecasts and predictive modeling for impacts resulting in better decision-making.
- **Data quality improvements**, including: (i) longer forecasts for up to 14 days, improving storm event pre-staging; (ii) ability to make better resourcing decision in advance; better coordination of resources with other utility partners, ensuring resources are available on short notice.
- **Improved customer trust** as a result of improved quality of response and restoration, especially during nights, weekends, and statutory holidays.
- **Single point access**, in that the system provides the ability to access the majority of the required information from one source instead of having to check multiple services and tools for the same information. This functionality has wide ranging efficiency and effectiveness benefits.

3.1.8 *SAP Business Warehouse Project*

This initiative was launched in November of 2020, and is forecast to result in $146,363 in cost avoidance from 2020 through 2024. Qualitatively, this initiative is expected to improve effectiveness, efficiency, and data quality control across numerous functions including, capital and operating portfolio management; accounts payable; accounts receivable; tax, OEB, and financial reporting; labour recoveries; and, forecasting.

3.2 Divisional & Departmental Productivity Initiatives

The following projects were brought forth by Toronto Hydro divisional and departmental leaders as a means to manage costs through productivity gains over the 2020 to 2024 rate period.

Table 4: Summary of Divisional and Departmental Productivity Initiatives

Initiative	Description	Cost Reduction ($000)	Cost Avoidance ($000)
Find It Fix It Program	Enable maintenance crews to perform minor corrective work immediately as part of inspection programs, reducing the time and cost impact of having to send a second crew to perform minor corrective repairs.	N/A	$2,953.1
Regulatory Intelligence Subscription Service	Tracks, analyzes, and reports on applications and proceedings before the OEB on a weekly basis, including rate applications, policy proceedings, and compliance matters. Provide access to low-cost regulatory research services on in-depth issues.	N/A	$396.0
Porcelain Insulator Replacement Initiative	Eliminate on-going need of the Reactive Insulator Washing program by replacing all porcelain insulators at high risk or in contamination areas. City salting operations were studied to determine high-risk areas.	N/A	$200.0
Equipment Failure Analysis Dashboard	Alteryx workflow to collect data related to an equipment failure and display it in a Tableau dashboard reducing time to complete equipment failure investigations.	N/A	$36.7
Standardized Outage Tracking Process	Standardized gated outage process tracking process.	$20.0	$35.0
Online Training	Transition from in-person to online training programs.	$589.6	N/A

Initiative	Description	Cost Reduction ($000)	Cost Avoidance ($000)
RISE 360	Implementation of RISE 360 software for online training program development.	$90.0	N/A
Classroom Maximization	Made more efficient use of underutilized work areas and created larger learning spaces to implement additional COVID precautions.	$69.4	N/A
CenarioVR	Development savings by keeping all design and development of scenarios in house with Toronto Hydro design consultants.	$37.3	N/A
Change Order Billing Process	Standardize process for claiming work done under change orders on monthly billing sheets.	$29.1	N/A

3.3 Additional Productivity Initiatives

Toronto Hydro's pursuit of continuous improvement in productivity and efficiency extends across its operations, as highlighted in the programmatic evidence references below. These examples showcase sustained efficiency improvements which combined with the initiatives above have the net effect of enhancing Toronto Hydro's ability to provide safe, reliable, and efficient service to its customers.

3.3.1 *Fleet and Equipment*

Table 5: Summary of Fleet and Equipment Productivity Initiatives

Initiative	Description
Elimination of Under-Utilized Vehicles	Toronto Hydro optimizes its fleet size on an ongoing basis. On average, each vehicle removed from the fleet reduces operating costs by $2,000-$7,000 per year. Since 2017, Toronto Hydro's fleet size has decreased by 132 vehicles (a net 22 percent reduction). Over the past two rate periods, the utility eliminated costly and specialized vehicles and equipment that were expensive to repair where the relevant services could be obtained through outsourcing (e.g. cable trucks, forestry units).

Initiative	Description
Fuel Consumption Reduction	Toronto Hydro achieved an average annual reduction in fuel needs (estimated to be approximately 20,000 litres per year) as a result of replacing internal combustion engine vehicles with hybrid and fully electric vehicles, in accordance with Toronto Hydro's Decarbonization Strategy discussed in Exhibit 2B, Section D6 and the Fleet and Equipment Services Program in Exhibit 2B, Section E8.3. This contributes to lower fuel costs.
Driver Safety Reporting	Toronto Hydro leveraged driver safety reporting regarding speeding, harsh braking, and reversing from parked position to influence improvement in driver safety behaviour, and help minimize safety incidents and repair costs. From 2020 to 2022 the number of speeding infractions decreased by approximately 93 percent.
Optimization of Vehicle Services	In 2020, Toronto Hydro eliminated costs attributed to truck-to-truck fuelling services and selected a more cost-competitive mobile wash vendor, which collectively resulted in an annual savings of approximately $250,000.
Repair Avoidance	Toronto Hydro is running a 10-year corrosion prevention pilot project with 18 pickup trucks that were put into service in 2020. The goal of this project is to determine the best form of corrosion protection to minimize repair and replacement costs by extending the life of the vehicles. The pilot includes testing three forms of protection on six vehicles each, with the aim to increase the effective useful loves of vehicles in the fleet, as corrosion to critical components of units are one of the primary factors leading to vehicle replacements.

3.3.2 *Asset and Program Management*

Table 6: Summary of Asset and Program Management Productivity Initiatives

Initiative	Description
Asset Deficiency Assessment Priority Tool	In 2021, Toronto Hydro implemented a new tool, Asset Deficiency Assessment Priority Tool ("ADAPT"), resulting in a significant reduction in manual engineering reviews. Specifically, between 2020 and 2021, manual engineering reviews for major assets decreased by 40 percent and escalations by crews were reduced by 25 percent.

Initiative	Description
Alteryx Data Processing	During the 2020 to 2022 period, a number of workflows were developed using Alteryx data processing to automate complex data analytics tasks. In one example, the Preventative Maintenance Units Tracking workflow, developed in 2022, translates Plant Maintenance order status from SAP to maintenance unit attainments. This workflow resulted in approximately 300 hours of time saved per year. Overall, the total recorded 69 workflows within the Program Management and Support segment are estimated to have saved approximately $420,000 per year.
Weekly Switching Work Plan	The Weekly Switching Work Plan ensures optimal feeder switching to deliver the planned Capital and Maintenance program. Toronto Hydro uses bundling to reduce the number of times a feeder is removed from service, leading to savings on switching costs, reduced risk of not completing capital and maintenance programs on time, reduced exposure to high-voltage equipment and improved customer reliability. From 2019 to 2022, approximately 2,606 switching hours per year were saved through bundling of outages

3.3.3 *Control Centre*

Table 6: Summary of Control Centre Productivity Initiatives

Initiative	Description
Hold-Offs	Each hold-off requires a power system controller to research the work location, prepare documentation, apply a condition to the circuit breaker, and verbally issue the hold-off to the requestor. Toronto Hydro issues over 21,500 hold-offs each year, most of which are requested between 6:30 am and 9:00 am on weekdays. Toronto Hydro implemented a planned hold-off process whereby requests are researched and prepared a day in advance. This has resulted in an average transaction time of approximately 3 minutes per hold-off, down from approximately 29 minutes in 2014, which allows crews to spend less time waiting for hold-offs to be issued and more time on their responsibilities in the field.

Initiative	Description
Switching Orders	Most planned distribution system work requires power system controllers to prepare and check multiple switching orders, also referred to as PC17A forms. These documents prescribe the steps necessary to eliminate and/or control electrical hazards in the field. An individual PC17A can be anywhere from 1 step to over 100 steps, depending on the complexity of the distribution system. In 2021, Toronto Hydro issued almost 7,500 PC17A forms to field stakeholders, accounting for a total of nearly 185,000 individual switching steps. In order to schedule and execute field work efficiently, field crews need to have their switching documentation issued prior to the planned start of their work. Control Centre managers monitor PC17A production relative to work volume and allocate resources accordingly. In 2022, 80 percent of PC17As were issued two or more days in advance of the requested work start date, helping to ensure that field crews can start their work on time.
Call Queuing	Toronto Hydro harmonized the primary mode of communication between the field and the Control Centre by establishing the phone system as the primary method, and implementing phone queuing software which provides managers and power system controllers real-time visibility of crew wait times. This insight enables managers to dynamically allocate resources based on need, reducing wait times for field crews. The phone queuing system also provides historical data with respect to call volumes and wait times, enabling performance reporting and process optimization. In 2021, over 94 percent of calls had a wait time of less than 10 minutes.
Automated Model Build	This initiative provides the ability to automatically extract distribution system changes and implement them into the Network Management System ("NMS"), reducing record update latency and the amount of effort required to maintain the NMS network model.
Work Request Tool	Implementation of a single software tool to manage all operational work requests with integration to core systems. This project will result in the retirement of several legacy databases and platforms, and enable efficiencies in scheduling and administering distribution system work requests (work protection, planned outages, hold-offs, design review, etc.).
Digitization	In 2020, the Control Centre completed the digitization of virtually all paper-based processes in the Control Centre. This initiative enhanced business continuity and ensured that critical operational information is readily available to all power system controllers and managers in real time.

3.3.4 *Supply Chain*

Table 7: Summary of Supply Chain Productivity Initiatives

Initiative	Description
Third-Party Procurement	Toronto Hydro uses a Third-Party Procurement ("3PP") provider to complement internal resources and improve productivity, reducing overhead per purchase order, increasing cost certainty, and improving operational flexibility. As 3PP staff have effectively integrated into Toronto Hydro' processes over time, Toronto Hydro has leveraged 3PP staff for additional areas including coordination of equipment repair, recertification of suppliers, acting as liaison between suppliers and quality assurance engineers, providing insight into material cost forecasts, and other areas. By complementing the core Demand and Acquisition Services team, the engagement of the 3PP provider has resulted in a 64 percent reduction in median business days between contract award to fully published state, and a 46 percent reduction in purchase requisition to purchase order conversion days.
Major Asset Equipment Reuse	Major assets such as transformers that were used for temporary connections or capital upgrades go through Toronto Hydro's Major Asset Equipment Reuse Program when they are returned from the field. Engineers from the Quality and Compliance team inspect each unit carefully, and if the unit is deemed fit for reuse, it is returned to stock and issued out to the next capital project. If the unit can be repaired, it is sent back to the manufacturer if it is under warranty, or sent to a third-party repair and recertification supplier for a small fee. By reusing and recertifying the major assets, Toronto Hydro is able to reduce the amount of waste generated and reduce the lead time and costs associated with purchasing a new unit.
Warehouse & Inventory Optimization	Where materials and equipment at the end of their useful lives are replaced with alternatives built to newer technical standards, Toronto Hydro ensures that the existing stock of the obsolete parts are used up first to minimize residual inventory. In certain cases, Toronto Hydro may also return remaining quantities of the obsolete equipment to the supplier, or sell them for scrap. This approach ensures that warehouse storage space is used efficiently without impeding the adoption of new technologies or types of equipment.

3.3.5 *Facilities*

Table 8: Summary of Facilities Productivity Initiatives

Initiative	Description
Building Efficiency Optimization	Toronto Hydro leverages parametric data it receives through its membership in industry associations such as the Building Owners and Managers Association ("BOMA") to improve the utility's operating efficiency. For example, Toronto Hydro studies data from the regional BOMA Experience Exchange Reports ("EER") measuring the cost per square-foot of key facilities management functions against other peer utilities and benchmarking data retrieved from the Energy Star Portfolio Manager. The utility uses this information to measure and track its energy and water consumption against other commercial and institutional buildings, analyze its performance, and make recommendations for improvements to areas such as energy and utilities conservation.
Facilities Maintenance Optimization	Toronto Hydro uses a computerized maintenance management system ("CMMS") that manages, tracks, and schedules maintenance work. The CMMS, in conjunction with departmental performance measures such as the On-Time in Full ("OTIF") metric that steers the completion criteria for tenant requests, enables Toronto Hydro to maximize the effectiveness of its maintenance resource dispatching strategy. The CMMS provides users with a range of functions that display new, existing, and historical work orders for repair, maintenance, cleaning, and external grounds segments and for each work centre, and track the resources allocated to a given activity or segment.

4. BENCHMARKING STUDIES

This application and the investment plan that underpins it has been informed by extensive benchmarking to assess the utility's performance and proposals relative to a range of peers across various jurisdictions, industries and operational areas. Consistent with the Rate Handbook, the utility is filing a number of expert benchmarking studies, along with key internal benchmarking analyses to assist the OEB in evaluating Toronto Hydro's application. This section briefly summarizes each of the benchmarking analyses that are being filed in this application.

4.1 Total Cost Benchmarking ("TCB")

At Exhibit 1B, Tab 3, Schedule 1, Appendix A Toronto Hydro filed a custom Total Cost and Reliability Benchmarking study prepared by Clearspring Energy Advisors, LLC ("Clearspring") under the leadership of expert Mr. Steve A. Fenrick. Mr. Fenrick and Clearspring have significant experience preparing benchmarking studies throughout North America, including studies that informed Toronto Hydro's 2015 and 2020 custom rate applications, as well as the custom rate applications of other large distributors in the province of Ontario.

In the utility's last rate application (EB-2018-0165) an area of notable exploration with respect to the total cost performance was the 'urban core variable' and its value within the context of benchmarking. The econometric experts recognized the statistical significance of an urban core variable in benchmarking Toronto Hydro costs, and the OEB Panel also commented in its Decision and Order that a well-constructed urban variable may be appropriate for Toronto Hydro. [23,24] While there was general recognition in the last application that costs within a dense urban core are different than those experienced in other settings, the complexity of quantification was the subject of discussion, which led the OEB to comment in its decision on how a future custom total cost benchmarking study might be improved. To that end, Toronto Hydro asked Clearspring to refine and further enhance the data relied upon to determine the urban core variable for total cost benchmarking purpose.

Having done that work, in addition to other enhancements that have been recognized as appropriate in major rate applications filed since EB-2018-0165 (particularly Hydro One's 2023-2027 rate application), the Total Cost Benchmarking Study found that Toronto Hydro's costs from 2020 through 2022 were 28 percent below the predicted benchmark, while costs

[23] EB-2018-0165, OH Volume 10 (July 15, 2019) at page 19, lines 10-19.
[24] EB-2018-0165, Decision and Order (December 19, 2019) at page 29.

over the 2025 to 2029 rate term are forecast to be 22.9 percent below the predicted benchmark.

4.2 Reliability Benchmarking

In the same study as noted in 3.1, Clearspring benchmarked Toronto Hydro's system average interruption frequency index ("SAIFI") and customer average interruption duration index ("CAIDI"). The study found Toronto Hydro's 2020-2022 actual SAIFI to be 98.8 percent above the benchmark and its CAIDI to be 104.1 percent below benchmark. Considering these two results together, Clearspring also concluded that Toronto Hydro's system average interruptions duration index ("SAIDI") is 5.3 percent better than the predicted benchmark.

4.3 Enterprise Information Technology Cost Benchmark and Functional Maturity Assessment Study

At Exhibit 2B, Section D8, Appendix A, Toronto Hydro filed an Enterprise Information Technology Cost Benchmark and Functional Maturity Assessment study completed by Gartner Inc. ("Gartner"). This study compares Toronto Hydro's IT costs over time and against a relevant international peer group of electric utility companies. The Gartner study concludes that Toronto Hydro's IT costs benchmark competitively relative to its peers, with the distribution of IT investments by cost category, investment category, and functional area all being comparable to the peer group.

The study also assessed and compared Toronto Hydro's IT maturity across seven domains (Application Development, Data & Analytics, Enterprise Architecture, CIO (IT Governance, IT Finance & Performance, Program & Portfolio Management, Security, Infrastructure & Operations) against a peer group of organizations from the energy and utility industry. The Gartner study concludes that Toronto Hydro's maturity across all domains is slightly higher than its peers.

4.4 Compensation and Benefit Review

At Exhibit 4, Tab 4, Schedule 5, Toronto Hydro filed a Compensation and Benefits Review of the utility's non-executive compensation costs completed by Mercer Canada Limited (Mercer). This review provides an independent, market-based assessment of Toronto Hydro's compensation and benefits practices against relevant general industry and energy peer group. The Mercer study concludes that Toronto Hydro's total compensation is positioned within a market competitive range relative to the 50th percentile of the energy market. With respect to the general industry peer group, total compensation is slightly above market due to pensions and benefits. However, the total cash component of compensation (i.e. salary and wages) is market-competitive at the 50th percentile.[25]

4.5 Operations and Workforce

To assist the OEB in evaluating the Toronto Hydro's request for custom operational funding beyond the 2025 rebasing year, in Exhibit 4, Tab 1, Schedule 1, Toronto Hydro included a benchmarking analysis of operational cost performance against an average of large and mid-sized electricity distributors in Ontario based on publicly available data reported to the OEB through the Electricity Record-keeping and Reporting Requirement ("RRR"). This analysis demonstrates that: (i) despite unique urban challenges and an expanding asset base, Toronto Hydro controlled operational costs over the 2015-2022 period while improving and maintaining high performance on numerous outcomes and service quality metrics as detailed in Exhibit 1B, Tab 3, Schedule 2; (ii) Toronto Hydro has a demonstrably lean workforce contingent when compared to its peers using various key ratio such as net fixed assets ("NFA") per Full-Time Equivalent ("FTE"), FTEs by system load (MWh), and FTEs per kilometer of line.[26]

[25] Exhibit 4, Tab 4, Schedule 5 – Mercer Benchmarking Report at page 5.
[26] Hydro One, Alectra Utilities, Hydro Ottawa, Elexicon Energy, London Hydro, EnWIn, and Enova.

The analysis also shows that despite what at first glance appears to be higher cost performance per customer when benchmarking the utility to its Ontario peers, closer examination shows that Toronto Hydro requires more system capacity, more assets and hence more resources per customer than other large or mid-size distributors in Ontario. In part, this is driven by Toronto Hydro customers serviced behind bulk meters, which skews the evaluation of performance against customer count. Examination of MWh of load relative to customer count demonstrates this reality, with Toronto Hydro providing an average of 31.8 MWh per customer, approximately 35 percent more load per customer relative to the peer group multi-year average of 23.6 MWh. This trend is consistent with observed number of high-rise buildings found within the service territories of the utilities in the peer group that serve cities in Ontario. Toronto Hydro has approximately 46 percent more high-rise buildings in its service territory than the all the utilities in the peer group combined based on publicly available data.[27]

Table 9: Highrise Buildings for Top Ontario Distributors

Distributor	Highrise Buildings
Toronto Hydro	2,619
Ontario Peer Group Combined[28]	1,790

4.6 Unit Cost Benchmarking ("UCB")

At Exhibit 1B, Tab 3, Schedule 3, Appendix C, Toronto Hydro filed a Unit Cost Benchmarking study completed by UMS Group ("UMS"). This study compares Toronto Hydro's 2020-2022 average unit costs for major asset classes and maintenance activities to a peer group of Ontario and U.S. utilities that responded to the survey sent out by UMS in preparing this study. Overall, UMS found that Toronto Hydro's unit costs performance was comparable or

[27] As per data from SkyscraperPage https://skyscraperpage.com/database/country/1
[28] Alectra, Elexicon, London Hydro, EnWin, and Enova.

better than the peer group, ranging from minus 12.2 percent to plus 1.9 percent relative to the median. UMS also noted that if certain qualitative considerations, such as customer density, could be statistically normalized in the data set, Toronto Hydro's comparative ranking would likely be better than shown.

4.7 Activity and Program-Based ("APB") Benchmarking

In accordance with section 2.1.6 of the Chapter 2 Filing Requirements, the following section provides a year-over-year variance analysis for the APB's ten programs. Toronto Hydro is unable to provide a unit cost variance analysis of the 2025 test year versus historical actuals because the utility plans both its capital and OM&A investments programmatically rather than on a unit basis.

- The utility forecasts in-service additions using a reasonable methodology that is subject to certain practical limitations that are noted Exhibit 2A, Tab 1, Schedule 1. Comparing unit cost actuals which are derived from assets as constructed out in the field, with forecasted unit costs derived by an in-service addition forecasting methodology, does not yield an apples-to-apples comparison that lends itself to explaining variances between historical and forecasted unit costs.
- Similarly to its ISA forecasting methodology, to allocate forecast program costs to USoA accounts, Toronto Hydro relies on historical data mapping, which is quite complex. Comparing historical and forecasted USoA-based unit costs would therefore not yield a meaningful comparison that lends itself to explaining variances.

Furthermore, Toronto Hydro notes that the APB econometric model does not account for recognized differences that set Toronto Hydro apart from other Ontario utilities due to its unique urban environment and customer base that includes many high-rise buildings, as described in sections 1 and 3.1.5 above, respectively.[29] As such Toronto Hydro, is not in a position to comment on the results of the econometric model.

4.7.1 *Billing O&M*

Table 10 below shows Toronto Hydro's annual billing O&M costs per customer. The increase from 2019 to 2020 is primarily attributed to the inclusion of the incremental costs from conversion from bi-monthly to monthly billing in 2020 where they had been previously tracked in the Monthly Billing deferral account.[30] Please see Exhibit 4, Tab 2, Schedule 14 for additional discussion of factors affecting Toronto Hydro's billing costs and the utility's efforts to control those costs.

Table 10: 2018-2022 Billing O&M Cost per Customer

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5315]	9,626	16,633	22,200	21,444	24,401	18,861
Scale (1,000 Customers)	772.6	777.9	779.2	785.7	790.5	781.2
Unit Cost ($/Customer)	12.46	21.38	28.49	27.29	30.87	24.10

4.7.2 *Metering O&M*

Table 11 below shows Toronto Hydro's annual metering O&M costs per customer. These costs have been relatively stable over the 2018-2022 period with minor variations depending on the volume and mix of metering maintenance and meter reading work required each year. For more detail please see Exhibit 4, Tab 2, Schedules 1 and 14.

[29] As noted by PEG in the APB report "some relevant business conditions will not be measured in the models" (PEG, Report to the Ontario Energy Board Activities and Program Benchmarking: 2021-2022 Results (October 10, 2023 at page 51) and as noted in section 1.1, econometric experts (including PEG) have recognized the statistical significance of an urban core variable in benchmarking Toronto Hydro costs, but no urban core variable (or anything similar) was included in the APB econometric benchmarking.
[30] EB-2018-0165, Exhibit 4A, Tab 2, Schedule 14 and Exhibit 9, Tab 1, Schedule 1.

Table 11: 2018-2022 Metering O&M Cost per Customer

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5065 + 5175 + 5310]	5,193	5,556	5,656	4,656	4,853	5,183
Scale (1,000 Customers)	772.6	777.9	779.2	785.7	790.5	781.2
Unit Cost ($/Customer)	6.72	7.14	7.26	5.93	6.14	6.64

4.7.3 *Vegetation Management O&M*

Table 12 below shows Toronto Hydro's annual vegetation management O&M costs per pole on the system. The cost per pole for vegetation management will vary depending on the volume of work, which can be planned (i.e. on a cycle of 2 to 5 years) or reactive (spot tree trimming). To track and assess its (planned) vegetation management cost performance, Toronto Hydro has been reporting annually on its 2020-2024 custom measure, Vegetation Management Cost per kilometer. Toronto Hydro also had this measure benchmarked against peer utilities as part of the UMS Unit Cost Benchmarking Study, which showed Toronto Hydro's costs being within 2 percent of the median. For more details on vegetation management and its costs on a per km basis, please see Exhibit 1B, Tab 3, Schedule 2, Appendix C to this schedule, and Exhibit 4, Tab 2, Schedules 1 and 4.

Table 12: 2018-2022 Vegetation Management O&M Cost per Pole

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5135]	3,309	2,826	3,230	2,083	3,431	2,976
Scale (1,000 Poles)	179.4	180.3	181.8	182.6	183.6	181.6
Unit Cost ($/Pole)	18.44	15.67	17.76	11.40	18.69	16.39

4.7.4 *Lines O&M*

Table 13 below shows Toronto Hydro's annual Lines O&M costs per circuit kilometer of primary line. The cost per circuit-kilometer has been increasing steadily over 2019-2022. This category includes a wide range of inspection and maintenance activities including underground and overhead, proactive and corrective; as a result, there are many factors driving Lines O&M costs year-to-year. For more details on some of the relevant activities and their cost drivers, please see Exhibit 4, Tab 2, Schedules 1, 2, 4, 5.

Table 13: 2019-2022 Lines O&M Cost per Circuit km

	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5020:5030 + 5040:5050 + 5090:5095 + 5125:5130 + 5145:5155]	21,869	23,264	25,850	29,596	23,661
Scale (Circuit km of Primary Line)	10,528	10,597	10,625	10,663	10,583
Unit Cost ($/Circuit km of Primary Line)	2,077	2,195	2,433	2,776	2,235

4.7.5 *Stations O&M*

Table 14 below shows Toronto Hydro's annual Stations O&M costs per total MVA. The cost per MVA fluctuates year-to-year depending on the number and relative complexity of the station assets due for inspection and maintenance and the volume of unplanned (corrective and emergency) maintenance work required. For more details please see Exhibit 4, Tab 2, Schedules 3-5.

Table 14: 2018-2022 Stations O&M Cost per Total MVA

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5016 + 5017 + 5114]	12,779	8,051	6,488	9,187	8,602	9,021
Scale (Total MVA)	7,583	7,617	7,774	7,891	7,853	7,744
Unit Cost ($/MVA)	1,685	1,057	835	1,164	1,095	1,167

4.7.6 *Poles, Towers, and Fixtures O&M*

Table 15 below shows Toronto Hydro's annual Poles, Towers, and Fixtures O&M costs per pole. Year-to-year variances in the cost per pole are primarily driven by the volume of unplanned (e.g. corrective and emergency) maintenance work needed for poles. For more details please see Exhibit 4, Tab 2, Schedules 1, 4, and 5.

Table 15: 2018-2022 Poles, Towers, and Fixtures O&M Cost per Pole

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5120]	581	1,161	2,123	2,102	1,751	1,296
Scale (1,000 Poles)	179.4	180.3	181.8	182.6	183.6	180.6
Unit Cost ($/Pole)	3.24	6.44	11.68	11.51	9.54	7.15

4.7.7 *Stations CAPEX*

Table 16 below shows Toronto Hydro's annual stations capital additions per total MVA. Since the scale used for this metric is relatively stable, these values are largely driven by the annual capital additions, which can fluctuate due to the volume and mix of stations assets installed and the timing of when they are put into service given that these projects typically span more than one year. For more details about the investments contributing to stations capital additions and their cost drivers please see Exhibit 2B, Sections E6.6.

Table 16: 2018-2022 Stations Capital Additions per Total MVA

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [1820] Capital Additions	30,320	16,655	21,541	25,606	26,295	24,083
Scale (Total MVA)	7,583	7,617	7,774	7,891	7,853	7,744
Unit Cost ($/MVA)	3,998	2,186	2,771	3,245	3,348	3,110

4.7.8 *Poles, Towers, and Fixtures CAPEX*

Table 17 below shows Toronto Hydro's annual poles, towers, and fixtures capital addition costs per pole installed. Since 2019, these unit costs have been relatively stable with some year-over-year variance. The costs to install poles can vary due to a number of factors including the type of project (planned versus reactive versus externally driven), site location and conditions, the number of circuits and attachments, and external cost drivers (e.g. supply chain pressures). Toronto Hydro tracks its planned wood pole renewal unit costs through its 2020-2024 custom measure, Average Wood Pole Replacement Cost, and had it benchmarked against peer utilities through the UMS Unit Cost Benchmarking Study, where it was within 2 percent of the median. For more information on the utility's performance on this measure and the major contributing programs, please see Exhibit 1B, Tab 3, Schedule 2, Appendix C to this schedule, and Exhibit 2B, Sections E6.1 and E6.5.

Table 17: 2018-2022 Poles, Towers, and Fixtures Capital Addition Costs per Pole

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [1830] Capital Additions	21,288	32,866	33,134	33,663	29,573	30,105
Scale (Pole Additions)	3,254	3,525	3,367	3,677	3,312	3,427
Unit Cost ($/Pole Addition)	6,542	9,324	9,841	9,155	8,929	8,758

4.7.9 *Line Transformers CAPEX*

Table 18 below shows Toronto Hydro's annual line transformer capital addition costs per transformer installed. Toronto Hydro's line transformers include overhead, underground (including padmount, submersible, and vault), and network transformers, and the relative volume of each of these in a year impacts the unit costs due to the large variation in costs for each type. As illustrated in the UMS Unit Cost Benchmarking Study, both Toronto Hydro's and the peer group median unit costs for underground transformers were approximately two times those for overhead transformers and network transformer unit costs were more than three times (or over $90,000 more) the underground transformer unit costs.[31] As a result, Toronto Hydro has observed that the year-over-year variations in unit costs in this category are correlated with the relative proportion of transformer types addressed within a given year. For more information on such drivers, please see Exhibit 2B, Sections E6.2-E6.5.

[31] Exhibit 1B, Tab 3, Schedule 3, Appendix C at page 8.

Table 18: 2018-2022 Line Transformer Capital Addition Costs per Transformer

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [1850] Capital Additions	62,026	79,731	84,980	87,980	78,613	78,666
Scale (Lines Transformer Additions)	2,900	2,746	2,716	3,086	2,470	2,784
Unit Cost ($/Line Transformer Addition)	21,388	29,035	31,289	28,510	31,827	28,410

4.7.10 *Meters CAPEX*

Table 19 below shows Toronto Hydro's annual meters capital addition costs per customer. A large portion of these investments are non-discretionary as an inherent part of connecting customers or to replace failed meters to ensure accurate and timely billing. Where Toronto Hydro has some discretion (i.e. planned meter replacements), it still must consider the timing of meter seal expiries. Another factor layered onto these considerations is the types of meters being installed or replaced. For example, in 2020 Toronto Hydro installed 10 of the more expensive ION meters compared to five or less in 2021 and 2022. Please see Exhibit 2B, Sections E5.1, E5.4, and E6.7 for more information on factors impacting Toronto Hydro's metering investments.

Table 19: 2018-2022 Meter Capital Addition Costs per Customer

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [1860] Capital Additions	24,359	14,491	19,983	15,476	17,882	18,438
Scale (1,000 Customers)	773	778	779	786	791	781
Unit Cost ($/Customer)	32	19	26	20	23	24

Econometric Benchmarking Study of Toronto Hydro's Total Cost and Reliability Metrics

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Clearspring Energy Advisors LLC

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1 Executive Summary

Toronto Hydro - Electric System Limited ("Toronto Hydro" or "Company") engaged Clearspring Energy Advisors, LLC ("Clearspring") to conduct an econometric benchmarking study of Toronto Hydro's past and projected total costs and reliability metrics. The lead researcher of the study is Mr. Steven A. Fenrick. Mr. Fenrick has led numerous benchmarking studies in Ontario and throughout North America, including in Toronto Hydro's last two custom incentive regulation ("Custom IR") applications. In both of those prior applications, total cost and reliability benchmarking was conducted for the Company. A copy of Mr. Fenrick's summary *curriculum vitae* is provided in Appendix B.

Clearspring uses the results of this study to determine the stretch factor recommendation for Toronto Hydro in its 2025-2029 Custom IR application. The benchmarking research uses the econometric approach to evaluate total costs. This approach aligns with the Ontario Energy Board Decision in the 4th Generation Incentive Regulation ("4GIR") proceeding.[1]

The benchmark models use established methodologies that have evolved and been refined through numerous incentive regulation proceedings in Ontario. Most notably, during Hydro One Network's most recent joint rate application, Clearspring and Board Staff's consultant, Pacific Economics Group, undertook a conferral process regarding benchmarking and together issued a joint report.[2] Clearspring used the Joint Report benchmarking research as the starting point for the current total cost study. Clearspring retained all the variables and methodologies used in the Joint Report with the only changes being that we improved the model specification by adding two distribution substation variables and further refining the congested urban core variable to vary over time.

1.1 Research Study Components

The research conducted and described in this report includes total cost and reliability benchmarking of Toronto Hydro. The research consisted of the following three studies:

- **Distribution total cost benchmarking of Toronto Hydro.** This study benchmarks the Company's total cost levels and is the basis for our recommendation for the stretch factor in this Custom IR application.
- **Sustained average interruption frequency index ("SAIFI") benchmarking of Toronto Hydro.** This study benchmarks the Company's SAIFI metrics, both historical and projected, to industry expectations. SAIFI measures the number of sustained outages an average customer on the system experiences.
- **Customer average interruption duration index ("CAIDI") benchmarking of Toronto Hydro.** This study benchmarks the Company's CAIDI metrics, both historical and projected, to industry

[1] Case EB-2010-0379.

[2] The prior Hydro One application was EB-2021-0110. The conferral process produced a report titled, *Clearspring/PEG Joint Report on Hydro One Benchmarking and Productivity Research*, ("Joint Report").

expectations. CAIDI measures the average duration when a sustained outage occurs.

Another reliability metric that is often tracked and reported is the sustained average interruption duration index ("SAIDI"). SAIDI equals the product of SAIFI and CAIDI. We provide the benchmark comparison for SAIDI in this report by multiplying the SAIFI and CAIDI benchmarks.

1.2 Total Cost Benchmark Findings

The first model benchmarks total costs for Toronto Hydro. Total costs are defined as the sum of OM&A expenses and capital costs. The capital cost portion is constructed based on net plant and historical plant additions over time, and includes the estimated economic depreciation and opportunity costs of capital. The components within the calculation of total costs are similar to the components in the distribution portion of revenue requirements.[3] Total cost benchmarking is the approach used in 4GIR to set stretch factors and is the basis for every other Custom IR application that our team has participated in. The total cost method is preferred to partial cost benchmarking approaches, such as OM&A or capital benchmarking, which exclude large portions of pertinent costs and do not account for differences between sampled utilities regarding input substitution or accounting.

Our total cost econometric benchmarking study results indicate the following:

1. The most recent 3-year average of historical total costs (2020 to 2022) of Toronto Hydro are below benchmark expectations. The average benchmark score for Toronto Hydro from 2020 to 2022 is -28.0%.
2. The projected total cost levels during the Custom IR period (2025 to 2029) remain below the benchmark predictions. The average benchmark score for Toronto Hydro during the Custom IR period is -22.9%.

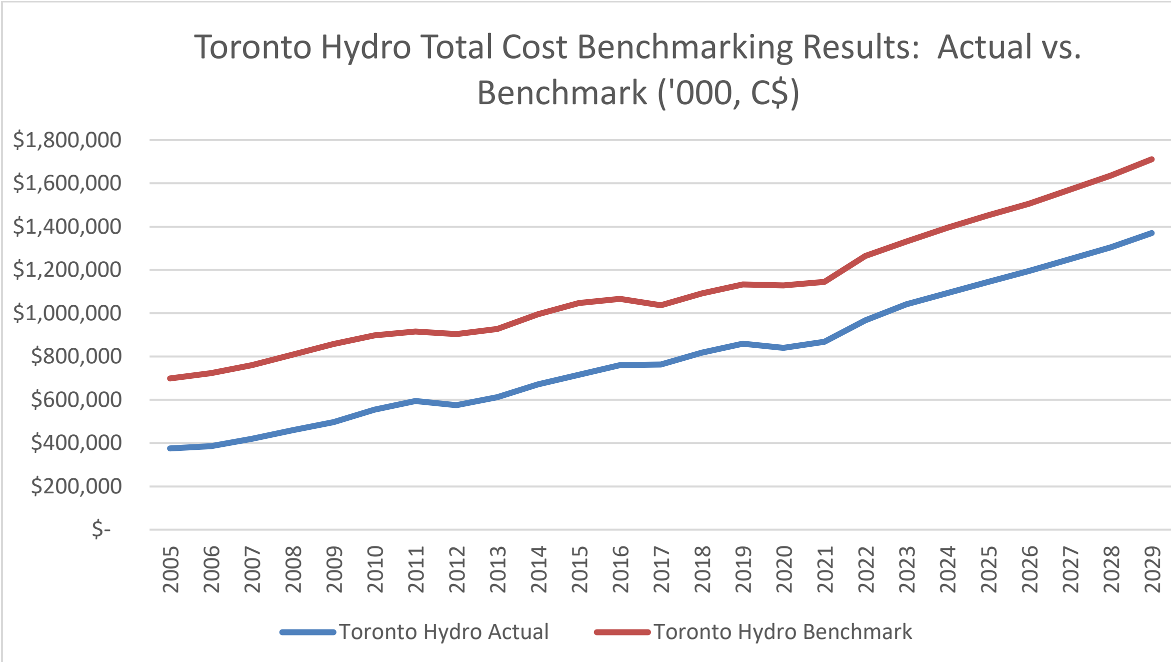
The following table and graph provide the comparison between Toronto Hydro's historical and projected total costs and the model's benchmark total costs.

[3] Total costs are not exactly analogous to revenue requirements because of the generalizations needed to offer a fair analysis between utilities with varying depreciation rates, rate of returns, capital addition patterns, and cost definitions.

Table 1 Toronto Hydro's Total Cost Performance 2005-2029

Year	**% Difference from Total Cost Benchmark**
2005	-62.1%
2006	-62.9%
2007	-59.3%
2008	-56.5%
2009	-54.5%
2010	-48.2%
2011	-43.1%
2012	-45.2%
2013	-41.6%
2014	-39.5%
2015	-38.1%
2016	-33.9%
2017	-30.7%
2018	-28.8%
2019	-27.6%
2020	-29.4%
2021	-27.6%
2022	-26.8%
2020-2022 average score	**-28.0%**
2023	-24.6%
2024	-24.4%
2025	-23.9%
2026	-23.1%
2027	-22.9%
2028	-22.6%
2029	-22.2%
2025-2029 average score	**-22.9%**

Figure 1 Historical and Projected Total Costs vs. Benchmarked Costs



1.3 Reliability Benchmark Findings

Clearspring Energy additionally conducted econometric reliability benchmarking of Toronto Hydro's SAIFI and CAIDI. The reliability study benchmarks Toronto Hydro's historical (2005 to 2022) data after major event day ("MED") exclusions are made.[4] The metrics include loss of supply outages to remain consistent with the U.S. dataset definition and are based on a five-minute sustained outage definition which matches most of the U.S. sample. The reliability benchmarking, like the total cost study, used a U.S. sample.

Excluding MEDs from the calculation of the metrics enables the study to gauge reliability performance during normal operating conditions. Clearspring Energy gathered U.S. reliability data and their MED definitions from publicly available regulatory filings.

Clearspring Energy's reliability benchmarking analysis indicates the following:

1. The most recent 3-year average (2020 to 2022) for SAIFI is 98.8% above benchmark expectations. During the Custom IR period, SAIFI is projected to be 99.4% above benchmark expectations.
2. The most recent 3-year average for CAIDI is 104.1% below benchmark expectations. During the Custom IR period, CAIDI is projected to be 110.2% below benchmark expectations.

The following table provides the comparison between Toronto Hydro's actual (or projected) SAIFI and CAIDI, the model's benchmark value, and the percentage difference of the actual/projected to the

[4] According to Toronto Hydro, its outage recording methods increased in automation and the ability to identify and track outages more precisely relative to historical metrics. This enhancement in outage tracking has slightly increased the projected reliability estimates.

benchmarks.

Table 2 Toronto Hydro's SAIFI and CAIDI Actuals and Benchmarks 2005-2029

Year	SAIFI (Actual)	SAIFI (Benchmark)	SAIFI (% Difference)	CAIDI (Actual)	CAIDI (Benchmark)	CAIDI (% Difference)
2005	0.93	0.46	70.2%	76.59	110.00	-36.2%
2006	1.11	0.46	88.1%	64.98	110.73	-53.3%
2007	1.14	0.47	89.7%	69.12	111.59	-47.9%
2008	1.08	0.46	85.0%	67.40	112.68	-51.4%
2009	0.95	0.46	72.8%	84.13	113.75	-30.2%
2010	0.98	0.46	75.5%	77.30	115.32	-40.0%
2011	1.05	0.45	83.9%	80.13	117.26	-38.1%
2012	0.88	0.45	67.4%	68.06	118.66	-55.6%
2013	0.95	0.45	75.8%	70.61	120.35	-53.3%
2014	0.92	0.45	72.6%	63.76	123.09	-65.8%
2015	0.97	0.44	78.4%	64.04	125.48	-67.3%
2016	0.93	0.45	73.3%	59.71	128.08	-76.3%
2017	1.09	0.45	87.4%	53.14	129.25	-88.9%
2018	1.09	0.46	86.8%	53.25	130.44	-89.6%
2019	0.95	0.45	73.9%	50.39	132.46	-96.6%
2020	1.11	0.45	91.2%	50.77	135.21	-98.0%
2021	1.20	0.44	100.3%	48.55	136.49	-103.4%
2022	1.24	0.43	105.0%	45.75	138.95	-111.1%
2020-2022 average	**1.18**	**0.44**	**98.8%**	**48.36**	**136.88**	**-104.1%**
2023	1.28	0.43	114.2%	42.76	141.81	-119.9%
2024	1.19	0.43	98.3%	51.28	144.87	-103.9%
2025	1.19	0.43	96.5%	51.49	148.16	-105.7%
2026	1.18	0.43	95.7%	51.54	151.67	-107.9%
2027	1.17	0.43	94.8%	51.68	155.43	-110.1%
2028	1.17	0.43	93.8%	51.85	159.47	-112.3%
2029	1.16	0.43	93.8%	51.96	163.82	-114.8%
2025-2029 average	**1.17**	**0.43**	**99.4%**	**51.70**	**155.71**	**-110.2%**

While SAIFI and CAIDI are modeled separately, the actuals and benchmarks for those metrics can be multiplied together to produce a SAIDI benchmark score. The following table provides the comparison between Toronto Hydro's actual (or projected) SAIDI, the benchmark value, and the percentage difference of the actual/projected to the benchmark.

Table 3 Toronto Hydro's SAIDI Actuals and Benchmarks 2005-2029

Year	SAIDI (Actual)	SAIDI (Benchmark)	SAIDI (% Difference)
2005	71.3	50.7	34.0%
2006	71.9	50.7	34.8%
2007	78.9	51.9	41.8%
2008	72.9	52.1	33.7%
2009	80.2	52.3	42.7%
2010	75.4	52.8	35.5%
2011	84.2	53.2	45.8%
2012	60.2	53.5	11.8%
2013	67.1	53.6	22.4%
2014	58.8	54.9	6.8%
2015	61.9	55.4	11.2%
2016	55.7	57.4	-3.1%
2017	58.1	58.8	-1.1%
2018	57.8	59.7	-3.3%
2019	47.8	60.1	-22.9%
2020	56.3	60.3	-6.9%
2021	58.2	60.1	-3.1%
2022	56.8	60.3	-6.0%
2020-2022 average	**57.1**	**60.2**	**-5.3%**
2023	54.8	61.5	-11.7%
2024	61.0	62.9	-3.0%
2025	61.2	64.3	-5.0%
2026	60.8	65.9	-8.0%
2027	60.6	67.5	-10.8%
2028	60.5	69.2	-13.6%
2029	60.2	71.1	-16.7%
2025-2029 average	**60.6**	**67.6**	**-10.8%**

1.4 Stretch Factor Recommendation

In the 4th Generation IR proceeding, five stretch factor groupings (cohorts) were established based on the most recent average three-year total cost benchmarking scores. A score better than -25% (i.e. costs were more than 25% below benchmark) received the lowest stretch factor of 0.00%. A score between -25% and -10% received a 0.15% stretch factor. Scores that are +/- 10% received 0.30%. Scores between 10%

and 25% received a 0.45% stretch factor, and scores exceeding 25% (i.e., costs were more than 25% above benchmark) received the highest stretch factor of 0.60%.

Our total cost study findings for Toronto Hydro show that during the Custom IR period, the Company's total cost benchmarking score is -22.9%. Based on the 4th Generation IR stretch factors and Clearspring's econometric benchmarking results, the appropriate stretch factor is 0.15%. This stretch factor not only aligns with Toronto Hydro's strong total cost benchmarking results, but also aligns well with other recent stretch factor precedents in Canada and the States.

2 Overview of Benchmarking Methodology, Narrowing of Differences, and Improvements Made

The total cost and reliability models have built upon the foundation laid in prior Custom IR proceedings. Hydro One Network's most recent Custom IR application included a conferral process involving Clearspring and the Board Staff's benchmarking expert, Pacific Economics Group ("PEG"). Clearspring and PEG issued a report titled, "Clearspring/PEG Joint Report on Hydro One Benchmarking and Productivity Research" ("Joint Report") during that application. Both Clearspring and PEG have endeavoured throughout prior Custom IR applications to narrow benchmarking methodological differences. The only consequential difference regarding distribution total cost benchmarking cited by Clearspring and PEG in the Joint Report was the service territory area of Hydro One.[5] That is a non-issue in this proceeding since Hydro One is not included in the sample.

Clearspring used the same methodology for the total cost model as used for Hydro One and the research found in the Joint Report. We made two further improvements regarding included variables. A summary of how prior differences have been narrowed and a discussion on these two improvements is found in the following sub-section (Section 2.1).

The benchmarking study for both the total cost and reliability studies employed the econometric benchmarking approach. This is the most accurate and fair method when comparing utility cost and reliability levels because it explicitly adjusts for the quantifiable differences between utility service territories and business conditions. It is also the same method preferred by the Board in the 4GIR Decision.

Simple comparisons of metrics such as rates, unit costs, or reliability indices do not typically allow regulators to compare utilities in a fair manner. For example, comparing a utility's costs to those of a peer group utilities' costs usually presents an inaccurate picture of the target utility's performance. Factors that cannot be controlled by the utility affect costs and reliability performance. Such factors include geographical size, regional wage levels, rural density, or serving a congested urban territory. It is often difficult or impossible to account for these factors using a peer group approach.

Adjusting for these and other influencing factors is necessary to accurately evaluate performance. With this concept in mind, Clearspring has estimated three econometric models from a large sample of utilities (total cost, SAIFI, and CAIDI) using variable parameters that are statistically influential on distribution utility costs and reliability indexes. The benchmarking method adjusts for service territory conditions and other factors that affect the studied metrics.

Using a large sample of utilities, the econometric model produces an industry-wide estimation of how the variables (e.g. number of customers, peak demand, etc.) affect the studied metric (e.g. total costs). For

[5] In the conferral process, there were a few changes made by the consultants to their original reported research. Regarding Clearspring's research, PEG suggested that both Clearspring and PEG include an O&M based scope variable. Clearspring investigated the merits of this suggestion and then agreed to include this variable and update the model results found in the Joint Report with this new variable. We now include this same variable in our current research for Toronto Hydro.

the present study, the sample used to estimate the models includes U.S. observations from multiple utilities for multiple years. It is a robust sample that produces an accurate benchmark assessment of Toronto Hydro's total cost and reliability metrics.

The high-level method for the three models is similar. In each case, the model uses the industry data over the studied period to determine the relationship between the metric and the factors that drive it. For example, the total cost model estimates the industry-wide relationship between total cost and certain variables, based on the utilities included in the sample. The model is then used to predict Toronto Hydro's "expected" (benchmarked) costs, using the same estimated relationship between the costs and the explanatory variables, and using Toronto Hydro's particular values for the variables. The approach for the reliability metrics is similar, although a different set of explanatory variables is used for each model.

Total cost and reliability predictions are calculated by inserting company-specific variable values into the estimated equation for the metric at hand (total cost, SAIFI, or CAIDI) for each year in the study. The benchmark score is defined as the logarithmic percentage difference of the observed data to the predicted value of the data for a given year, as shown below.

$$Benchmark\ Score = \text{Natural Log}\ \left(\frac{Observed\ or\ Projected\ Cost\ Data}{Predicted\ Cost\ Data}\right)$$

The general approach of our benchmarking analysis is:

1. We assembled a dataset that includes the historical costs (or reliability) of all the observations, along with the variables that affect cost (or reliability), such as customer totals, peak demands, forestation, congested urban, wage levels, customer density, etc.
2. Using the sample data, Clearspring estimated three econometric models. Each model expresses the relationship between the variables and one of the metrics (total cost, SAIFI, or CAIDI).
3. We can then produce "benchmark" values for Toronto Hydro for any given year. The benchmarks denote the expected value for an average-performing utility with identical explanatory variable values for that year. For example, if the SAIFI model predicted a value of X for Toronto Hydro for 2010, that can roughly be translated as: "Given the industry-wide relationship between SAIFI and the variables that drive it (number of customers, % forestation, rural density, etc.), and given Toronto Hydro's specific variable values for that year, we would expect an average-performing utility to have a SAIFI of X in 2010."
4. A comparison between the actual values and the benchmarks can then be made for each year.
5. Future years for Toronto Hydro are also benchmarked and compared to projected costs, using the same model parameter estimates, and *projected* explanatory variable values (instead of *actual* variable values for historical years).

2.1 Prior Methodological Differences Addressed and Improvements Made

There have been several differences that have been addressed and narrowed by both Clearspring and PEG regarding distribution total cost benchmarking. As stated earlier, the only remaining consequential difference in the Hydro One application was what value to give regarding Hydro One's service territory.[6] This remaining difference is moot regarding benchmarking Toronto Hydro and can be ignored since Hydro One does not enter the sample and Toronto Hydro's service territory is far easier to define and clearly matches how other utilities in the sample have this variable defined.

Other past issues that have already been previously addressed before this study include the following.[7]

- **Sample Period** – Clearspring used 2000 as a start year of the sample for the Hydro One research and also uses 2000 for this Toronto Hydro study, while PEG used 2002 in the Hydro One application for distribution benchmarking. However, this is not a consequential difference.

- **Estimation Procedure** – Both Clearspring and PEG used the Driscoll-Kraay ("DK") method in the Joint Report and Clearspring continues to use the DK method for this study.

- **Model Specification** – Clearspring in the Hydro One research adopted PEG's distribution total cost model variables that it put forth in the prior Hydro Ottawa Custom IR proceeding with only one additional variable (a distribution work variable that was not consequential). In the Joint Report both consultants added a new economies of scope variable. The scope variable measures the O&M of distribution expenses relative to the O&M of distribution, transmission, and generation expenses. This model specification of the Joint Report is continued in this research with two improvements: adding a distribution substation variable and further refining the congested urban core by allowing the variable to change over time.

- **Peak Demand Variable Definition** – Clearspring used a 10-year rolling average for our peak demand variable in the Hydro One research and applied that same definition in this Toronto Hydro research. PEG uses a ratchet definition for its variable in its Hydro One research. Both consultants agreed in the Joint Report that this was not a consequential difference.

- **Capital Asset Price Levels** – Clearspring adjusted its definition of these prices in our Hydro One research in response to PEG raising an issue that the price levels should be based more on all the service territory of each utility rather than just the headquarter city. We are using the same prices as used in the Hydro One research. PEG also used these same prices in its Hydro One research.

- **Canadian Input Price Inflation** – In the Hydro One proceeding, Clearspring and PEG used the same input price inflation assumption. This was based on using a 50% weight of PEG's preferred index and a 50% weight of Clearspring's preferred index. Clearspring continues with this compromise in the current research.

[6] Even regarding this difference, both consultants acknowledged the "difficulty and challenge in getting the perfect number for this variable".

[7] For a fuller description of these, please see the Clearspring report in the most recent Hydro One application. On p. 9, section 2.1 of that report we provide more details on each of these differences and how they were addressed.

- **Older Capital Benchmark Year** – In the Hydro One application, Clearspring undertook considerable efforts to begin the capital stock calculation as early as possible. For most of the sampled utilities, we were able to begin that calculation in 1947. This helped address one of the issues PEG had previously raised. We now use that same 1947 capital benchmark year in the Toronto Hydro research and PEG used that same year in its Hydro One research.

- **Customized Labour and Non-Labour OM&A Weights** – In Hydro One, Clearspring and PEG both used weights based on utility-specific data for the labour and non-labour components of the OM&A price index. Clearspring continues this treatment in the current study.

- **Pensions and Benefits Treatment** – Both Clearspring and PEG agreed to exclude pensions and benefits in the Hydro One proceeding and Clearspring continues this exclusion in the current Toronto Hydro study.

Most of the differences between the consultants have been narrowed considerably. Even a model specification difference such as whether to include the distribution work variable has minor impacts on results. PEG did not include that variable in its distribution Joint Report model, Clearspring did but both consultants agree it has minor implications on the results.[8]

2.1.1 Model Specification Improvements to Joint Report

There are two differences between the Joint Report distribution total cost methodology and model that Clearspring estimated and the model for this application. Clearspring improved the model specification by collecting the data and then adding two distribution substation variables (number of substations and substation capacity) and refined the congested urban variable by adding a time dimension.

Regarding the congested urban variable, Clearspring has further examined and refined the variable consistent with the Board's findings in Toronto Hydro's prior application in EB-2018-0165. Both Clearspring and PEG included a congested urban variable in that application. The Board stated in its December 19, 2019 Decision on page 29, "The OEB accepts that a well-constructed congested urban variable may be appropriate for Toronto Hydro. However, the OEB concludes that the congested urban variable needs further research and refinement before it can be accepted as a meaningful adjustment to the assessment of cost benchmarking performance."

In this study, Clearspring incorporates a refined version of the congested urban variable that has now been agreed to and used by both Clearspring and PEG in multiple proceedings since Toronto Hydro's last Custom IR application. This includes that Clearspring and PEG used this variable in recent years in Hydro Ottawa's latest Custom IR application (EB-2019-0261) and Hydro One's latest Custom IR application (EB-2021-0110) which included the Joint Report. The further refinement to this established variable that Clearspring has made is to vary the congested urban variable by time using an adjusted annual change in

[8] Clearspring tested its model in this application and the variable continues to have minor implications (less than 1%) on the results for Toronto Hydro's total costs.

high-rise skyscrapers for each utility.

This is a better and more accurate approach because Toronto is one of the fastest growing cities in North America. The congested urban cost challenge for Toronto Hydro will be much larger in 2029 than its historical values. Finding a method to allow the congested urban variable to adjust for this substantial growth will produce a more accurate depiction of Toronto Hydro's historical and projected total cost performance during the 2025 to 2029 Custom IR period.

The congested urban core variable data was meticulously gathered in 2016 and 2017 during the research phase for the prior Toronto Hydro Custom IR benchmarking research. This involved multiple engineers and mapping experts spending hundreds of hours going over maps of North American cities to identify areas with buildings that were predominantly seven stories or higher and would most likely cause higher infrastructure challenges, and thus cost challenges, to the utility serving those areas. While this variable continues to be the best available approach to adjust for extreme urban cost challenges for utilities, it does have the drawback of being a snapshot in time of the congested urban variable challenges of each utility. That is, it is time invariant. The 2017 challenges faced by each utility are not the exact same challenges faced in future (or past) years. This is especially true for utilities serving cities that are either rapidly growing or rapidly declining. Adding a time component to the variable also becomes more important as the Custom IR period goes through 2029, twelve years after the initial construction of the variable.

To make this congested urban variable time variant, Clearspring gathered the number of high-rise skyscrapers at or above 100 metres for each year and for each city served within the U.S. sample and Toronto. This data was gathered from the Council on Tall Buildings and Urban Habitat ("CTBUH").[9] The CTBUH dataset spans the years of the sample period, 2000 to 2022, enabling the changes in skyscrapers in each utility's service territory to be used to modify the congested urban variable. For the future years for Toronto Hydro, we used the last ten-year average annual growth rate in high-rise buildings in Toronto to estimate the projected number of high-rises in Toronto.[10]

One issue with using the change in the number of skyscrapers per year to modify the congested urban variable is that some of the increase in skyscrapers may be to infill areas that are already classified as congested urban. For example, a seven-story building might be torn down for a building that is higher than 100 metres. Therefore, it is appropriate to reduce the growth rate escalation to account for this reality. Clearspring created a regression model that estimated how the change in the skyscraper count would impact the congested urban variable. Using the sample observations with a congested urban area, we found that every 1% change in the number of skyscraper buildings equated to a 0.63% change in the congested urban variable.[11]

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[9] The CTBUH website and data is available at www.ctbuh.org.

[10] From 2012 to 2022, the number of high-rises in Toronto has increased at an average annual rate of 7.1%.

[11] The econometric equation was simply the natural log of the congested urban area as the left-hand side variable, with a constant and the natural log of the number of skyscrapers in 2017 for those utilities in the sample with a non-zero value for the congested urban variable and skyscrapers (n = 35).

The congested urban variable in 2017 is the same variable value in that specific year as the variable used by PEG and Clearspring in the prior Hydro One and Hydro Ottawa proceedings. To adjust it for years subsequent to 2017 the formula used is:

$$Congested\ Urban_t = Congested\ Urban_{t-1} * exp\left[0.6285 * ln(\frac{Skyscrapers_t}{Skyscrapers_{t-1}})\right]$$

To adjust the congested urban variable for years prior to 2017 the formula used is:

$$Congested\ Urban_t = Congested\ Urban_{t+1} * exp\left[0.6285 * ln(\frac{Skyscrapers_t}{Skyscrapers_{t+1}})\right]$$

The prior time invariant approach assumed there was no change in a city's congested urban area during the sample period. This is the same as assuming a 0.0% impact on skyscraper changes to the congested urban value rather than the 0.6285 value we used in the equations above.

Regarding the substation variables, in the Hydro One benchmarking research both Clearspring and PEG included substation variables for the transmission benchmark models. We did not include distribution substation variables because collecting that data requires a considerable amount of effort which had not been undertaken for that application. However, this effort has been undertaken in this application and we have, therefore, included two new variables which enable the model to account and adjust for the number of distribution substations owned and operated by the utility and the MVa capacity of those stations.[12]

2.2 Benchmarks for Future Years

The same econometric model and its associated parameter values that are estimated using historical data (and used to develop Toronto Hydro's historical benchmarks) are also used to calculate the Company's benchmarks for future years through 2029. These parameter values are combined with projected variable values to calculate the expected total costs of Toronto Hydro in the future years of the Custom IR period.

Clearspring Energy was provided OM&A expense, plant addition, customer counts, and peak demand projections from Toronto Hydro. We then inserted these projections for each future year into the estimated econometric model.

2.3 Other Model Details

The model variables, parameter estimates, cost definition details, and results are provided in the Sections 3 (total cost) and 4 (reliability). Appendix A includes methodology details which include the method used to calculate capital quantities and costs (perpetual inventory method), model estimation approach, model specification, and variable parameter hypothesis testing.

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[12] An issue that PEG brought up in the Hydro One research was how best to count substations in the FERC Form 1 data that have the same address. In this research, we used the method that PEG suggested and only counted once if the Form 1 showed stations with the same address.

3 Distribution Total Cost Benchmarking Variables, Model, and Results

Clearspring undertook a total cost econometric benchmarking study of Toronto Hydro's distribution costs. This study provides a comparison of Toronto Hydro's distribution total costs to the benchmark costs after adjusting for the specific output levels, input prices, and business conditions that the Company operates within. These comparisons are made for both historical and forecasted years through 2029. For more information on the benchmarking methods please see Chapter 2 and Appendix A.

3.1 Distribution Variables

The three output variables used in the distribution benchmarking research are:

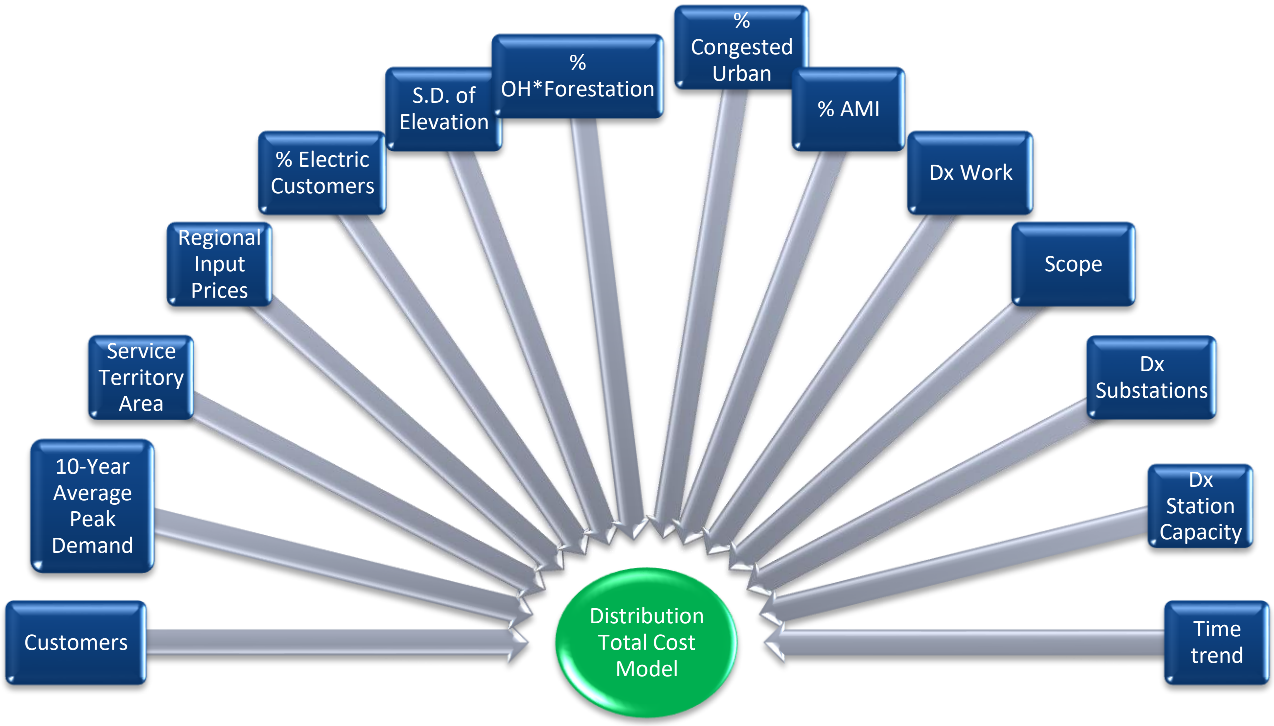
- Total customers served,
- A 10-year rolling average of peak demand, and
- The total distribution service territory of the utility.

The business condition variables used in the distribution benchmarking research are:

- Regional input prices (total costs in the model are divided by the input price index),
- Percent of electric customers in the total of electric and gas customers,
- Standard deviation of elevation,
- Percent of distribution plant that is overhead multiplied by the percent of forestation,
- Percent of congested urban area within each utility's service territory,
- Percent of AMI (smart meters) deployed by the utility in each year,
- The distribution work variable measures the percent of transmission lines classified as being served by transmission that are above 50 kV,
- The O&M based economies of scope variable which measures the percentage of distribution O&M expenses in total distribution, transmission, and generation expenses,
- The number of owned and operated distribution stations,
- The capacity of owned and operated distribution stations, and
- A time trend variable.

The variables included in the distribution benchmark analysis are shown in the figure below.

Figure 2 Variables in Distribution Cost Model



These variables provide a robust accounting of the varying service territory conditions faced by distribution utilities. All first order variables are statistically significant at a 90% confidence level and all variables are correctly signed (i.e., they are signed the way we would expect).

3.1.1 The Definition of Distribution Costs

OM&A and capital costs used in the benchmarking models for the U.S. distribution utilities are derived using FERC Form 1 filing data.[13] United States investor-owned utilities are required to file FERC Form 1 data annually, which includes operation and maintenance expenses broken down into specific cost categories (e.g., distribution, transmission, customer billing, administrative and general). Form 1s also include information regarding “plant in service” and accumulated depreciation that are used in constructing capital costs.[14]

We used a cost definition that is consistent between both the U.S. sample and Toronto Hydro. The cost definition is the same as the latest one used in the Hydro One total cost benchmarking study led by Mr. Fenrick. Clearspring began with the benchmark-based cost definition used by PEG in the 4GIR proceeding.

[13] Some of the FERC Form 1 data was gathered using SNL Energy’s database tool.

[14] Clearspring gathered plant addition data going back to 1947 for this study. This data was collected from various EIA annual reports.

To be consistent with the U.S. sample, we added high-voltage expenses to the cost definition for Toronto Hydro. The FERC Form 1 does not break down high- versus low-voltage distribution expenses, as Ontario reporting does. For the same reasons, contributions in aid of construction (“CIAC”) have been excluded from Toronto Hydro’s cost definition, due to those expenses not being included in the U.S. Form 1 data. Bad debt expenses (called uncollectible expenses in the FERC Form 1) have been excluded for all utilities, to match the 4GIR benchmark-based definition.

The cost definition also excludes customer service and information (“CSI”) expenses from total costs for all utilities. This is due to the possibility that the U.S. utilities include conservation demand management (“CDM”) expenses in the CSI expense category. This assures cost consistency between the U.S. sample and Toronto Hydro. The table below summarizes the cost definition treatment.

Table 4 Distribution Cost Definitions

Cost Element	Treatment
4th Generation IR Benchmark-Based Costs	This is the starting point for the sample.
Contributions in Aid of Construction (CIAC)	We subtracted from Toronto Hydro distributor costs, since U.S. cost data does not include CIAC.
High Voltage Expenses	We added to Toronto Hydro costs, since U.S. cost data includes distribution high voltage costs.
Customer Service and Information (CSI) Expenses	We excluded CSI expenses for both the U.S. and Toronto Hydro, given the possible inconsistency in CDM reporting.
Pensions and Benefits	We excluded OM&A pensions and benefits from both the U.S. and Toronto Hydro data.

The distribution total cost model includes three output variables. The first is the total number of customers served, the second is the ten-year rolling average of peak demand for each utility, and the third is the total service territory area for each utility. The first two output variables are gathered from FERC Form 1 data. The third uses GIS information on the utility service territory area; this variable uses the same values for the U.S. sample as found in the Hydro One research by Clearspring and PEG. The historical output data for Toronto Hydro regarding the number of customers and peak demands comes directly from the Company. The peak demand variable is calculated based on taking the ten-year rolling average of annual peak demand on the system in the sample that has occurred up to that year. For years without ten years’ worth of historical data, the years that are available were averaged.[15]

[15] This is another advantage of the 10-year rolling average method. There is no bias if fewer than ten years for a utility are available since we are taking an average rather than a maximum of the peak demands.

3.1.2 Distribution Business Condition Variables

Beyond the three output variables and the input price index, there are nine business condition variables included in the model (plus a time trend). Each variable is discussed briefly below.

The **percentage of electric customers** measures the percentage of electric customers served by a utility out of total gas and electric customers. This variable measures the economies of scope available from serving both electric and gas customers. Billing and other customer-related activities can be shared between the gas and electric divisions when a utility serves its customers with both commodities. The value is set to 100% for Toronto Hydro since they do not serve natural gas customers. We would expect a positive parameter estimate on this variable.

The **standard deviation of elevation** variable is calculated based on geographic information system ("GIS") elevation topography maps. A higher standard deviation of the elevation indicates increased elevation changes and variance within the utility's service territory. We would expect that a service territory with more hills, mountains, and other elevation changes would be more challenging and costly to serve, *ceteris paribus*. Therefore, a positive parameter estimate is expected (indicating a positive correlation between standard deviation of elevation and costs).

The **overhead percentage times percentage of forestation** variable is based on the overhead plant in service for each utility (for the percent overhead) and GIS land cover maps (for percent forestation). These maps used the GlobCover 2009 product produced by the European Space Agency ("ESA") and the Université Catholique de Louvain. These maps are matched with the areas served by each utility to create the forestation variable. We would expect that the higher the level of overhead lines and forestation, the higher OM&A costs required for right-of-way clearing and service restoration activities.

The **congested urban** variable measures the percentage of a utility's service territory that consists of a major urban load center that is "congested." Congested urban areas have physical constraints that necessitate complex and costly subterranean civil infrastructure for housing and operating electric distribution plant. Congested urban areas also often necessitate electrical equipment unique to such subterranean infrastructure. The variable measures the percentage of service territory classified as "congested urban" area.[16] This variable has been refined and improved to now vary by year based on the estimated impact of the percentage change in skyscrapers in the service territory, as described further above.

We expect a utility that has a congested urban area within its service territory would experience substantial incremental costs as compared to a utility that does not have such an area within its service

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[16] It is the same variable used in the prior Toronto Hydro, Hydro Ottawa, and Hydro One applications, with a few minor adjustments made between the prior Toronto Hydro case and the Hydro Ottawa research. The variable is fully described in our Toronto Hydro report titled, "Econometric Benchmarking of Historical and Projected Total Cost and Reliability Levels". Our team, while at Power System Engineering, produced the report in EB-2018-0165. July 16, 2018.

territory. The parameter value for this variable is expected to be positive, indicating a positive correlation of percent congested urban with total costs.

The **percentage of smart meters** variable measures the percentage of customers that have an installed smart meter. Smart meters enable hourly or sub-hourly interval use data to be collected from the meter. While installing more capable meters and the necessary infrastructure is expected to increase distribution costs, these meters enable time-of-use ("TOU") electricity rates that can create efficiencies mainly in the realm of power supply. Since this study is focused on distribution total costs, we would expect a positive coefficient on the percent smart meter variable.

The **distribution work variable** measures the percentage of transmission lines that are classified as transmission and are above 50 kV. This helps adjust for utilities classifying transmission and distribution assets differently. Some transmission utilities own lines that are below 50 kV and others do not. If the transmission system is taking on costs and serving lines that otherwise would be classified as distribution, this will tend to decrease costs for the distributor in that region relative to its peers. Likewise, if the distribution system is serving lines that would sometimes be classified as transmission for other utilities, this will tend to increase distribution costs for that utility relative to its sample peers. We use the 50 kV cut-off because this is the line used in the RRR reporting in Ontario between high voltage and low voltage. We would expect a positive correlation between distribution total costs and the percentage of lines above 50 kV served by the transmission utility.

The **O&M based scope variable** measures the percentage of distribution operation and maintenance expenses in the sum of distribution, transmission, and generation expenses. This variable measures the possible cost savings of serving multiple electric utility functions. We would expect that the increased availability of economies of scope would lower expenses and, therefore, a higher proportion of distribution-related expenses in total expenses is expected to have a positive parameter value.

The **number of distribution substations** measures the count of owned and operated substations that are classified as distribution. As the service territory requires a larger number of distribution stations, we would expect this to increase infrastructure and other costs for the distribution utility. This variable should have a positive parameter value.

The **capacity of distribution substations** measures the MVa capacity of those stations classified as distribution which are owned and operated by the utility. Higher capacity stations will tend to cost more and, thus, we expect to have a positive parameter value for this variable.

The **time trend** variable captures a general industry total cost level trend over the studied period. Time trend variables are often found in translog cost functions and standard in econometric total cost benchmarking research. In the present study, the variable is calculated by taking the current year of the observation and subtracting 1,999. For observations in the year 2000, the time trend variable equals 1. In 2019, the variable equals 20 (2,019 – 1,999). The coefficient value shows how adding an additional year increases or decreases total costs.

3.2 Distribution Sample

The distribution benchmarking sample is comprised of 78 U.S. utilities plus Toronto Hydro. The benchmark sample period begins in 2000 and extends to 2021. The sample is an unbalanced panel, which enables utilities that do not have available and plausible data for all sampled years to still be present in the sample for the years in which they do have available and plausible data. There are 1,642 U.S. utility observations in the sample. This large number of observations enables robust parameter estimates and a strong statistical model.

The sample of utilities within the sample is provided in the following table along with the number of customers for the most recent year within the sample for each utility. The econometric model actually used to benchmark Toronto Hydro does not include the Company itself to assure a fully external benchmark value.

Table 5 Total Cost Benchmarking Sample

Company	Number of Customers	Company	Number of Customers
Alabama Power Company	1,510,098	Madison Gas and Electric Company	159,249
ALLETE (Minnesota Power)	149,660	MDU Resources Group, Inc.	144,044
Appalachian Power Company	964,442	Metropolitan Edison Company	581,453
Arizona Public Service Company	1,317,266	Nevada Power Company	967,596
Atlantic City Electric Company	564,929	New York State Electric & Gas Corporation	913,611
Avista Corporation	402,518	Niagara Mohawk Power Corporation	1,459,832
Baltimore Gas and Electric Company	1,320,806	Northern Indiana Public Service Company	481,132
Black Hills Power, Inc.	74,150	Northern States Power Company - MN	1,522,746
Central Hudson Gas & Electric Corporation	249,483	Northern States Power Company - WI	265,235
Central Maine Power Company	653,222	Ohio Edison Company	1,062,269
Cleco Power LLC	291,370	Oklahoma Gas and Electric Company	874,592
Cleveland Electric Illuminating Company	755,210	Orange and Rockland Utilities, Inc.	238,798
Commonwealth Edison Company	4,095,261	Pacific Gas and Electric Company	5,479,889
Connecticut Light and Power Company	1,272,110	PacifiCorp	1,967,124
Consolidated Edison Company of New York, Inc.	3,530,570	PECO Energy Company	1,681,439
Consumers Energy Company	1,870,123	Pennsylvania Electric Company	587,567
Delmarva Power & Light Company	539,708	Pennsylvania Power Company	169,371
DTE Electric Company	2,244,945	Portland General Electric Company	902,237
Duke Energy Carolinas, LLC	2,764,820	Potomac Electric Power Company	914,279
Duke Energy Florida, LLC	1,943,012	PPL Electric Utilities Corporation	1,466,253
Duke Energy Indiana, LLC	860,972	Public Service Company of Colorado	1,535,755
Duke Energy Kentucky, Inc.	146,514	Public Service Company of New Hampshire	525,933
Duke Energy Ohio, Inc.	731,414	Public Service Company of Oklahoma	568,226
Duke Energy Progress, LLC	1,644,179	Public Service Electric and Gas Company	2,323,747
Duquesne Light Company	606,085	Puget Sound Energy, Inc.	1,196,851
El Paso Electric Company	445,647	San Diego Gas & Electric Co.	1,370,621
Empire District Electric Company	178,984	South Carolina Electric & Gas Co.	765,965
Entergy Arkansas, Inc.	727,743	Southern California Edison Company	5,071,773
Entergy Mississippi, Inc.	458,987	Southern Indiana Gas and Electric Company, Inc.	153,433
Entergy New Orleans, Inc.	209,159	Southwestern Public Service Company	396,990
Florida Power & Light Company	5,214,245	Tampa Electric Company	802,049
Gulf Power Company	477,672	Toledo Edison Company	314,440
Idaho Power Co.	596,393	**Toronto Hydro**	**790,699**
Indiana Michigan Power Company	604,549	Union Electric Company	1,244,260
Indianapolis Power & Light Company	516,323	Virginia Electric and Power Company	2,698,553
Jersey Central Power & Light Company	1,150,247	West Penn Power Company	733,761
Kansas Gas and Electric Company	337,830	Wisconsin Electric Power Company	1,144,822
Kentucky Power Company	165,416	Wisconsin Power and Light Company	485,194
Kentucky Utilities Company	560,922	Wisconsin Public Service Corporation	454,892
Louisville Gas and Electric Company	427,163		

3.3 Distribution Total Cost Model

The parameter estimates from the total cost model used to calculate Toronto Hydro's total cost benchmark are presented in the following table.[17]

Table 6 Total Cost Model Estimates

Variable	Coefficient	Standard Error	T-Statistic	P-Value
Constant	12.735	0.074	171.210	0.000
Customers (N)	0.512	0.012	43.130	0.000
Peak Demand (D)	0.397	0.018	22.160	0.000
Area (A)	0.050	0.006	9.040	0.000
N*N	0.490	0.085	5.780	0.000
D*D	0.840	0.065	12.970	0.000
A*A	0.036	0.009	3.910	0.001
N*D	-1.297	0.151	-8.610	0.000
N*A	0.096	0.013	7.260	0.000
D*A	-0.112	0.012	-9.060	0.000
% Electric	0.152	0.029	5.280	0.000
Standard Deviation of Elevation	0.012	0.004	3.320	0.003
% OH*% Forest	0.052	0.003	18.690	0.000
% Congested Urban	22.256	2.552	8.720	0.000
% AMI	0.060	0.013	4.690	0.000
Dx Work (% Tx Lines Above 50 kV)	0.157	0.027	5.740	0.000
O&M Scope Variable	0.088	0.008	11.700	0.000
# of Dx Substations	0.071	0.005	14.490	0.000
Capacity of Dx Substations	0.011	0.007	1.520	0.143
Trend	-0.005	0.001	-4.210	0.000

[17] We note that the capacity of Dx Substations is statistically significant at an 85% confidence level. This is lower than our typical 90% confidence level. Excluding the variable from the model improves Toronto Hydro's total cost score slightly.

All the parameter estimates are plausibly signed and have reasonable magnitudes. The first order terms of all variables have the theoretically expected signs and are statistically significant at a 90% level of confidence, except for the distribution substation variable which is significant at an 85% confidence level. In fact, all the other first order explanatory variables are statistically significant at a 99% confidence level. The adjusted R-Squared of the model equals a robust 0.977.

3.4 Total Cost Results

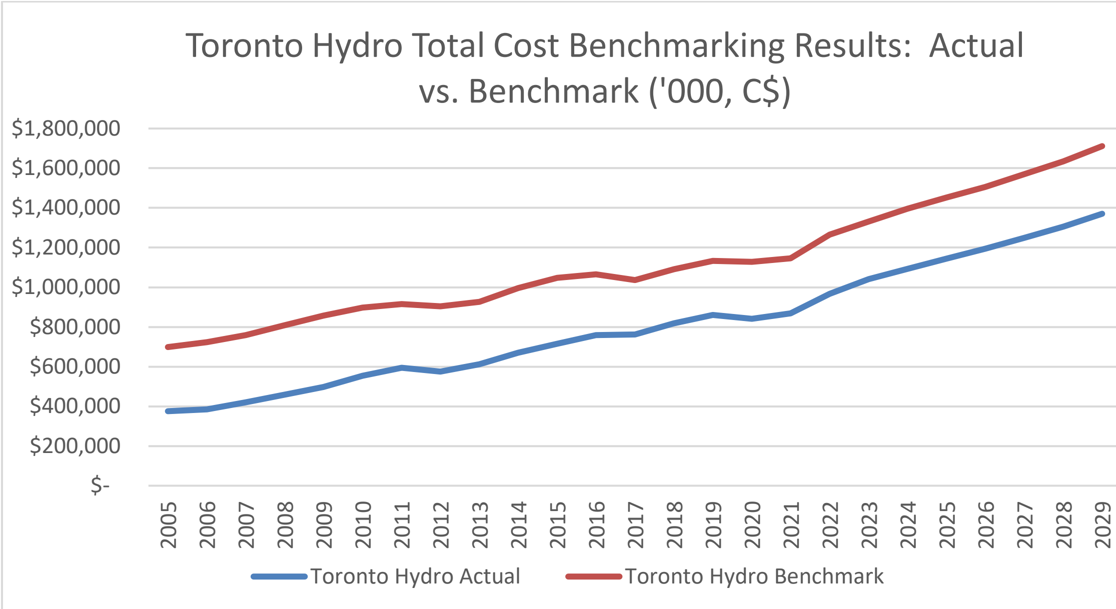
The following table breaks down the historical and forecast year benchmark and Company distribution total costs from 2005 through 2029. We note that the benchmark scores for the projected years assume that all the proposed spending will be incurred. If spending is less than the proposed amounts, the scores will improve; if spending is more than the proposed amounts, the scores will get worse.

Table 7 2005-2029 Total Cost Benchmark Score for Toronto Hydro

Year	% Difference from Total Cost Benchmark
2005	-62.1%
2006	-62.9%
2007	-59.3%
2008	-56.5%
2009	-54.5%
2010	-48.2%
2011	-43.1%
2012	-45.2%
2013	-41.6%
2014	-39.5%
2015	-38.1%
2016	-33.9%
2017	-30.7%
2018	-28.8%
2019	-27.6%
2020	-29.4%
2021	-27.6%
2022	-26.8%
2020-2022 average score	**-28.0%**
2023	-24.6%
2024	-24.4%
2025	-23.9%
2026	-23.1%
2027	-22.9%
2028	-22.6%
2029	-22.2%
2025-2029 average score	**-22.9%**

The following graph displays how Toronto Hydro's actual and projected total costs have compared to the benchmark costs over time and through the Custom IR period, respectively.

Figure 3 Toronto Hydro Total Cost: Actual vs. Benchmark



4 Reliability Benchmarking Models and Scores

Most, if not all, jurisdictions that require reporting of reliability indicators include the metrics of SAIDI, SAIFI, and CAIDI.[18] SAIDI measures the average duration of sustained interruptions per utility customer. SAIFI is a gauge of the average frequency of sustained interruptions per customer. CAIDI evaluates the average duration time per sustained interruption. SAIDI is thus the product of SAIFI and CAIDI.

$$SAIDI = SAIFI * CAIDI$$

The reliability benchmarking study performed by Clearspring focused on the reliability indexes of SAIFI and CAIDI. SAIFI measures the average number of outages a customer experiences per year. It indirectly measures the propensity of the distribution grid to fail. CAIDI measures the average restoration time when an outage does occur. It indirectly measures the Company's response time and preparedness for outage restoration.

Several jurisdictions, including Ontario in recent years, exclude extraordinary events from reliability statistics, with the goal of reducing year over year volatility due primarily to extreme weather. If a day is excluded, it is denoted as a major event day ("MED"). The bulk of MEDs stem from major storms. These severe storms vary in number and intensity from year to year. MED definitions vary by jurisdiction and/or utility; some use the Institute of Electrical and Electronics Engineers ("IEEE") standard 1366 to determine what constitutes a MED.[19] The industry appears to gradually be shifting towards the IEEE standard; however, considerable differences across utilities remain.

The reliability benchmarking study excluded MEDs from the SAIFI and CAIDI metrics but includes loss of supply outages to be consistent with the U.S. data. By excluding MEDs from the reliability indexes, we reduce the variance in the indexes associated with large and uncontrollable weather occurrences. The benchmark evaluation in this study is measuring the performance of utilities during the normal operations and not during severe weather events.

The industry reliability data for U.S. utilities is gathered through the EIA Form 861. This form has been gathering U.S. utility reliability indexes every year since 2013. Therefore, Clearspring's reliability dataset for the U.S. observations begins in 2013 and ends in 2021. Toronto Hydro provided its historical reliability results from 2005 to 2022 and then projections from 2023 to 2029.[20] These metrics exclude MEDs using the IEEE definition and are based on a 5-minute sustained outage definition, which is the predominant definition used in the U.S. data.

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[18] Some U.S. states only require reporting of two of these measures. However, the excluded indicator can still be determined by the researcher.

[19] The IEEE 1366 standard defines the "beta" method. If outages for a certain day exceed 2.5 standard deviations from the normal day, a major event day is declared. A normal day and the standard deviation are determined by the utility's previous five years of normal day data (not including the MEDs).

[20] The 2023 reliability data is historical through October 15, 2023 and then forecasted for the remainder of the year.

The following table lists the utilities included in the reliability dataset. The reliability dataset is composed of 80 U.S. distributors, plus Toronto Hydro.[21] There are 687 observations in the reliability dataset. This is sufficient to estimate statistically robust parameter estimates. The econometric model actually used to benchmark Toronto Hydro does not include the Company itself to assure a fully external benchmark value.

[21] As with the total cost model, the sample excludes Toronto Hydro's observations when estimating the model used to calculate the Company's benchmarks.

Table 8 Sampled Utilities for Reliability Benchmarking

Company	Number of Customers	Company	Number of Customers
Alabama Power Company	1,510,098	Metropolitan Edison Company	581,453
ALLETE (Minnesota Power)	149,660	Mississippi Power Company	190,660
Appalachian Power Company	964,442	Monongahela Power Company	395,031
Arizona Public Service Company	1,317,266	Nevada Power Company	967,596
Atlantic City Electric Company	564,929	New York State Electric & Gas Corporation	913,611
Avista Corporation	402,518	Niagara Mohawk Power Corporation	1,459,832
Baltimore Gas and Electric Company	1,320,806	Northern Indiana Public Service Company	481,132
Black Hills Power, Inc.	74,150	Northern States Power Company - MN	1,522,746
Central Hudson Gas & Electric Corpor	249,483	Northern States Power Company - WI	265,235
Central Maine Power Company	653,222	Ohio Edison Company	1,062,269
Cleco Power LLC	290,021	Oklahoma Gas and Electric Company	874,592
Cleveland Electric Illuminating Compa	755,210	Orange and Rockland Utilities, Inc.	238,798
Commonwealth Edison Company	4,095,261	Pacific Gas and Electric Company	5,479,889
Connecticut Light and Power Compan	1,272,110	PacifiCorp	2,002,780
Consolidated Edison Company of Nev	3,530,570	PECO Energy Company	1,681,439
Consumers Energy Company	1,870,123	Pennsylvania Electric Company	587,567
Delmarva Power & Light Company	539,708	Pennsylvania Power Company	169,371
DTE Electric Company	2,244,945	Portland General Electric Company	912,209
Duke Energy Carolinas, LLC	2,764,820	Potomac Electric Power Company	914,279
Duke Energy Florida, LLC	1,943,012	PPL Electric Utilities Corporation	1,466,253
Duke Energy Indiana, LLC	860,972	Public Service Company of Colorado	1,535,755
Duke Energy Kentucky, Inc.	146,514	Public Service Company of New Hampshire	529,986
Duke Energy Ohio, Inc.	731,414	Public Service Company of Oklahoma	568,226
Duke Energy Progress, LLC	1,644,179	Public Service Electric and Gas Company	2,323,747
Duquesne Light Company	606,085	Puget Sound Energy, Inc.	1,196,851
El Paso Electric Company	445,647	South Carolina Electric & Gas Co.	765,965
Empire District Electric Company	178,984	Southern California Edison Company	5,071,773
Entergy Arkansas, Inc.	727,743	Southern Indiana Gas and Electric Company, Inc.	153,433
Entergy Mississippi, Inc.	458,987	Southwestern Public Service Company	396,990
Entergy New Orleans, Inc.	209,159	Tampa Electric Company	802,049
Florida Power & Light Company	5,214,245	Toledo Edison Company	314,440
Gulf Power Company	477,672	**Toronto Hydro**	**790,699**
Idaho Power Co.	596,393	Tucson Electric Power Company	419,845
Indiana Michigan Power Company	604,549	Union Electric Company	1,244,260
Indianapolis Power & Light Company	516,323	United Illuminating Company	342,161
Jersey Central Power & Light Compan	1,150,247	Virginia Electric and Power Company	2,698,553
Kansas Gas and Electric Company	337,830	West Penn Power Company	733,761
Kentucky Power Company	165,416	Wisconsin Electric Power Company	1,144,822
Kentucky Utilities Company	565,153	Wisconsin Power and Light Company	485,194
Louisville Gas and Electric Company	427,163	Wisconsin Public Service Corporation	454,892
Madison Gas and Electric Company	160,976		

4.1 Econometric Reliability Benchmarking Variables and Models

Clearspring did not change the variables for either the SAIFI or CAIDI models that were included in the prior Toronto Hydro research, except to take out the percentage AMI variable in the CAIDI model because it was not statistically significant. The procedure for estimating the two reliability models is much the same as the procedure for the cost models, except that different variables are used. Refer to Section 2 for a general description of the model creation process.

Both the SAIFI and CAIDI models use reliability metrics with MEDs excluded. The SAIFI model's variables, parameter estimates, and statistical tests used to calculate the benchmarks are presented in the following table. The included variables are signed according to theory and statistically significant at a 90% confidence level.

Table 9 SAIFI Econometric Model Coefficients

Variable	Coefficient	Standard Error	T-Statistic	P-Value
Intercept	0.223	0.041	5.430	0.001
Number of Customers	0.030	0.008	3.960	0.004
% Forestation	0.050	0.014	3.660	0.006
% Plant Underground	-2.240	-0.052	43.400	0.000
Sq. KM per Customer	2.341	0.221	10.570	0.000
IEEE MED Definition	0.190	0.044	4.320	0.003

The CAIDI model statistics are presented in the table below. The included variables are signed according to theory and statistically significant at a 90% confidence level, with the exception of the customer variable which is typically always included in a reliability model.

Table 10 CAIDI Econometric Model Coefficients

Variable	Coefficient	Standard Error	T-Statistic	P-Value
Intercept	4.693	0.028	167.590	0.000
Number of Customers	0.006	0.006	1.010	0.341
% Forestation	0.048	0.003	15.520	0.000
Standard Deviation of Elevation	0.064	0.003	19.200	0.000
Sq. KM per Customer	0.060	0.004	14.010	0.000
% Congested Urban	20.199	2.341	8.630	0.000

4.2 Econometric Reliability Scores

We find that Toronto Hydro's most recent 3-year (2020 to 2022) SAIFI value is 98.8% above the benchmark value. During the Custom IR period of 2025 to 2029, the SAIFI projection from the Company is 99.4% above the benchmark.

The most recent 3-year CAIDI value is 104.1% below the benchmark value. During the Custom IR period of 2025 to 2029, the CAIDI projection from the Company is 110.2% below the benchmark. The following table displays the SAIFI and CAIDI actuals (or projections), the benchmarks, and the percentage differences from those benchmarks.

Table 11 Year-by-Year Reliability Benchmarks vs. Actual

Year	SAIFI (Actual)	SAIFI (Benchmark)	SAIFI (% Difference)	CAIDI (Actual)	CAIDI (Benchmark)	CAIDI (% Difference)
2005	0.93	0.46	70.2%	76.59	110.00	-36.2%
2006	1.11	0.46	88.1%	64.98	110.73	-53.3%
2007	1.14	0.47	89.7%	69.12	111.59	-47.9%
2008	1.08	0.46	85.0%	67.40	112.68	-51.4%
2009	0.95	0.46	72.8%	84.13	113.75	-30.2%
2010	0.98	0.46	75.5%	77.30	115.32	-40.0%
2011	1.05	0.45	83.9%	80.13	117.26	-38.1%
2012	0.88	0.45	67.4%	68.06	118.66	-55.6%
2013	0.95	0.45	75.8%	70.61	120.35	-53.3%
2014	0.92	0.45	72.6%	63.76	123.09	-65.8%
2015	0.97	0.44	78.4%	64.04	125.48	-67.3%
2016	0.93	0.45	73.3%	59.71	128.08	-76.3%
2017	1.09	0.45	87.4%	53.14	129.25	-88.9%
2018	1.09	0.46	86.8%	53.25	130.44	-89.6%
2019	0.95	0.45	73.9%	50.39	132.46	-96.6%
2020	1.11	0.45	91.2%	50.77	135.21	-98.0%
2021	1.20	0.44	100.3%	48.55	136.49	-103.4%
2022	1.24	0.43	105.0%	45.75	138.95	-111.1%
2020-2022 average	**1.18**	**0.44**	**98.8%**	**48.36**	**136.88**	**-104.1%**
2023	1.28	0.43	114.2%	42.76	141.81	-119.9%
2024	1.19	0.43	98.3%	51.28	144.87	-103.9%
2025	1.19	0.43	96.5%	51.49	148.16	-105.7%
2026	1.18	0.43	95.7%	51.54	151.67	-107.9%
2027	1.17	0.43	94.8%	51.68	155.43	-110.1%
2028	1.17	0.43	93.8%	51.85	159.47	-112.3%
2029	1.16	0.43	93.8%	51.96	163.82	-114.8%
2025-2029 average	**1.17**	**0.43**	**99.4%**	**51.70**	**155.71**	**-110.2%**

While SAIFI and CAIDI are modeled separately, the actuals and benchmarks for those metrics can be multiplied together to produce a Sustained Average Interruption Duration Index ("SAIDI") benchmark score. The following table provides the comparison between Toronto Hydro's actual (or projected) SAIDI, the benchmark value, and the percentage difference of the actual/projected to the benchmark.

Table 12 Toronto Hydro's SAIDI Actuals and Benchmarks 2005-2029

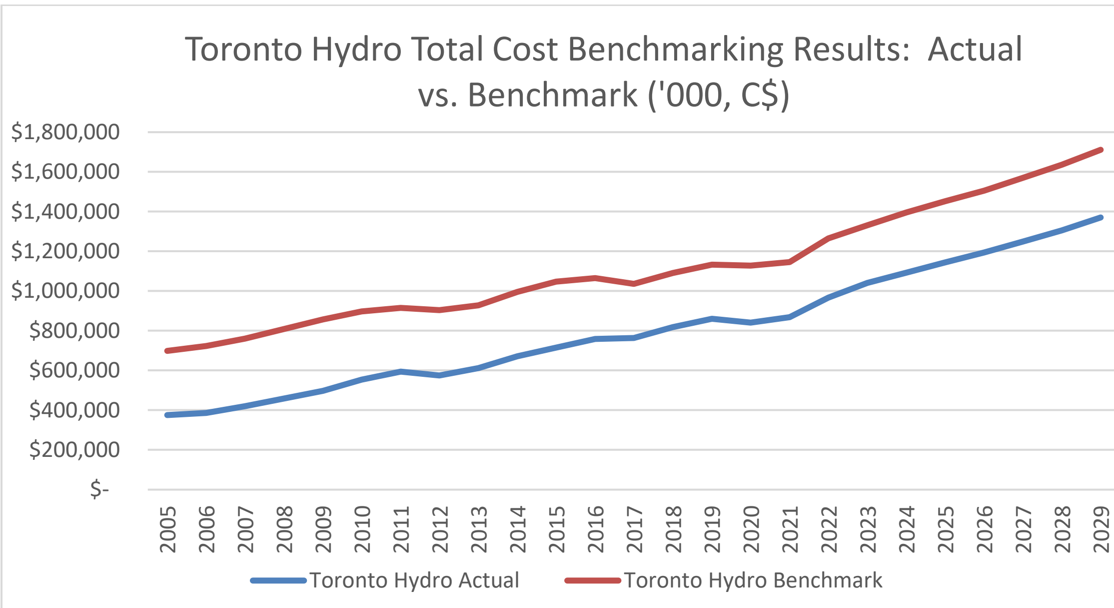
Year	SAIDI (Actual)	SAIDI (Benchmark)	SAIDI (% Difference)
2005	71.3	50.7	34.0%
2006	71.9	50.7	34.8%
2007	78.9	51.9	41.8%
2008	72.9	52.1	33.7%
2009	80.2	52.3	42.7%
2010	75.4	52.8	35.5%
2011	84.2	53.2	45.8%
2012	60.2	53.5	11.8%
2013	67.1	53.6	22.4%
2014	58.8	54.9	6.8%
2015	61.9	55.4	11.2%
2016	55.7	57.4	-3.1%
2017	58.1	58.8	-1.1%
2018	57.8	59.7	-3.3%
2019	47.8	60.1	-22.9%
2020	56.3	60.3	-6.9%
2021	58.2	60.1	-3.1%
2022	56.8	60.3	-6.0%
2020-2022 average	**57.1**	**60.2**	**-5.3%**
2023	54.8	61.5	-11.7%
2024	61.0	62.9	-3.0%
2025	61.2	64.3	-5.0%
2026	60.8	65.9	-8.0%
2027	60.6	67.5	-10.8%
2028	60.5	69.2	-13.6%
2029	60.2	71.1	-16.7%
2025-2029 average	**60.6**	**67.6**	**-10.8%**

5 Concluding Remarks and Stretch Factor Recommendation

This study provides benchmarking results useful for evaluating Toronto Hydro's 2025-2029 Custom IR application. The study has estimated total cost and reliability models that explicitly account and adjust for the service territory characteristics of Toronto Hydro. The models are statistically robust and provide accurate benchmark comparisons.

The total cost results show that Toronto Hydro's historical and projected cost levels are below expected levels. Toronto Hydro has consistently remained below its total cost benchmarks and remains below them throughout the Custom IR period, given its proposed spending levels. The graph below illustrates this consistency.

Figure 4 Actual and Benchmark Total Cost of Toronto Hydro Over Time



In the 4th Generation IR proceeding, five stretch factor groupings or cohorts were established based on the most recent three-year total cost benchmarking score. A score better than -25% (i.e. costs were more than 25% below benchmark) received the lowest stretch factor of 0.00%. A score between -25% and -10% received a 0.15% stretch factor. Scores that are +/- 10% received 0.30%. Scores between 10% and 25% received a 0.45% stretch factor, and scores exceeding 25% (i.e., costs were more than 25% above benchmark) received the highest stretch factor of 0.60%.

Our total cost study findings for Toronto Hydro show that during the Custom IR period, the Company's total cost benchmarking score is -22.9%. Based on the 4th Generation IR stretch factors and Clearspring's econometric benchmarking results, the appropriate stretch factor is 0.15%. This stretch factor not only aligns with Toronto Hydro's strong total cost benchmarking results, but also aligns well with other recent stretch factor precedents in Canada and the States.

Appendix A: Total Cost Benchmarking Methodology Details

Variable Types

In general, there are two types of variables used in econometric cost benchmarking: output variables and business condition variables. Output variables measure the output of the utility in question (i.e. what the utility "produces"). Business condition variables quantify the factors that drive costs in a particular service territory, such as regional input prices, highly congested urban areas, forestation, etc.

Output Variables

The three output variables for the distribution total cost benchmark study are the number of customers, a rolling ten-year average of peak demand, and the service area of each utility. This matches the outputs specified in Clearspring's Hydro One distribution cost benchmarking research. With the exception of a minor difference in the peak demand variable definition, this also matches PEG's Hydro One distribution cost benchmarking research and matches PEG's response to Clearspring's model in the last distribution application for Hydro Ottawa (again, with the slight modification of the peak demand variable).[22]

For the U.S. utilities, the output variables are calculated from FERC Form 1s. The customers are based on the reported data. The peak demand variable is defined for both studies using the annual peak demand value found on p. 401b of the FERC Form 1. This variable consists of the distribution system peak demands plus the required sales for resale. We adjusted the data to take out the proportion of the required sales for resale. This aligns with the treatment of peak demand that both Clearspring and PEG undertook in the Hydro One and Hydro Ottawa application.

The service area used for each utility is based on variables derived from GIS mappings of each utility's service area. The values used correspond to what both Clearspring and PEG used in the last Hydro One and Hydro Ottawa application.

Business Condition Variables: Input Prices

Business condition variables are discussed in following sections. However, one important business condition variable merits detailed discussion: input prices. Input prices are divided into two categories: capital and OM&A. The capital input price calculation used in our research is called the Perpetual Inventory Method and is discussed in detail in a following section. The OM&A input price captures the regional market price level that each utility encounters when procuring OM&A inputs, such as employees or materials and services. There are two components used to construct the OM&A input price. These are labour and non-labour.

[22] PEG "ratchets" the peak demand variable such that it takes the higher of all prior observations or the current annual peak demand value. Thus, the variable value can never decrease. Clearspring uses a ten-year rolling average of the annual peak demand value enabling the variable to decrease over time if peak demands are decreasing.

The labour component is calculated by taking wage levels of numerous job occupations and weighting them based on the U.S. Bureau of Labor Statistics ("BLS") estimates of job occupation weights in the Electric Power Generation, Transmission, and Distribution Industry. The BLS has estimates for wage levels for each job occupation by city and metropolitan area. To ascertain Toronto Hydro's wage level, we gathered job occupation wage estimates from the 2011 Canadian Census, using wage data reported for Ontario, translated job occupations to match their U.S. counterparts, and then weighted the job occupation wages by the BLS estimates. This provides consistency from the U.S. and Ontario regarding labour input prices and puts the input price in terms of each country's currency. We then escalated labour prices for U.S. utilities using BLS employment cost indices for the utility sector and escalated Toronto Hydro prices using the Ontario average weekly earnings estimates.

The non-labour component of the OM&A input price uses the U.S. gross domestic product price index for the U.S. utilities. The Toronto Hydro non-labour component uses the Canadian GDP-IPI in each year, but with a levelization adjustment using the purchasing power parity ("PPP") index in 2012. This translates the non-labour input price component into Canadian dollars.

To construct the overall OM&A input price we weighted each index using the customized labour and non-labour cost shares calculated from the FERC Form 1 data or based on data provided to us from Toronto Hydro. We then took the OM&A input price and combined it with the capital price using the capital and OM&A cost shares. This produces the total input price index.

Total cost is divided by this comprehensive input price index to adjust for regional input price differences between utilities and to account for annual inflation. Dividing total cost by the input price index imposes the requirement that total costs display linear homogeneity with respect to input prices. As the prices of inputs increase by X%, total cost should increase by that same percentage. For example, if all utility input prices (including labour) increase by 10%, its costs would also increase by 10%. This is derived from economic production theory, which states that costs equal input quantity multiplied by input price.

Other Business Condition Variables

Beyond the output variables and input prices, each model contains business condition variables that provide cost adjustments for given service territory conditions. These variables enable unique service territory conditions to be accurately benchmarked on an "apples to apples" basis. This ability to adjust for specific conditions is why the econometric benchmarking approach is more accurate and fair than unit cost approaches. Unit cost benchmarking tends to only reveal which utility has the most challenging service territory, rather than indicating cost <u>performance</u>. This is because service territory conditions have a profound impact on the cost levels of transmission and distribution utilities. Their capital assets are spread across the entire service territory, and the overall cost levels are thus highly influenced by the conditions the utility is faced with. These cost drivers and specific service territory conditions need to be accounted for to reveal and estimate the performance of the utility.

The business conditions used for the distribution total cost and reliability models are described in each model's specific Chapter.

Perpetual Inventory Method

Total cost is defined as the sum of the annual OM&A expenses plus capital costs. Clearspring's calculation of capital cost is based on the capital service price approach. This approach has a solid basis in economic theory; it is the same method used in all the Ontario benchmarking and productivity studies conducted by Mr. Fenrick, and is the same method chosen by PEG in its 4GIR research and its other studies in CIR applications.[23] The approach allows for a consistent way to account for differences between utilities with respect to historical plant additions and depreciation rates. The service price approach is also prominent in government-sponsored cost research. The Bureau of Labor Statistics of the U.S. Department of Labor uses the capital service price approach in computing multi-factor productivity indices for the U.S. private business sector and for several subsectors, including the utility services industry.

The cost of capital in each year *(t)* is the product of the capital service price index and capital quantity index at the end of the prior year (*t-1)*. The formula for this is given by:

$$CK_t = WKS_t \cdot XK_{t-1}$$

CK_t is the cost of capital, WKS_t is the capital service price index, and XK_{t-1} is the capital quantity index value in the prior period.

The capital quantity index (*XK*) is constructed based on the value of net plant in a benchmark year, and on gross plant additions in years subsequent to the capital benchmark year. In an effort to address past concerns of PEG regarding the start year (capital benchmark year) of this capital series, we put considerable effort into gathering and processing U.S. utility data going back to 1947.[24] We use 1947 for most of the U.S. sampled utilities as the capital benchmark year. A few utilities only had consistent data beginning in 1959, for those utilities we used 1959 as the capital benchmark year. We used 2002 as the capital benchmark year for Toronto Hydro, because this is the first year where data is available and can be readily verified.

A "triangulated weighted average" ("TWA") is used to divide the net plant value in order to adjust the net plant value for historical inflation.[25] This results in an estimate of the capital stock in 1947, 1959, or 2002

[23] See Hall and Jorgensen (1967) for a seminal discussion of the use of service price methods for measuring capital cost.

[24] In our past studies prior to the last Hydro One research, we used 1989 for the capital benchmark year, as that was the first year of electronically available data. We considered 1989 to be a sufficient start year for the capital series. However, to reduce the research differences, considerable efforts were invested into gathering and processing these data.

[25] For the U.S. sample, the 1947 or 1959 net plant value is for the total utility. To calculate a transmission or distribution net plant value we multiplied the total net plant value by the percentage of transmission or distribution gross plant in service to total gross plant in service, respectively. We note that any error in this net plant value calculation in 1947 or 1959 will have an extraordinarily minimal impact on the cost levels once the sample starts in 2000. This is because any possible small error in 1947 will have also depreciated for 53 years by the time it enters the sample period.

based on when the capital benchmark year begins for the utility. Subsequent years use the previous year's capital stock multiplied by one minus the depreciation rate and then escalated by that year's plant additions divided by the asset price in that year.[26] This same method is used for both Toronto Hydro and U.S. distributors. The formulas for the capital quantity index in 1947 and in subsequent years are provided below.[27]

$$XK_{1947}^{i} = \frac{Net\ Plant_{1947}^{i}}{TWA_{1947}^{i}}$$

$$XK_{t}^{i} = XK_{t-1}^{i} * (1-d) + \frac{Add_{t}^{i}}{WKA_{t}^{i}}$$

The capital service price (*WKS*) has two components: opportunity cost and depreciation. The capital service price index is thus given by the formula:

$$WKS_t = r_t * WKA_{t-1} + d_t * WKA_t$$

Here, r_t is the allowed rate of return based on the Board's historical calculated returns. This same annual value is also used in the capital service price computation for the U.S utilities in the dataset. Setting the same rate of return for all distributors provides consistency in determining the capital costs, so that decisions by regulators do not enter the benchmark evaluation, which is attempting to assess the performance of the utility itself. The parameter d_t is the economic depreciation rate. For this depreciation rate, we use the same value as we have used in all our distribution CIR benchmarking applications and the same one PEG used in the 4GIR proceeding and subsequent research: 4.59%.

The asset price deflator (*WKA*) is an index of the price of capital assets in each year. In several CIR applications, this has been an area of contention between PEG and our research team. Historically, Clearspring used the U.S.-based Handy-Whitman indices for both the U.S. sample and Canadian utilities, as these are well-known and provide asset inflation estimates that are specific to electric transmission or distribution.[28] Both Clearspring and PEG (at least historically) use the Handy-Whitman indices for the U.S. sample.

However, when estimating asset inflation for a Canadian utility, PEG has used Handy-Whitman indices in some of its prior research but has sometimes preferred a Canadian-specific asset inflation measure in some applications. The advantage of the latter approach is that it is specific to Canadian asset inflation; the disadvantage is that the measure is a comprehensive measure of water, sewer, gas, and electric utilities (including generation). In the Hydro Ottawa CIR research, PEG compromised between these two asset inflation measures and used a 50% weighting on the Handy-Whitman indices and a 50% weighting on their

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[26] The historical data going back to 1948 and forward all have plant in service additions disaggregated by transmission and distribution, enabling us to build up a robust capital quantity and cost estimate for each function.

[27] For the Ontario distributors, the subscripts would change to 2002 in the first equation.

[28] For Canadian utilities we adjust the Handy-Whitman for the purchasing price parity (PPPs) in each given year to put the inflation estimate into Canadian dollars.

implicit capital stock index measure. In the Hydro One research, Clearspring also moved to this compromise of a 50/50 weighting. In that application, both researchers used the 50/50 weighting which eliminated this area as a point of contention. Clearspring is using that same 50/50 weighting index in this application.

For the U.S. sample, we compute this index using data on differences in the cost of constructing utility plant between regions over time. For U.S. distributors, we use the Handy-Whitman indices for total power distribution plant; these indices vary over time and across six geographic regions.[29] For Toronto Hydro, we use the same Handy-Whitman index for total distribution plant in the North Atlantic region and then adjust for the Canadian purchasing power parity in the given year. This is for half of the weight in the index; for the other half, we use PEG's implicit capital stock deflator index found in the Capital Flows and Stocks data provided by Stats Canada.[30] For future years, we escalate the WKA index using a 50/50 calculation of the projections for the average weekly earnings in Ontario and the GDP-IPI index available from the Conference Board of Canada.

We determine the relative levels of utility plant asset prices for 2015 by using the City Cost Indices for electrical work in the 2016 edition of RSMeans' *Heavy Construction Cost Data*. These indices measure differences among cities in the cost of labour needed to install electrical equipment and differences in equipment prices. The construction service categories covered are: raceways; conductors and grounding; boxes and wiring devices; motors, starters, boards, and switches; transformers and bus ducts; lighting; electric utilities; and power distribution.

We modified this calculation in response to concerns put forth by PEG and other stakeholders prior to the most recent Hydro One application. The prior method was to calculate the level of the asset price index for each utility by the headquarter city in the service territory (or the closest available city). The concern was that the headquarter city might not be reflective of the entire service territory of the utility.

In response to this concern, we modified the asset price level calculation in the most recent Hydro One research to be based on a population-weighted average of the RS Means value for each 3-digit zip code served by a given utility. This spreads the levelization across the entire service territory, rather than centering on the headquarter city. We follow this same procedure in the current Toronto Hydro research. The index is already adjusted for currency differences between the two countries.

Model Estimation Procedure and Specification

We assume that the relationship between a utility's cost and the conditions that affect it, called "cost drivers," can be quantified and captured by a statistical function. This function, called a "cost function," allows Clearspring to specify cost as a dependent variable that can be explained by relevant independent or explanatory variables and associated parameters; the latter capture the effect of the independent

[29] Handy-Whitman indexes are widely used throughout the U.S. utility industry. They measure the construction cost trends for specific utility functions in six different regional areas of the U.S. For more information, please see: https://wrallp.com/about-us/handy-whitman-index

[30] We note that at the time of the research, this Canadian index was only available through 2020. For 2021, we escalated the Toronto Hydro index fully by the appropriate Handy-Whitman index.

variables on cost. Such a cost function is estimated using econometric techniques that rest on certain fundamental assumptions.

As implied by the term “independent,” one of these assumptions is that the explanatory variables used in the model are factors that are outside the control of utility decision-makers. For instance, the wage paid to labour is driven by market conditions in the service territory and is largely outside the control of a firm’s managers. On the other hand, the number of employees hired is within management’s control, and thus should not serve as an independent variable.

The data used to estimate this cost relationship can be from a single firm with multiple time observations (time series data), from many firms observed at a single time period (cross-sectional data), or from many firms with multiple time observations (cross-sectional time-series or panel data). The estimation procedure used to estimate model parameters is affected by the type of data used to estimate the model. In our present study, we have a panel dataset with cost data from multiple firms with observations starting in 2000 and extending to 2021. For benchmarks of past years, we use the model to produce benchmarks for each year and compare Toronto Hydro’s benchmark costs with its actual costs.

Additionally, for future years we can take Toronto Hydro’s cost projections through 2029, allowing us to also benchmark those forecasts “out of sample.” We use the model (which is based on historical data) and apply the estimated coefficients and projected independent variable values for Toronto Hydro to calculate a predicted benchmark value. This predicted benchmark value is then compared to Toronto Hydro’s projected total cost amount.

Statistical Tests on Parameter Estimates

The precision of parameter estimates is an important dimension of the cost estimation exercise. It identifies business condition variables that have a statistically significant effect on cost. Standard errors of parameter estimates, which measure the precision with which a parameter is estimated, are used to construct a test of a relevant hypothesis. The hypothesis to be tested is “the explanatory variable in question has no statistically significant effect on cost.” This procedure is called the *t*-test. A variable is statistically significant if this hypothesis is rejected at a pre-specified level of confidence. We use a 90% confidence threshold in our research for all first order terms. This restriction is not placed on the quadratic and interaction output terms that comprise the translog cost function.

A cost model with plausibly signed and statistically significant parameter estimates is ultimately used to assess the cost performance of each firm in the sample. By “plausibly signed” we mean that its sign (positive/negative) accords with our intuitive understanding of the relationship between that parameter and the variable. For example, we would expect to see distribution costs rise as the number of customers served increases (i.e. we expect that the customer parameter would be positively signed).

Once the industry cost model is estimated, the cost model with estimated parameters is fitted with the business conditions of each utility to generate cost benchmarks, against which actual cost is evaluated. A cost benchmark for a particular utility reflects the performance we would expect from an average hypothetical utility facing the business conditions of that utility.

If a given utility's actual cost is below the benchmark cost, its cost performance is better than average—it spent less than a hypothetical utility (with the same particular characteristics) would be expected to spend. If its actual cost is above the benchmark cost, its cost performance is worse than average. A statistical test of a cost efficiency hypothesis, based on the *t*-test, can also be constructed to identify whether the cost performance identified by the above exercise is statistically significantly different from average.

Model Specification

A translog function is selected for the total cost model estimated in this study. The translog cost function was the same functional form we have used in all our prior CIR research, and the one chosen by PEG in its 4GIR benchmarking research and subsequent CIR research. The function's general form, after suppressing time and firm subscripts, is given by:

$$ln\left(\frac{C}{W}\right) = \propto_0 + \sum_i \alpha_i \, ln\, Y_i + \sum_j \alpha_j lnZ_j + \frac{1}{2}\left[\sum_{i,k} \propto_{ik} \, lnY_i * ln\ Y_k\right] + \alpha_t t + \varepsilon$$

In this specification, $\alpha's$ are model parameters, and ε is the random noise term. In addition, Y_i quantifies output, W is the input price, Z_j is the other business condition variables, and *t* is a time trend term. This form has been widely used in cost function research.[31] A major advantage is its flexibility, which permits it to provide a good approximation for the wide range of functional forms that the data can reflect.[32]

Estimation Approach

As discussed earlier, the estimation approach has generated considerable discussion between benchmarking consultants in prior CIR proceedings. This is especially difficult for intervenors and the Board, due to the intricacies and difficulties for non-econometricians to evaluate these different approaches. However, it appears this difficulty has been addressed as both PEG and Clearspring used the same estimation approach in the most recent Hydro One application. Clearspring believes this best serves the Ontario industry for the benchmarking consultants to use consistent and pre-determined estimation approaches for all CIR benchmarking research.

The estimation procedure used to estimate model parameters is affected by the type of data used to estimate the models. In our present benchmarking studies, we have an unbalanced panel dataset with cost and reliability data from multiple utilities with multiple observations starting in 2000 and extending to 2021.

In multivariate regression analysis, the constructed model is designed to use a set of independent (often called explanatory or right-hand-side) variables to "explain" movement in the dependent (often called the

[31] In their Monte Carlo studies of functional forms' performance, Gagne and Ouellette (1998) use the translog as a benchmark because "it is the most widely used" functional form.

[32] See Guilkey, et al. (1983)

left-hand-side) variable. The numerical relationship between an independent variable and the dependent variable is provided through an estimated coefficient value. Under the assumptions of the model, this coefficient value is considered an unbiased estimator of the relationship. Multivariate regression analysis also makes statements about the precision of each coefficient value. Precision in this context is a statement about how confident or statistically valid the coefficient value is. When all the assumptions of multivariate regression are satisfied, the coefficient values are the best (or most precise) unbiased estimators that are available.

Two common issues arise in multivariate regression using real world data: heteroscedasticity and autocorrelation. Neither of these issues causes the coefficient values to be biased or less precise. This is important because it means the researcher does not need to worry about correcting the coefficient values: they are not misleading. However, both conditions render the standard error estimates which measure precision problematic. Specifically, the problem with heteroscedasticity and autocorrelation is that they increase the regression variance calculations, which means the researcher is less confident in the calculated coefficient values. For decades, the standard correction procedure involved trying to figure out the nature of each problem and strategically weighting the regression to render heteroscedasticity and autocorrelation less of a problem. One key issue with this strategy is that the researcher may have a hard time truly understanding how to reweight the regression. Additionally, the coefficient values will be different after the reweighting.

More recent treatments for dealing with heteroscedasticity and autocorrelation focus the correction procedures on methods that do not alter the regression or the coefficient values. Instead of reweighting the regression itself, these strategies leave the regression unaltered and focus on altering the way the variances of the coefficients are calculated. These procedures are systematic and do not depend on understanding the underlying reason for the heteroscedasticity and autocorrelation.

For our analysis, we have chosen to estimate the precision of our coefficients using Driscoll-Kraay standard errors.[33] Driscoll-Kraay standard errors have been coded and available in the STATA software suite since 2007.[34] The computer software calculates information crucial to understanding whether each relationship (as described by each coefficient) can be supported statistically.

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[33] Driscoll, J., and A. C. Kraay, 1998. "Consistent covariance matrix estimation with spatially dependent data," *Review of Economics and Statistics* 80: 549–560.

[34] Hoechle, Daniel, 2007 "Robust standard errors for panel regressions with cross-sectional dependence," *The Stata Journal* 7(3): 281-312.

Appendix B: Resume of Steve Fenrick

Clearspring Energy Advisors LLC

STEVEN A. FENRICK, Principal

Steve.fenrick@clearspringenergy.com (608.334.5994)

SUMMARY OF EXPERIENCE AND EXPERTISE

I have directed project teams and engaged in research in the fields of performance based regulation, performance benchmarking, DSM, load research and forecasting, and survey design and implementation.

I have been an expert witness in a number of cases involving performance-based ratemaking and incentive regulation, load forecasting, and peak time rebates.

PROFESSIONAL EXPERIENCE

Clearspring Energy Advisors, LLC– Madison, WI (2019 to Present)

Principal Consultant

Responsible for providing consulting services and expert witness testimony to utilities and regulators in the areas of reliability and cost benchmarking, productivity studies and other empirical aspects of performance-based ratemaking and incentive regulation. Manage activities in the areas of demand-side management programs, peak time rebate programs, load forecasting, and market research.

Power System Engineering, Inc.– Madison, WI (2009 to 2018)

Director of Economics

Responsible for providing consulting services to utilities and regulators in the areas of reliability and cost benchmarking, incentive regulation, value-based reliability planning, demand-side management including demand response and energy efficiency, ran peak time rebate programs, load research, load forecasting, end-use surveys, and market research.

Pacific Economics Group – Madison, WI (2001 - 2009)

Senior Economist

Co-authored research reports submitted as testimony in numerous proceedings in several states and in international jurisdictions. Research topics included statistical benchmarking, alternative regulation, and revenue decoupling. Managed and supervised PEG support staff in research and marketing efforts.

EDUCATION

University of Wisconsin - Madison, WI

Bachelor of Science, Economics (Mathematical Emphasis)

University of Wisconsin - Madison, WI

Master of Science, Agriculture and Applied Economics

PUBLICATIONS & PAPERS

"Peak-Time Rebate Programs: A Success Story", *TechSurveillance*, July 2014 (with David Williams and Chris Ivanov).

"Demand Impact of a Critical Peak Pricing Program: Opt-In and Opt-Out Options, Green Attitudes and other Customer Characteristics:, *The Energy Journal*, January 2014. (With Lullit Getachew, Chris Ivanov, and Jeff Smith).

"Evaluating the Cost of Reliability Improvement Programs", *The Electricity Journal*, November 2013. (With Lullit Getachew)

"Expected Useful Life of Energy Efficiency Improvements", Cooperative Research Network, 2013 (with David Williams).

"Cost and Reliability Comparisons of Underground and Overhead Power Lines", *Utilities Policy*, March 2012. (With Lullit Getachew).

"Formulating Appropriate Electric Reliability Targets and Performance Evaluations, *Electricity Journal*, March 2012. (With Lullit Getachew)

"Enabling Technologies and Energy Savings: The Case of EnergyWise Smart Meter Pilot of Connexus Energy", Utilities Policy, November 2012. (With Chris Ivanov, Lullit Getachew, and Bethany Vittetoe)

"The Value of Improving Load Factors through Demand-Side Management Programs", Cooperative Research Network, 2012 (with David Williams and Chris Ivanov).

"Estimation of the Effects of Price and Billing Frequency on Household Water Demand Using a Panel of Wisconsin Municipalities", *Applied Economics Letters*, 2012, 19:14, 1373-1380.

"Altreg Rate Designs Address Declining Average Gas Use", *Natural Gas & Electricity*. April 2008. (With Mark Lowry, Lullit Getachew, and David Hovde).

"Regulation of Gas Distributors with Declining Use per Customer", *Dialogue*. August 2006. (With Mark Lowry and Lullit Getachew).

"Balancing Reliability with Investment Costs: Assessing the Costs and Benefits of Reliability-Driven Power Transmission Projects." April 2011. *RE Magazine*.

"Ex-Post Cost, Productivity, and Reliability Performance Assessment Techniques for Power Distribution Utilities". Master's Thesis.

"Demand Response: How Much Value is Really There?" *PSE whitepaper.*

"How is My Utility Performing" *PSE whitepaper*.

"Improving the Performance of Power Distributors by Statistical Performance Benchmarking" *PSE whitepaper*.

"Peak Time Rebate Programs: Reducing Costs While Engaging Customers" *PSE whitepaper*.

"Performance Based Regulation for Electric and Gas Distributors" *PSE whitepaper*.

"Revenue Decoupling: Designing a Fair Revenue Adjustment Mechanism" *PSE whitepaper.*

EXPERT WITNESS EXPERIENCE

Docket EB-2021-0110, Hydro One Networks, Joint Rate Application for Transmission and Distribution. Custom Incentive Regulation Benchmarking and Productivity research.

Docket No. 2020-00299, Big Rivers Electric Corporation, Integrated Resource Plan. Econometric Load Forecasting research.

Docket EB-2019-0261, Hydro Ottawa, Custom Incentive Regulation Application. Econometric Benchmarking research.

Docket EB-2019-0082, Hydro One Networks Transmission, TFP and Econometric Benchmarking research.

Docket EB-2018-0165, Toronto Hydro Electric System Limited, Econometric Benchmarking research.

Docket EB-2018-0218, Hydro One Transmission Sault St. Marie, TFP and Econometric Benchmarking research.

Docket EB-2017-0049, Hydro One Distribution, TFP and Benchmarking research.

Docket EB-2015-0004, Hydro Ottawa, Custom Incentive Regulation Application.

Docket 15-SPEE-357-TAR, Application for Southern Pioneer Electric Cooperative, Inc., Demand Response Peak Time Rebate Pilot Program.

Docket EB-2014-0116, Toronto Hydro, Custom Incentive Regulation Application.

Docket EB-2010-0379, The Coalition of Large Distributors in Ontario regarding "Defining & Measuring Performance".

Docket No. 6690-CE-198, Wisconsin Public Service Corporation, "Application for Certificate of Authority for System Modernization and Reliability Project".

Expert Witness presentation to Connecticut Governors “Two Storm Panel”, 2012.

Docket No. EB-2012-0064, Toronto Hydro’s Incremental Capital Module (ICM) request for added capital funding.

Docket No. 09-0306, Central Illinois Light rate case filing.

Docket No. 09-0307, Central Illinois Public Service Company rate case filing.

Docket No. 09-0308, Illinois Power rate case filing.

CONFERENCE PRESENTATIONS

Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2019.

Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2018.

Panel Moderator at WPUI conference on cost allocation and innovative rate designs at Madison WI. June 2018.

Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2017.

Wisconsin Manager’s Meeting, “Reliability Target Setting Using Econometric Benchmarking”. November 2016.

Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2016.

Wisconsin Electric Cooperative Association (WECA) Conference, “An Introduction to Peak Time Rebates”. September 2016.

Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2015.

EUCI conference chair, 2015. “Evaluating the Performance of Gas and Electric Distribution Utilities.”

Institute of Public Utilities Advanced Rate Conference at Michigan State University, “Performance Benchmarking”. October 2014.

Cooperative Exchange Conference, Williamsburg VA. “Smart Thermostat versus AC Direct Load Control Impacts”. August 2014.

EUCI conference chair in Chicago. “The Economics of Demand Response”. February 2014.

Institute of Public Utilities Advanced Rate Conference at Michigan State University, "Performance Benchmarking". October 2013.

EUCI conference chair in Chicago. "Evaluating the Performance of Gas and Electric Distribution Utilities." August 2013.

Presentation to the Ontario Energy Board, "Research and Recommendations on 4th Generation Incentive Regulation".

Presentation to the Canadian Electricity Association's best practice working group. 2013

Conference chair for EUCI conference in March 2013 titled, "Performance Benchmarking for Electric and Gas Distribution Utilities."

Presentation to the board of directors of Great Lakes Energy on benchmarking results, December 2012.

Presentation on making optimal infrastructure investments and the impact on rates, Electricity Distribution Association, Toronto, Ontario. November 2012.

Conference chair for EUCI conference in August 2012 titled, "Performance Benchmarking for Electric and Gas Distribution Utilities."

2012 presentation in Springfield, IL to the Midwest Energy Association titled, "Reliability Target Setting and Performance Evaluation".

2012 presentation in Springfield, IL to the Midwest Energy Association titled, "Making the Business Case for Reliability-Driven Investments".

Conference chair for EUCI conference in 2012 titled, "Balancing, Measuring, and Improving the Cost and Reliability Performance of Electric Distribution Utilities". St. Louis.

Conference chair for EUCI conference in 2012 titled, "Demand Response: The Economic and Technology Considerations from Pilot to Deployment". St. Louis.

2012 Presentation in the Missouri PSC Smart Grid conference entitled, "Maximizing the Value of DSM Deployments". Jefferson City.

2011 conference chair on a nationwide benchmarking conference for rural electrical cooperatives. Madison.

2011 presentation on optimizing demand response program at the CRN Summit. Cleveland.

Conference chair for EUCI conference in 2011 titled, "Balancing, Measuring, and Improving the Cost and Reliability Performance of Electric Distribution Utilities". Denver.

2010 presentation on cost benchmarking techniques for REMC. Wisconsin Dells.

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED (“THESL”)

UNIT COSTS BENCHMARKING STUDY

October 2023

SECTION I - INTRODUCTION

Toronto Hydro-Electric System Limited ("THESL" or "the Company"), engaged UMS Group to conduct a third-party independent review of the Company's methodology for deriving unit costs, compare it to industry best practices, and perform benchmarking comparisons of a pre-selected set of asset categories and maintenance programs, namely the following:

Asset Categories

- Wood Poles
- UG Cable
- Pole Top Transformers
- Pad mount / UG Transformers
- Network Transformer / Protectors
- Breakers
- Cable Chambers / Manholes

Maintenance Programs

- Vegetation Management
- Pole Test and Treat
- Overhead Line Patrol
- Substation Maintenance
- Building Vault Inspections

In assessing the reasonableness of the derived and actual unit costs, UMS Group formed a peer group panel of comparable North American utilities, conducted "basic normalized comparisons" and identified any external factors (e.g., key technical, environmental, and regulatory drivers) that may need to be accounted for when comparing the peer group panel within the confines of a benchmarking study.

Establishing Context

In establishing context for the analyses and conclusions contained within this report, UMS Group undertook the following:

- Reviewed relevant reports, procedures, and system performance data provided by the Company, (***see Appendix A***).
- Received complete access to the Company's technical and management staff in the form of conference calls and workshops (e.g., Performance Management, Asset Management, Capital Planning, Execution, Project Management Delivery, and OM&A); and
- Formed a Peer Group Panel, comprised of 12 electric utilities with system and customer demographics comparable to those of THESL, each dealing with the unique cost drivers that are prevalent in urban settings (***see Appendix B***).

Comparative Analysis

The actual Peer Group comparisons of unit costs accounted for the fact that though there are similarities among the electric utilities selected, there are also differences to be reconciled, including the following:

- Regional costs,
- Practices in reporting costs,
- System demographics (e.g., Customer Density and underground utility congestion), and
- Other external factors (e.g., mandates and constraints regarding performance of work, weather, and vegetation).

Thus, we developed normalization factors for variations in data conversions and accounting practices, and in a more qualitative fashion, described the system demographics and other external factors that affect unit costs. With respect to our assessment of the Company's unit costing practices, we adopted an industry-wide perspective (*i.e.,* not constrained by those of the Peer Group Panel).

UMS Group Qualifications

THESL retained UMS Group, headquartered at 111 Littleton Road, in Parsippany, NJ, as an independent expert. With over 30 years of experience conducting comparative performance assessments for the global utilities industry, UMS Group has supported multiple assessments and global benchmarking programs on six continents, working with state and provincial public utility commissions as well as more than 300 electric, gas, and water utilities. UMS Group has augmented its analytical capabilities with a team of industry experts who are knowledgeable in best productivity and service-level performance practices to (1) ascertain an electric utility's efficiency and effectiveness in comparison to a qualified peer group, and (2) collaboratively develop aggressive, yet achievable performance improvement plans.

Among other qualifications, UMS Group leads several global learning and benchmarking consortia, which together with our portfolio of ongoing client engagements, facilitates our ability to maintain "real-time" proprietary cost and operational performance data, correlated to industry "best practices," all supported by an analytical framework built on the premise that industry "best performers" can be both efficient and effective. Appendix D provides additional details regarding UMS Group's qualifications and those of the individuals assigned to this effort.

The UMS Group-assigned experts for this effort, Messrs. Jeffrey W. Cummings, and Nicholas Austin, fully acknowledge their duties as experts in accordance with Rule 13 and Form A of the Ontario Energy Board's ("OEB" or "Board") Rules of Practice and Procedure. In so doing, they acknowledge that it is their duty to provide evidence in relation to this report as follows:

- To provide opinion evidence that is fair, objective and non-partisan,
- To provide opinion evidence that relates only to matters that are within his area of expertise, and
- To provide such additional assistance that the Board may reasonably require, to determine a matter in issue.

They acknowledge that the duty referred to above prevails over any obligation which they may owe THESL.

Structure of the Report

The ensuing discussion is divided into three sections:

- Section II – Executive Summary: A summarization of our conclusions on the Company's methodology for deriving unit costs and the benchmarking comparisons with the Peer Group Panel,
- Section III – Project Approach: A description of and rationale for the approaches, methodologies, criteria, and frameworks adopted in conducting our study, and
- Section IV – Summary of Results: An expanded discussion of findings, conclusions, and recommendations around the topic of unit costs.

We have provided additional appendices to supplement the information provided in Sections II through IV in the form of comparative charts, graphs, and tables, as well as more in-depth explanations of the bases for our evaluations and supporting analytics.

SECTION II – EXECUTIVE SUMMARY

Overview of THESL's Unit Cost Initiative

THESL retained UMS Group to conduct a review of THESL's methodology for determining the unit costs underlying its distribution system capital and maintenance programs, and to perform a utility benchmarking study to compare THESL's unit costs with those of a Peer Group Panel. In accomplishing these objectives, UMS Group:

- Conducted a series of workshops / interviews with several THESL stakeholder organizations (e.g., Performance Management, Asset Management, Capital Planning, Execution, Project Management Delivery, and OM&A),
- Reviewed a myriad of requested reports, procedure documents, and system performance data (***see Appendix A***),
- Established a Peer Group Panel of 12 electric utilities, largely based on demographics (customer density, vegetation, and weather / climate), and factors that add complexity to field execution (e.g., technical, legislative, regulatory, and bargaining unit constraints / mandates),
- Designed and administered a survey, seeking fully loaded unit cost comparators and key accounting and local factors to conduct normalization or present qualitative differentiators of the Peer Group Panel (i.e., described and placed in context elements beyond currency conversion rates and regional cost adjustments), and
- Analyzed the results of the survey, resulting in the benchmark of seven asset categories and five maintenance programs and a comparison of THESL's unit cost methodology with that of a representative sampling of industry peers.

The results of this effort summarized below and expanded upon in Section IV, "Summary of Results," yielded insights from both industry and THESL-specific perspectives.

Industry Perspective Regarding Unit Cost Methodology

Unit costing is a simple concept to grasp, yet the reporting of unit costs for productivity measurement or benchmarking across electric utilities can be complex, and often takes the following into account for the purposes of developing both a quantitative and qualitative analytical work product:

- *Unit Cost Approach:* The unit cost methodology typically is not a fundamental tenet for utilities when establishing, forecasting, analyzing, or reporting their financial or operational performance. As a result, efforts like this, undertaken to provide valid comparators, must engage individually with each utility to narrow any gaps in form and / or substance of the variables that drive unit cost calculations.
- *Asset Categories*: There are differences in how utilities track or even categorize asset categories. Frequently there are sub-asset classes that roll up to the asset class level, while others track these costs at the sub-asset class level.
- Direct Versus Overhead Costs: Most utilities map burdened labor (i.e., vacations, holidays, and training less corporate A&G), and material and equipment costs to asset classes based on some form of work order time sheets, and then allocate design, engineering,

permitting, warehousing and AFUDC to arrive at a total cost. One can then infer a unit cost by dividing this "fully loaded" cost by the number of units installed.

- *Maintenance Programs*: The industry remains consistent in not applying overheads to maintenance costs (only salary burdened by statutory costs and benefits). However, there are inconsistencies regarding the extent to which maintenance activities are "unitized" (often they are managed as "buckets" with budgets based on historical spending patterns with little, if any visibility on units inspected, tested, or maintained).

Performed properly with survey instruments such as those used for this effort, unit costing has a variety of applications, ranging from monitoring and forecasting workforce efficiency across a myriad of capital and operational expenditure programs, to forecasting specific project, program and budgetary blanket spends on a single or multi-year basis. Other uses include, but are not limited to, providing a basis for order-of-magnitude estimates, defining staffing levels, creating resource-loaded schedules, and/or supporting financial reporting requirements. Therefore, a sound unit cost methodology can be an adequate tool for utilities, and with respect to providing bases for comparing utility productivity, is viewed as "directionally accurate" (as opposed to "precise").

THESL – Specific Perspective Regarding Unit Cost Methodology

THESL's methodology for identifying and utilizing its unit costs across both its capital and non-capital expenditures constitute an organizational focus for THESL. In its unit cost approach, THESL allows for (1) the collection of labor and material cost information at the asset level (in contrast to the project or work order level), (2) comparison of actual and budgeted unit costs on an on-going basis, and (3) disaggregation of the components of unit cost to expand THESL's view of performance. In other words, THESL is disaggregating the components of unit cost to expand its view of performance by separating labor from material and removing financial loaders on labor to establish a direct labor unit cost.

Unit Cost Benchmarks

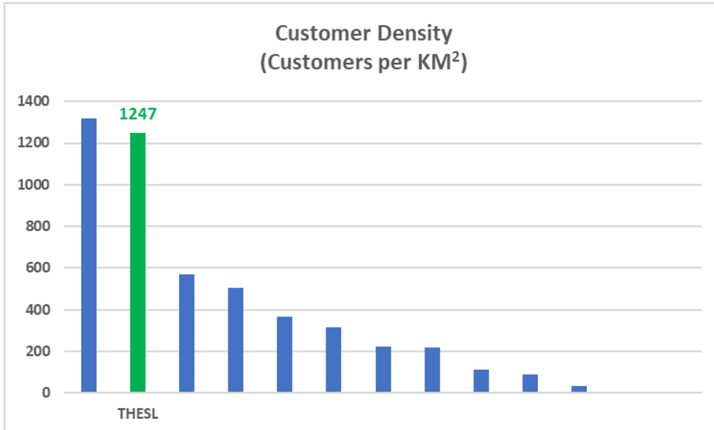
In reviewing the actual benchmarks, relative to a Peer Group Panel of 12 electric utilities spanning the North American continent (***see Section III and Appendix B***), two basic perspectives (or normalizers) are presented:

1. Comparisons after making the data conversion from US$ to CAD$ and from the Imperial to Metric System for the US Utilities, and
2. Incorporating Accounting Adjustments to address the different methods used by electric utilities in applying indirect and overhead costs to unit costs.

UMS Group also considered Congestion Factors and Regional Labor Costs in its review of unit cost differences.

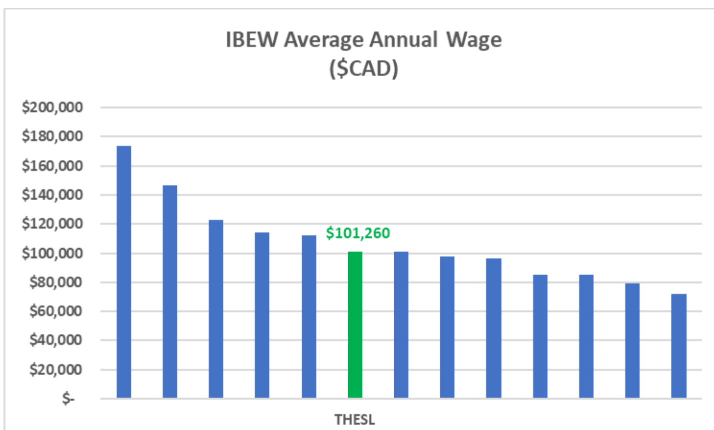
1. From a Congestion Factors perspective, UMS Group compared customer density as an indicator of unit cost pressures due to urban population, building density, and utility congestion. Within this dataset, THESL had the second highest density factor in the peer group (over 5 times the peer group median for customer density), indicating that if considered, congestion would have a material effect on THESL's comparative unit cost ranking.

Figure II-1: Customer Density



2. In its consideration of the Regional Labor Cost perspective, UMS Group reviewed the International Brotherhood of Electrical Workers ("IBEW") average annual wages across the regions represented by the peer group. Within this dataset, THESL represents the median, suggesting that if considered, these factors would have some effect on these comparisons.

Figure II-2: IBEW Average Annual Wage



Due to statistical and data challenges of normalizing for these factors in the context of the methodology and scope of this study, UMS Group opted to present them in qualitative terms (i.e., not part of the "normalized" unit cost value). That said, in UMS Group's professional opinion, these qualitative considerations, particularly the customer density factor, indicate that THESL's actual comparative ranking would be better than presented in the quantitative results summarized below if these factors could be statistically normalized.

Returning to the straight statistical (i.e., quantitative) comparison of THESL against its peer group, Table II-1 presents THESL's unit cost information and ranking of THESL's comparative position to the Median using just the Conversion and Accounting Adjustment normalizations. Adding further context to this information is an indication of the percent variance from the Median for each category / program.

Table II-1: Benchmark Comparisons ($CAD)
Applying Conversion and Accounting Adjustments Only

			Median	Percent from Median	Other Factors
Asset Categories					**Utility, Building and Population Congestion:** UMS Group looked at Customer Density data as a proxy for urban settings (i.e., highly concentrated population centers and resulting buildings, infrastructure, and utility congestion) and their impact on utility costs. As Figure II-1 illustrates, THESL is comparatively unique in this aspect. Statistical and data challenges precluded including this factor in the normalization of the unit costs. However, congestion has a material impact on productivity, and, if considered, would result in a stronger comparative ranking for THESL. **Regional Labor Factors:** Similar in the approach in addressing congestion, UMS Group reviewed the International Brotherhood of Electrical Workers ("IBEW") average annual wages as a proxy, with THESL ranking in the top 50% of the Peer Group Panel. As illustrated in Figure II-2 above, THESL's wage cost position relative to its benchmarking peers is in the top half. And though not utilized for normalization purposes, these differences impact utility costs, and if applied would also have placed THESL in a more favorable light regarding these comparisons.
Wood Pole	Each	$8,317	8,181	1.7%	
UG Cable (XLPE)	Per Meter	$131	131	0.0%	
Pole Top Transformer	Each	$18,691	18,423	1.5%	
Pad mount / UG Transformer	Each	$37.373	37,008	1.0%	
Network Transformer / Protector	Each	$127,649	130,690	-2.3%	
Breaker	Each	$37,983	40,772	-6.7%	
Cable Chambers / Manholes	Each	$136,409	135,571	0.6%	
Maintenance Programs					
Vegetation Management	Per Line KM	$2,175	2,139	1.7%	
Pole Test and Treat	Each	$17	19	-10.1%	
Overhead Line Patrol	Per Line KM	$23	26	-12.2%	
Substation Maintenance	MVA	$1,712	1,681	1.9%	
Building Vault Inspection	Each	$258	268	-3.9%	

NOTE: Shown above as combined, the 2-step basic normalization process is illustrated in Section IV (Figures IV-1 to IV-12) and Appendix C (Tables C-2 and C-3).

Generally, THESL is positioned within each of the categories and programs between approximately 1.9% above the Median (barely third quartile) to negative 12.2% below the Median (well-embedded in the second quartile) when combining the two basic benchmarking perspectives/normalizers. As noted above, UMS Group is of the view that THESL's comparative ranking would be even stronger than presented in the quantitative results found herein if the qualitative factors, particularly congestion, could be statistically normalized. This last statement is grounded by our understanding of the realities of working in confined spaces / congested areas, frequent disruptions in the performance of work, and higher labor costs, which when combined, are conservatively estimated to range between 5 and 10 percent.

Applicability of the Study

As a final step in our assessment, we reviewed the viability of these asset categories / maintenance programs to serve as a proxy for THESL's effectiveness and efficiency in performing work. Two areas were reviewed:

- *Contribution of the Benchmarked Categories and Programs to Capital Expenditures and Maintenance Spending*: According to THESL, the seven asset categories represent approximately 52% of the planned capital budget over the 2020 through 2022 period; and

THESL spends approximately 57% of all preventative and predictive maintenance costs in each year on the five maintenance programs that comprised this study.

- *Impact on Reliability*: UMS Group has conducted several reliability-related assessments over the past 10 years (ranging from reviewing system performance to adjudging response during major storm events, ***see Appendix E***). In conducting these assessments, the primary areas of concern when assessing a utility's reliability performance revolves around vegetation management, equipment failures, underground facilities, and the overall conduct of inspection, test, and maintenance programs, portions of which are addressed through the asset categories and maintenance programs that comprised this study.

It is therefore our view that any conclusions around performance resulting from benchmarking or trending the unit costs of these seven asset categories and five maintenance programs are reflective of THESL's overall unit cost performance.

SECTION III – PROJECT APPROACH

To assess the Company's methodology for deriving unit costs and perform benchmarking comparisons of a pre-selected set of asset categories and maintenance programs, UMS Group developed and executed the following work plan:

Figure III-1: Unit Cost Performance Assessment Overview

	Project Initiation	Review and Evaluation	Presentation of Results
Key Tasks	Mobilized the Team / Started the Project Conducted initial Targeted Interviews / Workshops	Administered the Survey Performed the Analysis	Presented Results
Activities	Confirmed alignment on scope and schedule, firmed up project organization, defined key points of contact, established communication and reporting protocols, and defined format, use and anticipated distribution of the Preliminary Findings Report Formed the Peer Group Panel Developed the Survey Instrument Received and reviewed requested Data and Information Conducted targeted interviews and workshops to establish the context and baseline regarding (1) past and future methodologies for calculating unit costs, and (2) comparisons of unit costs to the industry	Received completed data packages from THESL and each member of the Peer Group Panel Applied "adjustors / normalizers" to the unit costs to enable an "apples to apples" comparison (refer to Appendix C, "Data Normalization Process.") Tracked, trended, and compared unit costs across each of the asset categories and maintenance practices Determined THESL's position relative to the Peer Group Panel Compared THESL's methodology for calculating unit cost to that of other utilities	Issued Final Report

From Project Initiation to the Presentation of Results, UMS Group applied several elements of its proprietary and time-tested benchmarking and practices assessment methodology to independently assess THESL's approach in deriving unit costs; and benchmark the fully loaded unit costs of a representative cross-section of asset categories and maintenance programs. The following discussion will expound on those aspects of our approach that contributed to our achieving the requisite level of objectivity and relevance needed for this report.

Peer Group Panel

The Peer Group Panel used for this study consisted of 12 electric utilities, namely:

- AES-IPL (Indianapolis, IN)
- AES-DPL (Dayton, OH)
- Anonymous Utility (Canada)[1]
- Avista Utilities (Spokane, WA)
- Baltimore Gas and Electric (Baltimore, MD)
- Detroit Edison (Detroit, MI)
- Elexicon Energy (Various Communities, Ontario)
- ENMAX (Calgary, Alberta)
- London Hydro (London, Ontario)
- Portland General Electric (Portland, OR)
- SaskPower (Regina and Saskatoon, Saskatchewan)
- Seattle City Light (Seattle, WA)

NOTE 1: As a prerequisite to participation, one Canadian utility required anonymity in its participation and response.

In selecting these utilities, our goal was to provide comparisons that would be relevant to THESL's operating environment. Focusing first on other Province of Ontario electric distribution systems / organizations, we narrowed our consideration to those serving more than 75,000 customers, thus providing nine candidates for further review. UMS Group then compared these utilities relative to 10 data sets presented in the Ontario Energy Board ("OEB") data provided as part of the Activity and Program-based Benchmarking Initiative. In so doing, we identified Alectra Utilities, Hydro Ottawa, Elexicon Energy, and London Hydro as possible comparators (***See Appendix B, Figure B-3 and prefacing discussion for a listing of the 10 data sets and a summarization of the analysis***). All four were invited to participate, with Elexicon Energy and London Hydro providing input.

In parallel, UMS Group reached out to the utilities that had participated in a similar study conducted by UMS Group for THESL during the 2017 – 2018 timeframe and was successful in enlisting the participation of eight (the remaining balance of nine cited varying more pressing priorities amidst constrained resources as their reason for declining participation). Two additional utilities that had been invited but declined last time accepted this time around: Avista Utilities and a Canadian utility that requested anonymity as a precondition to participating.

As a means of validating the Peer Group Panel, Table III-1 illustrates THESL's relative position across five factors that define the elements that can affect like-for-like unit cost comparisons:

- *Vegetation* (besides the direct correlation to one of the maintenance programs being benchmarked, accounts for the challenges that increased vegetation might pose in gaining access to critical assets),
- *Underground Utility Congestion* (increases the propensity for third-party damage and accounts for the impact of tight spaces, both factors that can contribute to the slowdown of work),
- *Public, Building and Utility Congestion* (potentially impacts accessibility, increases awareness of public safety, and creates added distractions during the performance of work),
- *External Factors* (accounts for varying degrees of technical, legislative, regulatory, and bargaining unit constraints / mandates that dictate the specific practices to be employed in performing work, many of which inhibit the flow of work), and
- *Weather*, (accounts for the differences between harsh and temperate climates and their impact on productivity).

It shows that THESL aligns with most of the utilities across four of the five factors (exception being Public, Building and Utility Congestion) further substantiating the appropriateness of the Peer Group Panel.

Table III-1: Distribution of Peer Group Panel across External Factors (including THESL)[1]

Vegetation		
Low	Medium	High
2	8	3
UG Congestion		
Low	Medium	High
1	4	8
Public, Building and Utility Congestion		
Low	Medium	High
4	5	4
External Factors		
Low	Medium	High
2	2	9
Weather		
Mild	Moderate	Harsh
2	8	3

NOTES: The area shaded in green reflects the position of THESL in each category.

Asset Categories and Maintenance Programs

As stated in Section I – Introduction, the study addressed unit costs for installing / replacing seven categories of assets and conducting five maintenance programs for the Peer Group Panel as identified below:

Asset Categories

- Wood Poles
- UG Cable
- Pole Top Transformers
- Pad mount / UG Transformers
- Network Transformer / Protectors
- Breakers
- Cable Chambers / Manholes

Maintenance Programs

- Vegetation Management
- Pole Test and Treat
- Overhead Line Patrol
- Substation Maintenance
- Building Vault Inspections

As previously stated in the Executive Summary, in assessing the viability of these asset categories / maintenance programs to serve as a proxy for THESL's effectiveness and efficiency in performing work, UMS Group considered the following:

[1] Appendix B provides further definition of the categorization presented in Table III-1.

- *Contribution to Capital Expenditures and Maintenance Spending*: According to THESL, the seven asset categories represent approximately 52% of the planned capital budget over the 2020 through 2022 period; and THESL spends approximately 57% of all preventative and predictive maintenance costs each year on the five maintenance programs that comprised this study.
- *Impact on Reliability*: The primary areas of concern when assessing a utility's reliability performance revolves around vegetation management, equipment failures, underground facilities, and the overall conduct of inspection, test, and maintenance programs, portions of which are addressed through the asset categories and maintenance programs that comprised this study.

Survey Instrument

Over the course of this project UMS Group identified 23 electric utilities for inclusion in the Peer Group Panel, striving for the inclusion / participation of at least 10 to assure a valid sample size on which to make meaningful comparisons. We were successful in obtaining the participation of 12, thus enhancing the veracity of the results. The Survey Instrument itself (***see Appendix F***) addressed three areas:

- *Unit Costs* for years 2020 through 2022, requesting the fully loaded installation / replacement, test, and inspection costs and number of assets installed / test and inspections conducted for each asset category and maintenance program. We averaged the responses across the three-year period (weighted by number of replacements, inspections and / or tests each year) to "smooth out" the year-over-year fluctuations that are likely to occur while executing an annual capital investment and maintenance-spending portfolio.
- *Accounting*, requesting (1) brief descriptions of each electric utility's method for determining unit costs, (2) listings of costs (in addition to direct labor and material) that were included in the reporting of costs (in-house), and (3) listings of costs included for contracted work. This information was then used to inform the "Accounting Adjustment" perspective of the normalization process (i.e., account for the different methods used to apply indirect and overhead costs to capital projects), briefly described below and further expanded upon in ***Appendix C***.
- *Local Factors*, providing a listing of any technical, legislative, regulatory, and bargaining unit constraints / mandates (referred to as "external factors") that dictate specific practices to be employed in performing work that could have cost ramifications. This information informed the assessment, providing context to the comparisons presented throughout the report.

THESL first reviewed and tested the survey instrument, after which time UMS Group issued it to each of the electric utilities that agreed to participate in this study. As the completed surveys were returned, UMS Group reviewed the responses and reached out to the respondents as necessary to resolve any apparent outliers and/or address areas where there appeared to be confusion.

Practices Assessment

UMS Group met with several organizations / functions within THESL (e.g., Performance Management, Asset Management, Capital Planning, Execution, Project Management Delivery, and OM&A) to gain insights and perspective regarding its practices (past, current, and future state) to derive unit costs. We used a variety of sources to compare this input with practices in use across the industry (summarized in Section IV-Summary of Results); namely:

- Insights gleaned from the Peer Group responses in the accounting section of the Survey Instrument, augmented by follow up conversations to clarify / lend context to expressed points-of-view,
- Feedback from electric utilities that are part of UMS Group's Global Learning Consortia (the focus of which includes benchmarking and the sharing of practices to improve performance and reduce costs), and
- UMS Group knowledge and expertise gleaned from working with and on behalf of over 300 utilities across the world since UMS Group's inception thirty-plus years ago.

Benchmarking

UMS Group applied its methodology and a tailored work plan to meet the objective of benchmarking unit costs across seven asset categories and five maintenance programs. Data provided by the previously described Peer Group Panel (***see Appendix B***) established THESL's position with respect to efficiency (cost); and we conducted practices interviews to lend context to these comparisons. In so doing, we were able to ascertain THESL's position relative to the Peer Group Panel across two perspectives, and further inform our views regarding THESL's methodology to calculate unit costs.

The benchmarking process itself consisted of three steps:

- Data Collection and Analysis: As each electric utility indicated its willingness to participate in the Peer Group Panel for this effort, UMS Group transmitted to the utility the survey instrument designed to ensure consistent responses (i.e., the questions were tightly structured) and support the "normalization" process (allow for valid comparison of fully loaded unit costs). In concert with sending the survey instrument, UMS Group provided "real time" instruction, and over time, conducted follow-up sessions to track progress, provide clarification and address any questions that might arise. It should be noted that THESL was the initial recipient of the Survey Tool, enabling the identification and remediation of any unanticipated areas of confusion / ambiguity / difficulty in completing the data package, increasing the likelihood of a valid comparison with the Peer Group Panel. As the surveys were completed, UMS Group performed a validation check for data quality, increasing the overall credence of the results. As UMS Group detected instances of potential misinformation, omissions, or anomalies it contacted the respondent and attempted to resolve any underlying issues.
- Develop Context for the Comparison: The initial formation of a Peer Group Panel represents the first step in assuring valid unit cost comparisons. Table III-1 provides a view of this group relative to five areas that can affect performance (i.e., Vegetation, UG Utility Congestion, Customer Density, External Factors and Weather Climate). As typifies every benchmark comparison, there was not a perfect fit for the 12 electric utilities across all five areas, though each member of the peer group panel was "compatible" with THESL in several of these areas (some in all of them). Though UMS Group has developed data normalization routines in the past to account for these differences, we have opted to present them in a more qualitative manner (i.e., not directly adjusting the figures) to bring context to the results. Thus, we started with raw comparisons (accounting for the conversion from imperial to metric units and US to Canadian dollars), and then applied an adjustor, accounting for different methods used by electric utilities in burdening unit costs

with indirect and overhead costs. Addressed in more detail in ***Appendix C***, this approach provides transparency to the process of data normalization, deemed appropriate given the wide range of factors that can affect these comparisons, and qualitatively acknowledges THESL's uniqueness in the Province of Ontario, namely:

  - City ordinances,
  - Higher cost of living,
  - Amount of underground construction,
  - Greater volatility in customer movements,
  - Amount of electric distribution assets, and
  - Customer density.

- Present the Results: UMS Group presented THESL's position relative to the Peer Group Panel median for each perspective (refer to Table II-1, Figures IV-1 through IV-12, and Tables C-1 and C-2). Recognizing that some might prefer more delineation in the ranking, we also provided a more expansive presentation of THESL's position relative to each member of the Peer Group Panel for the perspective that incorporates the Accounting Adjustment in ***Appendix G***.

SECTION IV – SUMMARY OF RESULTS

The following discussion summarizes the results of an approach that:

- Utilized UMS Group's proprietary and time-tested benchmarking and practices assessment methodology,
- Drew upon our extensive cost and service level database and best practices library,
- Analyzed input from a survey instrument administered to the Peer Group Panel, and
- Captured insights and perspectives from key management staff within the THESL organization.

Assessment of THESL's Unit Cost Methodology

THESL's approach to unit cost methodology is consistent with the methodology employed by similarly situated utilities across North America. More specifically, THESL employs the following documented, specific, and repeatable process when identifying its unit costs:

- As an initial matter, THESL utilizes its financial reporting systems as base source data from which to derive unit costs. This facilitates THESL modifying its financial naming conventions to those that are normalized and more common. THESL can therefore capture relevant costs and quantities, thus minimizing risks related to groups using different naming conventions, while also supporting a more robust and accurate peer collection process across North American utilities.

- For those units that are capitalized, THESL captures the asset in-service date, and determines whether the projects are single or multi-years from a financial perspective. Relevant information for single year projects is captured within the year. For multi-year projects, the costs are aggregated and captured in the year in which most of the project costs are incurred (the "MaxCap" year).

- Next, a series of data aggregation and filtering takes place. These filters allow THESL to focus on work (and as a result, THESL's expenditures) that is controllable and readily manageable. THESL's filtering efforts include:
  - Grouping like projects with like projects in "MaxCap" years,
  - Applying the Distribution System Plan ("DSP") program filter, to appropriately include risk-based and planned work while filtering out demand-based work that is deemed inconsistent with respect to need, cause, controllability, or predictability, and
  - Obtaining a more detailed trimmed mean of unit costs, by finding the inclusive percentiles at 10% and 90% on unit cost, thus eliminating the statistical tails.

- THESL then ensures appropriate project costs are captured, and are not net of capital contributions, by removing the capital contribution line items from the various project-based financial data.

This methodology provides a dataset that is repeatable and capable of duplication on a year over year basis.

In assessing THESL's approach to unit costing, it is our view that THESL's continued maturity, refinement, and utilization of unit cost metrics is in line with (and perhaps ahead of) the industry. Specifically, THESL appropriately created governance around the naming and categorization of assets to ensure an appropriate population of relevant assets is captured. Moreover, THESL's filtering efforts work to exclude extraordinary, unplanned, and otherwise uncontrollable capital and operational expenditures that can (and often do) significantly eschew unit cost data. Industry value in unit cost analysis is intended to capture spend and compare it to internal and external spend on as much of an apples-to-apples comparison as possible, recognizing all the challenges identified herein. THESL's approach works to accomplish this end and, as a result, is appropriate in all major respects.

Benchmarking of THESL's Unit Costs

In accordance with the approach outlined in the previous section, UMS Group benchmarked THESL's Unit Costs at each of two basic pre-established checkpoints:

- Raw Comparisons, reflecting the conversions from imperial to metric units and US to Canadian dollars, and a few adjustments to the original asset categories / maintenance programs to facilitate Peer Group comparisons, and
- Accounting Adjustors, accounting for the different methods used by electric utilities in applying indirect and overhead costs to unit costs.

Figures IV-1 through IV-12 provide a visual representation of the information presented in Table II-1 comparing THESL's unit costs (a three-year average from 2020 through 2022), as compared to the Peer Group median for each of the categories and programs across these two basic perspectives.

Figure IV-1

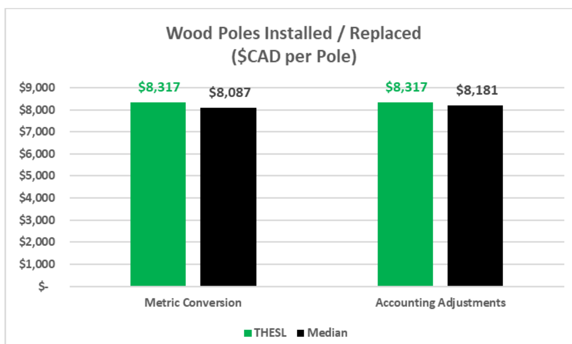


Figure IV-2

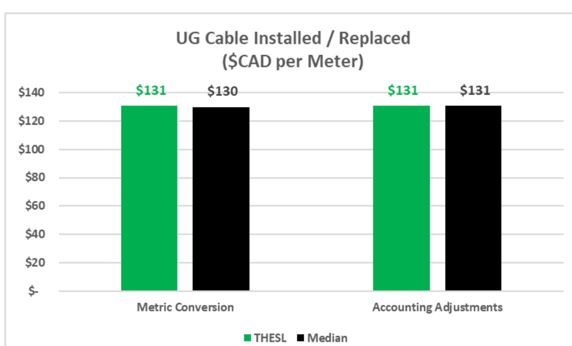


Figure IV-3

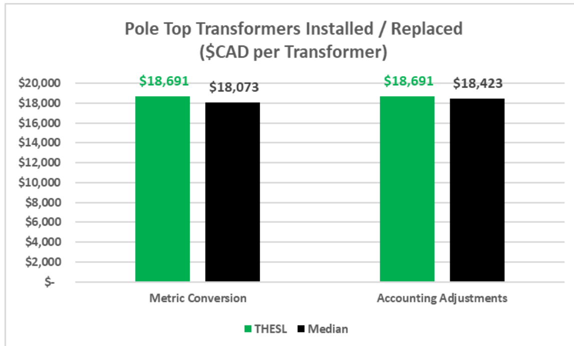


Figure IV-4

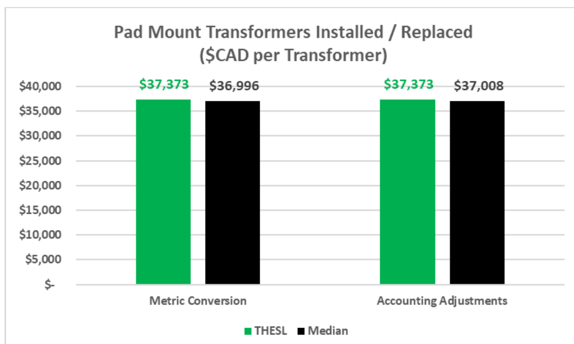


Figure IV-5

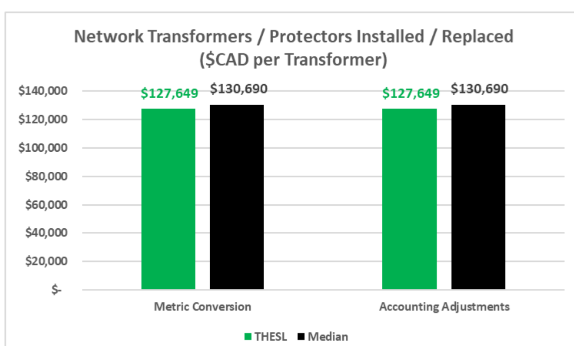


Figure IV-6

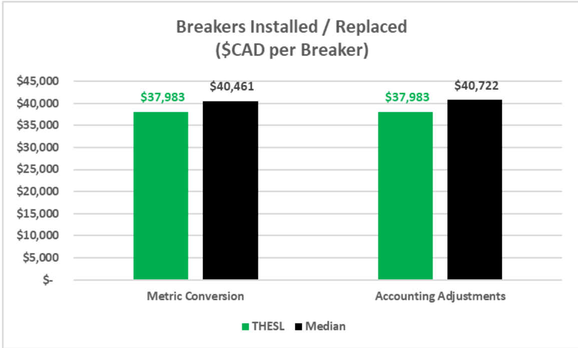


Figure IV-7

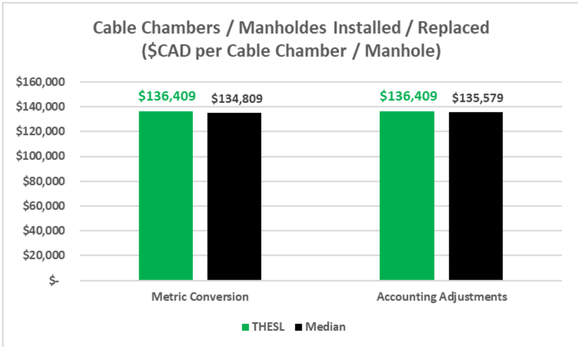


Figure IV-8

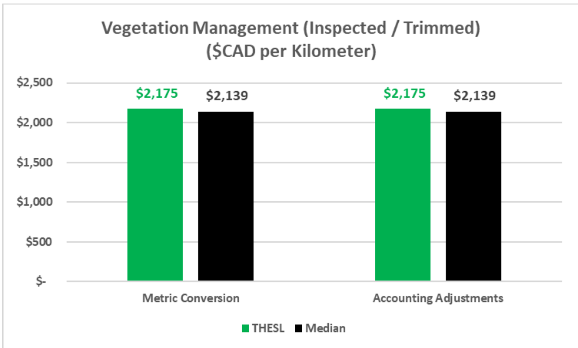


Figure IV-9

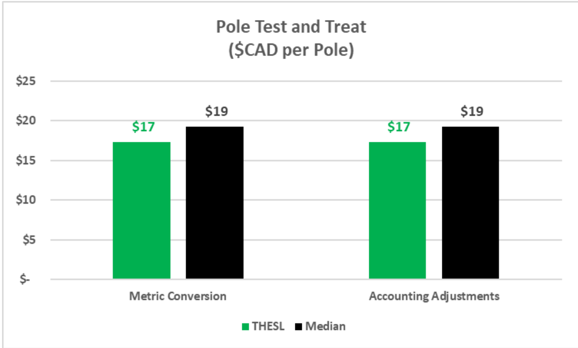


Figure IV-10

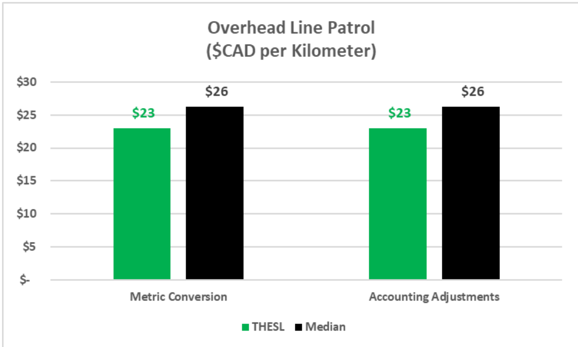


Figure IV-11

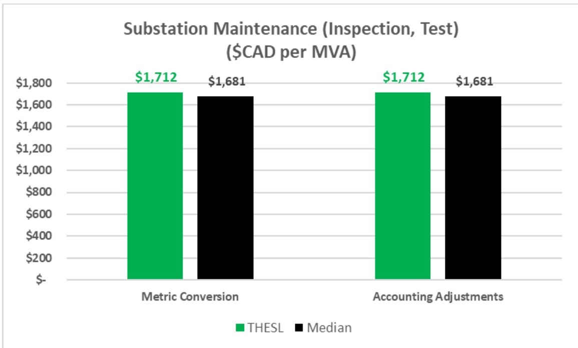
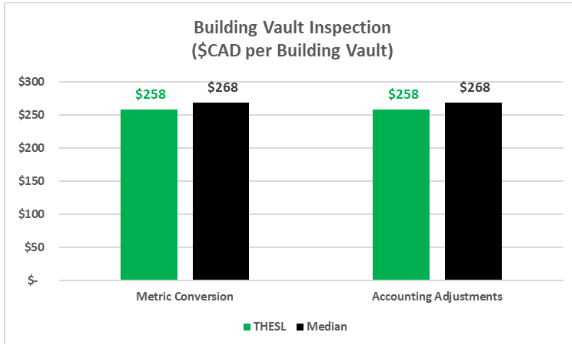


Figure IV-12



Implications of the Study

In reviewing our assessment of THESL's Unit Cost methodology, the subsequent benchmarking across seven asset categories and five maintenance programs, and taking stock of industry practices, the following additional conclusions apply:

- The asset categories and maintenance programs selected by THESL represent a valid proxy for trending its performance, and
- Benchmarking is directionally accurate in identifying opportunities for improvement and/or validating current cost and service levels. In applying this methodology to unit costs, absent detailed specifications regarding their calculation (which were developed for this study but not practical when conducting less rigorous comparisons of publicly available data), there are a wide array of variables to consider.

Appendix A – Supporting Material

UMS Group used the following THESL provided information and data to support or provide context to the study:

- 2020-2020 Capital Expenditures (CAPEX 2020-2022 Actuals_20230424.xlsx)
- 2021 Annual Report (2021-Annual-Report.pdf)
- 2021 OEB Electric Distribution Scorecard (2021-electricity-distributor-scorecard-toronto-hydro.pdf)
- Annual Information Form for the YE 12/31/2022 (2022-annual-information-form.pdf)
- Capital Expenditure Planning Process Overview (2020CIR_2B_E2 - Capital Plan Process Overview.pdf)
- Cable Chamber Description (Cable Chambers Brief Description and Pictures (2).docx)
- Customer Engagement Planning Process (2023-03-17 CE Residential Workbook_FINAL.pdf)
- Maintenance Program Annual Spend 2020-2022 (maintenance_ programs_annual_spend_3yr.xlsx)
- Overview of Distribution Assets (2020CIR_2B_D2 - Overview of Distribution Assets.pdf)
- Reliability Data 2020-2022 (Reliability - 3_yr_breakdowns.xlsx)
- System Maintenance Practices (Maintenance Cycle_Shared_20230424.xlsx)
- THESL System Demographics Summary (Toronto Hydro Asset Demographics.docx)
- THESL Unit Cost Methodology dated December 4, 2023 (UMS workshop_ walkthrough_110423.pdf)
- THESL Unit Cost Survey Response (Unit Cost Survey_FINAL_THESL.xlsx)

Appendix B – Peer Group

The Peer Group Panel used for this study consisted of 12 electric utilities, namely:

- AES-IPL (Indianapolis, IN)
- AES-DPL (Dayton, OH)
- Anonymous Utility (Canada)[1]
- Avista Utilities (Spokane, WA)
- Baltimore Gas and Electric (Baltimore, MD)
- Detroit Edison (Detroit, MI)
- Elexicon Energy (Various Communities, Ontario)
- ENMAX (Calgary, Alberta)
- London Hydro (London, Ontario)
- Portland General Electric (Portland, OR)
- SaskPower (Regina and Saskatoon, Saskatchewan)
- Seattle City Light (Seattle, WA)

NOTE 1: As a prerequisite to participation, one Canadian utility required anonymity in its participation and response.

In selecting the utilities that comprise this group, we strove to provide results based on comparisons that would be relevant to an electric utility of THESL's size and complexity. Table B-1 illustrates THESL's relative position across the myriad factors that need to be considered in conducting like-for-like unit cost comparisons of Electric Distribution Companies; and though no two Electric Distribution Systems / Organizations are identical, THESL is among the highest percentages within this peer group in all but one of the five factors that can influence comparisons to unit costs (and that one, Population, Building, and Utility Congestion was evenly split among the Peer Group Panel).

Table B-1: Distribution of Peer Group Panel across External Factors (including THESL)

Vegetation (Refer to Figure B-1)		
Low (Area Covered by Tree Canopy 0-10) %)	Medium (Area Covered by Tree Canopy 10-40%)	High (Area Covered by Tree Canopy > 40%)
2	8	3
UG Congestion (Refer to Table B-2)		
Low (Other Utilities)	Medium (UG Network and Other Utilities)	High (UG Network, Other Utilities, and Shoring requirements)
1	4	8
Population, Building and Utility Congestion (Refer to Figure B-3 and prefacing discussion)		
Low (Customer Density < 100)	Medium (Customer Density 100-500)	High (Customer Density >500)
4	5	4
External Factors (Refer to Table B-2)		
Low (0 to 6 External Factors)	Medium (7 to 10 External Factors)	High (>10 External Factors)
2	2	9
Weather (Refer to Figure B-2)		
Mild (Mediterranean)	Moderate (Humid Continental)	Harsh (Sub-Arctic)
2	8	3

NOTE: The area shaded in green reflects the categorization of THESL in each category.

UMS Group utilized Figure's B-1 and B-2 to ensure an appropriate comparative capability between the selected peer group set. Electric utility operations, by their very nature, are impacted by geography, and more specifically, by tree vegetation and weather among other factors. These factors impact operations from a broad perspective, ranging from the types of assets that are selected and in-serviced, to the frequency of maintenance programs, to the cost and ease of construction. To the extent possible in balancing "perfect fit" with Peer Group size requirements, UMS Group approached utilities that mirrored THESL within these two categories.

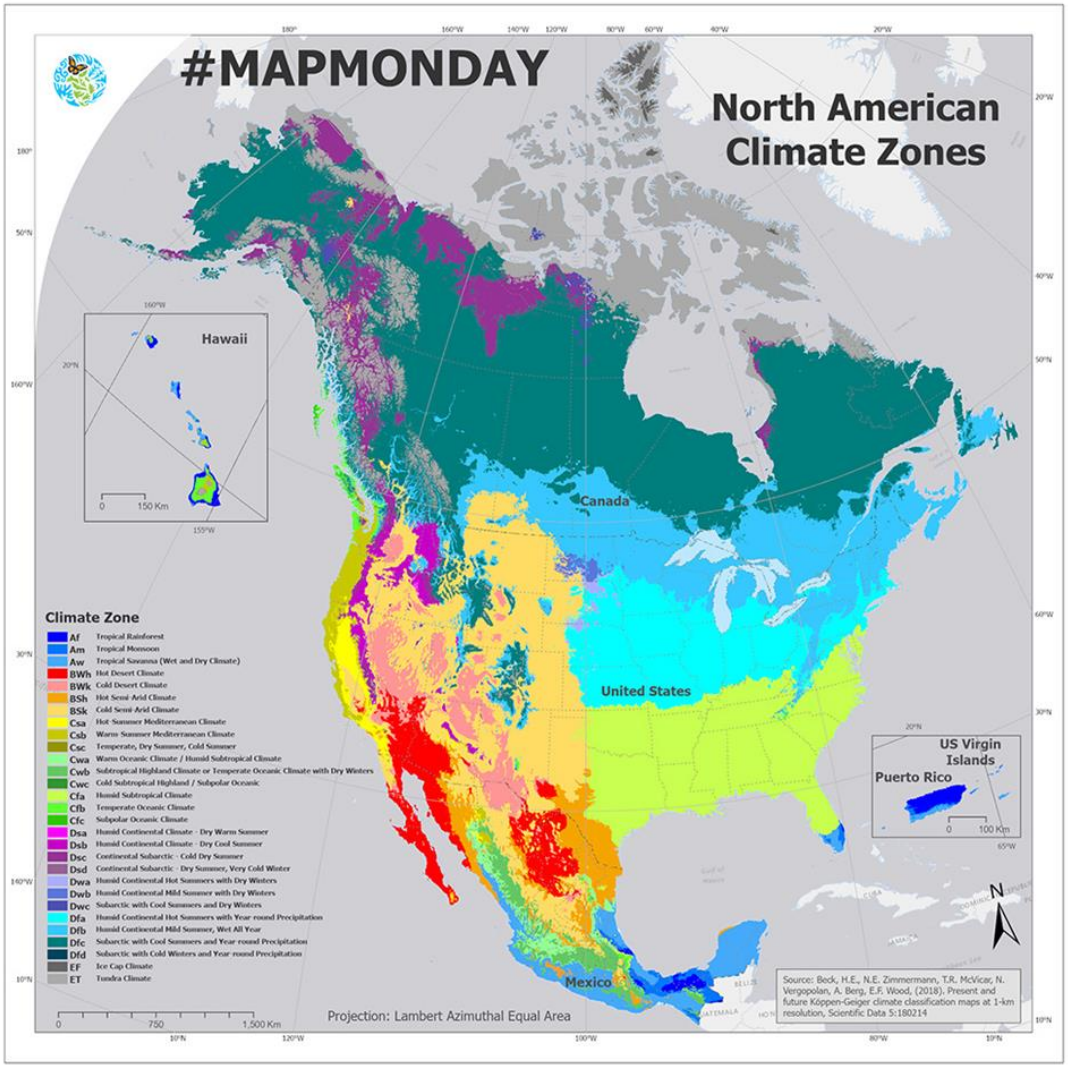
The following extract was used to categorize the Peer Group utilities in terms of **Vegetation** in Table B-1 (Based on percent of area covered by tree canopy):

Figure B-1: North American Vegetation Density

Reference: Percentage of surface (green) based on data by the U.S. Geographical Survey together with man-made structures (red, based on data by ESA and major rivers (blue). Areas that are neither red nor green represent other types of land cover such as crops, grass, shrubs, bare rocks, and water.

With respect to **Weather / Climate**, the vast majority of the Peer Group Panel (except Portland General Electric and Seattle City Light) are in areas with similar weather patterns. General descriptions of Climate Zones for the Peer Group Panel include Mediterranean, Humid Continental, and Sub-Arctic.

Figure B-2: Weather / Climate Map



Reference: Commission for Environmental Cooperation applying the Koppen-Geiger Climate Classification System.

The **External Factors** rating reflected responses to our queries regarding applicability of an array of factors that have an adverse effect on field productivity. Based on the responses, an assessment of the level of difficulty confronting each utility was made (high, medium, or low).

Table B-2: Summary of External Factors Ratings

COST IMPACT CATEGORY	THESL	A	B	C	D	E	F	G	H	I	J	K	L
Excessive travel time (over 30 mins)	X	X			X	X		X		X	X		X
Road restrictions which limit working hours	X	X	X	X	X	X	X		X	X	X	X	X
High water table	X				X	X	X	X		X	X		X
Working next to energized lines (requiring dedicated observer, gloves, etc.)	X	X	X	X	X	X	X	X	X	X	X	X	X
Requirements to perform work off hours (i.e., night / weekend)	X	X	X	X	X	X	X			X	X		X
Changed standards requiring rebuilds rather than like-for-like (i.e., clearances)	X	X			X	X	X				X	X	X
Excessive switching requirements (i.e., to isolate on dual radial construction)	X	X	X		X	X	X	X	X	X	X	X	X
Shoring requirements for UG work	X	X	X		X	X					X	X	X
Limitations on tree trimming (e.g., unusually tight clearances)	X	X	X	X	X	X	X		X		X		X
Prior use of lead cables			X	X		X				X			X
High fault currents (impacting equipment sourcing)		X	X							X	X		X
Paid duty for police presence on public roads	X	X	X	X	X	X			X	X	X		
Extensive use of submersible transformers							X						X
Environmental regulations	X	X	X	X	X	X	X	X	X	X	X		X
Insufficient IT Enablement			X	X					X				
Union Work Rules		X			X	X	X		X	X	X		X
City consent requirements (i.e., customer notification, restoration, progressive clean-up, etc.)	X	X	X	X	X	X	X		X	X	X	X	X
Other (please specify in comments)													
LEVEL OF DIFFICULTY	High	High	High	Med	High	High	High	Low	Med	High	High	Low	High

NOTES:

1. **The "alpha" designations are applied to mask the identity of any specific utility in the Peer Group Panel (a commitment that must be adhered to throughout the process, as guarantees of confidentiality were required to garner their participation in the study).**
2. **In assigning "High," "Medium," and "Low" level of difficulty, the following scale was used:**
    a. **LOW: 0 to 6 External Factors**
    b. **MEDIUM: 7 – 10 External Factors**
    c. **HIGH: > 10 External Factors**

Other Utilities Serving the Province of Ontario

There is rationale for defining a peer group outside of the utilities that serve the Province of Ontario (as the peer group determines the comparative position with respect to unit costs). First, from purely a demographic perspective, the City of Toronto ranks among the more urban in North America (let alone the Province of Ontario), and as with all predominantly urban electric utilities, Toronto-based utilities deal with several unique cost drivers, including:

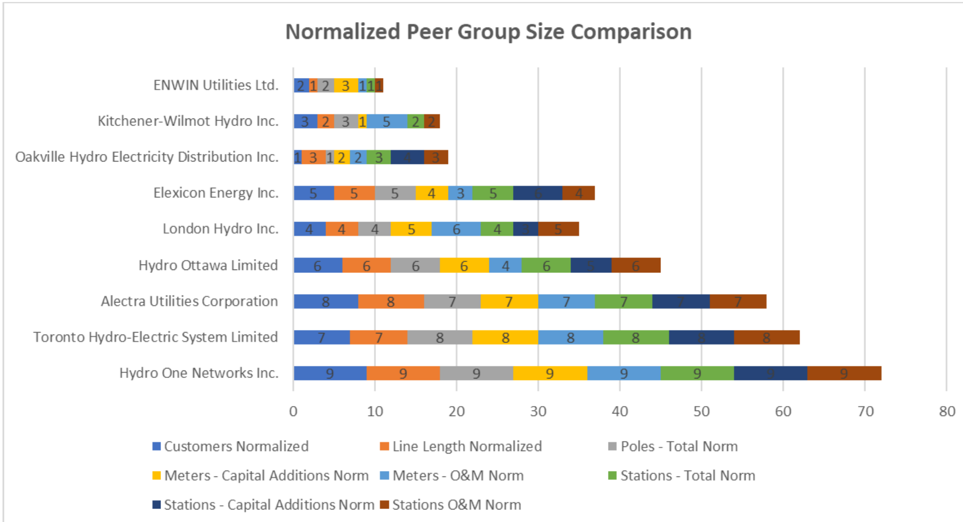
- City ordinances that impact the conduct of work (e.g., restrictions on work hours and additional police / traffic control), logistics that limit access of vehicles and work teams to the work site (e.g., traffic flow considerations and congestion), and system design (e.g., fully enclosed substations with due regard to external appearances and limits on use of overhead construction),
- Higher cost of living leading to higher wage structures and a noted increase in overheads (offices and other facilities),
- Complex underground construction related to secondary networks (e.g., limited access, possible interference with other underground utilities, underground cable through concrete duct banks, increased number of feeder ties and back-feed capability, and increased need for technology to provide more automation),
- More volatility in customer movements causing a higher number of turn-on / turn-offs, and
- With respect to the sheer number of customers, significantly higher density pointing towards increased measures for public health and safety.

However, there are a few utilities in the Province of Ontario that warrant consideration. We first filtered out all utilities associated with the Activity and Program-based Benchmarking Initiative (https://www.rds.oeb.ca/CMWebDrawer /Record/784172/File/document) (the "APB Initiative") with less than 75,000 customers. This narrowed the potential peer group to nine. Then, looking at the input data from the APB Initiative, we narrowed our focus to the following 10 data sets to assess viability for this study:

- Number of Customers
- Line Length (KM)
- Total Poles
- Pole Additions
- Meters – Capital Additions ($)
- Meter – O&M ($)
- Number of Stations
- Stations – O&M ($)
- Poles, Towers, and Fixtures – O&M ($)
- Vegetation Management – O&M ($)

We then performed a simple sum quantification of the data collected to visually depict relative position of each of the nine utilities, forced order ranking them in each of the 10 categories.

Figure B-3: 2021 Comparison of Ontario Utilities



As one can see, five utilities (Elexicon Energy, London Hydro, Hydro Ottawa, Alectra Utilities, and Hydro One) approach parity with THESL. We disqualified Hydro One as it does not serve a population center even remotely like that of THESL (i.e., without the complexities / difficulties confronting other utilities), and reached out to the other four. Two (Elexicon Energy and London Hydro) opted to participate.

Appendix C – Data Normalization Process

Prior to conducting comparative statistical analyses with the Peer Group Panel (***see*** Appendix B), it was necessary to "normalize" the unit cost performance across all participating electric utilities. Normalization involved a two-step approach, thereby presenting two basic perspectives and availing the reader total transparency to the comparisons at both major junctures of the normalization process.

- **Raw Comparisons (Perspective 1)** involved, where appropriate, the conversion from imperial to metric units and US to Canadian dollars. As we opted to adopt a three-year average (2020 through 2022), an average conversion rate of $US to $CDN ($1.00 USD to $1.278 CDN) was applied, and
- **Accounting Adjustors (Perspective 2)**, accounting for the different methods used by electric utilities in applying indirect and overhead costs to unit costs. In informing the bases for these adjustments, we queried each of the electric utilities as to what non-direct labor and material were included in the unit costs, distinguishing between utility and outside contractor performed work. Table C-1 illustrates the differences across the Peer Group Panel and the factor used to account for the differences.

Table C-1: Composition of Unit Costs
(In addition to Direct Labor and Material)

CATEGORY	THESL	A	B	C	D	E	F	G	H	I	J	K	L
Design and permitting costs	X	X	X	X	X	X	X	X	X	X	X	X	X
Project management and supervisory costs	X	X	X	X	X	X	X	X	X	X	X	X	X
Other project-related costs (e.g., fleet and warehouse)	X	X	X	X	X	X	X	X	X	X	X	X	X
Other labor-related costs (e.g., training, conferences, and meetings)	X	X	X	X	X	X							
Employee-related costs (e.g., vacation, sick time, insurance, and pension)	X	X	X	X	X	X		X		X		X	
Administrative and general costs	X	X	X	X	X	X	X	X	X	X	X	X	X
AFUDC / CWIP	x	X	X	X	X	X	x		X		X	X	
ADJUSTMENT FACTOR	1.0	1.0	1.0	1.0	1.0	1.0	1.04	1.03	1.04	1.03	1.04	1.02	1.05

NOTE: In determining the adjustment factor, THESL confirmed that AFUDC / CWIP comprised 0.8% of the fully loaded labor component of unit costs (a figure that is corroborated by data from Global Learning Consortia facilitated by UMS Group as are the 2% figures attributed to other labor and employee-related costs).

Tables C-2 and C-3 present the outputs of the two-stepped approach to normalization across the seven asset categories and five maintenance programs, noting that the Peer Group Panel is intentionally masked to comply with our commitment regarding the confidential handling of this information.

Table C-2: Raw Comparison
(Metric and Canadian Dollar Conversion)

Asset Category / Capital	Units	A	B	C	D	E	F	G	H	I	J	K	L	THESL	Peer Group Median	Quartile	Percent from Median
Wood Poles Installed / Replaced	Each	$ 7,829	$ 7,860	$ 7,977	$ 8,087	$ 9,147	$ 19,398	$ 3,020	$ 8,342	$ 7,943	$ 15,500	$ 14,945	$ 5,214	$ 8,317	$ 8,087	3rd	2.8%
UG Cable Installed / Replaced	Meters	$ 126	$ 117	$ 122	$ 126	$ 138	$ 839	$ 74	$ 134	$ 130	$ 810	$ 657	$ 62	$ 131	$ 130	3rd	0.7%
Pole Top Transformers Installed / Replaced	Each	$ 19,711	$ 17,282	$ 20,761	$ 16,197	$ 22,590	$ 17,456	$ 9,416	$ 22,065	$ 21,141	$ 7,600		$ 6,773	$ 18,691	$ 18,073	3rd	3.4%
Padmount / Vault Transformers Installed / Replaced	Each	$ 39,575	$ 36,643	$ 35,430	$ 32,955	$ 47,762	$ 43,287	$ 33,350	$ 37,350	$ 44,384	$ 15,500		$ 11,001	$ 37,373	$ 36,996	3rd	1.0%
Network Transformers / Protectors Installed / Replaced	Each	$ 125,054	$ 123,432	$ 120,482	$ 130,690	$ 133,554	$ 171,269		$ 131,051	$ 142,327		$ 220,000	$ 3,346	$ 127,649	$ 130,690	2nd	-2.3%
Breakers Installed / Replaced	Each	$ 31,407	$ 32,322	$ 39,301	$ 35,761	$ 42,142		$ 55,850	$ 41,621	$ 44,501	$ 55,000			$ 37,983	$ 40,461	2nd	-6.1%
Cable Chambers / Manholes Installed / Replaced	Each	$ 126,188	$ 133,210	$ 132,727	$ 144,022	$ 147,302		$ 65,200	$ 129,566	$ 160,610		$ 826,230		$ 136,409	$ 134,809	3rd	1.2%
Maintenance Programs / OM&A																	
Vegetation Management (Inspected / Trimmed)	Kilometers	$ 2,104	$ 2,502	$ 2,324	$ 1,789	$ 2,578	$ 480		$ 2,577	$ 2,284	$ 717	$ 1,860	$ 396	$ 2,175	$ 2,139	3rd	1.7%
Pole Test and Treat	Each	$ 15	$ 14	$ 17	$ 15	$ 20	$ 55	$ 47	$ 20	$ 33	$ 18		$ 21	$ 17	$ 19	2nd	-10.1%
Overhead Line Patrol	Kilometers	$ 21	$ 23	$ 29	$ 22	$ 25		$ 80	$ 23	$ 27	$ 48	$ 938	$ 1,665	$ 23	$ 26	2nd	-12.2%
Substation Maintenance (Inspection, Test)	Total MVA	$ 1,668	$ 1,649	$ 1,681	$ 1,553	$ 1,822			$ 2,156	$ 2,175	$ 665	$ 927	$ 6,232	$ 1,712	$ 1,681	3rd	1.9%
Building Vault Inspections	Each	$ 258	$ 268	$ 236	$ 252	$ 289		$ 1,136	$ 272	$ 296	$ 229	$ 700		$ 258	$ 268	2nd	-3.9%

Table C-3: Accounting Adjustment

Asset Category / Capital	Units	A	B	C	D	E	F	G	H	I	J	K	L	THESL	Peer Group Median	Quartile	Percent from Median
Wood Poles Installed / Replaced	Each	$ 7,829	$ 7,860	$ 7,977	$ 8,087	$ 9,147	$ 20,174	$ 3,111	$ 8,675	$ 8,181	$ 16,120	$ 15,244	$ 5,475	$ 8,317	$ 8,181	3rd	1.7%
UG Cable Installed / Replaced	Meters	$ 126	$ 117	$ 122	$ 126	$ 138	$ 873	$ 76	$ 140	$ 134	$ 842	$ 670	$ 65	$ 131	$ 131	Median	0.0%
Pole Top Transformers Installed / Replaced	Each	$ 19,711	$ 17,282	$ 20,761	$ 16,197	$ 22,590	$ 18,154	$ 9,698	$ 22,947	$ 21,775	$ 7,904		$ 7,112	$ 18,691	$ 18,423	3rd	1.5%
Padmount Transformers Installed / Replaced	Each	$ 39,575	$ 36,643	$ 35,430	$ 32,955	$ 47,762	$ 45,018	$ 34,351	$ 38,844	$ 45,715	$ 16,120		$ 11,551	$ 37,373	$ 37,008	3rd	1.0%
Network Transformers / Protectors Installed / Replaced	Each	$ 125,054	$ 123,432	$ 120,482	$ 130,690	$ 133,554	$ 178,120		$ 136,293	$ 146,597		$ 224,400	$ 3,513	$ 127,649	$ 130,690	2nd	-2.3%
Breakers Installed / Replaced	Each	$ 31,407	$ 32,322	$ 39,301	$ 35,761	$ 42,142		$ 57,526	$ 43,285	$ 45,836	$ 57,200			$ 37,983	$ 40,722	2nd	-6.7%
Cable Chambers / Manholes Installed / Replaced	Each	$ 126,188	$ 133,210	$ 132,727	$ 144,022	$ 147,302		$ 67,156	$ 134,749	$ 165,428		$ 842,755		$ 136,409	$ 135,579	3rd	0.6%
Maintenance Programs / OM&A																	
Vegetation Management (Inspected / Trimmed)	Kilometers	$ 2,104	$ 2,502	$ 2,324	$ 1,789	$ 2,578	$ 480		$ 2,577	$ 2,284	$ 717	$ 1,860	$ 396	$ 2,175	$ 2,139	3rd	1.7%
Pole Test and Treat	Each	$ 15	$ 14	$ 17	$ 15	$ 20	$ 55	$ 47	$ 20	$ 33	$ 18		$ 21	$ 17	$ 19	2nd	-10.1%
Overhead Line Patrol	Kilometers	$ 21	$ 23	$ 29	$ 22	$ 25		$ 80	$ 23	$ 27	$ 48	$ 938	$ 1,665	$ 23	$ 26	2nd	-12.2%
Substation Maintenance (Inspection, Test)	Total MVA	$ 1,668	$ 1,649	$ 1,681	$ 1,553	$ 1,822			$ 2,156	$ 2,175	$ 665	$ 927	$ 6,232	$ 1,712	$ 1,681	3rd	1.9%
Building Vault Inspections	Each	$ 258	$ 268	$ 236	$ 252	$ 289		$ 1,136	$ 272	$ 296	$ 229	$ 700		$ 258	$ 268	2nd	-3.9%

Appendix D – UMS Group and Project Team Qualifications

UMS Group is an International Utility Management Consulting firm founded in 1989 to serve the global utility industry. We specialize in enterprise-level value creation, performance management solutions, and utility asset management. We are a private employee-owned company incorporated in New Jersey with headquarters in Parsippany, New Jersey, and major branch offices in Australia, The Netherlands, and The Philippines. This project was managed out of UMS Group's Headquarters Office, located at 111 Littleton Road, Suite 111, Parsippany, NJ 07054.

We bring to our clients a unique knowledge of global industry best practices, an advanced library of diagnostic methodologies and performance benchmarking data, and a strong base of utility strategic and operational expertise. We combine experienced utility consultants and seasoned industry professionals with world class tools and intellectual capital to assist our clients in diagnosing problems, designing solutions, and implementing change.

We offer:

- A team of senior consultants who have "been there and done that" in implementing change in difficult cultural, political, and labor environments.
- Strong insights into key trends and directions across the global utility industry and comprehensive understanding of the underlying drivers and emerging technology and strategies for creating competitive advantage.
- Time-tested and accepted methodologies for conducting current state assessments in four core areas which we believe are the key to achieving best practices or best-in-class performance: Operating (and Accountability) Model, Business Processes and Practices, Competencies, and Technology, Data, and Information Management.
- A comprehensive set of tools and approaches that quickly and effectively build on performance insights gained from assessments, to create actionable improvement strategies and plans.
- Experience in the successful development and implementation management of projects and initiatives that drive improvements in the performance of operations, business and financial, customer service, and asset management.

Our specific product and service offerings fall under the categories of **Performance** or **Asset Management**.

Performance Management

- Performance diagnostics (i.e., *comparative analyses*) to identify areas in which to improve operational efficiencies (cost level) while increasing operational effectiveness (service level).
- Enterprise-wide and function-specific *benchmarking* to substantiate rate case filings, identify reliability improvement initiatives including service interruption mitigation and restoration, and support Capital and O&M budget submittals to external stakeholders.
- Development of *operational dashboards* to provide line-of-sight performance tracking between corporate strategy and specific investment and spending programs.

Asset Management

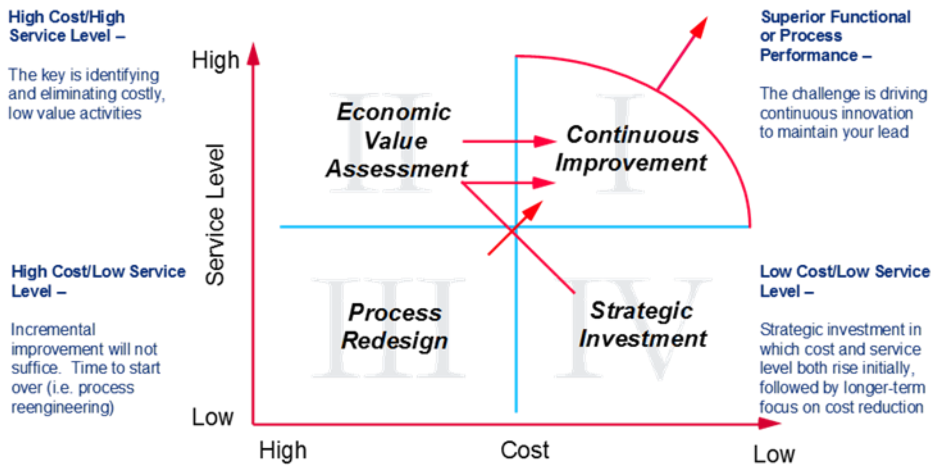
- Asset Management Business Architecture, Strategy and Planning: Major *Strategic Asset Management Transformations* facilitated by UMS Group, have achieved significant cost reductions/productivity improvements, process efficiency and effectiveness improvements, system reliability and customer satisfaction improvements and OPEX and CAPEX optimization. This practice competency has given rise to many decision support tools and a corporate performance dashboard design and implementation practice.
- Life-Cycle Investment Decision-Making and Optimization: Services range from improving practices and methodologies related to *aging infrastructure* to refining existing tools / installing new tools to aid in *Capital Investment and O&M Program Portfolio Optimization* supporting the notion of maximizing value enterprise-wide (comprehensive accounting of benefits aligned to corporate strategy) while operating within a pre-established budget and risk profile.
- Assess Management Program Assessments: As an *endorsed Assessor by the Institute of Asset Management*, UMS Group has conducted a significant number of PAS 55 / ISO55000 assessments, comparing utilities' compliance with basic asset management policies and practices. We view this standard as a lens in ensuring all asset management activities within a utility support the achievement of its business plan, at optimal cost and on a sustainable basis.

UMS Group Competencies and Skills

UMS Group has consistently demonstrated the following key competencies and skills required to complete a unit cost measurement and benchmarking effort in the utility industry:

- *Operational Knowledge of the Industry*: The ability to effectively converse with the utility Subject Matter Experts (critical to discovering the information under the numbers) requires a certain level of conversance with the factors that drive unit costs. The core team of three consultants that contributed to this effort total over 60 years of experience, three of whom have worked (either as full-time staff or in a consulting capacity) within utility organizations.
- *Development of a Performance Management Framework*: UMS Group has perfected the use of a 2-dimensional view of performance, calling for simultaneous measurement of cost and service level in conducting performance diagnostic and comparative analyses. Though this effort was largely cost-oriented, one still had to factor for the reality that maintaining an acceptable level of service (*e.g.,* reliability, power quality and customer service) is vital; and therefore, any comparisons to a Peer Group Panel had to factor for varying levels of customer expectations.

Figure D-1: UMS Group Performance Management Framework



- *Data Normalization*: Comparative Analysis (*i.e.,* Benchmarking), performed correctly, is directionally accurate in that it points towards areas where well-targeted intervention can result in improved performance (in this case reduced unit costs), and provides a point for real-time performance comparisons. However, normalization for factors such as customer density, amount and accessibility of vegetation, and weather need to be accounted for in presenting any comparisons (in the form of adjustments and / or mitigating statements). Specifically, about unit costs, there are issues with the peer data that need to be addressed / adjusted for to ensure an "apples-to-apples" comparison including the use of burdened vs unburdened rates, inclusion of equipment costs, whether work is performed energized or de-energized, comparability of work performed, etc. In forming the Peer Group Panel, these types of variances can be reduced, but never eliminated. Being able to assess the extent to which these factors negate exact comparisons and draw on years of benchmarking experience was critical to managing the presentation and interpretation of these results.
- *Communication*: The ability to frame the conversation in a manner that proactively dismisses the false impressions that benchmarking can reveal yet pose paradigms that are grounded and lead to constructive discussion are critical to any project's success. The previously presented competencies played a key role in conveying the correct message; but so was the operating discipline of thoroughly vetting a developing narrative before issuing any final documentation. Our views were substantiated by the data and information we requested and received and answers to the questions we posed, but may not have, at the first pass, represented the full story. Therefore, the ability to listen, interpret and modify views (requiring evidence of any bases to change them) was at least as important as the technical elements around industry knowledge, performance management and data normalization.

We have accomplished similar projects with clients in various markets around the world. The following table summarizes the successful completion of relevant projects,

Table D-1: Recent UMS Group Comparative Analyses / Benchmarking Efforts

Client / Project	Relevant Analyses
ATCO Electric PBR Rate Filing Support	• Capital Additions • Investment levels for Asset Replacement/ End of Life, Clearance and Safety, and Reliability • System Performance Risk Mitigation • Transmission Construction Costs and Practices
ATCO Electric T&D Performance Diagnostics	• T& D Capital Maintenance Program Frequency • Distribution Projects Efficiency and Budget Adherence • Vegetation Management Spending Levels and Performance • O&M Productivity (internal comparison and external benchmarks)
ATCO Electric T&D Gas Distribution Benchmarking	• O&M Productivity (cost per customer, CJ/Gas, per Km of main, % of net plant) • Total Gas Distribution Costs (O&M +A&G) • Hit Lines /Leaks • Safety
Black Hills Maintenance Program Review	• Substation Maintenance Frequency Practices Benchmarks • Substation Maintenance Task Performance Comparisons • Diagnostic Testing Performed
Dayton Power and Light (AES) Generation and T&D Performance Diagnostics T&D System Refurbishment and Replacement Risk Assessment	• Capital Investment Levels • O&M Spending Levels • System Reliability Performance • Maintenance Performance • Workforce Productivity (Unit Costs) • Aging Infrastructure Trends and Comparisons • Reliability and Equipment Failure • Adequacy of Capital Investment and O&M Spending Levels
Evergy Reliability Benchmarking Process and Accuracy Study	• Electric utility industry-wide benchmarking of CAIDI, SAIDI and SAIFI (MED and non-MED) • Data certainty and accuracy associated with outage reporting. • Comparative analysis associated with event exclusion inclusion.
Evergy Substation Operations Training Study	• Training locations and equipment used. • Simulations and Advanced Technology • Lessons Learned utilization.
FirstEnergy (JCP&L) Investment, O&M Spending and Performance Comparison Study	• Capital Investment Levels • O&M Spending Levels • Reliability Performance • Aging Infrastructure Analysis
Hydro One Capital Project Execution	• Capital project schedule attainment. • Project cost • Project resourcing selection • Scope management • Risk processes • QA/QC • Project communications protocol • Contract methodology
Indianapolis Power and Light Company (AES) Generation and T&D Benchmarking	• Generation Plant Performance Gap Assessment • Generation Asset Management Gap Analysis and Transformation Plan • T&D Asset Management Maturity • T&D Staffing Productivity (Unit Costs)
Lansing Board of Water and Light Power Production and Energy Delivery High Level Performance Diagnostic	• Cost and Service Level Comparison • Infrastructure Renewal Analysis • System Maintenance Performance • Aging Workforce Analysis • Worker Productivity (Unit Costs) • Organizational Effectiveness
Nova Scotia Power Enterprise-wide Performance Diagnostic	• O&M Spending Comparison • Capital Investment Levels Comparison • Investment Renewal and Asset Recovery Comparison • Reliability and Availability Comparison • Work Planning and Execution • Maintenance Program Effectiveness • Workforce Productivity (Unit Costs) • Aging Workforce Analysis

PSE&G-NJ and PSE&G-LI O&M Reduction Program Support Efficiency Improvement and Cost Reallocation Project	• O&M Spending Assessment • Workforce Management Assessment • Overtime Analysis / Comparisons • Organizational Effectiveness Review • Workforce Productivity (Unit Costs) • Aging Workforce Comparisons
PSE&G-LI Efficiency Improvement and Cost Reallocation Project	• Organization Redesign • Work Management • Asset Management • O&M Cost Reduction • Aging Workforce / Succession Planning
PSE&G – NJ Training Center of the Future	• Division of responsibilities • Partner Options with Community Colleges and Vocational Technical Schools • Success of Programs • Curriculum, including field and classroom.
Santee Cooper Organizational Excellence Study	• Generation organization staffing • Transmission and Distribution organization staffing • Customer operations organization staffing
SaskPower Business Renewal Initiative: Capital Efficiency and O&M Spending Assessments (Generation, T&D and Customer Service)	• Capital Investment Levels • O&M Spending Levels • System Reliability Performance • Worker Productivity (Unit Costs) • Maintenance Performance • Aging Infrastructure Trends and Comparisons • Aging Workforce Comparisons

Experience Summaries of UMS Group Core Team

Representing over 120 years of electric utility experience, the individuals provided by UMS Group are knowledgeable in unit costing practices, and conversant with the analytics necessary to perform the comparative analyses required to support an objective, independent third-party assessment. The following table provides a high-level view of their qualifications, followed immediately by resumes of those proposed as Expert Witnesses.

Table D-2: UMS Group Core Team

Name	Project Role	Years of Experience	Relevant Areas of Expertise
Jeffrey Cummings	Project Manager and Expert Witness	42	• Regulatory Support • Comparative Analysis / Benchmarking • Strategic and Operational Planning • T&D Grid Resiliency and Revitalization • Electric Distribution Reliability • Capital Investment and O&M Program Planning and Prioritization • Asset Lifecycle Planning • Maintenance Program Optimization • Repair vs. Replacement Criteria • Labor Relations
Nicholas Austin	SME-Utility Practices and Expert Witness	25	• Regulatory Support • Strategic and Operational Planning • T&D Grid Resiliency and Revitalization • Energy and infrastructure construction, project management and project lifecycle • Electric Distribution Reliability • Capital Investment and O&M Program Planning and Prioritization • Asset Lifecycle Planning • Maintenance Program Optimization • Repair vs. Replacement Criteria • Labor Relations

Johnny Shearman	SME-Comparative Assessments and Benchmarking		• Conducted comparative analyses and benchmarking efforts for multiple public utilities. • Analyzed key performance indicators (KPIs) such as operational efficiency, reliability, and financial metrics. • Evaluated performance of public utilities against industry peers to identify strengths and areas for improvement. • Examined operational processes, infrastructure, and technology adoption to determine best practices. • Identified regulatory and compliance factors affecting public utilities and evaluated their effectiveness.

Jeffrey W. Cummings

SUMMARY AND BACKGROUND

Mr. Cummings has over 42 years of professional consulting experience, with an extensive background in engineering, strategic and operational planning for vertically integrated investor-owned utilities and municipalities in North America and Asia Pacific. His most recent engagements include projects for LUMA (the combined entity of ATCO Electric and Quanta Services that has assumed management of Puerto Rico's electric T&D System), Public Service Electric and Gas-Long Island, Evergy, AES-Indianapolis Power and Light Company, Pacific Gas and Electric, FirstEnergy (Ohio, West Virginia, Maryland, New Jersey and Pennsylvania), NIPSCO (Gas), ATCO Electric, Saskatchewan Power, Ameren (Illinois and Missouri), Ergon Energy, Hydro One, Hydro Ottawa, Portland General Electric, Toronto Hydro (THESL), and Public Service Electric and Gas Company. He has supported the industry in addressing (1) key strategic and operational challenges related to system modernization / resiliency, (2) system cost and service level performance through comparative analyses (benchmarks) and the integration of industry best practices, (3) project and portfolio management, (4) reliability and risk mitigation, (5) energy efficiency, (6) fleet optimization, (7) capital investment planning and prioritization, (8) asset risk strategy and plan development, (9) organizational transformation, and (10) regulatory strategy. When called upon, he has offered expert testimony and/or opinion, most recently for three Canadian Provincial Utilities, the Israel Electric Company, and six US Investor-owned utilities operating in Kansas, New Jersey, Ohio, and Pennsylvania.

Earlier in his career, he held a series of engineering leadership positions at Vectra Technologies (formerly Pacific Nuclear and a publicly traded nuclear services company) and ultimately became Vice President of Nuclear Engineering. In that capacity, he served as the profit/loss manager for over 425 professional engineers across five regional offices in the U.S. In performing this role, he actively engaged in formulating strategies for customer development, product/service expansion, business consolidation, and oversaw the management of over 500 projects annually for approximately 75 percent of the U.S. nuclear utilities. Prior to his tenure with Vectra Technologies, Stone and Webster Engineering Corporation employed Mr. Cummings where he assumed increasing levels of responsibility in the management of large Lignite and Nuclear Power engineering and construction projects, culminating as Project Controls Manager for the completion of the last U.S. commercial nuclear power generating station (Clinton Power Station).

Mr. Cummings holds an M.S. degree in Operations Research from the U.S. Naval Postgraduate School and a B.S. degree from the U.S. Naval Academy at Annapolis, Maryland.

HIGHLIGHTS OF EXPERIENCE

Executive Consultant / UMS Group / March 2020 – present

Most recently supported the pre-commencement activities related to LUMA's takeover of the Puerto Rican Electric Power Authority (PREPA), conducting a gap assessment of its T&D Operations focused on Reliability, System Resiliency, Major Event Management, Asset and Work Management, Technical Services, Materials Management, and Fleet, supporting Regulatory in the development of the System Remediation Plan, and establishing the procedural / process infrastructure for its Asset Management function. Mr. Cummings provided oral testimony during the Technical Conferences leading up to Commencement and is currently assisting in the implementation of LUMA's Asset and Work Management Practices.

Supported the filing of a Midwest Utility's T&D Grid Modernization and Resiliency Plan, identifying and analyzing the rationale and wide-ranging implications of the Plan on the Company and its customers. Noting that the utility is committed to investing as wisely as possible on its customers' behalf, the final report provides transparency to the proposed investments and decisions driving their selection, quantifying the benefits (most notably those pertaining to reliability) in terms of improved performance or avoided risks.

Developed an Asset Management Plan for an Eastern Utility, addressing gaps that preclude its designation as competent across all elements that define an effective Asset Management system. Applying the ISO 55000 criteria, the resulting plan laid out a plan to achieve this level within three years, with identified / budgeted initiatives and a performance dashboard, against which progress can be measured.

Executive Vice President and Managing Director of Americas and Asia Pacific / UMS Group / September 2004 – March 2020

In connection with a Canadian Utility's Custom Incentive Rate ("CIR") application for transmission and distribution rates, undertook a study to examine the processes used to plan, approve, execute, and monitor transmission capital projects and the results achieved in executing its portfolio of transmission capital projects. In performing this work, Mr. Cummings conducted a series of interviews with utility individuals in relevant lines of business (e.g., Project Control, Project Delivery, Station Services, Transmission Lines, and Station Construction), reviewed relevant reports, procedures, and project performance data, identified and recruited a Peer Group Panel of 12 electric utilities, designed and administered an assessment framework (Maturity Rating Scales used to gauge an electric utility's progress from low ("Novice") to high ("Beyond Standards") across 10 Performance Domains, 9 of which comprise the Project Management Institute's Project Management Book of Knowledge – "PMBOK"), and surveyed the Peer Group Panel and combined with the insights gleaned from the interviews, determined the utility's absolute ("maturity level") and comparative ("quartile") standing across each of the 10 Performance Domains. The report was filed into testimony and Mr. Cummings will be supporting the utility in upcoming Technical Workshops and Oral Hearings (if necessary).

Reviewed the transmission O&M practices, processes, and procedures within 15 lines of business that define the utility's Asset Management and Centralized Services (AMCS), Electric Operations, and Projects and Construction organizations. Thirty-eight improvement and / or scoping initiatives / actions were identified, across seven categories:

1. Asset Growth: Projected increases attributed to the Electric Transmission and Distribution System Buildout (e.g., UG Cable, Relays, Transformers, and GIS Breakers) to improve overall system performance (reliability and resilience)
2. Productivity Improvement: Projected decreases including reduction of unit costs to achieve top quartile performance, right-sizing of crews and adjustment to test and inspection cycles.
3. New Work: Projected increases regarding emerging changes in FERC / NERC requirements, addressing heretofore pending issues (e.g., ROW encroachments and as-

build drawings), establishing new capabilities (e.g., TFI), and expanded scope across the utility (e.g., QA/QC).

4. Reclass to Capital: Projected decreases by revisiting previous capitalizing policies (e.g., Vehicle Leases and Planning Studies) and accounting for capital acquisitions as offsets to previous O&M funded activities (e.g., EMS Upgrades).
5. Technology: Projected changes (increases and decreases) attributed to expanded use of BI applications, installation of new technologies (e.g., EMS Upgrade, VENTYX, MEGA and Aerial Inspections and LMS expansion)
6. Workforce Effectiveness: Projected increases due largely to replacing anticipated retirements.
7. Insourcing: Projected decreases due to internal staff performing actions previously performed by a third party

In support of a Canadian Utility's rate filing application, performed a Unit Costs Benchmarking Study aimed at reviewing how the utility determined the unit costs underlying its distribution system capital and operational programs, performing benchmarking comparisons with a selected peer group of utilities in Canada and the United States, and providing recommendations on how the utility can improve its unit costing practices in the future.

Supported development of an Northeastern Utility's 5-year Base capital budget, providing justification for each element, complete with detailed supporting analysis and benchmarks where needed and appropriate, quantifying the impact of planned Clause and Blanket spend, as well as specific named Capital projects on anticipated asset failure rates and the resulting need for spending of each Capital Blanket, challenging and testing the logic and rationale for options considered and choices made for spend levels proposed, and creating a coherent narrative to explain the reasons and justification for major amounts involved and variances from previous plans, helping the utility harness their historical data on costs, workload volume and unit rates to clarify assumptions regarding cost drivers behind projections of Capital Spend in each area for each year looking forward over the 5 years, and providing support in the design / development of a presentation of the 5-year Capital Budget for Executive Management review.

Conducted an enterprise-wide review of a mid-western electric and water municipality to corporate organization structure considering pre-established strategic goals and six major initiatives, all geared towards its vision as a Utility of the Future. Included was the establishment of a Project Office for a new CCGT plant, the planned retirement of a coal-fired station, four major IT / OT initiatives, considerations regarding aging workforce and the attending opportunities to retool its staff, a mandate to reduce O&M spending by 15 percent, all within the construct of managing risk during a major industry transformation. His efforts included detailed analyses of staffing levels, worker productivity, O&M program execution, and capital efficiency, benchmarking cost and service level performance, and identifying industry best practices to close identified performance gaps, The recommendations were presented and accepted by the utility (with minor adjustments) and is in the process of extending the contract to include implementation support.

Assisted a Southeastern Utility in improving its planning, scheduling, and execution of transmission and distribution capital projects, O&M projects, asset programs and asset maintenance, including a comprehensive assessment of the key processes that underlie work management and development of recommendations to improve (1) process efficiencies and effectiveness, (2) cross-organizational collaboration and (3) process governance.

Worked with a west coast electric utility in establishing a Project and Portfolio Management function. Starting with defining criteria for evaluating and selecting projects for execution, the process framework put in place provided the governance and operating guidelines to manage a portfolio and specific projects throughout the fiscal year, establishing the concepts of "contingent" projects, the capture of value, risk mitigation and transparency in comparing the value of electric production and energy delivery investments.

Conducted several Asset Management Gap Assessments, using ISO 55000 (and its predecessor PAS 55) standard as a point of comparison:

- Provincial Canadian Municipality (Electric Distribution)
- Midwest Municipality (Electric and Water)
- Northwest Investor-owned Utility (Electric and Gas)
- Midwest Investor-owned Utility (Electric)
- Southwest Municipality (Electric and Water)
- Federally owned and operated Utility (Electric)

Further, to the extent requested by each utility, implemented programs and practices to close identified gaps with an eye towards ISO 55000 certification.

Provided expert opinion regarding a northeast utility's restoration performance during a major storm event in October 2017. Filed with the courts, his opinion addressed the utility's comparable position in restoration time, restoration rate, immediate response, restoration practices deployed, and overall prudence of its decisions in the events leading up to and during the storm. He not only provided incontrovertible proof of prudence, but through comparisons (benchmarks) with other major storm events in North America and Europe, he presented a compelling argument that the utility excelled in its performance, effectively managing the trade-offs between performance, cost, and operational risk.

Supported a mid-western electric utility's rate case, testifying to the veracity of its asset, risk, and performance management programs and efforts underway to address significant challenges with its central business district underground network system. Consistent with Mr. Cummings' recommendations, he participated in a collaborative effort to define an oversight process that focuses on a comprehensive performance dashboard of KPIs, and monitoring progress towards an Industry Leading Asset Management process.

Spearheaded efforts to provide third party assessments of a mid-Atlantic electric utility's capital investment, O&M spending levels and service level performance in support of a base rate filing; and later assessed the prudence of decisions made in the events leading up and during three extraordinary storm events during the 2011 - 2012 timeframe. He led a comprehensive benchmarking effort, focused on productivity (unit cost), reliability and overall system resiliency, and storm restoration performance. In both instances, he provided written direct and oral testimony during cross-examination demonstrating the utility's effectiveness in balancing operational performance, cost, and risk mitigation.

Assisted a mid-western utility in developing a System Revitalization and Resiliency Program for submittal to its Board of Directors and State Regulator. The proposed plan provided profiles of projected capital and O&M cash flows, the capture of utility and customer benefits and risks, and an industry context around which to justify such a program. The results of this effort were entered testimony in support of the utility's filing for a capital rider, for which it received sufficient funds to support the initial 18 months of a 10-year program.

Assisted a Canadian utility in offering an independent third-party assessment of a recent PBR filing performing high-level comparative analyses (benchmarks) of proposed growth and capital investments geared towards infrastructure renewal over a 5-year period; and assessing the risk of returning to previously established lower capital investment plans. This effort included providing testimony as part of a formal hearing with the Provincial Utility Commission.

Served as Project Director for a full-scale business renewal effort, establishing a plan to improve the efficiency of capital investments, and decrease O&M spending by $50 million annually without any noted decrease in system performance or increase in operational risk. Conducted across the entire enterprise with a focus on worker productivity (O&M program unit costs), capital efficiency (capital investment portfolio and unit cost management), this effort launched a series of initiatives that over 10 years will decrease spending levels by a cumulative $500 million and set the stage for transitioning to the Utility of the Future. Areas of focus included comparative cost and service level analyses, work planning and execution, performance dashboards, transmission and distribution reliability, overall system resiliency, capital portfolio optimization, and business value/risk tolerance frameworks; and addressed the necessary infrastructure to construct a "first-of-its-kind" carbon capture generating facility.

Served as Project Director of four comprehensive assessments for separate Transmission and Distribution operating companies of a large US-based electric holding company.

- Three involved a review of practices and processes related to system reliability with a thorough review of historical results (as reported in their outage management systems) and supporting reliability programs. Specifically, these assessments analyzed, trended, and benchmarked service interruptions, service restoration, organization and staffing, and capital/operating spending patterns with the objective immediately and sustainably improving performance; and included formal presentations to Commission staff across 2 regulatory jurisdictions, and
- Another assessment involved a thorough review of a utility's infrastructure from both asset condition and energy efficiency viewpoints, resulting in a long-term strategy and plan to transform the network to 21st century standard. This involved identification of key technical and financial legacy issues, incorporation of several constraints and factors (e.g., financial, technology and social equity), and a holistic portrayal of costs, benefits, and risks from both a portfolio and individual circuit/substations perspectives; and the articulation of the plan tailored for each external stakeholder (e.g., commission staff/regulator, legislators, environmentalists, shareholders, and customers).

Assisted a large Northeastern utility in identifying over $80 million of O&M cost reduction initiatives without impacting service level (e.g., customer service, availability, system reliability or safety). Areas of focus included benchmarking and practices review of the utility's electric transmission and distribution system, customer operations, gas distribution and asset management functions. The outcome has been incorporated into a long-range plan to improve earnings despite an unfavorable outcome in a recent rate case filing.

Performed a capital and O&M spending and risk mitigation diagnostic for a mid-level Midwest utility in support of an overall business case to infuse more capital into its transmission and distribution infrastructure. The case was compelling enough to present to the Board of Directors and the Commission State and will be a cornerstone for subsequent strategic planning and future rate filings.

Supported a mid-level Midwest utility in its energy efficiency/demand response filing with the state regulatory and governing entities. Applied industry comparative analyses in demonstrating value capture / risk avoidance for all stakeholders (investors, customers, and utility), and validated that the proposed program met the intent and letter of the legislative mandate.

Conducted an enterprise-wide capital efficiency assessment for a Canadian Utility spanning electric transmission and distribution and electric generation. In reviewing their planned capital expenditures over a 10-year period, Mr. Cummings led the analyses of worker productivity (unit cost) and capital project execution and developed a plan to (1) reduce the current planned capital expenditures by 25 percent and (2) optimize the allocation of capital over the 10-year planning horizon with due consideration to optimizing the trade-offs between value and asset risk.

Strategic advisor for a major transformation effort within a U.S. Midwest electric and water municipality, that included conducting performance diagnostics (benchmarks) of its engineering and production divisions, development of a work planning and outage management program (and support processes), and several initiatives focused on achieving organizational alignment. Supporting efforts included oversight of the completion of a CCGT Plant (including supporting negotiations with GE for a LTSA), establishing criteria and process for the converging IT/OT, and the creation of an Organizational Efficiency and Effectiveness model.

Assisted a large Australian electricity distribution utility in optimizing the size and mix of its fleet of vehicles and attached equipment, factoring in financial constraints, environmental requirements, and the aligning of work level, staffing and specific task descriptions. The process of arriving at a plan to reduce capital investments by as much as $20.0 million and operating expenses by $1.2 to $2.0 million involved the active participation of the company's internal customers (i.e., users of the fleet assets), resulting in organizational acceptance of the outcome. Mr. Cummings extended this effort to a large Western U.S. electric municipality, developing a strategy and plan to achieve comparative results.

Led the implementation of a process (and supporting software) to optimize the capital spending profile across three operating companies within a large US-based electric and gas company (electric transmission and distribution, gas transmission, distribution and storage, fleet, and electric generation); as well as one of the largest gas utilities in the US Midwest. In performing these projects, Mr. Cummings facilitated the linkage of a proposed investment's value and its contribution to overall corporate strategy as well as the risk should a specific investment be deferred; and equally important, implemented the process in a manner that garnered organizational support for change.

Oversaw the implementation of an industry forum to identify trends and perform causal analyses on the failure of critical transmission equipment and components. In pooling industry equipment/component performance data, the goal was to apply statistically relevant data to predict failure patterns and establish optimum replacement vs. refurbishment criteria. In parallel with the initial formation of this forum, Mr. Cummings also performed the following:

- Comprehensive performance diagnostic across all functions of one of the largest electric municipalities within the US Southwest. In so doing, he provided a plan of action to maintain service levels yet reduce operating costs by as much as 25 percent. The utility adopted the recommendations and integrated them with the municipality's five-year operating plan.
- Development of a preventive and corrective fleet (vehicle and attached equipment) maintenance program, adopting may of the best practices from the petroleum and U.S.

Naval programs, and tailoring them to application in a gas municipality environment. The project team, led by Mr. Cummings, provided a detailed process manual (with supporting process maps), an implementation plan (i.e., process/procedure changes and additions, technology enhancements and organization adjustments), and a series of key measures to assist the utility in adopting the recommendations. The municipality and city government officials embraced the program as submitted.

Executive Consultant / Self-Employed / September 1996 – September 2004

Participated in a task force and subsequently joined the implementation team in developing and executing a five-year plan to revamp the electric transmission and distribution infrastructure for the Chicago business district. This effort involved the translation of highly technical specifications and detailed budgeting information into terms easily understood by commission staff, city government, and the utility's customers. All external stakeholders (i.e., Board of Directors, City of Chicago, Commission Staff and State Regulator accepted the plan.

While supporting implementation, Mr. Cummings developed the strategies and plans for initially routing, certifying, designing, and installing 135kV and 345kV transmission to meet projected load growth and system reliability requirements. He played a key role in shortening the certification period by as much as 50 percent. This required effective liaison and communication with the Illinois Commerce Commission and Army Corps of Engineers as well as coordination of Commonwealth Edison's engineering and construction organizations and their assigned "contractors of choice."

Provided consulting services to several technology-based enterprises including gas and electric utilities, engineering and architectural firms and manufacturers of electric components. The projects included:

- Strategic and Operational Planning and Integration (Linkage of Business Vision, Core Values, Financial Goals and Core Business Processes, maintaining a balance between long-range sustainability of the business and short-range stakeholder expectations).
- Organizational Development (Competency-based Performance Management System Development and Implementation, Business Culture Assessments, Employee 360-degree Evaluations, Leadership Development, Recruiting and Employee Selection).
- Marketing and Sales Support (Branding Strategy Development, Customer Satisfaction Surveys, Product/Service Positioning and Pricing Strategies, and Sales Training).
- Technical and Commercial Management (Ensuring a proper balance between achieving profit/loss targets and meeting the quality standards as specified by the customer)
- Merger and Acquisition Assessment and Implementation

Vice President of Nuclear Engineering / VECTRA Technologies (previously Pacific Nuclear and NUTECH Engineers) / April 1985 – September 1996

Worked in a variety of capacities for a nuclear engineering consulting company, serving initially as a Project Manager and ultimately as the Vice President of Nuclear Engineering. Over this 11-year period, he played a major role in growing annual revenues from $5.0 million to $50.0 million while increasing market penetration to approximately 75 percent of the US nuclear utilities. He developed many of the skills and competencies used in his roles as management consultant (summarized above) through his hands-on experience in managing over 425 engineering professionals and overseeing the management of over 500 projects annually.

Assistant Project Manager / Stone and Webster Corporation / August 1980 – April 1985

Worked in a variety of capacities for Stone and Webster Corporation, primarily assigned to major nuclear power plant design and construction projects. Specific assignments included:

- Assignment to the Beaver Valley Power Station project, establishing a projects control process and system within the Duquesne Light Company to manage the installation of Three Mile Island modifications in support the second refueling outage, improving actual performance in terms of work performed and schedule duration from the initial refueling outage by a factor of three. Following this effort, Mr. Cummings shifted his focus to the unit under construction (unit no. 2) where he installed a process to facilitate the final turnover of the systems (and accompanying documentation) to plant operations over an 18-months period.
- Assignment to Clinton Power Station, where he acted as Project Controls Manager for the contractor, facilitating the lifting of 12 Nuclear Regulatory Commission (NRC) imposed stop work orders and subsequent construction and turnover of the plant to the Illinois Power Company (IPC). Key activities over a two-year period included a successful Fuel Load Caseload presentation to the NRC, rate case preparation, an information system installation to track the turnover of all systems and instituting an integrated cost and schedule process and system to support weekly and monthly reporting to project and IPC executive management. His role in integrating the construction and system turnover schedules (and subsequent development of computerized detailed system turnover punch lists) served as a primary catalyst for successful completion of the Clinton Power Station project.

Commissioned Officer / U.S. Navy / June 1973 – August 1980

Served in the U.S. Navy in increasingly responsible roles culminating as a Weapons Officer on a destroyer, USS Robert E. Peary (FF-1073). In this capacity, he managed and led three divisions totaling 100 sailors, responsible for the maintenance and operation of all weapon and detection systems, the major equipment necessary to support basic seamanship evolutions, and daily consumables for the entire ship's force. He left the U.S. Navy in 1980, having earned the Navy Achievement Medal for his efforts during two extended deployments and extraordinary performance in the areas of Anti-Submarine Warfare and Naval Gunfire Support.

RECENT ARTICLES AND SPEECHES

- *"Integrated Risk Management-Application to Pipeline Safety*," a white paper written in collaboration with a utility executive in October 2017.
- "*Driving Reliability Improvements-Regulatory Oversight",* presentation given to the EEI Transmission, Distribution and Metering Conference, New Orleans, LA, April 7, 2009.
- *"A Paradox of Thrift: Economic Barriers to T&D Network Modernization."*
- *"Grid Modernization: A Roadmap to Tomorrow's Infrastructure…Don't Get Lost on the Way to AMI*."

Nicholas Austin

SUMMARY AND BACKGROUND

Mr. Austin is a Partner and Managing Director, North America for UMS Group, Inc. He obtained his Bachelor of Science Degree from the University of Dayton, and his Juris Doctorate from The Ohio State University Moritz College of Law. He also completed the Leadership for Senior Executive Program at Harvard Business School.

Mr. Austin started his career in 1998 as an attorney with a large Midwest law firm, practicing initially in Cincinnati, Ohio, and then in Cleveland, Ohio with a focus on construction law. He counseled clients on contract negotiation, drafting and execution matters, advised clients on a wide variety of day-to-day and long-term business issues and decisions ranging from implementation of daily procedures to streamlining operations in anticipation of divestiture action, and managed all aspects of client litigation from matter intake to finalization via settlement, motion practice, alternative dispute resolution or trial.

After a successful career as an attorney, he pivoted to energy, working for FirstEnergy Corp. initially as an analyst in 2007 with increasingly expanding leadership roles over the next 15 years. More specifically, Mr. Austin includes the following as selected examples of his experience and success at FirstEnergy:

- As a lead analyst within FirstEnergy's Corporate Asset, Portfolio and Project Management organization, Mr. Austin lead the creation of a contracting and portfolio management strategy associated with a 2x capital portfolio increase/investment across all of FirstEnergy's distribution and transmission assets.
- Served in a leadership role during the merger of FirstEnergy and Alleghany Energy, guiding a team tasked with the assimilation and operationalization of the two entities' distribution and transmission vegetation management portfolios.
- As Director of Operations Support at the Pennsylvania Electric Company, oversaw all aspects of safety, financial and operational performance in the support organizations including the management of vegetation management, fleet, facilities, meter reading and meter services.
- As Corporate Director of Asset and Capital Portfolio, created a new corporate organization tasked with $1.4B portfolio-level management of FirstEnergy's transmission and distribution capital project lifecycle.
- In his role as Director of Operations Services for the Cleveland Electric Illuminating Company, oversaw 450 management and bargaining unit employees with a total capital and maintenance budget of over $150M.
- And as President of Pennsylvania Electric Company, was responsible for the utility-wide leadership of the organization, including creating a culture of safety excellence while driving performance and accountability across a management and bargaining unit team with a CAPEX budget of over $170M and an OPEX budget more than $70M.

With a desire to expand his entrepreneurial and energy-industry knowledge, experience, and expertise, Mr. Austin left FirstEnergy to join Ashton Gray, LLC as President and Partner of Ashton Gray Energy, LLC. While at Ashton Gray Energy, he helped turn-around the oil field services and infrastructure operating entities, while pivoting both organizations towards renewable energy projects in the central southern U.S. states as well as in generation projects in the Texas/ERCOT footprint. Upon completing the successful divestiture of Ashton Gray Energy's operations, he joined UMS Group in his current position.

HIGHLIGHTS OF EXPERIENCE

Project team lead to increase capital expenditures by 3x across three state, six division electric utility portfolio that included transmission and distribution line, substation, and facility assets; including therein the creation and initiation of organizational structure comprised of portfolio management, project management and asset management groups.

Oversaw implementation, maintenance, and delivery of Ohio IOU smart grid plans from an operational perspective, including addressing engineering, project planning and execution, work force retention and utilization, as well as benefit capture and reporting to commission.

Successfully led initiative team at large investor-owned electric utility tasked with decreasing divisional operating expenditures by 30%, with partial shift of same to emergent capital portfolio projects.

Managed divestiture efforts associated with sale of investor-owned utility's New York State territory to Rural Electric Cooperative.

Appendix E – UMS Group Reliability Performance Assessments

UMS Group has established credentials in electric distribution reliability, as illustrated by the following more recent engagements:

- *Pacific Gas and Electric:* UMS Group conducted a third-party expert review of Pacific Gas and Electric's distribution reliability to determine what had happened in the areas of *Equipment Failure* and *3rd Party Damage*, and what, if anything, could be done to help mitigate the reliability target shortfalls for the current year. As a result of our review of reliability results (reviewing restoration performance, weather effects, "Blue Sky" SAIFI trends, outage causes, equipment failure-caused outages, metrics – number of outages, customer interruptions, and customer minutes, worst performing circuits and wires down drivers) over a three-year time frame, key findings and recommendations were presented in the areas of Equipment Failure (OH Conductor, Transformers and UG Cable), and Third Party Damage (Vehicles and Metallic Balloons).
- *Public Service Electric and Gas – Long Island:* UMS Group was retained by Public Service Electric and Gas – Long Island (PSE&G-LI) to review its reliability in the context of pre-established performance targets and changes during the year preceding the project. The primary objective was to determine the underlying cause of an apparent deterioration of performance over a three-year period, with specific focus on those factors that resulted in PSEG LI approaching (and in the case of SAIFI exceeding) the minimum performance level specified in its contract with LIPA; and recommend specific actions that could be taken to reverse the trend and return to previous stronger levels of performance. Specific recommendations revolved around vegetation management (danger tree removal and use of herbicides), UG cable replacement, animal guarding, vehicle caused outages, and creating an asset management information repository.
- *Israel Electric Company:* UMS Group provided an expert opinion regarding Israel Electric Company's (IEC's) restoration performance during a major storm event in October 2015. Filed with the Israeli courts, his opinion addressed IEC's comparable position in restoration time, restoration rate, immediate response, restoration practices deployed, and overall prudence of its decisions in the events leading up and during the storm. He not only provided incontrovertible proof of prudence, but through comparisons with other major storm events in North America and Europe, he presented a compelling argument that IEC excelled in its performance.
- *FirstEnergy Pennsylvania Operating Companies:* The FirstEnergy Pennsylvania Operating Companies engaged UMS Group to conduct an independent review and assessment of its internal and external mutual assistance activities, including a review of the mutual assistance provided to and received from other electric distribution companies (EDCs) during 2011 and 2012. An initial list of 26 outages covering 13 storm events was developed, based on number of customers impacted (minimum of 5 percent), with due regard to including all four Operating Companies within Pennsylvania. We applied our standard multi-tiered diagnostic framework to:
  - Compare the FE PA OPCOs practices relating to Mutual Assistance with those in use at comparable electric distribution organizations, and
  - Assess execution of these practices, initially at a high level to address issues of equity in their application across the FE PA Operating Companies' service territories and electric utility industry, and then on a storm-by-storm / outage-by-outage basis to identify specific opportunities for improvement, either programmatic or event driven.

In order to establish context for the analyses and comparisons required to support the specific assessments and conclusions contained within this report, UMS Group reviewed (1) FirstEnergy's most current E-Plan, (2) specific service restoration information for the 26 outages contained within FirstEnergy's Outage Management System (OMS), and (3) all previously filed Major Event Reports (MERs) for these specific outages / storm events, and was afforded complete access to the Company's technical and management staff. UMS Group concluded that notwithstanding several opportunities to fine-tune / improve its practices that at the highest level, the FE PA Operating Companies' use of Mutual Assistance fell well within an industry-based range of reasonableness. Our review confirmed that plans were reasonably conceived, for the most part actions were properly executed (some exceptions were noted in the final report), and the results were generally appropriate (although with the benefit of hindsight, we did acknowledge that marginal improvement opportunities may have been possible). As with the above-mentioned Focused Reliability Audits, all findings and recommendations were accepted as presented by the respective Commission Staffs and FirstEnergy.

- *Jersey Central Power and Light:* In support of a 2011 Base Rate Case Filing, UMS Group was hired to provide an independent, third-party assessment of FirstEnergy's JCP&L Operating Company's investment and spending levels and reliability performance as compared against the other FirstEnergy electric utilities, other New Jersey electric utilities, and other peer group utilities. Our efforts objectively demonstrated that JCP&L's reported reliability had shown consistent improvement since 2004 and that its performance ranged between top quartile and median relative to two comparable peer groups. We were also successful in showing JCP&L's effectiveness in implementing asset management-related initiatives, and industry-leading service restoration processes; appropriately bridging the gap between reported reliability and the customer experience related to two extraordinary storm events in 2011 (Hurricane Irene and the October 31st Snowstorm). Further, his analyses illustrated that the capital investment and O&M spending levels were appropriate for the level of service required by the Regulator (BPU). In conjunction with filing written direct testimony, Mr. Cummings provided direct and rebuttal testimony at rate hearings conducted in October 2013 and supported JCP&Ls outside counsel in the preparation of final briefs. Related to this effort, he prepared a written report adjudging the prudence of decisions made during the 2011 extraordinary storm events and Super Storm Sandy, from which the utility received a favorable outcome.
- *Met-Ed, Cleveland Electric Illuminating, and Penelec:* UMS Group has also performed several detailed reliability assessments for other FirstEnergy Operating Companies (Met-Ed, CEI and Penelec). This work was conducted for FirstEnergy with the approval / concurrence of respective State Regulators to address concerns around reliability and included extensive interaction with commission staff. In each of these efforts, UMS Group assessed actual reliability performance, relevant O&M practices, spending and investment levels, and overall approaches to Asset Management against industry "best practices," and provided recommendations that were accepted by each utility and their respective Commission Staffs. The final deliverables included a comprehensive report and a formal presentation to the PA and OH Commission Staffs.

Appendix F – Peer Group Panel Survey

NOTE: In ensuring the readability of the various tables, we excluded columns for comments and a precursor question for unit costs that read as follows: Please enter number of units and total cost over the past 3 years, the percent of these costs attributable to labor, of this labor the percent outsourced, and whether the equipment was purchased in-house.

Unit Costs

Asset Category / Capital	Unit of Measure	Actual (Total, 3-YR Period)		Unit Cost	Percent of Cost Assigned to Labor	Percent of Labor Outsourced	In-House Purchase of Equipment (Yes/No)
		No. of Units	Sum of Cost				
Wood Poles Installed & Replaced	Each						
UG Cable Installed & Replaced	Meters / Feet						
Pole Top Transformers Installed & Replaced	Each						
Padmount Transformers Installed & Replaced	Each						
Vault Transformers Installed / Replaced	Each						
Network Transformers / Protectors Installed & Replaced	Each						
Breakers Installed & Replaced	Each						
Cable Chambers / Manholes Installed & Replaced	Each						

Maintenance Programs / OM&A	Unit of Measure	Actual (Total, 3-YR Period)		Unit Cost	Percent of Cost Assigned to Labor	Percent of Labor Outsourced	In-House Purchase of Equipment (Yes/No)
		No. of Units	Sum of Cost				
Vegetation Management (Inspected / Trimmed)	Kilometers / Miles						
Pole Test and Treat	Each						
Overhead Line Patrol	Kilometers / Miles						
Building Vault Inspections	Each						
Substation Maintenance (PM and CM, Collectively)	Total MVA						

Accounting

Question 1	Method	Answer
Which of the following methods do you use to determine unit rates for your asset categories and / or maintenance programs?	Divide total spent by number of units.	☐
	Average individual costs of separate work orders	☐
	Other (please specify in comments)	☐

Question 2	Method	Answer
In addition to Direct Labor and Material, which of the following costs are included in your unit costs for <u>In-House work</u>?	Design and permitting costs	☐
	Project management and supervisory costs	☐
	Other project-related costs (e.g. fleet and warehouse)	☐
	Other labor-related costs (e.g. training, conferences, and meetings)	☐
	Employee-related costs (e.g. vacation, sick time, insurance, and pension)	☐
	Administrative and general costs	☐
	AFUDC / CWIP	☐
	Other (please specify in comments)	☐

Question 3	Method	Answer
In addition to contractor costs, which of the following costs are included in your unit costs for contracted work?	Contractor management / supervision costs (please indicate in comments if these costs include overheads per question 2)	☐
	Permitting and design costs	☐
	Other (please specify in comments)	☐

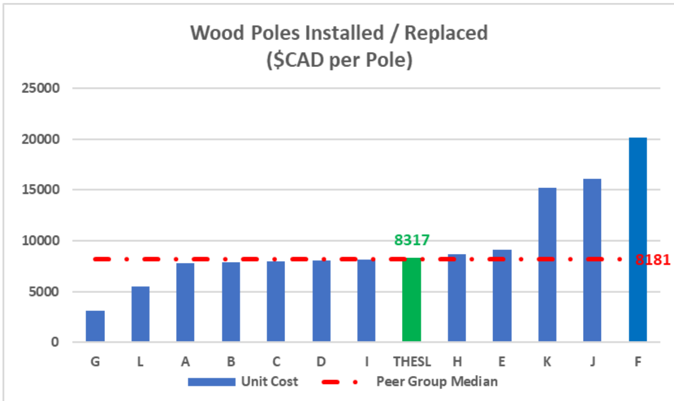
Question 4	Answer (Yes / No)
Do you "net out" customer contributions from your unit costs?	

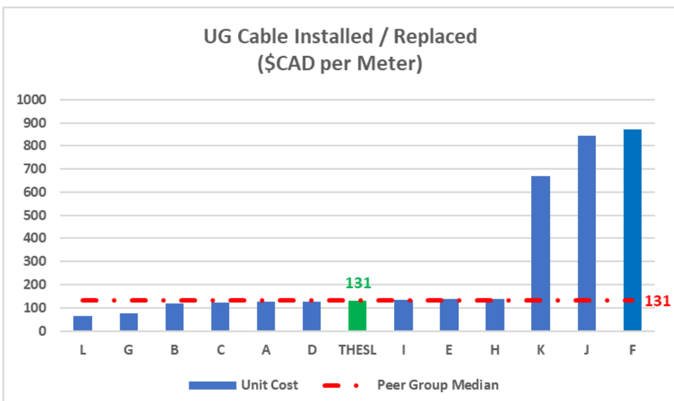
Local Factors

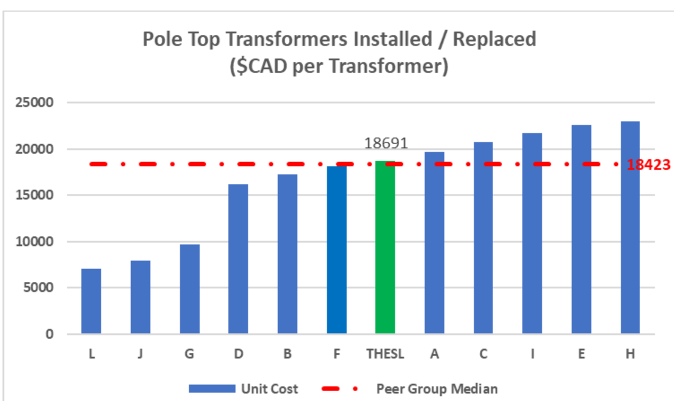
Question 1	Factor	Answer
Which of the following factors impact the cost of you performing inspections and replacement work?	Excessive travel time (over 30 mins)	☐
	Road restrictions which limit working hours	☐
	High water table	☐
	Working next to energized lines (requiring dedicated observer, gloves, etc.)	☐
	Requirements to perform work off hours (i.e. night / weekend)	☐
	Changed standards requiring rebuilds rather than like-for-like (i.e. clearances)	☐
	Excessive switching requirements (i.e. to isolate on dual radial construction)	☐
	Shoring requirements for UG work	☐
	Limitations on tree trimming (e.g. unusually tight clearances)	☐
	Prior use of lead cables	☐
	High fault currents (impacting equipment sourcing)	☐
	Paid duty for police presence on public roads	☐
	Extensive use of submersible transformers	☐
	Environmental regulations	☐
	Insufficient IT Enablement	☐
	Union Work Rules	☐
	City consent requirements (i.e. customer notification, restoration, progressive clean-up, etc.)	☐
	Other (please specify in comments)	☐

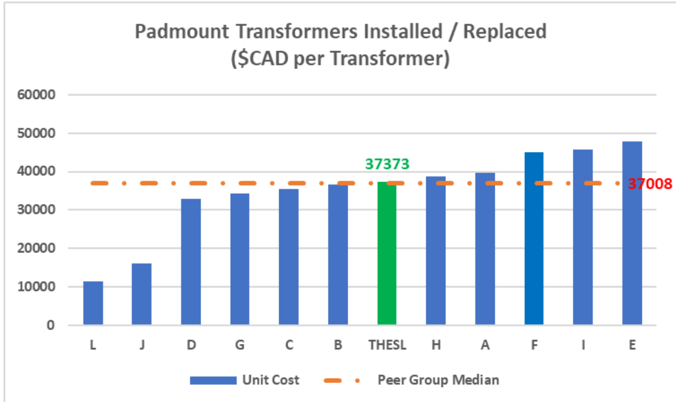
Appendix G – Detailed Benchmarking Results

The following charts are provided, presenting the unit costs for each of the utilities (in ascending order), showing THESL's (Green) position relative to each of the electric utilities and the Peer Group Panel "normalized" median value (Red). Tables that detailed each step of the "normalization" process are presented in Appendix C.

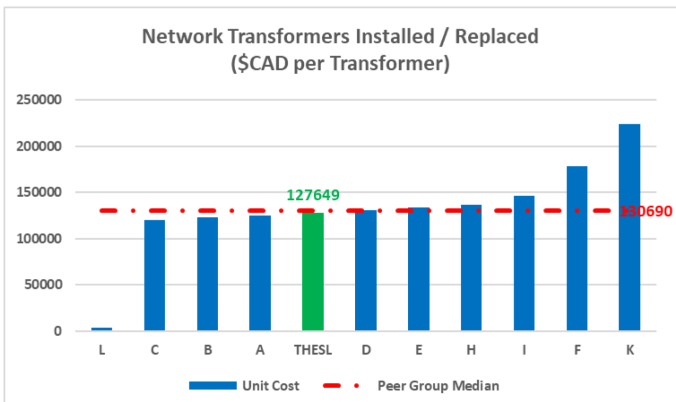




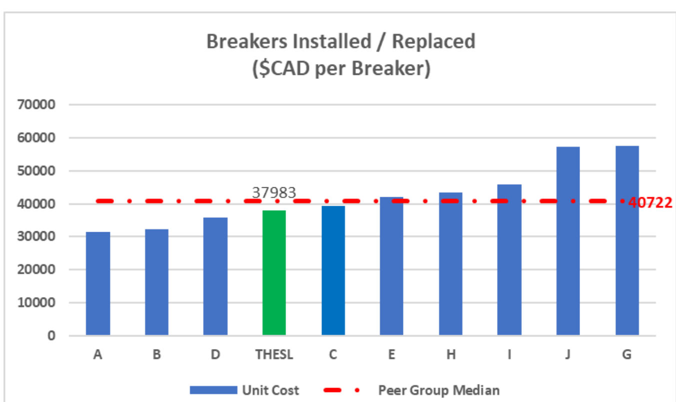




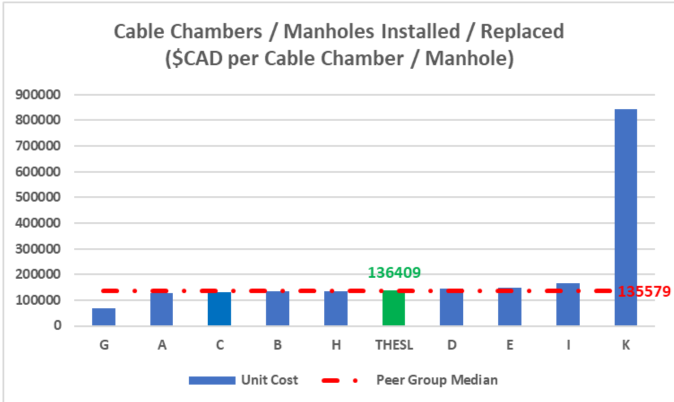
Padmount Transformers Installed / Replaced
($CAD per Transformer)
60000
50000
40000
30000
20000
10000
0
37373
37008
L
J
D
G
C
B
THESL
H
A
F
I
E
Unit Cost
Peer Group Median



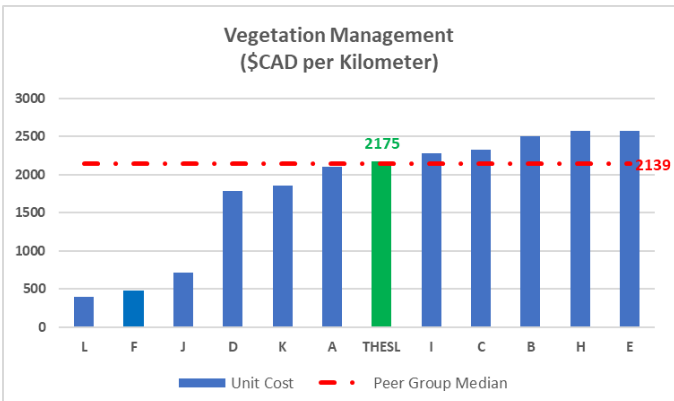
Network Transformers Installed / Replaced
($CAD per Transformer)
250000
200000
150000
100000
50000
0
127649
130690
L
C
B
A
THESL
D
E
H
I
F
K
Unit Cost
Peer Group Median



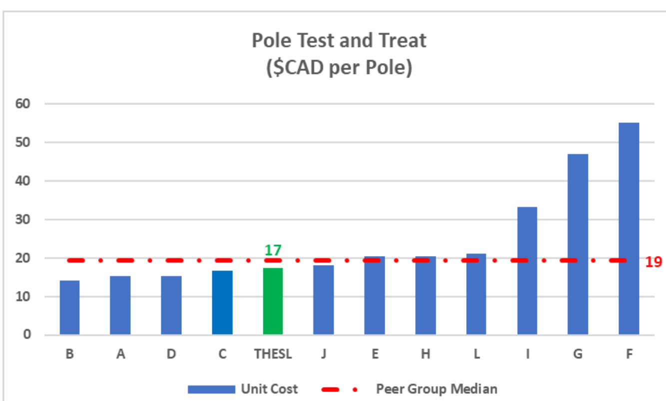
Breakers Installed / Replaced
($CAD per Breaker)
70000
60000
50000
40000
30000
20000
10000
0
37983
40722
A
B
D
THESL
C
E
H
I
J
G
Unit Cost
Peer Group Median



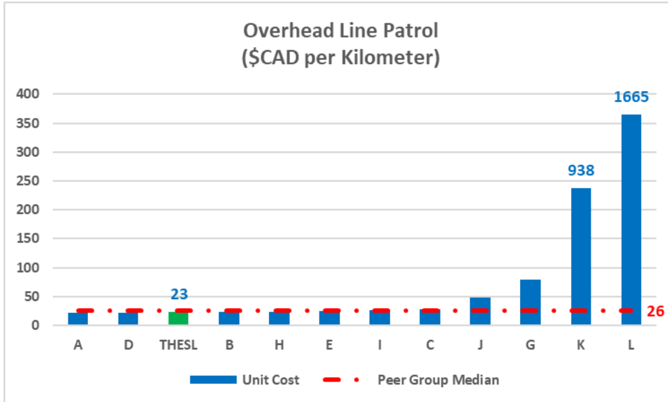
Cable Chambers / Manholes Installed / Replaced
($CAD per Cable Chamber / Manhole)
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
136409
135579
G
A
C
B
H
THESL
D
E
I
K
Unit Cost
Peer Group Median

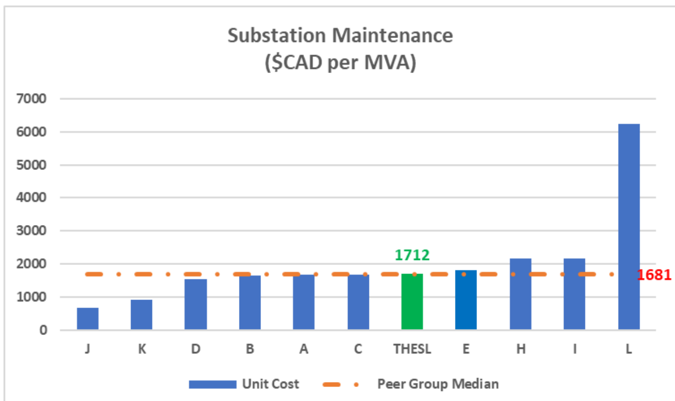


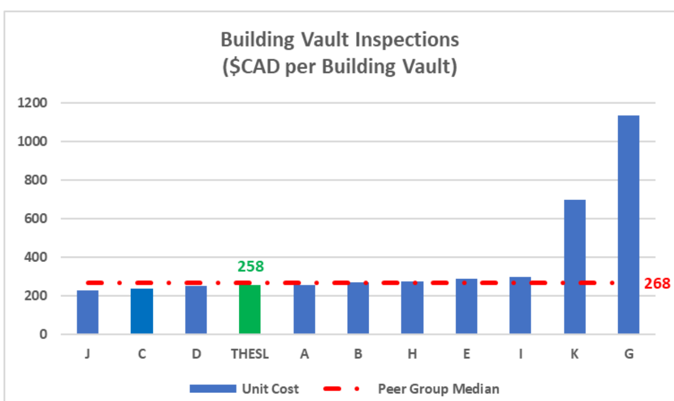
Vegetation Management
($CAD per Kilometer)
3000
2500
2000
1500
1000
500
0
2175
2139
L
F
J
D
K
A
THESL
I
C
B
H
E
Unit Cost
Peer Group Median



Pole Test and Treat
($CAD per Pole)
60
50
40
30
20
10
0
17
19
B
A
D
C
THESL
J
E
H
L
I
G
F
Unit Cost
Peer Group Median


Overhead Line Patrol
($CAD per Kilometer)
400
350
300
250
200
150
100
50
0
1665
938
23
26
A
D
THESL
B
H
E
I
C
J
G
K
L
Unit Cost
Peer Group Median


Substation Maintenance
($CAD per MVA)
7000
6000
5000
4000
3000
2000
1000
0
1712
1681
J
K
D
B
A
C
THESL
E
H
I
L
Unit Cost
Peer Group Median


Building Vault Inspections
($CAD per Building Vault)
1200
1000
800
600
400
200
0
258
268
J
C
D
THESL
A
B
H
E
I
K
G
Unit Cost
Peer Group Median

FACILITATING INNOVATION

Toronto Hydro's approach to innovation focuses on the deployment of new and advanced business strategies and technologies to enhance grid performance and operational processes, upskill the utility's workforce, and deliver incremental value to customers. In accordance with section 2.1.7 of the OEB's Filing Requirements, this schedule details Toronto Hydro's past achievements and future plans to advance innovation across the organization. With reference to key strategies, demonstrative examples and specific projects, this evidence describes how: (1) Toronto Hydro advanced innovation in the current 2020-2024 rate period, and (2) innovation shaped key components of the 2025-2029 investment plan and regulatory framework that underpin this application.

Toronto Hydro's innovation activities span many areas of the organization, including:

- fostering a culture of innovation and continuous improvement where employees are empowered to bring forward ideas for improvement through a Toronto Hydro-wide Innovation Sandbox;
- modernizing the grid by deploying new field technologies to enhance system observability and controllability, to enable a more modern, resilient, and efficient grid for the future;
- integrating Distributed Energy Resources ("DERs") onto the distribution system and developing capabilities to leverage new resource types such as Demand Response ("DR") and Energy Storage Systems ("ESSs") as tools to address system planning objectives;
- preparing for electrification by augmenting the capacity planning process with new scenarios-based modelling to gain a clearer view of the range of load growth trajectories;

- leveraging Information and Operational Technologies ("IT/OT") to enhance organizational systems and drive productivity through process automation;
- enhancing customer experience and service levels through digital tools that increase customer self-service capabilities and enable customers to receive more information;
- investing in workforce development and upskilling to acquire new skillsets such as digital skills and data analytics needed to run a modern utility; and,
- evolving regulatory frameworks to ensure that Toronto Hydro can deliver its investment plan while providing accountability and risk mitigation to ratepayers.

1. INNOVATION IN THE 2020-2024 RATE PERIOD

This section describes innovative strategies and initiatives undertaken by Toronto Hydro during the current 2020-2024 rate period across numerous dimensions of its business.

1.1 Innovation @ TH (Sandbox)

In 2021, Toronto Hydro launched an internal sandbox initiative referred to as "Innovation @ TH" to engage and encourage employees to bring forward ideas for proof of concept projects that are novel and provide value to customers across any area of the company's business and processes. This initiative empowers employees to embrace change and fosters a culture of innovation, meaning a solution-oriented mindset that obstacles can be overcome through creative problem-solving. Importantly, through the Innovation @ TH Sandbox, the utility has identified new strategies and technologies that can be scaled into its normal operations.

An example of an Innovation Sandbox project that is in the process of being scaled is the Virtual Reality ("VR") Training project. This project enables employees to receive an immersive field training experience in a virtual environment which enhances the quality of training and improves safety outcomes by eliminating the physical risk of potential mistakes. In 2022, a VR module was integrated into Toronto Hydro's training program for Pad-Mounted Switchgear operations and repair.[1]

Another example of a project that is currently in progress and supported by the sandbox is the intelligent vegetation management project ("AiDash"). This proof of concept allows Toronto Hydro to leverage artificial intelligence ("AI") powered tools for analytics and asset management purposes. Specifically, the AiDash program applies system imagery technology to create a view of the overhead distribution system with an overlay of vegetation (e.g. tree branches) to conduct predictive maintenance analytics. If successful and scaled, this would allow for more efficient deployment of resources (e.g. prioritizing high-risk areas for trimming tree branches to avoid damage to overhead wires).

1.2 System Observability: Network Condition, Monitoring and Control (NCMC)

Toronto Hydro continues to implement Network Condition Monitoring and Control ("NCMC") technology to increase situational awareness of the low voltage secondary distribution network. This program includes investments in field technologies (i.e. sensors and alarms) that enable better system observability (e.g. monitoring water levels, vault and transformer operating temperature, oil level and tank pressure, and real-time loading data) and controllability (i.e. remote switching) within network vaults.[2]

Increased system observability, through vault sensors and alarms, enables Toronto Hydro to detect and intervene in fault triggers (e.g. water levels) preventing potentially catastrophic vault flooding and other failures, such as oil spills. As of June 2023, Toronto Hydro avoided over $120,000 by leveraging this technology to remotely check protectors (rather than

[1] Exhibit 4, Tab 4, Schedule 3.
[2] Exhibit 2B, Section E7.3.

dispatching trucks and crews). Furthermore, in multiple instances, Toronto Hydro's power system controllers leveraged real-time loading data during outage events to determine that the network could support multiple contingencies, allowing the failed equipment to be isolated without taking the network down.[3] The lessons learned, skills developed, and benefits realized through the NCMC program provide a robust foundation for the continued implementation of system observability technology as part of the Grid Modernization Strategy outlined in Exhibit 2B, Section D5 and summarized in section 2.1 below.

1.3 System Controllability: Reclosers Pilot

Reclosers are pole-mounted fault interrupting devices which will allow Toronto Hydro to reduce the impacts of momentary and sustained outages by preventing faults downstream of the recloser from impacting customers upstream of the recloser. For example, if a tree branch downstream of a recloser makes contact with a line, the recloser responds to the detected fault by temporarily opening the circuit to clear the fault and automatically closing to restore power, unless the fault persists. Reclosers can also serve as remotely-operated tie or sectionalizing points, helping to reduce switching (e.g. fault isolation and service restoration) times.

Toronto Hydro undertook engineering studies to assess the technical feasibility of reclosers on the distribution system, followed by pilot projects to test the correct operation of reclosers. One set of pilot projects was aimed at testing time-current coordination of reclosers with upstream protective devices (e.g. station circuit breakers). After successful results of one of the pilot projects, Toronto Hydro has started to deploy reclosers. These reclosers, once installed and operational, will not only provide immediate reliability benefits,

[3] *Ibid.*

but will also serve as building blocks for the deployment of the self-healing grid that Toronto Hydro intends to implement in the next decade per its Grid Modernization strategy.[4]

The second set of pilot projects was aimed at testing communication-based coordination of reclosers with upstream protective devices. Communication-based protective device coordination allows for more protective devices (such as reclosers) to be deployed on the distribution system, enhancing the flexibility and reliability of the system. This project was submitted and approved as part of the "Innovation @ TH" initiative described in section 1.1.The pilot is currently undergoing the iterative testing needed to set up and program the communication protocol between the reclosers and station circuit breakers. If the proof of concept is validated, it can be scaled and integrated into investment programs such as System Enhancements as a foundational technology for developing the self-healing grid.[5]

1.4 Etobicoke Demand Response Pilot

Toronto Hydro's Non-Wires Solutions ("NWS") program was established in the 2015-2019 Distribution System Plan to address capacity constraints through local demand response ("LDR").[6] For the 2020-2024 rate period, Toronto Hydro is deploying LDR to alleviate capacity constraints in the Etobicoke area at two transformer stations: Manby and Horner. As an additional layer to the program, Toronto Hydro also set out to test how demand-side resources can be dispatched to support both the local grid and the upstream bulk system (a strategy referred to as benefit stacking). To that end, in 2022, Toronto Hydro received joint approval from the OEB Innovation Sandbox and the Independent Electricity System Operator ("IESO") Grid Innovation Fund to launch a pilot project (known as the Etobicoke Demand

[4] Exhibit 2B, Section E7.1.
[5] *Ibid.*
[6] Exhibit 2B, Section E7.2.

Response pilot) in partnership with Power Advisory LLC and Toronto Metropolitan University Centre for Urban Energy.[7]

The Etobicoke Demand Response Pilot examines how Toronto Hydro can leverage local demand response capacity procured from third-party resources (including behind-the-meter customer resources) to address system peak demand, while also offering that same capacity into the IESO market (on a simulated basis for the purpose of the pilot) to test how additional revenue streams and system benefits can be unlocked for customers. This project is the first of its kind in Ontario to test how a distributor can enable IESO market participation on behalf of its customers as the Total Distribution System Operator ("DSO").

1.5 Battery Energy Storage Systems

Toronto Hydro owns and operates a grid-side 2 MW/2MWh Battery Energy Storage System ("BESS") located at the site of the former Bulwer MS.[8] Commissioned in 2020, the Bulwer BESS enables Toronto Hydro to test and explore how utility-owned energy storage systems can support the grid, and offers a hands-on opportunity to learn how to integrate energy storage technology with existing practices and procedures of managing and operating the grid. The Bulwer BESS is equipped with remote monitoring and controlling capabilities that are integrated into the Energy Centre as part of the utility's ongoing development of the DER management system ("DERMS").[9] Toronto Hydro uses the Energy Centre to remotely operate Bulwer BESS, and analyze the system impacts of different dispatch schedules. Other valuable experience gained from the Bulwer BESS project includes how to procure, design, construct and maintain grid-side BESS. These insights will be instructive as the utility

[7] *Ibid.*
[8] Exhibit 2B, Section E7.2.
[9] See Exhibit 2B, Section D5 for more information on DERMS.

continues to explore further use cases for grid-side BESS, particularly to enable the connection of renewable energy generation as outlined in Exhibit 2B, Section E7.2.[10]

1.6 Future Energy Scenarios Modelling Tool

In preparing for this application, Toronto Hydro complemented its capacity planning process with an innovative modelling tool called Future Energy Scenarios ("FES") – the first pathway study in Ontario to focus on the distribution-level impacts of the energy transition.[11] Using bottom-up consumer choice modelling (informed by data on technology cost and performance, policy, consumer attitudes, challenge factors (i.e. barriers to consumer adoption of new technologies), deployment levels, energy prices, etc.), this tool explores a range of possible changes to future peak demand based on the interplay of different policy, technology and consumer behaviour assumptions.

From this study, Toronto Hydro learned that while the nature of load changes on the distribution system varies considerably over the modelled time period, in this decade, electricity load growth is very similar across all scenario worlds. Load growth starts to diverge across the scenario worlds in the early part of the next decade (2030s), highlighting the need for early planning and capacity investments to ensure the distribution system is prepared for both near-term and long-term energy system changes.

The outputs of the Future Energy Scenario model are distinct from the System Peak Demand Forecast discussed in the capacity planning evidence in Exhibit 2B, Section D4. Rather than predict what the future holds through probabilistic methods, the Future Energy Scenarios enables the utility to explore the distribution system impacts of different plausible paths to Net Zero, and begin to quantify investments that would be required to reinforce the grid in

[10] Referred to as Renewable Enabling Battery Energy Storage System ("REBESS").
[11] Exhibit 2B, Section D4, Appendix A and Appendix B.

different scenarios. This capability supports Toronto Hydro's least regrets planning philosophy in that it allows the utility to stress test the 2025-2029 investment plan against plausible scenarios to ensure that it does not: (1) overbuild the system, or (2) become a barrier to enabling particular decarbonization pathways.

1.7 Electric Vehicles ("EV") Demand Response

To further facilitate electrification grid readiness, Toronto Hydro recently conducted an EV "smart charging" pilot with both Plug 'n' Drive and Elocity. The pilot recruited EV owners to install upgraded networked chargers (which include an internet connection for data communications) and provided them access to a mobile application which gives EV owners information about optimal charging schedules and an opportunity to participate in demand response events. The pilot also provided Toronto Hydro with a portal through which demand response events were conducted. Through this pilot, Toronto Hydro is gaining valuable insights into EV charging patterns and customer behaviour, while assisting EV owners to optimize their charging based on usage.

The next phase of the project is to understand how EVs can be leveraged to provide distribution system services. This entails reviewing technologies available for smart charging and testing them with technical control options, such as onboard vehicle telematics control systems that connect to applications from the vehicle's original equipment manufacturer's ("OEM"), in order to trigger demand response events. This phase also explores integration into Energy Centre and other metering systems to further real-time situational awareness in order to deploy EV DR assets to address specific network needs. Toronto Hydro intends to implement this next phase of the EV demand response pilot through the proposed Innovation Fund summarized in section 2.5.3 and detailed in Exhibit 1B, Tab 4, Schedule 2 and Appendix A.

1.8 Process Automation

Toronto Hydro's process automation strategy focuses on reducing the amount of manual labour required for routine tasks that do not require decision-making inputs. Over the 2020-2024 period, Toronto Hydro implemented over 80 different instances of automation using software tools such as "Wdesk" and "UiPath".

In 2022 Toronto Hydro rolled out the Wdesk – an application for automation in external reporting. This application streamlines the preparation and review of corporate financial statements, notes to the financial statements, and all relevant supporting documents by using structured templates that pull financial data directly from the appropriate sources. The application tracks and highlights changes, allowing for more efficient review of the documents by employees. Through the implementation of these automation programs Toronto Hydro's finance department has been able to save approximately 7,000 hours annually.

Toronto Hydro also implemented robotic process automation ("RPA") through an industry-leading platform known as UiPath, which is a general tool that provides a user-friendly platform for writing scripts to automate tasks across multiple applications. This tool does not require knowledge of technical programming language which allows for process automation to be implemented directly by business resources, with support from technical IT resources. Through UiPath, Toronto Hydro increased the number of process automation projects being deployed across the organization. For example, the Finance department has deployed UiPath in conjunction with another application to automate the daily preparation of project capitalization files by gathering data from multiple sources, preparing working files, and notifying responsible staff that action is required. Without this automation, each analyst would have to run multiple, iterative queries to collect appropriate data and manually compile working papers by using large, complex spreadsheets.

1.9 Customer Experience and Service Tools

Providing customers with timely updates about power outages remains a priority for the utility. As a result, Toronto Hydro continues to build on its digital customer service offerings by improving existing tools and expanding customer channels in order to make it easier for customers to get near real-time information about power outages. Examples of recent enhancements are summarized below. Toronto Hydro notes that all of these new digital channels underwent extensive user and accessibility testing to help ensure they would serve all customers seamlessly.[12]

- The outage map now allows customers to track the progress of power outage restoration live – including informing customers when crews are on-site and providing an estimated restoration time;[13]
- Customers are able to chat online with a live agent to report outages;
- Customers are able to enroll in outage notification alerts via email and text messages.[14] These alerts notify customers when an outage occurs, provide an estimated time of restoration (when established), and notify customers when power is restored; and
- Toronto Hydro rolled out its mobile application in 2022. This application provides customers with access to outage and construction maps, online account information, and other self-service tools.

Toronto Hydro is also offering customers increased access to information and better service. For example, Toronto Hydro redesigned its Customer Self-Serve (“CSS”) portal and

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[12] *Ibid.*
[13] Exhibit 4, Tab 2, Schedule 14.
[14] *Ibid.*

mobile application with additional functionality that enables customers to review their consumption data and use tools to compare their bills under different pricing plans.[15] These functionalities allowed Toronto Hydro to be one of the first utilities in the province to make the new Ultra-Low Overnight rate available to customers. Going forward, Toronto Hydro plans to leverage AI-enabled tools to expand customer self-service capabilities through the use of chatbots and virtual assistants.[16]

1.10 Workforce Development and Upskilling

Toronto Hydro invests in its workforce by developing and nurturing talent, and by fostering a workplace culture that promotes change and innovation. Through advanced training programs, Toronto Hydro delivers upskilling opportunities to enhance employees' technical and professional abilities across all segments of the workforce. Between 2020-2022, Toronto Hydro delivered nearly 550 training and development programs tailored to the work requirements of different positions across the organization.[17] For example, after the implementation of the new Enterprise Resource Planning ("ERP") system, Toronto Hydro established a group of highly-trained and skilled employees, known as "enterprisers", to enable users throughout the company to unlock the full functionality of the new system.[18]

Furthermore, Toronto Hydro continually monitors trends to identify emerging skill requirements to support innovation. For example, in response to expected increases in data generated by new technologies such as the Advanced Metering Infrastructure ("AMI 2.0"), enhanced data analytics has been identified as a critical skill set for the future. Toronto Hydro is continuing to develop in-house training that focuses on building employees' future-ready skills, including fluency with data analytics programs to perform sophisticated

[15] *Ibid.*
[16] Exhibit 2B, Section D4.
[17] Exhibit 4, Tab 4, Schedule 3.
[18] *Ibid.*

research using modern software tools. These investments in upskilling the workforce are critical to developing advanced operational capabilities to intelligently manage a more complex and highly-utilized energy system.

Toronto Hydro has a long-standing history of partnerships with colleges and universities to develop new curricula and explore interdisciplinary learning opportunities that are aligned with the utility's short- and long-term workforce requirements. Collaborations with institutions such as George Brown College, Georgian College and Toronto Metropolitan University support academic programs that: (1) are aligned to entry level qualifications for key roles within the utility (i.e. Certified and Skilled Trades, and Designated and Technical professionals), and (2) advance skills sets for incoming talent. For example, in 2020, Toronto Hydro partnered with George Brown College to influence the curriculum development for a new three-year Electromechanical Engineering Technology – Power and Control Diploma Program.[19] Additionally, investments in experiential learning have resulted in 20 percent of co-op students finding employment at Toronto Hydro after graduation.

2. INNOVATION IN THE NEXT RATE PERIOD

Innovation shaped this application, and the 2025-2029 investment plan that underpins it in a number of ways, as detailed below.

2.1 Grid Modernization Strategy

The Grid Modernization strategy at Exhibit 2B, Section D5 identifies the operational and field technology investments necessary to ready the grid for decarbonization and the energy system transformation, while enhancing the value that the system provides to customers through improved reliability, resilience and efficiency outcomes.[20] Specifically, the strategy

[19] *Ibid.*
[20] Exhibit 2B, Section D5.

includes: (i) deploying field technologies onto the distribution system for better monitoring and controls; (ii) investments in resources (human capital) with enhanced skill sets to install and integrate field technology (and analyze the valuable data it provides) into day-to-day operations and system planning functions; and (iii) enabling IT/OT investments to facilitate connectivity, enable efficient data collection, improve management and analysis, and integrate multiple operating systems into centralized platforms such as the Distributed Energy Resource Management System ("DERMS").[21]

Through these investments, the Grid Modernization strategy aims to continue transforming existing infrastructure into a more technologically advanced distribution system and enable Toronto Hydro's journey towards a more integrated, intelligent, and self-healing grid that can provide: (i) greater resiliency in light of more frequent extreme weather events, (ii) enhanced grid capabilities to accommodate two-way power flows while maintaining safety and reliability, and (iii) long-term efficiency outcomes by reducing manual work efforts and improving asset analytics to enable grid optimization.

The success of the Grid Modernization Strategy hinges in part on a foundational investment in the Advanced Distribution Management System ("ADMS") – a multi-faceted software platform with various advanced capabilities and connected applications that integrate analytics, real-time data and control algorithms to optimize distribution network operations. The system provides a holistic view of the grid, and encompasses advanced applications (like Outage Management System ("OMS"), Fault Location Isolation and Service Restoration ("FLISR"), Volt/Var Optimization, etc.) which allow swift detection and response to outages and grid disturbances, and enable reliable and efficient DER management by optimizing

[21] Exhibit 4, Tab 2, Schedule 7.

voltage levels and reactive power flows throughout the distribution system. For more information on ADMS, please see the ADMS Business Case.[22]

2.2 Local Demand Response

Toronto Hydro's experience with LDR over the last two rate periods has led to a better understanding of how non-wires solutions can be used to complement traditional capacity planning functions and investments. In the optimal situation, LDR is successfully deployed to indefinitely avoid the need for a load transfer in a given area. Where this can be achieved, the capital work is no longer necessary resulting in significant long-term savings for ratepayers.[23] In other situations, where there is volatility or uncertainty with respect demand growth, LDR can be used to defer load transfers for a period of time until there is greater certainty that the load transfer will be needed. In these circumstances, although the net savings to customers may ultimately be lower, LDR provides value to the system as a flexibility tool to manage capacity. This is increasingly important since capacity is inherently complex and subject to external factors that are beyond the utility's control, and which are becoming more dynamic in the coming years as a result of changes in policy, technology and consumer preferences.

Building on its existing LDR program, Toronto Hydro identified further opportunities to use LDR in the 2025-2029 rate term to avoid and defer capital investments in load transfers, and set an ambitious goal to expand the reach of the LDR program in the next rate term.[24] Toronto Hydro intends to procure up to 30MW of flexible system capacity through the LDR program to displace and defer the need for load transfers in the Horseshoe North area

[22] Exhibit 2B, E8.4, Appendix A.
[23] Long term savings result from the avoidance of the revenue requirement related to the capital assets that would have been constructed through the load transfer project
[24] Exhibit 2B, Section E7.2.

during the 2025-2029 period.[25] Load transfers in this area are currently necessary to alleviate capacity constraints at a number of stations including Finch TS and Bathurst TS. The goal is to use LDR to defer or displace certain load transfers by procuring flexible system capacity from third-party or customer-owned DERs.

2.3 Renewable Enabling Investments

As of the end of 2022, Toronto Hydro connected 2,424 unique DER connections to its distribution grid. This represents over 304.9 MW of DER capacity across the various technology types. Renewables currently represent 116.2 MW of all DER capacity. Between 2023 and 2029, Toronto Hydro forecasts the connection of over 1700 additional renewables (totalling over 74 MW) to the distribution system, which would bring total installed capacity for renewable DERs to nearly 200 MW.[26,27]

Toronto Hydro's system capability to connect renewable DER facilities is subject to a number of constraints, including short-circuit capacity, the risk of islanding, and thermal limits. To address these constraints, Toronto Hydro continues to install real-time monitoring and control systems at every DER site that exceeds a certain size threshold.[28] This technology provides system planners and operators real-time visibility to ensure that the anti-islanding features of DER facilities operate in the event of a distribution system fault, and to inform system planning analyses. These field technologies are being integrated into Toronto Hydro's DERMS and SCADA-connected communication networks to enable the safe and reliable operation of the grid with bi-directional distribution grid flows.

[25] Exhibit 2B, Section E7.2.
[26] Exhibit 2B, Section E3.
[27] Exhibit 2B, Section E5.1
[28] Exhibit 2B, Section E5.5.

Additionally, Toronto Hydro plans to deploy nine energy storage systems, with an aggregate capacity of 10.2 MW, to enable the connection of forecasted renewable growth on nine high-priority feeders. The utility selected these feeders based on their existing high renewable DER penetration, low minimum load to generation ratios, and high forecasted renewable DER growth. Rather than restricting the connection of renewable DER facilities to feeders where minimum load is low, renewable enabling ESS can be deployed to increase the load to generation ratio to the recommended threshold and thereby enable the connection of renewable DER facilities.[29]

2.4 Enterprise Technology Portfolio

As noted throughout this schedule, Toronto Hydro relies on information technology ("IT") assets and systems to enable innovation across all areas of its business and operations. Robust planning and prioritization of IT projects is essential for the utility to advance innovation through technology. To that end, Toronto Hydro developed Enterprise Technology Portfolio ("ETP") roadmaps that identify and prioritize a number of enabling technology investments to advance innovation and efficiency outcomes while also ensuring optimal levels of IT system reliability and availability, and compliance with IT standards. The ETP roadmaps provide the utility with the necessary balance of certainty and precision for the implementation of near-term initiatives, and longer-term flexibility and agility to effectively respond to changes in requirements and availability of technological solutions.

For the 2025-2029 rate period, the ETP roadmaps include 55 software enhancement projects to implement the utility's modernization vision.[30] Specifically, to support grid modernization, Toronto Hydro intends to prioritize projects that enable monitoring and operational capabilities of its distribution system, including: (i) enhancing device communication and data acquisition capabilities (ii) introducing advanced grid configurations such as distribution

[29] Exhibit 2B, Section E7.2.
[30] See Exhibit 2B, Section E8.4 and the appendices thereto.

automation through manual FLISR, and (iii) enabling system monitoring and control capabilities, and asset analytics to optimize grid performance, and enhance day-to-day operational decisions and long-term system planning functions.

2.5 Regulatory Innovation

Innovation shaped both the investment plan and regulatory framework for this application. As noted in Exhibit 1B, Tab 2, Schedule 1, in developing the custom rate framework for this application, Toronto Hydro built upon the foundation of performance-based regulation in Ontario, rooted in the principles of the 2012 Renewed Regulatory Framework and OEB Handbook. The proposed 2025-2029 custom rate framework is comprised of several innovative elements that work together to create a balanced framework to enable the utility to deliver on outcomes that its customers need and value in the context of a changing energy landscape. These elements of regulatory innovation are summarized below.[31]

2.5.1 Performance Incentive Mechanism

A key enhancement and innovation within Toronto Hydro's 2025-2029 custom rate framework is the proposed Performance Incentives Mechanism ("PIM"). The PIM shifts cost and performance risk to the utility, ensuring greater accountability to customers for key outcomes in the areas of: (i) reliability and resilience, (ii) customer service and experience, (iii) environment, safety and governance, and importantly (iv) efficiency and financial performance. These performance outcomes are measured through twelve custom metrics with set targets on the utility's 2025-2029 Custom Scorecard.[32] Toronto Hydro carries the risk of achieving the performance outcomes since, if the targets are not achieved, Toronto Hydro cannot earn its approved return on equity ("ROE"). As such, the PIM is an

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[31] See Exhibit 1B, Tab 2, Schedule 1 for Rate Framework; and Exhibit 1B, Tab 5 for Customer Engagement.

[32] See the Performance Outcomes Framework evidence at Exhibit 1B, Tab 3, Schedule 1 for more information on the performance targets and weighted metrics set out in the Custom Scorecard.

asymmetrical incentive to the benefit of customers that also safeguards the utility's financial integrity by providing it with the opportunity (not the guarantee) to earn its full ROE.[33]

The PIM is enabled by an evolution to the existing incentives within the rate framework. More specifically, the PIM complements the efficiency incentive within the X-factor (i.e. the stretch-factor that is based on empirical total cost benchmarking), with a proactive performance incentive factor of 0.6 percent that provides customers a significant upfront rate reduction benefit of approximately $65 million, which the utility can earn back if it meets the performance targets on its 2025-2029 custom scorecard. This innovation to the rate framework balances efficiency and other important performance outcomes, within a comprehensive incentive mechanism that places greater accountability risk on the utility and delivers financial benefits and service quality outcomes to customers.

2.5.2 Flexibility Mechanism

A flexibility mechanism, known as the Demand-Related Variance Account (the "DRVA") is another innovative element of Toronto Hydro's 2025-2029 custom rate framework. The DRVA is responsive to the practical reality that this five-year application is being filed during a time of change, as customers, communities and governments at all levels are actively embarking on an energy transition to mitigate the existential and economic impacts of climate change. This transition is creating new roles for electricity as an energy source, and while there is certainty that fundamental change is ahead, there are degrees of uncertainty about how that change will unfold in this decade. To address this uncertainty in the 2025-2029 rate period, Toronto Hydro proposes a symmetrical variance account that protects both ratepayers and the utility from structural unknowns in forecasted costs and revenues.[34]

[33] Toronto Hydro is proposing to finalize the targets once the rate proceeding commences. See Exhibit 1B, Tab 3, Schedule 1 for more information.
[34] Exhibit 1B, Tab 2, Schedule 1.

Utilizing existing regulatory tools (variance accounts) as purposeful flexibility mechanisms recognizes that in times of greater uncertainty, risk is best placed on performance outcomes that provide value to customers regardless of what happens, rather than on the accuracy of predictions models of what could happen. The DRVA empowers the utility to be more agile, and remain responsive to serving its customers even in the face of unforeseen changes or challenges to how customer demand manifests in this first chapter of the energy transition.

2.5.3 Innovation Fund

The last element of regulatory innovation in Toronto Hydro's framework is a proposal to establish an Innovation Fund to support the design and execution of pilot projects over the 2025-2029 rate period.[35] The pilot projects undertaken through the Innovation Fund would be focused on testing new technologies, advanced capabilities and alternative strategies that enable electrification grid readiness and are responsive to the OEB's expectations with respect to distributors facilitating DER integration, as expressed in the Framework for Energy Innovation ("FEI") report.[36] Toronto Hydro proposes to collect the amounts allocated to the Innovation Fund through a rate rider, rather than through base rates, in order to provide transparency to ratepayers on their bill and flexibility to the utility to determine how the funds should be allocated across capital and operational expenditures on the basis of the selected pilot projects.

The proposed fund is an innovative element of the 2025-2029 custom rate framework because it supports utility investment in innovation work that is more early stage, exploratory and developmental in nature, and therefore where the outcomes are less certain, but the potential benefits for the system and customers could be significant. While the benefits of individual projects may not be immediate or certain, and some initiatives

[35] Please refer to Exhibit 1B, Tab 4, Schedule 2 for more information about the Innovation Fund proposal.
[36] Ontario Energy Board, Framework for Energy Innovation: Setting a Path Forward for DER Integration (January 2023)

may prove to be more or less fruitful than others, this type of work is nevertheless critical to achieving real innovation during a time of change and transformation of the energy sector.

Furthermore, the Innovation Fund assists Toronto Hydro in overcoming the challenges of pursuing innovation in the context of a rate cycle that generally requires investment planning to be carried out far in advance and that requires spending to be classified either as a capital or operating expense. By providing Toronto Hydro with operational flexibility to identify and pursue the research, development and piloting of new technologies, capabilities and strategies throughout the rate period, and to determine the necessary types of expenditures in real time based on the specifics of each project or initiative, the Innovation Fund would enable the utility to be more responsive to emerging needs and technologies as they arise during the rate period, and to scope, design and implement pilot projects and other exploratory initiatives more effectively.

INNOVATION FUND PROPOSAL

1. OVERVIEW

In alignment with the Ontario Energy Board's ("OEB") statutory objective to facilitate innovation in the electricity sector, Toronto Hydro proposes to establish an Innovation Fund to support the design and execution of innovative pilot projects over the 2025-2029 rate period. The pilot projects to be deployed through the Innovation Fund would focus on testing new technologies, advanced capabilities, and alternative strategies that are responsive to the OEB's expectations expressed in the *Framework for Energy Innovation* ("FEI") report:[1]

> *The OEB expects distributors to modify their planning and operations to prepare for DER impacts on their systems, including integrating these resources cost-effectively, while maintaining reliable service for their customers. Distributors are also expected to consider DER solutions as NWAs when assessing options for meeting system needs.*

Toronto Hydro proposes to allocate approximately $16 million to the Innovation Fund to be collected through a rate rider, rather than through base rates, in order to provide greater transparency to ratepayers on the bill and flexibility to the utility to determine how the funds should be allocated across capital and operational expenditures on the basis of the selected projects. In addition, Toronto Hydro proposes to establish a new variance account to record variances between the amounts collected by the rate rider and the actual costs incurred to execute projects as part of the Innovation Fund.

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[1] Ontario Energy Board, Framework for Energy Innovation: Setting a Path Forward for DER Integration (January 30, 2023).

Deployment of the Innovation Fund would target specific areas of innovation and be subject to the governance framework described herein.

a. **Section 2** describes the rationale for establishing the proposed Innovation Fund;
b. **Section 3** describes the areas of innovation that will be the focus of Toronto Hydro's pilot projects, including the rationale for their selection;
c. **Section 4** describes the governance framework Toronto Hydro will follow for deploying the Innovation Fund, including the processes for designing, implementing, and evaluating pilot projects relating to each of the areas of innovation; and
d. **Section 5** describes the proposed rate treatment, including the rationale for using a rate rider and the proposed variance account.

2. RATIONALE FOR THE PROPOSED INNOVATION FUND

The need for innovation in the electricity sector is well documented and has taken on increasing prominence within the regulatory framework applicable to Ontario's electricity distributors. For example, the OEB's electricity-related objectives under section 1 of the *Ontario Energy Board Act, 1998* now include a responsibility to facilitate innovation in the sector and the Letters of Direction that the OEB has received from the Minister of Energy in recent years have demonstrated a growing recognition of the importance of innovation to support rapid and transformative change in the sector, to enable the government's *"vision for the energy system in which Ontario leverages its clean energy grid to promote electrification and job creation while continually enhancing reliability, resiliency and customer choice."*[2]

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[2] Ministry of Energy, Letter of Direction from the Minister of Energy to the Chair of the OEB Board of Directors (October 21, 2022), online: <https://www.oeb.ca/sites/default/files/letter-of-direction-from-the-Minister-of-Energy-20221021.pdf>

Consistent with the themes identified in the Minister's Letters of Direction,[3] and in other prominent expressions of federal, provincial, and municipal policy,[4] Toronto Hydro recognizes that the energy sector is on the cusp of transformation, driven by the imperatives of decarbonizing key sectors of the economy through electrification. This shift is expected to expand the role of clean electricity as a source of energy for transportation and heating. Toronto Hydro also recognizes that the pace and timing of these changes is driven by a complex interplay of policy, technological developments, and consumer choice. While there is certainty that fundamental change is ahead, there are degrees of uncertainty about how that change will unfold.[5] Innovation is key tool for managing within this uncertainty by building new capabilities to adapt to change and by leveraging technology to achieve expanded benefits for customers.

These trends and the need for innovation are not unique to Ontario, but the solutions will need to be designed to work in Ontario and, for Toronto Hydro, to meet the specific needs and challenges of a dense urban city with a diverse customer base. As customers increasingly adopt DERs, electrified transport, and heating at scale, Toronto Hydro will have to ensure sufficient distribution system capacity, often in densely populated and congested parts of the system, so that it can continue to fulfill its service obligations of connecting customers in a timely manner and providing electricity reliably. One of the proposed pilot project concepts – Flexible Connections,[6] would seek to explore new operational capabilities that

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[3] *Supra* note 2.
[4] For examples of federal plans see Net-Zero by 2050, Emissions Reduction Plan 2030 (including Canadian Net-Zero Emissions Accountability Act, 2021), and Canada's Climate Actions for a Healthy Environment and a Healthy Economy, online: <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview.html>. For an example of provincial plans see Minister's Letter referenced above in Footnote 2. For an example of municipal plans see TransformTO Net Zero Strategy, online:<https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/transformto/.>
[5] Exhibit 2B, Section D4.
[6] Exhibit 1B, Tab 4, Schedule 2, Appendix A.

could enable new DER customers to be connected to otherwise constrained parts of the grid without having to build costly infrastructure. If this pilot is successful, it could improve Toronto Hydro's DER hosting capabilities and avoid the need for more capital-intensive upgrades.

The proposed Innovation Fund is an important part of Toronto Hydro's approach to innovation because it addresses needs that are not adequately met by existing funding mechanisms. In this way, the Innovation Fund would be complementary to existing funding mechanisms insofar as they relate to innovation. For instance, whereas existing mechanisms tend to support spending where the beneficial outcomes are more proven or certain, the proposed Innovation Fund would be able to support work that is more early stage, exploratory and developmental in nature. While the benefits of individual projects may not be immediate or certain, and some initiatives may prove to be more or less fruitful than others, this type of work is nevertheless critical to achieving real innovation and unlocking new benefit streams for the system and its customers.

The proposed Innovation Fund would also assist Toronto Hydro in overcoming the challenges of pursuing innovation in the context of a rate cycle that generally requires investment planning to be carried out far in advance and that requires spending to be classified either as a capital or operating expense, with little flexibility to trade-off between these types of investment during the rate period. By providing Toronto Hydro with operational flexibility to identify and pursue the research, development, and piloting of new technologies, capabilities, and strategies throughout the rate period, and to determine the funding implications in real time based on the facts of each project or initiative, Toronto Hydro would be able to design and implement pilot projects and other exploratory initiatives more effectively.

Toronto Hydro's attention to the specific areas of innovation and application of the governance framework, each of which is discussed below, would help bring rigour, discipline, and focus in deploying the funding associated with the Innovation Fund. Given that the pilot projects and other initiative have yet to be designed or undertaken, it is on the basis of the framework for implementation and deployment of the Innovation Fund, as a component of its overall approach to innovation, that Toronto Hydro seeks approval for this proposal.

Toronto Hydro conducted research to inform the level of funding requested for this proposal. Toronto Hydro's research revealed that utility investments across comparable innovation initiatives and research and development activities range from 0.3 to 1 percent of revenues. Accordingly, the utility proposes to allocate 0.3 percent of its revenue requirement, or approximately $16 million, to the 2025-2029 Innovation Fund.[7] For example, in the United Kingdom, under Ofgem's performance-based regulatory framework known as RIIO 2 (Revenues = Incentives plus Innovation Opportunities), networks may recover 0.5 to 1 percent of base revenues for innovation that facilitates decarbonization while driving down costs for network customers and for projects with the potential to address consumer vulnerability or deliver longer-term financial or environmental benefits.[8][9] Similarly, pursuant to the Reforming Energy Visions ("REV") framework in New York, utilities can recover 0.5 percent of their total revenue requirement up to a maximum of $10 million per year for REV demonstration projects that advance the development of new utility and third-party service or business models or enable the integration of DERs without having an

[7] Exhibit 6, Tab 1, Schedule 1.
[8] Ofgem, RIIO-2 Network Innovation Allowance program: Governance Documents, online: <https://www.ofgem.gov.uk/publications/riio-2-nia-governance-document-update>;
[9] Ofgem, Electricity Network Innovation Competition, online: <https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/network-price-controls-2013-2023-riio-1/network-price-controls-2013-2023-riio-1-riio-1-network-innovation-funding/electricity-network-innovation-competition-riio-1>..

adverse impact on reliability.[10] Toronto Hydro also notes that most recently in Ontario, Enbridge Gas Inc. proposed an Energy Transition Technology Fund ("ETTF") to advance research, development, and commercialization of low-carbon technologies. The ETTF allocates $25 million, or approximately 0.4% of the test year revenue requirement, to the advancement of low-carbon technology innovation.[11]

3. AREAS OF INNOVATION

Toronto Hydro plans to test specific new distribution capabilities by deploying pilot projects that have the potential to be scaled into standard capital or operational work programs. Pilot projects are the most effective method for testing new distribution capabilities because they allow testing and evaluation to happen quickly and at a small enough scale to reduce technical, operational, and financial risk. This approach is further supported by the recognition that new distribution capabilities cannot be readily integrated with Toronto Hydro's unique distribution system characteristics without a thorough analysis and testing of impacts. This analysis must typically be undertaken as part of a pilot project to assess the following types of parameters: functional compatibility with existing core technology, feasibility of integration with existing control systems; compliance with minimum safety, operating, and cyber security standards; and financial viability and sustainability.

As Toronto Hydro develops pilot projects under the Innovation Fund, the utility intends to focus on areas of innovation that have the following characteristics:

[10] New York City State, *Reforming the Energy Vision* (March 2016) online: <https://www3.dps.ny.gov/W/PSCWeb.nsf/All/B2D9D834B0D307C685257F3F006FF1D9>.
[11] EB-2022-0200, Enbridge Gas Inc. Application, Exhibit 1, Tab 10, Schedule 7 (October 31, 2022).

1. The innovation project explores a distribution capability that is connected to adapting to fundamental change in the energy landscape as identified in or related to expectations set out by the OEB for DER integration in the FEI report,[12] mainly:
    - Evolving and enhancing load forecasting, considering DER adoption;
    - Making enabling investments such as system monitoring and data analytics;
    - Adjusting operational practices to incorporate and manage DERs on the system, including dispatching and use as non-wires-alternatives;
    - Modifying planning processes to identify, assess, and implement non-utility-owned DER solutions; and
    - Developing skills and knowledge, and acquiring talent.
2. The innovation project has potential to deploy an inventive solution, where the definition of innovation is aligned with section 2.1.7 ("Facilitating Innovation") of Chapter 2 of the OEB's Filing Requirements for Distribution Rate Applications:[13]
    - the use of new technology or new ways of using existing technology;
    - innovative business practices, including relationships with others to enhance services to customers and share costs; or
    - enhancing distribution services in a way that benefits customers, including facilitating customers' ability to innovate in how they receive distribution services.

Toronto Hydro undertakes a continuous process of developing pilot project candidates as part of its annual planning activities and regular engagements with customers, stakeholders, experts, and utility peers. The 2025-2029 Grid Modernization Strategy (Section D5),

[12] Ontario Energy Board, Framework for Energy Innovation: Setting a Path Forward for DER Integration (January 30, 2023) at page 3.
[13] Ontario Energy Board, Filing Requirements for Electricity Distribution Rate Applications - Chapter 2 (December 15, 2022)

highlights four pilot project concepts that could be supported by the proposed Innovation Fund: Flexible Connections, Electric Vehicle ("EV") Commercial Fleet Charging, EV Demand Response, and Advanced Microgrids.[14] Toronto Hydro identified these project concepts through its distribution system and modernization planning processes.[15] In evaluating system needs, Toronto Hydro considered new solutions, including new technologies, business practices, and strategies being utilized by other organizations. However, adopting the innovative solutions implemented by utilities in other jurisdictions is not a "cut-and-paste" exercise; it requires further in-depth exploration and testing or piloting to assess the parameters identified above. As a result, upon closer consideration of potential innovative solutions as part of the planning and modernization processes, the four areas identified as pilot project concepts were considered to be too nascent to deploy as standard distribution system solutions. They were also identified as posing a funding risk because more developmental work is needed to test the technologies and prove related beneficial outcomes for Toronto Hydro's system.

4. GOVERNANCE FRAMEWORK

The governance framework outlined in this section guides the deployment of the proposed Innovation Fund with a view to providing transparency and accountability to ratepayers as to how the funds collected through rates would be allocated and used to facilitate innovation at Toronto Hydro. The framework outlines the activities that would be taken to design, execute, evaluate, and account for pilot projects to ensure that deployment of the Innovation Fund delivers on its principal aim of enabling Toronto Hydro to develop new distribution capabilities needed to adapt to transformative changes in the energy system related to the use of DERs and to enable decarbonization through electrification.

[14] *Supra* note 6.
[15] Exhibit 2B, Section A3.

A steering committee of senior utility leaders oversees the four-phase governance framework depicted in Figure 1 below. The committee is responsible for approving key decisions with respect to the project such as scope, budget, and timelines. To advance a particular project throughout the four phases of the framework, the steering committee designates a pilot project owner based on key business functions that correspond to the area of innovation.

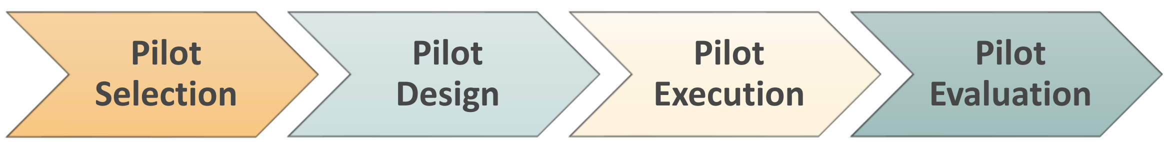

Figure 1: Innovation Fund Governance Framework

4.1 Pilot Selection and Design Phases

The initial phase of the governance framework involves engaging the internal leaders and pilot project owners who are responsible for the business functions that correspond to the areas of innovation. These individuals would collectively assess and select one or more of the areas of innovation to pursue through the implementation of one or more pilot projects. While the pilot projects have been flagged for interest due to their potential to develop into new distribution capabilities, further research and screening would be required to progress the projects from concepts into scoped-out proposals that fit within the timelines and budget available through the Innovation Fund. Toronto Hydro would select the pilot projects that would proceed to the next phase on the basis of the following key considerations:

a. **Potential Business Value** – informed by market readiness based on industry trends and technological advancements, as well as lessons learned from the implementation of similar projects and initiatives by Toronto Hydro or other entities.

b. **Feasibility** – selected pilot project(s) can be designed, executed, and completed by the end of the 2025-2029 rate period, as informed by primary research or reference to similar projects undertaken by other utilities.
c. **Opportunity for scalability** based on parameters such as functional compatibility with existing core technology; feasibility of integration with existing control systems; compliance with minimum safety, operating, and cyber security standards; and financial viability and sustainability.
d. **Opportunity to leverage external funding –** where possible Toronto Hydro would seek alignment with areas of research and development being funded by organizations such as Natural Resources Canada or other government agencies, including programs that are aimed at supporting the energy transition and climate policies.[16] For example, under the Investing in Canada: Green Infrastructure program, NRCan offered opportunities for demonstration projects in the areas of zero emissions vehicles, smart grids, building energy efficiency, and renewable power generation.[17] Any such external funding that Toronto Hydro is able to obtain would be tracked in the proposed variance account as an offset.

To inform the pilot project selection process, Toronto Hydro would engage with external stakeholders to present ideas and solutions that are being considered for the deployment of the Innovation Fund. These stakeholder engagements would help Toronto Hydro gain a better understanding of what is technically and financially feasible, and provide additional perspective with respect to the range of potential innovation needs and opportunities. External engagements would include industry stakeholders such as:

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[16] Exhibit 1B, Tab 4, Schedule 2, Appendix B.
[17] Government of Canada, Green infrastructure programs (October 12, 2022) online: <https://natural-resources.canada.ca/climate-change/green-infrastructure-programs/19780>.

- provincial bodies such as the OEB and IESO, in particular their innovation teams;
- energy services companies and clean technology vendors and suppliers;
- government agencies such as Natural Resources Canada; and
- other regulated entities such as Ontario distributors and energy companies in other jurisdictions that have relevant experience with innovation projects.

After considering the feedback and information received at the stakeholder engagements, Toronto Hydro would prepare the pilot selection report identifying the selected projects and key details about the projects, including the rationale for selecting them. The team would then scope out a work plan for designing and implementing the selected pilot project(s) during the 2025-2029 rate period.

The next paragraphs describe the general objectives and activities of the design phase that would be undertaken for each pilot project independently, according to the work plan. The pilot project owners would be responsible for compiling and proposing pilot project scopes and a work plan to the steering committee. In turn, the steering committee would be responsible for approving the work plan, including pilot project scopes and budgets, and for providing strategic direction and guidance to the project owners. A key component of the design phase would be to maximize Toronto Hydro's ability to learn and develop new distribution capabilities from its pilot projects, which would be achieved as follows:

1. Designated responsible persons ("DRPs") for the pilot project set outcomes for each selected pilot project in the design phase, which are aimed at learning about how the selected pilot project's innovation can be developed into new distribution capabilities and integrated into business operations. Learning objectives may include:

a. **Developing an understanding of the business case:** The Pilot Selection process guides the selection of pilot projects that are rationally connected to and required for adaptation to fundamental change in the energy landscape. However, in order for new distribution capabilities to be developed and integrated in Toronto Hydro's planning and operational process, the utility may need to develop a more detailed understanding of the business case for investing in a particular technology, in order to test the financial sustainability of the proposed solution.

b. **Defining and testing a "theory of operation"**[18] for a new technological or operational solution to address, for example, a technical system need (e.g., peak loading or power quality issues on transformers, feeders, etc.) arising from changing network conditions driven by new behaviour, such as customers charging EVs and installing heat pumps, as well as new resources such as distributed generation.

c. **Further exploring use cases with a focus on ratepayer benefit**. This objective would effectively involve setting a hypothesis as to the benefits and impacts of technological or operational capabilities that are enabled by advances in underlying technology or business practices and further exploring the application of the underlying capability and its potential benefits.

2. Once the pilot outcomes and learning objectives have been set, project owners scope the pilot project(s) by identifying what activities and expenditures need to be undertaken to execute the pilot project in a manner that delivers the planned outcomes. This may include:

[18] CIGRE Canada, Integrating Distributed Resources into ENMAX's Secondary Network System, 2022 CIGRE Canada Conference & Expo (October 31 – November 3, 2022) online: <https://cigreconference.ca/papers/2022/paper_522.pdf>.

   a. **Preparing materials** such as program rules, contracts, terms of reference, application forms, and technical designs and schematics;
   b. **Procuring products and/or services** from vendors, energy services companies, or customers;
   c. **Deploying or developing technology or equipment** on the system or into operational processes such as system communication;
   d. **Modifying business practices** such as separate accounting of activities, installing protective equipment or taking protective measures to isolate testing from affecting system and customer reliability, or other technical and financial risk mitigation measures that may be appropriate;
   e. **Gathering and analyzing internal data** such as metered generation and load data, forecasts of system loading or resource adoption (e.g., EVs, heat pumps, storage systems), financial information, and performance, etc.; and
   f. **Identifying whether there are any regulatory obstacles** that may require Toronto Hydro to consult with or make an application to the OEB Innovation Sandbox for regulatory relief.
3. Pilot project owners set milestones for each pilot project to be monitored and tracked throughout the lifecycle of the pilot project. The milestones primarily set out the start and end dates for each pilot project and intermediate milestones may consist of monitoring identified indicators or required analysis and decisions to support meeting the learning outcomes initially set for each pilot project.
4. Pilot project owners document the work plan, final pilot project designs, and supporting materials.

4.2 Pilot Execution & Evaluation Phases

During the pilot execution phase, the pilot project owners would be responsible for executing the work plan and implementing each of the pilot projects in accordance with the activities, expenditures, and milestones contained in the project scopes. The milestones set out for each pilot project would play a vital role as they would provide a "gated" approach to controlling funding and expenditures. Mainly, the steering committee would be responsible for reviewing milestone reports created by the project owners, including the funding of activities that were completed in order to achieve the milestone.

This final phase of the governance framework would evaluate each executed pilot project on the basis of the outcomes, learning objectives, and milestones identified separately for each pilot project. The pilot project owners would document their evaluations and learnings to be presented to the steering committee for the committee's decisions on next steps.

Pilot evaluation would focus on whether the set outcomes (i.e. learning objectives) of the project have been achieved. This would be an open-ended evaluation where the pilot project DRPs would reflect on what happened during the implementation of a pilot project and comment on whether the outcomes have been achieved as set out in the project scope during the design phase. In commenting on the achievement of outcomes, the pilot project owner would elaborate on lessons learned and how the results of the pilot project contributed to the learning objectives. Additionally, the pilot project owners would assess the execution of the project, including whether there were material deviations in pilot execution from the approved project scopes, budgets, and timelines.

Finally, since pilot projects by nature are exploratory, it is conceivable that a pilot project may not meet the outcomes initially set out for it. This result may be attributed to external factors that cause material deviations from the timeline and budget contained in the workplan. It would be incumbent on the Innovation Fund team to identify and comment on what learnings may have been gained even if the initial outcomes were not achieved as expected.

Pilot evaluation would also consider whether the pilot project should be continued, discontinued, repeated with modifications, or scaled into a new distribution capability fitting into an existing investment program. This is the key conclusion for a pilot project, where Toronto Hydro determines the future of the piloted technology, capability, or strategy-based on the outcomes achieved and learnings gained from implementing the pilot project. Depending on what the original outcomes were set for a given pilot project, an appropriate set of next steps would be determined. For illustrative purposes only, next steps could include the following, non-exhaustive possibilities:

- outcomes were achieved and sufficient information and data were gathered throughout the pilot to warrant scaling a pilot project into a new distribution capability in either an existing or new program;
- outcomes were achieved but further information or data is needed (perhaps use case was understood but a stronger business case needs to be created) to warrant continuation or repeating the pilot project with modifications as a next phase of the project;
- outcomes were achieved but learnings indicate that there it is no value in pursuing the pilot project further, warranting the pilot project to be discontinued; or
- outcomes were not achieved but learnings helped identify gaps and value in pursuing the pilot project further, warranting to repeat the pilot project with modifications.

In the pilot evaluation and learnings report, the steering committee, based on the evaluation provided by the pilot project owners, would document the next steps for the pilot. To maximize learnings gathered from implementing the selected pilot projects and contribute to broader knowledge sharing with the electricity sector, Toronto Hydro would share the report with the OEB Innovation Sandbox team, and through the Sandbox the learnings could be further shared with industry stakeholders as the OEB deems suitable.

5. PROPOSED RATE TREATMENT

Toronto Hydro proposes that the Innovation Fund receive total rate funding of approximately $16 million to execute innovative pilot projects over the 2025-2029 rate period in the manner described in this Schedule. Toronto Hydro proposes to recover this amount through an Innovation Fund rate rider.[19] The use of a rate rider gives Toronto Hydro funding certainty for prioritizing innovation investments and provides ratepayers with transparency by appearing as a separate and distinct line item. Furthermore, it enables the Innovation Fund to be created independently of Toronto Hydro's base revenue requirement, thereby providing the utility the necessary flexibility to determine whether the expenditures would be capital or operational in nature on the basis of the selected project(s).

Toronto Hydro proposes to establish a new variance account—the Innovation Fund Variance Account ("IFVA")—to record variances between the amounts collected by the rate rider and the actual costs incurred to deploy the selected pilot projects. The proposed variance account meets the OEB's three-part test for establishing a new account:[20]

a. **Causation:** As described above, the forecast amount to be recorded in the proposed variance account is clearly outside of base upon which rates are derived, as the

[19] Exhibit 9, Tab 1, Schedule 1.
[20] *Supra* note 13.

innovation pilot projects that Toronto Hydro would track in this account would not form part of the utility's base revenue requirement.

b. **Materiality:** The amounts to be recorded in the proposed variance account would depend on the actual expenditures incurred to execute the select pilot projects, which will be determined in accordance with the governance framework.

c. **Prudence:** Prudence is supported by the fact the forecast amount is based on reasonable spending comparable with utilities and regulators in other jurisdictions and by the governance framework described above which will provide rigour and focus in how the funds are used for driving innovation.

APPENDIX A TO INNOVATION FUND PROPOSAL: PILOT PROJECT CONCEPTS

The 2025-2029 Grid Modernization Strategy outlined in Exhibit 2B, Section D5 highlights four pilot project concepts that could be supported by the proposed Innovation Fund:

- Flexible Connections,
- Electric Vehicle (“EV”) Commercial Fleet Charging,
- EV Demand Response, and
- Advanced Microgrids.

In sections that follow Toronto Hydro provides a brief description of each of these pilot project concepts and explains how they align with the following key considerations:

- Exploring a **distribution capability** that is connected to adapting to fundamental change in the energy landscape, or as identified in the OEB’s expectations for DER integration in the FEI report;
- Having the **potential to deploy an innovative solution** meaning: a) the use of new technology or new ways of using existing technology; b) innovative business practices, including relationships with others to enhance services to customers and share costs; or c) enhancing distribution services in a way that benefits customers, including facilitating customers’ ability to innovate in how they receive grid services.

Flexible Connections Pilot Project Concept
The rapid integration of Distributed Generation (DG) assets into the distribution network poses several technical constraints if not proactively managed and coordinated. These include reverse power flow (particularly in low load scenarios), compromised power quality, voltage violations, and elevated fault levels. Consequently, DG customers looking to connect to the network can be faced with financial and time-related burdens associated with network upgrades. It may also be the case that Toronto Hydro cannot reasonably accommodate additional DG on a feeder under the certain circumstances and must reject the application entirely. In order to improve customers' ability to develop and connect their desired DG project at an affordable connection cost, Toronto Hydro is planning to explore and develop alternative solutions, capitalizing on innovative technological and commercial offerings. The Flexible Connections pilot project concept can accelerate the effort of developing and implementing a comprehensive framework to facilitate efficient and cost-effective integration of DG into constrained areas of the distribution network. This could be achieved through continued development of an advanced DERMS system, coupled with intelligent device installation utilized through a communications platform. "Flexible" refers to real-time adaptability in managing constraints and DG access to network capacity without the need for expensive distribution system upgrades. DG customers would be offered an alternative to the standard fixed connection, where Toronto Hydro would have greater control of the output of the DG asset, with the goal of curtailing production in real- or near-real time (potentially in a fully automated manner), in coordination with real- or near-real-time conditions on the distribution grid. Such a solution would ultimately result in a faster and more cost-effective connection process for the DG customer. To enable this offering, Toronto Hydro would need to develop technical and operational protocol systems in a holistic manner.

Flexible Connections Pilot Project Concept
Distribution Capability
• **Making enabling investments such as system monitoring and data analytics:** Real-time awareness of system characteristics require sensors and smart devices installed on the network to monitor, as well as to control DERs. These investments are foundational to enabling faster, cheaper DG connections by avoiding the need for infrastructure upgrades. • **Adjusting operational practices to incorporate and manage DER on the system, including dispatching and using as NWA:** To undertake the modification of this business practice, a comprehensive framework that facilitates the efficient and cost-effective integration of DG assets as controllable, flexible resources into constrained areas of the distribution network needs to be developed, including modified connection agreements.
Potential to Deploy an Innovative Solution
• **The use of new technology or new ways of using existing technology:** The solution leverages some combination of existing technology (e.g. telecommunication system, digital relays, etc.), new DERMS capabilities, and new field technologies (e.g. smart inverters) to create an innovative monitoring and control solution that is tailored to Toronto Hydro's operational reality. • **Enhancing distribution services in a way that benefits customers, including facilitating customers' ability to innovate in how they receive distribution services:** A flexible connections process would support customer abilities to adopt DER technologies such as generation and energy storage more quickly and at a potentially cheaper cost compared to traditional approaches.

Electric Vehicle (EV) Commercial Fleets Pilot Project Concept
The Commercial EV Pilot would examine the impact of commercial EV fleet charging at commercial facilities and charging depots, and optimize charging schemes based on the flexibility requirements and preferences of Toronto Hydro and agreed upon by project partners. These tasks could offer insights into managing charging schemes for the most common charging locations, identifying methods for easy and cost-effective fleet electrification, and optimizing commercial fleet charging while considering flexibility services. Moreover, the project could assess the usefulness and benefits of flexibility services to Toronto Hydro. Additionally, demand forecasting and mitigation planning can be achieved once data is aggregated from the above studies.
Distribution Capability
Adjusting operational practices to incorporate and manage DER on the system, including dispatching and using as NWA: The project concept entails collaboration with major commercial fleet operators to assess the impact of their fleet's electrification on the distribution system. Various testing methods would be employed to gain insight into diverse charging options and develop an effective implementation strategy for fleet operators. The project encompasses quantifying and minimizing the network impact of commercial EVs through trialing different methods, exploring the total cost of ownership of smart solutions for EV fleets operators, and determining the necessary infrastructure to facilitate the EV transition. Technical solutions would be tested and implemented by fleet operators and Toronto Hydro, including flexibility services to grid (e.g. Vehicle-to-Grid, Demand Response, managed charging, etc.) from commercial EV fleets and planning tools for depot energy modeling and optimization.
Potential to Deploy an Innovative Solution
Business practices including relationships with others to enhance services to customers and share costs: The project would develop the ability to quantify and minimize the impact of commercial fleet electrification on the distribution network, investigate and quantify the total cost of ownership for intelligent scheduling and charging solutions for EV fleets, and identify the necessary infrastructure, including network, charging, and IT components, to facilitate the transition to EV fleets and enable effective load management and capacity optimization.

Electric Vehicle Demand Response (EVDR) Pilot Project Concept
EVDR would allow Toronto Hydro to manage EV charging in real-time based on the type of conditions occurring on the network. Currently, Phase 1 of an EV Smart Charing pilot is being trialed with Elocity which explores new hardware to convert simple chargers to "smart chargers" by adding a device to connect to the internet and enable on/off functions, and a customer application and utility portal to trigger DR events. In a subsequent phase, Toronto Hydro would like to review available technologies for smart charging, and test technical control options such as the Open Charge Point Protocol (OCPP) with electric vehicle supply equipment (EVSE) and onboard a vehicle telematics control to directly connect with vehicle original equipment manufacturer's (OEM) applications. Finally, Toronto Hydro would like to explore broader tool integration into the Energy Center and metering systems to further real-time situational awareness for EVDR.
Distribution Capability
Adjusting operational practices to incorporate and manage DER on the system, including dispatching and using as NWA: EVs particularly in high-concentration can pose network challenges, such as overloading secondary distribution transformers, exerting additional electrical stress on overhead conductors and underground cables, and increasing peak load at various levels. EV demand response could become a flexible and intelligent solution to maintain grid stability in areas of high-EV penetration by managing EV load as a non-wires solution rather than by expanding or enhancing grid infrastructure.
Potential to Deploy an Innovative Solution
• **The use of new technology or new ways of using existing technology:** Identify viable technical hardware and control models along with demand response (DR) events to facilitate coordinated charging and potential discharging of EV batteries to support network needs (also known as Vehicle-to-Grid). This would be achieved through development of applications, hardware integration, and mechanisms to identify and trigger EV DR events to support trials and roll-out with Toronto-based market participants.

Electric Vehicle Demand Response (EVDR) Pilot Project Concept
• **Enhancing distribution services in a way that benefits customers, including facilitating customers' ability to innovate in how they receive distribution services:** By participating in demand response offerings EV customers could have access to a wider range of choices with respect to charging times, including more incentives to manage their electricity use. • **Business practices including relationships with others to enhance services to customers and share costs:** The pilot would explore opportunities to build and expand on relationships with charge-point operators, demand side service providers, and electric vehicle supply equipment providers to identify best practices for market and utility led smart charging solutions with an outcome of maximizing benefits for the various project participants while minimizing/sharing costs.

Advanced Microgrids Pilot Project Concept
According to the Electric Power Research Institute, a microgrid is "a group of interconnected loads and distributed energy resources (DERs) within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid and can connect and disconnect from the grid to operate in both grid-connected and islanded modes." Toronto Hydro is uniquely positioned to trial a microgrid on its distribution system owing to the unique urban characteristics (e.g. Toronto Island where access is generally restricted to water transportation) and the dense service environment in which it operates, along with key customers with sensitive needs. Under this pilot, Toronto Hydro would explore the role of a regulated distributor operating a microgrid nested within the distribution grid, would be controlled by Toronto Hydro, would involve Toronto Hydro assets, and may involve customer-owned Distributed Energy Resources. Demonstration of a community microgrid on Toronto Hydro's system would be necessary to quantify the potential value of resiliency capabilities and optimizing microgrid assets to provide backup power in outage events. Insights would help support utility investment planning and customer engagement with smart communities.
Distribution Capability
• **Adjusting operational practices to incorporate and manage DER on the system, including dispatching and using as non-wires-alternatives:** Microgrids involve the control of DERs and management of system stability (e.g. Voltage and frequency), functions that historically have not been typical distribution operation activities but that will be necessary to enable a more interactive grid and decentralized generation. Capabilities need to be developed to operate microgrids and microgrid assets in a safe and reliable manner. These capabilities include processes, systems and field devices. This pilot would entail the development of such capabilities. • **Modifying planning processes to identify, assess, and implement non-utility-owned DER solutions:** Microgrids can offer **unique** benefits, and as such conventional grid planning needs to be evolved appropriately to integrate microgrids. This pilot would involve the development of a microgrid planning framework and the integration of the framework into Toronto Hydro's normal planning processes.

Advanced Microgrids Pilot Project Concept
Potential to Deploy an Innovative Solution
• **The use of new technology or new ways of using existing technology:** The pilot would involve the introduction and integration of microgrid controllers into the grid, and the operation of Toronto Hydro and/or customer assets through the microgrid controller. • **Enhancing distribution services in a way that benefits customers, including facilitating customers' ability to innovate in how they receive distribution services:** The project would involve customers in order to understand their needs and to explore the use of customer-owned DERs in a microgrid owned and operated by Toronto Hydro, thereby opening a new benefit stream for customers who own DERs or who are load customers in a microgrid. • **Business practices including relationships with others to enhance services to customers and share costs:** In pursuing opportunities to collaborate with customers such as key accounts, customers with critical loads, and DER customers, to plan, implement and operate the microgrid, Toronto Hydro would explore how it can leverage these relationships to maximize benefits (e.g. enhanced services such as reduced outage duration) and reduce costs. There is also an opportunity to partner with academic institutions to utilize new analytical tools and share knowledge about operating a microgrid on an urban utility network.

Natural Resources Canada Ressources naturelles Canada

October 27, 2023

RE: Utility innovation to enable affordability and customer choice

Dear Ontario Energy Board,

The Office of Energy Research and Development (OERD) at Natural Resources Canada (NRCan) is providing this letter in response to Toronto Hydro's proposal **to fund utility innovation** as part of their Fall 2023 rate application.

OERD leads the Government of Canada's efforts in delivering energy research, development, and demonstration (RD&D) funding, accelerating efforts in energy innovation. OERD recognizes the role of the regulator in setting just and reasonable rates and in addressing innovation needs in its jurisdiction.

Please find attached OERD's summation of publicly available NRCan information on the value of utility innovation. The document, Experience and Evidence of Utility Innovation Benefits, contains the following information:

- The value of utility innovation in general;
- What OERD has heard from its stakeholders on utility innovation;
- What OERD has learned through our programs; and
- Examples of regulatory mechanisms that have successfully enabled utility innovation.

The document outlines the value for funding innovation to develop options to advance customer choice, reduce consumer costs and increase options for customer participation.

Thank you for your time and consideration.

Sincerely,

Handler, Cynthia

Digitally signed by Handler, Cynthia
Date: 2023.11.06 14:46:25 -05'00'

Cynthia Handler
(she/her/elle)
Acting Director General, Office of Energy Research and Development
Energy Efficiency and Technology Sector
Natural Resources Canada

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Attachments (1): Experience and Evidence of Utility Innovation Benefits

Experience and Evidence of Utility Innovation Benefits

Natural Resources Canada (NRCan) - Office of Energy Research and Development (OERD)

Utility Innovation Benefits

Utility innovation plays a considerable role in enhancing affordability for customers by exploring cost-effective approaches in an evolving energy system.

Utility innovation promotes affordability. Utility innovation allows for the testing and demonstration of novel technologies, technical solutions, and business models that can deliver better and cost-effective service for customers. For example, grid optimization solutions and demand-side management can deliver reduced energy consumption and increased comfort for customers. These solutions maximize the use of existing assets, reducing the need for new grid investments that would otherwise put upwards pressure on rates.

Utility innovation delivers value to customers by responding to emerging customer needs and preferences. Electrification and the energy transition are changing expectations about the traditional relationship between customers and utilities. Customer needs and preferences are evolving with the rising adoption of distributed energy resources, smart grid technologies and devices, and electric vehicles. Through innovation in new technical solutions, technology adoption, and service delivery models, utilities have the potential to better meet customer needs and improve service for customers. Innovation in service delivery models includes scenarios where customers receive compensation for active participation in the provision of value-added services to the grid, creating new revenue streams for customers.

Utility innovation is a necessary part of an effective energy innovation ecosystem. Utilities have the potential to adopt and implement innovative technologies and solutions at the distribution level to the benefit of their customers. Utility innovation stimulates private sector innovation and improves the effectiveness and impact of government support for sector-wide innovation, ultimately resulting in the accelerated development and adoption of novel cost-effective solutions to the benefit of customers.

Utility innovation projects enable the collection of data and dissemination of information that further promote innovation. Data and information are required to evaluate the viability of business cases and use cases for novel solutions, while limiting ratepayer impacts. These insights can help utilities and decision-makers in other jurisdictions to consider the value of similar novel solutions deployed in their markets.

What We Heard: stakeholder perspectives on utility innovation

Stakeholders have communicated to NRCan the value of, and need for, utility innovation in supporting core utility business activities, improving customer choice and experience, and reducing costs.

The “What we heard” results from the NRCan Request for Information published in 2023 on electricity regulation and grid modernization regarding **enabling innovation and promoting innovation projects at the utility level.** (Source)

- Respondents identified that the current regulatory landscape poses challenges to utilities with respect to proposing innovative projects to their regulators. They also stated that the current regulatory landscape is challenged by evolving market conditions and ongoing revolutionary system changes in the energy sector.
- Respondents emphasized the importance of regulatory sandboxes and other mechanisms and processes to enable and promote piloting and experimentation.
- Respondents highlighted an ongoing need for research, development, and demonstration projects, especially for systems integration of new technologies and operations.

The "What we heard" results from the NRCan Request for Information published in 2022 on grid readiness for zero-emission vehicles regarding **innovation in enabling new technical solutions and applications to meet emerging needs of an evolving energy system.** (Source).

- Respondents identified the importance of encouraging interoperability, building out the infrastructure that is needed to accommodate transportation electrification, and enabling new capabilities for this infrastructure. This would involve establishing open-innovation approaches to facilitate interoperability and increase knowledge dissemination.
- To address concerns with infrastructure readiness and availability to meet higher loads, respondents identified the need for utilities and grid operators to develop new tools for meeting infrastructure needs. They also saw a need for programming to facilitate vehicle-to-grid transactional capabilities while ensuring safety and grid reliability.
- Respondents emphasized the importance of promoting the development and adoption of grid readiness technology at the distribution level, from the innovation phase to scaling and deployment.

What we See: OERD observations from its programs

Utility-led innovation projects have resulted in clear benefits with respect to customer choice and experience, affordability, and energy system benefits.

NRCan has funded grid innovation projects since 2003 and has observed meaningful outcomes that advance technological, social, environmental, and economic benefits for Canadians. **Providing support to adopters (such as utilities) and their providers to develop and demonstrate innovative solutions enhances their ability to drive change that realizes value for their business, the electricity system, ratepayers, and taxpayers**.

The Smart Grid Program (2018-2023) provided partial funding to 21 utility and adopter-led demonstration and deployment projects across eight jurisdictions. This program advanced technical solutions such as grid monitoring and automation, integration of distributed energy resources, microgrids, demand management (demand response and energy efficiency), new markets, and rate design. Broadly, these projects have resulted in several significant benefits, including:

- Improved utilization of existing electricity system assets;
- Increased penetration distributed energy resources, including renewable energy;
- Increased reliability, resiliency and flexibility of the power system;
- Maintained or enhanced cyber security;

- Enabled reductions in greenhouse gas emissions; and
- Economic benefits, including local job creation; new business models, market actors, and revenue opportunities; and net energy bill savings to customers.

The projects funded under the Smart Grid Program are now ending, and final public reports are becoming available (See Annex for project list). **These reports provide evidence that utility-led innovation projects can result in clear benefits to customer choice and experience, affordability, and to the electricity system.** For example:

- A microgrid that reduced congestion issues on a constrained transmission system, thereby deferring costly upgrades by increasing the utilization of existing assets while enhancing power quality and reliability. (Source)
- A microgrid with state-of-the-art capabilities that enables GHG emissions reductions and that has the potential to be replicated in remote locations that rely on fossil-based generation. This project will also help with local training and skills development and promotes public education and awareness through a public exhibition. (Source)
- A transactive energy market that leveraged customer assets to provide valuable grid services during peak demand periods, in exchange for credits to local businesses, thereby promoting grid efficiency while providing economic benefits to local merchants and promoting customer participation in energy markets. (Source)
- Controllable DERs paired with advanced telemetry and artificial intelligence, that optimize resource dispatch and reduce monthly peak demand, resulting in substantial cost savings to the utility, as well as system GHG reductions. (Source)
- A competitive market-based approach to secure energy, capacity, and reserve services from DERs to meet local, regional and province-wide electricity needs through transmission-distribution coordination. This demonstration project explores the potential of non-wires solutions to defer, reduce or avoid costs associated with traditional infrastructure. The project supports reliability and affordability to ratepayers, provides communities more options to address their local electricity needs, and provides new revenue opportunities to new market participants, such as commercial business. (Source)

Some Examples: Regulatory mechanisms that have successfully enabled utility innovation

OERD acknowledges the efforts of several jurisdictions in developing regulatory mechanisms that enable utility innovation that benefits customers. Enabling innovation under a regulatory framework may allow a utility to incorporate innovation into long-term planning and promote organizational culture change in a way that temporary government programs cannot typically afford.

- **FortisBC Energy Clean Growth Innovation Fund**: The British Columbia Utilities Commission rate-funded FortisBC Inc.'s Innovation Fund to promote investments in innovative emissions-reducing projects. FortisBC Energy Inc. justified the innovation fund by stating that it was required to accelerate the pace of clean energy innovation, to achieve performance breakthroughs and cost reductions, and to provide cost-effective, safe, and reliable solutions for customers. (Source)

- **Nova Scotia Utility and Review Board (NSUARB) Innovation Justification Criteria:** These criteria allow innovation projects to be justified on the basis that there is a reasonable expectation that they will provide customer value on 1) reducing upward pressure on revenue requirement, 2) reliability and grid stability, 3) environmental and other compliance, and 4) customer experience improvements. Projects can also be justified on the basis that they are reasonably expected to allow for testing before deploying at scale, provide valuable data and learnings, or aid in the development of business cases. (Source)
- **Ofgem Network Innovation Allowance:** This represents a set amount that RIIO network licensees receive as part of their price control allowance. This allows utilities to create innovation funds and to claim them as operations and maintenance expenditures. (Source)
- **Ontario Energy Board (OEB) Innovation Sandbox:** The first of its kind in Canada, the Innovation Sandbox supports pilot projects testing new activities, services, and business models. The OEB has also published an Innovation Handbook and has launched an Innovation Sandbox Challenge, all in the interest of promoting utility innovation to promote affordability and to create customer value. (Source)

Annex: List of projects funded by NRCan's Smart Grid Program

Table 1. List of projects funded by NRCan's Smart Grid Program

Number	Recipient	Project Title	Project Type	System category
1	Yukon Energy	Residential Demand Response Program (RDRP)	Demonstration	DERMS
2	EPCOR	EPCOR Smart Grid System (ESGS)	Deployment	DERMS, Microgrid, Distributed energy storage
3	EQUS REA	Canada's 1st Member-Owned Rural Smart Grid Project	Deployment	DERMS
4	ENMAX Power	Integrating Distributed Generation into Secondary Networks in Large Urban Centres	Demonstration	Grid monitoring and automation
5	FortisAlberta Inc.	FortisAlberta Waterton Energy Storage Project	Demonstration	Microgrid-connected
6	City of Lethbridge	Conservation Voltage Reduction (CVR) Deployment in Lethbridge	Demonstration	Grid monitoring and automation

		Electricity Utility (LEU) Distribution Network		
7	SaskPower	SaskPower Distribution Modernization Program	Deployment	Grid monitoring and automation
8	SSM PUC	Sault Smart Grid	Deployment	Grid monitoring and automation
9	Entegrus Powerlines Inc.	Conservation Voltage Reduction	Deployment	Grid monitoring and automation
10	Bracebridge	Smart, Proactive, Enabled, Energy Distribution; Intelligent, Efficiently, Responsive (SPEEDIER) Project	Hybrid	DERMS
11	London Hydro	West 5 Smart Grid Project	Hybrid	DERMS
12	Alectra Utilities	Power.House Hybrid: Minimizing GHGs and Maximizing Grid Benefits	Demonstration	DERMS
13	Alectra Utilities	GridExchange	Demonstration	DERMS
14	Independent Electricity System Operator (IESO)	York Region Non-Wires Alternatives Demonstration Project	Demonstration	New markets & rate options (NRO)
15	Lakefront Utilities	Digital Utility Platform	Deployment	Grid monitoring and automation
16	Hydro-Quebec	Smart Grid Deployment of Off-Grid Networks	Deployment	Microgrid off-grid, grid monitoring, automation and storage off-grid
17	Hydro-Quebec	Lac-Megantic Microgrid	Hybrid	Microgrid-connected
18	Saint John Energy	Integrated Dispatchable Resource Network for	Hybrid	DERMS

		Local Electric Distribution Utility		
19	New Brunswick Power	Collaborative Grid Innovation for Atlantic Smart Energy Communities	Hybrid	DERMS
20	Nova Scotia Power	Collaborative Grid Innovation for Atlantic Smart Energy Communities	Hybrid	DERMS
21	PEI Energy	Slemon Park Microgrid Project	Deployment	Microgrid, DERMS
Legend: DERMS– Distributed Energy Resource Management				

CUSTOMER ENGAGEMENT

Customer engagement is one of the key tools that Toronto Hydro uses to inform business planning and decision making. It helps the organization gather critical information, including to identify what is working and what is not working with regards to the programs and services it provides to customers. Customer engagement activities ensure customers' voices are being heard and enable Toronto Hydro to continue meeting evolving customer expectations.

The 2025-2029 investment plan that underpins this application is the product of an extensive application-specific customer engagement process, which garnered feedback from over 37,000 customers (approximately 4.7 percent of the utility's customer base) from start to finish. The plan is also informed by extensive ongoing customer and stakeholder engagement activities undertaken in the normal course of business as part of the utility's robust and sophisticated customer research and response model, as described below in section 3. This schedule describes each of these sources of customer feedback and how they informed the 2025-2029 investment plan that underpins the application.

1. CHANGING CUSTOMER LANDSCAPE

Toronto Hydro serves over three million residents, 28 million visitors annually, and approximately 100,000 businesses.[1] Toronto Hydro's customers include individual residential consumers, large industrial and commercial businesses and thousands of high-rise multi-residential condominium and apartment buildings, with hundreds of thousands of end-use sub-metered customers behind a Toronto Hydro "bulk meter."[2] The utility's service

[1] City of Toronto, *Toronto at a Glance*, "online", https://www.toronto.ca/city-government/data-research-maps/toronto-at-a-glance/>.
[2] Exhibit 1B, Tab 3, Schedule 3 at page 31.

territory is home to Canada's largest banks, stock exchange, major manufacturers, and other large organizations that are particularly sensitive to power interruptions, including dozens of hospitals, healthcare and long-term care facilities and hundreds of schools, colleges, and universities that rely on Toronto Hydro for their electricity needs. In addition, the utility serves the Provincial Legislature, City Hall and a range of government offices and work centres that plan, deliver and oversee a wide-range of community functions and matters of broad socio-economic significance. Finally, Toronto Hydro serves current and future transit lines in the City including the Yonge North Subway Extension, Scarborough Subway Extension, Eglinton Crosstown West Extension, and the Ontario Line.

Toronto Hydro has a robust customer research and response model that is effective at understanding and responding to customer needs and expectations. Ongoing and application-specific research reveals that customer behaviour and attitudes are evolving, and there is a shift in terms of customer needs and priorities. These include:

- Reliability and investment in new technology have become increasingly important to customers, and are almost on par with price.
- Customers are looking for information to improve their understanding of climate change, decarbonization and electrification, as well as an understanding of Toronto Hydro's role in these initiatives, while at the same time looking for opportunities to reduce their overall energy costs.
- Many customers have strong expectations for Toronto Hydro to commit to environmental initiatives and lessen environmental impact.
- Customers have evolving communication preferences – email is the preferred method of contact for all communications and younger Torontonians, in particular, have above-average preference for SMS communications.

- Customers have shown more concern for the future of the electricity system and the grid than in past years.

In addition, as key sectors of the economy electrify, previously non-electric energy usages (e.g. building heating and transportation systems), and as customers leverage technology to play a more active role in the production and management of the electricity they consume, Toronto Hydro expects that customer needs and expectations will continue to increase, driving the need for greater resiliency, and higher volumes and more complexity in customer inquires and interactions.

The utility's 2025-2029 investment plan, and in particular the operational investments within the plan summarized in Exhibit 4, Tab 1, is designed to ensure that the utility has the necessary level of resources with the right skills to maintain an agile and robust customer research and response model as the energy transition unfolds.[3] Similarly, the utility's *Grid Modernization Strategy* presented in Exhibit 2B, Section D5 lays the groundwork for building a more intelligent and self-healing grid that is able to deliver the future system resiliency that customers will increasingly expect as they become more reliant on clean electricity for their energy needs.

2. APPLICATION-SPECIFIC CUSTOMER ENGAGEMENT

Following the OEB's policy guidance, and building on the successful approach in its prior application, Toronto Hydro undertook a two-phased customer engagement approach to inform this application. First, prior to embarking on the business and investment planning process, it obtained a genuine understanding of its customers' needs and priorities, and used

[3] Exhibit 4, Tab 1, Schedule 1 and Section 5.1.6.

this feedback to set strategic direction for the investment priorities of its plan.[4] Second, after the 2025-2029 draft plan was prepared, Toronto Hydro went back to customers to obtain feedback on the draft plan. The utility considered this feedback in refining and finalizing its plan.

As illustrated in the Figure 1 below, Toronto Hydro's application-specific customer engagement process spanned over 18 months, between late 2021 and mid-2023. From start to finish, Toronto Hydro obtained feedback from nearly 37,000 customers, representing an increase of 190 percent compared to the customer engagement in its prior application, and approximately 4.7 percent of the utility's total customer base.[5] This gave Toronto Hydro a genuine understanding of its customers' needs, priorities and preferences and informed the development, refinement and finalization of Toronto Hydro's 2025-2029 investment plan.

[4] Exhibit 2B, Section E2.
[5] In the 2020-2024 Rate Application, approximately 12,500 customers participated in the application specific customer engagement.

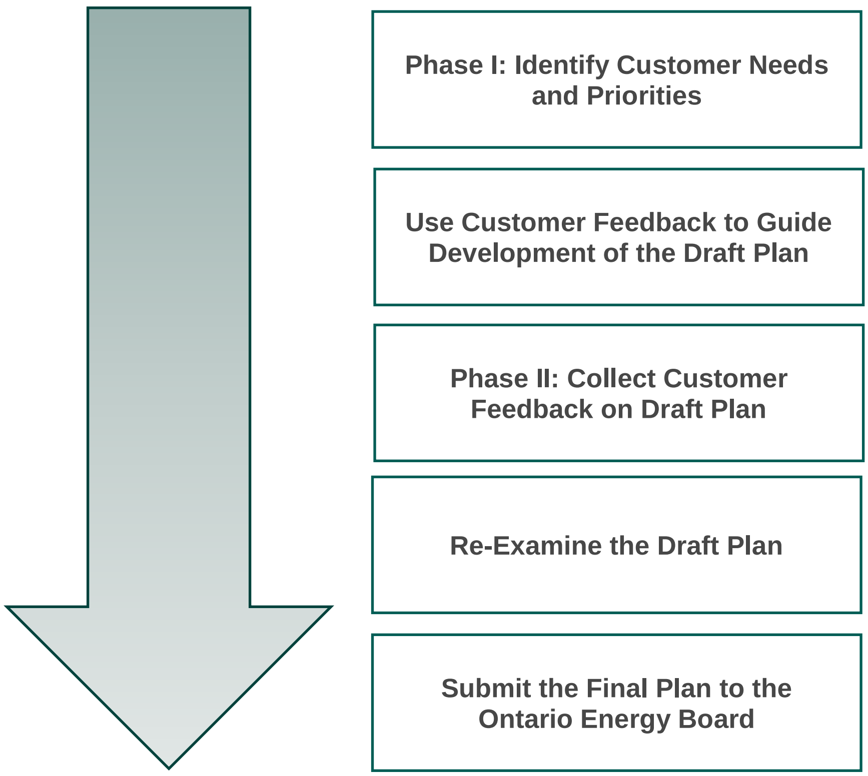

Figure 1: Customer Engagement Process

Toronto Hydro engaged Innovative Research Group ("Innovative"), a national consulting firm with expertise in public opinion research (and experience in energy policy in particular), to execute the utility's customer engagement process. The Innovative Report, found at Appendix A to this schedule, describes in detail the process, methodology and results of Toronto Hydro's application-specific customer engagement.

2.1 Phase 1

Phase 1 of the customer engagement process assessed customers' needs and preferences in relation to Toronto Hydro's programs and services for the 2025-2029 rate period. The results revealed that customers' core priorities are centered around three themes:

1. **Price and reliability are the top customer priorities:** Relative to price, reliability has become increasingly important to residential customers. When it comes to reliability, customers prioritize reducing the length of outages, with a particular focus on extreme weather events for residential and small business customers. Key Account customers are more sensitive to power interruptions and prioritize reducing the total number of outages.
2. **New Technology:** Almost as equally important to price and reliability, customers expect the utility to invest in new technologies that will reduce costs and make the system better, even if the benefits aren't immediate, as long as the costs and benefits are clear.
3. **System Capacity:** Customers expect Toronto Hydro to invest proactively in system capacity to ensure that high growth areas do not experience a decrease in service levels. The majority of Key Account customers surveyed have Net Zero goals to reduce their business' net greenhouse gas emissions to and expect Toronto Hydro to support them in meeting their climate action objectives by ensuring that the system has capacity for growth and by providing them advisory services.

Toronto Hydro applied this feedback as a front-end input into the development of the draft investment plan. Considering this feedback, and other inputs, Toronto Hydro organized its plan around the following investment priorities:

1. **Sustainment:** Investments to upkeep old equipment that is in poor condition and replace outdated equipment**.**
2. **Modernization:** Investments in technology to get more use out of existing equipment, and build a smarter, more efficient and reliable grid.
3. **Growth:** Investments in capacity to power the growing city and serve customers' growing and changing needs for electricity.

4. **General Plant:** Investments in vehicles, work centers and IT to keep the business running and reduce Toronto Hydro's emissions.

For each of these strategic priorities, Toronto Hydro set performance objectives that provide value for customers based on the feedback received, and are meaningful to its operations, including to:

- invest enough in the sustainment of asset health and other leading indicators of asset risk to maintain reliability performance;
- prioritize investments in technology to modernize the grid and develop advanced operational capabilities to make the system better for the future; and
- invest proactively in system capacity to ensure that the grid is able to support future growth without compromising other outcomes like safety and reliability.

Through an iterative process that spanned over a year, Toronto Hydro system planners and experts worked diligently to identify the minimum investments necessary to meet these objectives and balance near-and long-term service quality performance with price impacts for customers, as informed by the feedback in Phase 1. Achieving this important balance entailed both top-down direction with respect to price constraints and budget limits, and bottom-up analysis of system requirements and performance levels.[6]

To help Toronto Hydro integrate the customer feedback into its planning process, Innovative developed a placemat summarizing the findings of the Phase 1 Customer Engagement survey in an accessible format. Toronto Hydro shared this placemat with system planners and other subject matter experts involved in the planning process to ensure that customer feedback was considered in developing the plan from a bottom-up perspective. Employing

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[6] *Supra* Note 4

this feedback and other business inputs such as asset condition and system performance, Toronto Hydro developed a $5.9 billion draft plan that was then taken back to customers during Phase 2 of the engagement.

2.2 Phase 2

Phase 2 solicited detailed customer feedback on the $5.9 billion draft plan and the associated price impacts, providing the utility additional insight about customers' preferences relative to the investment plan priorities, options and outcomes. This feedback: (i) confirmed that Toronto Hydro found a suitable balance between price and other key outcomes of its 2025-2029 investment plan, (ii) supported the refinement and finalization of the plan, and (iii) informed the development of the 2025-2029 custom scorecard presented in Exhibit 1B, Tab 3, Schedule 1.

To obtain this critical customer feedback, Innovative developed an interactive online workbook providing customers the opportunity to learn about Toronto Hydro's draft plan and express preferences with respect to key investment choices. Toronto Hydro distilled the 2025-2029 draft investment plan into seven investment areas:

1. **Modernization**: Investments to build a smarter, more efficient and resilient grid.
2. **Growth**: Investments to increase grid capacity to reliably serve customers' growing electricity needs.
3. **Sustainment – Reliability:** Investments to manage near-term reliability risk due to equipment failure.
4. **Sustainment – Stewardship:** Investments in the paced upkeep of equipment at or near end of life to manage longer-term reliability outcomes.
5. **Sustainment – Standardization**: Investments to replace outdated equipment with equipment meeting modern standards.

6. **General Plant**: Investments in fleet, facilities and IT infrastructure to keep the business running efficiently.
7. **Decarbonization**: Investments to reduce Toronto Hydro's greenhouse gas emissions from its own operations by electrifying fleet and facilities assets.

For each investment area, Toronto Hydro put forward the draft plan, along with pacing options to spend more or less, for faster or slower progress towards achieving performance across the following key outcomes: system health, reliability, customer service, efficiency and environment. After making their preliminary choices, customers were provided with the total price implications of those choices and invited to change their selections if desired. At the end of the workbook, customers were asked if they would be willing to support the rate increase associated with Toronto Hydro's draft plan – a question commonly referred to as *social permission*.

Through this interactive customer engagement process, Toronto Hydro obtained valuable feedback on the draft plan. At the top level, Toronto Hydro learned that on average, 84 percent of customers surveyed supported the draft plan and its associated rate impacts. Further, 18 percent of customers supported a plan that does even more to advance key outcomes. At a more granular level, this process provided the utility insights into customer prioritization between respective investment categories. In general, customer trade-offs between price and progress were: (a) in-line with the draft plan on Modernization, Stewardship and Standardization, and (b) slightly lower than the draft plan on Growth, Reliability, Running the Business and Decarbonization.

Toronto Hydro considered this feedback, and took it into account in order to refine and finalize its 2025-2029 investment plan presented in this application. In direct response to customer feedback, Toronto Hydro challenged itself to reprioritize certain investment, and reduce the overall capital plan by approximately $70 million, as further described in Exhibit 2B, Section E2.

2.3 Responsive to OEB Guidance

In conducting the application-specific customer engagement process described above in section 2, Toronto Hydro considered the OEB's *Renewed Regulatory Framework for Electricity Distributors* ("RRF"), the *Filing Requirements for Electricity Distribution Rate Applications* ("Filing Requirements"), the *Handbook for Utility Rate Applications*, the EB-2018-0165 decision in respect of Toronto Hydro's 2020-2024 rate application, and OEB decisions in other utilities' rate applications. The OEB's guidance centres on two key considerations, which were thoroughly addressed by Toronto Hydro through its customer engagement process, as detailed in this schedule and in Exhibit 2B, Section E2.

1. A utility's business plan must be informed by and responsive to customer needs and preferences, in the context of broader considerations such as asset condition, system performance and other safety and regulatory requirements; and
2. A utility is expected to develop a genuine understanding of its customers' needs and preferences, and be able to demonstrate how the business plan was informed by customer feedback.

In addition to being responsive to this OEB guidance, Toronto Hydro specifically reflected on the OEB's feedback in the 2020-2024 Decision, which noted that *"[i]n future customer engagement initiatives, there may be an opportunity to build on the current level of customer understanding and focus on some areas of particular concern*."[7] The OEB also expressed some caution about customers' ability to understand the system investments requirements

[7] EB-2018-0165, Decision and Order (December 19, 2019) at Page 13.

or priorities in details. Reflecting on this feedback, Toronto Hydro enhanced its application-specific customer engagement process to be more focused, yet comprehensive and accessible, so that customers could meaningfully participate even without having in-depth knowledge of the electricity system.

For Phase 1, rather than conducting the low volume customer surveys solely via telephone, Toronto Hydro and Innovative were able to move these surveys to an online format, resulting in increased customer participation and more robust customer insights to inform the development of Toronto Hydro's 2025-2029 investment plan. In the Phase I engagement, Toronto Hydro saw a 546 percent increase in participation rates among residential customers, and a 293 percent increase among small business customers.

In Phase 2, mindful of the expanded investment priorities and rate impacts associated with its plan, Toronto Hydro put its entire draft plan to customers for feedback in an interactive survey that took customers through key investment areas of the plan. The investment choices presented in the workbook were grounded in the investment options developed and considered throughout the planning process.[8] Each choice was designed to solicit feedback about customers' preferences and trade-offs between price (i.e. rate impacts) and other key outcomes (i.e. system health, reliability, customer service, efficiency and environment). To enable customers to express their preferences, an interactive slider tool and outcomes table was developed for each area.

In an effort to increase customer participation rates, Toronto Hydro took a number of steps to bring visibility to the workbook including:

[8] To present the full rate impacts to customers, the utility allocated the cost of operational investments to each of the seven key areas of investment.

- Emailing over 440,000 customers with an invitation to complete the workbook;
- Notifying customers about the workbook through the utility's print newsletter (included with customer bills) and an electronic newsletter (delivered to nearly 200,000 customers);
- Inviting customers to participate in the Phase 2 engagement through the Toronto Hydro website and social media channels; and
- Using online display ads through social media which generated approximately 5.45 million impressions and over 17,000 clicks to the workbook.

These efforts were successful in increasing customer participation in the Phase 2 engagement. Nearly three times more customers completed the workbook compared to the 2018 survey conducted in the lead up to the 2020-2024 rate application. Table 2 below, compares the customer engagement results for the previous and the current rate application. Overall, customers were more supportive of the draft plan presented in this application compared to last time.

Table 1: Phase 2 Customer Engagement Comparison

Rate Class	2018		2023		2018 vs. 2023	
	Participation	Social Permission	Participation	Social Permission	Participation	Social Permission
Residential	10,765	71%	32,187	80%	199%	+9%
Small Business	396	55%	695	77%	76%	+22%
C&I	202	73%	264	82%	31%	+9%
Key Accounts	37	78%	52	96%	41%	+18%
Total	11,400	69%	33,198	84%	191%	+15%

3. ONGOING CUSTOMER ENGAGEMENT

Ongoing customer and stakeholder engagement activities occur in the normal course of business as part of Toronto Hydro's robust and sophisticated customer research and response model.[9] Insights collected by the utility through these ongoing activities were embedded in the development of this application, in addition to the results of the application-specific engagement detailed above in section 2.

Interactions with customers through various channels informed the utility's plans in a number of ways, including: (i) development of capital plans particular investments to expand and modernize the grid to meet the future load demands of customers; (ii) the continuous improvement of customer-interfacing functions and services; and (iii) specific performance outcomes and measures that relate to customer service and experience as detailed in Exhibit 1B, Tab 3, Schedule 1.

This section summarizes the ongoing customer research activities undertaken across different programs and functions that comprise the 2025-2029 investment plan detailed in Exhibit 2B (capital) and Exhibit 4, Tab 2 (operations), and summarizes key areas of Toronto Hydro's plan and rate application that have been informed by and are responsive to the evolving expectations and needs of the utility's diverse customer base.

3.1 Customer Services

Toronto Hydro's customer services, outlined in the Customer Care program, and in the Customer Operation Program respond to the needs of the utility's large and diverse customer base. [10,11]

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[9] Exhibit 2B, Section B.
[10] Exhibit 4, Tab 2, Schedule 14.
[11] Exhibit 4, Tab 2, Schedule 8.

As noted in the Customer Care Program, an increasingly popular method of engagement continues to be Toronto Hydro's mobile and digital self-service portal, known as Customer Self-Serve (CSS) portal.[12] It offers customers 24/7 online access to their account, including ability to view and download bills and payment histories. It also provides access to additional features to help manage their account including automated move-in/move-out capability, register for electronic billing (i.e. eBills), pre-authorized debit enrolment and outage notifications, switch electricity price plan, and chat with Customer Care representative regarding any account-related inquiries. In addition, the "My Usage" page on the CSS portal provides customers the ability to track and compare their electricity usage and costs on an hourly, daily, monthly, and yearly basis. Furthermore, customers are able to access a price comparison tool to help make an informed decision when selecting between tiered, standard time of use, and the new Ultra-Low Overnight time of use electricity pricing plans.

In 2022, the Contact Centre received and addressed approximately 70,000 written (i.e. paper mail, fax, and email) inquiries and about 343,000 telephone calls. Customers engage with the Contact Centre to inquire about Toronto Hydro's business practices, available programs and service choices (such as pricing plan options), government incentives, payment options, electricity consumption and demand, moves, collections, financial assistance programs, and a variety of other topics. The Contact Centre is responsible for many activities that contribute to the service quality performance results tracked by the OEB through scorecards and annual reporting requirements.[13] Despite an increasing volume and complexity of customer interactions, the utility intends to maintain high service quality performance on over the 2025-2029 rate period and expand its accountability to other aspect of customer service and experience outcomes.[14]

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[12] *Supra* note 13.
[13] Exhibit 1B, Tab 3, Schedule 2.
[14] Exhibit 1B, Tab 3, Schedule 1.

The Escalations and Special Investigations area resolves specific customer concerns that require complex or lengthy analysis. The most frequently occurring issues relate to energy and bill management, including high bill issues, energy management, payment challenges, and power quality requests pertaining to interruptions in power. With customers increasingly working from home since 2020, any interruption in power, including momentary and short duration outages, has become more impactful to customers. The Escalations and Special Investigations function intakes escalated matters through a variety of channels. For example, in 2022, this function processed approximately 1,900 escalations received through the Contact Centre. The Escalations and Special Investigations function is also responsible for Toronto Hydro's consumer complaint response process and the resolution of customer escalations forwarded through the OEB E-Portal. The function deploys field resources as necessary to investigate power quality, billing, or other issues. In 2022, Escalations and Special Investigations resolved 99 percent of escalated customer inquiries within 10 business days or less.

In recent years, the issues handled by the Escalations and Special Investigations function have become progressively more complex. The investigation and resolution of these issues typically involve internal stakeholders from multiple capital and OM&A programs, such as Customer Operations, Work Program Execution, or Public Legal & Regulatory, and sometimes external stakeholders such as provincial and municipal transit operators, various departments of the City of Toronto, or social assistance agencies. Toronto Hydro expects the complexity of issues addressed by this function to increase as more customers adopt DERs and EVs and those resources are integrated with distribution operations, and as public policy initiatives relating to major transit, telecom, or construction projects drive various activities in the utility's service territory in an impactful way for customers.

3.2 Key Accounts

Toronto Hydro's Key Account customers are those customers who have critical loads including customers who have electricity use greater than 1MW, priority loads (such as hospitals and financial institutions), essential public services, and developers. These customers often have distinct needs and priorities including:

- **High sensitivity to reliability issues** – for many Key Account customers any interruptions, even momentary ones, can cause high costs due to loss of product and health and safety concerns.
- **Complex connections and expansions –** connections and expansions for Key Account customers are often more complex, due to their sheer size and requirement for more sophisticated configurations.
- **Environmental Social & Governance (ESG) goals** – Approximately 64 percent of Key Account customers have plans to decarbonize and expect Toronto Hydro to support them in their journey as they consideration electrification solutions.

Toronto Hydro's Key Account's team manages the relationships and acts as a single point of contact for all work activities related to serving the distinct needs of Key Accounts customers, including matters such as: [15]

- facilitating and assisting with scheduling and planning for major capital and maintenance projects, operational requirements, and regulatory compliance;
- liaising with departments across Toronto Hydro including: engineering, design and construction, and operations;
- meeting with customers to resolve billing issues, coordinate planned outages, and provide business-specific updates during unplanned outages;
- resolving issues related to reliability and power quality;

[15] Exhibit 4, Tab 2, Schedule 8.

- discussing opportunities for reducing emissions and meeting decarbonization goals;
- partnering with the IESO to support the delivery of Local Incentive Programs;[16] and,
- providing account and sector specific information through various channels such as direct mail, newsletters, workshops, and association outreach.

As the needs of customers evolve, the Key Accounts function is keeping abreast of these evolutions by investing in more proactive engagement with Key Account customers, and by working closely with other parts of the organization to facilitate a positive customer connections experience for these customers.[17] To that end, there are currently over 30 Key Account customers actively pursuing large expansions and new connections greater than 1 MVA, totaling 57 connection and expansion projects.[18]

3.3 Media and Public Relations

Toronto Hydro's Media and Public Relations department engages customers and other stakeholders through a number of different channels, including: [19]

- Owned media channels (content that is published through channels that Toronto Hydro creates or controls), including its website, social media channels, print newsletters, email newsletters/blasts, bill inserts, customer bill, mobile app, media events, community events and, Interactive Voice Response system);
- Paid media channels (third-party channels that require payment from Toronto Hydro), e.g. newspaper advertising, radio advertising, direct mail, digital and social media advertising;

[16] Under previous Conservation and Demand Management frameworks, the Key Accounts function worked with large customers to access provincial funding for energy efficiency programs.
[17] In 2022, the Toronto Hydro undertook over 1,100 engagements with customers.
[18] *Supra* note 14.
[19] These channels are regularly reviewed and updated to reflect Customer feedback and preferences. For more information see Exhibit 4, Tab 2, Schedule 18.

- Earned media channels (content about Toronto Hydro that comes voluntarily from others) such as print, broadcast and online news outlets;
- Customer surveys, including the OEB's and Electricity Canada's customer satisfaction surveys (annual and bi-annual, respectively), the OEB's bi-annual *Public Awareness of Electrical Safety Survey*, and Toronto Hydro initiated surveys on brand trust and reputation and other one-off topics (e.g. billing) as needed for gathering relevant quantitative customer feedback
- Contact with local business improvement organizations, community groups and ratepayer associations;
- Proactive outreach to City Councillors, the Mayor's office and City staff; and
- Community events.

Toronto Hydro also considers direct customer feedback through its Customer Advisory Panel ("CAP"). The CAP is selected through a multi-step process to ensure representation from a diverse cross-section of customers. The utility engages its CAP to obtain ongoing feedback on a variety of topics using a mix of focus groups, surveys, user experience testing, targeted one-on-one interviews, and workshop sessions (inclusive of both residential and business customers). In recent years, Toronto Hydro used feedback from its CAP to help inform the redesign of its customer-facing website, the rollout of new digital tools such as the Toronto Hydro mobile app, updates to its service connections brochures, and development of rates communications, among other initiatives.

Additionally, the media serves as an important conduit between Toronto Hydro and its customers. Media and Public Relations proactively and reactively communicates accurate and timely information to the media about Toronto Hydro's programs, services and operations, including power outages, electrical safety, rates, and investments in the distribution system.

Increasingly, digital channels, including social media, and online tools, such as mobile apps, SMS notifications and live online chat, are becoming the preferred source of information for customers experiencing an outage. Toronto Hydro's digital team focuses on engaging the public through these channels and actively communicates with those who engage Toronto Hydro via its social media channels (Toronto Hydro has over 121,000 followers on X (formerly known as Twitter) as of November 2023. Media outlets and journalists also rely on digital channels to collect information, increasing their importance and creating an opportunity for Toronto Hydro to use these channels as additional communications tools with the media.

Municipal Government Relations and the Office of the President manages relationships with key City stakeholders. Customer escalations for complex cases are managed through a multi-stage dispute resolution process. The Office of the President handles approximately 1,000 issues per year with approximately two-thirds directed to it from councillors and other elected and public officials. The remaining third is comprised of the second level in the customer dispute resolution process if customers are not satisfied with the outcome of an escalation handled by customer facing teams as described above. The Customer Advocate is the final step within Toronto Hydro's complaint process and reviews cases for customers unsatisfied with responses provided by Toronto Hydro. Of the approximately 1,000 issues managed through the Office of the President in 2022, over 98 percent were successfully resolved without a formal Customer Advocate review. This is further discussed in Exhibit 4, Tab 2, Schedule 18.

3.4 Community Relations

Through Community Relations, Toronto Hydro communicates regularly with customers regarding planned capital work projects and scheduled outages, in order to engage and help customers prepare for work at or near their property.[20] Toronto Hydro issues proactive communications to notify customers of planned work, and manages a customer inquiry line to address questions and concerns. Community Relations staff are dispatched on-site, when needed, to liaise with customers in a prompt and courteous manner. This process is critical for building brand trust and upholding Toronto Hydro's reputation within the communities it serves.

Toronto Hydro maintains productive relationships with public interest groups and agencies involved in commerce, environmental protection, and education. Stakeholder outreach commonly takes the form of one-on-one contact with customers, community town hall meetings, special information sessions, and a variety of online content. Using a variety of communication channels allows Toronto Hydro to engage customers with varying needs, concerns, and preferences, with the goal of giving appropriate attention to all customer segments.

When work has the potential to disrupt local neighbourhoods and property, typically, Toronto Hydro engages customers through three rounds of notifications:

- General notification of construction work is given to all affected residents;
- Letters are provided to all customers that will have equipment, such as poles or transformers, located on or adjacent to their property; and
- A pre-construction letter is issued approximately one week prior to work commencing.

[20] Exhibit 4, Tab 2, Schedule 18.

Community Relations is responsible for providing these notifications and for addressing or escalating customer concerns. For example, if customers are not satisfied with the scope or nature of planned work, Community Relations may investigate new design options or engage customers in-person or at utility-initiated community meetings.

More intensive and incremental engagement is used in relation to rear-lot projects, which can require significant work on Toronto Hydro's part to relocate electrical infrastructure and remove legacy assets from private property. Before work begins, Toronto Hydro proactively initiates an Open House in the community where work is expected to take place. At that forum, Toronto Hydro provides an overview of the scope and timelines of the work, an explanation of why the work is taking place and contact information for customers who wish to follow up for more information. The three-round notification process is then implemented.

3.5 System and Capacity Planning

Ongoing customer engagement also plays a role in various aspects of Toronto Hydro's capital planning process. For example, the utility uses the City of Toronto's development pipeline to engage large customers and developers with upcoming projects to understand their needs, determine their load requirements and timelines, provide technical guidance, explore innovation opportunities, and provide support in understanding the connection process. These engagements usually occur up to five to eight years before an intended connection materializes, enabling a smoother connection experience for customers and providing Toronto Hydro with valuable insight into emerging technologies that customers are adopting behind-the-meter, that can drive significant load growth or change in demand patterns in certain parts of the grid. Accordingly, these engagements enable Toronto Hydro to incorporate anticipated connections into its System Peak Demand Forecast with a higher degree of confidence. Based on this forecast, Toronto Hydro determines investment needs in demand-driven program such Stations Expansion and Load Demand, to manage capacity and plan for future system peak load growth.[21]

Toronto Hydro's participation in Regional Planning is another channel of ongoing engagement that informs the development of the capital plan. The Regional Planning Process includes community and stakeholder engagement, including webinars, led by the IESO. The IESO invites the City of Toronto, First Nations, and Métis communities, stakeholders, community groups and the general public to provide input on the Scoping Assessment Outcome Report and development of the IRRP that is currently underway. The inaugural webinar occurred in March 2023, and coincided with the publication of the Scoping Assessment Outcome Report. For more information about the Regional Planning Process, see Exhibit 2B, Section B3 of the DSP.

Finally, Toronto Hydro's plans are responsive to the priorities of local government, and in particular the City's *TransformTO Strategy*, which identifies objectives to reduce greenhouse gas emissions, improve health, grow the economy, and improve social equity. In 2021, Toronto Hydro prepared an industry-leading Climate Action Plan to assess the utility's role in enabling and advancing the City's *TransformTO* objectives.[22] The Climate Action Plan revealed that most significant opportunity for Toronto Hydro to enhance its contributions to climate action is to substantially expand its existing, regulated, electricity distribution business to build a grid that is capable of supporting the realization of the City's *Net Zero Strategy*. The 2025-2029 Investment Plan that underpins this rate application is a critical step in that direction, with least regret investments in system capacity and modernization

[21] Exhibit 2B, Sections B and D4.
[22] Toronto Hydro, Climate Action Plan, "online", https://www.torontohydro.com/documents/20143/74105431/climate-action-plan.pdf/8fe4406c-7675-76a7-00c9-c0c4e58ae6df?t=1638298942821

initiatives that enable Toronto Hydro's grid and operations to be ready and equipped to serve an electrified future.[23]

[23] Exhibit 2B, Section D4. For more information on Toronto Hydro's alignment with city of Toronto priorities, see Section D2.1.4 of the DSP.

INNOVATIVE RESEARCH GROUP

CONFIDENTIAL

Toronto Hydro Customer Engagement

Executive Summary

2025-29 CIR Application

TORONTO HYDRO®

STRICTY CONFIDENTIAL

Customer Engagement

2025-29 CIR Application

November 2, 2023

Confidentiality

This Report and all of the information and data contained within it may not be released, shared or otherwise disclosed to any other party, without the prior, written consent of Toronto Hydro Electric-System Ltd. (Toronto Hydro).

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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Introduction

Toronto Hydro Electric-System Ltd. (**Toronto Hydro**) engaged Innovative Research Group Inc. (**INNOVATIVE**) to design, execute, and document the results of its customer engagement process under the Renewed Regulatory Framework for Electricity Distributors (RRFE) as part of its business planning process for the 2025-2029 Custom Incentive Rate-Setting Application.

Throughout the process of developing its 2025-2029 Custom Incentive Rate-Setting Application, Toronto Hydro set out to gather meaningful feedback from its customers, specifically when it came to their needs, preferences and trade-offs regarding the pacing and prioritization of specific investment and spending areas.

Findings from this customer engagement revealed that an average of 84% of customers, across all rate classes, provided *social permission* to proceed with Toronto Hydro's draft plan.

Social permission is the percentage of customers who responded to Toronto Hydro's draft plan by indicating either: (1) they think Toronto Hydro should accelerate spending beyond the level in the draft plan to deliver better system outcomes, (2) they support the proposed rate increase that is reflected in the draft plan, or (3) they feel that the proposed rate increase in the draft plan is necessary, even though they don't like the proposed increase.

Approach to Meaningful Customer Engagement

The Ontario Energy Board's (OEB) "consumer-centric" approach to rate applications contained in the *RRFE* requires Local Distribution Companies (LDCs) to demonstrate that their services are provided in a manner that responds to identified customer needs and preferences.[1] LDCs are required to provide an overview of customer engagement activities that they have undertaken with respect to their plans and how customer needs and preferences have been reflected in the LDCs' application. The Handbook for Utility Rate Applications notes the following: *"The OEB expects a utility's rate application to provide an overview of customer needs, preferences and expectations learned through the utility's customer engagement activities."*[2] These requirements have the effect of bringing customers feedback data to bear on utility planning.

The OEB does not specify how customer engagement should be conducted or how customer feedback should be received. However, it has encouraged utilities to use *"both existing and new processes."*[3] Toronto Hydro's customer engagement was designed with this in mind, where customer feedback was collected using multiple methodologies, including: an online customer feedback portal, focus groups, one-on-one interviews, telephone surveys and online surveys. Additional information on the approach is provided in subsequent sections of this executive summary and within the relevant appendices.

Between 2021 and 2023, INNOVATIVE gathered feedback from nearly 37,000 Toronto Hydro customers as part of the utility's application-specific customer engagement efforts. In context, this engagement represented Toronto Hydro's largest and most comprehensive customer engagement over the utility's history.

[1] OEB Renewed Regulatory Framework for Electricity Sections 2.4.2, 5.0, and 5.0.4.
[2] Handbook for Utility Rate Applications, p. 12 (October 13, 2016)
[3] Handbook for Utility Rate Applications, p. 12 (October 13, 2016)

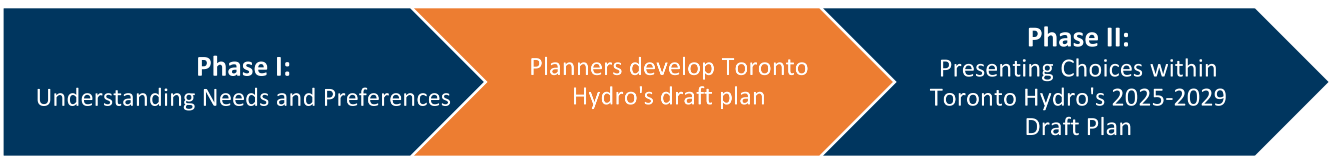
The key objectives of this customer engagement were to:

1. Obtain input as to customers' needs and preferences as they relate to the outcomes and goals that the utility should focus on over the 2025-2029 rate period.

2. Solicit customer feedback on key investment areas based on pacing and bill impact.

3. Assess overall social permission for the draft plan.

INNOVATIVE and Toronto Hydro developed a two-phased engagement approach to achieve these objectives. Following the customer engagement in Phase I, Toronto Hydro developed a draft plan to align with identified customer needs, preferences, and expectations. Afterwards, INNOVATIVE worked with Toronto Hydro to translate the draft plan into engagement materials that a typical customer could understand. INNOVATIVE developed a workbook survey and tested it through a series of focus groups and one-on-one interviews. The workbook was then made available to all customers. It mainly focused on obtaining customer feedback on key investment areas based on pacing and bill impact.



The way customers want to be engaged is evolving. Building off lessons learned from its 2020 rate application customer engagement, Toronto Hydro's approach employed enhanced methods of engagement to better meet evolving expectations. Details of the enhancements are documented at the end of this summary. Some of the key enhancements included:

- Descriptive video narratives to help explain complex themes such as the energy transition, electrification, and grid modernization.
- Providing customers with the *entire* draft plan – including capital expenditures and operating expenses – to get feedback on the trade-offs between prices and other outcomes such as system health, reliability, efficiency, customer services, and the environment.
- An online-centered approach served as the focal point of this customer engagement, which contributed to a successful participation rate and representative sample of customers.

This document contains the results of both phases of customer engagement, with a focus on the generalizable results of the representative customer samples from Phases I and II.

Customer Engagement Key Findings

Phase I: Understanding Needs and Preferences

Based on a review of the OEB Handbook for Utility Rate Applications and previous decisions, the first phase of Toronto Hydro's customer engagement focused on understanding customers' **needs** and **preferences**, defined as follow:

Needs	**Needs questions** focus on understanding the gap between the services and experience customers want and the services and experience customers are receiving.
Preferences	**Preferences questions** focus on customer views about the outcomes the utility should focus on, priorities among those outcomes, and trade-offs illustrated by choices on specific programs or the pacing and prioritization of investments.

The first phase of the customer engagement took place between **November 2021 and March 2022**. In addition to obtaining input as to customers' needs and preferences as they relate to the outcomes and goals that the utility should focus on over the 2025-2029 rate period, it also developed a detailed understanding of the demographic differences between customers with known email addresses (email sample) and the broader customer base (telephone sample). See **Appendix 2.0** for the findings of the comparison.

Customer Engagement Approach

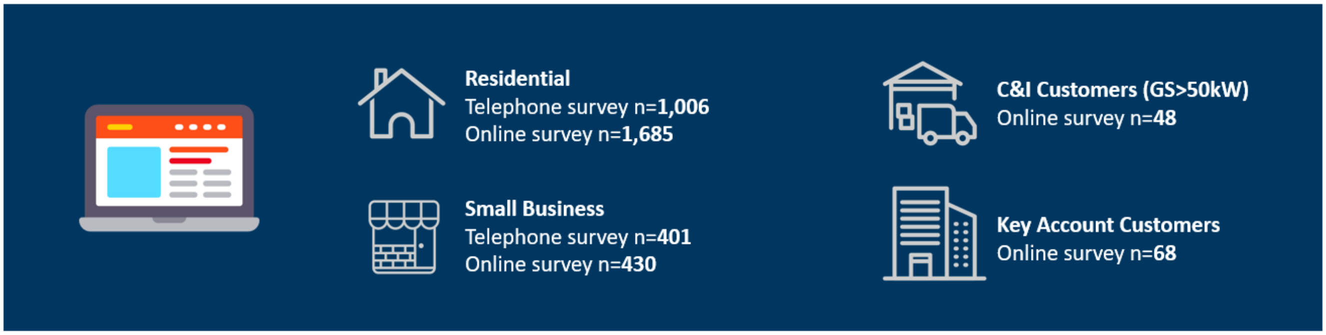
As one of the objectives of Phase I was to obtain input as to customers' needs and preferences, the customer engagement focused on understanding the range of views that exist within the customer base, how different types of customers perceive certain issues, and ultimately deliver a summary or "**Placemat**" that can be used by the planners in developing the draft plan.

This initial phase of engagement was conducted at the beginning of Toronto Hydro's planning cycle to ensure that the draft plan that was subsequently prepared took into consideration the needs and preferences of customers. Building on existing research, INNOVATIVE conducted a series of exploratory focus groups and in-depth interviews with customers.

Between November 2021 and January 2022, an initial round of exploratory qualitative research was conducted amongst residential, small business (GS<50 kW), commercial & industrial (GS 50-999 kW), and key account customers. Through discussing customers' expectations, today and into the future, these focus groups and interviews were able to identify key outcomes and the criteria customers use to measure success. This engagement also provided insights into what customers expect of Toronto Hydro, and what customers prioritize, both in the context of valued customer outcomes, and choices the utility was considering in its 2025-2029 rate application.

Toronto Hydro's customer engagement was an iterative process, wherein each phase and activity informed the next. The results of the exploratory qualitative research (see **Appendix 1.0** for summary) played an important role in informing the questions that were asked in a subsequent series of telephone and online surveys. Results from these subsequent surveys formed the bulk of the insights gathered in Phase I of the customer engagement.

The graphic below summarizes the sample sizes of the surveys conducted by rate class.



This section provides an overview of customer needs, preferences and expectations as gathered through the representative online surveys conducted in Phase I. Full results can be found in **Appendices 3.0 – 6.0.**

Customer Needs

Before understanding customer needs, the survey measured customer satisfaction with the services provided by Toronto Hydro. A large majority of the customers across rate class were satisfied with the services provided.

Overall Satisfaction with Toronto Hydro	Phase I Online Survey Results			
	Residential (n=1,600)	Small Business (n=430)	C&I* (n=48)	Key Accounts (n=68)
Satisfied	77%	76%	90%	76%
Neutral	15%	16%	10%	13%
Dissatisfied	8%	8%	0%	11%

* Interpret C&I results as directional due to the small sample size.

Comprehending customer needs means understanding the gap between the services and experience customers want and the services and experience customers are receiving. To uncover this gap, we asked what Toronto Hydro could do to improve its services.

Overall, the results indicated that Toronto Hydro is meeting its customers' needs. In addition to overall high levels of satisfaction with Toronto Hydro, most customers – across all rate classes – indicated they either *don't know* or *do not believe that there is anything specific* that the utility can do to improve services.

Top-5 Customer Needs (open-ended)	Phase I Online Survey Results			
	Residential (n=1,600)	Small Business (n=430)	C&I (n=48)	Key Accounts (n=68)
1st	**Don't know**	**Don't know**	**Don't know**	**Don't know**
2nd	Nothing	Costs	Reliability	Communications
3rd	Rates	Billing	Communication	Reliability
4th	Climate Action	Nothing	Billing	Customer Service
5th	Communications	Reliability	Customer Service	Billing

* Interpret C&I results as directional due to the small sample size.

Customer Preferences

Based on a preliminary review of Toronto Hydro's past and ongoing customer engagement efforts, as well as the initial exploratory qualitative research, a list of potential utility outcomes was identified as follows:

1. *Delivering electricity at reasonable distribution rates.*
2. *Enabling customers to access new electricity services.*
3. *Ensuring reliable electrical service.*
4. *Ensuring the safety of electricity infrastructure.*
5. *Expanding the electricity grid so that customers can reduce their impact on climate change by using electricity to replace fossil fuels.*
6. *Helping customers with conservation and cost savings.*
7. *Investing in new technology that could help either reduce costs or better help withstand the impacts of adverse weather.*
8. *Minimizing Toronto Hydro's impact on the environment.*
9. *Providing quality customer service and enhanced communications.*
10. *Replacing aging infrastructure that is beyond its useful life.*

General Priorities

Among competing outcomes, *price*, *reliability*, and *investing in new technology* were the top three priorities for both residential and small business customers. Commercial and industrial customers prioritized *rates, reliability,* and *grid capacity expansion.* For key account customers, *reliability, restoration times,* and *infrastructure safety* topped the list of service outcome priorities.

Prioritizing Outcomes	Phase I Online Survey Results			
	Residential (n=1,600)	**Small Business** (n=430)	**C&I** (n=48)	**Key Accounts** (n=68)
(%) indicates total percentage by rate class that place specific priority in their top 3 outcomes	**Reasonable rates (46%)**	**Reasonable rates (54%)**	**Reasonable rates (50%)**	**Reliable service including power quality (69%)**
	Reliable service (45%)	**Invest in new technology (40%)** Reduce costs Withstand adverse weather	**Reliable service (48%)**	**Outage restoration in extreme weather (52%)**
	Invest in new technology (45%) Reduce costs Withstand adverse weather	**Reliable service (36%)**	**Grid capacity expansion for climate action (33%)**	**Safety of infrastructure (39%)**

For residential customers, *rates*, *reliability*, and *investing in technology* were all tied as their top priorities. Traditionally, rates and reliability were the top priorities for the residential rate class. As for the interest in investing in technology to reduce costs and withstand adverse weather, many customers in this engagement expressed an interest in making long-term investments that not only could improve reliability and lower rates, but also address climate change.

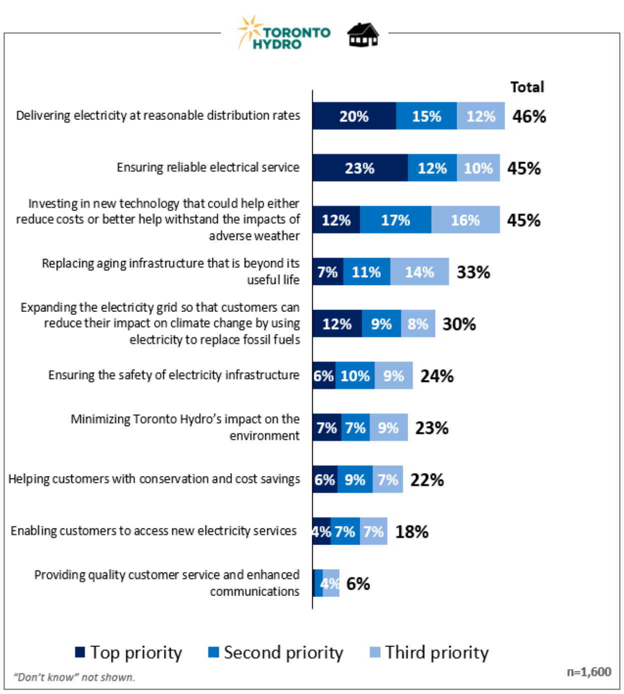
For small business customers, "reasonable rates" was cited as their top priority. Small business customers appeared to be more price-sensitive than residential customers. Reasonable rates stood out as the top priority by a considerable margin compared to other priorities. The next priority was investing in new technology to reduce costs and withstand adverse weather. Reliability was the third highest priority.

For C&I customers, rates and reliability were tied as their top priorities. C&I customers prioritized both rates and reliability, like residential customers. Other outcome priorities were substantially less important to this rate class.

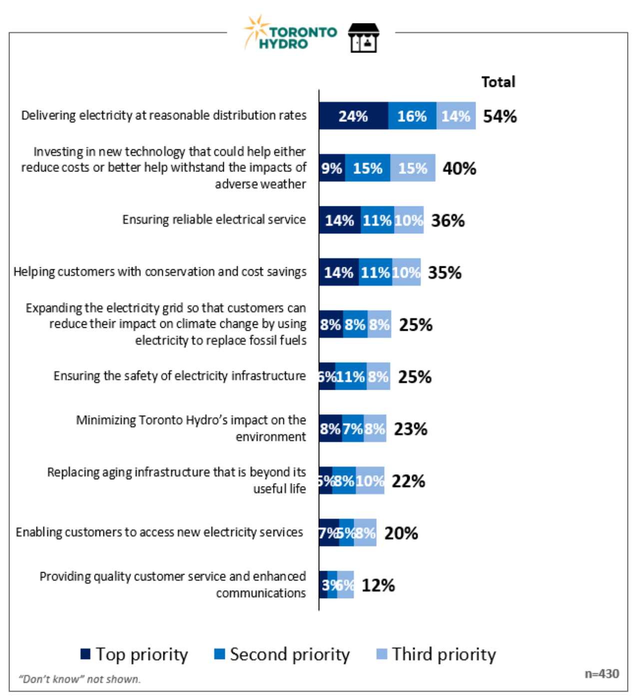
For key account customers, reliability was cited as their top priority. Key account customers prioritized reliability more than any other outcome priorities given their sensitivity to power quality issues. Without reliable electrical service, these customers cannot operate efficiently or safely. Other key outcomes these customers valued was Toronto Hydro's ability to prevent or reduce outage restoration time caused by extreme weather and ensuring safety of the infrastructure. The importance of these other outcome priorities appeared to be related to a need for reliable services so these customers can carry on their operations with minimal disruptions. Other priorities were substantially less important to Toronto Hydro's key account rate class.

The charts below detail outcome priorities across Toronto Hydro's rate classes.

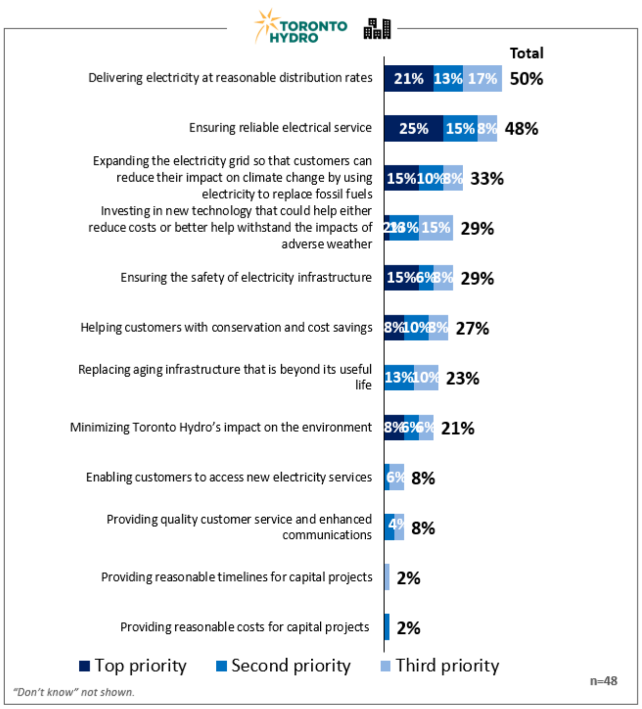
Residential



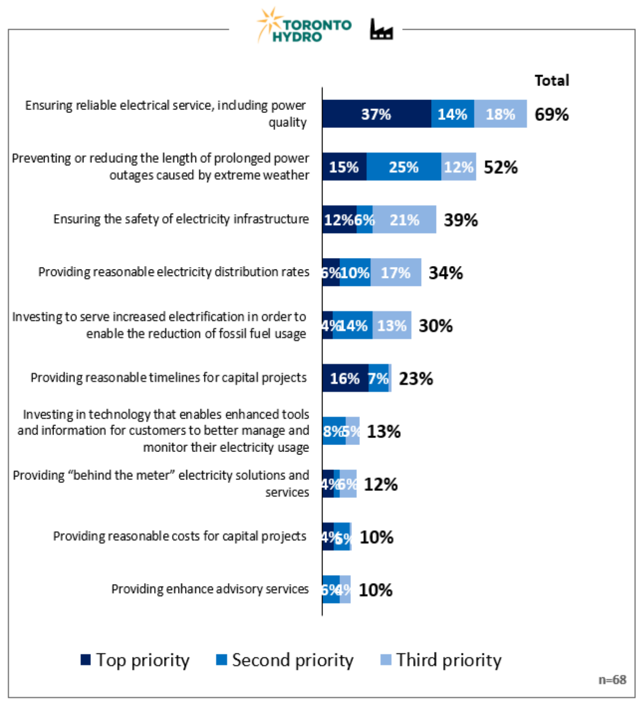
Small Business



Commercial & Industrial



Key Accounts



In addition to identifying top customer needs and general priorities, other preferences around **reliability**, **grid modernization**, **climate action** and **social equity** were measured.

Prioritizing Reliability Investments

In terms of prioritizing reliability investments, residential and small business customers were primarily interested in reducing both the length of time and number of power outages caused by extreme weather. C&I and key account customers were less concerned about outages caused by extreme weather and put a greater priority on investments that generally reduce the number and length of regular outages. Key account customers also put relatively high prioritization on improving power quality.

Reliability	Phase I Online Survey Results			
	Residential (n=1,600)	**Small Business** (n=430)	**C&I** (n=48)	**Key Accounts** (n=68)
(%) indicates total percentage by rate class that place specific priority in their top 3 outcomes	**Reduce restoration time in extreme weather (70%)**	**Reduce restoration time in extreme weather (60%)**	**Reduce restoration time (63%)**	**Reduce outages (78%)**
	Reduce outages in extreme weather (57%)	**Reduce outages (57%)**	**Reduce outages (56%)**	**Improve power quality (73%)**
	Reduce outages (56%)	**Reduce outages in extreme weather (56%)**	**Reduce outages in extreme weather (54%)**	**Reduce restoration time (59%)**

Prioritizing Technology Investments

In terms of prioritizing grid modernization, residential, small business, C&I customers all ranked investments in technologies that reduce customers costs highest, followed by investments in technologies that reduce the environmental impact of Toronto Hydro's operations. Key account customers were not asked these questions.

Grid Modernization	Phase I Online Survey Results			
	Residential (n=1,600)	**Small Business** (n=430)	**C&I** (n=48)	**Key Accounts** (n=68)
(%) indicates total percentage by rate class that place specific priority in their top 3 outcomes	**Find efficiencies and reduce customer costs (79%)**	**Find efficiencies and reduce customer costs (79%)**	**Find efficiencies and reduce customer costs (79%)**	n/a
	Reduce environmental impact of internal operations (56%)	**Reduce environmental impact of internal operations (51%)**	**Reduce environmental impact of internal operations (52%)**	n/a
	Reduce both length and number of outages (54%)	**Help customers better manage electricity usage (50%)**	**Reduce both length and number of outages (54%)**	n/a

Support for Core Investment Priorities

The Phase I customer engagement surveys revealed that a majority of customers support investments in core aspects of Toronto Hydro's distribution system, even if that meant electricity bills would need to increase.

Investment Trade-off (% total support)	Residential (n=1,600)	Small Business (n=430)	C&I* (n=48)	Key Accounts (n=68)
System Renewal Toronto Hydro should invest what it takes to replace the system's aging infrastructure to maintain system reliability.	**76%**	**69%**	**79%**	**87%**
General Plant Toronto Hydro should make the investments necessary to ensure its staff have the equipment and IT and computer systems they need.	**68%**	**59%**	**56%**	**68%**
System Capacity Toronto Hydro should proactively invest in system capacity to ensure customers in high growth areas do not experience a decrease in reliability.	**66%**	**61%**	**73%**	**82%**

* Interpret C&I results as directional due to small sample size.

Support for Grid Modernization

The **Canadian Net-Zero Emissions Accountability Act**, which became law on June 29, 2021, enshrines in legislation Canada's commitment to achieve net-zero emissions by 2050. Toronto Hydro's shareholder, the **City of Toronto**, has set even more ambitious targets to reduce community-wide greenhouse gas (GHG) emissions in Toronto to net zero by 2040 – 10 years earlier than initially proposed.

Overhauling the City of Toronto's energy infrastructure in a relatively short amount of time represents an unprecedented technical challenge that will cost billions of dollars over the coming decades.

As such, a key component of Toronto Hydro's Phase I customer engagement was to understand customer priorities as they pertain to the energy transition and electrification.

Across all rate classes, customers were supportive of Toronto Hydro exploring investments in new technologies that may increase rates, so long as the benefits of these investments are clearly articulated.

Furthermore, customers were supportive of the idea of Toronto Hydro exploring electrification investments today that help prepare for the future, even if the benefits might not be immediately realized.

Grid Modernization (% total support)	Residential (n=1,600)	Small Business (n=430)	C&I* (n=48)	Key Accounts (n=68)
System Enhancements If Toronto Hydro is clear about the cost to customers and the potential benefits, they should explore new technologies that would make the system better, even if it could increase customer rates.	**63%**	**59%**	**75%**	**76%**
Future Benefits If Toronto Hydro is clear about the cost to customers and the potential benefits, they should explore new technologies that might not provide immediate benefit but will in the future.	**71%**	**67%**	**73%**	**78%**

***** Interpret C&I results as directional due to the small sample size.

Support for Climate Action

A key part of the City of Toronto's "**TransformTO Net Zero Strategy**" requires switching from gasoline in the transportation system and natural gas in home/building heating to electricity-powered alternatives, adopting more distributed energy resources (DERs) and using energy storage systems.

These initiatives will require Toronto Hydro to expand and modernize its existing electricity distribution grid to ensure that it can help achieve the City's targets.

Another key component of Toronto Hydro's Phase I customer engagement was to understand customers' willingness to pay more to help meet future emission reduction targets and support financial assistance programs for low-income customers.

Nearly half of all Toronto Hydro customers (and a majority of key account customers) said they support a specific charge on their monthly bill to help Toronto meet its future emissions targets, even if their electricity bill grows by between 2.5% and 10% a year for the next 10 years (5% for C&I and key accounts).

Customers were split on whether they would be willing to pay more to provide financial assistance to make electricity bills more affordable for low-income customers.

It should be noted that an estimated 64% of Toronto Hydro's key account customers had "net zero" targets or carbon reduction initiatives in place at the time of this survey in early 2022.

Climate Action (% total support)		**Residential** (n=1,600)	**Small Business** (n=430)	**C&I*** (n=48)	**Key Accounts** (n=68)
	**Electrification** Support for a specific charge on monthly bill to help Toronto **meet its future emissions targets** if your electricity bill will grow by… *2.5% to 10% annually / 5% for C&I and key accounts*.	**48%**	**47%**	**44%**	**53%**
	**Social Equity** Would you be willing to **pay an extra few dollars per month** for Toronto Hydro to provide financial assistance to make electricity bills more affordable for low-income customers?	**41%**	**42%**	**52%**	**N/A**

* Interpret C&I results as directional due to the small sample size.

Delivery of Phase I Findings

The findings from these surveys are also summarized in the *"Customer Engagement: Needs and Preferences Planning Placemat"* (see **Appendix 7.0**) which was shared with Toronto Hydro planners, so that customer feedback could be considered by them as an input in the early stages of the planning process.

Phase II: Presenting Choices within the 2025-29 Draft Plan

Following the findings of Phase I, Toronto Hydro began developing a draft plan to align with identified customer needs, preferences, and expectations. Toronto Hydro engaged again with INNOVATIVE to design, execute, and document the results of a second customer engagement based on that plan.

The purpose this second phase of engagement was to:

1. Solicit customer feedback on key investment areas based on pacing and bill impact.
2. Assess overall social permission for the draft plan.

Customer Engagement Approach

INNOVATIVE worked with Toronto Hydro to understand the utility's draft plan, where there was optionality within the plan, and what implications these decisions would have for customers, including service levels and overall cost. In late 2022, the draft plan was then translated into engagement materials that a typical customer could understand. INNOVATIVE developed a workbook survey and tested it through a series of focus groups and one-on-one interviews. The survey was then made available to all customers in the spring of 2023.

Using workbook surveys, customers were re-engaged to solicit customer feedback on Toronto Hydro's draft plan and explore specific trade-offs in relation to seven key investment areas and the associated bill impacts, as well as the pacing and prioritization of investments.

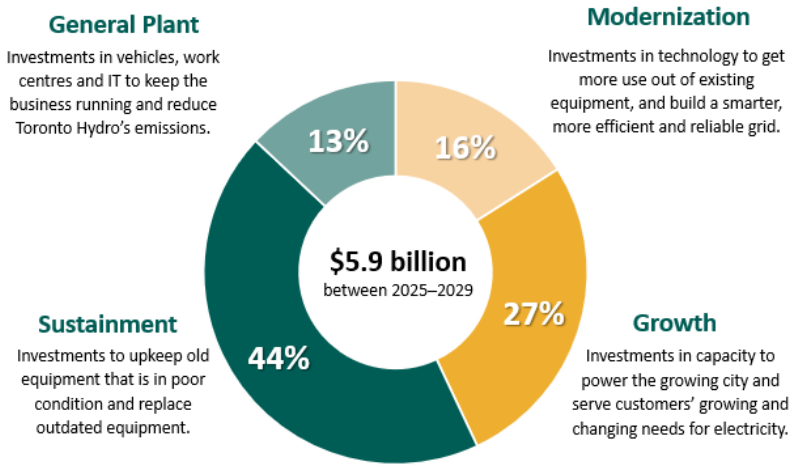
The following section summarizes customer feedback from this online survey among residential, small business (GS<50 kW), commercial and industrial (GS 50-999 kW), and key account customers.

Key account customers consist of GS 1,000-4,999 kW customers with either a single account, or multiple accounts (which together constitute large load volume) and large use customers with demand of 5,000 kW+.

The graphic below summarizes the sample sizes of this engagement by rate class.

Core Investment Categories

Toronto Hydro's 2025–2029 draft plan was made up of four spending categories: *Modernization, Growth, Sustainment,* and *General Plant*.



Within these four categories, customers were asked to make choices on trade-offs consisting of seven key investment areas:

		Sustainment:	*General Plant:*
1. Modernization	**2. Growth**	**3. System Reliability**	**6. Running the Business**
		4. Grid Stewardship	**7. Decarbonization**
		5. Standardization	

Social Permission

An average of 84% of customers, across all rate classes, gave Toronto Hydro social permission to proceed with its draft plan.

These customers provided social permission by indicating either:

1. They think Toronto Hydro should accelerate spending beyond the level in the draft plan to deliver better system outcomes.
2. They support the proposed rate increase that is reflected in the draft plan, or
3. They feel that the proposed rate increase in the draft plan is necessary, even though they don't like the proposed increase.

Together, these three customer choices constitute what we define as "social permission".

Overall Social Permission by Rate Class

Rate Class	Residential	Small Business	C&I	Key Accounts*	Average across rate classes
Sample Size	n = 32,187	n = 695	n = 264	n = 52	
Proposed Rate Impact (increase by 2029)	$17.18	$50.88	$870.85	$7,480.60 (KA) / $39,221.50 (LU)	
Accelerate Spending	18%	14%	15%	26%	18%
Support Proposed Plan	24%	24%	23%	38%	27%
Necessary to Maintain Grid	38%	39%	44%	32%	38%
Scale Back Plan	14%	16%	11%	3%	11%
Don't Know	6%	7%	7%	2%	6%
Social Permission (Accelerate + Support + Necessary)	**80%**	**77%**	**82%**	**96%**	**84%**

* "**Key Accounts**" customers consist of GS 1,000-4,999 kW customers with either a single account, or multiple accounts (which together constitute large load volume) and large use customers with demand of 5,000 kW+.

In addition to assessing the level of social permission customers gave to Toronto Hydro's draft plan, the survey also gauged customer preferences on specific trade-offs within the seven key investment areas. Within each investment area, customers had a range of different preferences around the draft plan. To provide a general direction of customer preference for each investment area, customer responses were grouped to **three** categories depending on the degree to which they would like to dial the draft plan up or down. The three categories were: Above Plan, On Plan, and Below Plan. The definition of these categories is detailed in **Appendix 8.0**.

At a high-level, customer preferences on specific trade-offs can be summarized as follows:

- A majority of **key account customers** felt Toronto Hydro should spend on plan or above plan within each of the seven key investment areas. For **residential customers**, either a majority or near-majority felt Toronto Hydro should spend on plan or above plan within the seven key investment areas. The percentage of customers indicating Toronto Hydro should spend on plan or above plan, within the seven key investment areas, was somewhat lower among **commercial and industrial customers**, and lowest among **small business customers**.
- Customers were generally in-line with Toronto Hydro's draft plan (on plan), or in some instances preferred a higher level of spending (above plan), in the areas of **Modernization**, **Stewardship** and **Standardization**.
- Spending preferences were relatively lower in other areas: **Growth**, **Reliability**, and **General Plant** investments (including **Running the Business** and **Decarbonization**).

The detailed results by rate class can be found in **Appendices 9.0** to **12.0**.

While customers who opted for dialing the draft plan up were more likely to give social permission to the draft plan and vice versa, it is worth exploring the level of social permission from customers who opted for dialing the draft plan *down*.

The tables below show the level of social permission received from customers in the three categories (Above Plan, On Plan, and Below Plan) for each investment area. The results across rate class showed that:

- A vast majority of customers regardless of rate class who preferred dialing the draft plan up (in the above plan category) gave social permission to the draft plan.
- Similarly, a large majority of those who opted for the draft (in the on plan category) also gave social permission to the draft plan.
- While the level of social permission received among customers who preferred dialing the draft plan down (in the below plan category) was the lowest of the three categories, a majority of customers from this category nonetheless gave social permission for proceeding with the draft plan (in that they still felt the rate increase was necessary). This holds true across all rate classes.

Residential

Social Permission (%)	Three Categories of Customer Preference		
	Above Plan	On Plan	Below Plan
Overall Social Permission		**80%**	
Modernization	95%	91%	62%
Growth	96%	94%	69%
Reliability	95%	93%	69%
Stewardship	94%	90%	62%
Standardization	94%	92%	65%
Running the Business	96%	94%	69%
Decarbonization	94%	92%	68%

Small Business

Social Permission (%)	Three Categories of Customer Preference		
	Above Plan	On Plan	Below Plan
Overall Social Permission		**77%**	
Modernization	94%	89%	64%
Growth	96%	91%	69%
Reliability	95%	91%	69%
Stewardship	91%	89%	63%
Standardization	90%	91%	64%
Running the Business	88%	95%	68%
Decarbonization	90%	89%	68%

Commercial & Industrial

Social Permission (%)	Three Categories of Customer Preference		
	Above Plan	On Plan	Below Plan
Overall Social Permission		**82%**	
Modernization	91%	85%	75%
Growth	88%	93%	76%
Reliability	86%	92%	77%
Stewardship	89%	91%	73%
Standardization	93%	90%	73%
Running the Business	98%	92%	75%
Decarbonization	91%	95%	75%

Key Accounts

Due to the small sample size of key account customers as well as the high level of social permission to the draft plan, the study did not divide key account customers into segments based on their spending preferences to explore the connection with the level of social permission.

LEAP Qualified Residential Customers

While lower than the average residential customer, 72% of Low-income Energy Assistance Program (LEAP) qualified residential customers gave Toronto Hydro social permission to proceed with its draft plan.

The level of social permission was similar among customers who did not disclose their household income after tax and household size in the survey.

The level of social permission among residential customers whose household income after tax is less than $52,000 but who do not qualify for LEAP are on par with the residential customers overall.

Social Permission by Residential Rate Class

	Residential Overall	LEAP Qualification			
		LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Accelerate Spending	18%	16%	14%	22%	11%
Support Proposed Plan	24%	18%	25%	28%	18%
Necessary to Maintain Grid	38%	38%	40%	36%	41%
Scale Back Plan	14%	16%	14%	11%	21%
Don't Know	6%	13%	7%	3%	9%
Social Permission (Accelerate + Support + Necessary)	**80%**	**72%**	**79%**	**86%**	**71%**

Delivery of Phase II Findings

Following Phase II, findings from this phase were provided to Toronto Hydro so they could be considered in finalizing the draft plan.

Customer Engagement Coverage & Enhancements

The following section provides details on the expanded coverage and enhancements applied in Phase I and Phase II of Toronto Hydro's customer engagement.

Comparing Coverage to Previous Customer Engagement

The number of completed workbooks tripled compared to the last customer engagement among residential and small business customers, resulting in approximately 33,000 completed workbooks.

C&I customers were not surveyed online in the last engagement. As such a comparison was not made.

While the number of completed workbooks might seem relatively low among key account customers (n=52), it represents 16% of the key account customer base. Both the number of completed key account workbooks and the response rate have increased over 40% compared to the last engagement.

Rate Class	Current Engagement	Change of Complete Rate from last Application	Last Engagement	
	Online		Online	Telephone
Residential	n=32,187	↑ 217%	n=10,165	n=600
Small Business	n=695	↑ 284%	n=181	n=215
C&I	n=264	n/a	n/a	n=202
Key Accounts	n=52 (16% response rate)	↑ 41%	n=37 (11% response rate)	n/a

Enhancements to Toronto Hydro's Customer Engagement

New elements in Toronto Hydro's customer engagement included:

Reference surveys: To prepare for a shift from a telephone-centric engagement with low-volume customers to an online methodology, INNOVATIVE introduced two concurrent surveys; one using a telephone and the other an online methodology. This exercise was to better understand the composition of the customer base and to ensure the results of online surveys were representative of the customers.

Video narratives: A series of overview videos were embedded in the online workbook to help explain complex subjects, such as electrification and investments in modernization.

Investment categories: Toronto Hydro organized its plan around four investment categories. Within these categories, the survey further specified seven key areas to help customers make choices. These investment areas were designed to solicit feedback about customer preferences and trade-offs between price and other key outcomes.

Total impact of investment categories: The seven investment areas presented the total 5-year draft plan including both capital expenditures and operating expenses. This way the engagement was able to connect the bill impact to each of the seven investment areas in a transparent fashion. Traditionally, the engagement focused on capital expenditures only.

Customer outcomes: When soliciting feedback about customer preferences, the survey laid out how the size of investments connected to outcomes in a grid format. Each of the seven key investment areas had a description of multiple outcomes. This grid layout allowed customers to better understand the trade-offs between price and the different outcomes in a clear and meaningful way.

Scaled responses: For each key investment area, the survey provided customers with a sliding scale that gave customers flexibility to dial the draft plan up or down to indicate their preference between price and outcomes.

Dynamic bill calculator: Customers were able to see changes to their bill in real-time based on their selections. This allowed customers to build a bill that better reflected their preferences and priorities relative to the draft plan.

Enhanced participation: A more extensive effort was made to increase participation in the online survey. These efforts included using the latest customer list and encouraging participation by having Toronto Hydro widely promote the survey through both internal and external communications channels. As part of the promotion of the survey, creative incentives were used to help increase response rates. This resulted in over 33,000 completed workbooks (over three times as many completed workbooks from the 2020 Rate Application customer engagement).

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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CONFIDENTIAL

APPENDIX 01

Phase I

Customer Engagement
Qualitative Research

November 2, 2023

STRICTLY CONFIDENTIAL

Customer Engagement

2025-2029 CIR Application

November 2, 2023

Confidentiality

This Report and all of the information and data contained within it may not be released, shared or otherwise disclosed to any other party, without the prior, written consent of Toronto Hydro Electric-System Ltd. (THESL).

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for THESL. The conclusions drawn and opinions expressed are those of the authors.

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Table of Contents

1. Introduction

Innovative Research Group Inc. (INNOVATIVE) was engaged by Toronto Hydro in 2021 to design, execute, and document the results of its customer engagement, as part of Toronto Hydro's Rate Application to the Ontario Energy Board (OEB) for the years 2025 to 2029.

The primary goal of Phase I focus groups and the interviews was to explore customer needs and preferences with regards to the electricity service they receive from Toronto Hydro. This research also identified gaps in the services and experience customers want and the services they are currently receiving.

As part of this engagement, a series of focus groups was held among Toronto Hydro Low-Volume customers (e.g. residential and small business customers) in November 2021 and among commercial and industrial (C&I) customers in December 2021 via the Zoom videoconference platform. A series of in-depth interviews was also held among Toronto Hydro key account customers in December 2021 and January 2022, also via Zoom.

Focus Group Structure

The focus groups were facilitated by a trained moderator and followed a structured discussion guide. All groups began with a discussion about what Toronto Hydro does, Toronto Hydro's share of customers monthly electricity bill, and how Toronto Hydro fits into Ontario's electricity system. To aid in that discussion, a handout was used and displayed to customers through screensharing (see *Section 5: Focus Group Stimulus*).

Customers were then asked about their level of satisfaction with Toronto Hydro's services, and what Toronto Hydro could do to better serve them as their electricity distributor. The groups went on to discuss what it means for Toronto Hydro to be doing a good or bad job.

Customers from the first two nights were asked to think about future challenges that will face Toronto Hydro. A list of planning challenges was also shown to customers. However, given there was a significant overlap between this discussion and the following one about outcomes, this discussion was subsumed as part of the outcomes discussion with the remaining groups.

The groups then moved on to discussing key outcomes they expect from a utility. A list of outcomes was provided to facilitate the discussion. This led into a discussion of trade-offs, including whether customers would be willing to pay more to help Toronto Hydro prepare for future needs and challenges.

This report summarizes key findings and offers observations. Respondent verbatim responses are in italics. In general, our approach in reporting is to allow the respondents to be heard as much as possible, utilizing representative verbatim comments, offering interpretation and comment where necessary.

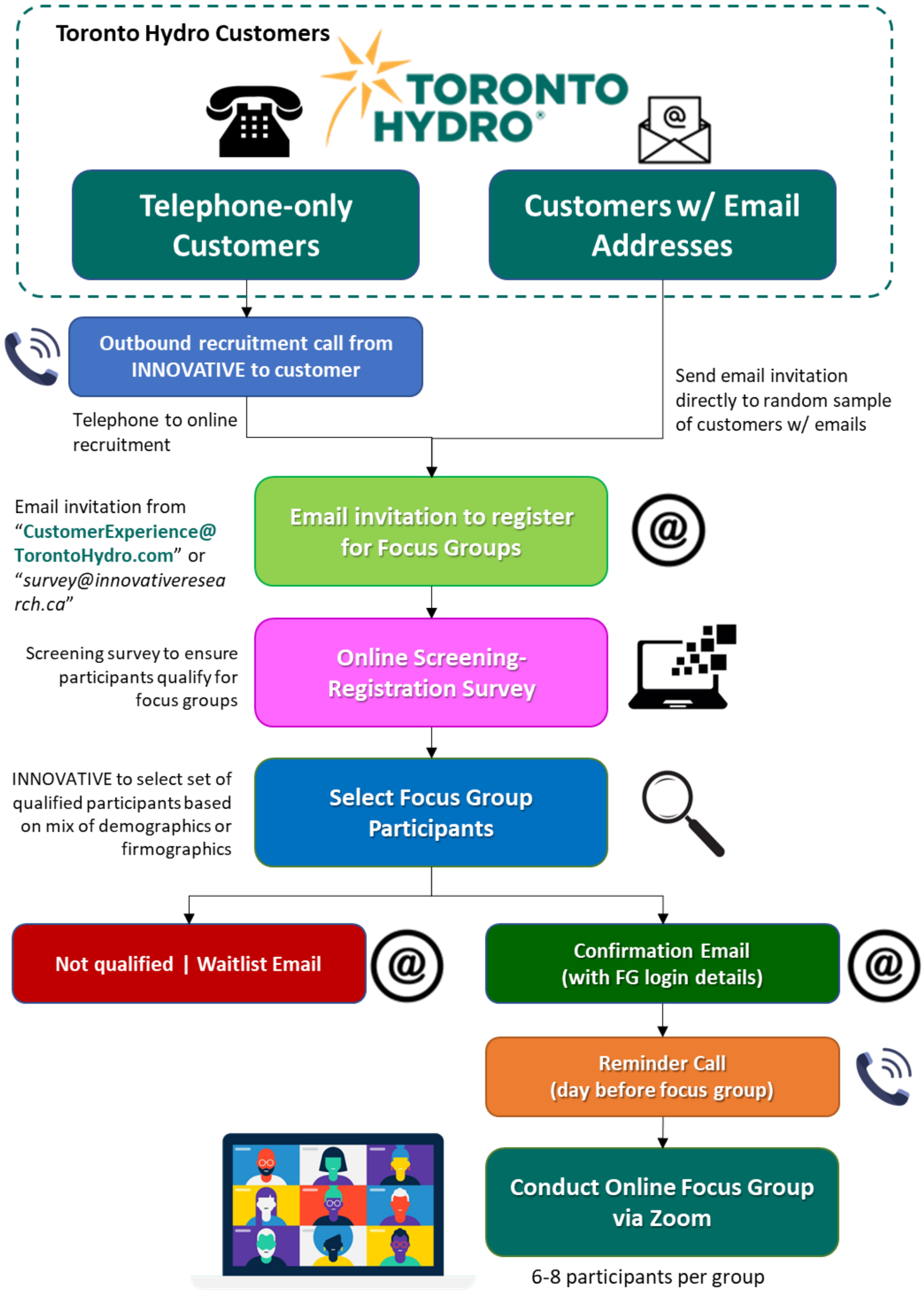
Interpreting Focus Groups and Interview Findings

Qualitative research does not hold the same statistical reliability or representativeness of quantitative research. It is an exploratory research technique that should be used for strategic direction only.

In focus group research, the value of the findings lies in the *depth* and *range* of information provided by the customers, rather than in the *number* of individuals holding each view. References in this report such as "most" or "some" customers cannot be projected to the full population. Only a large sample, quantitative survey would be accurately projectable to the full population.

Qualitative Research Customer Recruitment Process

Low-volume and C&I customers were randomly recruited to participate in the focus groups using both telephone and email methodologies as illustrated in the diagram below. Key account customers were recruited exclusively via email invitations from a list of customers provided by Toronto Hydro.



2. Low-Volume Customer Focus Groups

2.1 Methodology

Eight focus groups were held with low-volume customers (residential and small business customers) from each of the following areas below.

Date	Focus Group Times	Number of Participants	Customer Type	Service Area
November 18th, 2021	5:00 pm – 7:00 pm	6 participants	Small business	Etobicoke/ York
	7:00 pm – 9:00 pm	7 participants	Residential	
November 22nd, 2021	5:00 pm – 7:00 pm	6 participants	Small business	North York
	7:00 pm – 9:00 pm	9 participants	Residential	
November 23rd, 2021	5:00 pm – 7:00 pm	8 participants	Small business	Scarborough
	7:00 pm – 9:00 pm	7 participants	Residential	
November 24th, 2021	5:00 pm – 7:00 pm	6 participants	Small business	Toronto/ East York
	7:00 pm – 9:00 pm	6 participants	Residential	

Participants were recruited randomly over the phone and by e-mail, using customer lists provided by Toronto Hydro. Small business participants received a $150 cash incentive as compensation for their time, while residential customers received $100.

2.2 Key Findings

Customers were vaguely familiar with the role Toronto Hydro plays in Ontario's electricity system.

Most customers were able to identify that Toronto Hydro is responsible for electricity distribution. As part of operating the distribution system, maintenance of infrastructure was mentioned in most groups. Only a few customers had a more detailed understanding of Toronto Hydro's role within Ontario's electricity system.

Furthermore, customers were unfamiliar with the Ontario Energy Board (OEB), and the rate application process that regulated utilities must go through. Most were not aware that the OEB regulates electricity prices in Ontario, including Toronto Hydro's rates.

Most customers expect reliable electricity first and foremost.

When asked about their current needs and expectations regarding their electricity service, the main topic that arose unaided was reliability. Furthermore, customers mentioned a desire for lower electricity bills, followed by improved customer service.

Customers who are more dependent on electricity were not willing to sacrifice their service; these customers prefer Toronto Hydro to be focused on maintaining infrastructure in order to sustain or improve reliability, regardless of a rate increase. Only a few were willing to have less reliable service in exchange for a rate reduction.

Most customers are supportive of additional measures to support electrification and fight climate change.

When talking specifically about measures to prepare for electrification, most were willing to pay more on their bill, although there were also those who were less willing to pay more for this purpose. Small business customers were more likely to say they shouldn't be the ones paying more.

2.3 Detailed Findings

2.3.1 General Awareness

Most participants were aware that Toronto Hydro delivers electricity. As part of operating the distribution system, maintenance of the distribution infrastructure was explicitly mentioned in most groups. Only a few were also aware that Toronto Hydro is not responsible for producing electricity and how Ontario's electricity system works at a high level.

> *"So essentially, it's ensuring delivery of electricity to homes. It's billing its service and maintenance of those lines."*

> *"I don't think Toronto Hydro produces electricity. I'm not totally sure on the structure. But I know, there's like the Bruce Power, the people who generate the power, and then it flows through lines by maybe Hydro One, and then all the individual utilities distribute the power amongst whatever regions they have."*

However, there was some confusion among participants with respect to the specific role Toronto Hydro plays in Ontario's electricity system. Some participants were unsure if Toronto Hydro is also responsible for the generation of electricity.

> *"I don't think that Toronto Hydro generates. I'm not sure, I have no idea about that. They could or they could not, I have no idea."*

Having explained how Toronto Hydro fits into the electricity system in Ontario and shown how the payments they make to Toronto Hydro are allocated to the electricity system (see Section 5 for the information shared), there was still confusion over Toronto Hydro's ownership structure and revenue expectations. Concerns were raised about how much profit the utility could make and where it was being allocated.

> *"The whole Toronto Hydro system, is it a private company or something or is it government funded?"*

Furthermore, most participants were unfamiliar with the Ontario Energy Board (OEB), and the rate application process that regulated utilities must go through. Most were not aware that the OEB regulates electricity prices in Ontario, including Toronto Hydro's rates.

> *"Who regulates Toronto Hydro? Hydro One? OPG?"*

2.3.2 Needs and Expectations

Satisfaction levels

Having discussed the role Toronto Hydro plays in the electricity system and what they pay for to the electricity system, participants were asked about their current satisfaction level regarding their electricity service. Most participants were satisfied with the services. They were generally satisfied with reliability and customer services.

> *"Just like having said my lights turn on when I turn on the switch, I haven't had any issues. I've had to deal with them on the phone. They are okay. They're pleasant. No problem so far."*

However, some participants had concerns with reliability, communication related to outages, customer service more broadly, and cost.

Reliability

Reliability was the top need that came up unaided across all groups. Generally, participants were satisfied with reliability, and expected that to continue or be improved. Some also pointed out that they had noticed improvements in reliability and restoration times recently.

> *"I think the diminishing frequency of [outages] makes us more satisfied. And seeing when there are outages, even if it's not in my own neighborhood, seeing how dedicated the teams are to get everyone online… I think that increases satisfaction as well showing that you're valued as a client."*

Having said that, some participants noted specific problems with reliability, especially in particular neighbourhoods compared to others.

> *"I have to say that I'm not happy at all. Over here, where we are right now, the quality of the service has been awful, right from the start. And I find that almost everything of importance in this place is running on a battery backup because otherwise, it's just not good."*

> *"I feel like on a big kind of winter storm, windstorm, [the electricity] kind of flicks in and out. Especially working from home the last couple of years, I just want to make sure that we could really rely on it, but the power in my neighborhood flicks on like in the last month, three or four times."*

Communication

On the outage front, participants expressed a range of satisfaction levels. Many were quite happy with the speed at which outages were resolved. Some participants also found the outage map on Toronto Hydro's website useful. It provides key information and updates about restoration times during outages.

> *"I really like that online, you could just look at the map, like the outage map, and it's pretty accurate."*

However, a significant portion of the customers were dissatisfied with the level of communication on updates during outages, especially by phone. Difficulty getting in touch with Toronto Hydro during outages was a common issue.

> *"When we immediately called, at first there was no knowledge of what happened, which is understandable. Yeah, and it took probably about half an hour before we got any satisfaction in terms of yes, the power in your particular block is gone."*

Customer Service

Some participants mentioned concerns with long response or wait times to receive services and the right information. This was a particular concern for small business customers.

> *"Getting a new connection is a really big headache, especially if it has to be a high voltage service. We waited almost five, six weeks to get a new connection, which is I think, very slow… also, for a business like us where we are trying to compete with other businesses, time delay is gonna cost us a lot. I mean, we pretty much lost a client… I don't understand why we had to wait for three weeks to get 20 minutes [of work]."*

Cost

The other top issue mentioned was the cost of electricity. Many were concerned about the rising electricity bill. For some participants, the priority was to keep cost as low as possible, even if that would mean lowering expectations for power quality and reliability.

> *"You know, I've watched my bill climb steadily over the last years. This is something that I find alarming."*

> *"They could probably cut costs. I live in an area where I've never had an issue with any power outages or anything of that nature. [When asked if they would be willing to have an outage or two if they could reduce their bills] Yeah, I don't see it being the end of the world. That wouldn't be an issue for me. I don't spend a lot of time using a lot of electricity. I'm not on a computer. I don't work from home. I don't have kids. I wouldn't see it as a problem… If you're gonna have an outage in January, February, when it's freezing, it probably wouldn't be ideal. But I'm sure there's way that they can cut costs."*

2.3.3 How Toronto Hydro can serve its customers better

When asked how Toronto Hydro could serve them better, participants tended to follow up on issues that they first mentioned when asked whether they were satisfied or dissatisfied, especially on cost and customer service. The topic of reliability was mentioned by fewer participants relative to cost and customer service.

New issues such as billing and concern for the environment emerged in this discussion. Some customers expected a better billing experience and Toronto Hydro to help customers make more environmentally conscious choices.

Cost

Reducing the cost of electricity was mentioned in most of groups. Some felt Toronto Hydro can help them find efficiencies, provide tools to monitor their usage, and provide information to compare different billing methods to keep their costs low.

> *"As a business owner, or as even if a consumer it comes down to the bottom line, how can we reduce that number on our bill. There's many ways about it. There's both responsibility of the user, the consumer, and also, hopefully, programs and campaigns on Toronto Hydro's side, for example recommendation on how to reduce your energy consumption."*

> *"I think if they were more transparent about how individual families could cut costs, I think that's particularly important in like going through COVID, and people working from home where I'm sure people's electricity bills have gone up, because of increased daytime usage, etc.*

So, if there were more transparent ways [to see] what your usage is and how you could do things, I think that could make a big difference."

"I can suggest that given that there's an option for time of use and tiered rates, why doesn't Hydro just come out and do a comparison from each of us. Tell us which is more beneficial, as opposed to making us do all the work. My suspicion is that we've been using less electricity as a result of the efficiencies, the bulbs, the awareness of when time of use is cheaper, but at the same time, the bills are still going up higher. And that doesn't seem to make a lot of sense."

While suggestions to cut costs were made, one participant expressed appreciation of how Toronto Hydro helped their customers manage their bills during the pandemic by providing different pricing options.

"I like how they provided us a means of, either you can choose a flat rate that's higher and just stick to that, or during the COVID they came up with some innovative billing methods."

Customer Service

Participants mentioned concerns with customer service in terms of response times and the information they received.

"I think they need to have a better communication, because whenever we try to reach out for anything, it was hard to get response… As a business owner, we have other things to take care of. At the same time, we should not be spending more time trying to reach out and it's not easy to reach out to somebody over the phone when they are working from home. My operations manager, she spent at least easily every day, almost two to three hours on the phone, trying to get answers. So that's a lot of our spending on something which we should not."

Many small business customers also expressed a desire for Toronto Hydro to communicate with them more proactively and more transparently. They felt the conversations can help Toronto Hydro better understand their customer needs and the neighbourhoods they serve.

"Toronto Hydro could build something where they get to understand us as customers more. There should be a [method] where it will help them decide when to shut an area down to upgrade. So, you're not hurting the people that are paying the bills."

Reliability

Only some participants mentioned reliability as an area for improvement. To protect themselves from service interruption, some small business customers would be willing to pay more to trade reliability. One participant even reported a desire to pay into a plan that could mitigate loss during outages.

"I'd love to be able to pay into an insurance plan. I don't mind it being on my electric bill, if there were a possibility… that they were allowed to start a fund [that would help businesses in unexpected times of need]. I have no problem with that as a business person."

Billing

A few customers mentioned a need to improve their billing experiences, from the ease of accessing their bills to paying their bills online.

> *"Alternative methods of payment would be great. Instead of the sort of direct debit they have currently... You don't have to [use credit card] if you don't want to, and if you do you pay the cost."*
>
> *"I know for preauthorized debit, you still have to fax that form in, which is, given the fact it's 2021, you know, not the most ideal thing."*

Environment

There were several mentions of expecting Toronto Hydro to help customers make more environmentally conscious choices.

> *"Toronto Hydro should encourage people to use natural gas less either by marketing, or just like giving affordable services."*
>
> *"I know some people that want to get an electric vehicle, but they don't have a driveway. And they don't have a garage so they can't charge at home. I'd love to see them do what city of London does, where they have charging stations in the neighborhoods, maybe every fifth or sixth home, and then people can, you know, reserve that spot and charge once a week."*

2.3.4 Outcome Priorities

When asked what outcomes would determine whether Toronto Hydro was doing a good versus bad job, main topics that came up unaided were reliable electricity services, keeping cost low, good customer service, efforts to prepare for climate change, and a transparent billing system.

Reliability

Reliability was the top outcome that came up unaided across all groups. Generally, participants were expecting continued or improved reliability. This includes an expectation of fewer outages and faster response times when an outage does occur.

> *"There [are] no power outages, especially here. We need the fridges on all the time. And if there is any power glitches or anything that is resolved right away."*
>
> *"If they're reliable, that is half the game. I have to say Toronto Hydro is pretty reliable."*

Cost

The other top issue mentioned in all groups was the cost of electricity. Some participants had also suggested looking for Toronto Hydro to provide tools and information to help customers better manage their energy usage and find efficiencies.

> *"I'm just looking for information on ways we can reduce the bill, everything comes back to the bill as a consumer."*
>
> *"I think, in line with affordability. I would like to see more incentives offered to allow people to find ways of paying less. I think at one point, there were some monitoring devices that were given to households, so that we can monitor usage throughout the day. Also, to measure some of the appliance usage… I think more of that would be known."*

Customer Service

Although participants mentioned customer service less frequently than reliability and affordability, it was still cited as a desirable outcome, especially among those that had experienced issues in the past.

> *"[Good customer service for me means that Toronto Hydro would] actually have a solution for the issue, or if not, if, like, if they didn't have a solution then to have like a clear timeline of how to resolve the situation or when they would be able to get an answer."*

Environment

There were several mentions of expecting Toronto Hydro to consider the impact of, and prepare for, climate change and extreme weather events.

> *"The drive towards sustainability, energy conservation. That's important. Their continuous effort and sense of not just building the infrastructure maintaining but also future thinking in terms of what could potentially be an issue over the next coming years as far as what's we're seeing in BC and all these disasters around the world, the ability to at least prepare for such events."*

Several participants mentioned focusing on incentives and rebates for upgrading their buildings and equipment to be more sustainable.

> *"[I would like to see] incentives for business clients who want to switch to solar energy, or some kind of other alternative sources and whatnot. And I want to see better kinds of plans…to help people to shoulder those expenses."*

When asked if participants were willing to pay more to focus on climate action, most participants were open to the idea with the hope that this will improve the electricity system as a whole and lower the costs for customers in the long run.

> *"Absolutely. I would be willing to pay more. Because I believe that there's long term gain. So, if multiple companies or buildings put solar panels in and collected electricity in the walls, and that was distributed, I think that would help small businesses, or even residents."*

Billing

A few participants expressed an interest in learning more about where their money is going. They would like to receive more education on their billing. Some felt the reduction in usage but an increase in their bill left them feeling Toronto Hydro was not transparent about their operation.

> *"I like transparency. Where is my money actually going? I know that you showed us that pie chart. But I didn't really know that before. I don't think It's on my bill. I see, like, all these explanations of things I don't understand. And then my little graph of how much I spent last year versus this year, I'm like, oh, I've gotten better, but my bills are still high. So, what am I actually paying for?"*

Enabling New Technology

When prompted with a list of possible outcomes Toronto Hydro can focus on (see Appendix 4 for the information shown), many participants expressed that upgrading general equipment and enabling new technologies were outcome priorities. This was most commonly expressed as a long-term goal that would help with not only reliability and affordability, but also with climate change and the energy transition.

> *"I would put [my number one choice] into enabling new technology, because I think it feeds back into both reliability and affordability."*

> *"Enabling new technology, I feel like it's… a long-term goal, especially with our current climate."*

Helping to address social issues

Many participants expressed the preference for addressing social issues, such as to provide subsidies for lower income families and struggling businesses.

> *"Especially with the pandemic, where small businesses were given a chance to apply for subsidies, I think that that model, I think could totally work if let's say somebody or household had a certain amount of income."*

When asked how such a rate relief program should be executed, many had a preference for Toronto Hydro running such a relief program, but a sizable group of participants felt this responsibility lies within the government and Toronto Hydro should focus on distributing electricity.

> *"I'm a little bit on the fence about the last one helping to address social issues. From my point of view, these are social issues, that's why we have the Government of Ontario."*

> *"I think Toronto Hydro should mainly concentrate on working, getting reliable connections."*

2.3.5 Trade-offs: Reliability vs. Cost

After prompting participants with possible outcomes, the discussion led to two major trade-offs. One of the two trade-offs is between reliability and cost. It's about whether customers are willing to pay more for reliable electricity or not.

Some participants raised the importance of reliability over lower cost unprompted. They would rather pay more to get reliable power.

> *"For me, I think reliability is the major one. Because having power supply continuously makes more difference than whether it's cheap or not. I mean, even if I end up paying a little more, if I have 100 percent electricity, that's what I look for."*

When asked if participants would trade lower rates for reliability, most were unwilling to trade less reliability for lower rates; only some participants expressed a desire for lower rates.

> *"For me, reliability is number one, and affordability is number two. Because this is coming in store. And if there's no power, that's a big issue for me. I lose business or even losing money directly from something melting."*

> *"I mean if you can have uninterrupted connection then I don't mind paying a little bit more. Because if power goes down, my entire business goes down. So, if I'm losing money on something I'd rather pay upfront and be 100% secure."*

> *"Affordability. You know what, in this time with everything, the inflation rate, everything going up. Trying to try to keep the business going and to keep the bottom dollar in check."*

When further probed on whether Toronto Hydro's equipment should be run 'to failure' more often, or regularly maintained, even if there is nothing wrong with it, most customers opted either for preventative maintenance or for finding a balance between being preventative/safe and keeping costs low.

> *"For me, reliability is key. So [being] proactive, that preventative maintenance angle is critical for me."*
>
> *"...don't run it to failure. But don't just replace it too early and spend tons of money on it. Find that optimal [point] where there might be a little bit less reliability, but the chances are pretty low and you'll save a good chunk of money."*

2.3.6 Trade-offs: Investing in the Future vs. Lower Costs Today

The second trade-off is between investing in the future and having a lower bill today. Investing in the future would mean a higher electricity bill today to finance those investment projects. This discussion explored which one is more important to participants.

Some participants raised the importance of investing to prepare for the future unprompted. One small business participant also discussed the importance of pacing the investments to minimize bill impact.

> *"I'm going to go back to the fact that they have under invested in capital hardware... They've tried to put a plan together in the past. I don't know if they have a specific capital plan where they're going to replace 6% of the wires every year for the next decade, whatever. I would like to see a plan where they have targets. We've got a million miles wires in Toronto, and we're going to do 50,000 or 100,000 wires a year or something... Because if they don't, you're gonna wind up having to do 600,000 wires one year, and have a massive extra cost... We're gonna pay one way or the other, I would rather pay a few cents more now than dollars later."*

When asked if Toronto Hydro should think ahead and make investments to prepare for the future even if that means customers will have to pay more today, there was a general consensus that Toronto Hydro should, with some citing innovating and preparing for the future as reasons. Some also envisioned that investing in the future can lead to a host of benefits such as lower rates and shifting to cleaner energy sources.

> *"I think we have no choice. Again, if you want to talk about reliability. Well, without keeping up to date with the infrastructure, you lose reliability."*
>
> *"Enabling the new technology is the most important because if you allow for that, you're going to enable energy transition, you're going to create a system where hopefully, it'll be reliable. And it also leads to affordability. Because with a reduction for the more efficient and effective use of your resources should lower the price, and at the same time, it enables economic growth, it provides safety, and maybe we could even address social issues such as a carbon footprint."*

Despite this general consensus, some participants still identified maintaining lower costs and sticking to reliability in the shorter term as more important.

> *"I think we need to be practical about things and keep costs low and be reliable. And that's really where it's at."*

When talking specifically about measures to reduce climate change, most customers were willing to pay more.

> *"I'm absolutely in favor of paying more, I think there's a responsibility, I do support, lowering our emissions, encouraging more renewable sources of energy and trying to reduce our carbon footprint and help climate change. I think we have an obligation being Canadian in Toronto being in Ontario to be thought leaders on this."*

However, compared to residential customers, some small business customers are more hesitant when it comes to paying more for climate change measures.

> *"I definitely don't think that something that this is something that I should pay for… there has to be an incentive… and there's no incentive for me."*

3. Commercial & Industrial Focus Groups

3.1 Methodology

Four focus groups were held across two evenings with C&I customers from each of the following areas below.

Date	Focus Group Times	Number of Participants	Customer Type	Service Area
December 1st, 2021	5:30 pm – 7:30 pm	5 participants	C&I	Etobicoke/ York
	7:30 pm – 9:30 pm	4 participants	C&I	North York
December 2nd, 2021	5:30 pm – 7:30 pm	4 participants	C&I	Scarborough
	7:30 pm – 9:30 pm	5 participants	C&I	Toronto/ East York

Participants were recruited randomly over the phone and by e-mail, using customer lists provided by Toronto Hydro. Commercial and industrial participants received a $200 incentive as compensation for their time.

3.2 Key Findings

Most customers are satisfied with the service they receive from Toronto Hydro.

Most customers were generally satisfied with the reliability of the electricity service they receive. However, some experienced an increase in outages over the past few years. Some customers expressed concerns with billing; in particular, the complexity of rates and how they might reduce their bills. In general, customers were satisfied with the customer service they receive.

Most customers expect reliable electricity first and foremost.

The most frequently mentioned priority was reliability. This was also often the first outcome mentioned when customers were asked how to determine whether Toronto Hydro is doing a good job. Customers referred to reliability both in terms of minimizing disruptions but also in terms of getting power back again when there is an issue. One aspect of reliability that was stressed was upgrading equipment to improve reliability and reduce outages. Overall, reliability was prioritized above affordability, with some customers stating they would pay more to have fewer outages.

When it comes to climate change measures, most customers were supportive of shifting to using more electricity.

Most customers were supportive of shifting to using more electricity, although there were some hesitations regarding the cost of their electricity bill. A few customers also expressed concern about the safety and reliability of an electricity system with higher demands than today.

3.3 Detailed Findings

3.3.1 General Awareness

Most participants were somewhat aware that Toronto Hydro delivers electricity and is not responsible for electricity generation, although some were not entirely sure of the specific role Toronto Hydro plays in Ontario's electricity system.

> *"What I see on the bill is delivery. They're not actually the producer, right?"*

> *"They're kind of like the middleman. I know a lot of our electricity sometimes is bought from the states wholesale. And then they'll take that and then they'll run it through their systems to power the other homes and businesses around the area that they're servicing. That's their job and to make sure we have a reliable connection and to provide us with any support that we need or anything that goes down to make sure that that's all being repaired."*

Understanding of how their payments to the electricity bills are allocated is limited. However, one participant was aware that Toronto Hydro collects payment for the entire electricity system unaided.

> *"I know you guys basically distributing the [electricity], managing the infrastructure so that you can distribute electricity from the generator to the end users. So more, you manage and maintain the infrastructure, but you do not generate electricity. And you basically pass along the cost of the customer, but you don't technically make a profit when you're selling electricity."*

Having shared how Toronto Hydro fits into Ontario's electricity system and how their payments are allocated to the electricity system (see Section 5), a few participants felt there is an opportunity to learn more.

> *"I had no idea that only 6% of the bill goes to Hydro. A hydro bill is all so big to begin with. And there's no like a formal education process that can advise us as consumers, what are we actually paying for?"*

> *"I was surprised that the 6%. I didn't think it was such a low percentile that they took as far as covering their costs. And maybe, as well as similar education, where something like that could be passed on to the board and the directors… then they'll have a better understanding instead of just why did the bill go up so high? How are we gonna budget for this, so on and so forth?"*

3.3.2 Needs and Expectations

Satisfaction levels

Apart from a few isolated incidents, participants were generally satisfied with the service they received from Toronto Hydro.

Reliability

Participants were generally satisfied with the reliability of the electricity service they received.

> *"Reliability has never been questioned."*

> *"We haven't had many issues. And we've been in business for over 25 years now… In terms of power outages, if we have any, I can't even recall the last time we've had one at our place."*

However, some expressed an increase in outages over the past few years, as well as issues with a transformer.

> *"We are now finding that over the last two, three years, there have been a lot of blackouts…every five minutes, I'm saving my files, because I don't know when there's gonna be a surge or blackout or whatever, because it's happening a little bit more frequently than before."*

> *"Just recently, in this year, we had power outages two times… and it caused us roughly half a day to restore the power. It's happened quite often, in my opinion."*

> *"It's probably increased over the past few years. Like we used to get a two to three times. And we have like a transformer actually in front of our building itself, that sometimes will blow and it'll have an issue… It has increased over the times where we've had to send people home early, just because we can't do anything that day."*

Participants expressed a range of views in terms of how long it usually takes for the power to come back on after experiencing an outage. While some outages were short, a few participants expressed that despite the short durations, they still caused large disruptions for their business.

> *"These one, two second outages happen, I would say on average maybe every two to three weeks. Sometimes more often, sometimes less. And that is disruptive."*

> *"We have about 50 security cameras in the building. So then they have to restart. The same thing with computers, we have to reboot them, and sometimes there are problems with rebooting."*

> *"As a food manufacturer, the biggest thing for us is when the power goes out, and sometimes we are not aware about it… how much of our inventory is going to be lost?"*

Billing

Some participants expressed concerns with billing; in particular, the complexity of rates. This left them wondering about ways in which they can reduce their bills.

> *"They have numerous delivery items on the bill. It's not just one, but it's multiple. So that's the only question that you know, I've never had answered."*

> *"I guess for us, we don't understand the bills. I engaged… a third party to say, okay, how can you knock my bill down, because I have no idea how to do this… It kind of bothers me why*

certain people know about this and yet you know, the ordinary Joe, which I was for years, why I didn't know. Why was I so stupid to pay the high rates?"

"For years, I've been debating switching over to tiered or time of use, but they can't really comment on whether or not you should do it. Because they don't want to assume it because it might cost more, it might cost less. They weren't great at helping me."

Customer Service

In general, participants were satisfied with the customer service they had received. Some participants expressed that it was easy to get hold of customer service when they had an issue that needed resolving.

"I think they have one of the better customer services. I can get through almost immediately. And, their menu system is quite easy to get a hold of them."

Other positive experiences mentioned included the way Toronto Hydro has dealt with an incident involving a transformer explosion.

"At one point in time… we actually had an explosion. Hydro, to their credit, they kind of came by and with our contractors worked through the night to kind of get up and going so that it happened on a Sunday afternoon, we were wiped out for good 12 hours, [and] the next morning was Monday morning, production was there and no one even knew that we had an explosion or anything."

However, some expressed dissatisfaction with the way Toronto Hydro deals with issues related to their transformers.

"I have complained about how they inspect and notify me. [They] say we were in your vault room today, and you have these deficiencies. Please call this phone number for more information… The person who answers the phone at the number doesn't have the information, you have to send an email if you want to get more information about it. And I've repeatedly asked when the person is on site, could they please come and talk to me."

Others expressed dissatisfaction with communication and specifically communication relating to their bills.

"The only one glitch we had was one month, for some reason our bill had doubled. And when I tried to call Toronto Hydro about the reasoning for this, the only answer I got was that's what the meter says."

"If you asked me personally, how is Toronto Hydro doing, I would say in terms of communication pretty bad."

3.3.3 How Toronto Hydro can serve its customers better

When asked how Toronto Hydro could serve them better, many participants mentioned better communication and customer service in general, others hoped to see more reliable power with less interruptions and more education on how customers can keep their bills low.

Better Communication

Many participants indicated a desire for better communication and ease of contacting people at Toronto Hydro, particularly for discussing billing issues.

"I would just like a way to communicate with them directly when there's an issue."

"It would just be nice to have a human being to talk to. And it would be even nicer if when they were on site, they would introduce themselves and say I'm here, I've just looked at this. This is what the situation is."

Many also expressed the desire for better communication in the case of an outage.

"A lot of organizations are also switching to SMS text alerts, I guess, again, because everyone's on their phones. So that would be really helpful and even a chat function, because we can't stay on the phone for a long time, [during outages]."

Transparency was also mentioned in terms of accurate communication regarding how long outages and disruptions last. This was especially important for businesses that deal with food products, as they need to make decisions about how to deal with their refrigerated or frozen inventory.

"I think in terms of power outrage … like Toronto Hydro to inform the area who has a problem… So give us … roughly how long the [problem would be] so we'll be better prepared for our company. We process food. We don't have any [power], will be spoiled. But what's the timeframe?"

Reliability

A few participants mentioned reducing the number of outages – momentary outages included.

"These short outages that I spoke about, I understand that it's easier said than done to, to rectify this issue. Whether these short outages can be eliminated? I don't know."

Keeping Cost Low

Many participants expressed the desire for Toronto Hydro to do more in helping them reduce their bills, including assistance navigating which type of billing system they should use based on their usage.

"It would have been nice if somebody had come to me and said 'Hey, you could be saving money a lot of money by doing this.'"

"[We would like] a better recommendation of what would work better for us because obviously we want to pay less."

Some participants also suggested incentive programs for those with multiple accounts, where they could "bundle" their accounts and save more. Other incentive programs mentioned included incentives for upgrades, such as switching to LED lights.

"If they could be a little more proactive in helping us like, finding better ways to save because we have different sites… Is there a way to bundle everything together? … If you have more, the more you save, so there's nothing like that, right?"

"More incentives, if you change to LEDs, or you upgrade stuff a condominium or even at home."

3.3.4 Outcome Priorities

When asked what outcomes would determine whether Toronto Hydro was doing a good versus bad job, the main topics that came up unaided were reliable electricity services, followed by keeping costs low and good customer service. Other outcomes customers mentioned included a transparent billing system and efforts to prepare for climate change.

Reliability

The most frequently mentioned priority was reliability. This was also often the first outcome mentioned when participants were asked how they would know whether Toronto Hydro is doing a good or a bad job. Participants referred to reliability both in terms of minimizing disruptions but also in terms of getting power back again when there is an issue, such as an exploded transformer.

> *"If, you know, we go to work one day, and nothing's working, if that were to happen often I could say they're not doing a good job."*

> *"When I think about the 'good job, bad job' it's are my lights on every day? And the answer is generally, yes."*

One aspect of reliability that was stressed was the need to upgrade Toronto Hydro's equipment to improve reliability and reduce outages.

> *"[They need to] improve their infrastructure to avoid power fluctuation or more momentary power outages. That's number one."*

Some participants also expressed the need to focus on reliability in neighbourhoods that have more businesses, as opposed to residential areas.

> *"[I'd like to see them] working on maybe fixing outages faster, especially neighborhoods that might need more… if it's purely residential, maybe the residential people don't care as much as if it's strictly a business center area."*

Overall, reliability was preferred above affordability, with some participants stating they would pay more to have fewer outages.

> *"To keep the power on, and not to have outages, I would pay more because in the long run, it would be very expensive for us anyway if the power's out."*

Keeping Cost Low

Several participants also mentioned affordability when asked about how to know whether Toronto Hydro is doing a good or bad job.

> *"On a per dollar basis of this many hours I ran last year, this many hours I ran this year, is it higher or lower. That's the way I guess I judge the utility bill."*

Many participants indicated that energy saving programs, incentives, and education were priorities to help businesses reduce their bills. This included the potential for Toronto Hydro to conduct energy audits for large buildings. Another idea mentioned was a reimbursement or credit for businesses who are affected by outages.

> *"[With a reimbursement or credit], as a business, you feel more happy that someone's actually looking after you and taking care of you. And that they do value us."*

When comparing affordability with other outcomes, there were a few participants who prioritized affordability over everything.

> *"At the end of the day, residential customers, commercial customers, they really just care about their hydro bill… I think affordability at the end of the day is the most important outcome for anybody."*

Customer Service

Another top outcome was customer service. As with reliability and keeping cost low, it was often mentioned right away as an indicator of whether Toronto Hydro is doing a good or a bad job.

> *"The only way I can personally know what's good or bad is if there's ever an issue, and I have to call in, the type of service that I get, and getting the problem resolved."*

Transparency in Billing

Several participants felt that they would like to see more accountability and transparency in their billing as an outcome priority.

> *"I'd like to see some accountability in terms of where exactly the money goes, the bulk of it,… [and] how they justify what they charge us."*

Environment

A few participants mentioned a focus on the environment as a priority without being prompted. Specifically, some participants would like to see Toronto Hydro being more involved in building charging stations for electric vehicle.

> *"We are at the very beginning stages of installing electric vehicle charging stations. And it would be great if there was some, you know, reliable source of information, [or] if they could be involved in that process."*

Assisting Low-Income Populations

When prompted with a list of possible outcomes Toronto Hydro can focus on (see Section 5 for the information shown), many participants' attention was drawn to helping to address social issues, specifically providing financial assistance to low-income populations, and enabling new technology. These issues were not brought up as an outcome Toronto Hydro should focus on prior to showing the list of possible outcomes to participants.

Helping to address social issues was not brought up unaided. Once it was shown in a list of outcomes and the moderator provided helping low- or fixed-income customers as an example of addressing social issues, most participants agreed that it is an important priority for Toronto Hydro to make sure bills are affordable for vulnerable members of the population. One participant also recalled some form of ongoing support programs for low-income people.

> *"I actually do think it should be on the list. I'm assuming social issues kind of ties in with, a lot of neighborhoods within Toronto, or within the Ontario region that are like… below middle-class families. And so, for those families, or even businesses in that area, it might not be easy to pay those monthly bills or to keep up with the monthly bills. So, affordability kind of ties in with that."*

> *"It's quite visible with some condominium residents that they cannot afford the bills. And then I remember there was there was a program, I'm not sure if it's still alive that the program that was targeting low-income families. Some residents applied for health. I'm not sure."*

Enabling new technology

The list of possible outcomes also prompted a few participants stating that there is a need to invest in research and development that help Toronto Hydro find energy efficiencies and develop green energy.

> *"There are a lot of countries that we can mimic that are doing a lot of great things with energy efficiency and green energy. So just to have like a dedicated unit within Toronto Hydro to focus on research, R&D, would be good."*

3.3.5 Climate change and electrification

The groups then discussed if they think net-zero commitments in Toronto or in the country will have an impact on their businesses and on Toronto Hydro's operations. Participants were shown an image of what energy transition might mean (see Section 5 for the information shown) and asked for their reaction to the shift.

For most participants, the main incentive for reducing their carbon footprint is cost savings, through financial rewards such as energy efficiency measures and rebates. Other participants have more general goals to be sustainable.

Some participants expressed an expectation from their clients to install electric charging stations and solar panels. However, most participants said that cost is still a barrier to more rigorous electrification measures, and very few participants indicated that their clients expect them to reduce their carbon footprint.

3.3.6 Trade-offs: Preparing for the energy transition vs. Lower short-term costs

In general, although most participants were concerned about the cost of electrification and preparing for energy transition, they were largely supportive of moving forward with it.

> *"I think the world is going towards this new world. It's going to happen. It's just a matter of time."*

> *"I would say it's a benefit more than a problem. But there are costs associated with it."*

> *"It would be good for business. I don't see it in the near future, but maybe down the road."*

A few participants expressed concern about the safety and reliability of the new system because there is room for improvement when it comes to reliability as the electricity system stands right now. Moving to a new system left them feeling worried if the system will be even less reliable than today.

> *"I feel that was dangerous? Because we don't have that capacity, or the technology to link those power generators into the system. I don't think [it's] reliable right now at least I haven't experienced this. I don't think they're reliable."*

When prompted as to whether Toronto Hydro should act now to anticipate demand for electricity, or wait until they have a firmer indication of growing demand, there were mixed responses. Some participants favoured acting slowly and waiting until demand firms up.

> *"Wait until the demand firms up or do it slowly in stages and see how it works. Let's say phase one and wait a year and see how it goes."*

“I don't agree with the concept that if you build it, they will come.”

Others preferred acting now to prepare for the future, even if that meant taking on the risk that demand won’t be there.

“I would be more future focused, to get more reliable service.”

“I don't think that you can risk stability. I think you have to pay into it what you have to pay into it to make it a stable, reliable system.”

Several participants expressed concern about the high costs of preparing for the future on vulnerable populations, even if they were in favour of moving quickly, in general.

“I’d rather see the higher costs and moving forward. However, the vulnerable groups should be protected somehow.”

In some groups, participants were asked if they would be willing to pay 5% more on their bill to help tackle climate change. There were a mix of responses to this. Although some participants expressed some hesitation with spending more, having information on exactly how the money would be spent was seen as something that would leave them more willing to pay extra.

“What I think is how the thing is sold. If we can say, we're doing A, B, C, D, E, and it can be clearly related to helping and bettering the environment, I think it's something that that is palatable and can be swallowed.”

4. Key Account Interviews

4.1 Methodology

INNOVATIVE conducted 14 interviews with key accounts between December 6, 2021 and January 12, 2022. Participants were randomly recruited by e-mail from a list of key accounts provided by Toronto Hydro. Interviews were approximately 60 minutes in length and followed a structured interview guide, similar to that of the focus groups with residential, small business, and C&I customers.

In appreciation of their time, INNOVATIVE made a $100 donation to a charity of each participating key account customers' choice.

4.2 Key Findings

Reliability appears to be paramount for most Key Accounts.

Good reliability appears to be seen as "table stakes" for most key accounts. Without reliable electrical service, this rate class cannot operate efficiently or in some cases safely (in the case of public institutions such as hospitals, colleges, and universities). Among large industrial customers, power quality continues to be an issue for key accounts with sensitive machinery and equipment. Improving reliability appears to far outweigh any concern about increases in the distribution portion of this rate classes' electricity bills.

Increased capacity is largely seen as a key requirement to successfully navigating the energy transition.

Key accounts expressed a need to know where the electrical grid capacity is today and where it will be tomorrow. Almost all key accounts interviewed have net zero targets or at least have carbon reduction initiatives in the works. Most key accounts customers suggested that without increased electrical capacity, their net zero initiatives will be significantly hampered.

Furthermore, almost all key accounts are acutely aware that electrification will have a significant impact on the price they pay for electricity. However, for many, this appears to be viewed as a cost of doing business.

Almost all key accounts customers cited a need from Toronto Hydro for accurate capacity and cost forecasts so they can better plan for the energy transition and electrification.

Key Accounts customers expressed a desire for enhanced customer service.

While all key accounts customers stated that they are satisfied with the services they receive from Toronto Hydro, many also conveyed the need for enhanced services. To many, this meant going beyond the traditional *Key Account-LDC* relationship and providing additional advisory services to help navigate the challenges presented by the energy transition and electrification. A number suggested that they want to work with Toronto Hydro as a partner, not just a utility, to overcome these challenges. This included interests in timely, proactive engagement to help solve problems, identify opportunities, improve efficiencies, and better manage energy costs. Some went as far as to suggest interests in behind-the-meter solutions delivered through Toronto Hydro, and in some cases, financing options to help overcome immediate investment hurdles.

4.3 Detailed Findings

4.3.1 Customer Experience

Key account participants generally had a positive experience with Toronto Hydro. Praises were centred around the quality of **customer service** and **power reliability**.

Customer service: This came up again when asked more specifically, what Toronto Hydro did well. The positive impact of having direct contact with Toronto Hydro and their key account managers was a recurring theme that emerged in almost all the interviews. They were very satisfied with the service they received. Those who had worked with other utilities even mentioned that other utilities didn't seem as committed to keeping them happy or working closely with them through their key account management team.

Power reliability: Many key account customers also expressed contentment with the limited frequency of outages that they experienced, despite concerns about aging infrastructure.

Areas for Improvement

When asked what, if anything, Toronto Hydro could do better to serve their organizations, various companies had differing suggestions centering around **communications**, **power reliability**, and **business partnership** regarding the enhancement of Toronto Hydro's services.

- **Communications**: The theme of improved communications was voiced among several key account participants. Some wished to have a more meaningful say in Toronto Hydro's investment plans that could address their future needs. Others stressed the importance of clearer communication during scheduled power outages to prevent miscommunication.
- **Power reliability**: Hospitals, given the critical nature of their work, particularly emphasized the necessity for a reliable power supply to ensure the safety of patients during periods of voltage fluctuations or power outages. This applied to other businesses where they expected a certain standard of power quality to assure the quality of their products, for example, which needed a temperature-controlled environment.
- **Business partnership**: Some key account participants expected a more streamlined approach for new service connections or system upgrade projects, as these projects had posed challenges for them in the past. They believed that simplifying this process would be beneficial. Other companies wanted a more streamlined process for obtaining quotes as their organizations changing energy needs (e.g. when fuel switching to electricity to meet net-zero emission goals).

4.3.2 Needs and Preferences

Needs and preferences of key account customers centred on three key areas.

1. **Power reliability:** Generally speaking, almost all key account participants had high expectations for reliability in their electricity services. While reliability is considered relatively good by key accounts who participated in these interviews, even a few annual power outages or power quality issues can be very disruptive and costly for this rate class.
2. **Customer service/Business partnership:** As mentioned earlier, many customers felt that having a key account manager they could reach out made it easier for them to do business with Toronto Hydro, compared to other utilities they either currently or previously have worked with. While most key account participants are satisfied with their existing dedicated key account managers at Toronto Hydro, many also expressed a desire for enhanced services including advisory support and even behind-the-meter solutions to help them navigate the energy transitions and meet their net zero commitments.
3. **Infrastructure Investments/Enabling Climate Action:** Some key account participants expressed concerns about Toronto Hydro's aging grid infrastructure and limited capacity to meet future electricity demand. Not only was this deemed as a potential barrier to their own net zero comments and growth, but it could also pose a barrier to broader economic growth and the energy transition across the City of Toronto. Ensuring reliable power is available to customers when they need it is very important to almost all key account participants.

4.3.3 Emerging Challenges

Customers saw **capacity for reliable power** and **climate action** as the main areas Toronto Hydro will need to focus on over the next decade.

- **Capacity for reliable power**: Customers were concerned about how aging infrastructure, increased frequency of extreme weather events, and cyber security threats might affect the reliability of the grid. With the need to have a reliable supply of electricity, many key account participants expect upgrades to the electricity system that would lead to an expansion of the grid to increase capacity, a stronger economy, and a lower carbon future.
- **Climate Action:** As mentioned above, almost all key account participants have net zero targets or carbon reduction initiatives in the works, but few know how they are going to reach these targets. Many key account participants shared their hopes that Toronto Hydro would increase their support in helping them transition to lower or non-emitting carbon energy sources, building out more distributed energy resources (including battery storage), and enabling grid modernization, such as microgrids technologies.

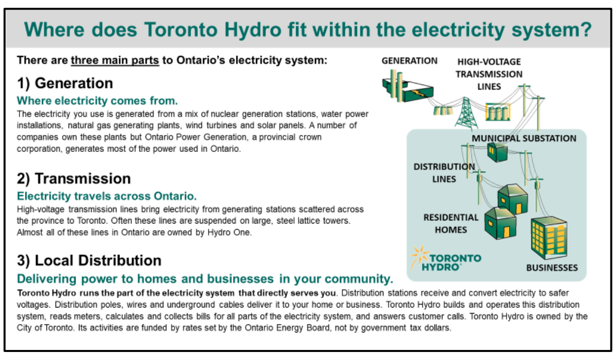
5. Focus Groups Stimulus

In all focus group sessions with residential, small business, and C&I customers, a series of stimulus was used to help guide the conversation. The stimulus focused on the following 5 themes:

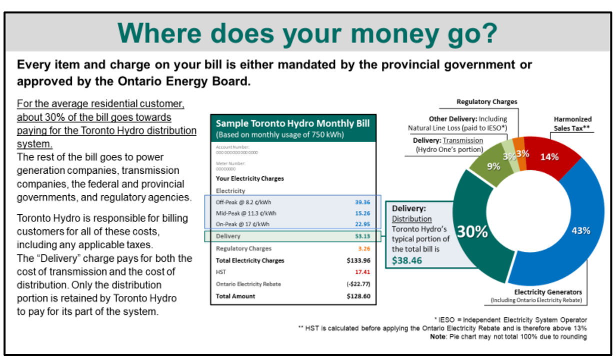
1. Where does Toronto Hydro fit within the electricity system?
2. Information on "Where does your money go?"
3. Planning Challenges
4. Outcome Prioritization
5. Changing World of Electricity

The complete stimulus used in each group can be found below.

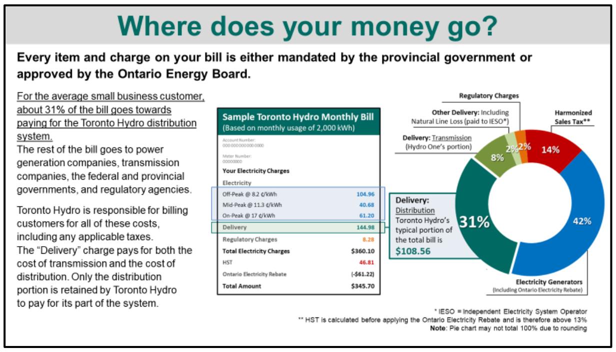
Where does Toronto Hydro fit within the electricity system?



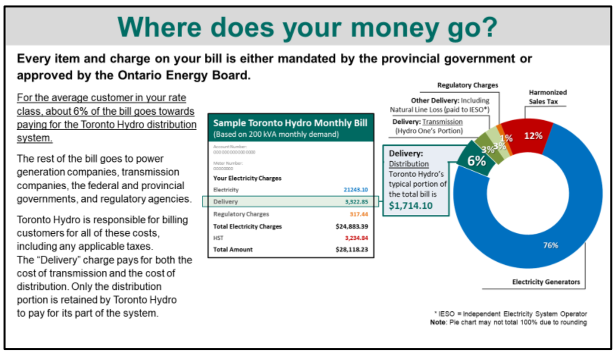
"Where does your money go?" Residential version



“Where does your money go?” Small Business version



“Where does your money go?” C&I version



Planning Challenges

Planning Challenges?

Aging Infrastructure

Local growth

Climate Change

Emerging electricity technology

Evolving Customer Service Needs

Cybersecurity

Social issues

Impact of COVID-19

Outcomes

Outcomes?

Reliability

Affordability

Good Customer Service

Enabling Energy Transition

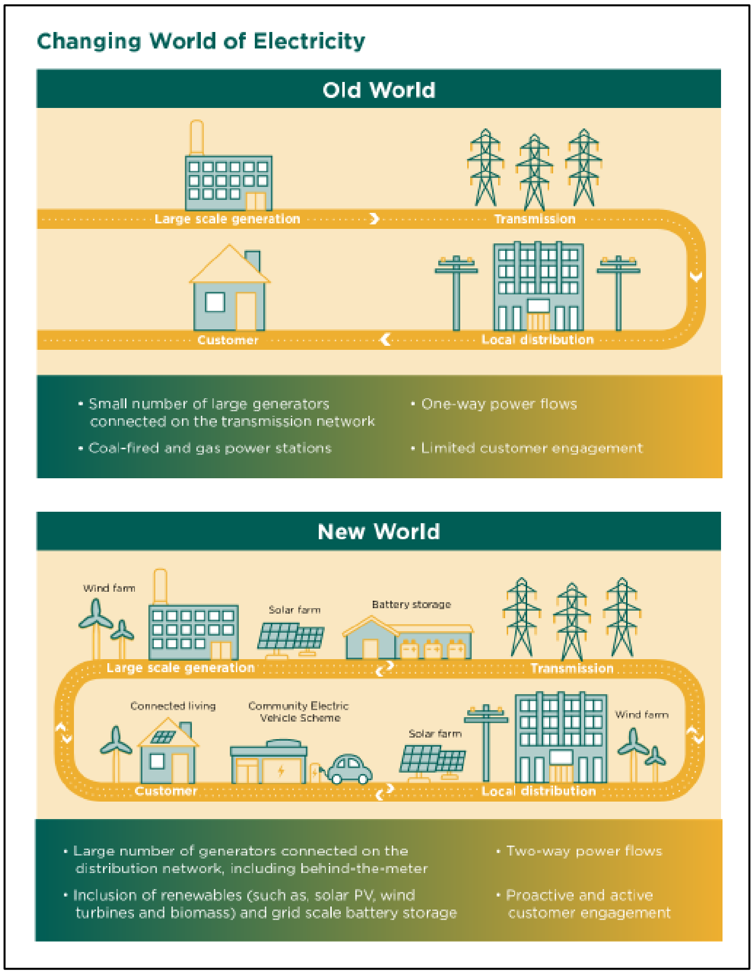
Enabling New Technology (Generation such as Solar, EVs)

Safety

Enabling Toronto’s Economic Growth

Helping to Address Social Issues

“Changing World of Electricity”



Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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APPENDIX 02

Reference Survey Report

Customer Sample Validation

TORONTO HYDRO

November 2, 2023

STRICTLY CONFIDENTIAL

Report Navigation

APPENDICIES

PHASE I

PHASE II

Reference Survey Overview

Research Objective

As part of the Phase I Customer Engagement, Toronto Hydro commissioned Innovative Research Group (INNOVATIVE) to survey its customers across rate classes. Among low-volume customers, which consist of residential and small business rate classes, INNOVATIVE conducted parallel telephone and online surveys.

Running parallel telephone and online surveys served two primary purposes:

1. **To gather feedback and insights on preferences and needs from low-volume customers.**
Feedback from these surveys helped Toronto Hydro's planners and engineers inform the design of the utility's business plan, which was shared in draft with customers in Phase II of this engagement.

2. **To establish baselines and develop weights that allow Toronto Hydro to move to an online methodology for its low-volume customer engagement program**.
Establishing a baseline and understanding the difference between customers with known email addresses (email sample) and the broader customer base is a critical step for utilities that wish to migrate to representative online survey methodologies in the second phase of their customer engagement. Where significant differences exist between the email sample and the broader customer base (e.g. demographics, firmographics, attitudes, and opinions), the insights gained from these parallel surveys can be used to develop weights, which can minimize these differences.

Benefits of Moving to an Online Methodology

The benefits of migrating from a generalizable pure-telephone methodology to a generalizable pure-online methodology was realized in Phase II of Toronto Hydro's customer engagement when its draft plan was presented to customers in an interactive workbook format. These benefits included:

- Better presentation of information through the use of visuals (e.g. diagrams, pictures, videos).
- Ability to ask more questions, as respondents are more likely to spend a longer time participating in an online survey than on the phone.
- Reduced costs as online surveys are less costly than telephone surveys.

This report documents the results of four surveys conducted by INNOVATIVE among Toronto Hydro's low-volume customers (small business and residential) and provides recommendations on appropriate weighting for future Toronto Hydro online survey methodologies.

Sample Validation

Email Sample vs. Total Customer Accounts

Overall Customer Email Coverage

The information below compares the sample of each rate class with email addresses to the total customer accounts of that rate class.

- For **Residential** accounts, 49% has an email address on file. Removing duplicate email addresses leaves 46% unique email addresses.
- For **Small Business** accounts, 35% has an email address. Removing duplicate email addresses leaves 19% unique email addresses.
- For **C&I** accounts, 64% has an email address. Removing duplicate email addresses leaves 26% unique email addresses.

Rate Class	Total Accounts	Email Sample	Email Coverage (out of Total Accounts)	Unique Emails	Unique Email Coverage (out of Total Accounts)
Residential	627,729 records	310,696	**49%**	291,869	**46%**
Small Business	65,514 records	23,150	**35%**	12,191	**19%**
C&I	8,716 records	5,573	**64%**	2,268	**26%**

- Toronto Hydro provided a list of the most up-to-date **Key Account** representative contact information at the time. At the time, the list contained 204 unique emails.

Sample Validation

Email Sample vs. Total Customer Accounts

Sample Validation

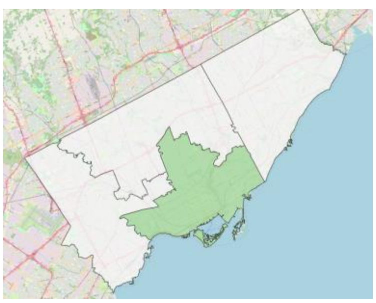
The information below compares the sample of each rate class with email addresses to the total customer accounts of that rate class across two known variables – distributions of (1) region and (2) consumption quartile.

(1) Regional Distribution by Rate Class

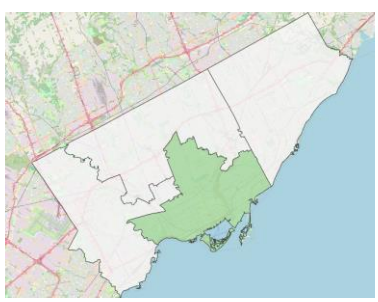
Using the first three digits of postal codes (FSAs), customers are grouped into four unique regions within Toronto Hydro's service territory.

For most regions, the distributions are comparable (within a difference of +/-4%) between the full set of customer records and those with an email account on file. The exception was residential customers in Toronto/East York, who were +5% overrepresented among customers with an email address compared to the full set of customer records.

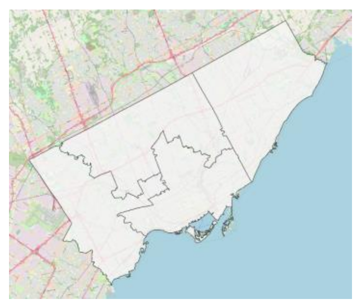
Residential



Small Business



C&I



Legend: Difference*
More than -10%
-10% to -4%
-4% to +4%
+4% to +10%
More than +10%

(2) Distribution of Consumption Quartile by Rate Class

For most consumption quartiles, the distributions are comparable (also within a difference of +/-4%) between the email sample and the total accounts. In the Fourth quartile among small business customers, there are +7% more of the email samples than the total accounts.

Quartiles	Email Sample	Difference*	Email Sample	Difference*	Email Sample	Difference*
Rate Class	***Residential***		***Small Business***		***C&I***	
First	28%	**+3%**	22%	**-3%**	21%	**-4%**
Second	25%	**0%**	21%	**-4%**	25%	**0%**
Third	23%	**-2%**	24%	**-1%**	26%	**1%**
Fourth	24%	**-1%**	32%	**+7%**	28%	**+3%**

Note: * The difference is the distribution in the email sample *minus* the distribution among total customer accounts.

Sample Validation

Email Sample vs. Total Customer Accounts

Survey Sample

For the most part, responses from the telephone and online surveys were very similar within both customer types. However, there were a few distinct difference that are worth noting. The table below documents the differences between the *email* and *telephone* samples. These differences below are from the weighted samples, unless specified.

Areas	Residential	Small Business
Demographics / Firmographics	**Age:** *Before weighting*, online respondents were older than telephone respondents.	None
Environmental Controls	None	**Bill impact:** Online respondents were more likely to report that their bill has an impact on the bottom line of their organizations than telephone respondents (65% vs 56%).
Customer Perceptions	**Familiarity with Toronto Hydro**: Online respondents were more likely to say they are familiar with Toronto Hydro than telephone respondents (76% vs 66%). **Reliability experience**: Online respondents were more likely report having experienced an outage (67% vs 57%).	**Familiarity with Toronto Hydro**: Online respondents were more likely to say they are familiar with Toronto Hydro than telephone respondents (67% vs 59%). **Familiarity with Toronto Hydro's share of bill**: Online respondents were more likely to say they are familiar with the amount of their bill going to Toronto Hydro (39% vs 25%). **Reliability experience**: Online respondents were more likely report having experienced an outage (55% vs 45%).

Weighting Scheme

Given the similarities in known account characteristics (average consumption and region), Toronto Hydro's email sample appeared to be a good representation of the broader customer base. The online and telephone surveys returned similar results on most demographics and firmographics, as well as environmental controls.

While there were some differences on customer perceptions between online and telephone surveys, the *direction* of the results was comparable. For example, although online residential respondents were more likely to say they are familiar with Toronto Hydro than telephone respondents, more respondents say they were familiar than unfamiliar regardless of the survey mode.

Even though the online sample skewed towards certain customers, weighting the samples by consumption and region ensured the final samples were representative of the customers by the two known variables. As such, no one area or no one consumption quartile was over or underrepresented in the survey samples.

To further account for the skew in age among residential customers, the online residential survey was also weighted by age to more closely reflect the age distribution that was captured in the telephone survey.

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Methodology and Respondent Profiles

Section 1

Reference Survey
Methodology

Survey Design

This report documents the results of four surveys conducted by INNOVATIVE among Toronto Hydro's low-volume customers (residential and small business).

The **residential telephone survey** was fielded from **December 3rd to 20th, 2021** amongst a random sample of **n=1,000** (unweighted n=1,006) residential customers.

The **small business telephone survey** was fielded from **December 7th to 22nd, 2021** amongst a random sample of **n=400** (unweighted n=401) small business customers.

Both telephone surveys were weighted by region and consumption quartiles within their respective rate classes to produce a representative sample of Toronto Hydro's customer base.

The **residential online survey** was fielded from **December 7th, 2021 to January 10th, 2022** amongst **n=1600** (unweighted n=1685) residential customers.

The **small business online survey** was fielded from **December 9th, 2021 to January 9th, 2022** amongst **n=430** (unweighted n=430) small business customers.

As discussed earlier, because the telephone survey generally had a younger age demographic than the online survey, in addition to weighting the residential online survey by region and consumption quartiles, it was weighted by age to more closely reflect the age distribution that was captured in the telephone survey.

The small business online survey was weighted by region and consumption quartiles to report on a representative sample of the customer base.

Sample Design

Toronto Hydro provided INNOVATIVE with confidential access to its customer lists in order to conduct this research. The customer list included information on region and electricity consumption, as well as all available telephone numbers and email addresses. The four surveys followed a random sample methodology. Random samples were then surveyed.

Since only a subset of the customers on the lists have email addresses on file, INNOVATIVE conducted a baseline analysis to see how customers with email addresses differ from the broader customer base, followed by a detailed comparison between online and telephone survey results. The following pages detail the sampling methodology used for this research.

Residential Sample

Sample Validation

Telephone Residential Sample

Targets were set based on region and annual electricity usage in the residential telephone survey. Weights were also applied to ensure the sample is representative of the residential customer base.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	44 (44)	49 (49)	52 (52)	50 (50)	195 (195)
North York	58 (57)	53 (53)	52 (52)	59 (59)	222 (220)
Scarborough	22 (22)	58 (58)	67 (66)	53 (53)	200 (200)
Toronto/E. York	129 (127)	91 (91)	80 (79)	89 (88)	389 (385)
Total	253 (250)	251 (250)	251 (250)	251 (250)	1006 (1000)

Online Residential Sample

Similar to the telephone residential sample, targets were set based on region and annual electricity usage in the residential online survey.

As discussed earlier, because the telephone survey generally had a younger age demographic than the online survey, in addition to weighting the residential online survey by region and consumption quartiles, it was weighted by age to more closely reflect the age distribution that was captured in the telephone survey.

The online residential sample has been weighted by age, region and consumption.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region, as well as age against the telephone reference survey.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	63 (71)	83 (78)	87 (83)	88 (81)	321 (312)
North York	54 (90)	81 (84)	81 (84)	86 (94)	302 (352)
Scarborough	37 (35)	91 (94)	105 (106)	74 (85)	307 (321)
Toronto/E. York	218 (203)	213 (145)	162 (127)	162 (140)	755 (615)
Total	372 (400)	468 (400)	435 (400)	410 (400)	1685 (1600)

Age	Total
18-34	88 (242)
35-54	515 (616)
55+	1082 (741)
Total	1685 (1600)

Small Business Sample
Sample Validation

Telephone Small Business Sample

Targets were set based on region and annual electricity usage in the small business telephone survey. Weights were also applied to ensure the sample is representative of the small business customer base.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	15 (15)	19 (18)	19 (19)	18 (18)	71 (70)
North York	22 (22)	24 (24)	23 (23)	23 (23)	92 (91)
Scarborough	19 (19)	23 (23)	21 (20)	21 (21)	84 (84)
Toronto/E. York	44 (44)	35 (35)	38 (37)	37 (37)	154 (153)
Total	100 (100)	101 (100)	101 (100)	99 (100)	401 (400)

Online Small Business Sample

Similar to the telephone small business sample, targets were set based on region and annual electricity usage in the small business online survey. Weights were also applied to ensure the sample is representative of the small business customer base.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	14 (17)	14 (19)	17 (20)	23 (20)	68 (76)
North York	17 (23)	24 (25)	23 (25)	18 (25)	82 (98)
Scarborough	15 (21)	25 (25)	23 (22)	18 (23)	81 (91)
Toronto/E. York	60 (47)	55 (38)	52 (40)	32 (40)	199 (165)
Total	106 (107)	118 (108)	115 (108)	91 (107)	430 (430)

Telephone versus Online

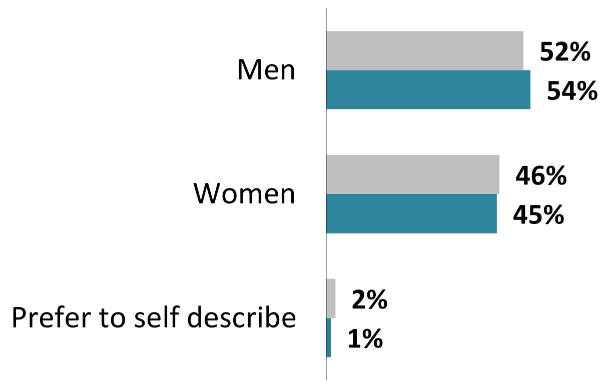
Demographics

Residential

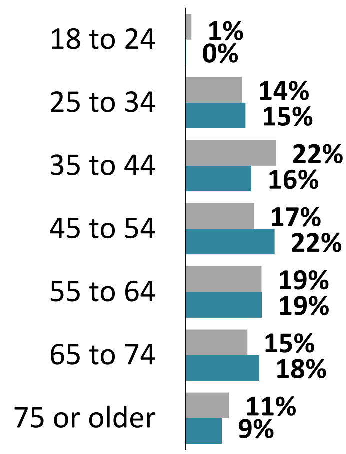
Telephone

Online

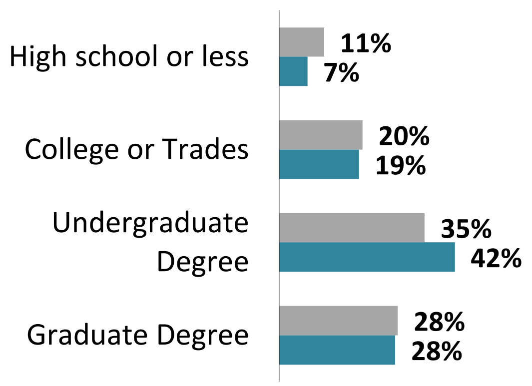
Gender



Age

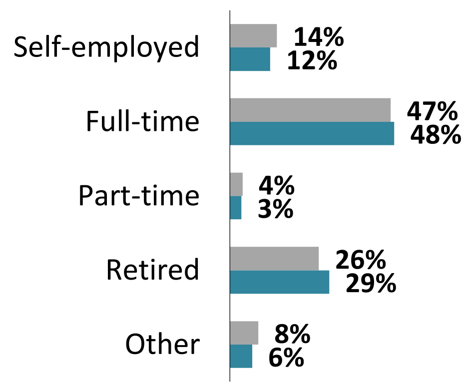


Education



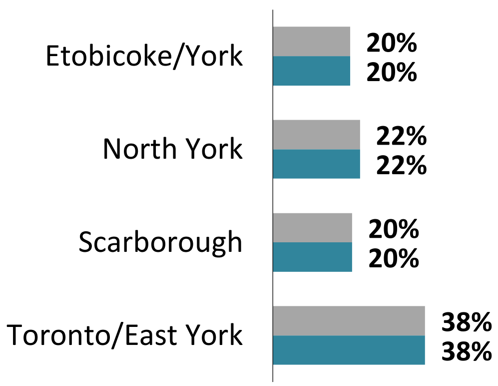
Note: 'Other/Prefer not say' (T: 6%; O: 5%) not shown

Employment



Note: 'Prefer not say' (T: 2%; O: 2%) not shown

Region



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Telephone versus Online

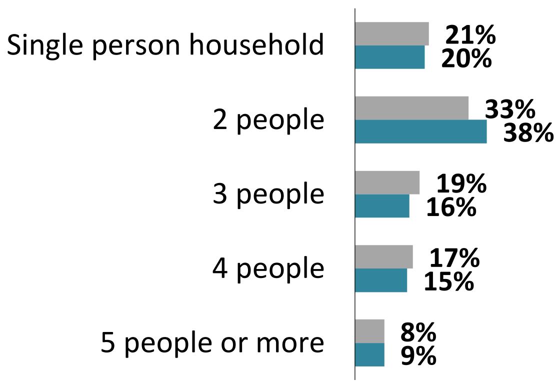
Demographics

Residential

Telephone

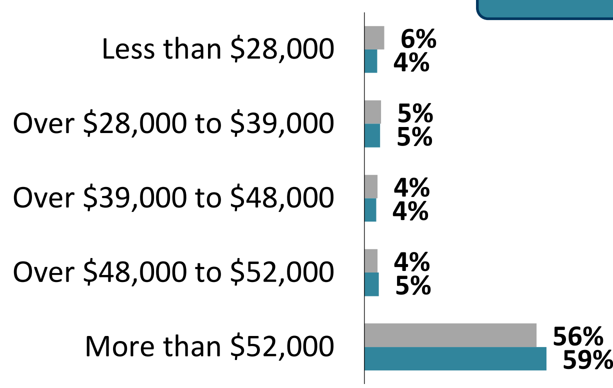
Online

Household Size



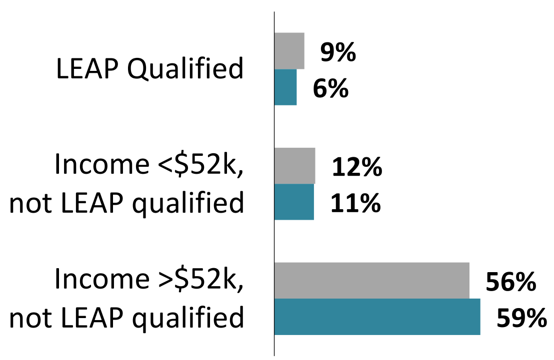
Note: 'Prefer not to say' (T: 2%; O: 3%) not shown

Household Income (after-tax)



Note: 'Prefer not say' (T: 24%; O: 23%) not shown

LEAP Qualification (calculated based on household size and after-tax income)



Note: 'Refused' (T: 24%; O: 23%) not shown

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Telephone versus Online

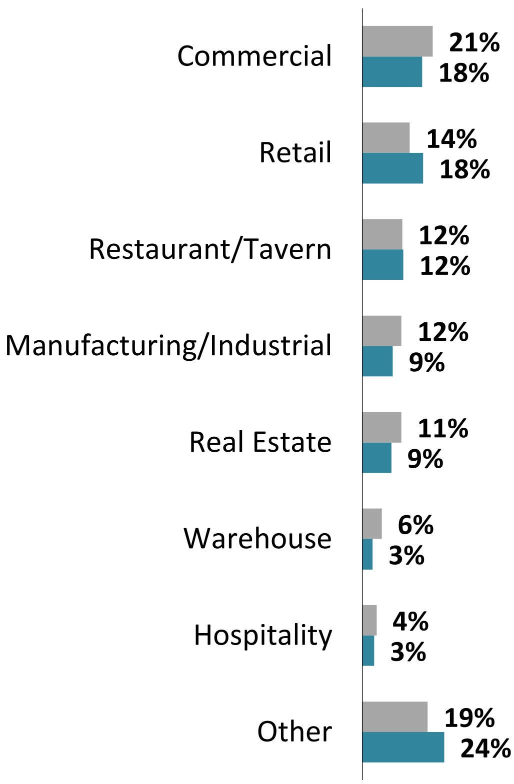
Firmographics

Small Business

Telephone

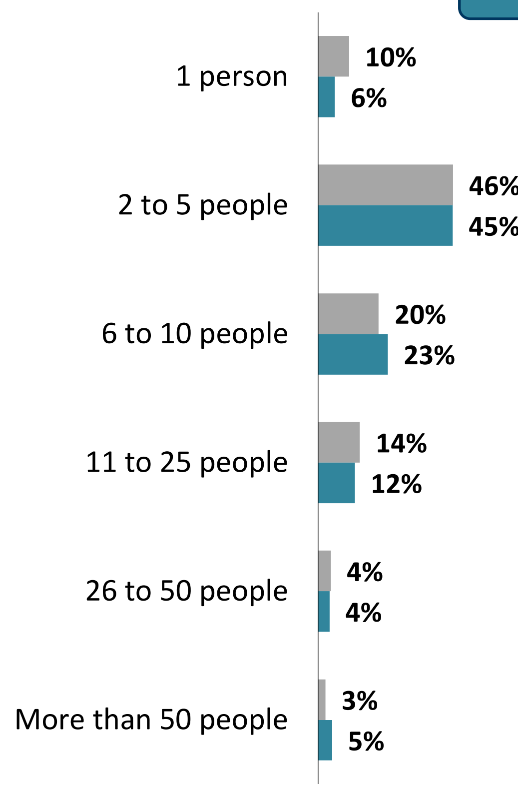
Online

Industry



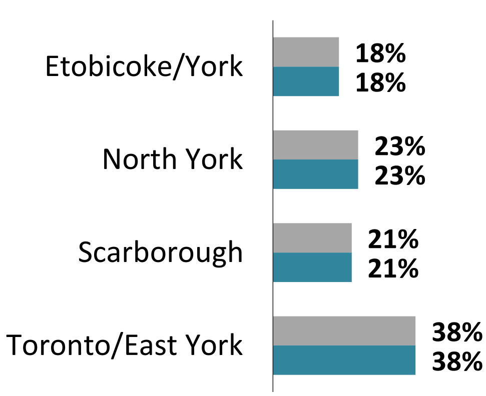
Note: Ranked in order by telephone responses.
'Prefer not to say/Don't know' (T: 2%; O: 4%) not shown

Number of Employees



Note: 'Prefer not say/Don't know' (T: 3%; O: 4%) not shown

Region



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Environmental Controls

Section 2

Telephone versus Online

Environmental Controls

It is important to distinguish between what is within, and what is outside of Toronto Hydro's influence or control when it comes to drivers of customer opinion.

Perceptions of distributors often tend to move with general perceptions of ***Ontario's electricity sector*** rather than in response to the local utility.

To prepare for the energy transition, perceptions of distributors are now more tied to ***attitudes towards phasing out fossil fuels*** than ever before.

Perceptions of utilities are also strongly correlated with ***financial circumstances***. In tough times perception and preference can change because customers are struggling with their bills, not because of anything the company has, or has not, done.

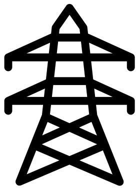
Control questions help distributors distinguish between:

a) utility driven programs that impact customer opinion; and

b) uncontrollable external drivers that impact customer opinion.

When conducting research in the energy sector, INNOVATIVE often tests multiple environmental controls to assess what role predispositions (customer values and beliefs – which can be difficult and costly to change) play in the formation of an opinion towards a utility.

In this study, our environmental controls focus on three key questions to help capture external phenomena:



General perceptions of Ontario's electricity sector: *Customers are well served by the electricity system in Ontario.*

Attitudes towards phasing out fossil fuels: *Fossil fuels should be phased out as quickly as possible to speed up the shift to a lower-carbon future.*

Financial Circumstances: *The cost of my electricity bill has a major impact on [Residential: my finances / Small Business: the bottom line of my organization] and requires I do without some other important priorities.*

Telephone versus Online

Environmental Controls

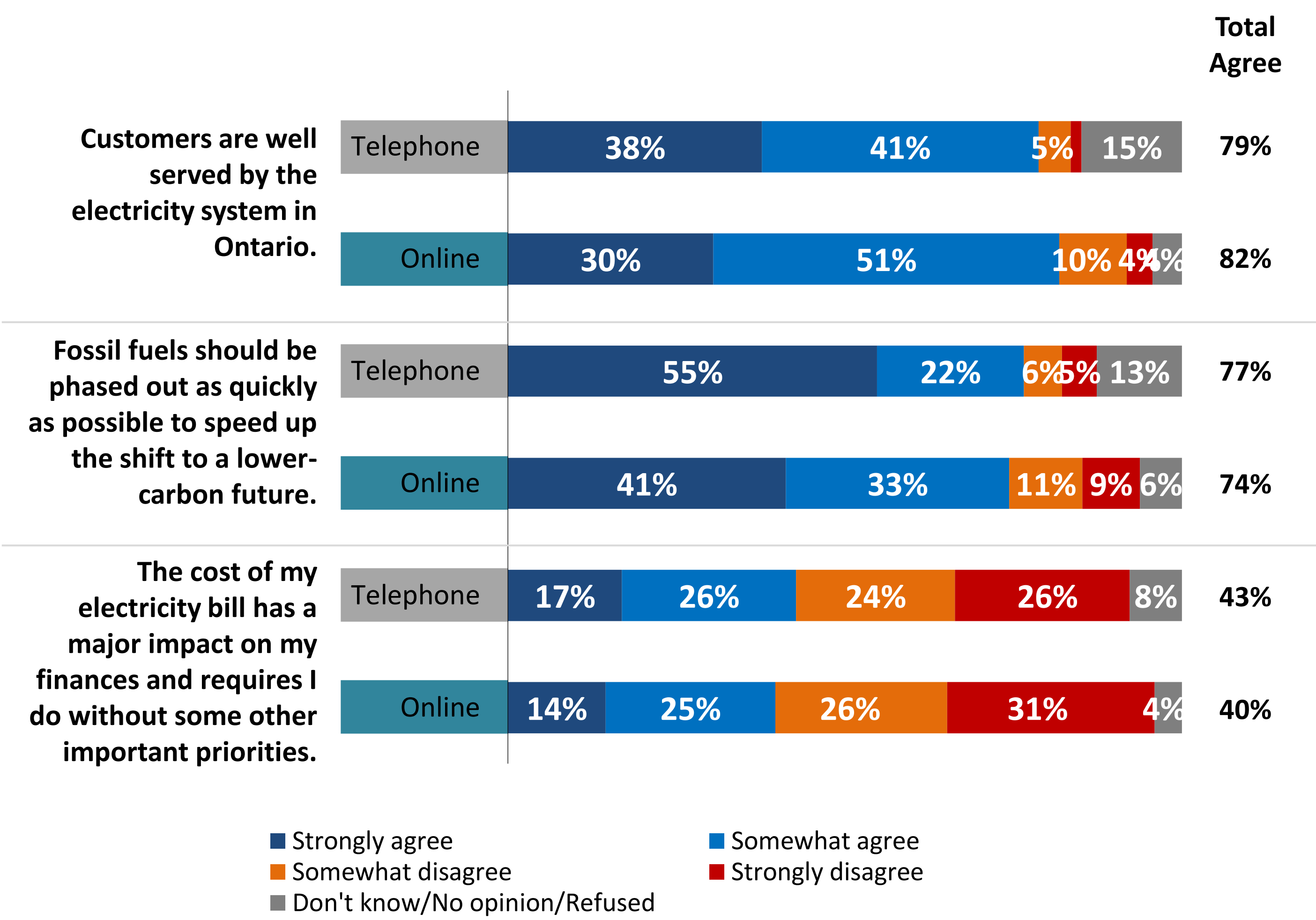
Residential

Q

[Telephone] Lastly, I'd like to ask you some general questions about the electricity system in Ontario.

For each statement, please tell me if you would strongly agree, somewhat agree, somewhat disagree or strongly disagree. If you don't know enough to say or don't have an opinion just let me know.

[Online] To what extent do you agree or disagree with the following statements?



Note: sums added before rounding.

Telephone versus Online

Environmental Controls

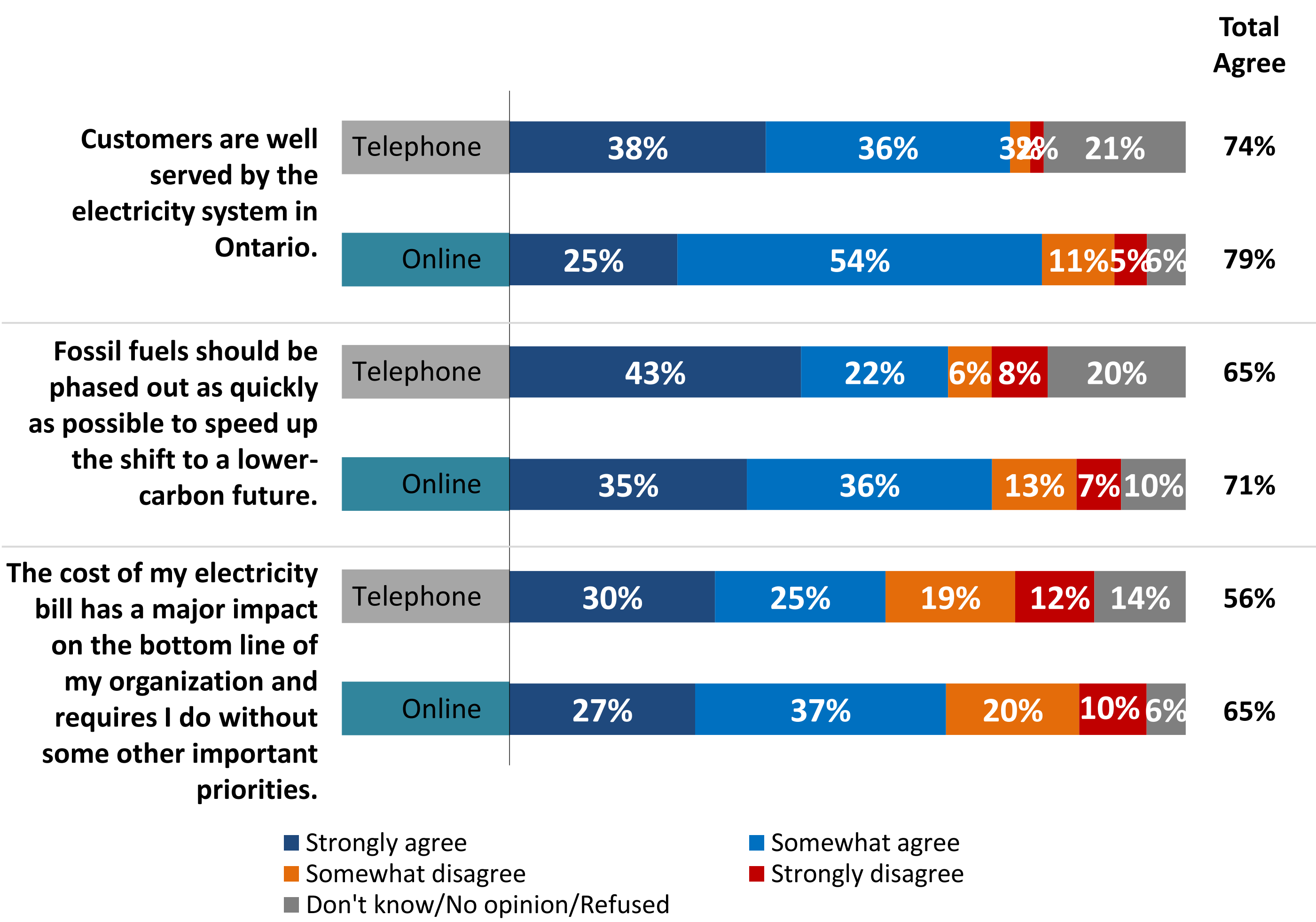
Small Business

Q

[Telephone] Lastly, I'd like to ask you some general questions about the electricity system in Ontario.

For each statement, please tell me if you would strongly agree, somewhat agree, somewhat disagree or strongly disagree. If you don't know enough to say or don't have an opinion just let me know.

[Online] To what extent do you agree or disagree with the following statements?



Note: sums added before rounding.

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Customer Perceptions

Section 3

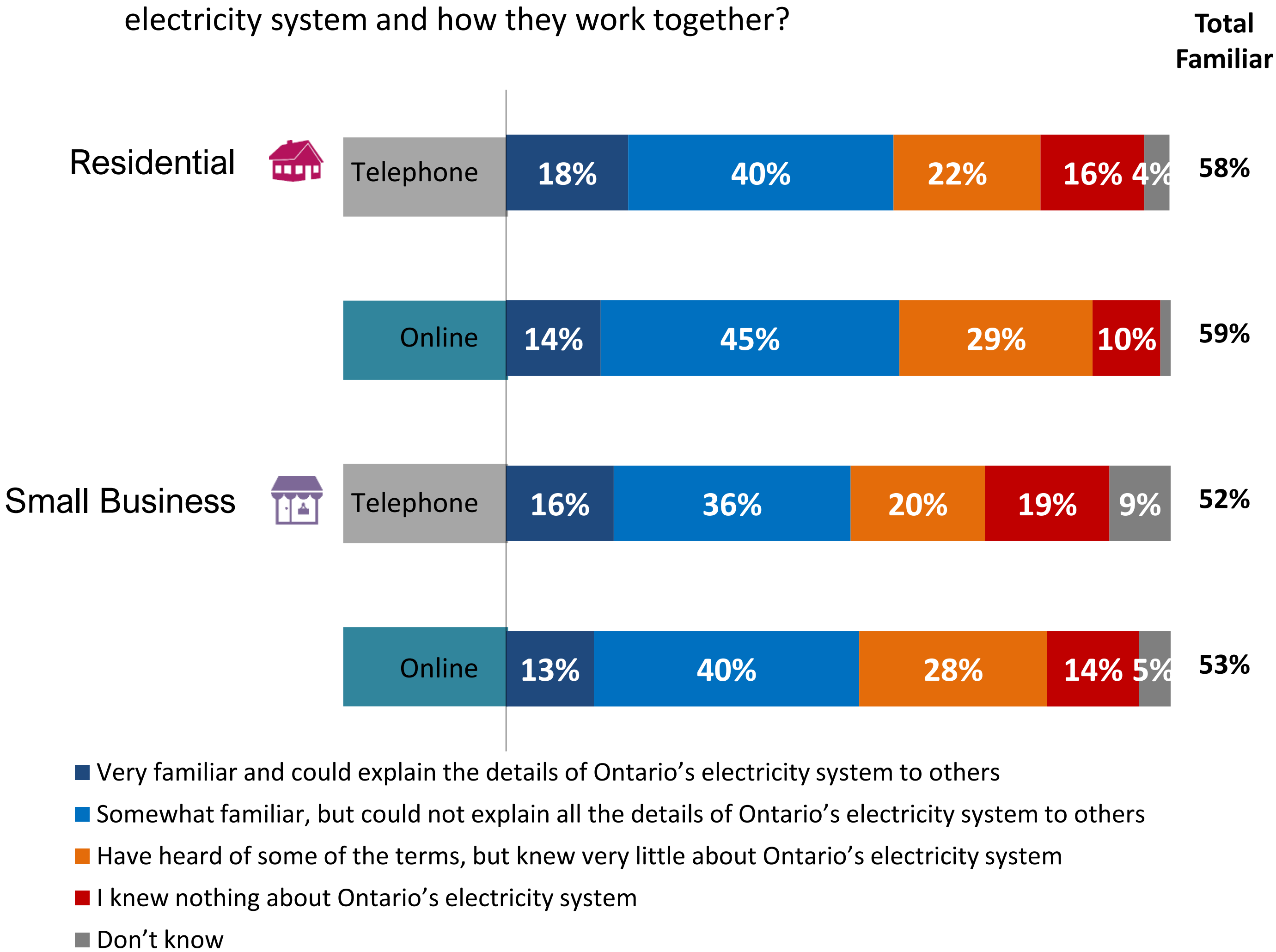
Familiarity with Ontario's Electricity System

Q

As you may know, Ontario's electricity system has three key components: **generation**, **transmission** and **distribution**.

- **Generating stations** convert various forms of energy into electric power
- **Transmission lines** connect the power produced at generating stations to where it is needed across the province
- **Local distribution networks** take the electricity from provincial transmission lines and bring it to your home through a network of wires, poles and other equipment.

Before this survey, how familiar were you with the various parts of the electricity system and how they work together?

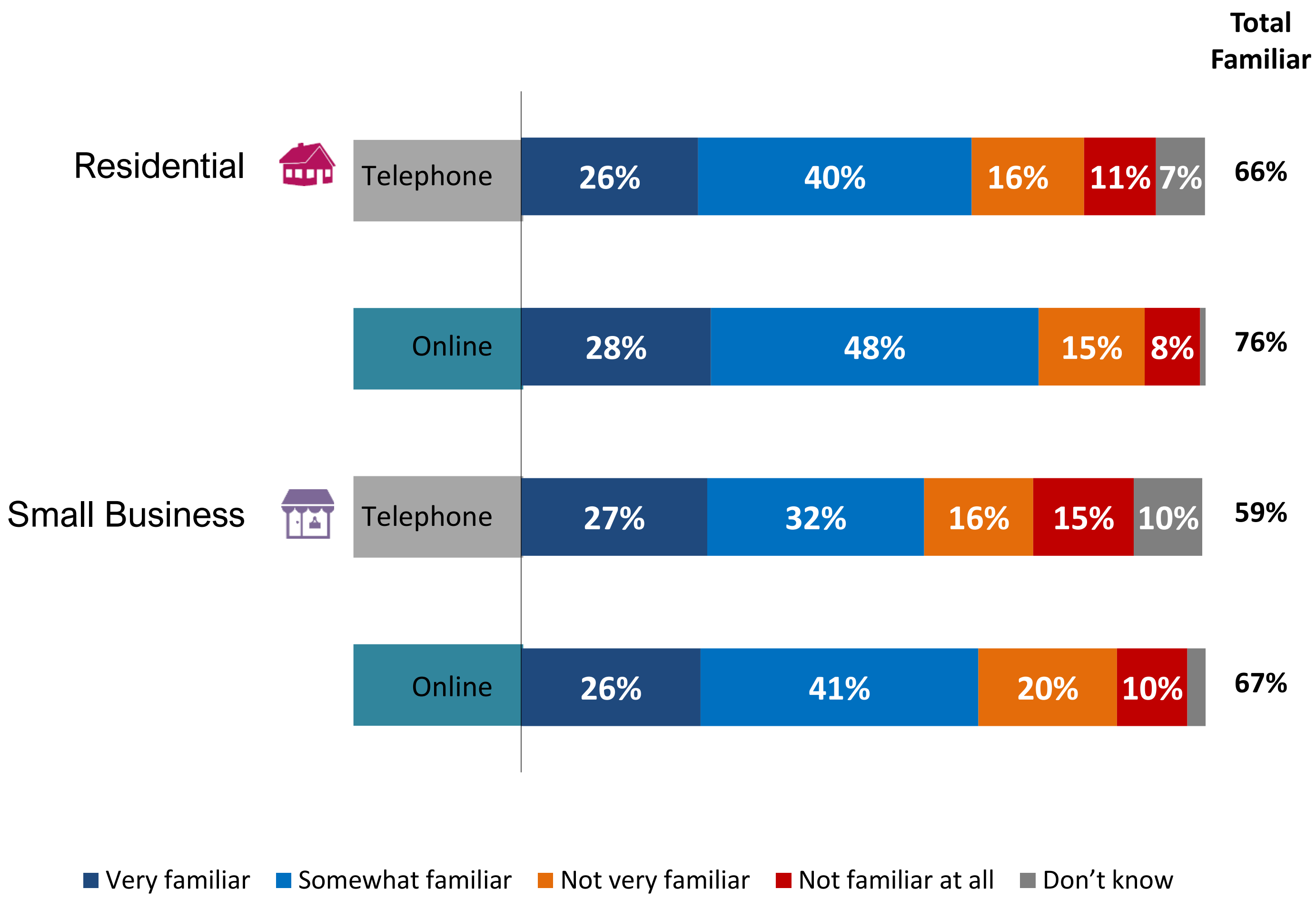


Note: sums added before rounding.

Familiarity with Toronto Hydro

Q **Toronto Hydro** owns and operates Toronto's distribution network. This is the network that takes the electricity from high-voltage transmission towers and brings it to your home through a network of wires, poles and other equipment.

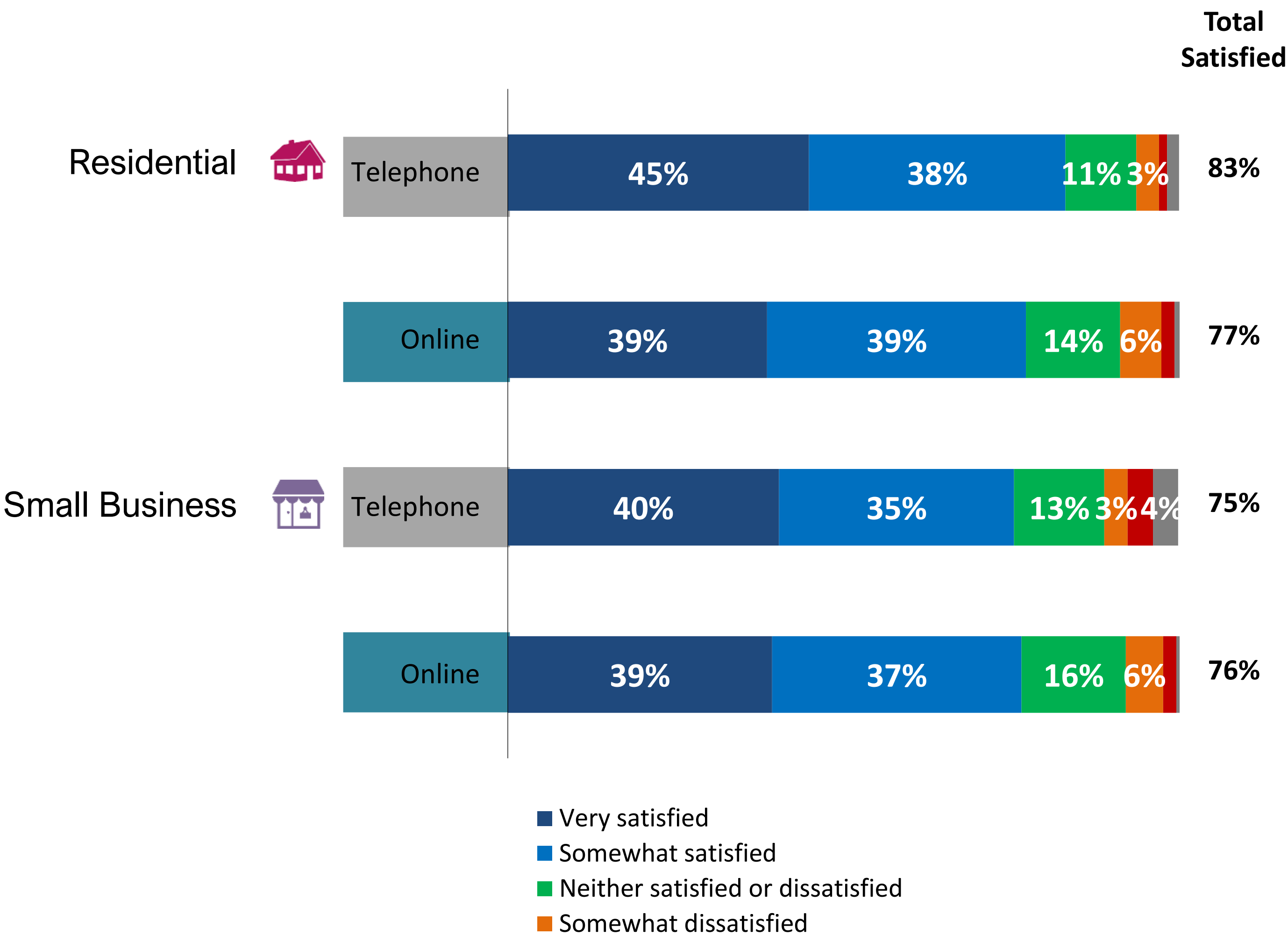
Before this survey, how familiar were you with **Toronto Hydro**, which operates the electricity distribution system in your community?



Note: sums added before rounding.

Satisfaction with Toronto Hydro

Q Thinking specifically about the services provided to you and your community by **Toronto Hydro**, overall, how satisfied or dissatisfied are you with the services that you receive?



Note: sums added before rounding.

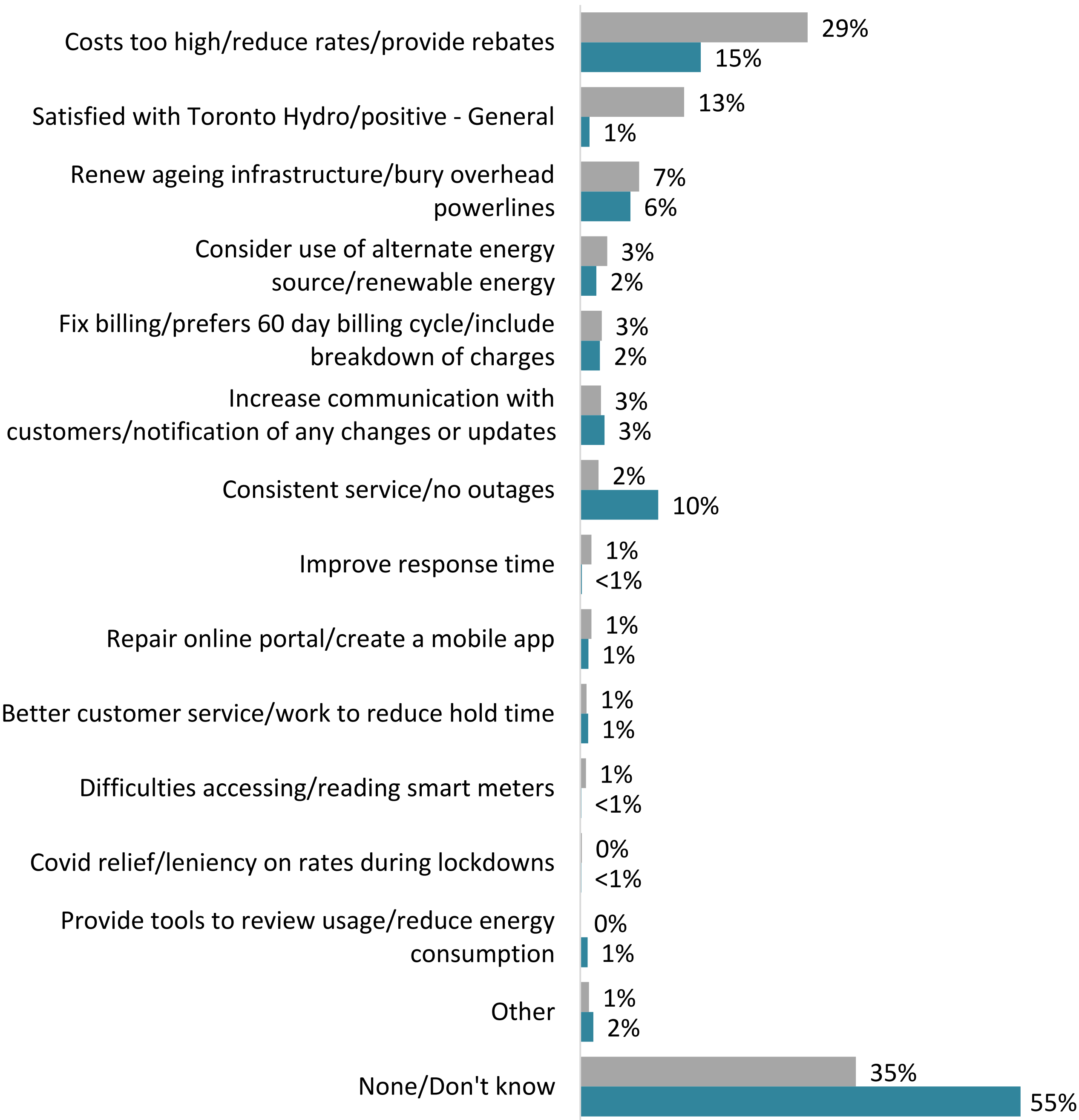
Residential

Suggestions for Improvement

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Telephone

Online



Ranked in order by telephone responses. “Other” represents responses codes <1%.

INNOVATIVE RESEARCH GROUP

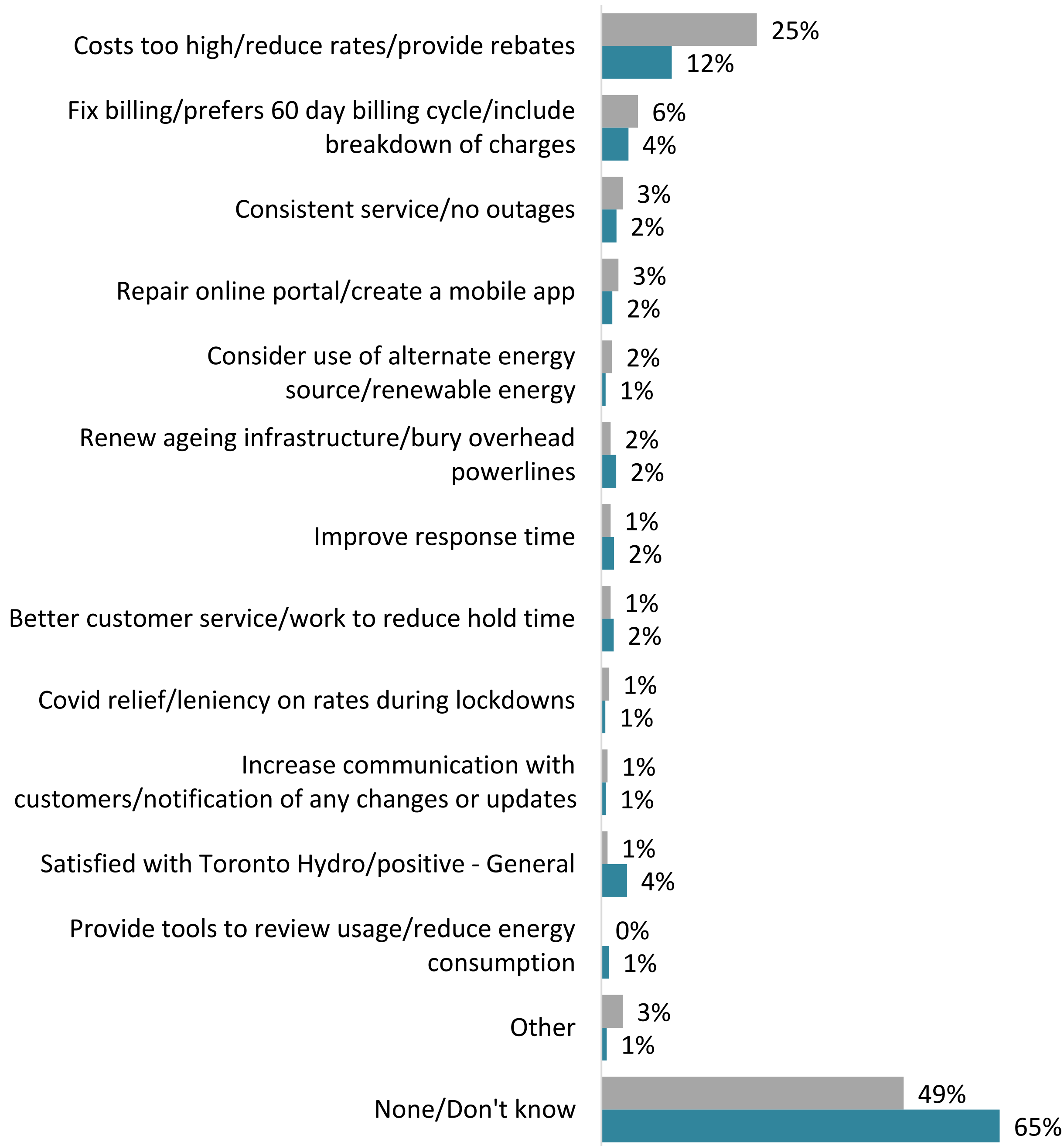
Small Business

Suggestions for Improvement

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Telephone

Online



Ranked in order by telephone responses. “Other” represents responses codes <1%.

INNOVATIVE RESEARCH GROUP

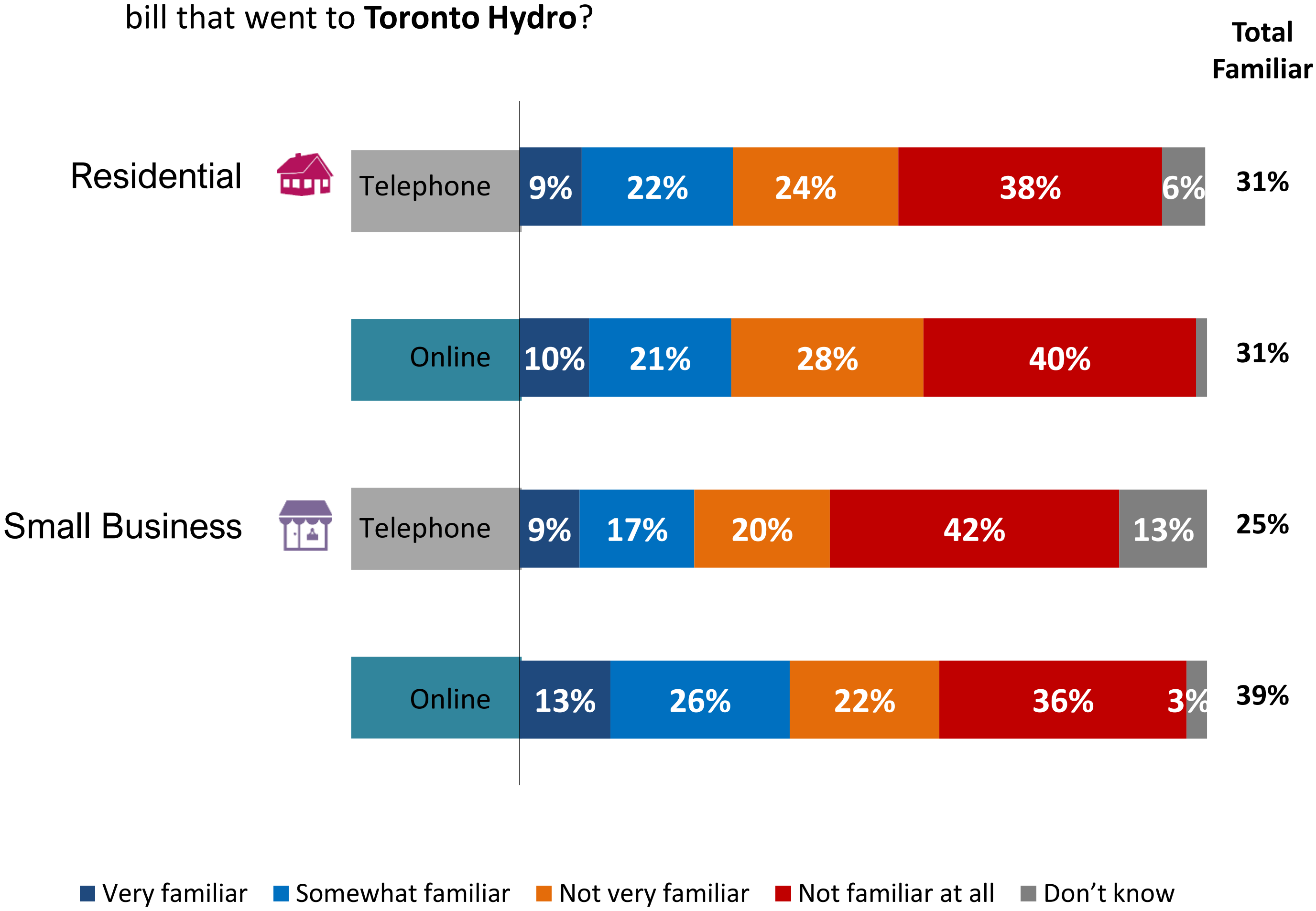
Familiarity Toronto Hydro's Share of the Bill

Q

While **Toronto Hydro** is only responsible for the distribution portion of the system, to make it easier for customers, they are responsible for collecting payment for the entire electricity system.

Toronto Hydro keeps about [Residential: **30%** / Small Business: **31%**] of the average residential customer's bill. The rest of the bill goes to power generation companies, transmission companies, the provincial government and regulatory agencies.

Before this survey, how familiar were you with the amount of your electricity bill that went to **Toronto Hydro**?



Note: sums added before rounding.

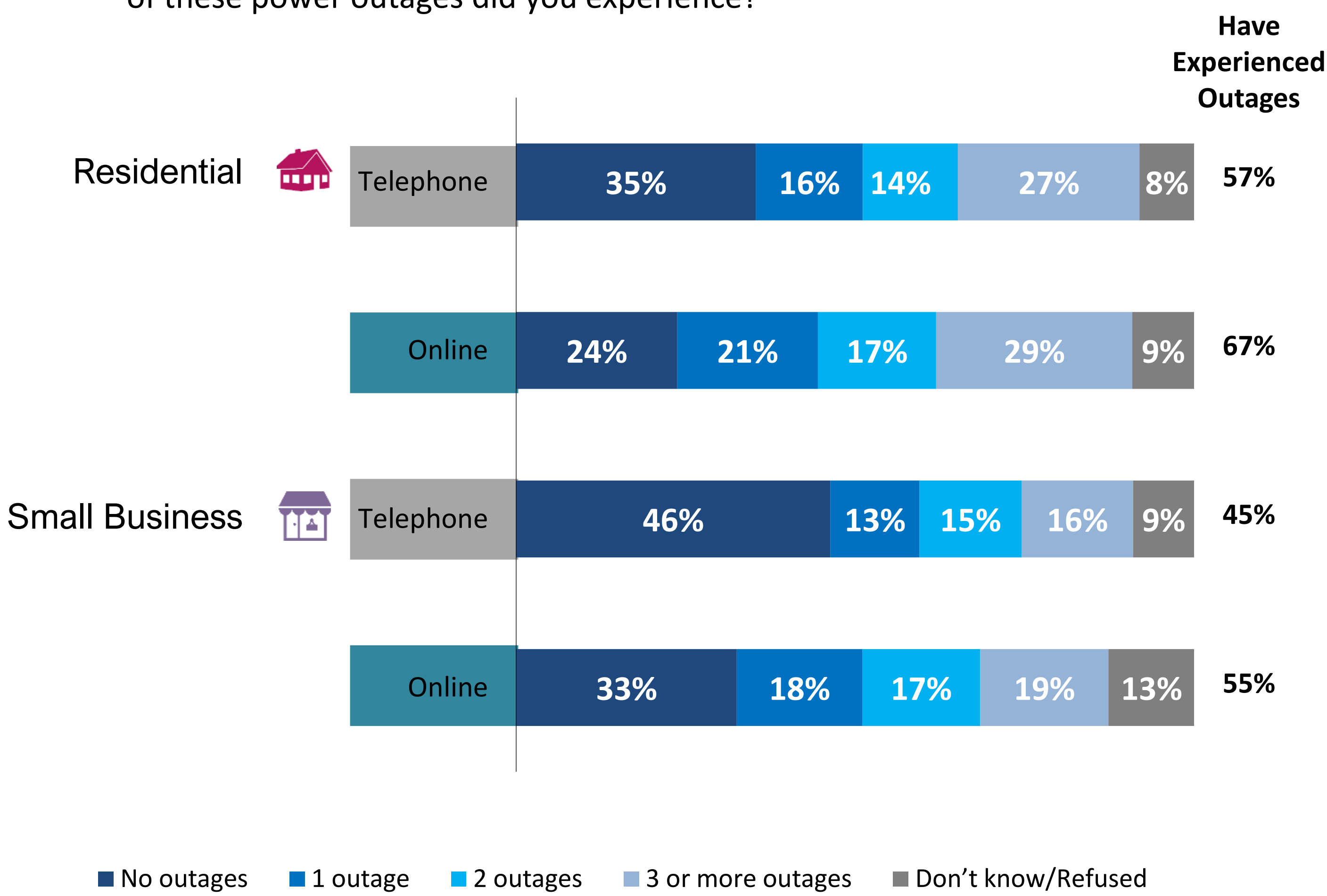
Reliability Experience

Q **[Residential]** Now, let's talk about the reliability of electricity service you receive.

Have you experienced any power outages at **home in the past 12 months** which *lasted longer than one minute*? If so, approximately how many of these power outages did you experience?

[Small Business] Now, let's talk about the reliability of electricity service your organization receives.

Have you experienced any power outages at **your organization in the past 12 months** which *lasted longer than one minute*? If so, approximately how many of these power outages did you experience?



Note: sums added before rounding.

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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RESEARCH GROUP

CONFIDENTIAL

APPENDIX 03

Residential

Needs and Preferences Survey

TORONTO HYDRO

November 2, 2023

STRICTLY CONFIDENTIAL

2025 – 2029 Rate Application

Report Navigation

APPENDICIES

PHASE I

PHASE II

Residential Customers

Online Survey Results

Section 3.1

Online Survey

Survey Design & Methodology

Residential

INNOVATIVE was engaged by Toronto Hydro to gather customer input to assess the importance of the outcomes and priorities identified in the qualitative components of Phase I of the customer engagement.

Field Dates

The **Residential Online Survey** was sent to a random selection of Toronto Hydro residential customers who provided the utility with an email address. Customers had an opportunity to complete the survey between **December 7th, 2021, and January 10th, 2022**.

Each customer received a unique URL that could be linked back to their annual consumption, region and rate class.

In total, the residential survey was sent to **40,094** customers from *customerexperience@torontohydro.com*. A reminder email was sent 6 days after the initial invitation to those who had not yet completed the survey.

Residential Online Survey Completes

A total of **1,685** (unweighted) Toronto Hydro residential customers completed the online survey via unique URL.

Sample Weighting

The residential online survey sample was weighted proportionately by age, consumption quartiles and region in order to be representative of the broader Toronto Hydro customer base.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region, as well as age against the telephone reference survey.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	63 (71)	83 (78)	87 (83)	88 (81)	321 (312)
North York	54 (90)	81 (84)	81 (84)	86 (94)	302 (352)
Scarborough	37 (35)	91 (94)	94 (105)	74 (85)	307 (321)
Toronto/E. York	218 (203)	213 (145)	145 (162)	162 (140)	755 (615)
Total	372 (400)	468 (400)	435 (400)	410 (400)	1685 (1600)

Age	Total
18-34	88 (242)
35-54	515 (616)
55+	1082 (741)
Total	1685 (1600)

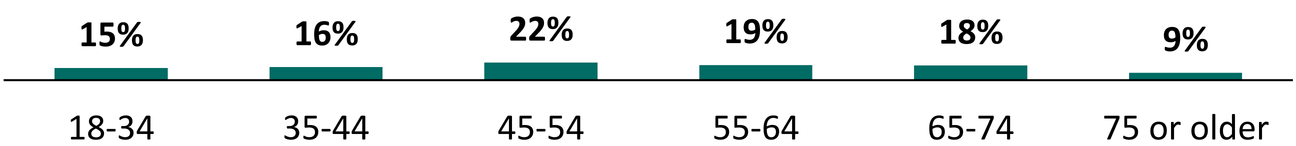
Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

Online Survey

Demographic breakdown

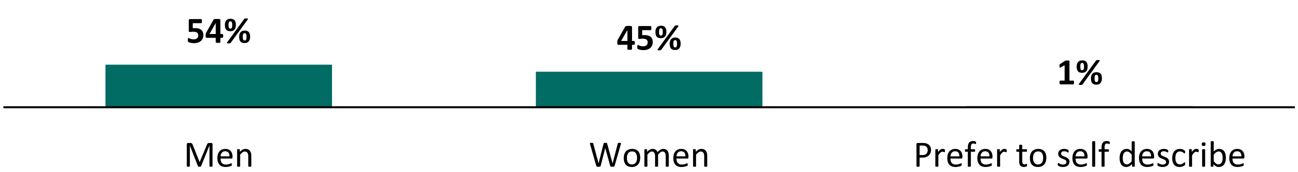
Residential

Q Age



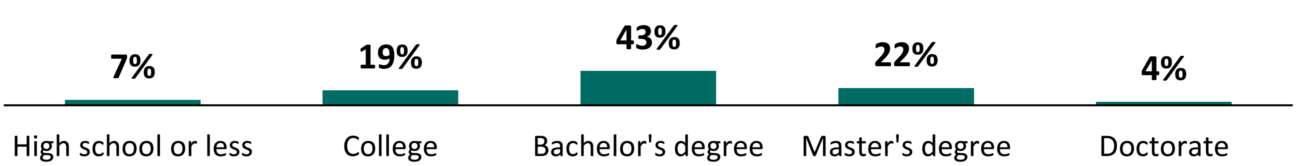
n=1,600

Q Gender



n=1,600

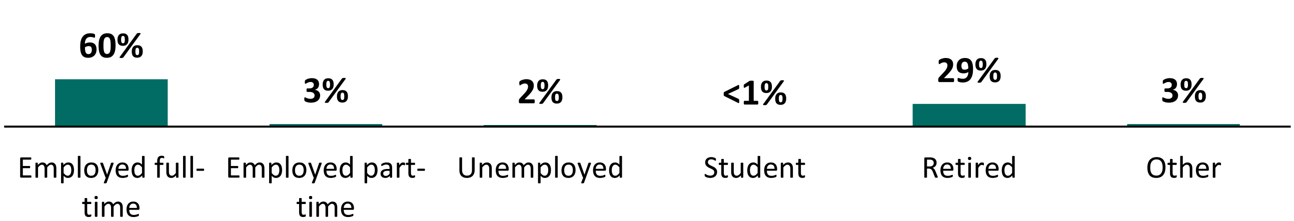
Q Education



“Prefer not to say” (5%) not shown.

n=1,600

Q Employment Status



“Prefer not to say” (2%) not shown.

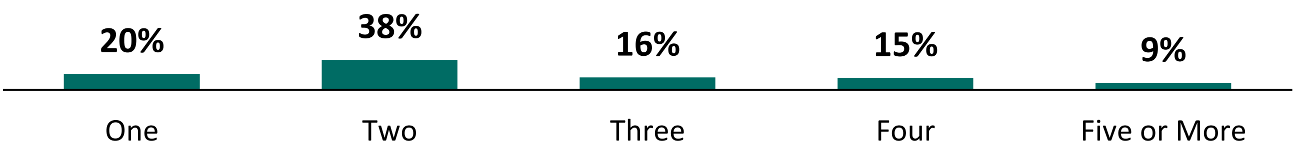
n=1,600

Online Survey

Demographic breakdown

Residential

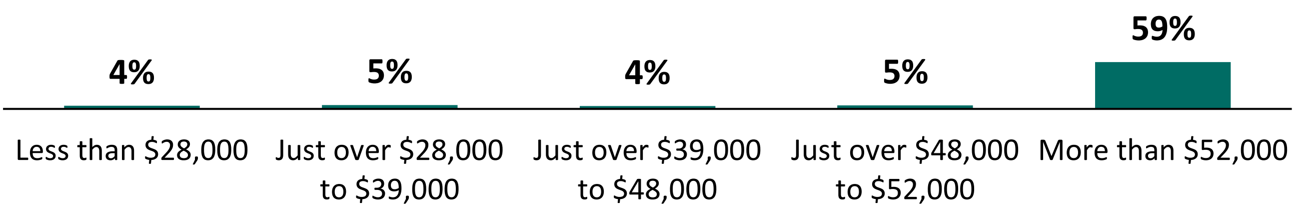
Q Household Size



"Prefer not to say" (3%) not shown.

n=1,600

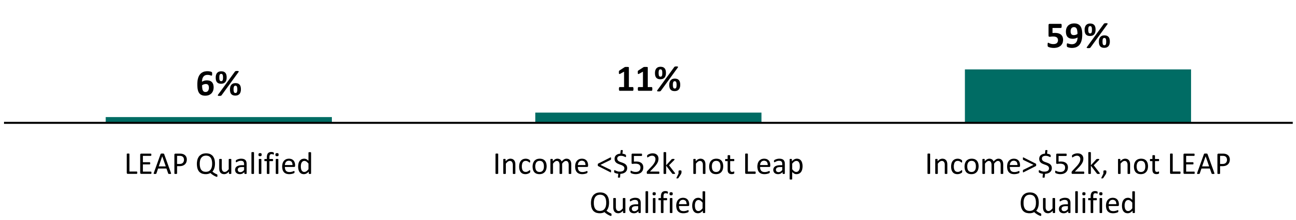
Q After Tax Household Income



"Prefer not to say" (23%) not shown.

n=1,600

Q **LEAP Qualification** (calculated based on household size and income)



"Prefer not to say" (23%) not shown.

n=1,600

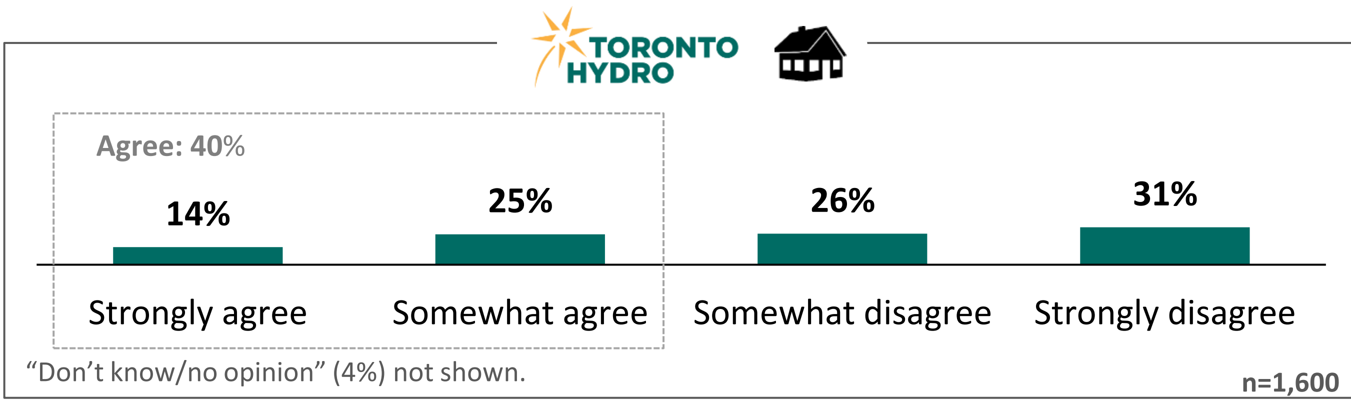
Online Survey

Environmental Controls

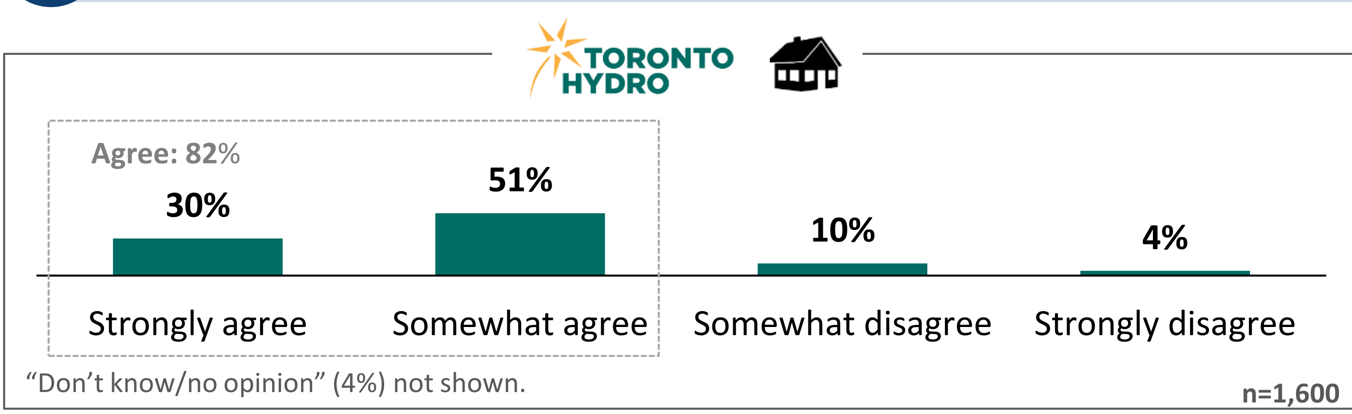
Residential

To what extent do you agree or disagree with the following statements?

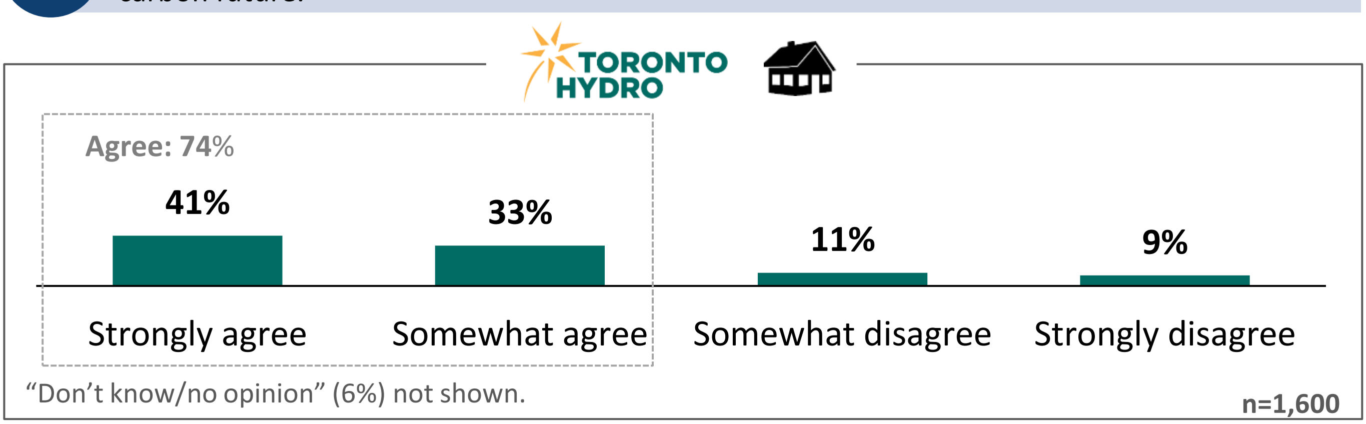
Q The cost of my electricity bill has a major impact on my finances and requires I do without some other important priorities.



Q Customers are well-served by the electricity system in Ontario.



Q Fossil fuels should be phased out as quickly as possible to speed up the shift to a lower-carbon future.



Online Survey

Familiarity with Ontario's Electricity System

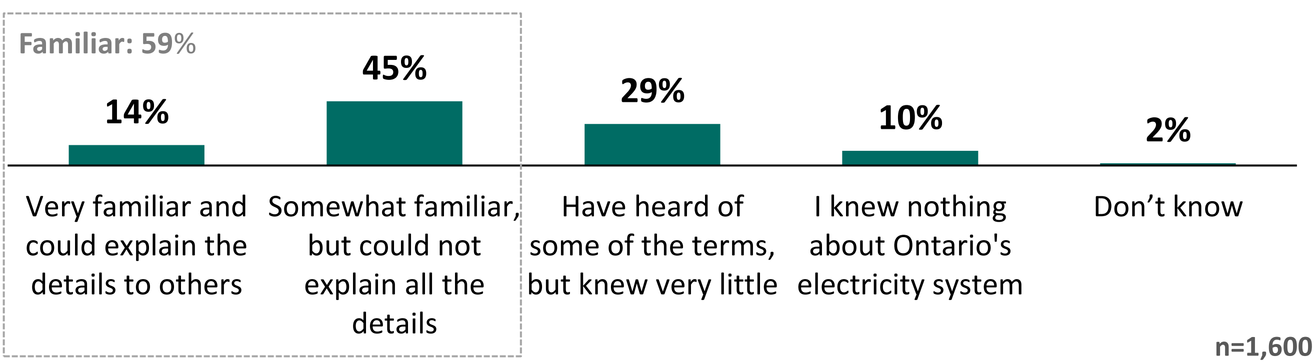
Residential

As you may know, Ontario's electricity system has three key components: **generation**, **transmission** and **distribution**.

- **Generating stations** convert various forms of energy into electric power
- **Transmission lines** connect the power produced at generating stations to where it is needed across the province
- **Local distribution networks** take the electricity from provincial transmission lines and bring it to your home through a network of wires, poles and other equipment.

Q Before this survey, how familiar were you with the various parts of the electricity system and how they work together?

TORONTO HYDRO



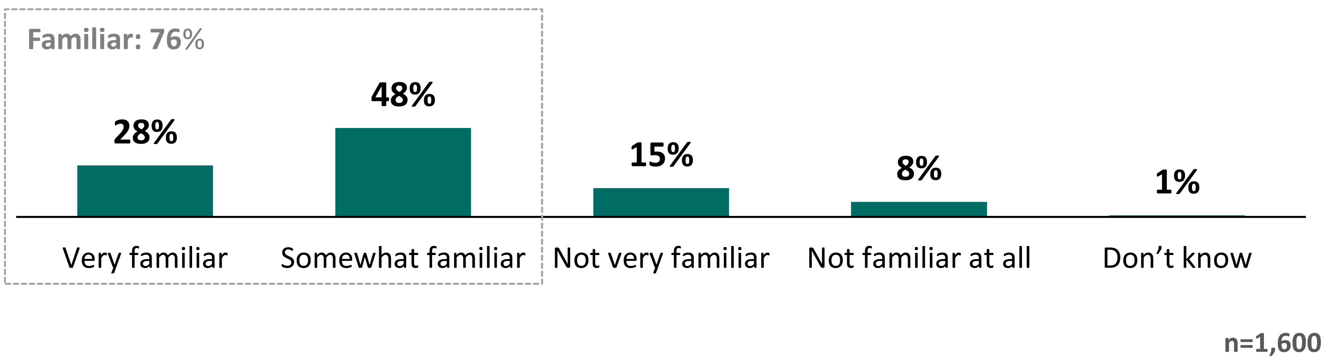
	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	17%	15%	14%	12%	12%	13%	15%
Somewhat familiar	48%	40%	45%	46%	42%	47%	45%
Knew very little	24%	30%	30%	31%	29%	27%	30%
Knew nothing	8%	13%	9%	10%	15%	11%	9%
Don't know	2%	2%	2%	1%	2%	2%	2%
Familiar (Very + Somewhat)	**66%**	**55%**	**59%**	**59%**	**54%**	**60%**	**60%**

Online Survey
Familiarity with Toronto Hydro

Residential

Toronto Hydro owns and operates Toronto's distribution network. This is the network that takes the electricity from high-voltage transmission towers and brings it to your home through a network of wires, poles and other equipment.

Q Before this survey, how familiar were you with **Toronto Hydro**, which operates the electricity distribution system in your community?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	31%	27%	32%	24%	32%	25%	28%
Somewhat familiar	50%	46%	45%	50%	41%	48%	50%
Not very familiar	11%	15%	16%	18%	16%	15%	15%
Not familiar at all	7%	11%	6%	8%	10%	11%	7%
Don't know	1%	1%	<1%	1%	1%	1%	1%
Familiar (Very + Somewhat)	**81%**	**73%**	**77%**	**74%**	**73%**	**73%**	**77%**

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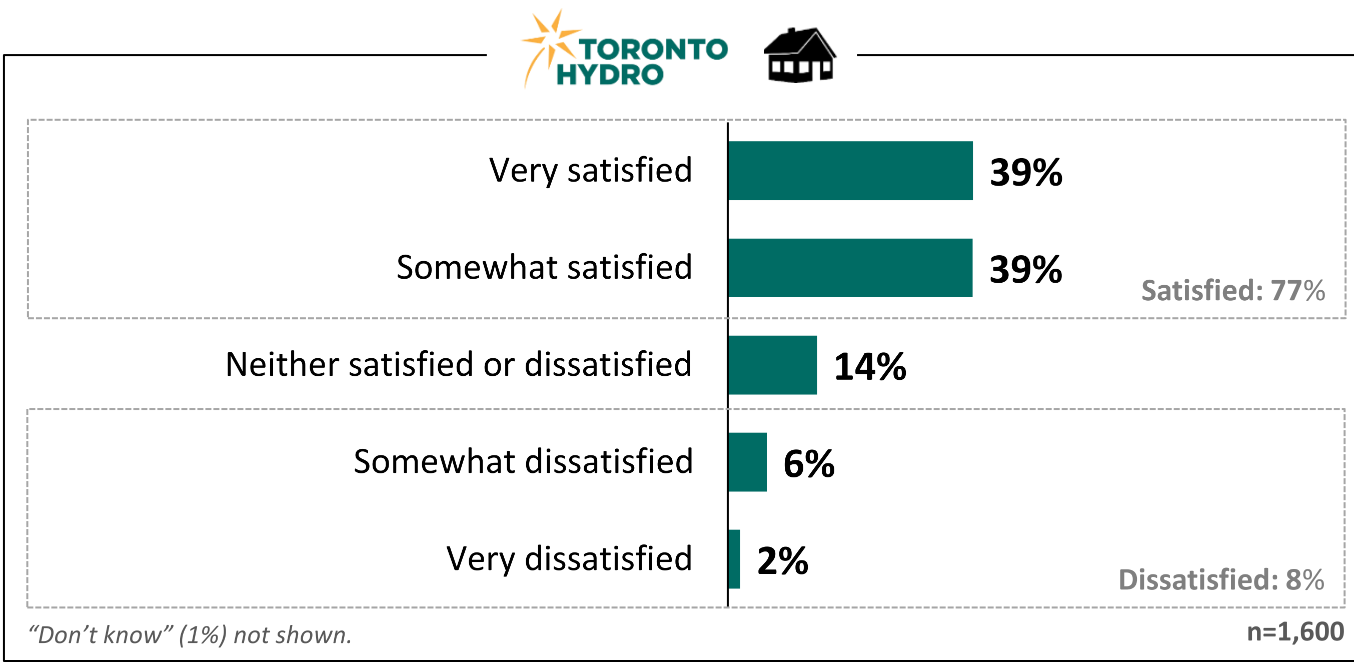
Online Survey

Overall Satisfaction with Toronto Hydro

Residential

Q Thinking specifically about the services provided to you and your community by **Toronto Hydro**, overall, how satisfied or dissatisfied are you with the services that you receive?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very satisfied	38%	38%	39%	39%	32%	33%	42%
Somewhat satisfied	33%	42%	41%	38%	36%	39%	39%
Neither satisfied or dissatisfied	16%	11%	13%	15%	19%	14%	13%
Somewhat dissatisfied	8%	6%	6%	6%	7%	11%	4%
Very dissatisfied	4%	2%	1%	1%	6%	3%	1%
Satisfied (Very + Somewhat)	**71%**	**80%**	**81%**	**77%**	**68%**	**72%**	**81%**
Dissatisfied (Very + Somewhat)	**11%**	**8%**	**7%**	**7%**	**12%**	**13%**	**5%**

Online Survey

How Toronto Hydro can Improve Services to Customers

Residential

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Response	%
Costs too high/reduce rates/provide rebates	15.1%
Consistent service/no outages	9.8%
Renew ageing infrastructure/bury overhead powerlines	6.3%
Increase communication with customers/notification of any changes or updates	3.0%
Fix billing/prefers 60-day billing cycle/include breakdown of charges	2.5%
Consider use of alternate energy source/renewable energy	2.0%
Satisfied with Toronto Hydro/positive - General	1.2%
Repair online portal/create a mobile app	1.0%
Better customer service/work to reduce hold time	1.0%
Provide tools to review usage/reduce energy consumption	0.9%
Improve response time	0.2%
Difficulties accessing/reading smart meters	0.1%
Covid relief/leniency on rates during lockdowns	0.1%
Other	1.6%
None/Don’t know	55.2%

Note: Only responses >0.1% shown

Online Survey

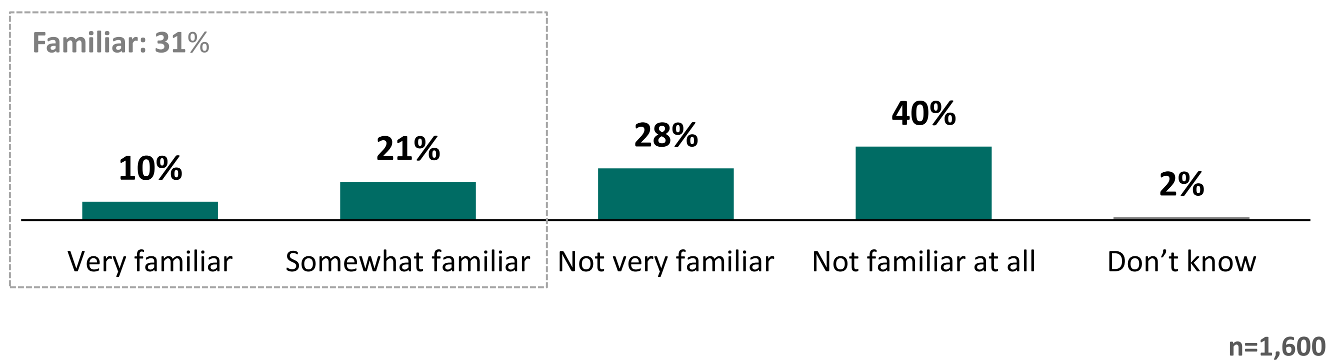
Familiarity with Bill Remittance to Toronto Hydro

Residential

While **Toronto Hydro** is only responsible for the distribution portion of the system, to make it easier for customers, they are responsible for collecting payment for the entire electricity system.

Toronto Hydro keeps about **30%** of the average residential customer's bill. The rest of the bill goes to power generation companies, transmission companies, the provincial government and regulatory agencies.

Q Before this survey, how familiar were you with the amount of your electricity bill that went to **Toronto Hydro**?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	15%	9%	10%	8%	9%	10%	10%
Somewhat familiar	22%	23%	23%	18%	21%	30%	17%
Not very familiar	25%	26%	33%	28%	27%	26%	29%
Not familiar at all	36%	39%	33%	46%	40%	31%	43%
Don't know	2%	3%	1%	1%	3%	2%	1%
Familiar (Very + Somewhat)	**37%**	**33%**	**33%**	**25%**	**30%**	**41%**	**27%**

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Residential Customers

Consumer Priorities

Section 3.2

Online Survey

Importance of Customer Priorities

Residential

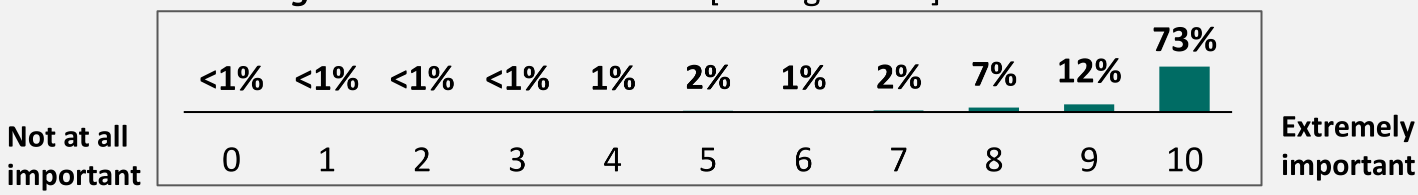
Now, let's talk about our second topic – outcomes.

Everyday **Toronto Hydro** interacts with hundreds of its customers through multiple channels and touchpoints, including surveys, the call centre and social media.

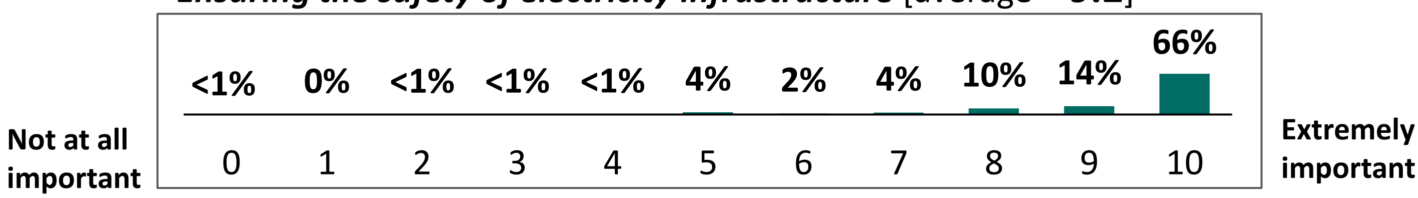
In a recent series of customer focus groups, a number of company goals were identified as priorities for **Toronto Hydro**.

Q Using a scale from 0 to 10, where *0 means not important at all* and *10 means extremely important*, how important are each of the following **Toronto Hydro** priorities to you as a customer?

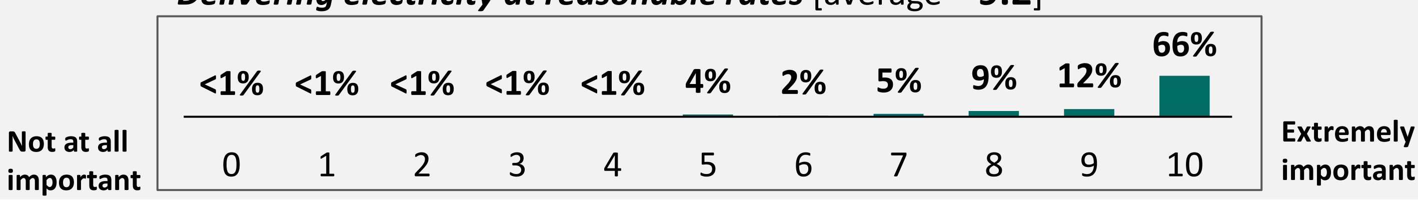
Ensuring reliable electrical service [average = **9.5**]



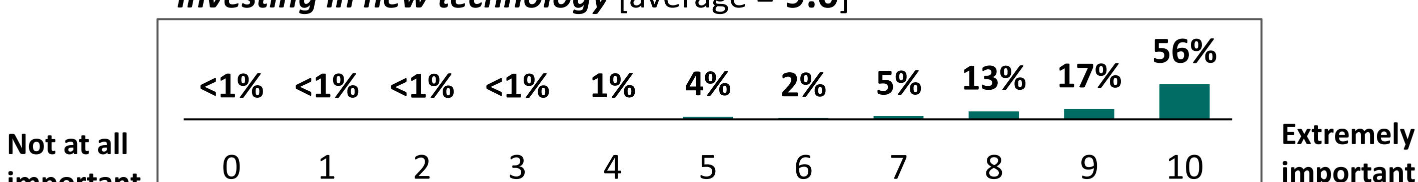
Ensuring the safety of electricity infrastructure [average = **9.2**]



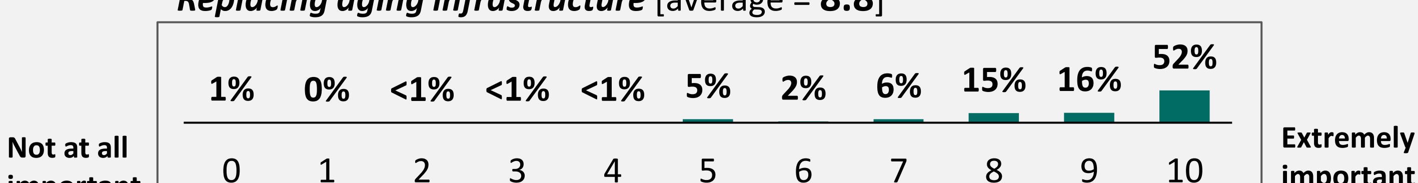
Delivering electricity at reasonable rates [average = **9.2**]



Investing in new technology [average = **9.0**]



Replacing aging infrastructure [average = **8.8**]



Online Survey

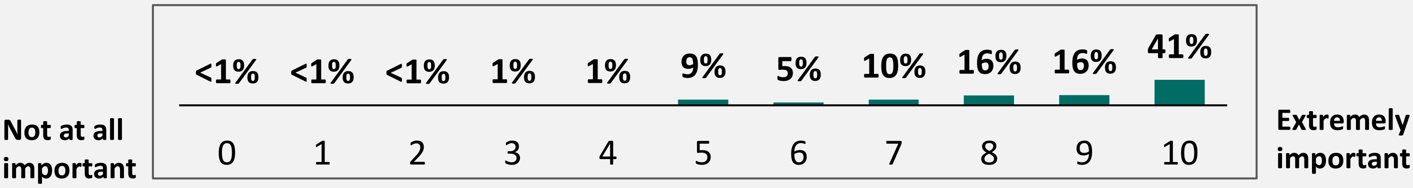
Importance of Customer Priorities (Cont'd)

Residential

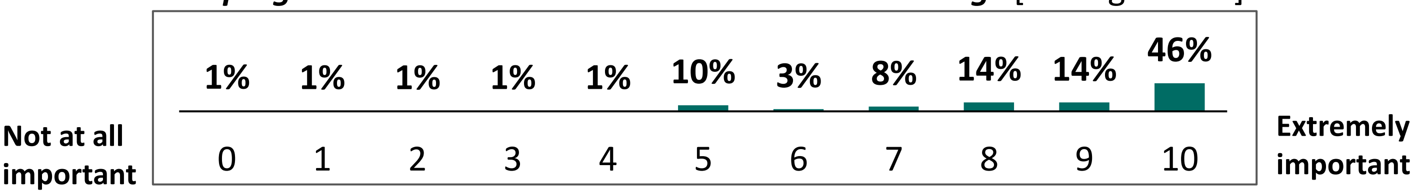
Q

Using a scale from 0 to 10, where _0 means not important at all_ and _10 means extremely important_, how important are each of the following **Toronto Hydro** priorities to you as a customer?

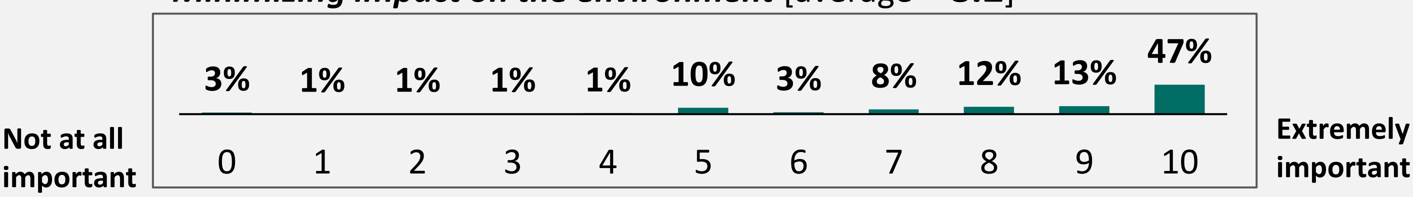
Providing quality customer service [average = **8.4**]



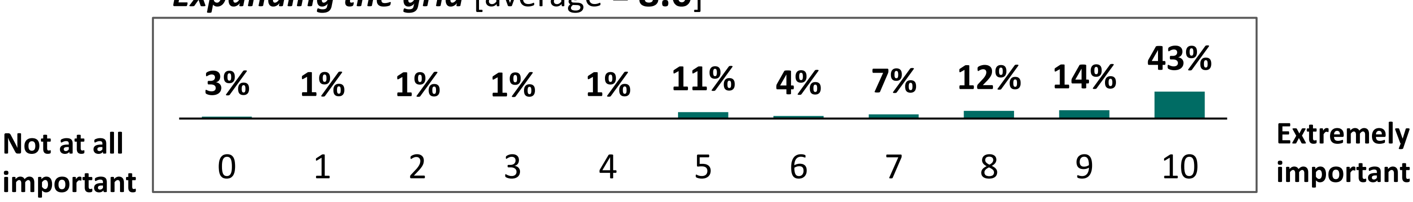
Helping customers with conservation and cost savings [average = **8.4**]



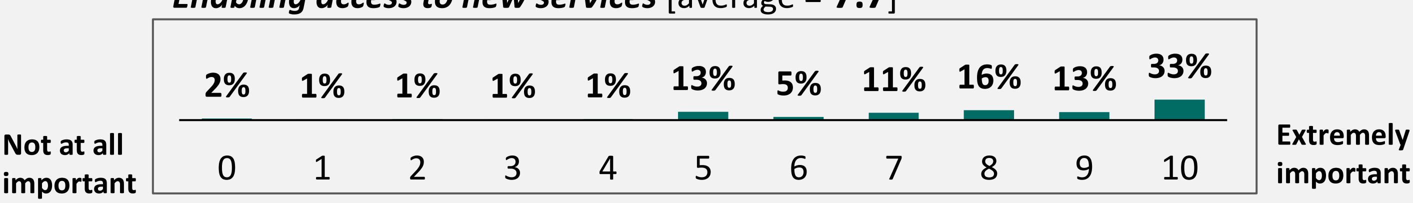
Minimizing impact on the environment [average = **8.2**]



Expanding the grid [average = **8.0**]



Enabling access to new services [average = **7.7**]



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Online Survey

Importance of Customer Priorities | Summary Scores

Residential

Q

Using a scale from 0 to 10, where _0 means not important at all_ and _10 means extremely important_, how important are each of the following **Toronto Hydro** priorities to you as a customer?

Average Score	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Ensuring reliable service	9.4	9.5	9.5	9.4	9.4	9.4	9.5
Ensuring safety of infrastructure	9.1	9.3	9.3	9.2	9.1	9.1	9.3
Delivering electricity at reasonable rates	9.3	9.3	9.3	9.1	9.7	9.3	9.1
Investing in new technology	8.9	9.1	8.9	9.0	8.8	9.0	9.0
Replacing aging infrastructure	8.9	8.9	8.6	8.9	8.5	8.8	9.0
Providing quality customer service	8.4	8.5	8.6	8.2	8.6	8.5	8.2
Helping customers with conservation	8.3	8.4	8.5	8.3	8.7	8.6	8.2
Minimizing impact on the environment	8.0	8.0	8.1	8.6	7.5	8.3	8.4
Expanding the grid	7.8	7.8	7.7	8.4	7.1	8.0	8.3
Enabling access to new services	7.9	7.6	7.8	7.7	7.8	7.8	7.7

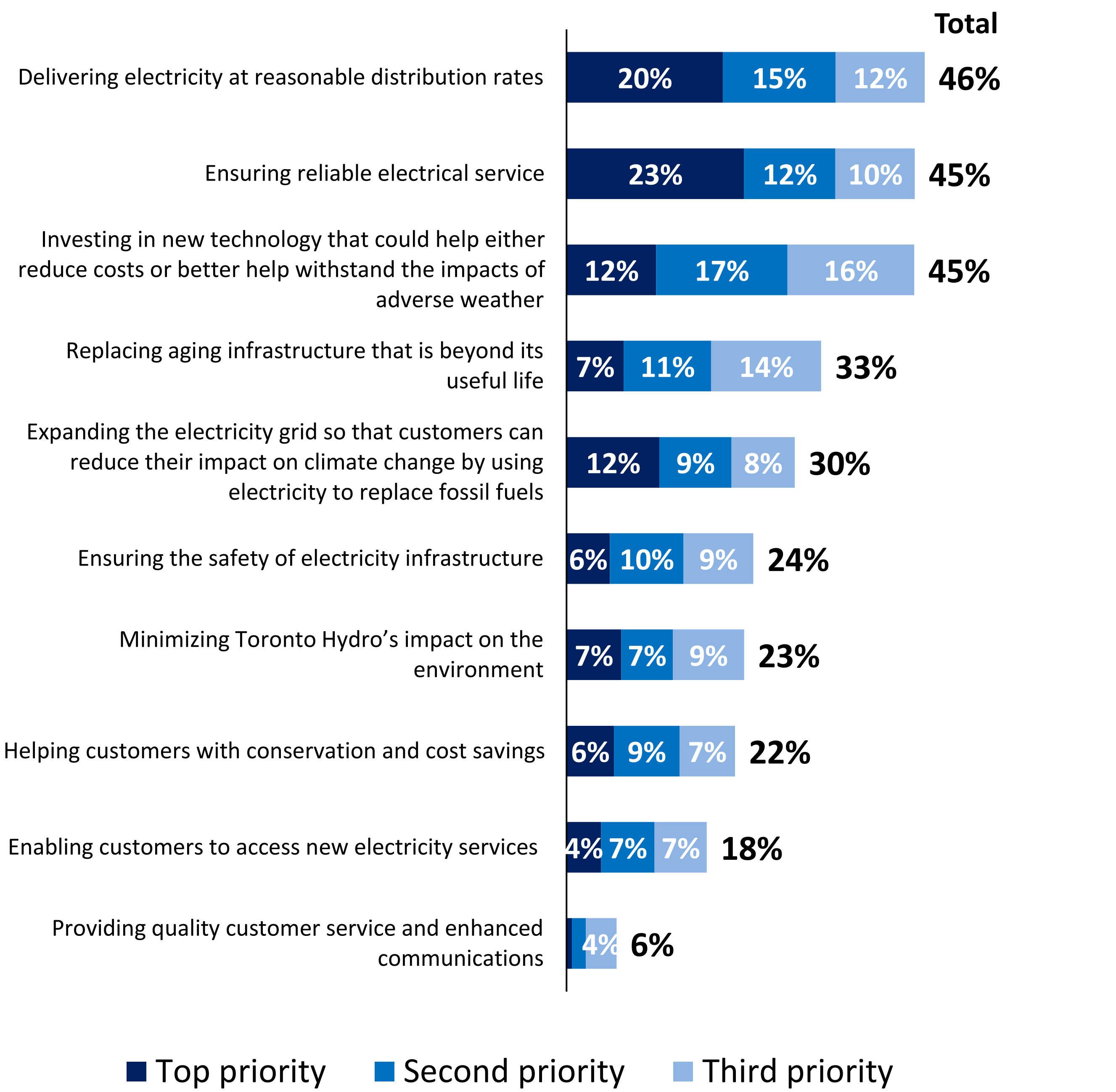
Online Survey
Ranking Customer Priorities

Residential

Q

Thinking of the priorities on the previous page, which would you say is the **most** important? What is the next most important priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?

TORONTO HYDRO



"Don't know" not shown.

n=1,600

Online Survey

Ranking Customer Priorities | Summary Scores

Residential

Q Thinking of the priorities on the previous page, which would you say is the **most** important? What is the next most important priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?

% who select as top 3 priority	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Delivering electricity at reasonable rates	50%	49%	52%	40%	74%	56%	36%
Ensuring reliable service	47%	50%	42%	43%	37%	44%	48%
Investing in new technology	46%	45%	46%	44%	38%	49%	45%
Replacing aging infrastructure	33%	33%	32%	33%	23%	30%	37%
Expanding the grid	26%	23%	24%	38%	14%	26%	35%
Ensuring safety of infrastructure	21%	28%	24%	24%	19%	21%	27%
Minimizing impact on environment	19%	20%	18%	29%	12%	22%	26%
Helping customers with conservation	24%	20%	32%	16%	47%	25%	15%
Enabling access to new services	18%	19%	16%	19%	14%	18%	20%
Providing quality customer service	8%	8%	7%	5%	12%	8%	5%

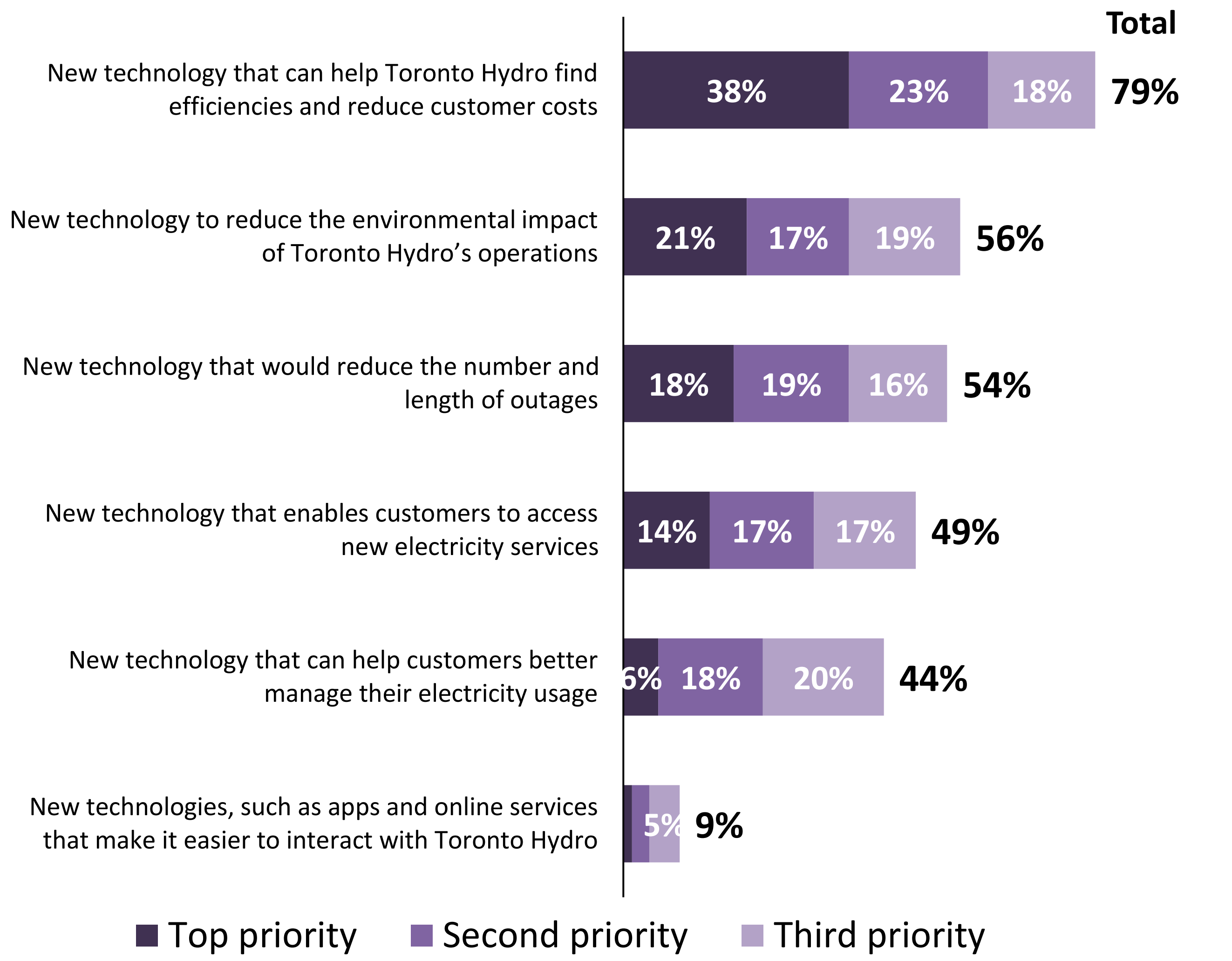
Online Survey

Ranking Technology Priorities

Residential

Investments in new technology can help Toronto Hydro address a range of issues. These include reliability, efficiency, customer service, Toronto Hydro's impact on the environment, new service offerings and tools to manage electricity usage.

Q Among the following potential investments in new technology, which would you say is the **most** important? What is the next most important new technology priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



"Don't know" not shown.

n=1,600

Online Survey

Ranking Technology Priorities | Summary Scores

Residential

Q

Among the following potential investments in new technology, which would you say is the **most** important? What is the next most important new technology priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?

% who select as top 3 priority	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
New tech that make it easier to interact with Toronto Hydro	78%	84%	84%	74%	92%	81%	75%
New technology to reduce the environmental impact of Toronto Hydro's operations	52%	51%	51%	64%	36%	55%	62%
New technology that would reduce the number and length of outages.	55%	62%	52%	51%	48%	54%	56%
New tech that enables customers to access new services	52%	41%	47%	53%	42%	45%	52%
New tech that can help customers better manage usage	41%	44%	49%	42%	56%	45%	40%
New technologies, such as apps and online services that make it easier to interact with Toronto Hydro.	10%	12%	11%	7%	20%	9%	7%

Online Survey
Additional Priorities

Residential

Q Can you think of any other important priorities that **Toronto Hydro** should be focusing on?

Response	%
Lowering rates	5.0%
Reducing carbon footprint/assessing environmental impact	4.0%
Improving reliability/safety/efficiency in power delivery	3.4%
Finding efficiencies/reducing operating costs	2.0%
Improving customer service/communication/transparency	1.9%
Offering renewable energy options	1.8%
Upgrading infrastructure/burying lines	1.3%
Allowing for greater demand due to electric vehicles	0.6%
Cyber Security/Grid Security	0.5%
Improve billing/provide more information on bill/usage	0.3%
Survey biased	0.1%
Other	1.5%
None	5.7%
Don't know	72.0%

Note: Only responses >0.1% shown

INNOVATIVE RESEARCH GROUP

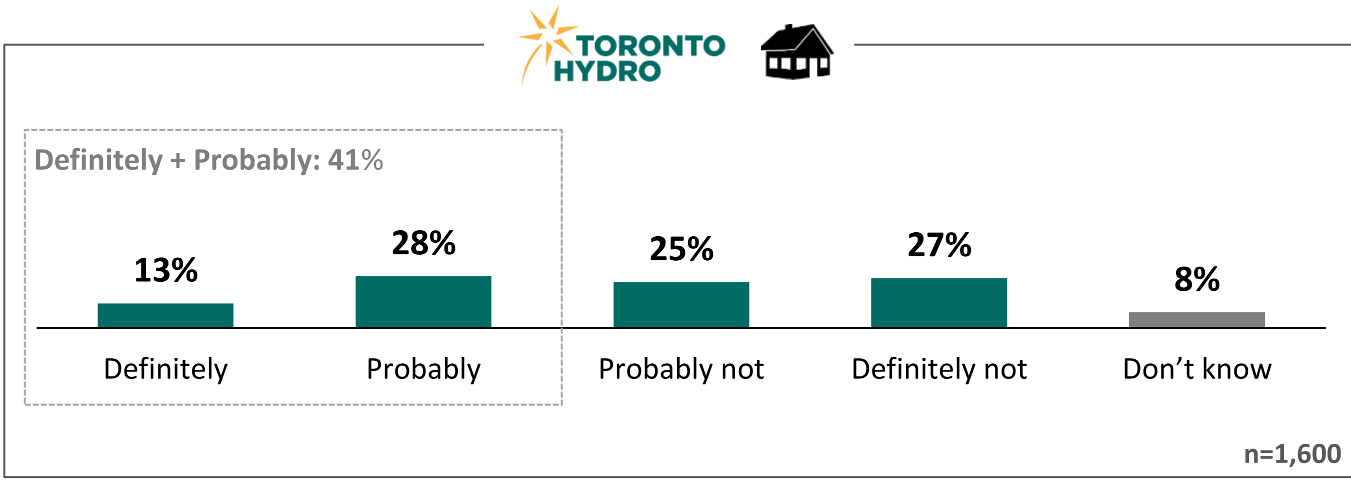
Online Survey

Support for Low-Income Customers

Residential

In recent interactions with customers, a number of customers identified assisting low-income Torontonians with their electricity bills.

Q In addition to the amount that you currently pay on your electricity bill, would you be willing to pay an extra few dollars per month in order for Toronto Hydro to provide financial assistance to make electricity bills more affordable for low-income customers?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Definitely	9%	10%	11%	18%	6%	9%	17%
Probably	28%	22%	20%	34%	9%	23%	34%
Probably not	28%	23%	30%	20%	19%	30%	24%
Definitely not	27%	34%	31%	20%	61%	28%	18%
Don't know	8%	10%	7%	8%	6%	10%	8%
Definitely + Probably	37%	33%	32%	52%	14%	32%	51%

INNOVATIVE RESEARCH GROUP

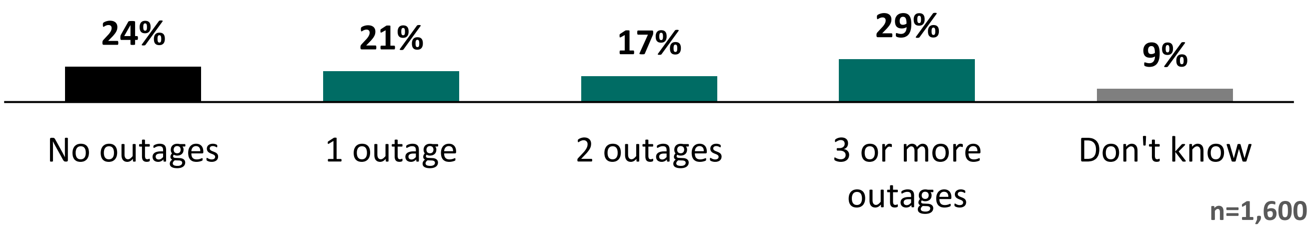
Online Survey

Number of Outages Experienced

Residential

Q Now, let's talk about the reliability of electricity service you receive. Have you experienced any power outages at **home in the past 12 months** which *lasted longer than one minute*? If so, approximately how many of these power outages did you experience?

TORONTO HYDRO



n=1,600

	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
No outages	16%	22%	16%	33%	20%	21%	26%
1 outage	21%	15%	24%	22%	17%	19%	22%
2 outages	20%	20%	19%	14%	21%	20%	16%
3 or more outages	35%	31%	33%	23%	35%	30%	27%
Don't know	8%	12%	7%	9%	7%	10%	9%

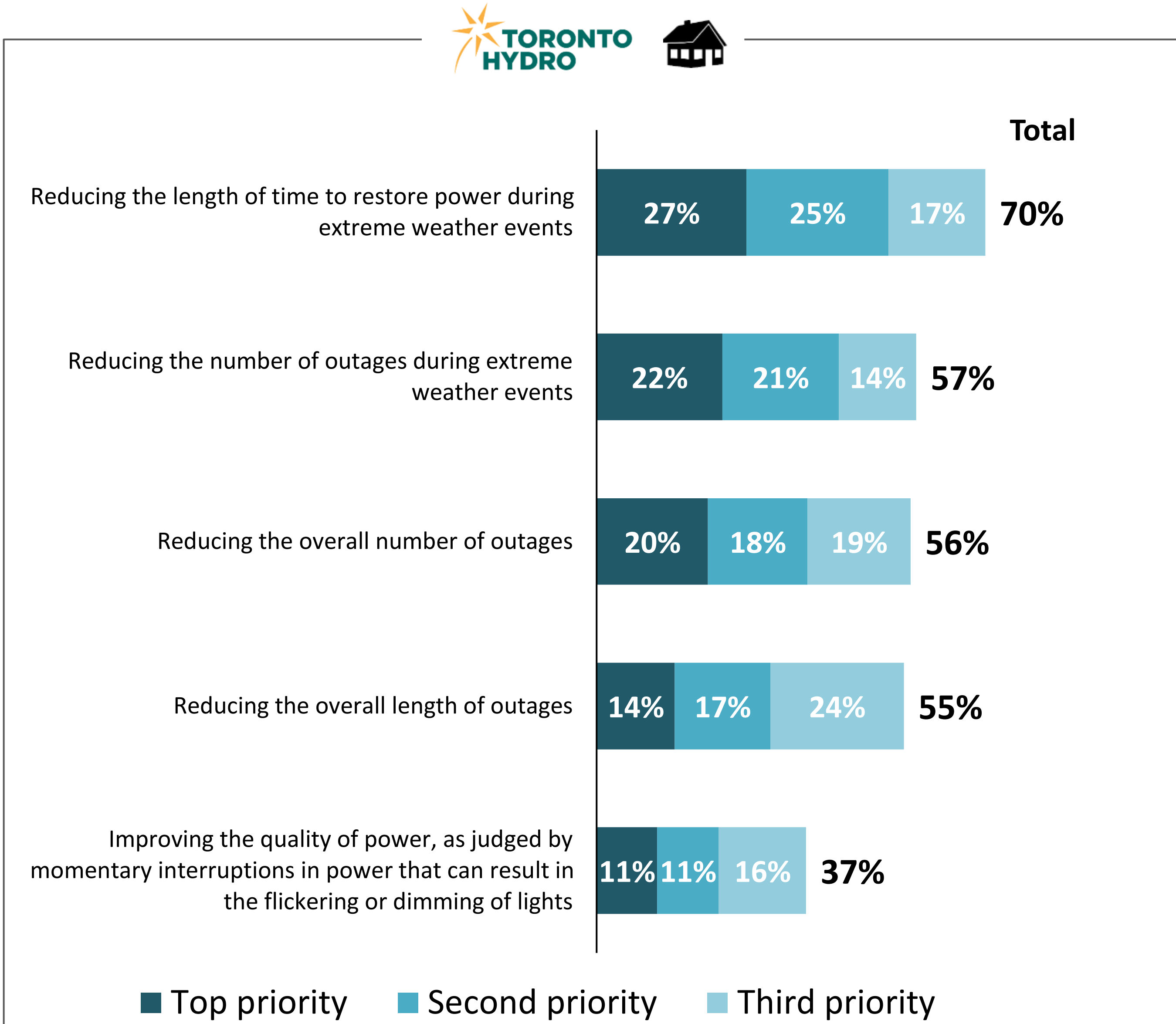
Online Survey

Ranking Reliability Priorities

Residential

When it comes to reliability, there are a number of areas that **Toronto Hydro** could focus on.

Q Among the following reliability outcomes, which would you say is the **most** important? What is the next most important reliability outcome you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



"Don't know" not shown.

n=1,600

Online Survey

Ranking Reliability Priorities | Summary Scores

Residential

Q Among the following reliability outcomes, which would you say is the **most** important? What is the next most important reliability outcome you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?

	Region				Bill impact on finances		
% who select as top 3 priority	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Reducing the length of time to restore power during extreme weather events	63%	74%	66%	72%	67%	66%	72%
Reducing the number of outages during extreme weather events	53%	59%	55%	60%	59%	57%	57%
Reducing the overall number of outages	57%	55%	56%	57%	53%	58%	56%
Reducing the overall length of outages	58%	55%	58%	52%	56%	51%	56%
Improving the quality of power, as judged by momentary interruptions	43%	38%	45%	31%	45%	43%	33%

Residential Customers

Investment Trade-Offs

Section 3.3

Online Survey
System Renewal

Residential

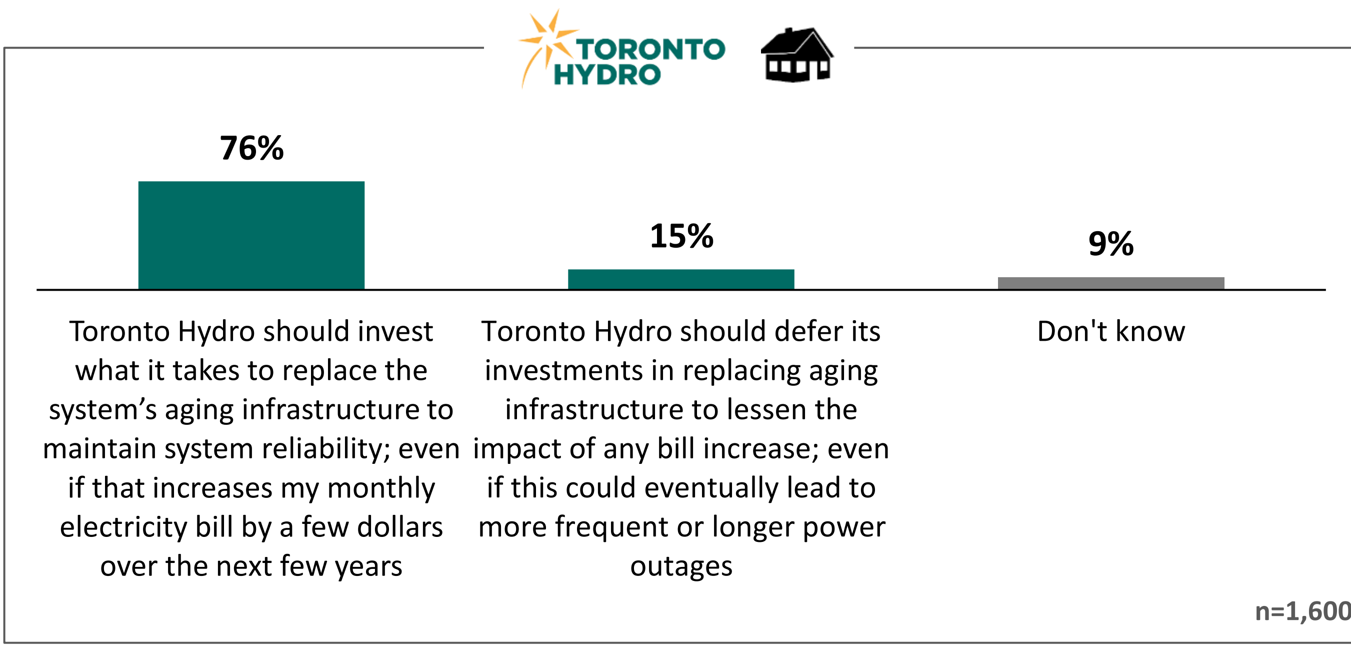
Now let's turn to our final topic – investment trade-offs.

Toronto Hydro is in the early stages of developing its investment plan for the next five years. While conversations with customers will continue over the next several months, the utility wants to know your preferences when it comes to finding the right balance between costs and other outcomes.

There are four investment categories that we would like to discuss.

The first category focuses on projects that replace and restore aging electrical infrastructure, like overhead poles and underground cables.

Q Regarding investments in aging infrastructure, which of the following statements best represents your point of view?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Invest what it takes	73%	76%	70%	82%	47%	67%	88%
Defer investments	17%	15%	20%	10%	41%	19%	6%
Don't know	10%	9%	10%	8%	12%	14%	6%

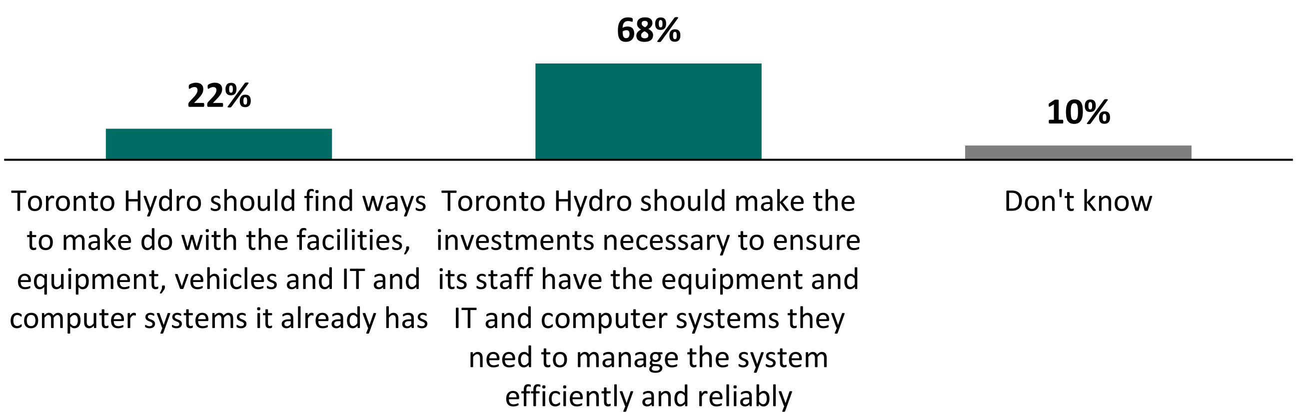
Online Survey

General Plant

Residential

The second category focuses on keeping **Toronto Hydro's** business running. This includes facilities to house staff and equipment, vehicles and tools to service equipment and IT systems to manage the system and other information.

Q Regarding these types of investments, which of the following best represents your point of view?



n=1,600

	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Make do with what it already has	24%	26%	25%	17%	43%	22%	17%
Make the necessary investments	65%	66%	63%	73%	48%	65%	74%
Don't know	12%	8%	12%	10%	9%	13%	9%

INNOVATIVE RESEARCH GROUP

Online Survey

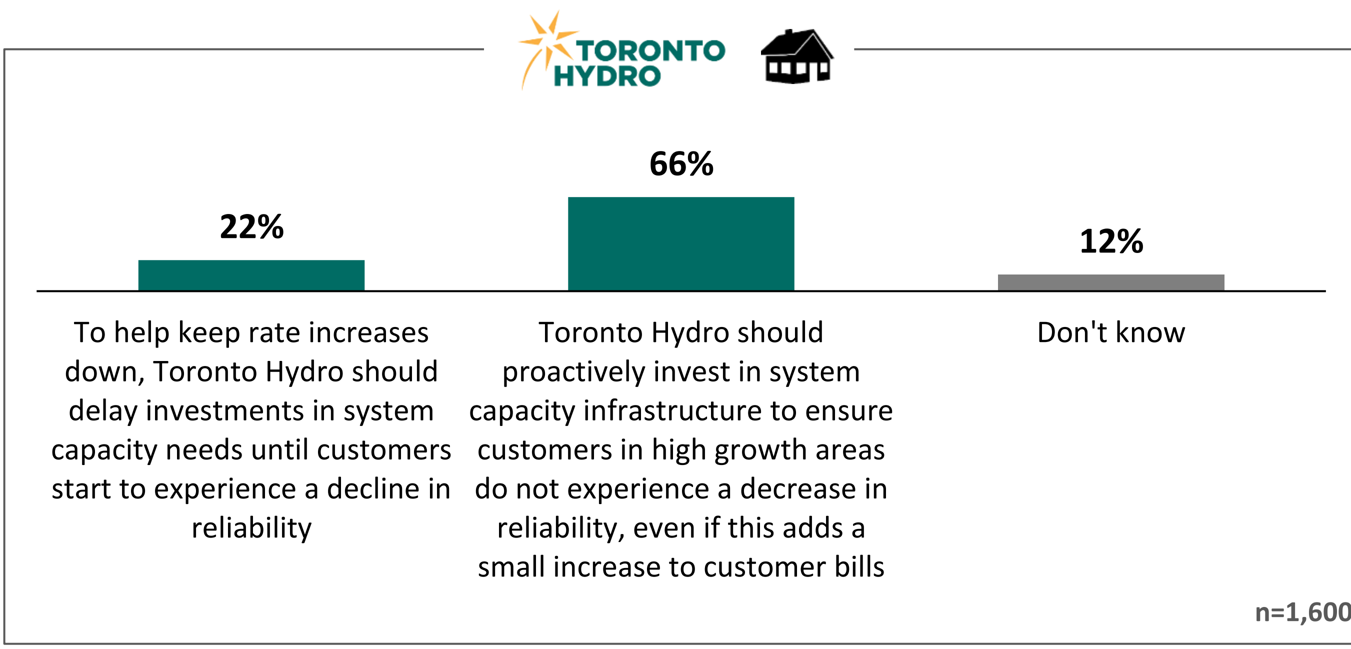
System Service

Residential

The third investment category focuses on growth and greater demand for electricity in various parts of **Toronto Hydro's** service territory.

Increased demand for electricity puts pressure on existing electrical infrastructure. Eventually, further infrastructure investments are required to support increased demand for electricity.

Q With this in mind, which of the following statements best represents your point of view?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Delay investments	21%	27%	31%	15%	49%	24%	15%
Proactively invest	65%	60%	59%	75%	35%	61%	76%
Don't know	14%	13%	11%	10%	16%	15%	9%

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Online Survey
Grid Modernization

Residential

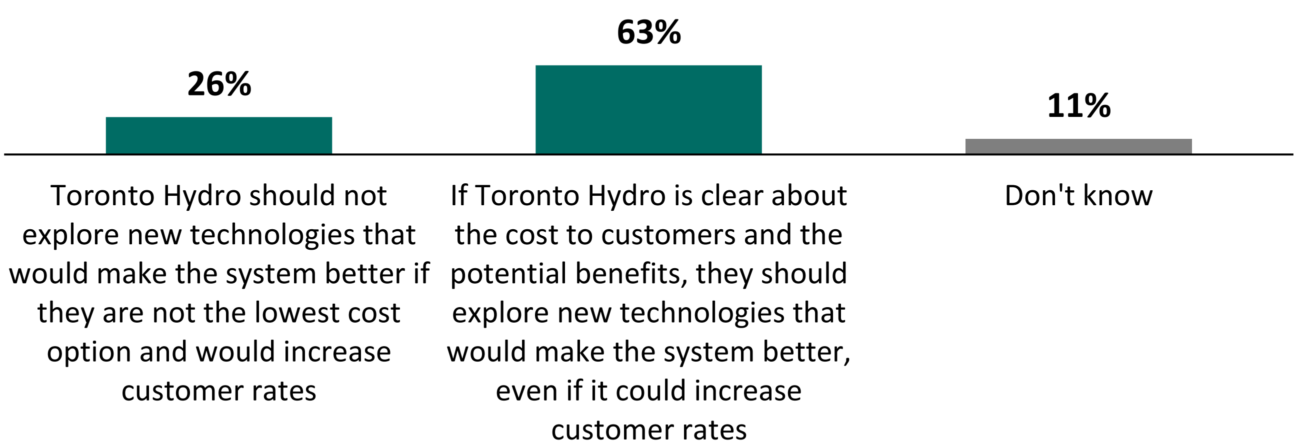
Toronto Hydro can invest in technology than can lead to a wide range of benefits including reliability, efficiency, customer service, and reducing environmental impacts.

When deemed the lowest cost option that will provide equal or improved service, Toronto Hydro will, in most cases, invest in technology.

However, there are two other scenarios where Toronto Hydro needs your feedback.

First, there are times when Toronto Hydro identifies new technology that <u>can improve reliability or provide other benefits, but it will cost customers more.</u> For instance, advanced customer meters that can measure when different home appliances are running, allowing Toronto Hydro to provide customers with better advice on how to reduce their energy consumption and costs.

Q Regarding these types of investments, which of the following best represents your view?



n=1,600

	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Should not explore new tech	29%	31%	31%	20%	47%	33%	18%
Should explore new tech	60%	57%	59%	69%	39%	54%	72%
Don't know	11%	12%	10%	11%	14%	13%	9%

Online Survey

Grid Modernization (Con't)

Residential

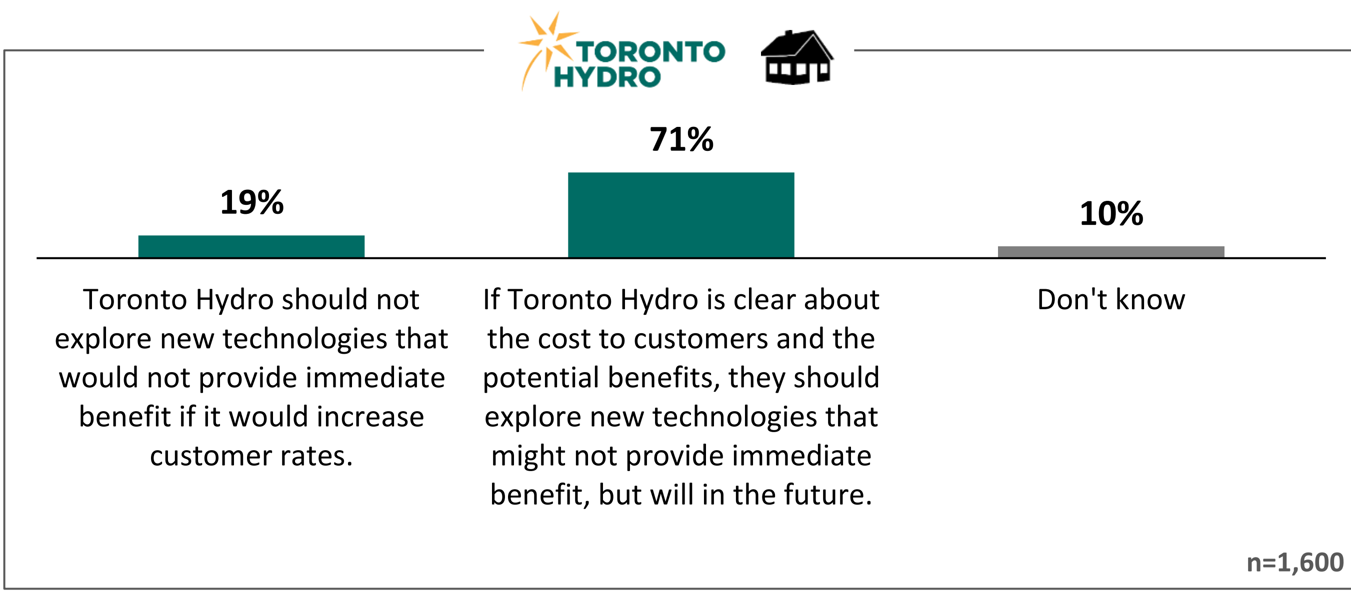
The second scenario is where Toronto Hydro identifies new technology that is needed to improve the system in the future and would increase costs now, but the benefit might not be felt until later.

This includes accommodating emerging technologies like solar power, battery storage and electric vehicles.

Regardless of whether you are considering new energy choices like an electric vehicle for yourself today, Toronto Hydro must be prepared as adoption becomes more widespread over the next 5-10 years.

For instance, charging each electric vehicle draws as much energy as two average homes. If a dozen or so people come home and start changing their vehicles at a period of peak demand, it could overload the grid in that neighbourhood. While Toronto Hydro cannot predict the exact rate of electric vehicle adoption in the City of Toronto, the utility must make certain investments today that will allow it to manage electric vehicle demand in the future.

Q Which of the following best represents your view?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Should not explore new tech	19%	19%	27%	15%	38%	26%	12%
Should explore new tech	69%	71%	63%	77%	47%	61%	81%
Don't know	12%	10%	10%	8%	14%	13%	7%

Online Survey

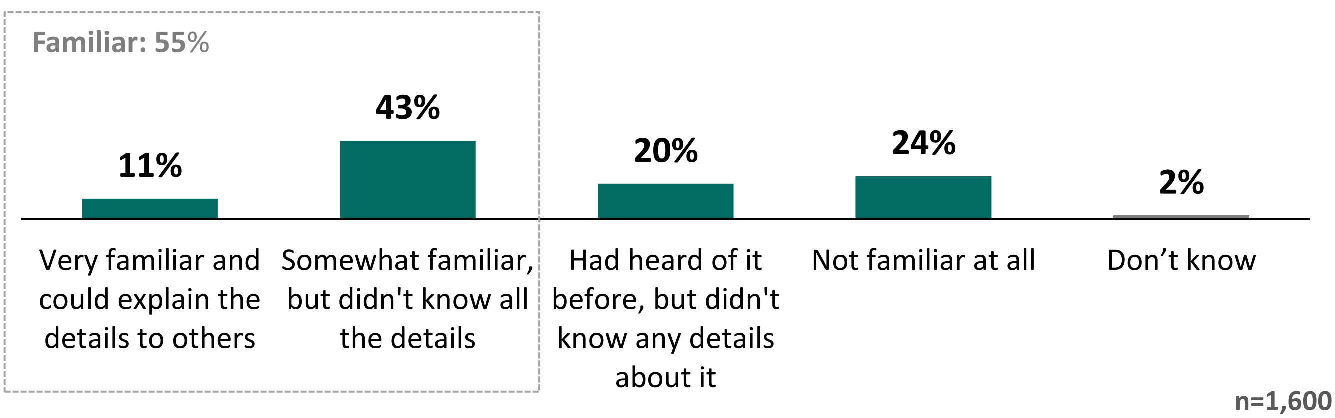
Familiarity with Sources of GHG Emissions

Residential

In November 2021, the City of Toronto released its 2019 Greenhouse Gas (GHG) Inventory, which tracks Toronto's progress towards GHG reduction targets and identifies key emissions sources. GHG emissions have a wide variety of environmental impacts that lead to climate change and global warming.

This report notes that the two **primary sources of GHG emissions** in Toronto are: energy use in buildings (natural gas and electricity) and transportation fuels (primarily gasoline) – accounting for 93% of all emissions in the city.

Q Before this survey, how familiar would you say you were with the primary sources of GHG emissions in Toronto?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	14%	12%	11%	9%	14%	8%	12%
Somewhat familiar	45%	45%	38%	44%	33%	45%	45%
Had heard of it	19%	16%	21%	21%	18%	23%	18%
Not familiar at all	20%	24%	26%	24%	32%	21%	23%
Don't know	1%	3%	3%	1%	2%	3%	1%
Familiar (Very + Somewhat)	**59%**	**57%**	**50%**	**54%**	**47%**	**53%**	**57%**

INNOVATIVE RESEARCH GROUP

Online Survey

Familiarity with the City's Plan

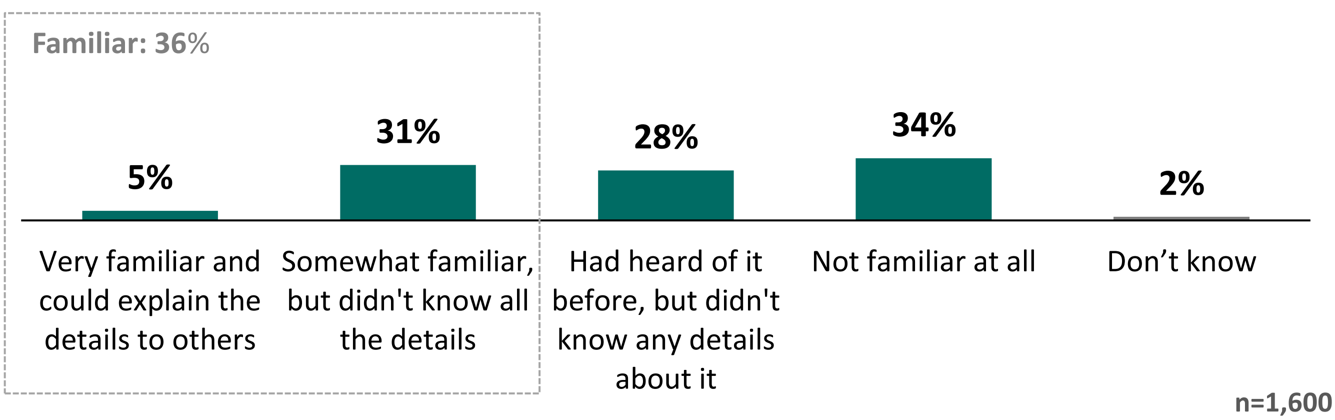
Residential

In October 2019, Toronto City Council voted to accelerate its efforts to mitigate and adapt to climate change and adopt a stronger emissions target for Toronto: **net zero emissions by 2040.**

A key part of the City's "Net Zero Strategy" requires switching from gasoline in the transportation system and natural gas in home/building heating to electricity-powered alternatives, adopting renewable generators and using energy storage systems.

These initiatives will require Toronto Hydro to expand and modernize its existing electricity distribution grid to ensure that it is capable of helping achieve the City's targets.

Q Before this survey, how familiar were you with the City of Toronto's plan to use an expanded and modernized grid to reduce GHG emissions in Toronto to help address climate change?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	7%	6%	6%	4%	7%	5%	5%
Somewhat familiar	30%	29%	30%	32%	25%	35%	30%
Had heard of it	31%	26%	30%	26%	31%	27%	27%
Not familiar at all	30%	36%	32%	37%	36%	29%	36%
Don't know	2%	4%	2%	1%	1%	4%	1%
Familiar (Very + Somewhat)	**36%**	**35%**	**36%**	**36%**	**31%**	**40%**	**35%**

Online Survey

Support for Bill Increase to Meet Emissions Targets

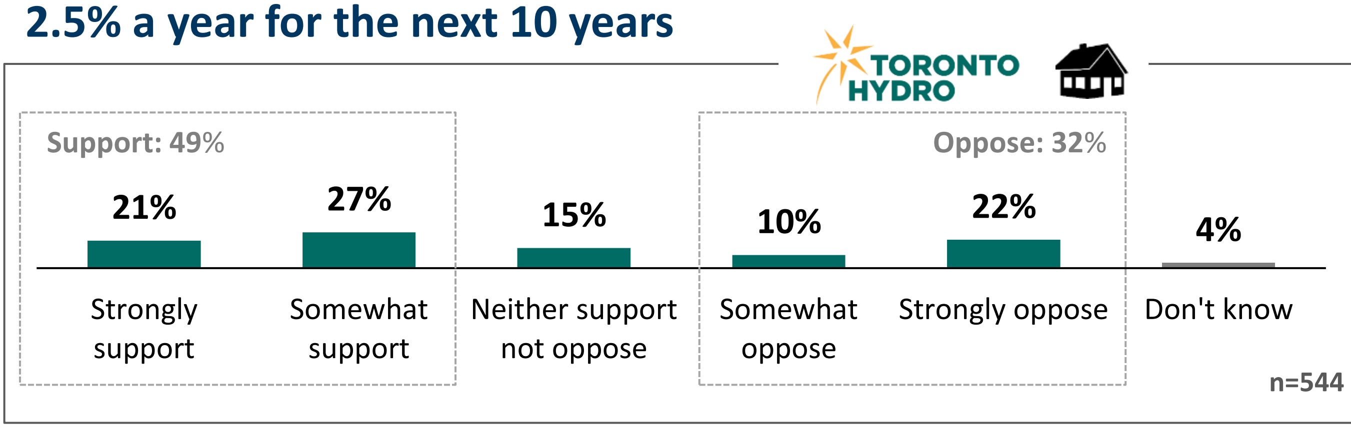
Residential

As Toronto Hydro is 100% funded through the rates its customers pay, investing in an expanded and modernized electricity grid would mean that customers, like yourself, would pay more.

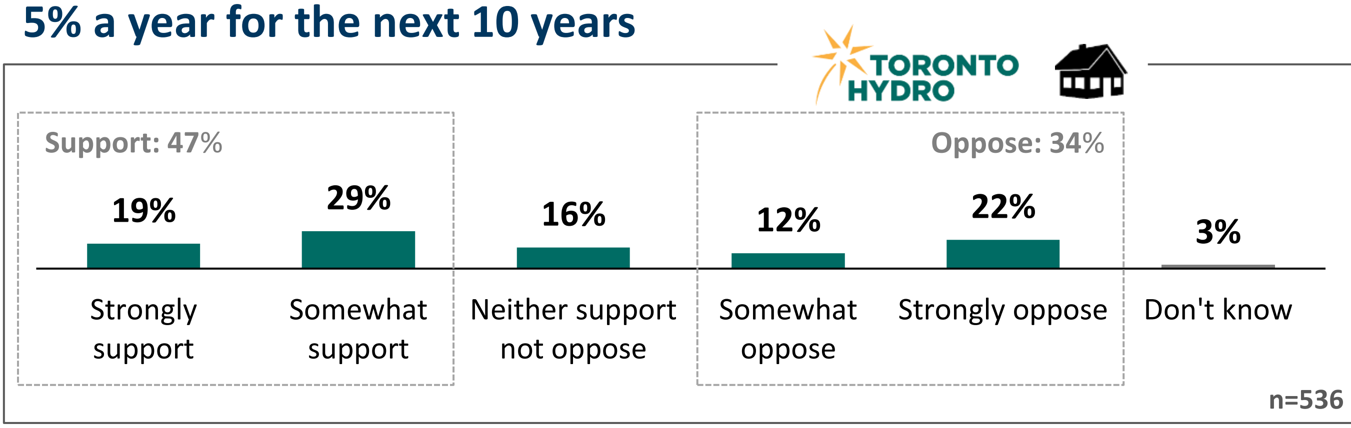
The sooner that Toronto Hydro expands and modernizes the grid, the sooner Toronto can reach its climate change goals.

Q Would you support or oppose a specific charge on your monthly bill to help Toronto meet its future emissions targets if your electricity bill will grow by **[COST]**?

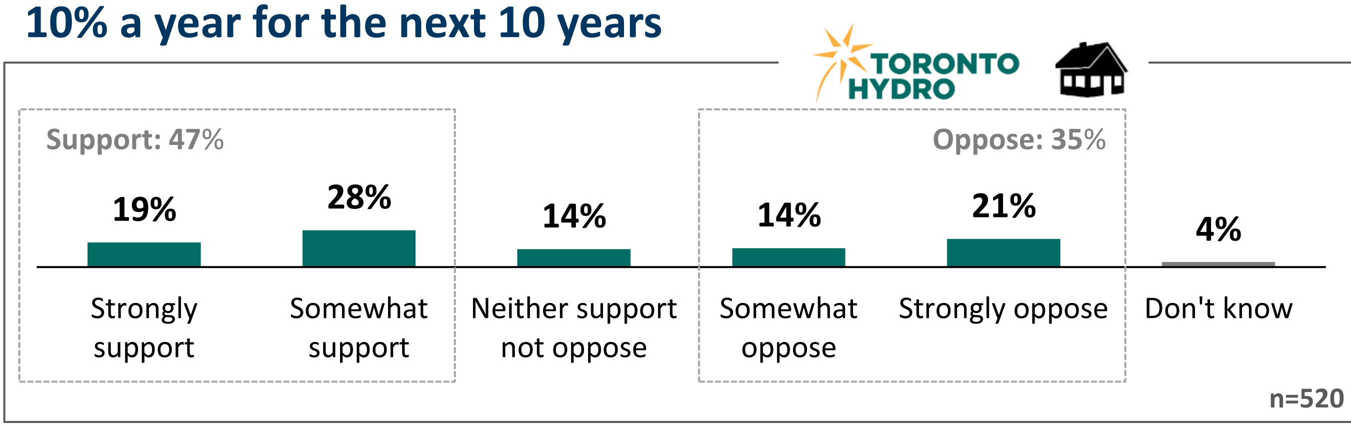
2.5% a year for the next 10 years



5% a year for the next 10 years



10% a year for the next 10 years



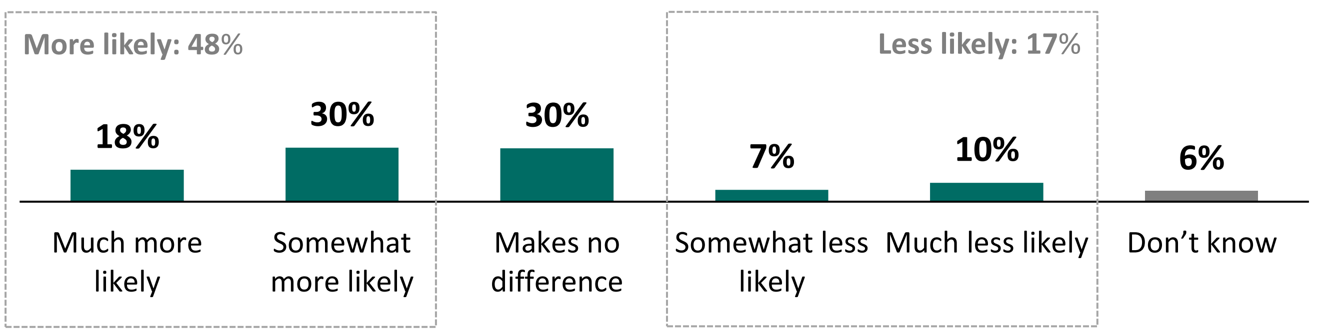
Online Survey

Potential for Rate Increase Offset

Residential

Some studies have indicated that increasing customer bills to specifically help meet emissions targets could be offset in later years because of reductions in other types of energy bills. For example, as fuel-switching to electricity becomes more widespread, customers may experience cost reductions for gasoline and natural gas.

Q Does knowing these types of rate increases could be offset in later years because of reduction in other types of energy bills make you more or less likely to support a specific charge on your monthly bill to help Toronto meet its future emissions targets?



n=1,600

	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Much more likely	19%	12%	16%	21%	9%	12%	22%
Somewhat more likely	26%	33%	29%	31%	17%	32%	32%
No difference	26%	29%	23%	35%	25%	26%	32%
Somewhat less likely	7%	10%	10%	2%	12%	10%	4%
Much less likely	15%	9%	14%	7%	32%	12%	5%
More likely (Very + Somewhat)	**45%**	**44%**	**45%**	**52%**	**26%**	**43%**	**55%**
Less likely (Very + Somewhat)	**22%**	**19%**	**24%**	**10%**	**44%**	**22%**	**9%**

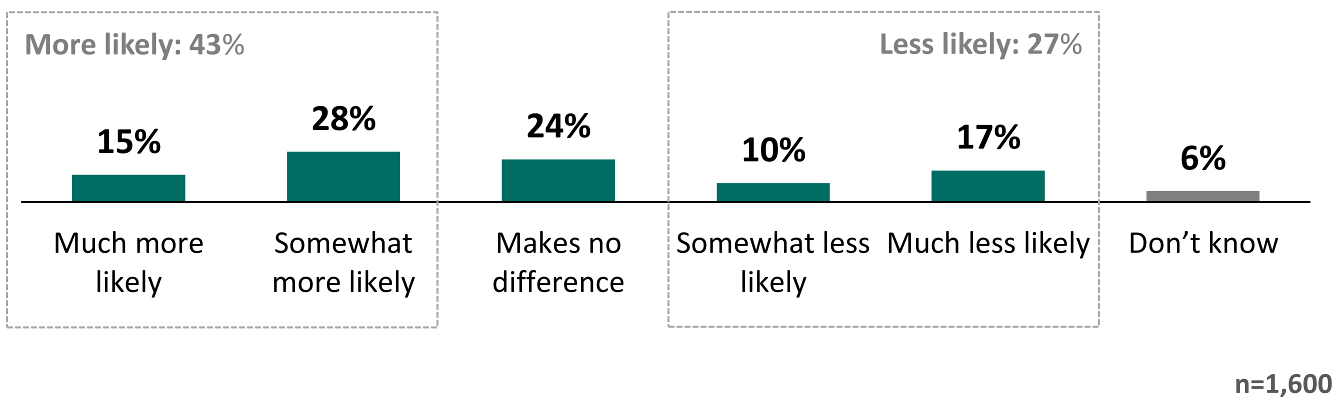
Online Survey

Inclusion of Rate Relief

Residential

Some customers have said that they would be willing to spend more in order to help Toronto meet its future emissions targets, however, feel that lower-income Torontonians should receive rate relief in order to offset any associated price increase.

Q Would the inclusion of “rate relief” for low-income customers make you **more or less likely to support** a specific charge on your monthly bill to help Toronto meet its future emissions targets?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Much more likely	11%	9%	15%	20%	14%	9%	18%
Somewhat more likely	27%	25%	25%	31%	14%	28%	31%
No difference	24%	26%	20%	25%	15%	23%	26%
Somewhat less likely	10%	11%	15%	8%	10%	13%	9%
Much less likely	22%	21%	18%	12%	43%	19%	11%
More likely (Very + Somewhat)	**39%**	**35%**	**40%**	**51%**	**28%**	**37%**	**49%**
Less likely (Very + Somewhat)	**32%**	**32%**	**34%**	**20%**	**52%**	**33%**	**20%**

Online Survey

Do future offset rates and rate relief increase or decrease support?

Residential

Does knowing these types of rate increases could be offset in later years because of reduction in other types of energy bills make you more or less likely to support a specific charge on your monthly bill to help Toronto meet its future emissions targets?

	Would you support or oppose a specific charge on your monthly bill to help Toronto meet its future emissions targets if your electricity bill will grow by [COST]?						
	Total	Strongly support	Somewhat support	Neither support nor oppose	Somewhat oppose	Strongly oppose	Don't know
Much more likely	18%	58%	16%	7%	2%	1%	3%
Somewhat more likely	30%	22%	53%	36%	27%	9%	8%
Makes no difference	30%	18%	26%	41%	40%	34%	10%
Somewhat less likely	7%	1%	2%	7%	19%	10%	9%
Much less likely	10%	0%	1%	3%	7%	40%	6%
Don't know	6%	1%	1%	8%	5%	6%	65%
Net "More Likely"	**+31%**	**+79%**	**+66%**	**+33%**	**+2%**	**-39%**	**-4%**

Would the inclusion of "rate relief" for low-income customers make you more or less likely to support a specific charge on your monthly bill to help Toronto meet its future emissions targets?

	Would you support or oppose a specific charge on your monthly bill to help Toronto meet its future emissions targets if your electricity bill will grow by [COST]?						
	Total	Strongly support	Somewhat support	Neither support nor oppose	Somewhat oppose	Strongly oppose	Don't know
Much more likely	15%	44%	13%	5%	2%	6%	5%
Somewhat more likely	28%	28%	47%	37%	15%	5%	14%
Makes no difference	24%	18%	24%	28%	33%	21%	18%
Somewhat less likely	10%	3%	10%	13%	20%	11%	3%
Much less likely	17%	5%	4%	11%	19%	52%	7%
Don't know	6%	2%	2%	6%	10%	5%	54%
Net "More Likely"	**+15%**	**+64%**	**+47%**	**+17%**	**-22%**	**-51%**	**+9%**

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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APPENDIX 04

INNOVATIVE RESEARCH GROUP

Small Business

Needs and Preferences Survey

TORONTO HYDRO

November 2, 2023

CONFIDENTIAL

STRICTLY CONFIDENTIAL

Report Navigation

APPENDICIES

PHASE I

PHASE II

Small Business Customers

Online Survey Results

Section 4.1

Online Survey
Survey Design & Methodology

INNOVATIVE was engaged by Toronto Hydro to gather customer input to assess the importance of the outcomes and priorities identified in the qualitative components of Phase I of the customer engagement.

Field Dates

The **Small Business Online Survey** was sent to all Toronto Hydro small business customers who provided the utility with an email address. Customers had an opportunity to complete the survey between **December 9th, 2021, and January 9th, 2022**.

Each customer received a unique URL that could be linked back to their annual consumption, region and rate class.

In total, the small business survey was sent to **11,212** customers from *customerexperience@torontohydro.com*. A reminder email was sent 6 days after the initial invitation to those who had not yet completed the survey. Two additional reminder emails were sent weekly afterwards.

Small Business Online Survey Completes

A total of **430** (unweighted) Toronto Hydro small business customers completed the online survey via a unique URL.

Sample Weighting

The small business sample has been weighted proportionately by consumption quartiles and region in order to be representative of the broader Toronto Hydro service territory.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	14 (17)	14 (19)	17 (20)	23 (20)	68 (76)
North York	17 (23)	24 (25)	23 (25)	18 (25)	82 (98)
Scarborough	15 (21)	25 (25)	23 (22)	18 (23)	81 (91)
Toronto/E. York	60 (47)	55 (38)	52 (40)	32 (40)	199 (165)
Total	106 (107)	118 (108)	115 (108)	91 (107)	430 (430)

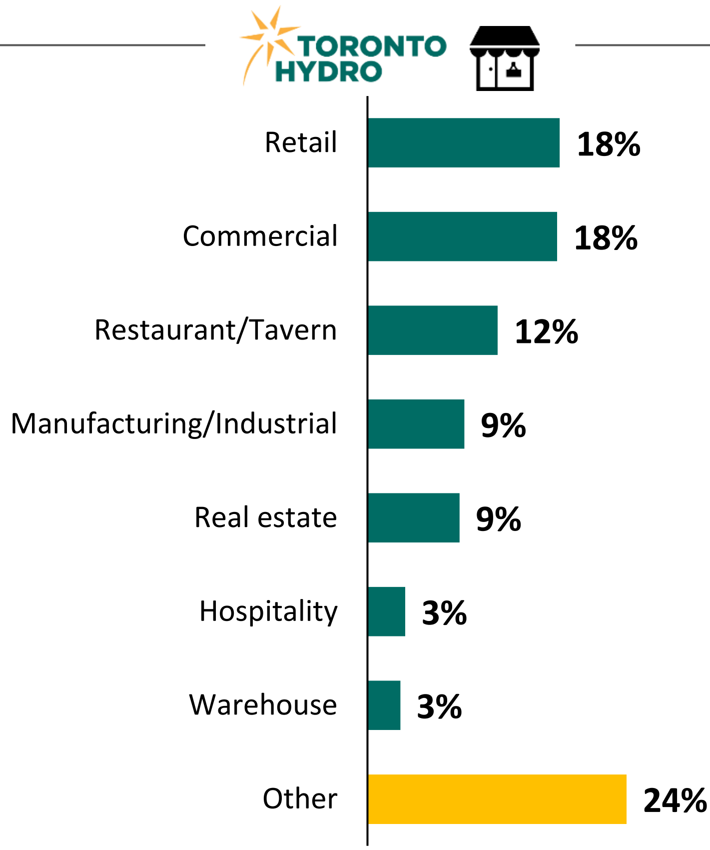
Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

Online Survey

Demographic breakdown

Small Business

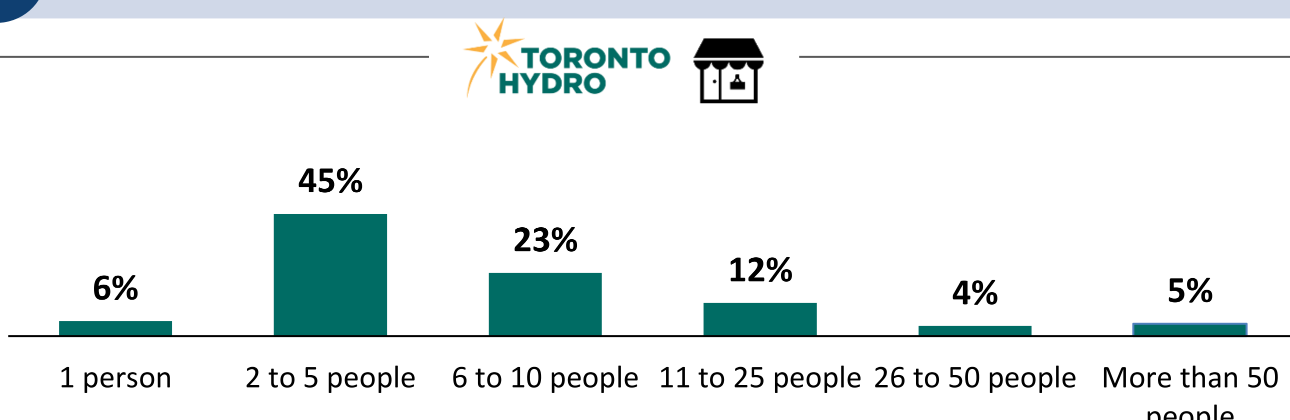
Q Which of the following best describes the sector in which your business operates?



"Don't know" (1%) and "Prefer not to say" (4%) not shown.

n=430

Q Including yourself, how many people work at your organization?



"Don't know" (<1%) and "Prefer not to say" (4%) not shown.

n=430

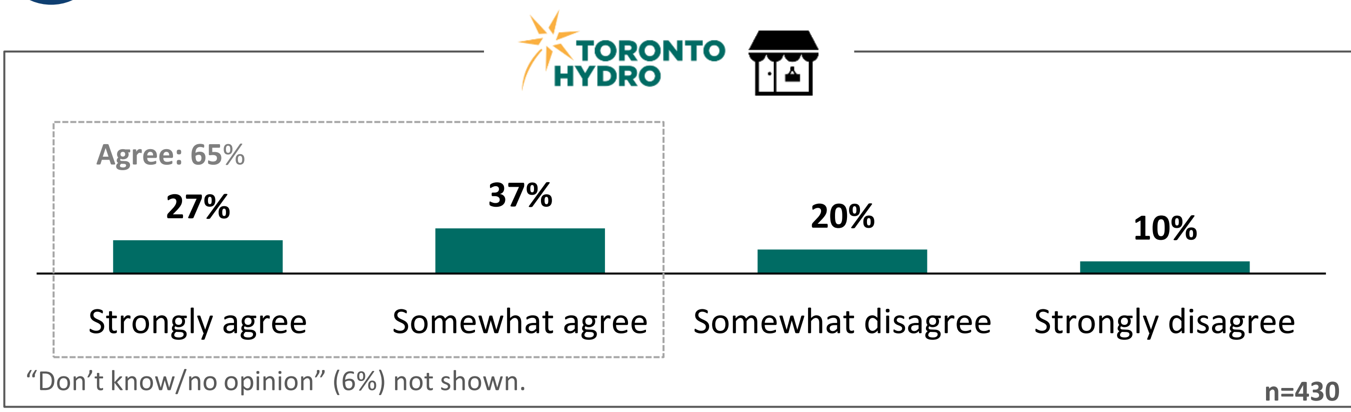
Online Survey

Environmental Controls

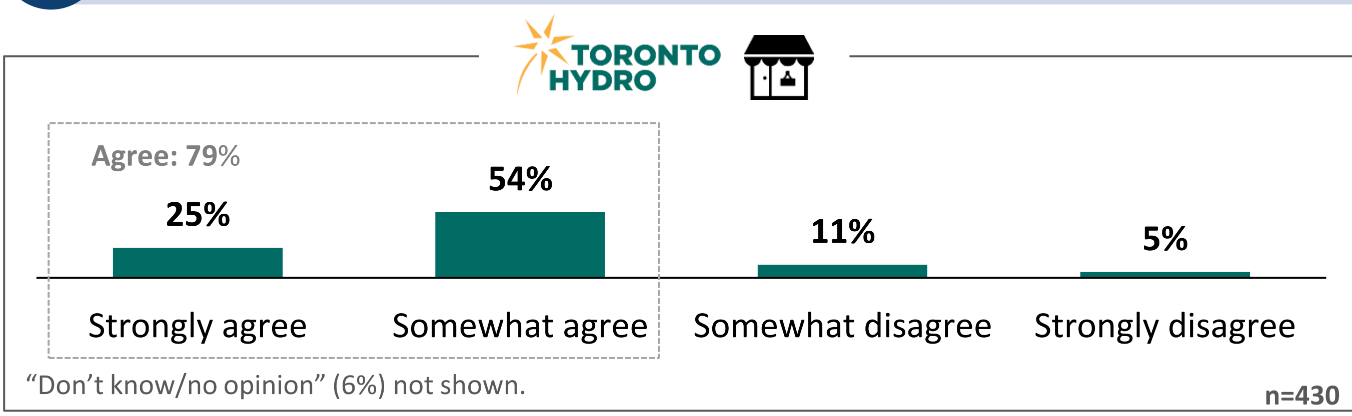
Small Business

To what extent do you agree or disagree with the following statements?

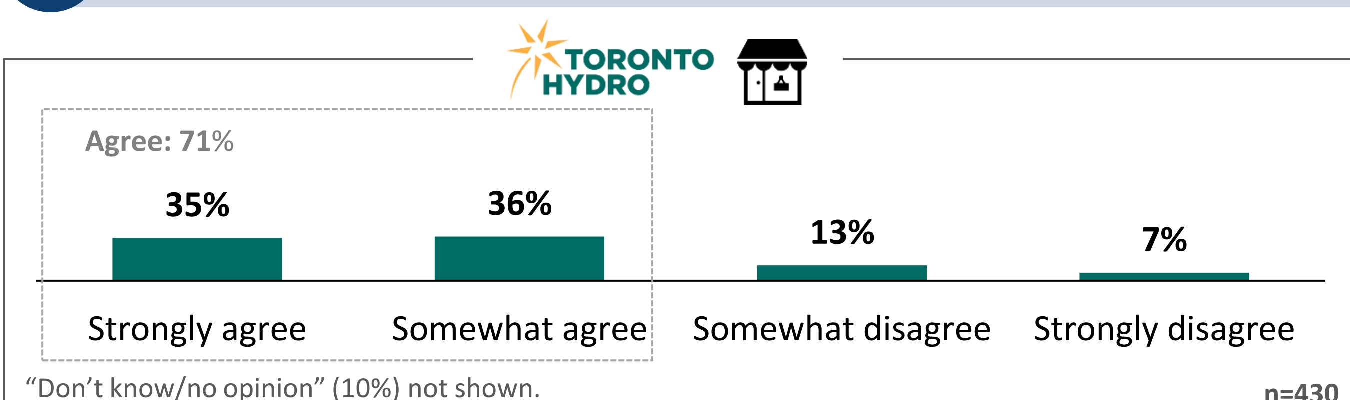
Q The cost of my electricity bill has a major impact on the bottom line of my organization and results in some important spending priorities and investments being put off.



Q Customers are well-served by the electricity system in Ontario.



Q Fossil fuels should be phased out as quickly as possible to speed up the shift to a lower-carbon future.



Online Survey

Familiarity with Ontario's Electricity System

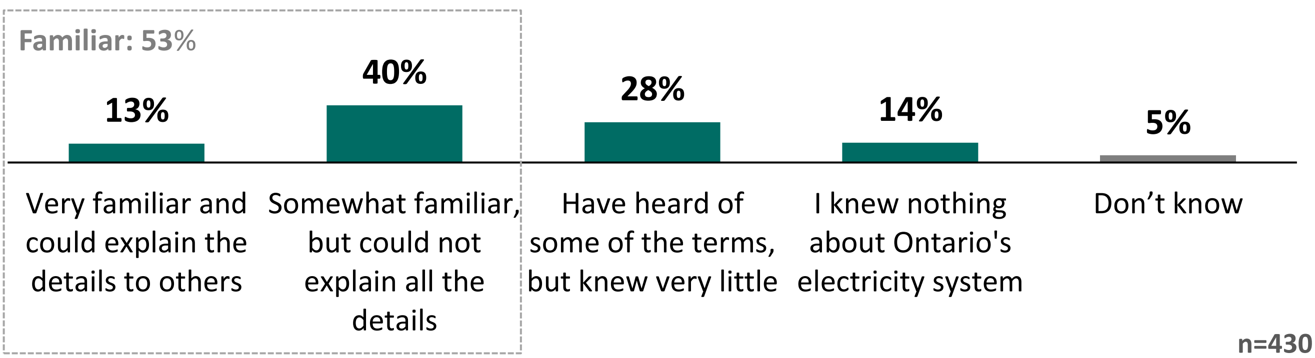
Small Business

As you may know, Ontario's electricity system has three key components: **generation**, **transmission** and **distribution**.

- **Generating stations** convert various forms of energy into electric power
- **Transmission lines** connect the power produced at generating stations to where it is needed across the province
- **Local distribution networks** take the electricity from provincial transmission lines and bring it to your home through a network of wires, poles and other equipment.

Q Before this survey, how familiar were you with the various parts of the electricity system and how they work together?

TORONTO HYDRO



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	14%	15%	14%	12%	17%	15%	8%
Somewhat familiar	42%	39%	35%	42%	34%	41%	44%
Knew very little	30%	24%	28%	30%	30%	25%	30%
Knew nothing	11%	19%	15%	11%	12%	15%	14%
Don't know	3%	3%	7%	5%	7%	3%	5%
Familiar (Very + Somewhat)	**55%**	**54%**	**49%**	**54%**	**51%**	**56%**	**52%**

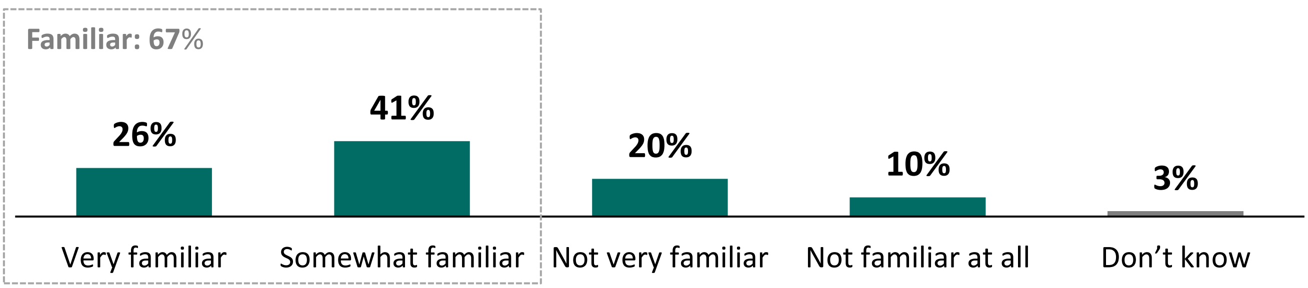
Online Survey

Familiarity with Toronto Hydro

Small Business

Toronto Hydro owns and operates Toronto's distribution network. This is the network that takes the electricity from high-voltage transmission towers and brings it to your business through a network of wires, poles and other equipment.

Q Before this survey, how familiar were you with **Toronto Hydro**, which operates the electricity distribution system in your community?



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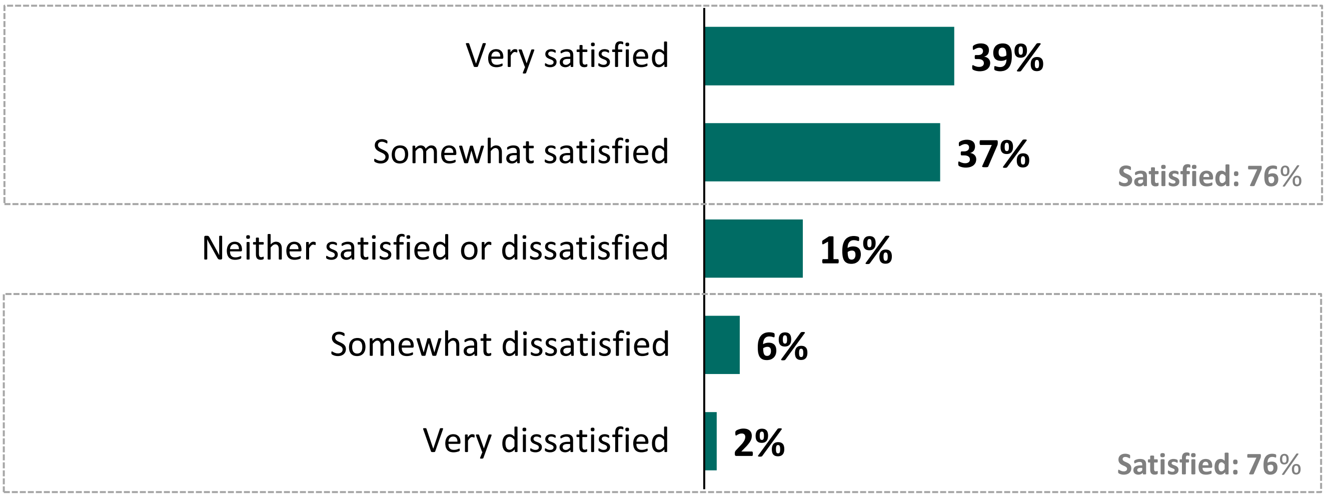
	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	26%	27%	24%	28%	29%	25%	25%
Somewhat familiar	48%	37%	37%	41%	39%	42%	41%
Not very familiar	15%	25%	22%	19%	16%	23%	21%
Not familiar at all	8%	10%	12%	10%	14%	8%	9%
Don't know	4%	1%	5%	2%	1%	2%	4%
Familiar (Very + Somewhat)	**73%**	**63%**	**61%**	**69%**	**68%**	**67%**	**66%**

Online Survey

Overall Satisfaction with Toronto Hydro

Small Business

Q Thinking specifically about the services provided to you and your community by **Toronto Hydro**, overall, how satisfied or dissatisfied are you with the services that your organization receives?



"Don't know" (1%) not shown.

n=430

	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very satisfied	42%	36%	48%	35%	33%	37%	47%
Somewhat satisfied	43%	42%	28%	37%	38%	43%	30%
Neither satisfied or dissatisfied	10%	17%	9%	21%	19%	13%	15%
Somewhat dissatisfied	3%	2%	10%	6%	8%	4%	5%
Very dissatisfied	2%	3%	2%	1%	2%	2%	1%
Satisfied (Very + Somewhat)	**85%**	**78%**	**76%**	**72%**	**70%**	**80%**	**78%**
Dissatisfied (Very + Somewhat)	**5%**	**5%**	**12%**	**8%**	**11%**	**6%**	**6%**

Online Survey

How Toronto Hydro can Improve Services to Customers

Small Business

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Response	%
Costs too high/reduce rates/provide rebates	11.5%
Fix billing/prefers 60 day billing cycle/include breakdown of charges	4.4%
Satisfied with Toronto Hydro/positive - General	4.2%
Consistent service/no outages	2.4%
Renew ageing infrastructure/bury overhead powerlines	2.4%
Improve response time	2.1%
Better customer service/work to reduce hold time	2.0%
Repair online portal/create a mobile app	1.8%
Provide tools to review usage/reduce energy consumption	1.2%
Increase communication with customers/notification of any changes or updates	0.7%
Consider use of alternate energy source/renewable energy	0.7%
Covid relief/leniency on rates during lockdowns	0.6%
Other	0.9%
None/Don't know	65.1%

Note: Only responses >0.1% shown

Online Survey

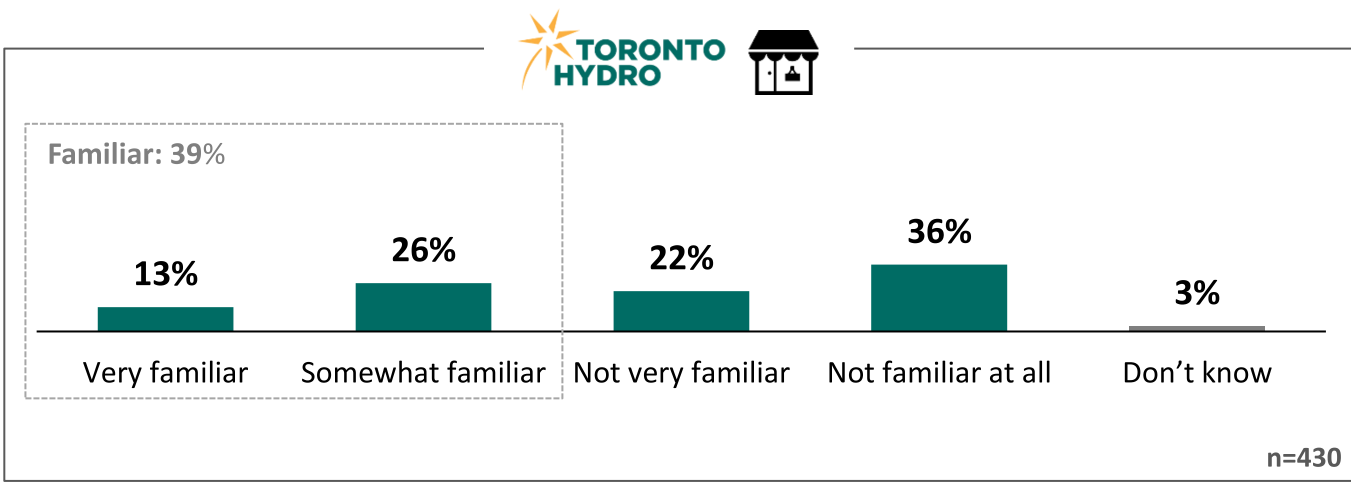
Familiarity with Bill Remittance to Toronto Hydro

Small Business

While **Toronto Hydro** is only responsible for the distribution portion of the system, to make it easier for customers, they are responsible for collecting payment for the entire electricity system.

Toronto Hydro keeps about **31%** of the average small business customer's bill. The rest of the bill goes to power generation companies, transmission companies, the provincial government and regulatory agencies.

Q Before this survey, how familiar were you with the amount of your organization's electricity bill that went to **Toronto Hydro**?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	15%	12%	10%	15%	19%	12%	10%
Somewhat familiar	27%	21%	35%	24%	28%	32%	19%
Not very familiar	19%	24%	20%	22%	21%	20%	25%
Not familiar at all	35%	41%	30%	37%	30%	34%	43%
Don't know	3%	1%	5%	3%	2%	3%	4%
Familiar (Very + Somewhat)	**42%**	**33%**	**45%**	**39%**	**47%**	**44%**	**29%**

INNOVATIVE RESEARCH GROUP

INNOVATIVE
RESEARCH GROUP

Small Business Customers

Customer Priorities

Section 4.2

Online Survey
Importance of Customer Priorities

Now, let's talk about our second topic – outcomes.

Everyday **Toronto Hydro** interacts with hundreds of its customers through multiple channels and touchpoints, including surveys, the call centre and social media.

In a recent series of customer focus groups, a number of company goals were identified as priorities for **Toronto Hydro**.

Q Using a scale from 0 to 10, where _0 means not important at all_ and _10 means extremely important_, how important are each of the following **Toronto Hydro** priorities to you as a customer?

Ensuring reliable electrical service [average = **9.2**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	<1%	<1%	0%	<1%	<1%	4%	1%	3%	6%	17%	65%	Extremely important

Delivering electricity at reasonable rates [average = **9.1**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	<1%	<1%	0%	<1%	<1%	7%	1%	3%	6%	14%	64%	Extremely important

Ensuring the safety of electricity infrastructure [average = **9.0**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	0%	1%	0%	1%	1%	6%	1%	6%	9%	15%	58%	Extremely important

Investing in new technology [average = **8.8**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	<1%	<1%	<1%	1%	1%	7%	2%	6%	11%	16%	54%	Extremely important

Providing quality customer service [average = **8.6**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	<1%	0%	<1%	<1%	1%	9%	4%	7%	12%	18%	46%	Extremely important

Online Survey

Importance of Customer Priorities (Cont'd)

Small Business

Q Using a scale from 0 to 10, where *0 means not important at all* and *10 means extremely important*, how important are each of the following **Toronto Hydro** priorities to you as a customer?

Replacing aging infrastructure [average = **8.5**]

Not at all important	0	1	2	3	4	5	6	7	8	9	10	Extremely important
	<1%	1%	<1%	1%	1%	7%	3%	8%	13%	17%	47%	

Helping customers with conservation and cost savings [average = **8.5**]

Not at all important	0	1	2	3	4	5	6	7	8	9	10	Extremely important
	1%	1%	1%	<1%	1%	10%	2%	5%	12%	16%	49%	

Minimizing impact on the environment [average = **8.1**]

Not at all important	0	1	2	3	4	5	6	7	8	9	10	Extremely important
	2%	1%	2%	1%	1%	12%	4%	6%	13%	15%	42%	

Expanding the grid [average = **8.0**]

Not at all important	0	1	2	3	4	5	6	7	8	9	10	Extremely important
	1%	2%	1%	1%	2%	12%	4%	6%	13%	16%	41%	

Enabling access to new services [average = **7.8**]

Not at all important	0	1	2	3	4	5	6	7	8	9	10	Extremely important
	2%	1%	1%	1%	2%	16%	4%	6%	11%	15%	38%	

INNOVATIVE RESEARCH GROUP

Online Survey

Importance of Customer Priorities | Summary Scores

Small Business

Q

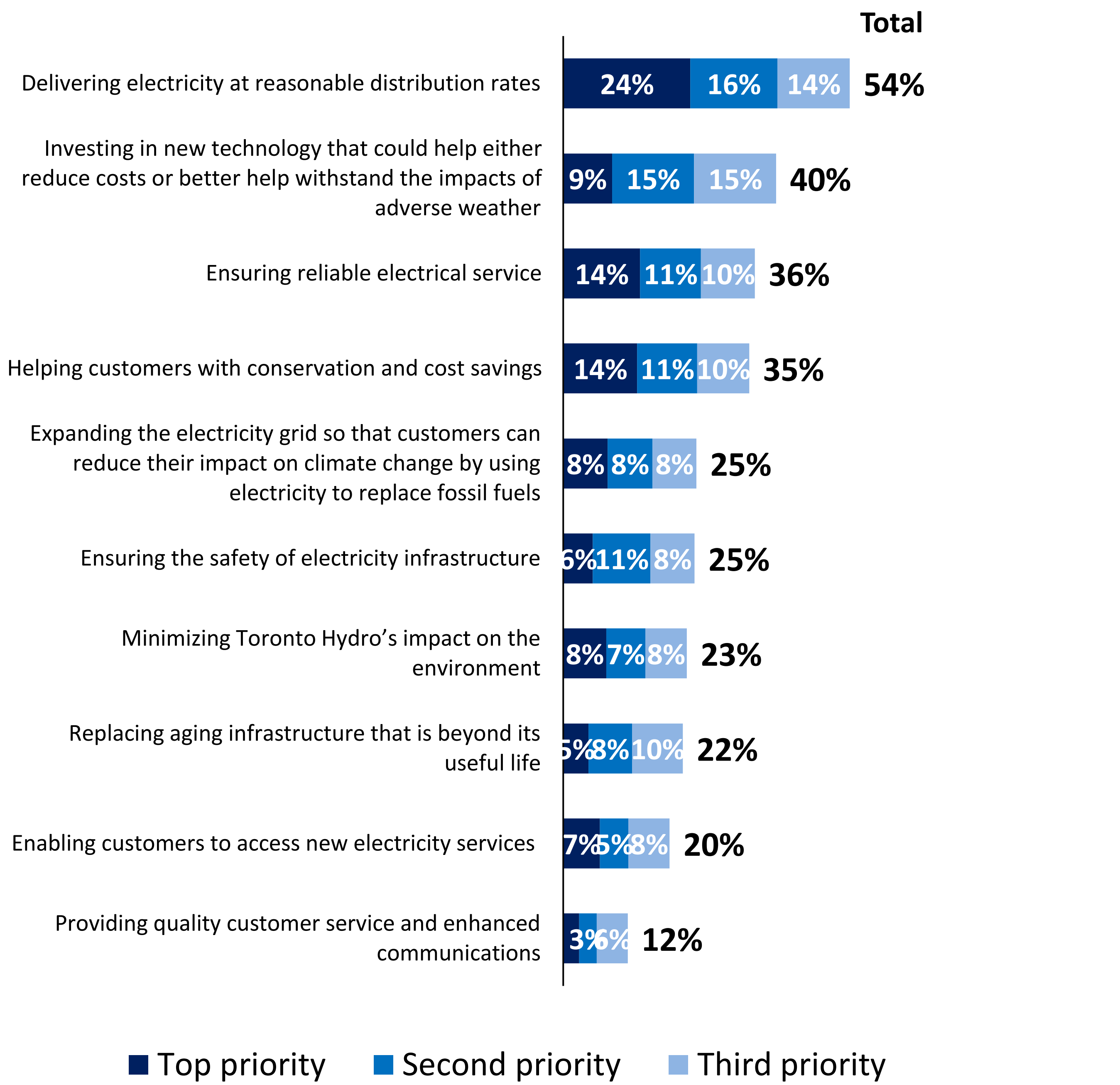
Using a scale from 0 to 10, where _0 means not important at all_ and _10 means extremely important_, how important are each of the following **Toronto Hydro** priorities to you as a customer?

Average Score	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Ensuring reliable service	9.6	9.3	8.7	9.3	9.2	9.3	9.2
Delivering electricity at reasonable rates	9.2	9.3	8.8	9.2	9.4	9.2	8.9
Ensuring safety of infrastructure	9.1	9.1	8.7	9.0	8.9	9.0	9.0
Investing in new technology	9.1	8.8	8.6	8.6	8.6	8.9	8.8
Providing quality customer service	8.5	8.9	8.6	8.5	8.8	8.6	8.5
Replacing aging infrastructure	8.8	8.6	8.2	8.6	8.3	8.6	8.6
Helping customers with conservation	8.5	8.8	8.2	8.5	8.9	8.6	8.2
Minimizing impact on environment	8.0	8.1	8.2	8.1	7.9	8.0	8.4
Expanding the grid	8.2	7.8	7.9	8.1	7.9	7.9	8.2
Enabling access to new services	7.8	7.6	8.1	7.9	8.0	7.7	7.9

Online Survey
Ranking Customer Priorities

Small Business

Q Thinking of the priorities on the previous page, which would you say is the **most** important? What is the next most important priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



n=430

"Don't know" not shown.

Online Survey

Ranking Customer Priorities | Summary Scores

Small Business

Q

Thinking of the priorities on the previous page, which would you say is the **most** important? What is the next most important priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?

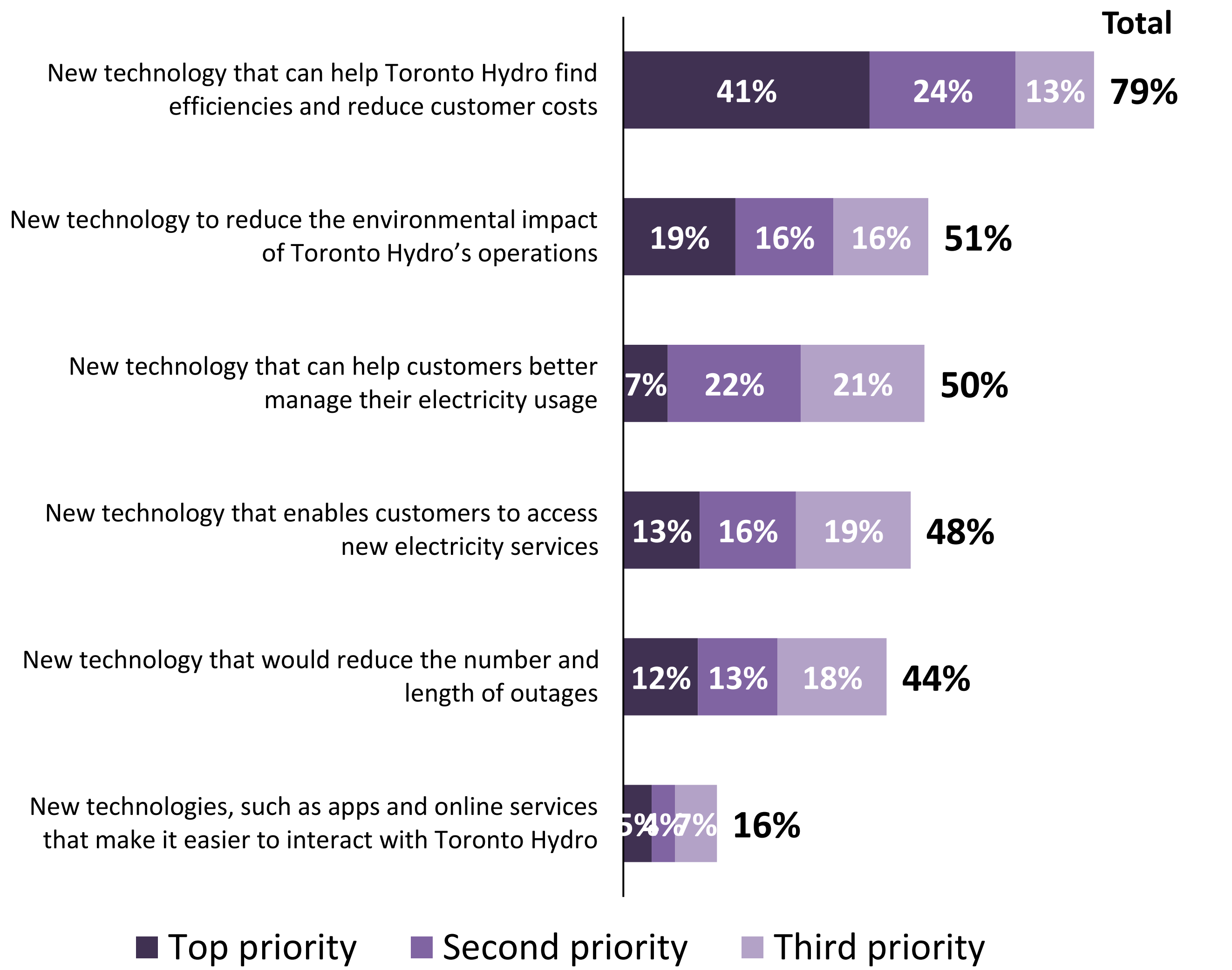
% who select as top 3 priority	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Delivering electricity at reasonable rates	61%	55%	51%	51%	60%	59%	44%
Investing in new technology	43%	46%	33%	39%	35%	41%	42%
Ensuring reliable service	39%	33%	29%	40%	30%	39%	37%
Helping customers with conservation	29%	34%	45%	33%	43%	35%	28%
Expanding the grid	21%	25%	20%	30%	19%	24%	31%
Ensuring safety of infrastructure	29%	22%	23%	24%	29%	24%	22%
Minimizing impact on environment	22%	27%	22%	22%	23%	22%	25%
Replacing aging infrastructure	26%	23%	21%	21%	15%	24%	26%
Enabling access to new services	15%	20%	22%	21%	20%	19%	20%
Providing quality customer service	9%	14%	16%	10%	20%	8%	11%

Online Survey
Ranking Technology Priorities

Small Business

Investments in new technology can help Toronto Hydro address a range of issues. These include reliability, efficiency, customer service, Toronto Hydro's impact on the environment, new service offerings and tools to manage electricity usage.

Q Among the following potential investments in new technology, which would you say is the **most** important? What is the next most important new technology priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



"Don't know" not shown.

n=430

Online Survey

Ranking Technology Priorities | Summary Scores

Small Business

Q Among the following potential investments in new technology, which would you say is the **most** important? What is the next most important new technology priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?

	Region				Bill impact on finances		
% who select as top 3 priority	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
New tech that can help Toronto Hydro find efficiencies and reduce costs	86%	80%	71%	79%	77%	83%	75%
New tech to reduce environmental impact	43%	51%	52%	54%	42%	49%	60%
New tech that can help customers better manage usage	49%	46%	54%	51%	57%	54%	42%
New tech that enables customers to access new services	57%	47%	34%	52%	46%	48%	50%
New tech that would help reduce number and length of outages	45%	50%	44%	40%	45%	43%	44%
New tech that make it easier to interact with Toronto Hydro	13%	18%	18%	14%	21%	13%	14%

Online Survey

Additional Priorities

Small Business

Q Can you think of any other important priorities that **Toronto Hydro** should be focusing on?

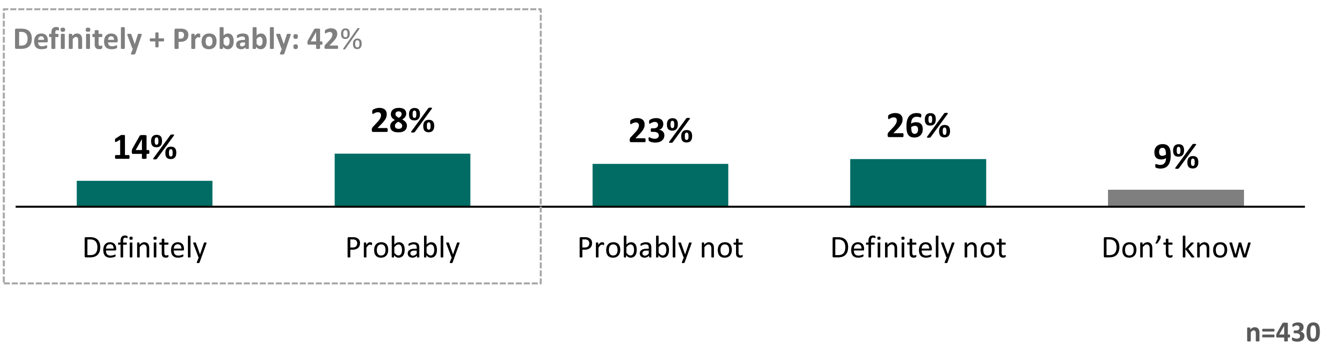
Response	%
Offering renewable energy options	2.8%
Lowering rates	2.6%
Finding efficiencies/reducing operating costs	2.5%
Improving reliability/safety/efficiency in power delivery	2.4%
Providing programs and incentives/cost savings for consumers	2.3%
Upgrading infrastructure/burying lines	2.2%
Improving customer service/communication/transparency	2.0%
Reducing carbon footprint/assessing environmental impact	2.0%
Improve billing/provide more information on bill/usage	1.2%
Allowing for greater demand due to electric vehicles	1.2%
Other	0.5%
None	7.2%
Don't know	71.1%

Note: Only responses >0.1% shown

Online Survey
Support for Low-Income Customers

In recent interactions with customers, a number of customers identified assisting low-income Torontonians with their electricity bills.

Q In addition to the amount that you currently pay on your electricity bill, would you be willing to pay an extra few dollars per month in order for Toronto Hydro to provide financial assistance to make electricity bills more affordable for low-income customers?



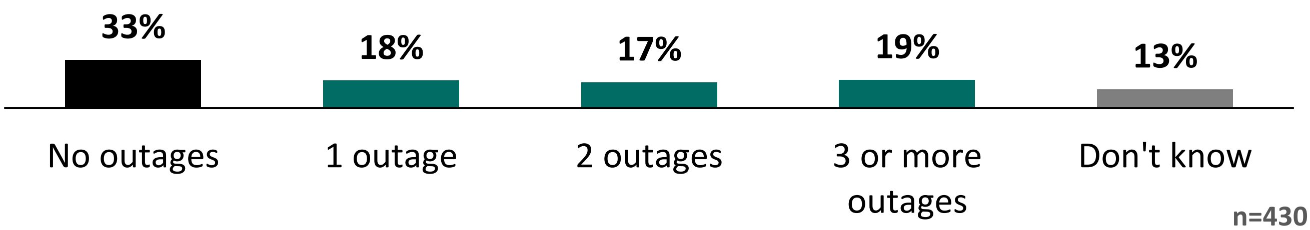
	Region				**Bill impact on finances**		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Definitely	17%	14%	13%	14%	15%	10%	18%
Probably	21%	26%	32%	31%	17%	25%	40%
Probably not	21%	32%	17%	22%	23%	28%	17%
Definitely not	32%	23%	27%	23%	34%	29%	16%
Don't know	9%	5%	11%	10%	10%	8%	9%
Definitely + Probably	38%	40%	45%	45%	33%	35%	58%

Online Survey
Number of Outages Experienced

Small Business

Q Now, let's talk about the reliability of electricity service your organization receives. Have you experienced any power outages at **your organization in the past 12 months** which *lasted longer than one minute*? If so, approximately how many of these power outages did you experience?

TORONTO HYDRO



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
No outages	21%	33%	30%	39%	36%	29%	34%
1 outage	24%	6%	26%	19%	20%	19%	17%
2 outages	22%	25%	16%	12%	13%	17%	21%
3 or more outages	17%	25%	15%	18%	21%	20%	16%
Don't know	16%	11%	14%	12%	9%	16%	12%

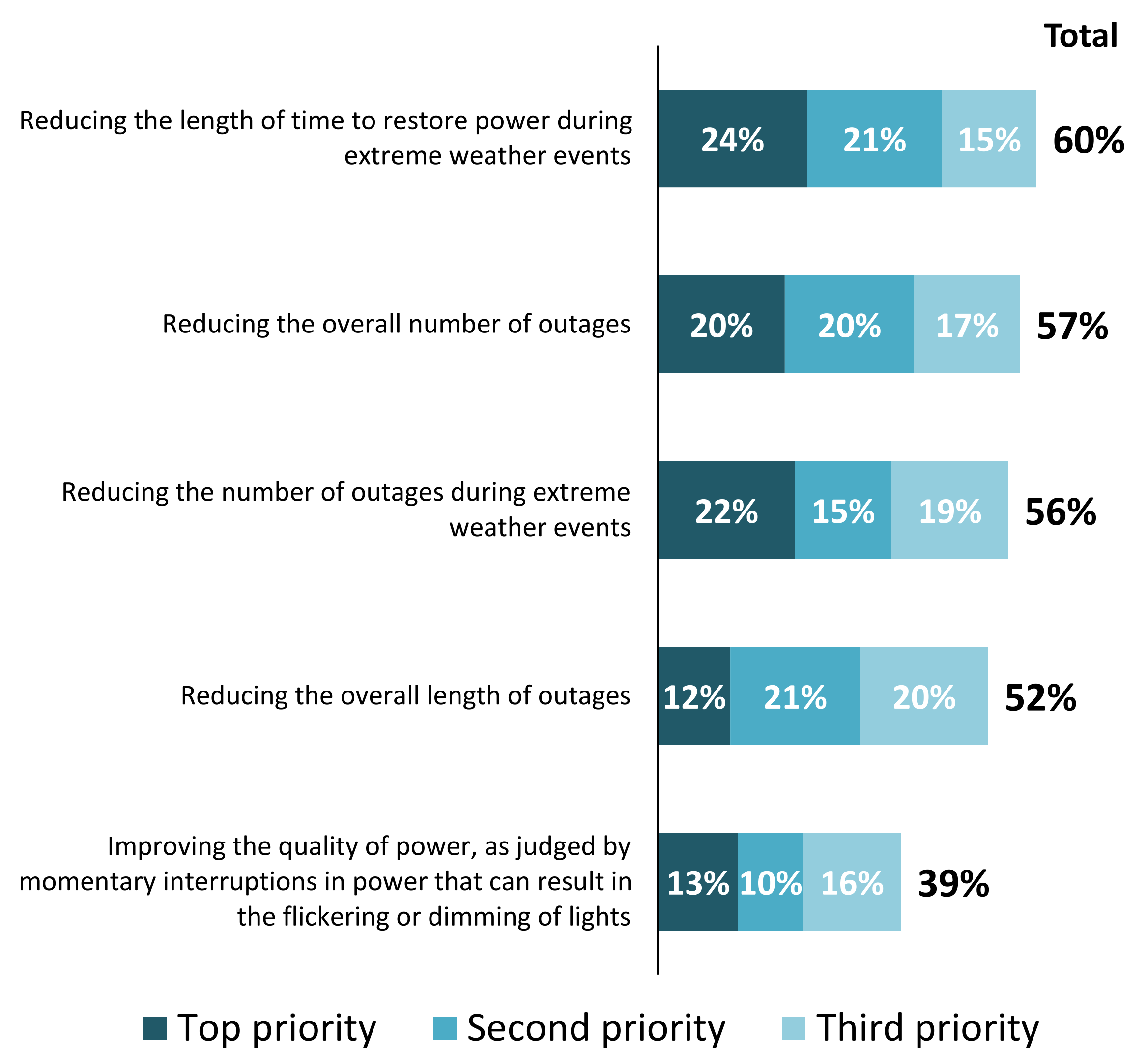
Online Survey

Ranking Reliability Priorities

Small Business

When it comes to reliability, there are a number of areas that **Toronto Hydro** could focus on.

Q Among the following reliability outcomes, which would you say is the **most** important? What is the next most important reliability outcome you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



"Don't know" not shown.

n=430

Online Survey

Ranking Reliability Priorities | Summary Scores

Small Business

Q

Among the following reliability outcomes, which would you say is the **most** important? What is the next most important reliability outcome you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?

	Region				Bill impact on finances		
% who select as top 3 priority	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Reducing the length of time to restore power during extreme weather events	60%	61%	56%	61%	65%	55%	61%
Reducing the overall number of outages	58%	60%	56%	56%	49%	59%	62%
Reducing the number of outages during extreme weather events	50%	63%	52%	56%	52%	61%	52%
Reducing the overall length of outages	56%	49%	52%	54%	53%	52%	52%
Improving the quality of power, as judged by momentary interruptions	41%	38%	42%	36%	48%	39%	31%

Small Business Customers

Investment Trade-Offs

Section 4.3

Online Survey

System Renewal

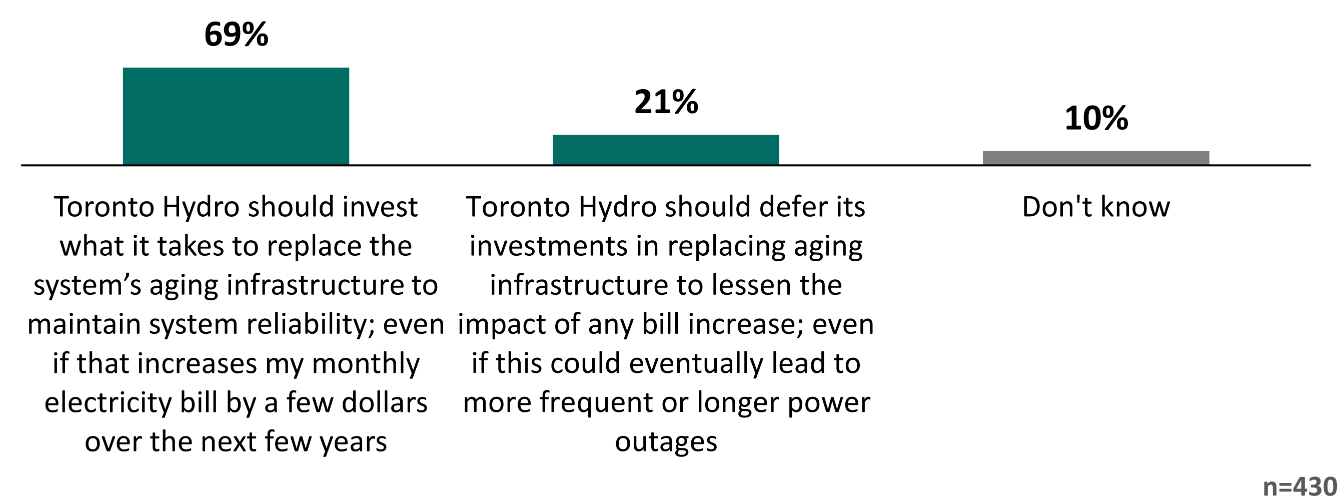
Now let's turn to our final topic – investment trade-offs.

Toronto Hydro is in the early stages of developing its investment plan for the next five years. While conversations with customers will continue over the next several months, the utility wants to know your preferences when it comes to finding the right balance between costs and other outcomes.

There are four investment categories that we would like to discuss.

The first category focuses on projects that replace and restore aging electrical infrastructure, like overhead poles and underground cables.

Q Regarding investments in aging infrastructure, which of the following statements best represents your point of view?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Invest what it takes	64%	73%	67%	69%	62%	65%	78%
Defer investments	21%	19%	22%	22%	29%	22%	15%
Don't know	15%	8%	10%	8%	9%	13%	7%

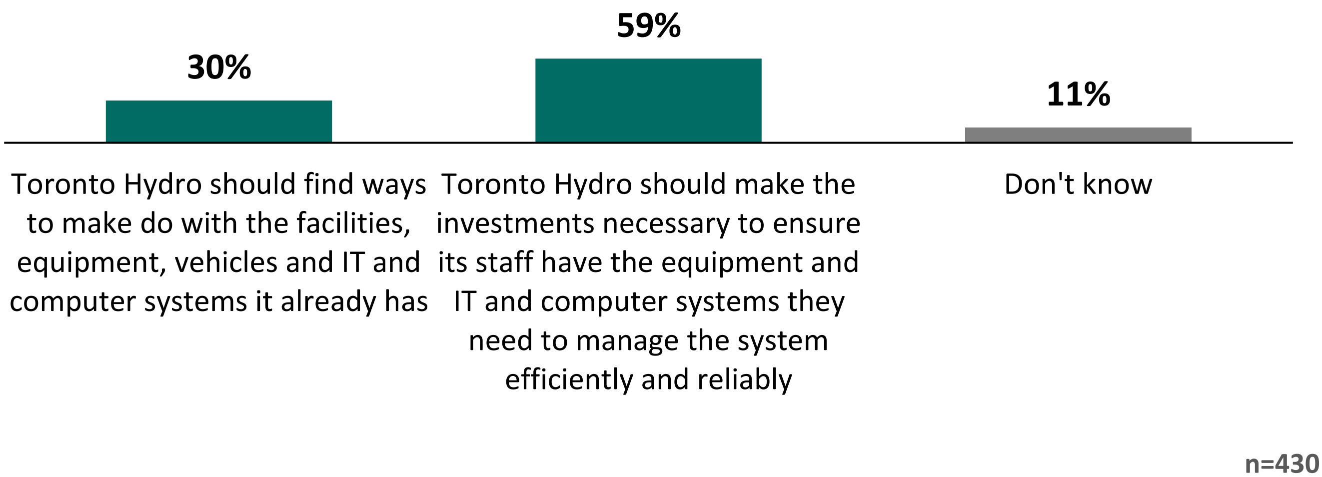
Online Survey

General Plant

Small Business

The second category focuses on keeping **Toronto Hydro's** business running. This includes facilities to house staff and equipment, vehicles and tools to service equipment and IT systems to manage the system and other information.

Q Regarding these types of investments, which of the following best represents your point of view?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Make do with what it already has	33%	27%	27%	31%	35%	32%	24%
Make the necessary investments	52%	63%	56%	62%	57%	58%	62%
Don't know	14%	10%	17%	7%	8%	10%	14%

Online Survey

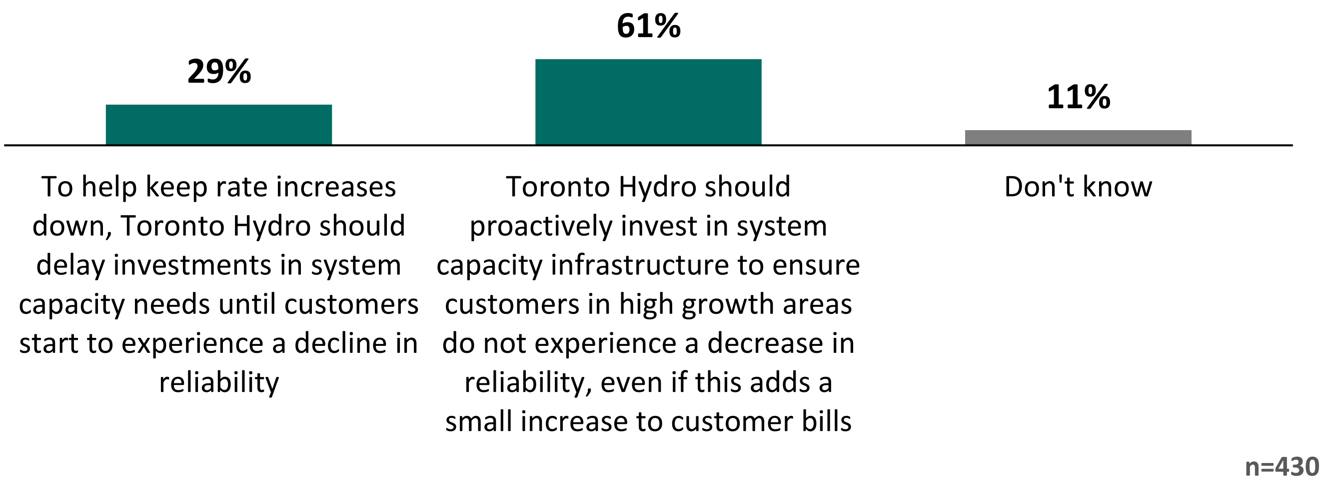
System Service

Small Business

The third investment category focuses on growth and greater demand for electricity in various parts of **Toronto Hydro's** service territory.

Increased demand for electricity puts pressure on existing electrical infrastructure. Eventually, further infrastructure investments are required to support increased demand for electricity.

Q With this in mind, which of the following statements best represents your point of view?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Delay investments	23%	27%	31%	31%	35%	33%	19%
Proactively invest	63%	67%	57%	58%	52%	58%	70%
Don't know	14%	6%	12%	11%	13%	9%	11%

Online Survey
Grid Modernization

Small Business

Toronto Hydro can invest in technology than can lead to a wide range of benefits including reliability, efficiency, customer service, and reducing environmental impacts.

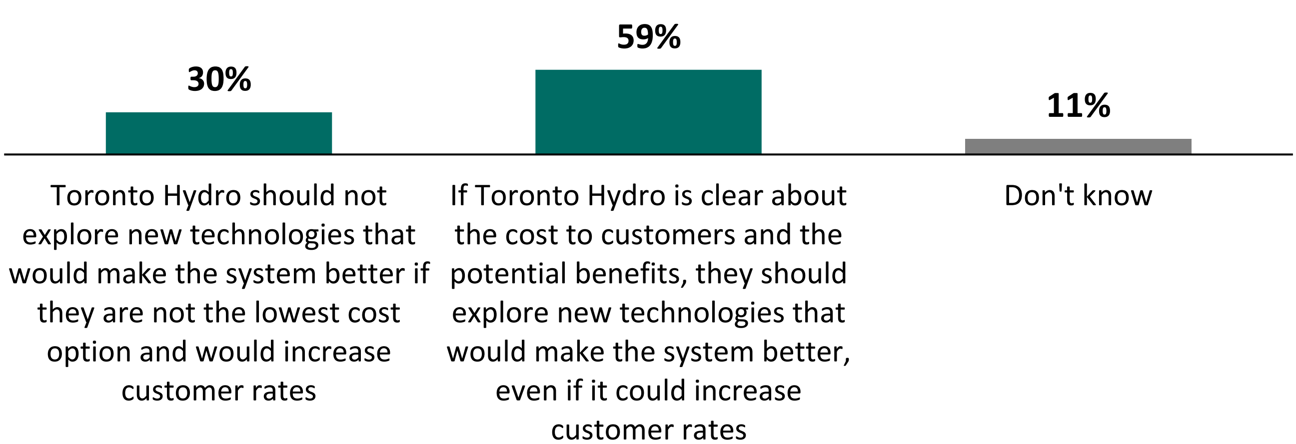
When deemed the lowest cost option that will provide equal or improved service, Toronto Hydro will, in most cases, invest in technology.

However, there are two other scenarios where Toronto Hydro needs your feedback.

First, there are times when Toronto Hydro identifies new technology that can improve reliability or provide other benefits, but it will cost customers more. For instance, advanced customer meters that can measure when different home appliances are running, allowing Toronto Hydro to provide customers with better advice on how to reduce their energy consumption and costs.

Q Regarding these types of investments, which of the following best represents your view?

TORONTO HYDRO



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	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Should not explore new tech	39%	32%	24%	27%	37%	34%	19%
Should explore new tech	48%	61%	61%	63%	54%	56%	68%
Don't know	13%	7%	14%	11%	9%	10%	13%

Online Survey

Grid Modernization (Con't)

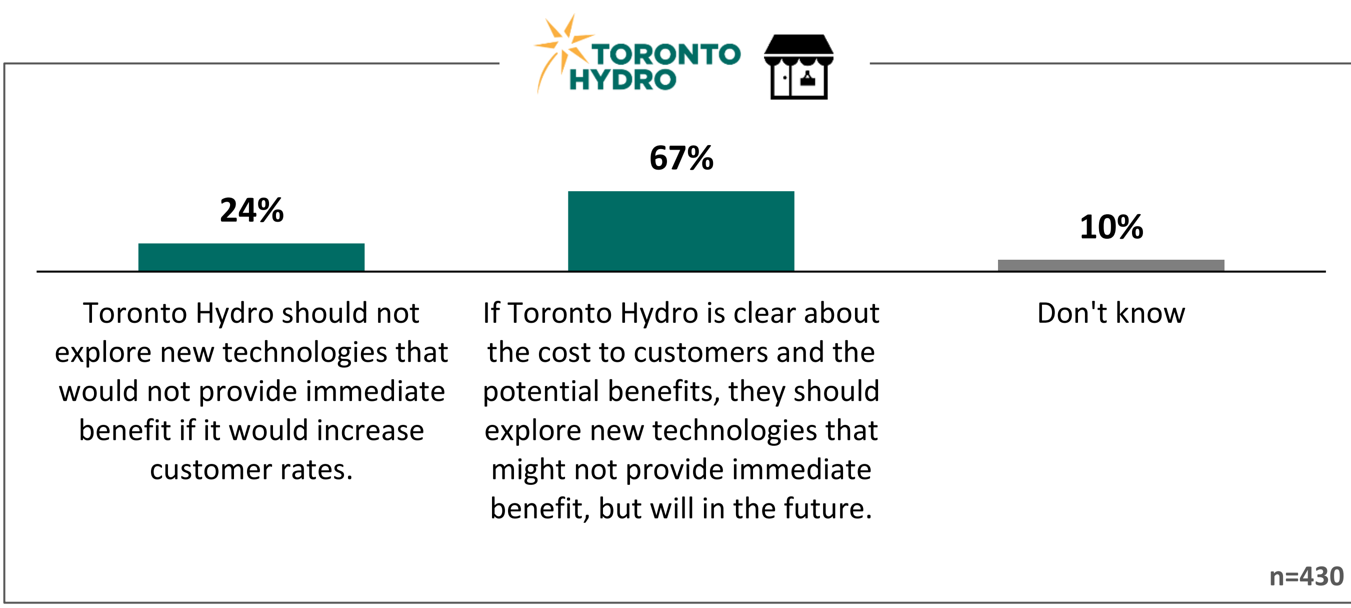
The second scenario is where Toronto Hydro identifies new technology that is needed to improve the system in the future and would increase costs now, but the benefit might not be felt until later.

This includes accommodating emerging technologies like solar power, battery storage and electric vehicles.

Regardless of whether you are considering new energy choices like an electric vehicle for yourself today, Toronto Hydro must be prepared as adoption becomes more widespread over the next 5-10 years.

For instance, charging each electric vehicle draws as much energy as two average homes. If a dozen or so people come home and start changing their vehicles at a period of peak demand, it could overload the grid in that neighbourhood. While Toronto Hydro cannot predict the exact rate of electric vehicle adoption in the City of Toronto, the utility must make certain investments today that will allow it to manage electric vehicle demand in the future.

Q Which of the following best represents your view?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Should not explore new tech	26%	33%	21%	18%	26%	26%	19%
Should explore new tech	62%	63%	67%	71%	62%	66%	72%
Don't know	12%	4%	12%	11%	12%	8%	10%

RESEARCH GROUP

Online Survey

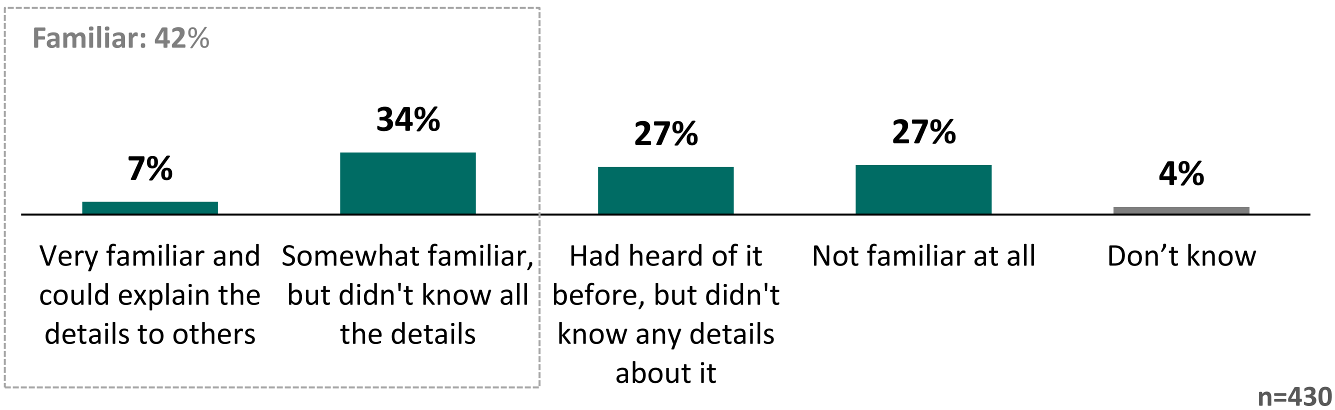
Familiarity with Sources of GHG Emissions

Small Business

In November 2021, the City of Toronto released its 2019 Greenhouse Gas (GHG) Inventory, which tracks Toronto's progress towards GHG reduction targets and identifies key emissions sources. GHG emissions have a wide variety of environmental impacts that lead to climate change and global warming.

This report notes that the two **primary sources of GHG emissions** in Toronto are: energy use in buildings (natural gas and electricity) and transportation fuels (primarily gasoline) – accounting for 93% of all emissions in the city.

Q Before this survey, how familiar would you say you were with the primary sources of GHG emissions in Toronto?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	9%	11%	7%	4%	10%	7%	5%
Somewhat familiar	27%	34%	31%	40%	31%	33%	39%
Had heard of it	31%	21%	27%	28%	30%	25%	25%
Not familiar at all	26%	29%	31%	25%	26%	30%	26%
Don't know	8%	5%	4%	3%	3%	5%	5%
Familiar (Very + Somewhat)	**35%**	**45%**	**38%**	**44%**	**42%**	**40%**	**44%**

INNOVATIVE RESEARCH GROUP

Online Survey

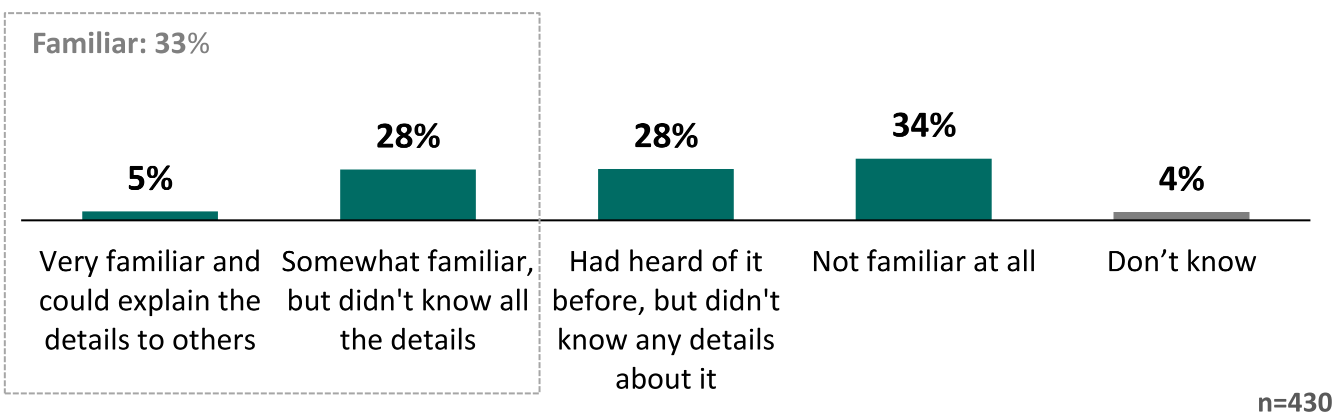
Familiarity with the City's Plan

In October 2019, Toronto City Council voted to accelerate its efforts to mitigate and adapt to climate change and adopt a stronger emissions target for Toronto: **net zero emissions by 2040.**

A key part of the City's "Net Zero Strategy" requires switching from gasoline in the transportation system and natural gas in home/building heating to electricity-powered alternatives, adopting renewable generators and using energy storage systems.

These initiatives will require Toronto Hydro to expand and modernize its existing electricity distribution grid to ensure that it is capable of helping achieve the City's targets.

Q Before this survey, how familiar were you with the City of Toronto's plan to use an expanded and modernized grid to reduce GHG emissions in Toronto to help address climate change?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Very familiar	5%	7%	6%	2%	7%	4%	4%
Somewhat familiar	24%	24%	33%	30%	25%	31%	27%
Had heard of it	28%	26%	28%	30%	32%	26%	28%
Not familiar at all	35%	37%	30%	35%	32%	34%	36%
Don't know	8%	6%	2%	4%	3%	5%	5%
Familiar (Very + Somewhat)	**30%**	**32%**	**39%**	**32%**	**32%**	**36%**	**31%**

Online Survey

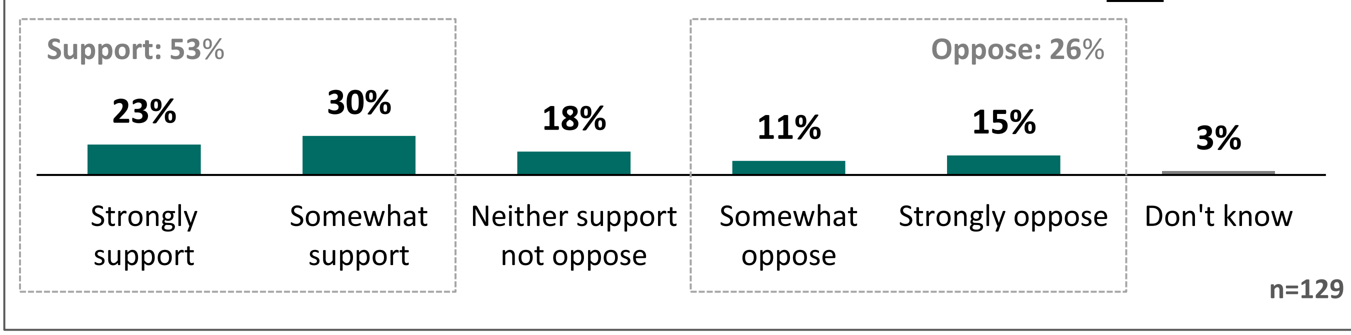
Support for Bill Increase to Meet Emissions Targets

As Toronto Hydro is 100% funded through the rates its customers pay, investing in an expanded and modernized electricity grid would mean that customers, like yourself, would pay more.

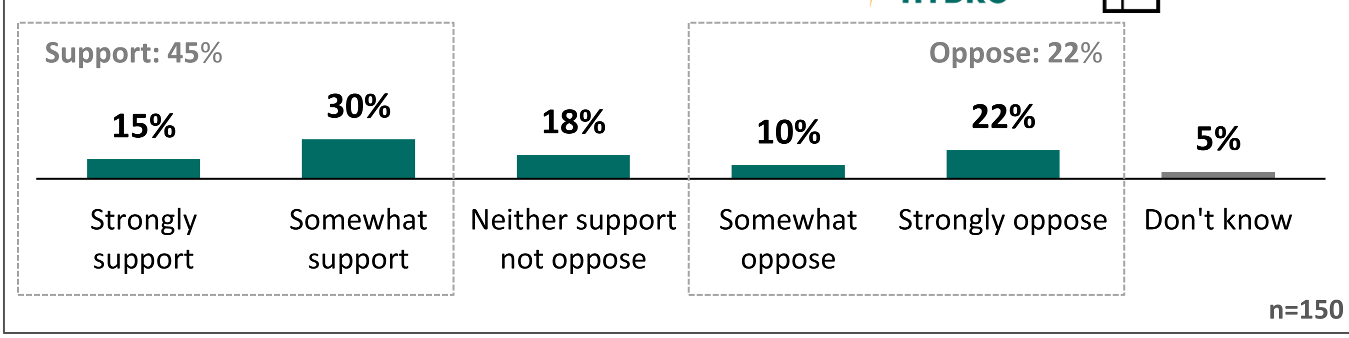
The sooner that Toronto Hydro expands and modernizes the grid, the sooner Toronto can reach its climate change goals.

Q Would you support or oppose a specific charge on your monthly bill to help Toronto meet its future emissions targets if your electricity bill will grow by **[COST]**?

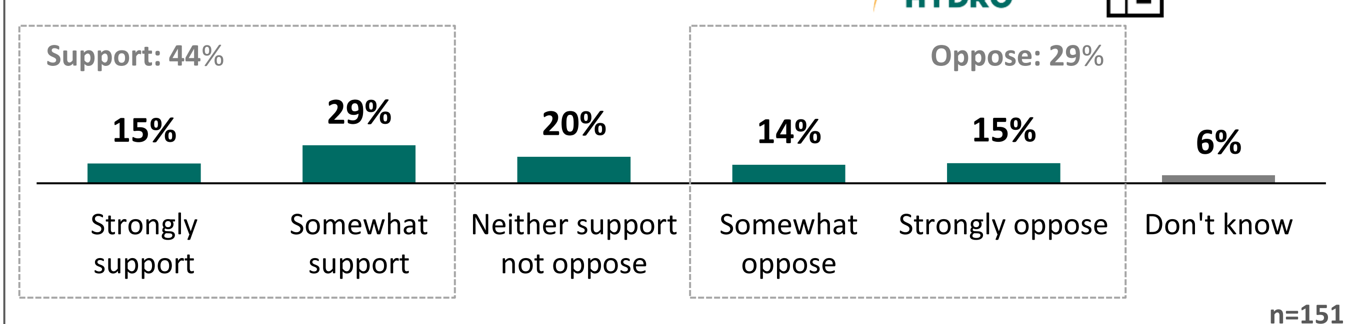
2.5% a year for the next 10 years



5% a year for the next 10 years



10% a year for the next 10 years



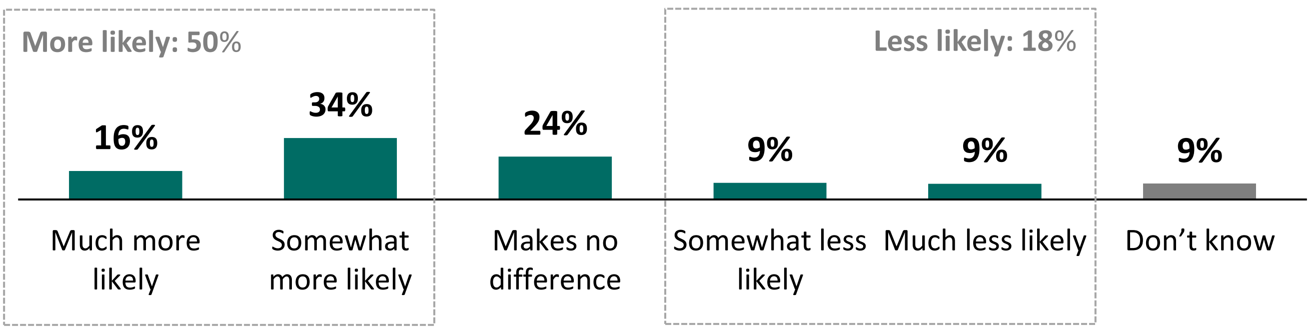
Online Survey

Potential for Rate Increase Offset

Small Business

Some studies have indicated that increasing customer bills to specifically help meet emissions targets could be offset in later years because of reductions in other types of energy bills. For example, as fuel-switching to electricity becomes more widespread, customers may experience cost reductions for gasoline and natural gas.

Q Does knowing these types of rate increases could be offset in later years because of reduction in other types of energy bills make you more or less likely to support a specific charge on your monthly bill to help Toronto meet its future emissions targets?



n=430

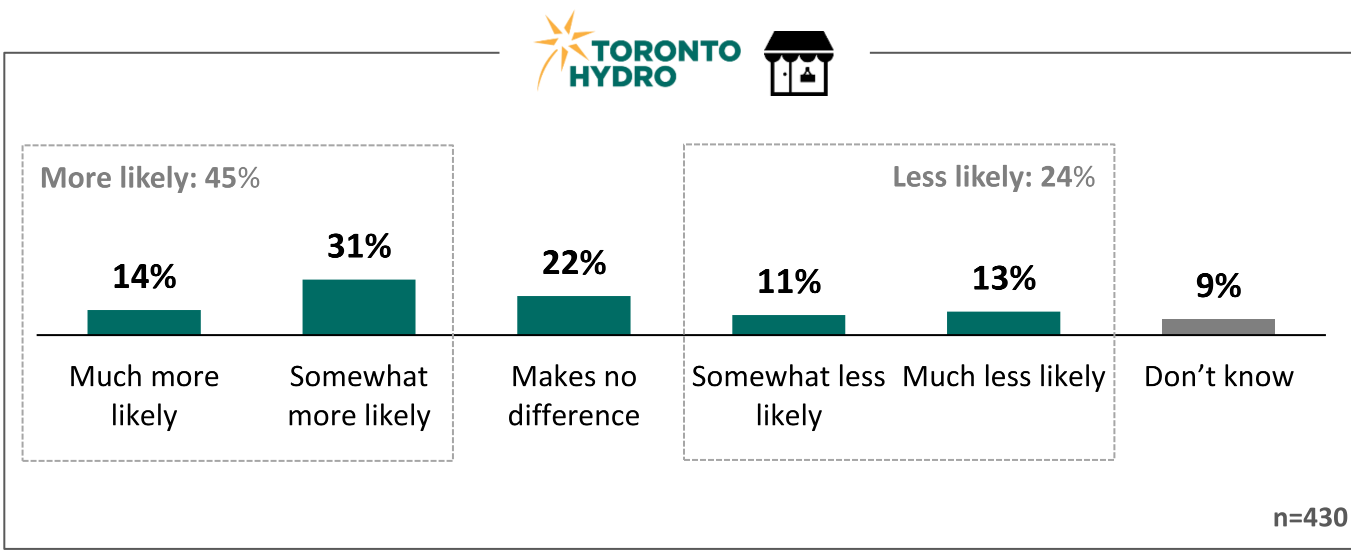
	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Much more likely	18%	11%	17%	17%	14%	10%	24%
Somewhat more likely	29%	38%	39%	31%	31%	38%	32%
No difference	30%	21%	14%	27%	24%	25%	23%
Somewhat less likely	8%	11%	13%	6%	10%	11%	8%
Much less likely	6%	10%	9%	9%	13%	10%	4%
More likely (Very + Somewhat)	**47%**	**50%**	**56%**	**48%**	**45%**	**48%**	**56%**
Less likely (Very + Somewhat)	**14%**	**22%**	**23%**	**15%**	**23%**	**21%**	**11%**

Online Survey

Inclusion of Rate Relief

Some customers have said that they would be willing to spend more in order to help Toronto meet its future emissions targets, however, feel that lower-income Torontonians should receive rate relief in order to offset any associated price increase.

Q Would the inclusion of "rate relief" for low-income customers make you **more or less likely to support** a specific charge on your monthly bill to help Toronto meet its future emissions targets?



	Region				Bill impact on finances		
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	Significant impact	Impact	No Impact
Much more likely	12%	15%	17%	13%	18%	8%	17%
Somewhat more likely	27%	28%	32%	34%	20%	36%	34%
No difference	23%	21%	21%	22%	22%	23%	20%
Somewhat less likely	9%	12%	15%	10%	15%	11%	9%
Much less likely	15%	17%	8%	13%	18%	15%	7%
More likely (Very + Somewhat)	**40%**	**43%**	**49%**	**47%**	**38%**	**43%**	**52%**
Less likely (Very + Somewhat)	**24%**	**29%**	**23%**	**23%**	**33%**	**26%**	**16%**

Online Survey

Small Business

Do future offset rates and rate relief increase or decrease support?

Does knowing these types of rate increases could be offset in later years because of reduction in other types of energy bills make you more or less likely to support a specific charge on your monthly bill to help Toronto meet its future emissions targets?

	Would you support or oppose a specific charge on your monthly bill to help Toronto meet its future emissions targets if your electricity bill will grow by [COST]?						
	Total	Strongly support	Somewhat support	Neither support nor oppose	Somewhat oppose	Strongly oppose	Don't know
Much more likely	16%	51%	17%	4%	5%	1%	7%
Somewhat more likely	34%	22%	61%	38%	22%	10%	13%
Makes no difference	24%	18%	13%	35%	36%	33%	0%
Somewhat less likely	9%	5%	5%	6%	25%	16%	0%
Much less likely	9%	0%	1%	8%	10%	31%	4%
Don't know	9%	4%	2%	10%	2%	8%	76%
Net "More Likely"	**+32%**	**+69%**	**+72%**	**+27%**	**-9%**	**-37%**	**+16%**

Would the inclusion of "rate relief" for low-income customers make you more or less likely to support a specific charge on your monthly bill to help Toronto meet its future emissions targets?

	Would you support or oppose a specific charge on your monthly bill to help Toronto meet its future emissions targets if your electricity bill will grow by [COST]?						
	Total	Strongly support	Somewhat support	Neither support nor oppose	Somewhat oppose	Strongly oppose	Don't know
Much more likely	14%	35%	18%	7%	4%	1%	10%
Somewhat more likely	31%	31%	49%	31%	19%	14%	10%
Makes no difference	22%	18%	19%	31%	27%	22%	3%
Somewhat less likely	11%	10%	12%	7%	23%	11%	0%
Much less likely	13%	3%	1%	14%	22%	40%	4%
Don't know	9%	3%	2%	9%	5%	12%	73%
Net "More Likely"	**+21%**	**+53%**	**+54%**	**+17%**	**-22%**	**-36%**	**+16%**

INNOVATIVE
RESEARCH GROUP

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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APPENDIX 05

CONFIDENTIAL

INNOVATIVE RESEARCH GROUP

Commercial & Industrial
Needs and Preferences Survey

TORONTO HYDRO

November 2, 2023

STRICTLY CONFIDENTIAL

APPENDICIES

INNOVATIVE
RESEARCH GROUP

Commercial & Industrial Customers

Online Survey Results

Section 5.1

Online Survey
Survey Design & Methodology

INNOVATIVE was engaged by Toronto Hydro to gather customer input to assess the importance of the outcomes and priorities identified in the qualitative components of Phase I of the customer engagement.

Field Dates

The **C&I Online Survey** was sent to all Toronto Hydro C&I customers who provided the utility with an email address. Customers had an opportunity to complete the survey between **January 17th and 31st, 2022**.

Each customer received a unique URL that could be linked back to their annual consumption, region and rate class.

In total, the C&I survey was sent to **2,382** customers via e-blast from *customerexperience@torontohydro.com*. A reminder email was sent 2 days after the initial invitation to those who had not yet completed the survey. An additional reminder email was sent 2 days later, and a final reminder email was sent a week later.

C&I Online Survey Completes

A total of **48** (unweighted) Toronto Hydro C&I customers completed the online survey via a unique URL.

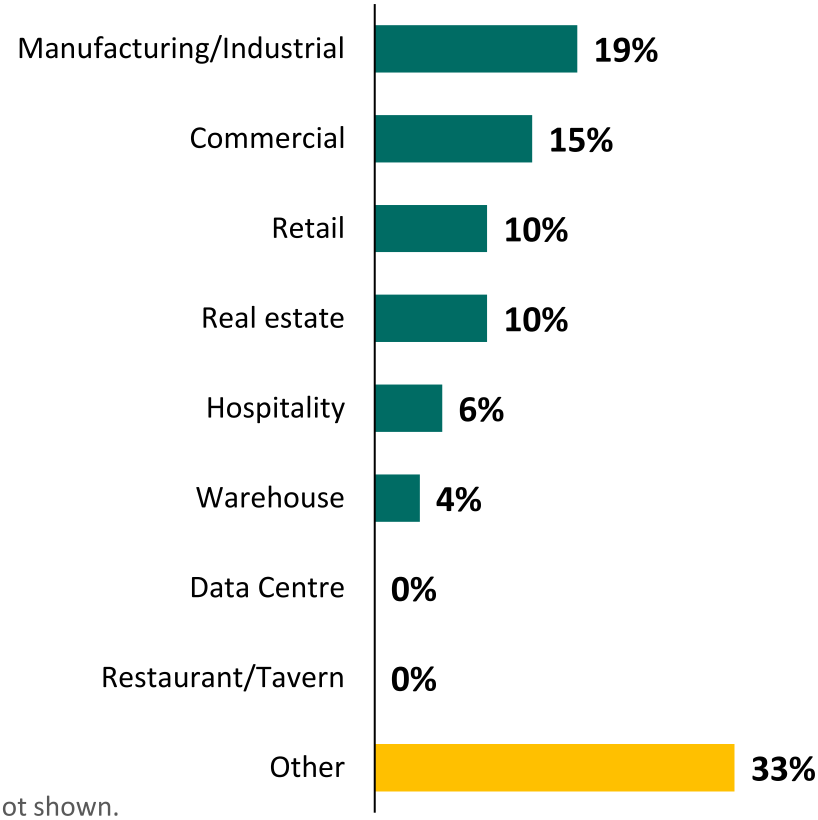
Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

Online Survey

Demographic breakdown

Commercial & Industrial

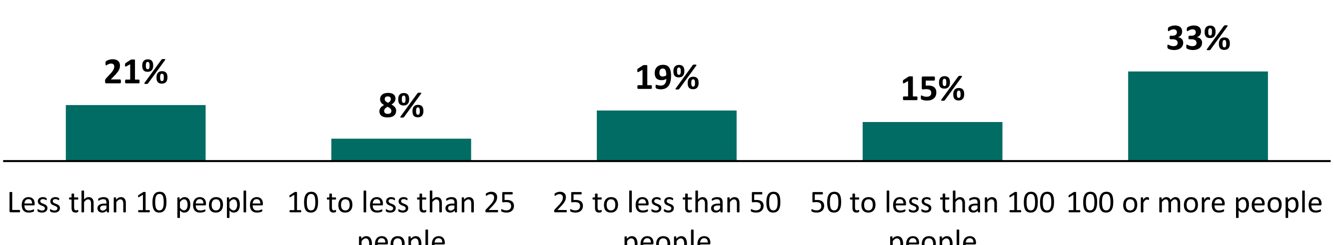
Q Which of the following best describes the sector in which your business operates?



"Don't know" (2%) not shown.

n=48

Q Including yourself, how many people work at your organization?



"Don't know" (4%) not shown.

n=48

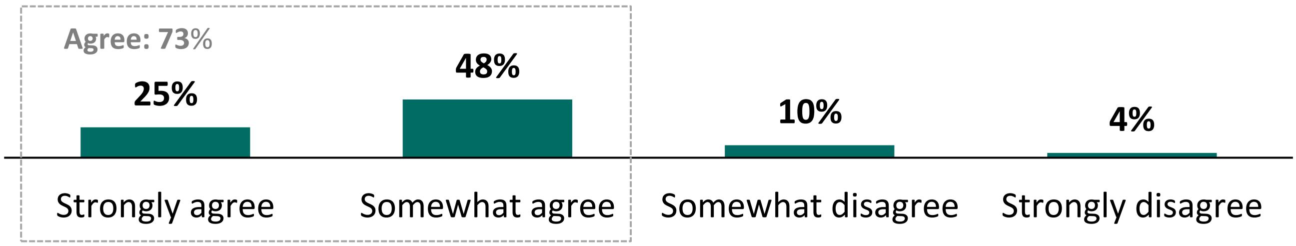
Online Survey

Environmental Controls

Commercial & Industrial

To what extent do you agree or disagree with the following statements?

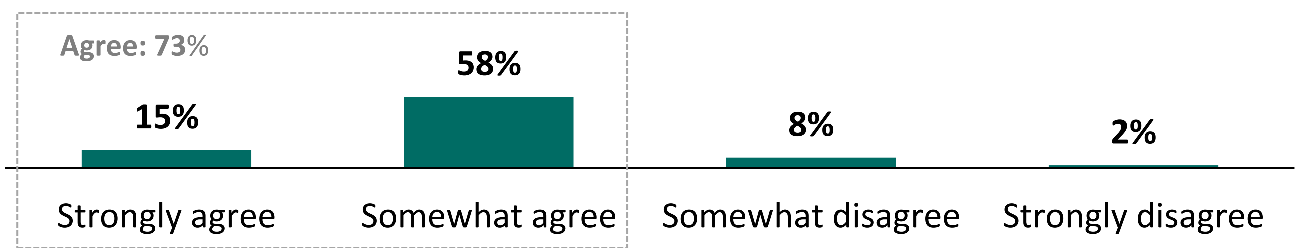
Q The cost of my electricity bill has a major impact on the bottom line of my organization and results in some important spending priorities and investments being put off.



"Don't know/no opinion" (13%) not shown.

n=48

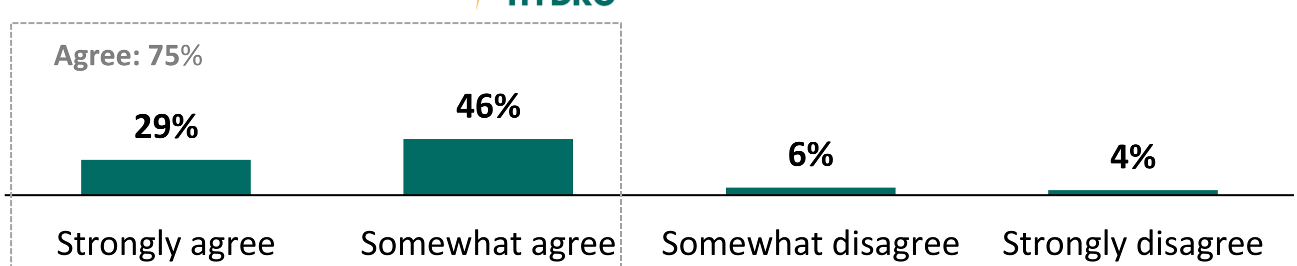
Q Customers are well-served by the electricity system in Ontario.



"Don't know/no opinion" (17%) not shown.

n=48

Q Fossil fuels should be phased out as quickly as possible to speed up the shift to a lower-carbon future.



"Don't know/no opinion" (15%) not shown.

n=48

Online Survey

Familiarity with Ontario's Electricity System

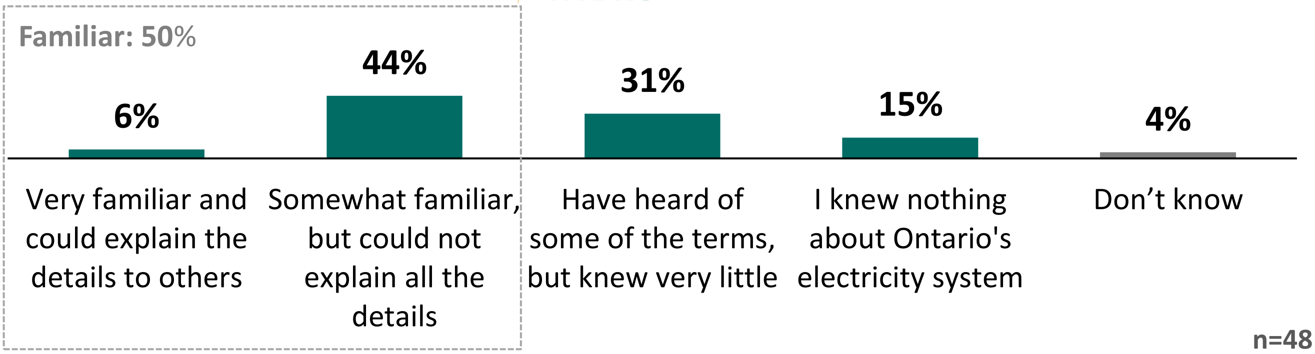
Commercial & Industrial

As you may know, Ontario's electricity system has three key components: **generation**, **transmission** and **distribution**.

- **Generating stations** convert various forms of energy into electric power
- **Transmission lines** connect the power produced at generating stations to where it is needed across the province
- **Local distribution networks** take the electricity from provincial transmission lines and bring it to your home through a network of wires, poles and other equipment.

Q Before this survey, how familiar were you with the various parts of the electricity system and how they work together?

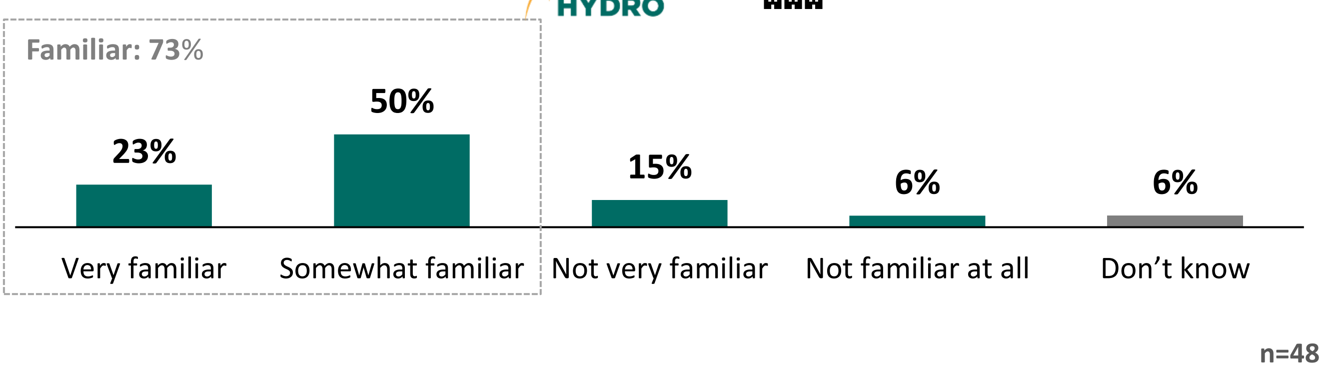
TORONTO HYDRO



Toronto Hydro owns and operates Toronto's distribution network. This is the network that takes the electricity from high-voltage transmission towers and brings it to your business through a network of wires, poles and other equipment.

Q Before this survey, how familiar were you with **Toronto Hydro**, which operates the electricity distribution system in your community?

TORONTO HYDRO

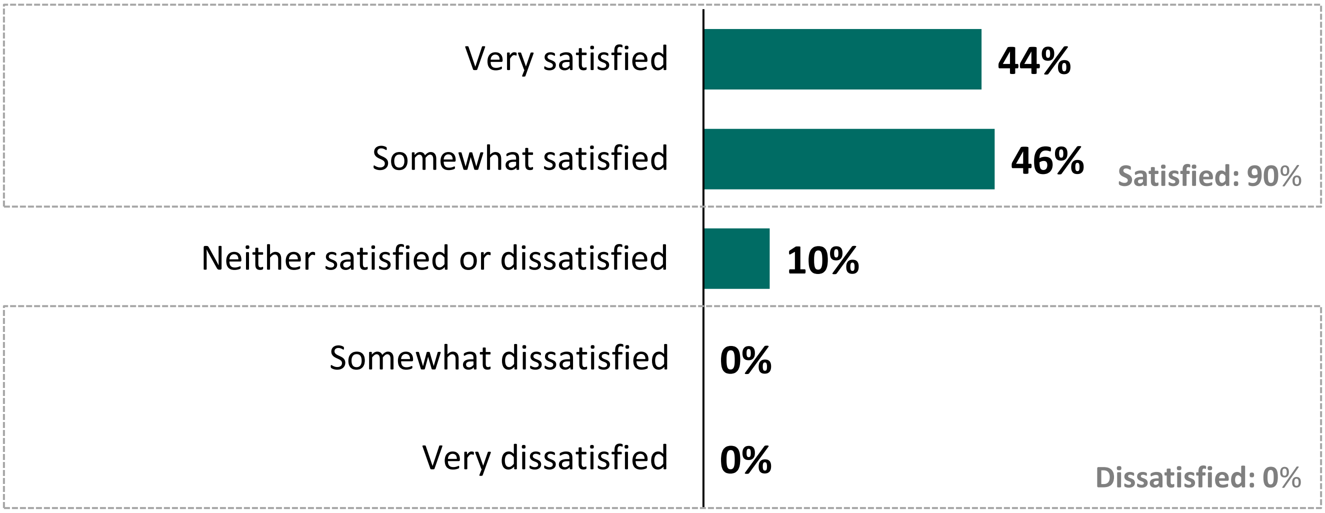


Online Survey

Satisfaction & Improvement with Toronto Hydro

Commercial & Industrial

Q Thinking specifically about the services provided to you and your community by **Toronto Hydro**, overall, how satisfied or dissatisfied are you with the services that your organization receives?



"Don't know" (0%) not shown.

n=48

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Response	%
Reliability	10%
Communication	8%
Billing	8%
Service	4%
Costs	4%
None	6%
Don't Know	58%

Online Survey

How Toronto Hydro can Improve Services to Customers

Commercial & Industrial

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Reliability
"Consistent hydro - there are a lot of power failures in the area which cause problems for security, computer and building systems."
"Either in summer and winter, power outage is a hassle. In winter it will be worst. Although it is not often (can't imagine what will be if that happens), yet it's ideal to have zero power outage."
"Eliminate power outages."
"Preventative Maintenance on distribution lines to prevent auto-reclosure events especially in spring time, overgrowth and animal activity that cause disruptions."
"Spikes in power that are causing damage to equipment."
Communication
"Better communications."
"Community communications on efficiency improvement plans."
"It seems that Toronto Hydro has my email address attached to numerous accounts within our organization that I am not responsible for."
"We want to be informed once a power outrage happens."
Billing
"As far as e-billings are concerned Toronto Hydro is quite excellent in providing us this service."
"Find a way to make the billing less complicated..."
"Help clarify why power usage on bill jumps up on occasion without any change in operational practice."
"When in the accounts (particularly for multiple accounts) page it would definitely help if there was a column to show due date as well for payments, next to the current balance. that would be better to view the bills as per due dates."
Service
"Response times when we plan a shutdown for private hydro-station maintenance; waited 4+ hours for vehicles to arrive despite being told they were coming. Had to PM Toronto Hydro on Twitter to get a response. Have experienced this a few times. Random power "blips" (not too frequent fortunately) but with no explanation or reason. Our restart and inspection of equipment can take up to 2 hours depending if we have personnel on site at the time."
"Maybe to provide updates from time to time to consumer. re: upgrade."
Costs
"If the rates can be reduced - that will be great."
"Lower rates."

Online Survey

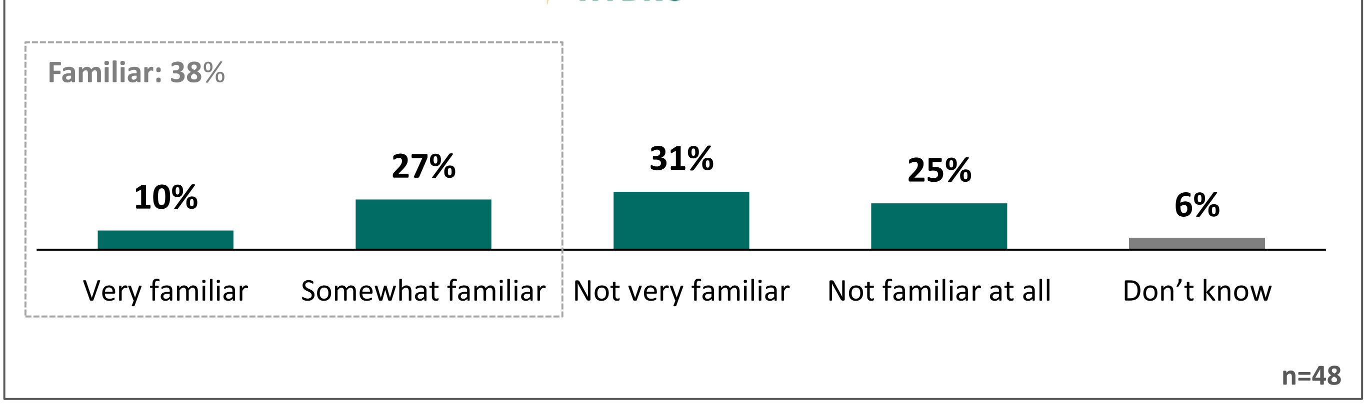
Familiarity with Bill Remittance to Toronto Hydro

Commercial & Industrial

While **Toronto Hydro** is only responsible for the distribution portion of the system, to make it easier for customers, they are responsible for collecting payment for the entire electricity system.

Toronto Hydro keeps about **6%** of the average mid-sized business customer's bill. The rest of the bill goes to power generation companies, transmission companies, the provincial government and regulatory agencies.

Q Before this survey, how familiar were you with the amount of your organization's electricity bill that went to **Toronto Hydro**?



Commercial & Industrial Customers

Customer Priorities

Section 5.2

Online Survey

Importance of Customer Priorities

Commercial & Industrial

Now, let's talk about our second topic – outcomes.

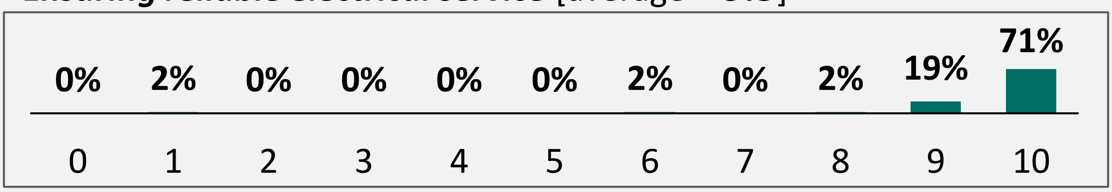
Everyday **Toronto Hydro** interacts with hundreds of its customers through multiple channels and touchpoints, including surveys, the call centre and social media.

In a recent series of customer focus groups, a number of company goals were identified as priorities for **Toronto Hydro**.

Q Using a scale from 0 to 10, where _0 means not important at all_ and _10 means extremely important_, how important are each of the following **Toronto Hydro** priorities to you as a customer?

Ensuring reliable electrical service [average = **9.5**]

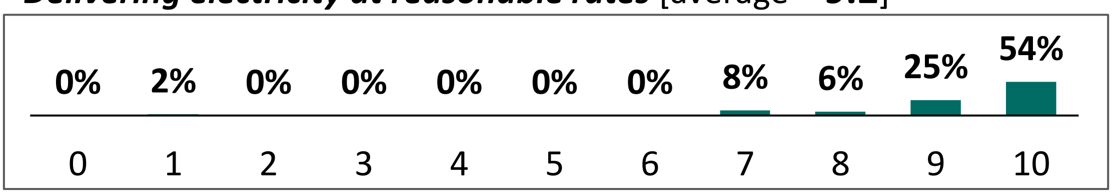
Not at all important



Extremely important

Delivering electricity at reasonable rates [average = **9.2**]

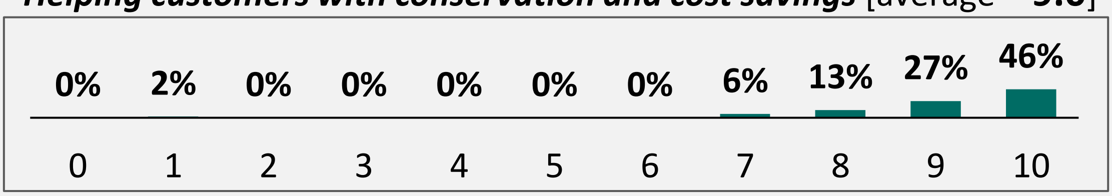
Not at all important



Extremely important

Helping customers with conservation and cost savings [average = **9.0**]

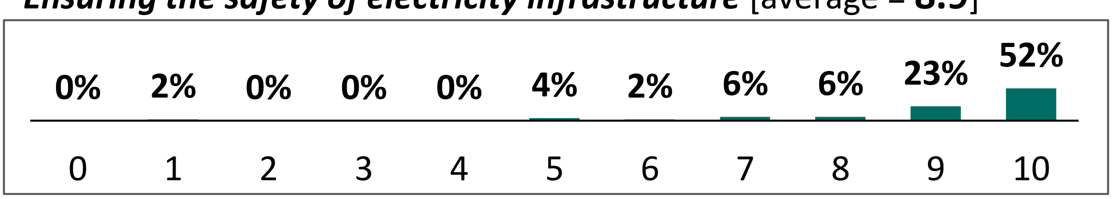
Not at all important



Extremely important

Ensuring the safety of electricity infrastructure [average = **8.9**]

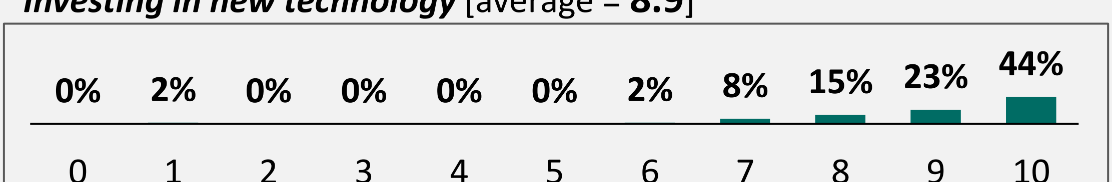
Not at all important



Extremely important

Investing in new technology [average = **8.9**]

Not at all important



Extremely important

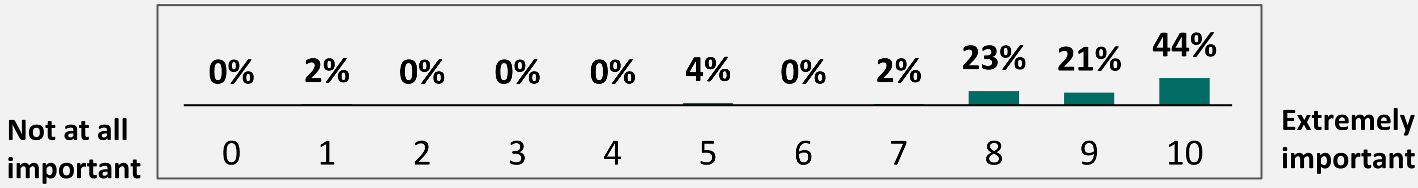
Online Survey

Importance of Customer Priorities (Cont'd)

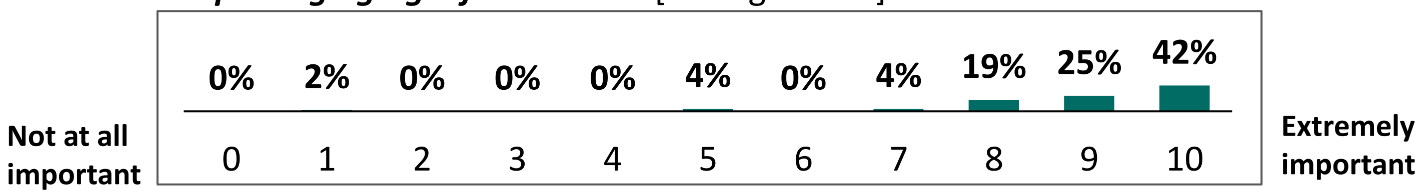
Commercial & Industrial

Q Using a scale from 0 to 10, where *0 means not important at all* and *10 means extremely important*, how important are each of the following **Toronto Hydro** priorities to you as a customer?

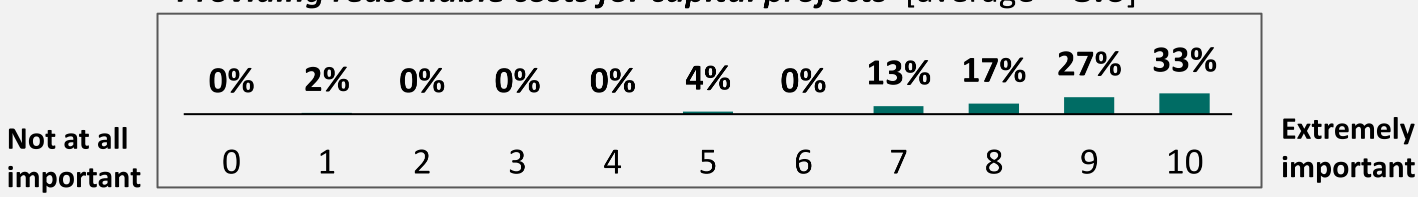
Providing quality customer service [average = **8.8**]



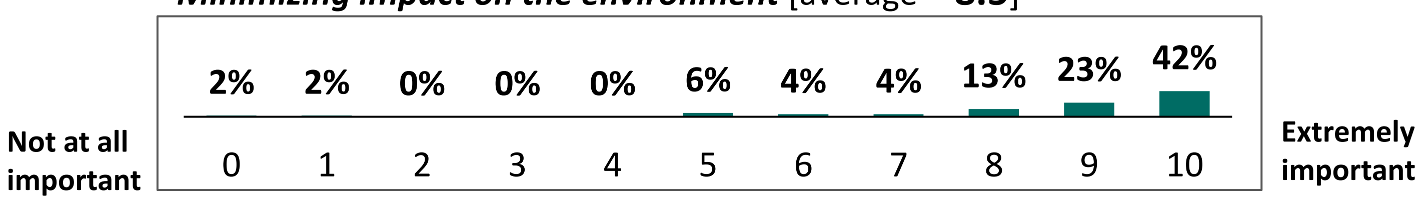
Replacing aging infrastructure [average = **8.8**]



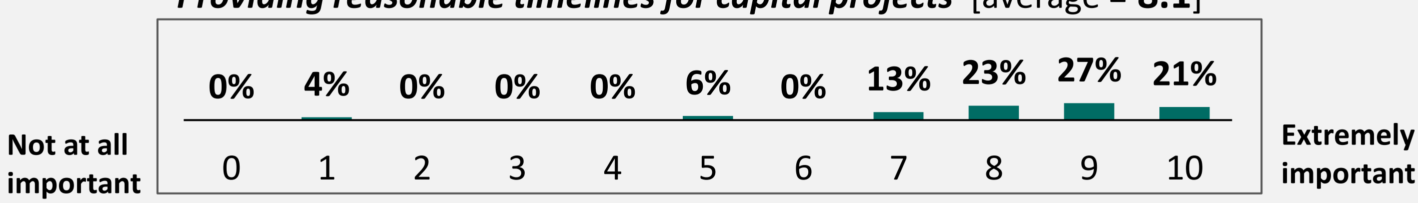
Providing reasonable costs for capital projects [average = **8.6**]



Minimizing impact on the environment [average = **8.5**]



Providing reasonable timelines for capital projects [average = **8.1**]

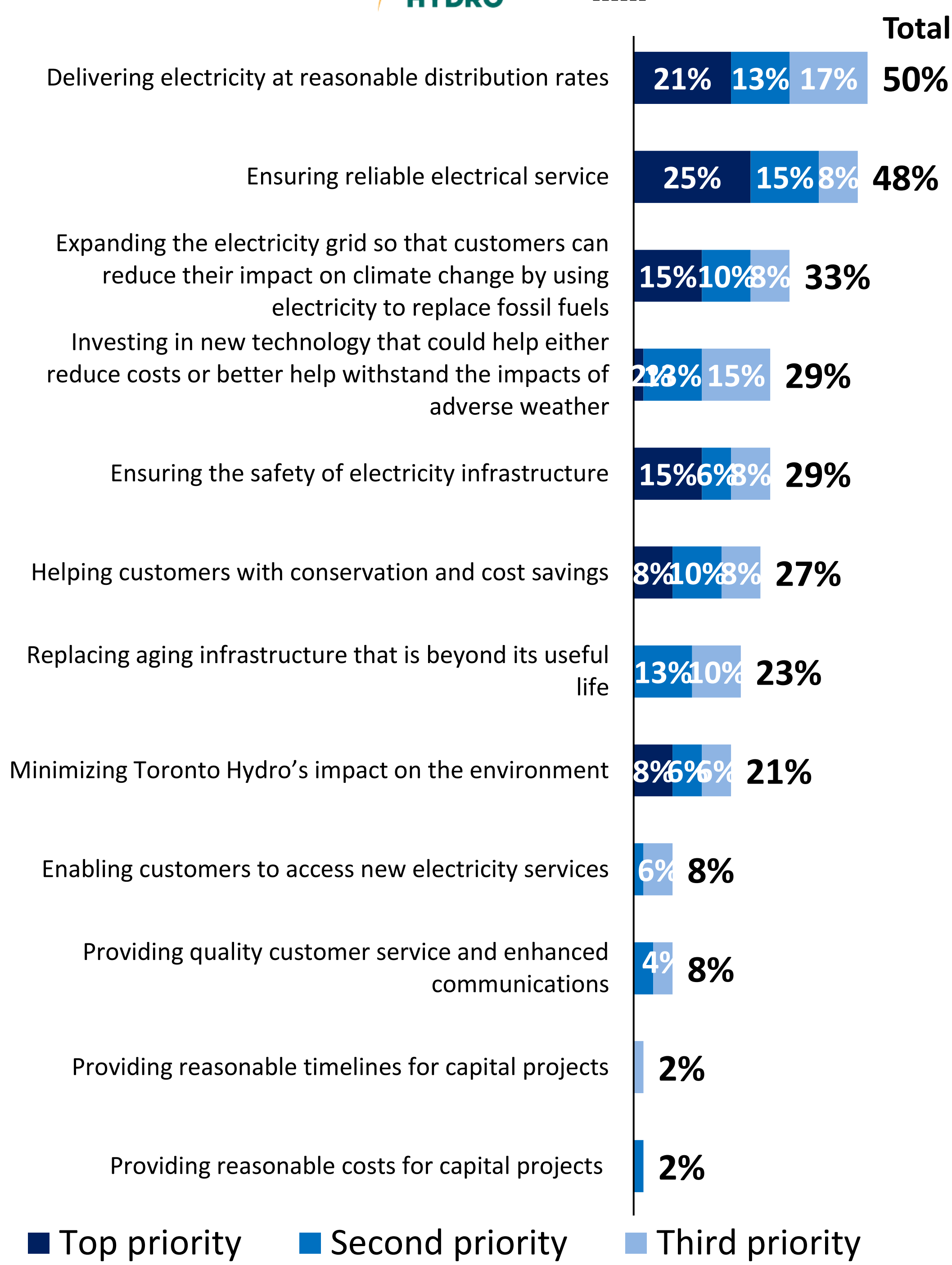


INNOVATIVE RESEARCH GROUP

Online Survey
Ranking Customer Priorities

Commercial & Industrial

Q Thinking of the priorities on the previous page, which would you say is the **most** important? What is the next most important priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



n=48

"Don't know" not shown.

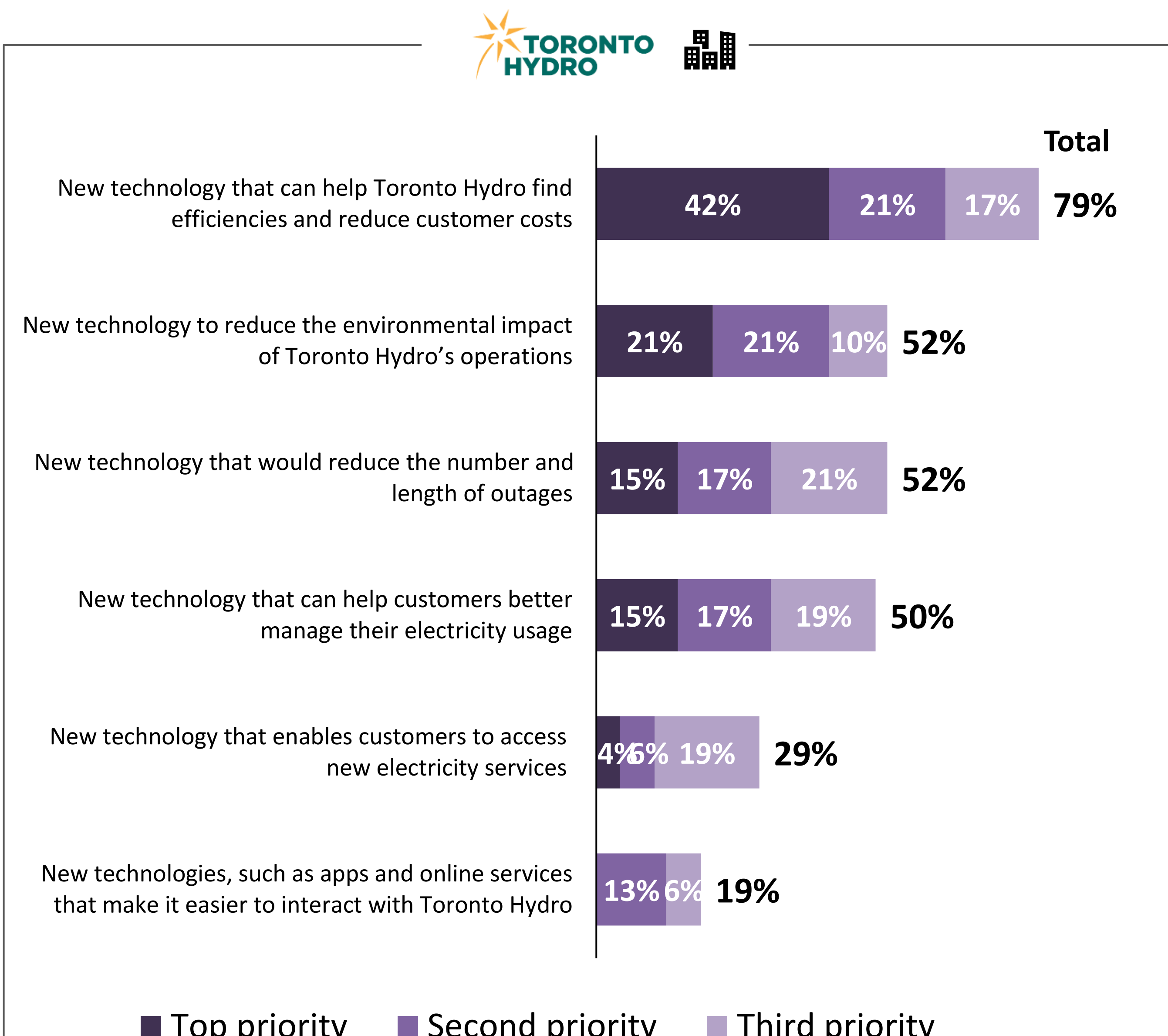
Online Survey

Ranking Technology Priorities

Commercial & Industrial

Investments in new technology can help Toronto Hydro address a range of issues. These include reliability, efficiency, customer service, Toronto Hydro's impact on the environment, new service offerings and tools to manage electricity usage.

Q Among the following potential investments in new technology, which would you say is the **most** important? What is the next most important new technology priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



"Don't know" not shown.

n=48

Online Survey
Additional Priorities

Commercial & Industrial

Q Can you think of any other important priorities that **Toronto Hydro** should be focusing on?

Response	%
Fighting Climate Change	4%
Communication	2%
Costs	2%
Reliability	2%
Other	4%
None	4%
Don't Know	81%

Fighting Climate Change
"Reducing their negative effect on the environment."
"Replacing fossil fuels!"
Communication
"Easy phone communication."
Costs
"For me focus on cost savings especially to consumers."
Reliability
"Preventative maintenance."
Other
"Public education."
"Focus on long-term benefits to the customers, not just short-term."

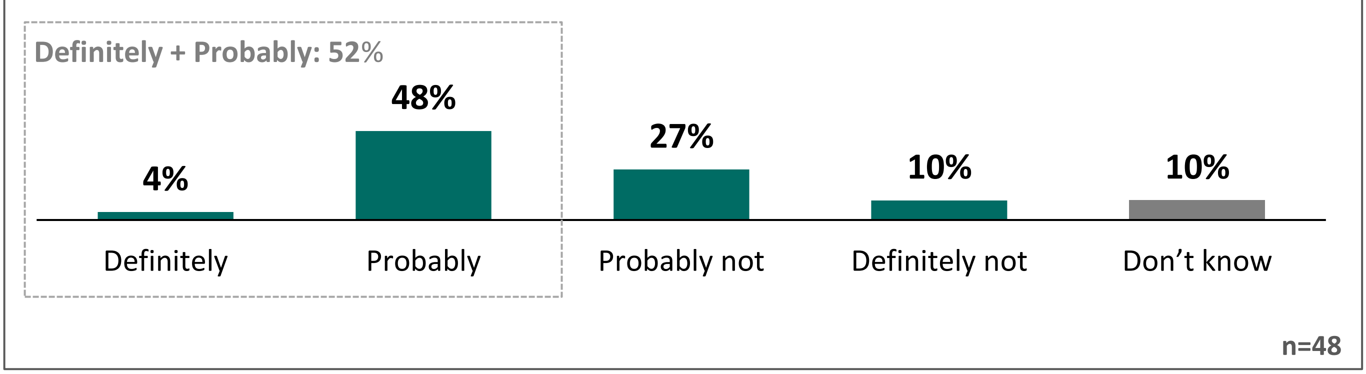
Online Survey

Support for Low-Income Customers & Outages Experienced

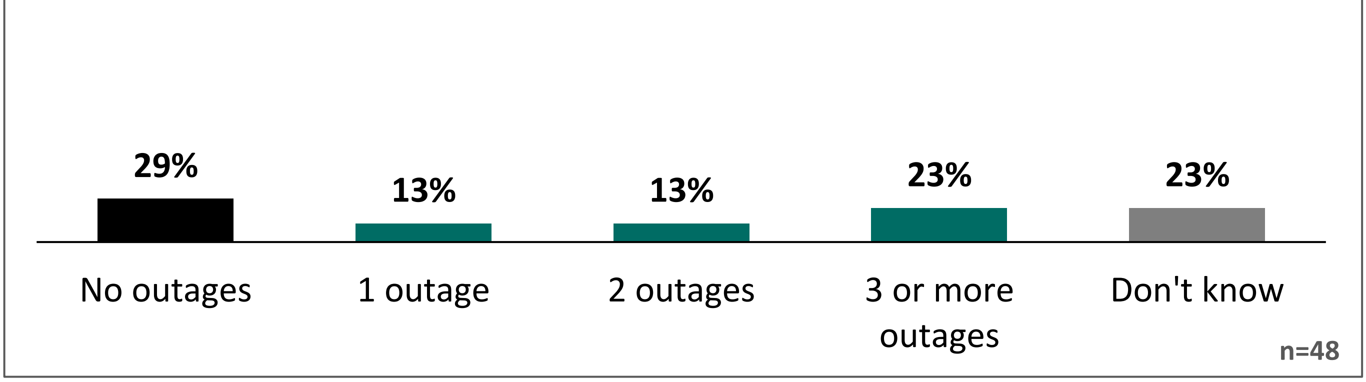
Commercial & Industrial

In recent interactions with customers, a number of customers identified assisting low-income Torontonians with their electricity bills.

Q In addition to the amount that you currently pay on your electricity bill, would you be willing to pay an extra few dollars per month in order for Toronto Hydro to provide financial assistance to make electricity bills more affordable for low-income customers?



Q Now, let’s talk about the reliability of electricity service your organization receives. Have you experienced any power outages at **<u>your organization in the past 12 months</u>** which *<u>lasted longer than one minute</u>*? If so, approximately how many of these power outages did you experience?

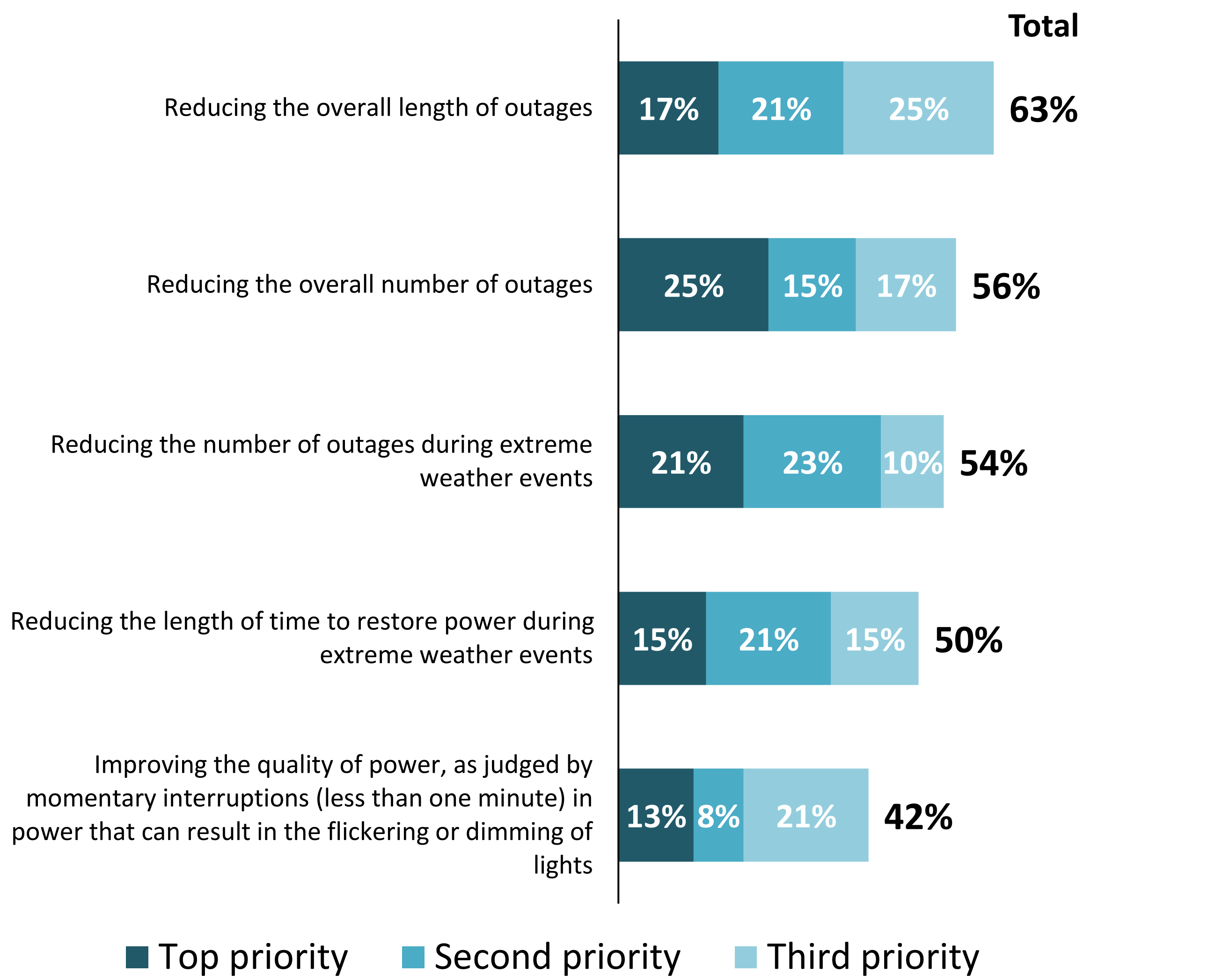


Online Survey
Ranking Reliability Priorities

Commercial & Industrial

When it comes to reliability, there are a number of areas that **Toronto Hydro** could focus on.

Q Among the following reliability outcomes, which would you say is the **most** important? What is the next most important reliability outcome you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



"Don't know" not shown.

n=48

INNOVATIVE RESEARCH GROUP

Commercial & Industrial Customers

Investment Trade-Offs

Section 5.3

Online Survey
System Renewal

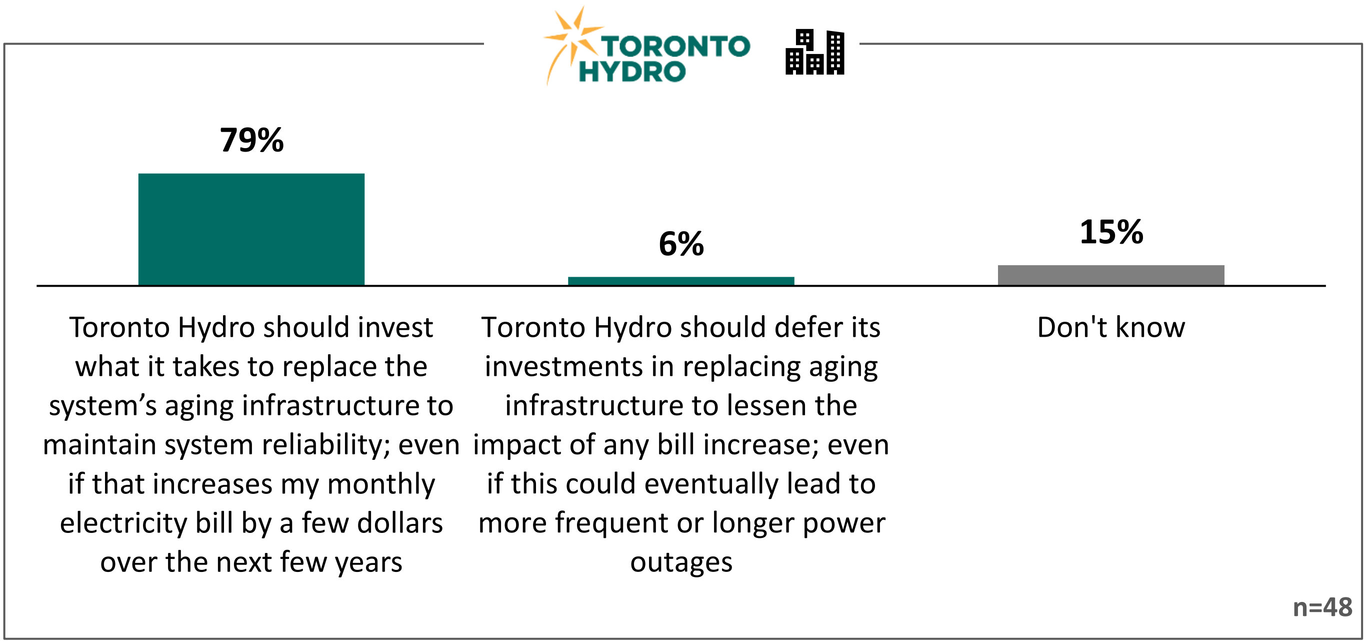
Now let's turn to our final topic – investment trade-offs.

Toronto Hydro is in the early stages of developing its investment plan for the next five years. While conversations with customers will continue over the next several months, the utility wants to know your preferences when it comes to finding the right balance between costs and other outcomes.

There are four investment categories that we would like to discuss.

The first category focuses on projects that replace and restore aging electrical infrastructure, like overhead poles and underground cables.

Q Regarding investments in aging infrastructure, which of the following statements best represents your point of view?

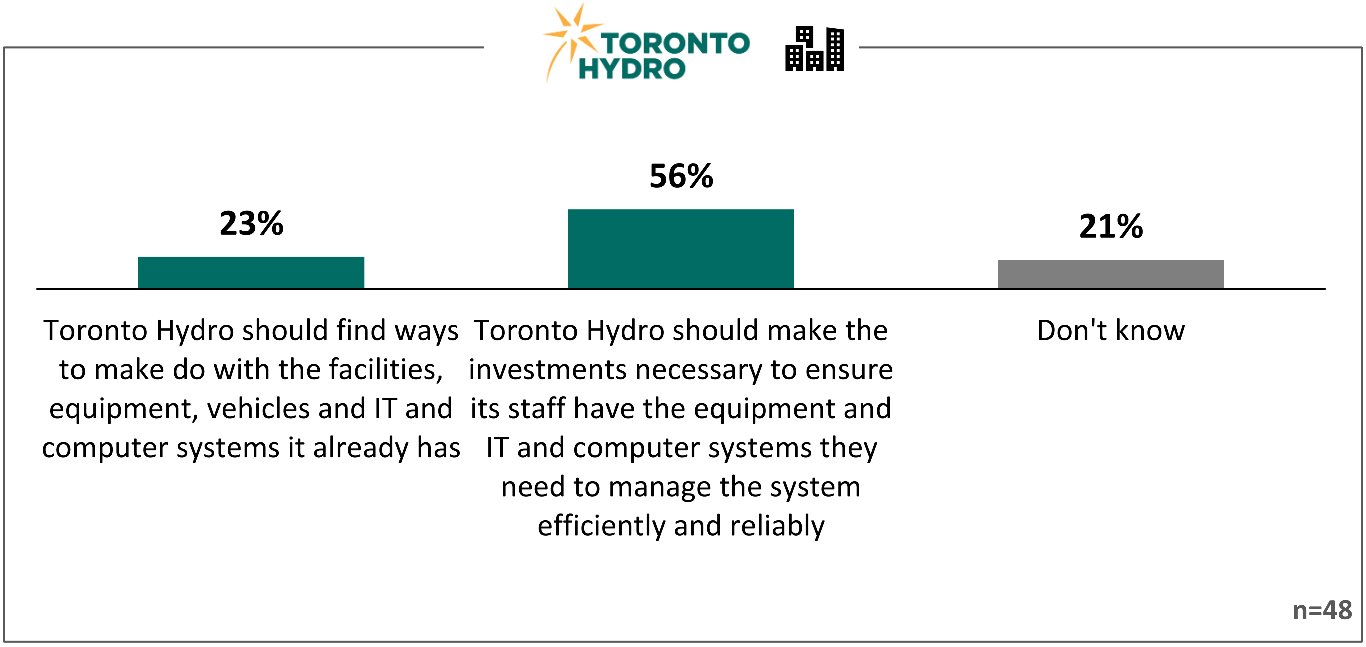


Online Survey
General Plant

Commercial & Industrial

The second category focuses on keeping **Toronto Hydro's** business running. This includes facilities to house staff and equipment, vehicles and tools to service equipment and IT systems to manage the system and customer information.

Q Regarding these types of investments, which of the following best represents your point of view?



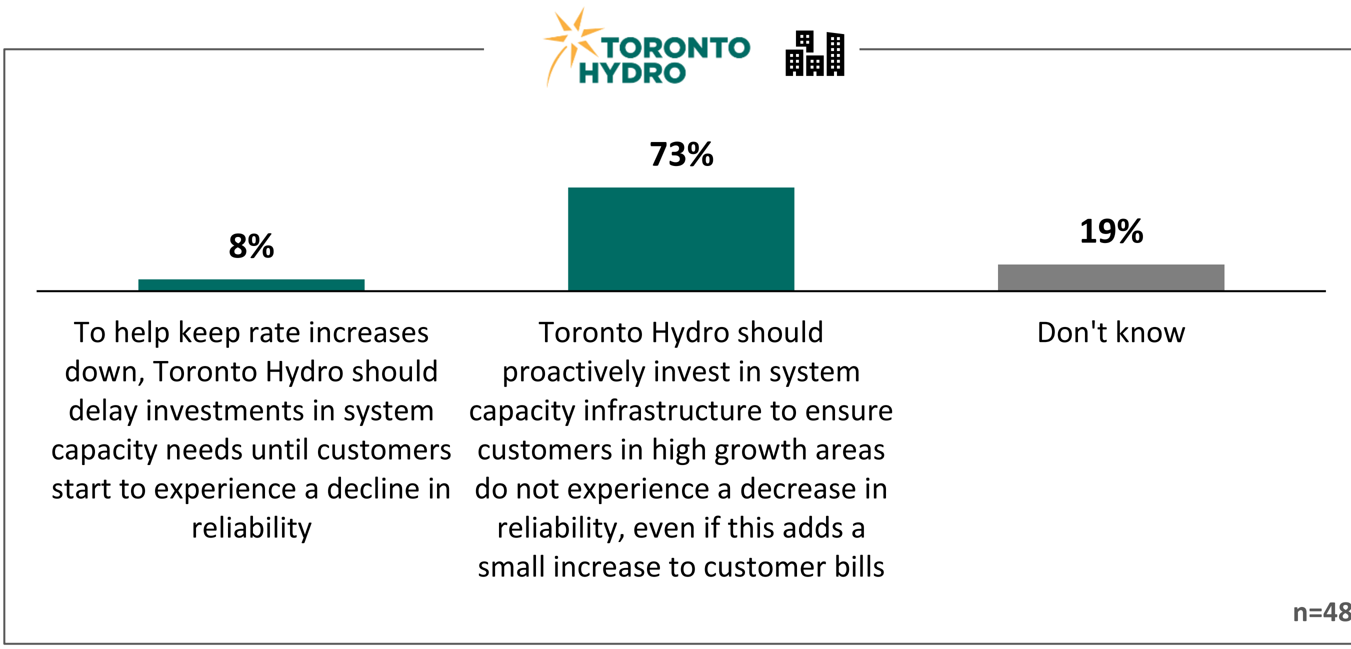
Online Survey
System Service

Commercial & Industrial

The third investment category focuses on growth and greater demand for electricity in various parts of **Toronto Hydro's** service territory.

Increased demand for electricity puts pressure on existing electrical infrastructure. Eventually, further infrastructure investments are required to support increased demand for electricity.

Q With this in mind, which of the following statements best represents your point of view?



Online Survey
Grid Modernization

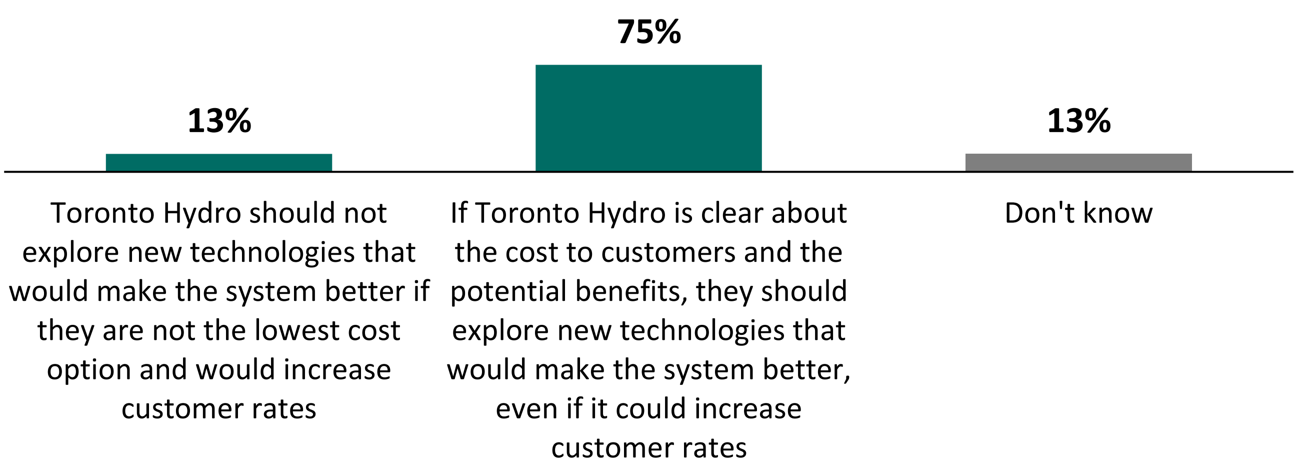
Toronto Hydro can invest in technology than can lead to a wide range of benefits including reliability, efficiency, customer service, and reducing environmental impacts.

When deemed the lowest cost option that will provide equal or improved service, Toronto Hydro will, in most cases, invest in technology.

However, there are two other scenarios where Toronto Hydro needs your feedback.

First, there are times when Toronto Hydro identifies new technology that can improve reliability or provide other benefits, but it will cost customers more. For instance, advanced customer meters that can measure when different home appliances are running, allowing Toronto Hydro to provide customers with better advice on how to reduce their energy consumption and costs.

Q Regarding these types of investments, which of the following best represents your view?



n=48

Online Survey

Grid Modernization (Con't)

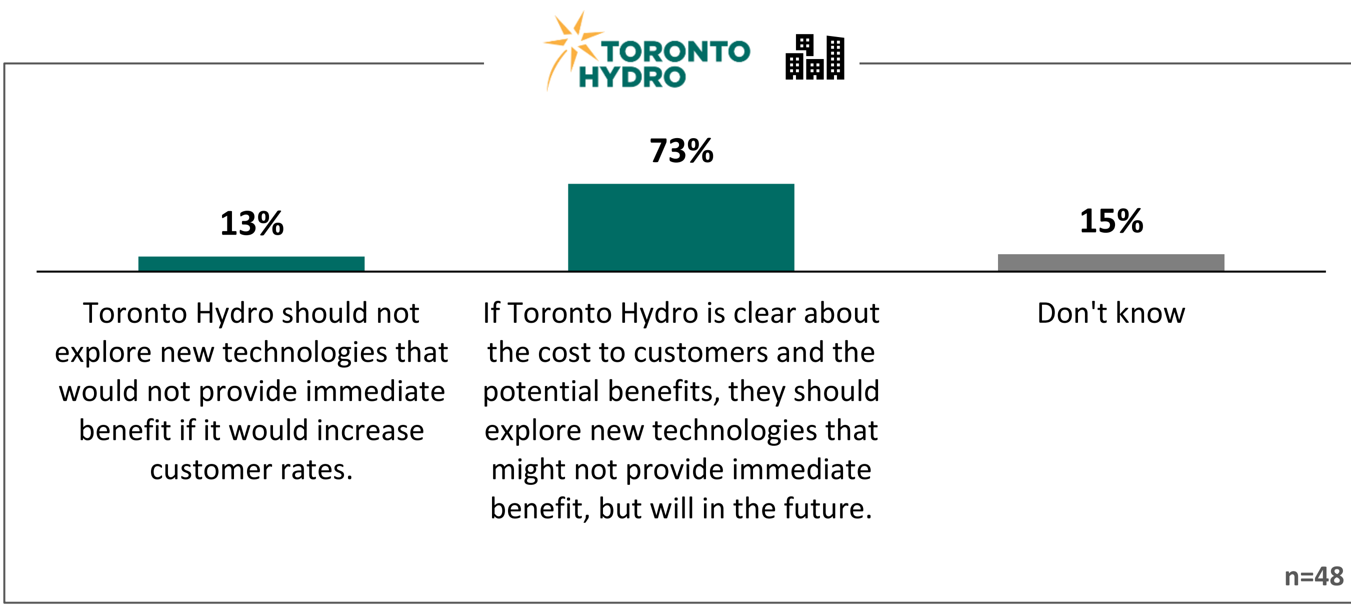
The second scenario is where Toronto Hydro identifies new technology that is needed to improve the system in the future and would increase costs now, but the benefit might not be felt until later.

This includes accommodating emerging technologies like solar power, battery storage and electric vehicles.

Regardless of whether you are considering new energy choices like an electric vehicle for yourself today, Toronto Hydro must be prepared as adoption becomes more widespread over the next 5-10 years.

For instance, charging each electric vehicle draws as much energy as two average homes. If a dozen or so people come home and start changing their vehicles at a period of peak demand, it could overload the grid in that neighbourhood. While Toronto Hydro cannot predict the exact rate of electric vehicle adoption in the City of Toronto, the utility must make certain investments today that will allow it to manage electric vehicle demand in the future.

Q Which of the following best represents your view?



Online Survey

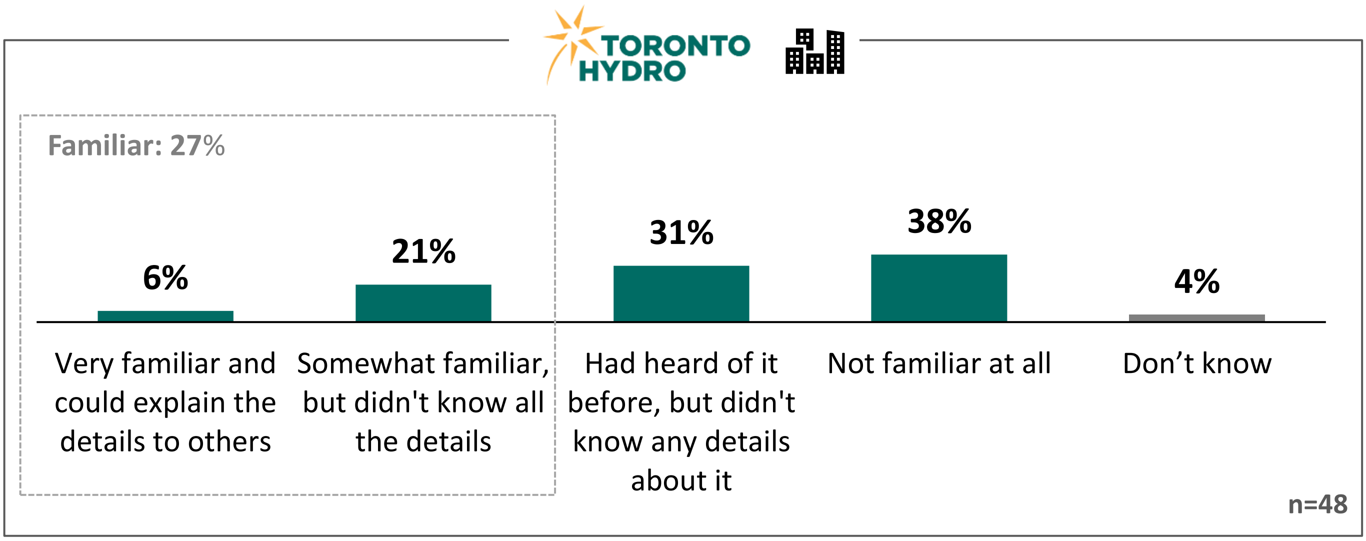
Familiarity with Sources of GHG Emissions

Commercial & Industrial

In November 2021, the City of Toronto released its 2019 Greenhouse Gas (GHG) Inventory, which tracks Toronto's progress towards GHG reduction targets and identifies key emissions sources. GHG emissions have a wide variety of environmental impacts that lead to climate change and global warming.

This report notes that the two **primary sources of GHG emissions** in Toronto are: energy use in buildings (natural gas and electricity) and transportation fuels (primarily gasoline) – accounting for 93% of all emissions in the city.

Q Before this survey, how familiar would you say you were with the primary sources of GHG emissions in Toronto?



Online Survey

Familiarity with the City's Plan

Commercial & Industrial

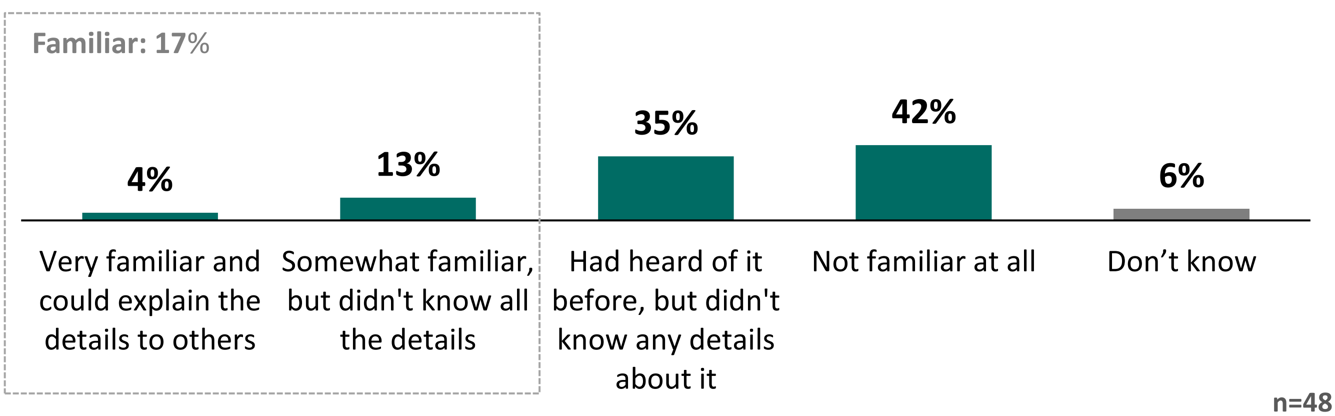
In October 2019, Toronto City Council voted to accelerate its efforts to mitigate and adapt to climate change and adopt a stronger emissions target for Toronto: **net zero emissions by 2040**.

A key part of the City's "Net Zero Strategy" requires switching from gasoline in the transportation system and natural gas in home/building heating to electricity-powered alternatives, adopting renewable generators and using energy storage systems.

These initiatives will require Toronto Hydro to expand and modernize its existing electricity distribution grid to ensure that it is capable of helping achieve the City's targets.

Q Before this survey, how familiar were you with the City of Toronto's plan to use an expanded and modernized grid to reduce GHG emissions in Toronto to help address climate change?

TORONTO HYDRO



Online Survey

Commercial & Industrial

Support for Bill Increase to Meet Emissions Targets

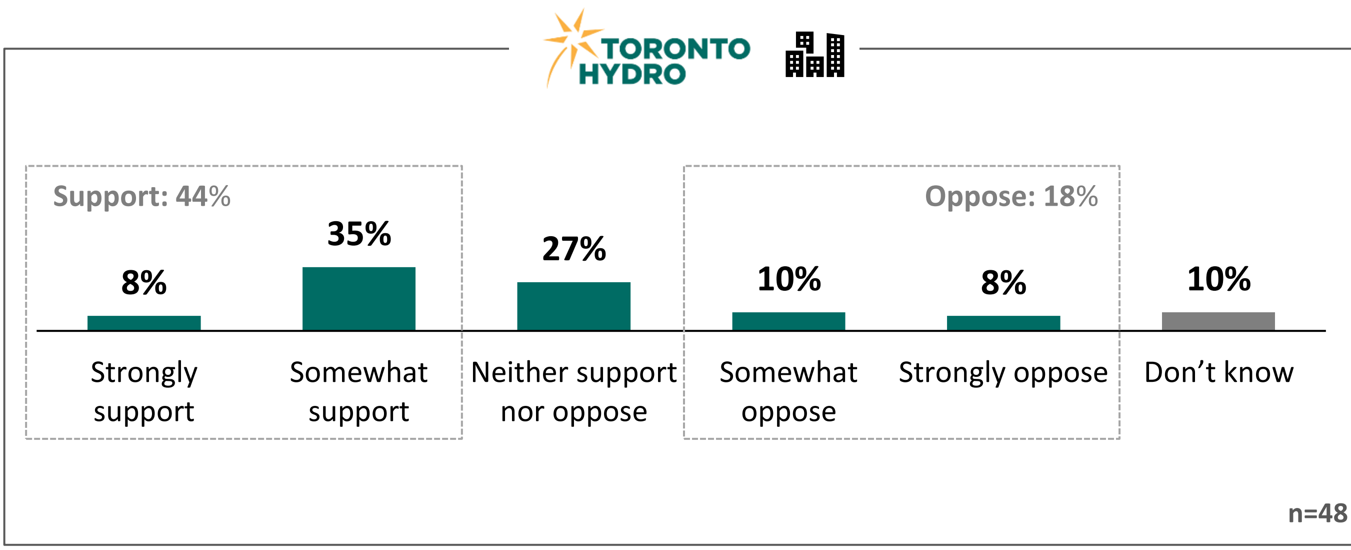
As Toronto Hydro is 100% funded through the rates its customers pay, investing in an expanded and modernized electricity grid would mean that customers, like yourself, would pay more.

The sooner that Toronto Hydro expands and modernizes the grid, the sooner Toronto can reach its climate change goals.

Q

Would you support or oppose a specific charge on the distribution portion of your monthly bill to help Toronto meet its future emissions targets if your electricity bill will increase by **5% a year for the next 10 years**?

*Recall, the distribution portion of your monthly bill is approximately **6%** of your total electricity bill.*

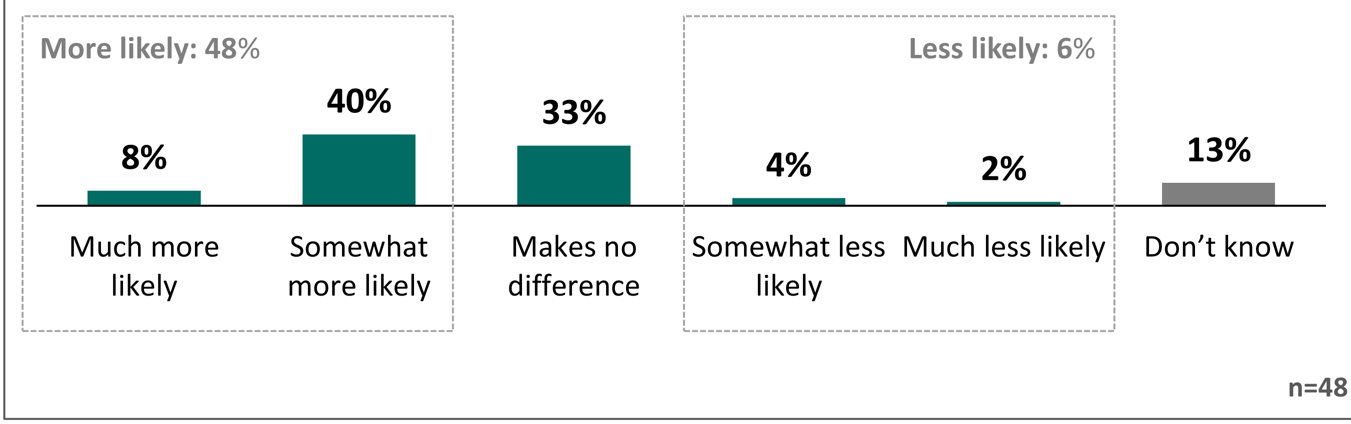


Online Survey

Potential for Rate Increase Offset

Some studies have indicated that increasing customer bills to specifically help meet emissions targets could be offset in later years because of reductions in other types of energy bills. For example, as fuel-switching to electricity becomes more widespread, customers may experience cost reductions for gasoline and natural gas.

Q Does knowing that these rate increases could be offset in later years because of reduction in other types of energy bills make you more or less likely to support a specific charge on your monthly bill to help Toronto meet its future emissions targets?



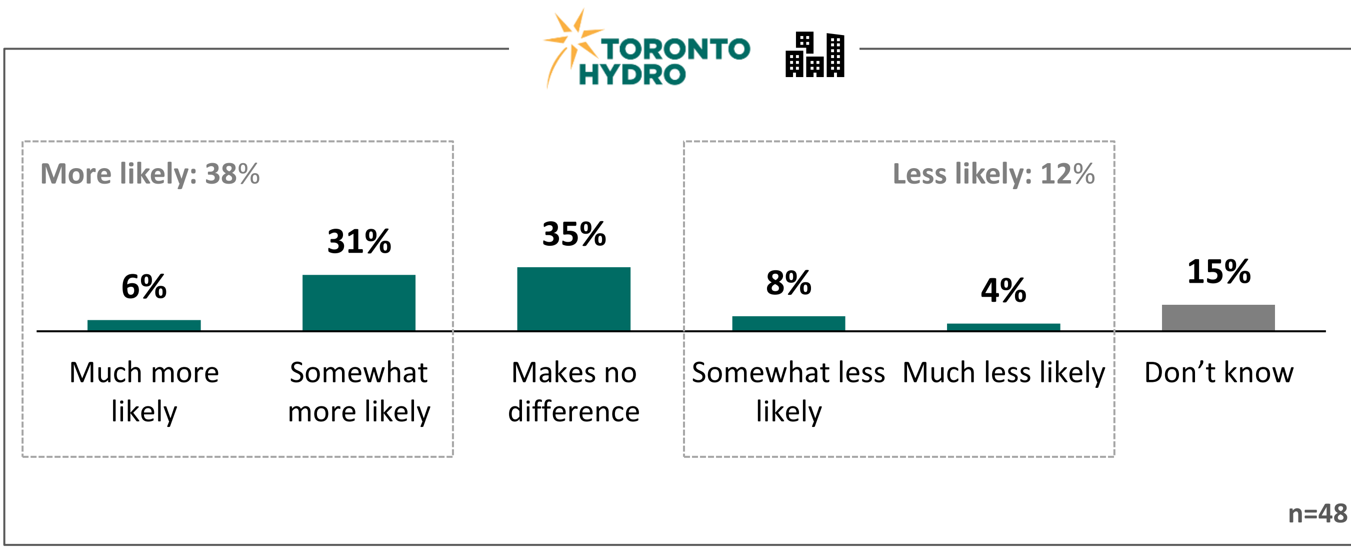
Online Survey

Inclusion of Rate Relief

Commercial & Industrial

Some customers have said that they would be willing to spend more in order to help Toronto meet its future emissions targets, however, feel that lower-income Torontonians should receive rate relief in order to offset any associated price increase.

Q Would the inclusion of "rate relief" for low-income customers make you **more or less likely to support** a specific charge on your monthly bill to help Toronto meet its future emissions targets?



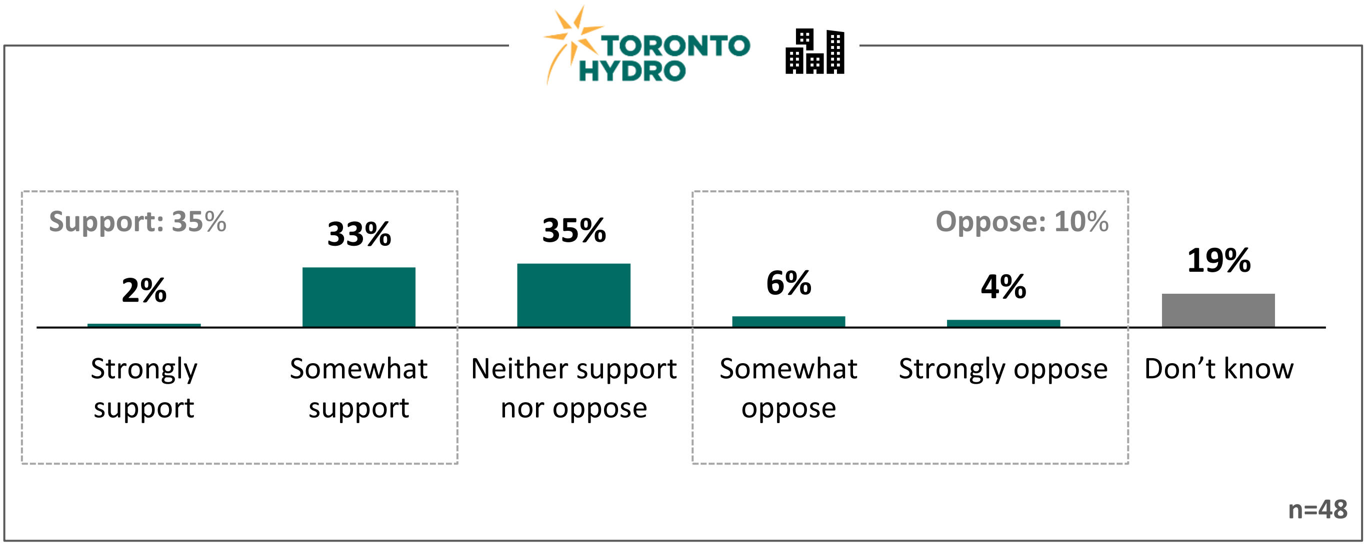
Online Survey

Support for Project Financing

Commercial & Industrial

In a recent series of interview with business customer, the idea of project financing was discussed.

Q Should Toronto Hydro help finance capital costs of energy transition projects through your monthly bills (i.e. finance behind-the-meter solutions and new equipment over an extended period to time through your organization's operating costs)?



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Commercial and Industrial Customers

Account Assessment

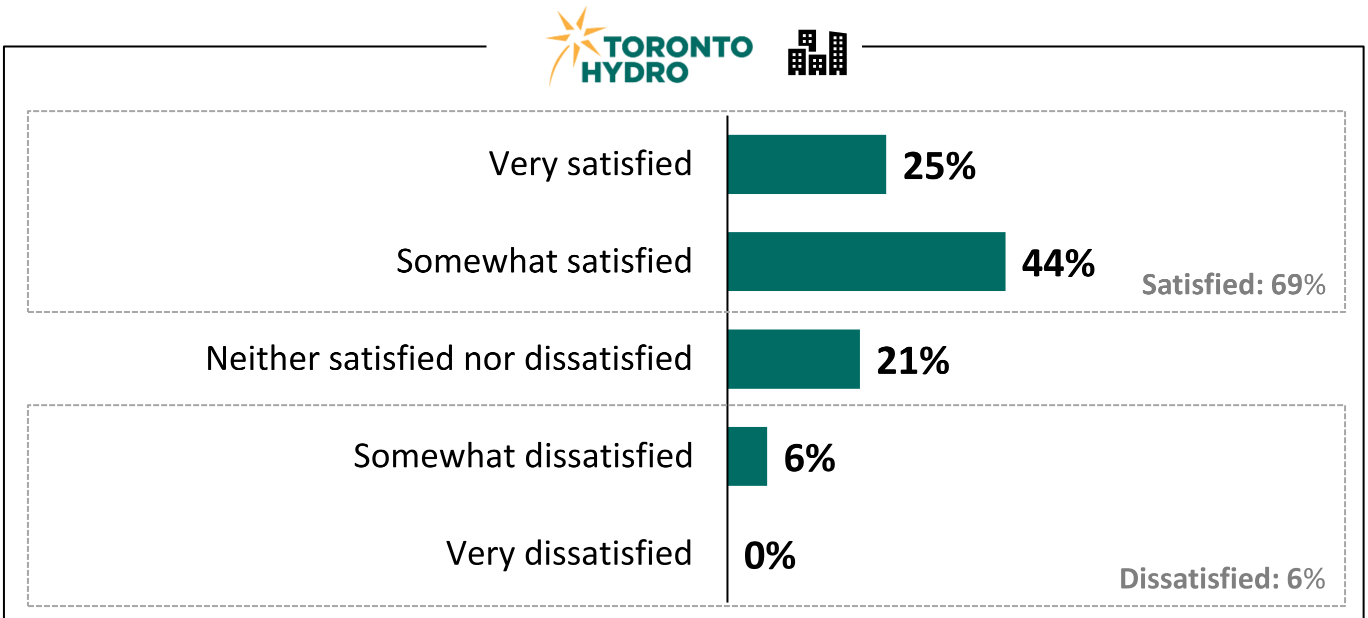
Section 5.4

Online Survey

Overall Satisfaction with Customer Care

Commercial & Industrial

Q Overall, how satisfied are you with Toronto Hydro's customer care services?

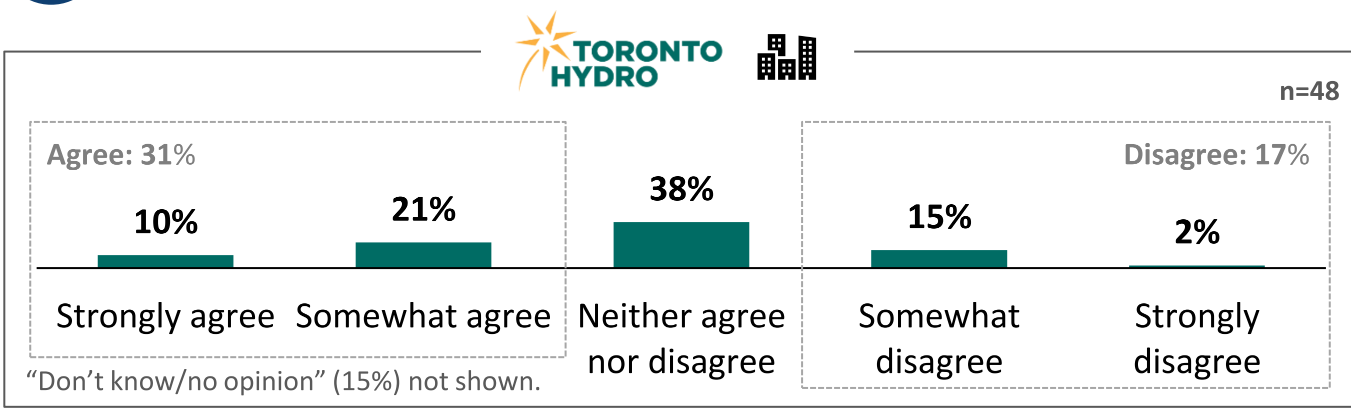


"Don't know" (4%) not shown.

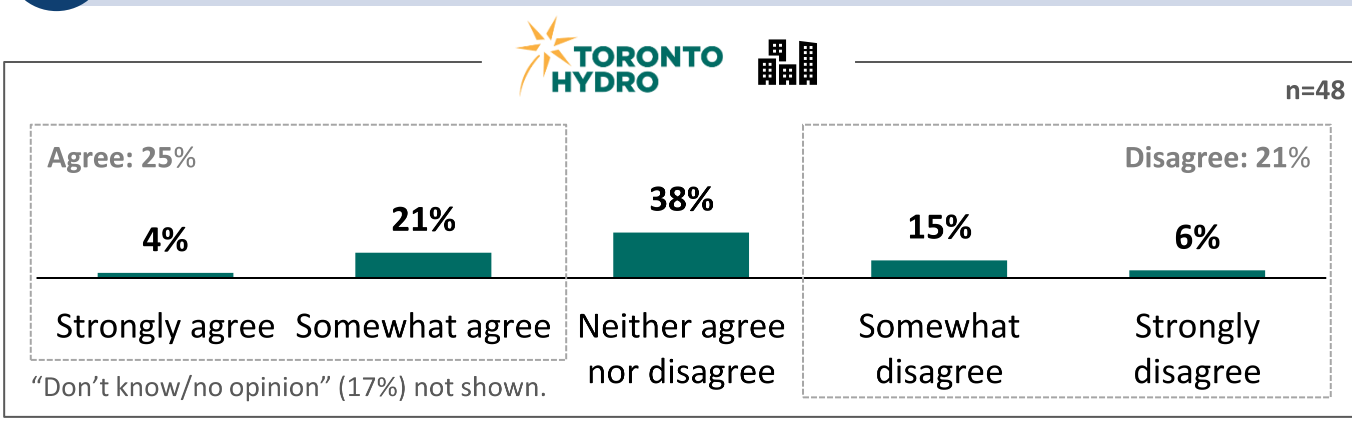
n=48

Please indicate if you agree or disagree with the following statements.

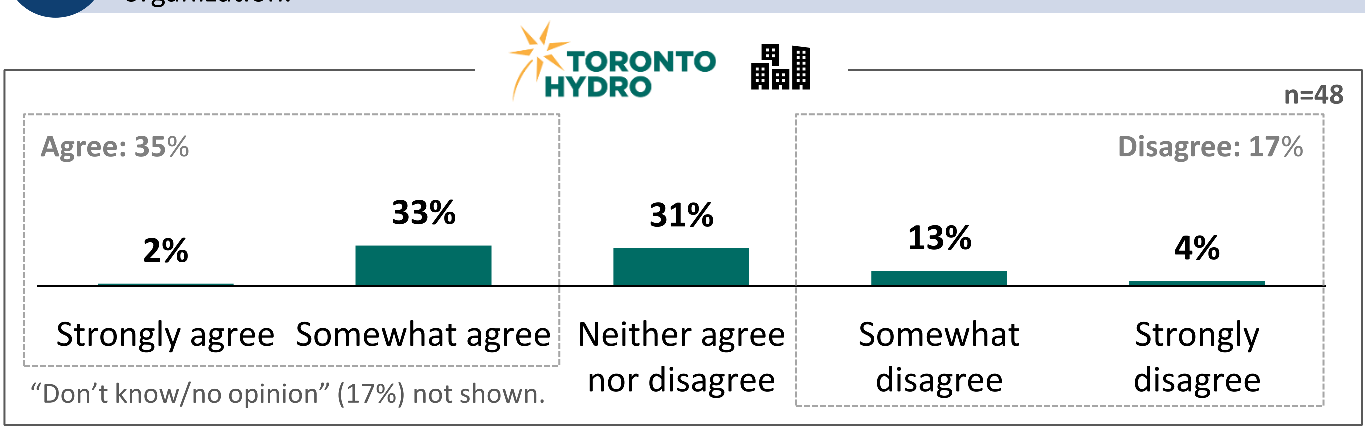
Q Toronto Hydro understands my organization and its challenges.



Q Toronto Hydro proactively provides my organization with business solutions.



Q Toronto Hydro is more than an electricity distributor, it is a business partner to my organization.

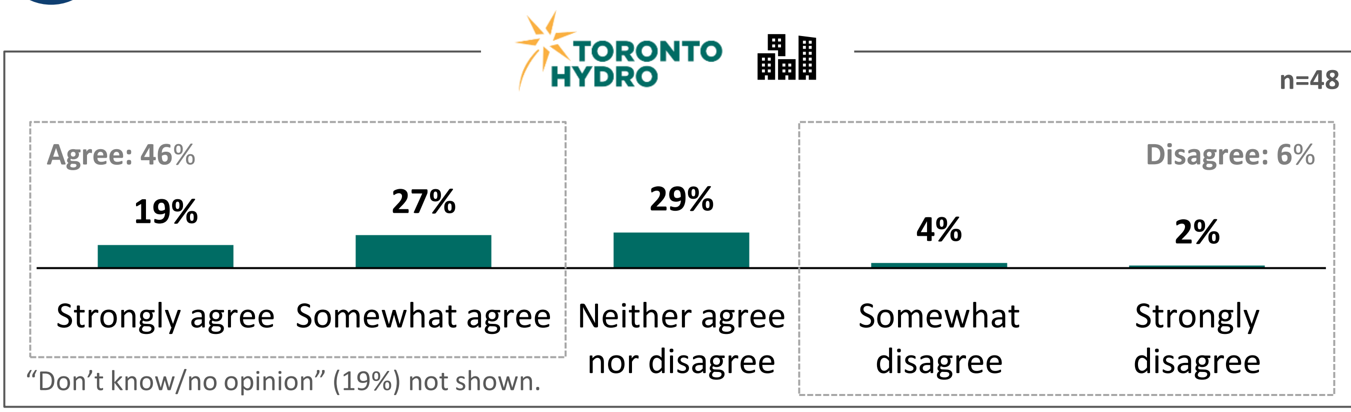


Online Survey
Account Assessment

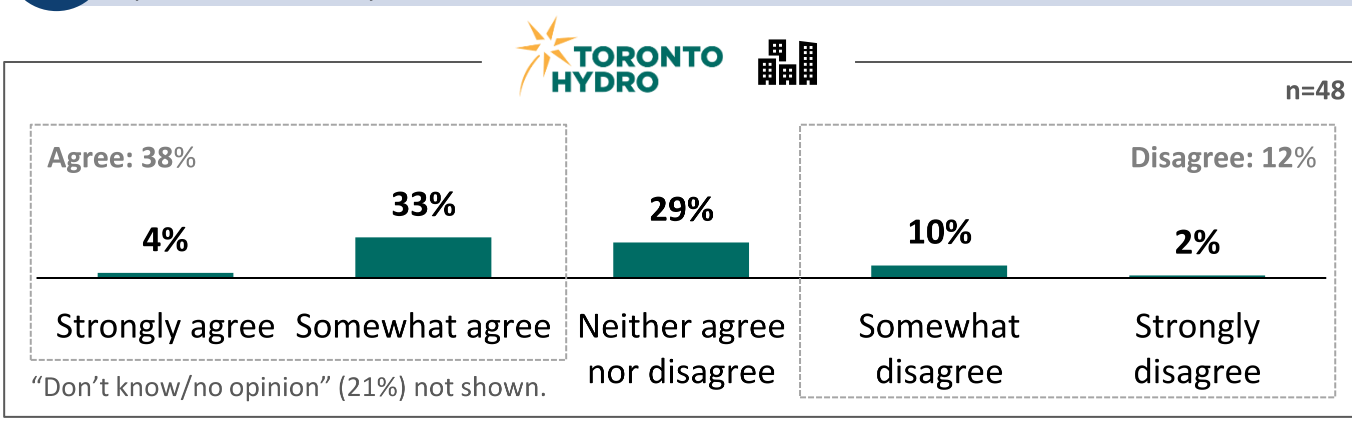
Commercial & Industrial

Please indicate if you agree or disagree with the following statements.

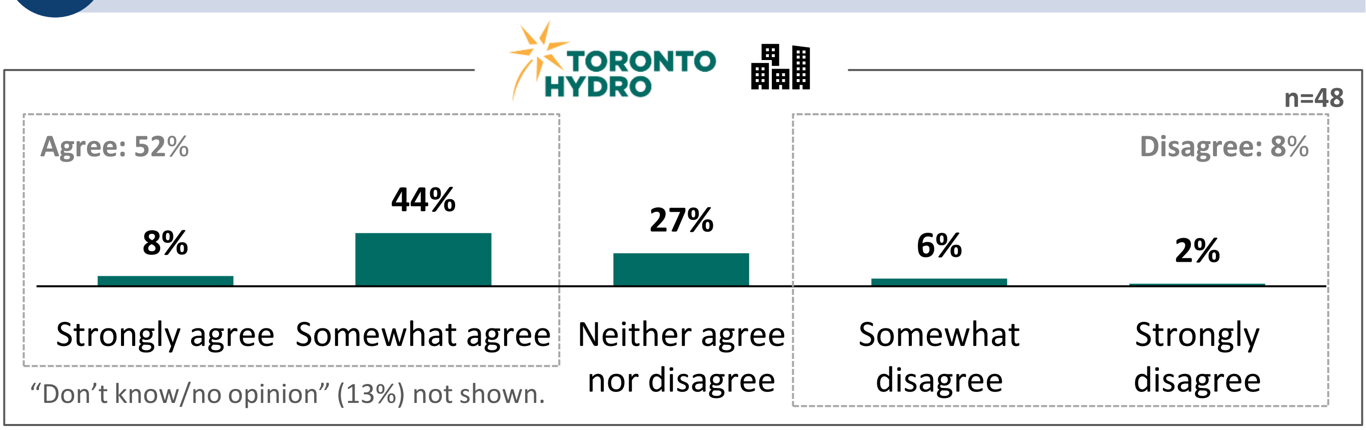
Q Toronto Hydro staff are easily accessible to my organization.



Q Toronto Hydro staff provide my organization with quality advice and guidance when I have questions about my service.



Q Toronto Hydro provides my organization with good value for money.



Commercial & Industrial Customers

Additional Services

Section 5.5

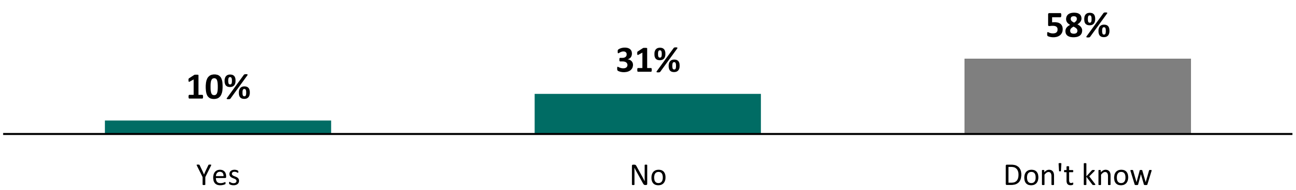
Online Survey

Service Offered by Toronto Hydro's Customer Care Team

Commercial & Industrial

Q Are there services that are currently offered by Toronto Hydro's **customer care team** that could be done differently to better fit your needs?

TORONTO HYDRO



n=48

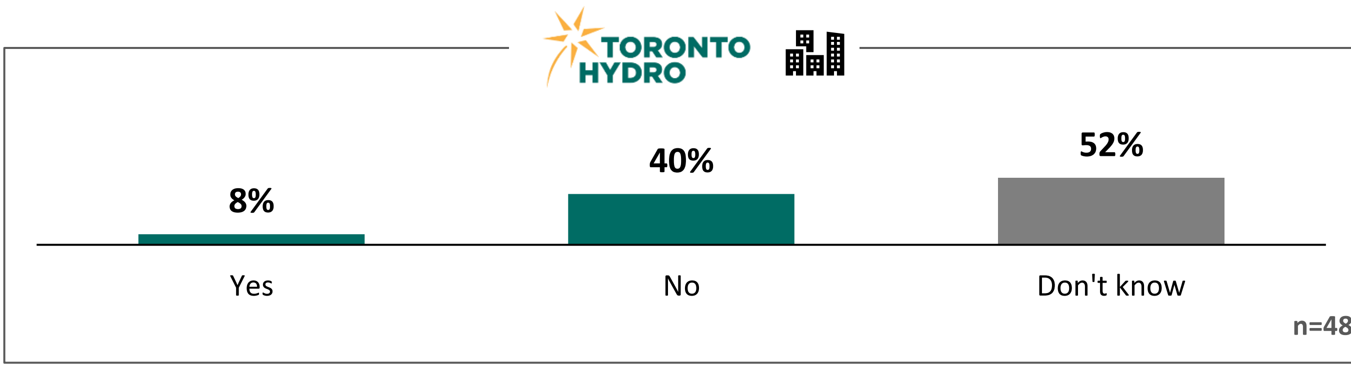
Responses from those who say "Yes"
Communication (6%)
"Email the customer about the power outages."
"It is very difficult to reach you out by phone."
"It would be great to have an assigned rep to business accounts."
Efficiency/Conservation Tips (2%)
"Proactive support in energy management / reduction strategies."
Service (2%)
"Reduce wait times."

Online Survey

Commercial & Industrial

Additional Services by Toronto Hydro's Customer Care Team

Q Are there any additional services that you would look to Toronto Hydro's **customer care team** to provide and would be willing to pay for?



Responses from those who say "Yes"
Communication (4%)
"Mobile app."
"Possibly, virtual metering."
Service (2%)
"If customers qualify for rebate, it should be done automatically without having to complete forms."
Efficiency/Conservation Tips (2%)
"Saving energy solutions."

INNOVATIVE
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Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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INNOVATIVE RESEARCH GROUP

CONFIDENTIAL

APPENDIX 06

Key Accounts

Needs and Preferences Survey

TORONTO HYDRO

November 2, 2023

STRICTLY CONFIDENTIAL

APPENDICIES

INNOVATIVE
RESEARCH GROUP

Key Account Customers

Online Survey Results

Section 6.1

INNOVATIVE was engaged by Toronto Hydro to gather customer input to assess the importance of the outcomes and priorities identified in the qualitative components of Phase I of the customer engagement.

Field Dates

The **Key Accounts Online Survey** was sent to all Toronto Hydro key accounts customers who have provided the utility with an email address. Customers had an opportunity to complete the survey between **January 18th and February 4th, 2022**.

Each customer received a unique URL that could be linked back to their annual consumption, region and rate class.

In total, the key accounts online survey was sent to **362** customers via e-blast from *customerexperience@torontohydro.com*. A reminder email was sent 2 days after the initial invitation to those who had not yet completed the survey. An additional reminder email was sent a week after the first reminder.

Key Account Online Survey Completes

A total of **68** (unweighted) Toronto Hydro key accounts customers completed the online survey via unique URL.

Sample Weighting

The key accounts online survey sample has been weighted proportionately by sector in order to be representative of the broader key accounts customers within the Toronto Hydro service territory.

The table below summarizes the distribution, unweighted and weighted sample breakdown by sectors.

Category	Distribution		Survey Sample		Diff.	Weighted Sample	
	#	%	#	%	%	#	%
Commercial	115	32%	17	25%	-7%	21	32%
Industrial	93	26%	27	40%	+14%	17	26%
MASH	51	14%	15	22%	+8%	10	14%
MURB	105	29%	9	13%	-16%	20	29%
Total	**364**	**100%**	**68**	**100%**	**--**	**68**	**100%**

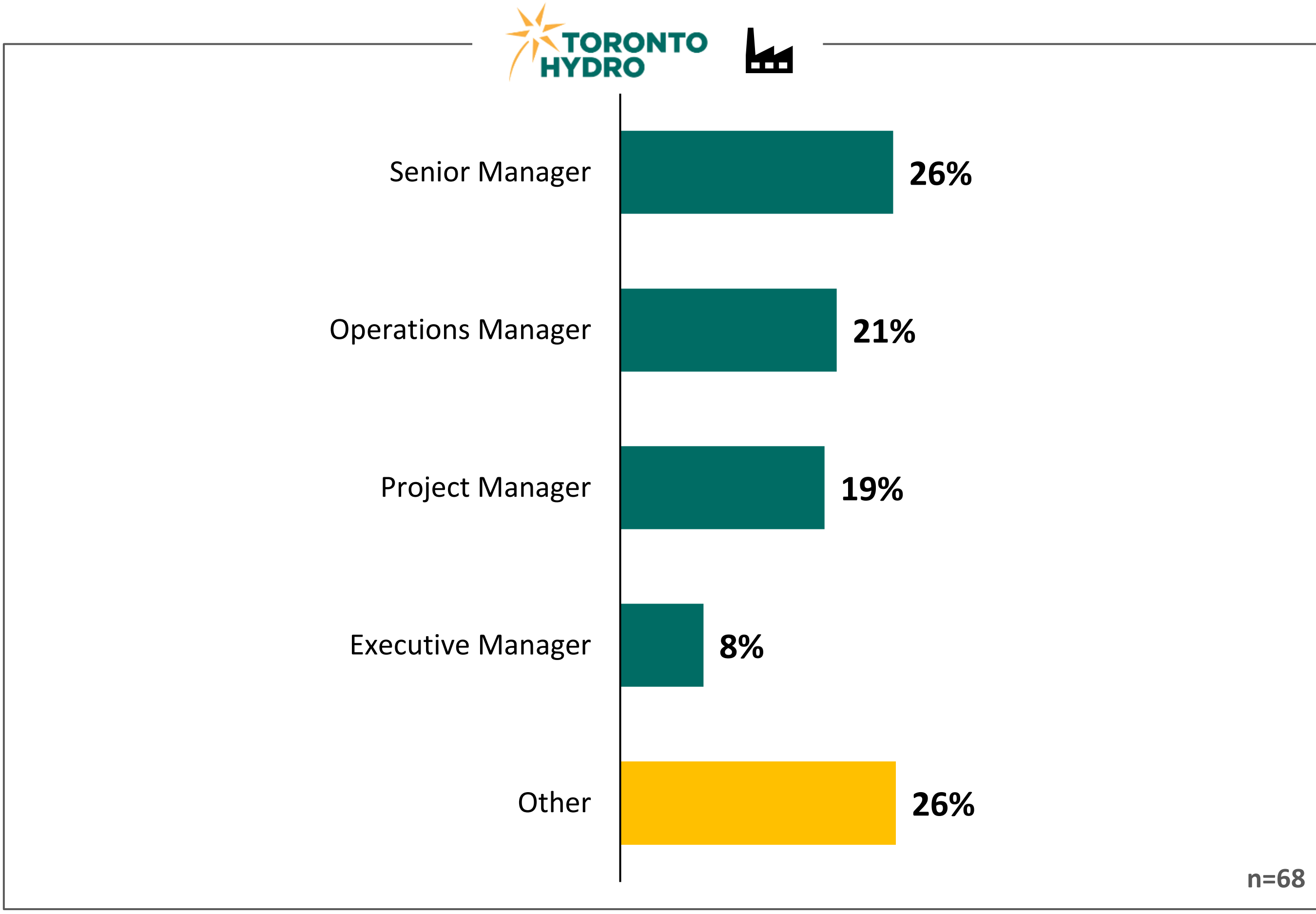
Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

Online Survey

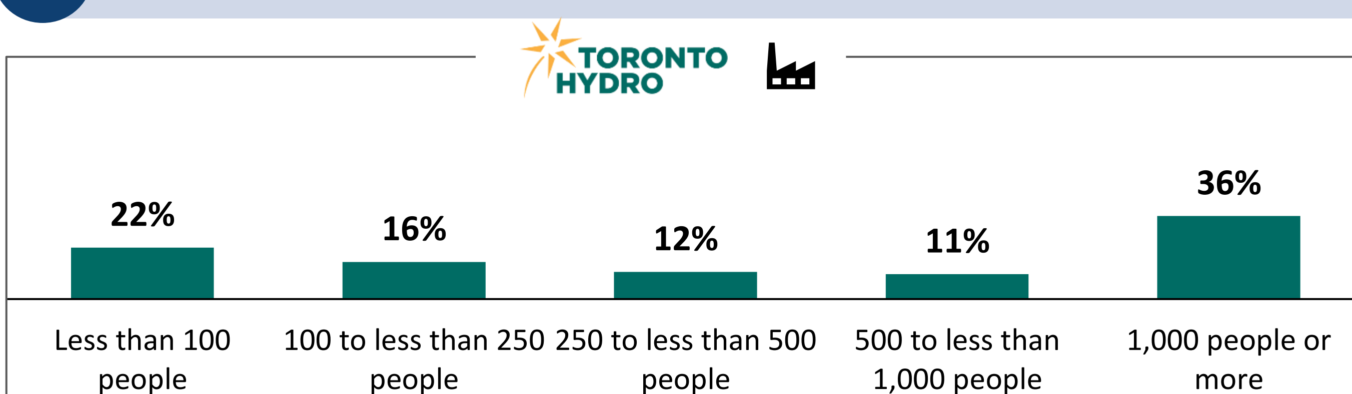
Demographic breakdown

Key Accounts

Q What occupation or position best describes your role at your organization?



Q Approximately, how many people work at your organization in Toronto?



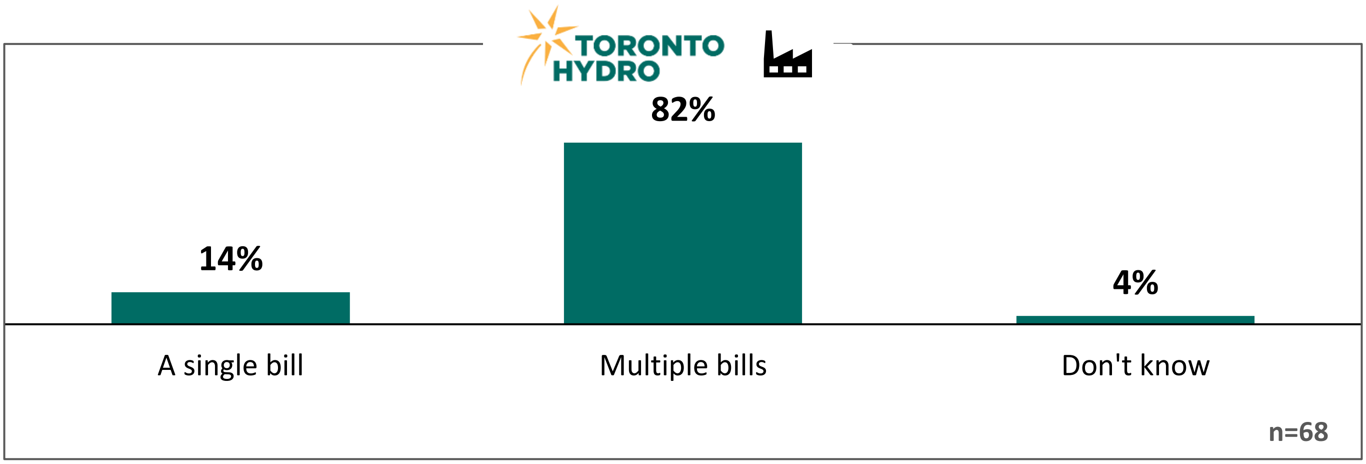
"Don't know" (4%) not shown.

n=68

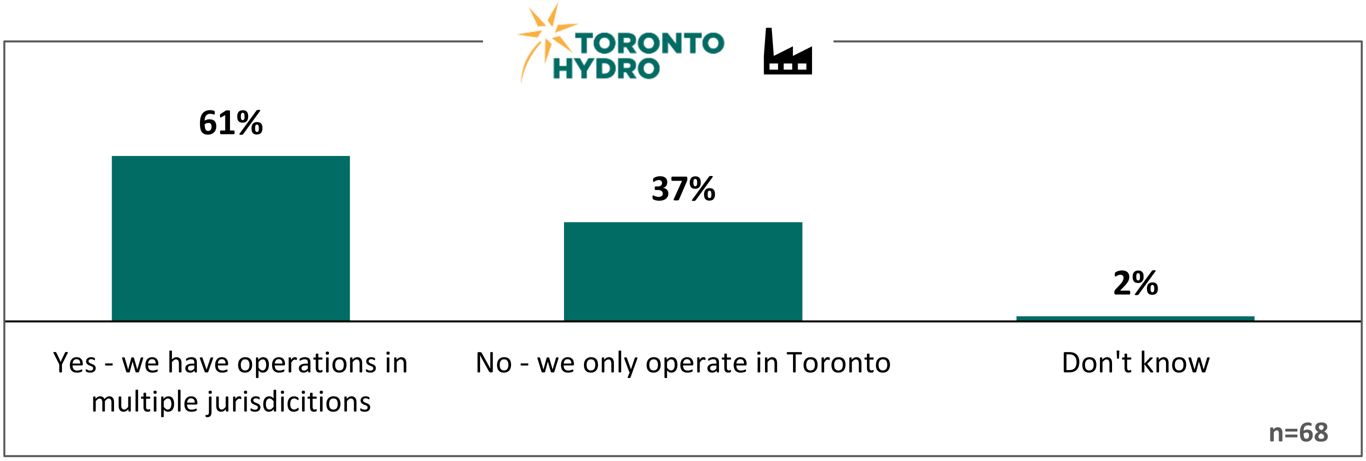
Online Survey
Demographic breakdown

Key Accounts

Q Does your organization receive a single bill or multiple bills from **Toronto Hydro**?



Q Does your organization receive electrical bills from utilities other than Toronto Hydro?



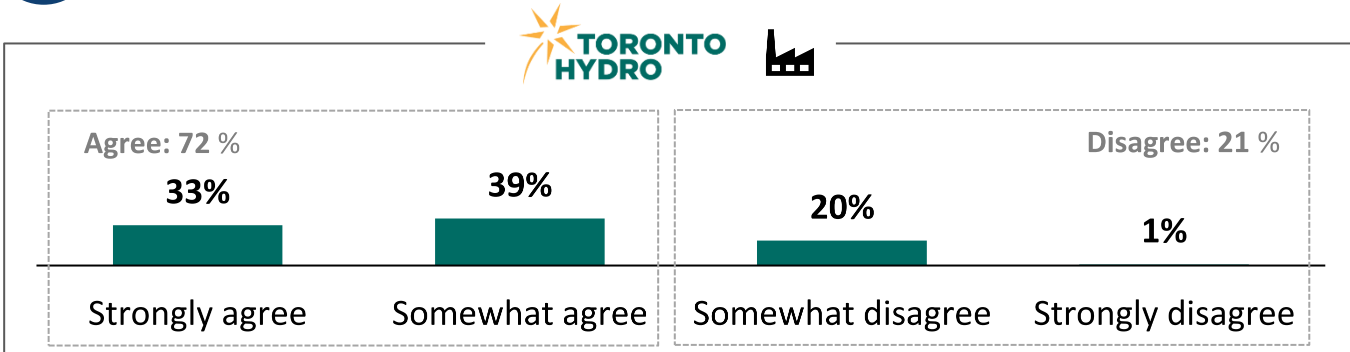
Online Survey

Environmental Controls

Key Accounts

To what extent do you agree or disagree with the following statements?

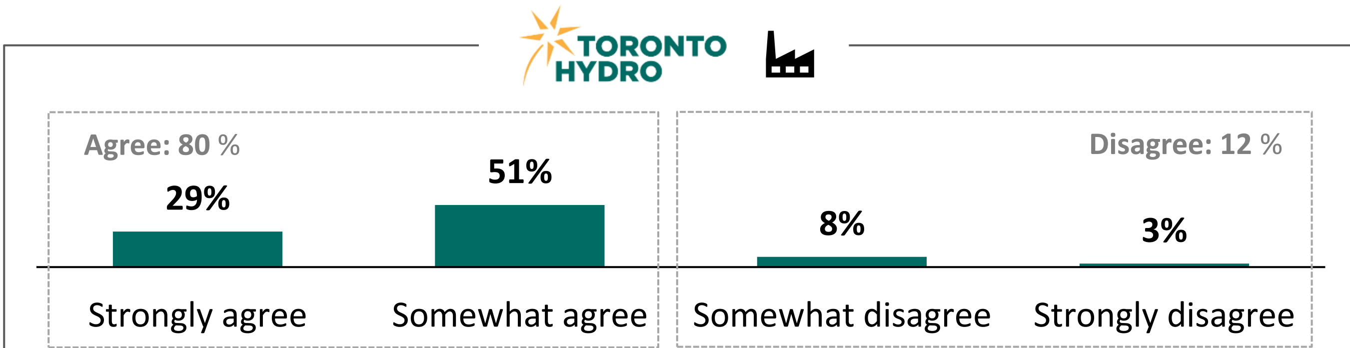
Q The cost of my electricity bill has a major impact on the bottom line of my organization and results in some important spending priorities and investments being put off.



"Don't know/no opinion" (7%) not shown.

n=68

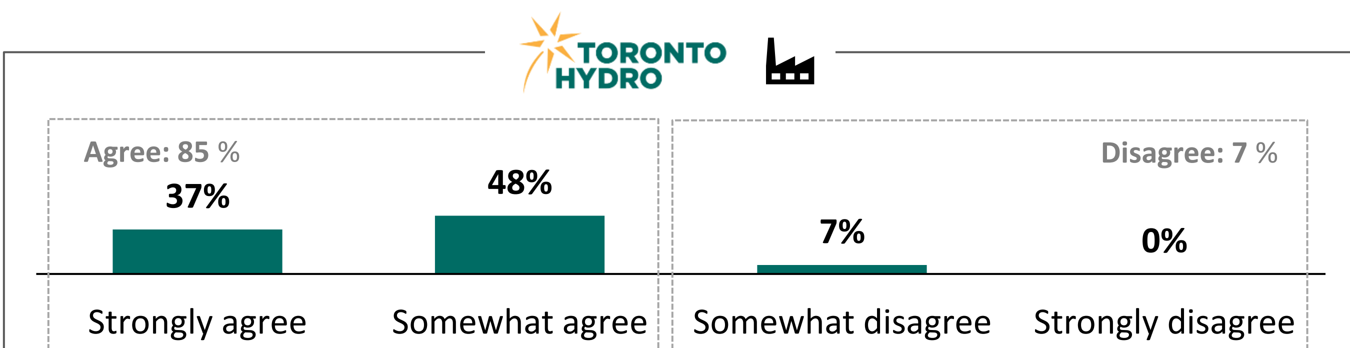
Q Customers are well-served by the electricity system in Ontario.



"Don't know/no opinion" (8%) not shown.

n=68

Q Fossil fuels should be phased out as quickly as possible to speed up the shift to a lower-carbon future.



"Don't know/no opinion" (8%) not shown.

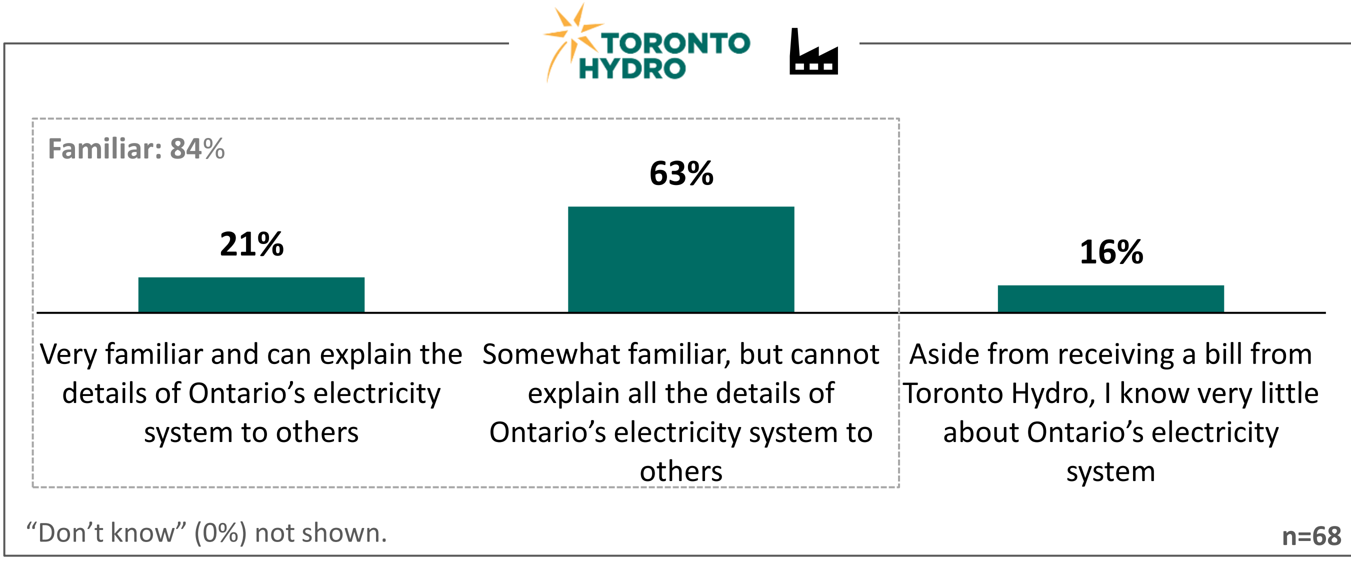
n=68

Online Survey

Key Accounts

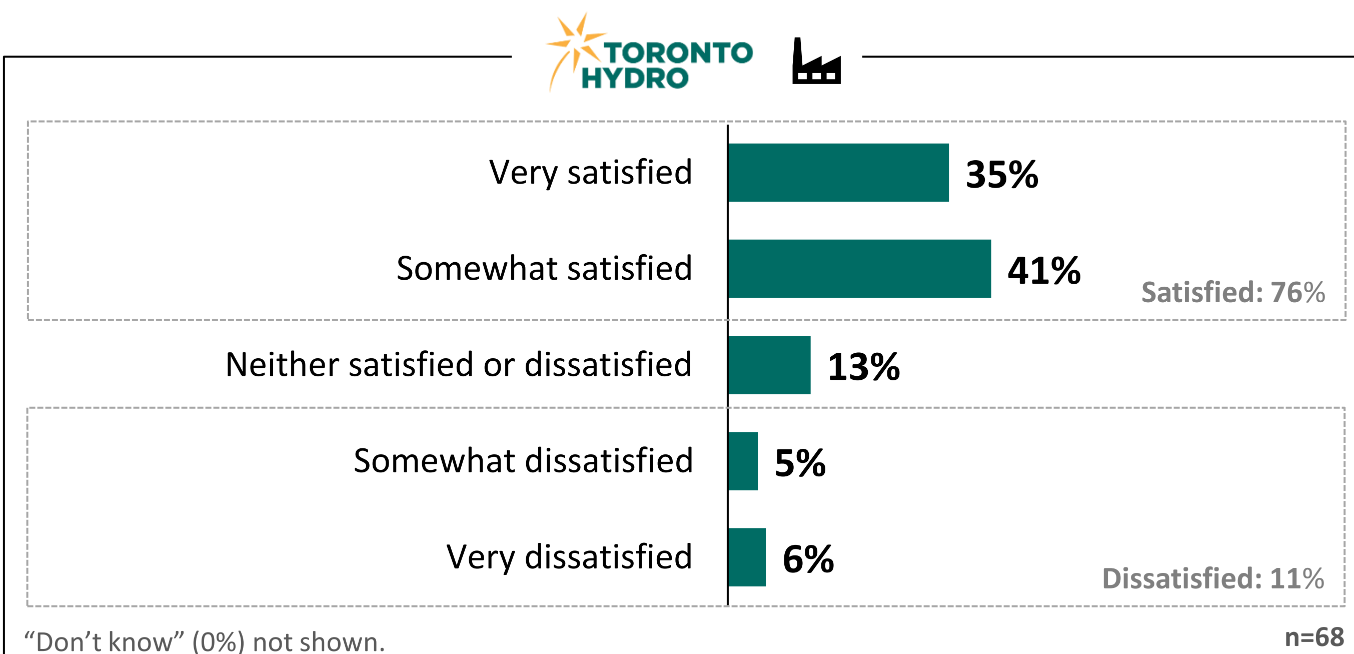
Familiarity & Satisfaction with Ontario's Electricity System

Q How familiar are you with the various parts of Ontario's electricity system, how they work together, and which parts Toronto Hydro is responsible for?



As you may know, Toronto Hydro operates and maintains the local electricity distribution system, reads meters, calculates your charges, answers your calls, responds during outages and clears trees and brush from power lines. Toronto Hydro does not set the commodity price of electricity or the Global Adjustment charge.

Q Generally, how satisfied are you with the service your organization receives from Toronto Hydro?



Online Survey

How Toronto Hydro can Improve Services to Customers

Key Accounts

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Response	%
Communication	25%
Reliability	18%
Service	8%
Billing	6%
Efficiency/Behind the Meter	4%
Costs	1%
Other	3%
None	3%
Don't know	32%

Online Survey

How Toronto Hydro can Improve Services to Customers

Key Accounts

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Communication
"No issues with the service received. Communication is good and your team is response whenever we do have issues."
"It would be good to have a regular discussion with the customers on a regular basis."
"Keep close communication and deliver required service according to the agreed timeline."
"Send notifications about upcoming scheduled power interruptions."
"More dialogue between account reps ad end customers. We are a large consumer and there is a partnership here. Other providers such as Alectra do a better job in this area. - thanks."
"We operate multiple commercial towers and are accountable to many different people. We need to ensure that our communication to these individuals are timely and accurate. we also need advance notice of any capital work that would affect our operations so that we can plan accordingly."
"Understand costumers needs better. Prompt response when outages occur rather then looking at Toronto outage map. Key account reps and improve communication with us as large complex managers. More flexible and firm commitments for maintenance at our sites."
"More communication with each construction team will be helpful."
"Working with newly appointed [Toronto Hydro employee] to help bilateral communications has help make the process with Hydro easier, especially the connection of new buildings."
"Service for when power needs to be shut off for PM / Maintenance work could be improved. Last summer we had Last minute cancel causing a lot of headaches and the information was know and could have been communicated sooner."
"Ensure that when you sub out services make sure the customer is aware who the sub is."
"A yearly meeting with the plant may be beneficial."
"Assign designers to project files. Have them act as liaison from inception into construction. Having a client sub out design to a third party creates issues. it is tough to track projects and get information back in a reasonable amount of time using the existing process."
"Stop changing key account managers often."

Online Survey

Key Accounts

How Toronto Hydro can Improve Services to Customers

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Reliability
"Improve reliability."
"Reliability of hydro service at [our organization], we have had 6 prolonged outages since summer 2019."
"We consume in the range of 3 - 4 MW annually yet in recent years have lost our client service rep. we would like to get a client service rep to help guide us and respond to certain reliability issues we experience."
"My company operates a data center in Toronto and Toronto Hydro provides the least reliable electrical service of any facility in our portfolio (over 10 facilities). Our service in Toronto has gone down more times in 12 months than our entire portfolio combined in the last 10 years."
"Provide and maintain redundant capacity for the Copeland transformer that feeds our site."
"It will definitely help us to improve on micro-cut/power glitch which occurs. We experienced 2 times in the year 2021."
"Would like more frequent updates on what improvements or upgrades are being made to the electrical infrastructure. Our plants experience outages on a regular basis and it would be great if we can determine what is the root cause and how to prevent them."
"Toronto Hydro should improve the stability of the voltage in South Etobicoke in the area of Islington/Queensway area as we are prone to power blips, while not full power outages they affect our equipment negatively."
"Reduce the number of power outages / blips."
"1. Improve the power quality of critical vulnerable locations. For [us], these are [first branch location mentioned], [second branch location mentioned], both located in Scarborough. We also recently experienced power quality issues at [third brand location mentioned] in Etobicoke. 2, Customer outreach and training - particularly relating to permit approval."
"Reduce power failures."
"We experience a lots of short power outages which results a lots loss for our continuous operations. equipment and product losses."
"Power blips in our area are a huge concern leading to extensive financial losses."
"Delay for disconnection and connection again extremely long."

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Online Survey

How Toronto Hydro can Improve Services to Customers

Key Accounts

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

Service
"Improve response time and status communication to disconnect and reconnect high voltage supply at the pole ie we have experienced delays in getting a crew to disconnect our incoming supply from the road ... and then to reconnect the supply."
"Reaching out to get information is difficult. Hard to get power shutdown support."
"The only concern I have with Toronto Hydro is the response times for concerns especially the outside lighting posts that are connected to the T.H. lighting grid."
"All good for services at this time."
"Our site suffered from multiple momentary power outage events last year, specially in the last quarter. We were informed that the maintenance around feeders was not up to date due to COVID. We would benefit a great deal from more frequent feeder maintenance, tree cutting, animal traps, any other preventive measures to provide reliable power supply. Maybe this tool already exists, but being able to track the maintenance schedule would give our organization a forewarning on possible issues due to delays, allowing us to pursue solutions before the issue gets out of hand. In addition, our site would benefit from receiving semi-annual records of voltage sags and momentary interruptions."
"Maintenance shutdown schedule should be more flexible with the operations of the customer's property."
Billing
"The bills to be more clear."
"When new chargers are added to bills, an explanation letter to accompany those new charges would help save time on both our end and Toronto Hydro's end investigating these charges. As an example, in January 2021 a new charge labelled 2019 Rate Rider Adjustment was added to our bill totaling roughly $17,000. We did not receive an explanation for this charge until February 2021, which led to billing confusion, bills being cancelled and reissued, and logistical headaches for our accounting department. A second example is the repayment of the GA Deferral which was built-in to the GA total rather than added as a separate line item. We had to go through significant challenges to ensure that our accruals were accurate so expenses incurred over two fiscal years were expensed in the appropriate fiscal years as the billing happened over two different fiscal years."
"Provide a consolidated bill where there are multiple unmetered services on one account. - Provide a central contact for all account related inquiries for large businesses that have thousands of accounts and often need expedient Service."
"As a large organization, we take time to process and approve invoices as they go through multiple departments, and approvals before a physical payment cheque is cut. As a result, we sometimes incur multiple late fees on our monthly bills if our review and approvals don't line up with our cheque cutting dates (which only happen every 2 weeks). The delayed payments are not due any prolonged inaction on our part, which makes it frustrating as a customer with every intent to pay. More flexibility on the late penalties or more time before they are incurred for us as large institutional organization would be very helpful."

Online Survey

How Toronto Hydro can Improve Services to Customers

Key Accounts

Q Is there anything in particular you would like Toronto Hydro to do to improve its services to you?

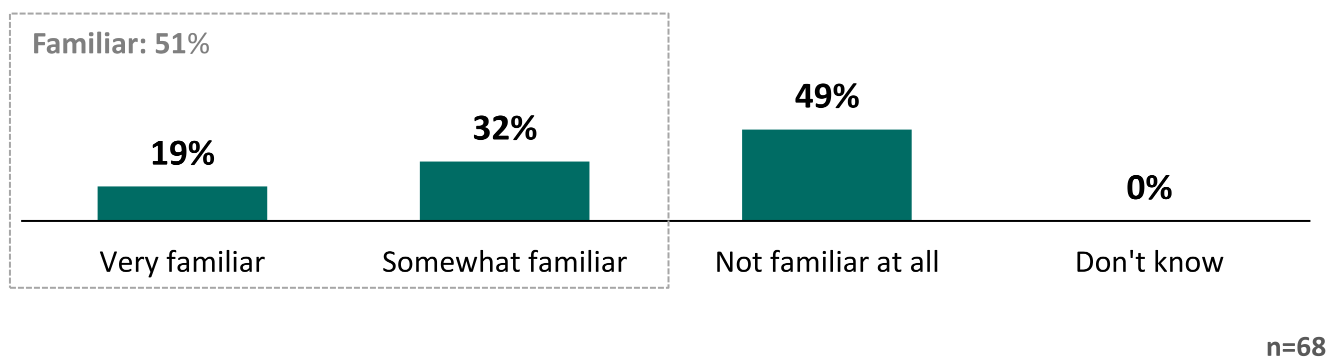
Efficiency/Behind the Meter
"Our organization wanted to put in a co-gen power plant but the age of the power distribution system in our area prevents us from doing this. Something to do with micro harmonic voltages."
"Energy reduction incentives tend to grease the investment skids on our side. It provides credibility to our investment and helps build the support from our senior leadership team."
"A more meaningful commitment to low carbon energy and incorporation of distributed energy resources into the Toronto and Ontario grid."
Costs
"Cost reduction."
Other
"I would like to be able to apply for PAP online."
"Support Utilities in Place, issue OTC's when paper work is ready, regardless of when the project is due."

Online Survey

Familiarity with Bill Remittance to Toronto Hydro

While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, it retains anywhere from **5% to 6%** of the average Key Account's bill – depending on customer load and type of customer account. The rest of the bill goes to power generation companies, transmission companies (mainly Hydro One), the provincial government and regulatory agencies.

Q Before this survey, how familiar were you with the percentage of your organization's electricity bill that went to **Toronto Hydro**?



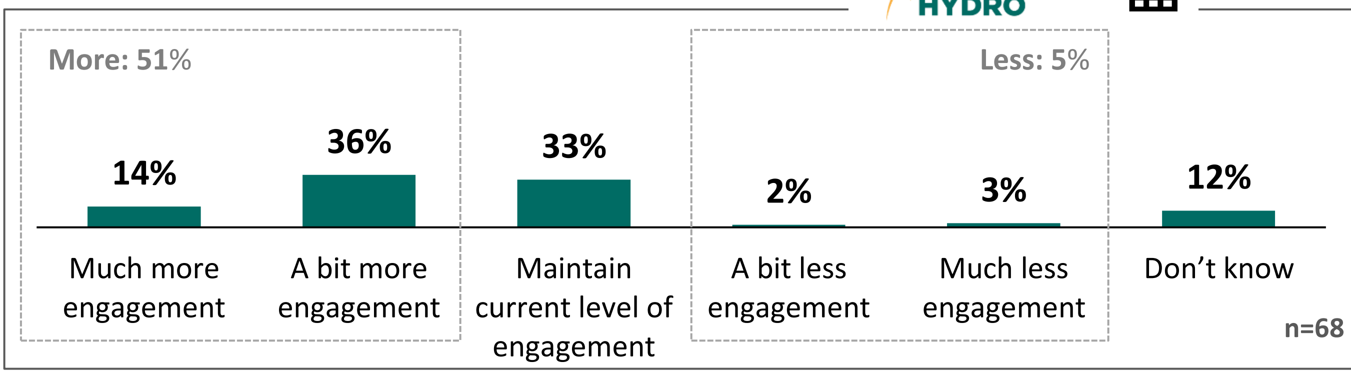
Online Survey

Engagement with Levels of Management

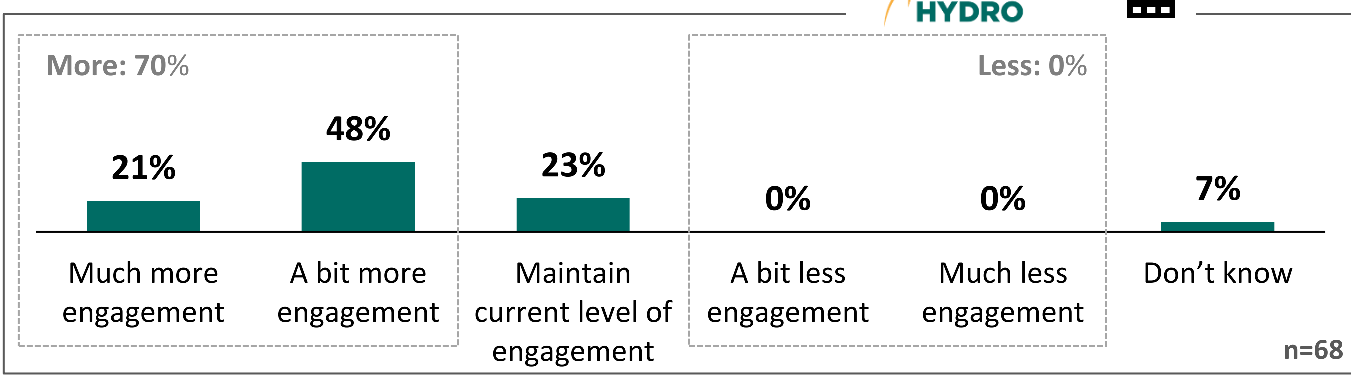
Key Accounts

Q Do you think **Toronto Hydro** staff should be making more or less effort to engage with the following levels of management at your organization?

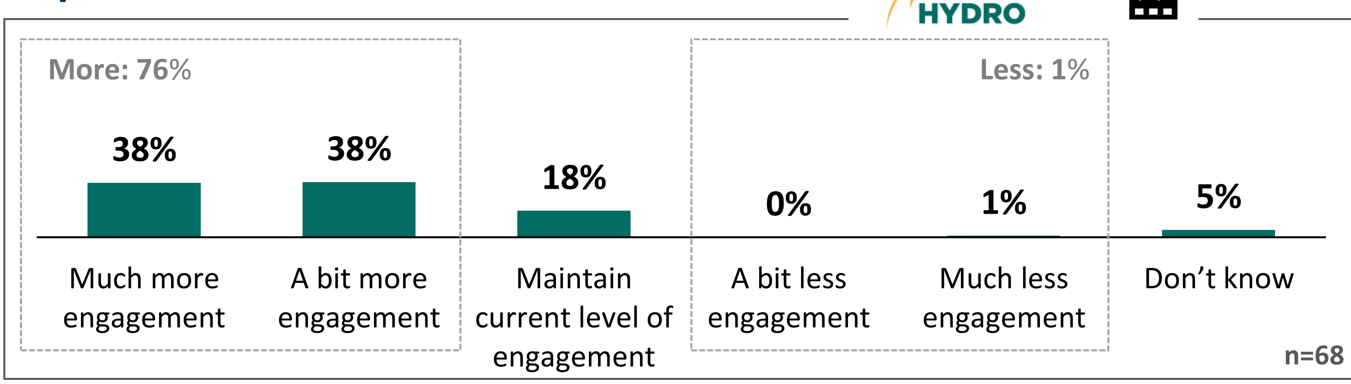
Executive Management Team



Senior Managers



Operations Team



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RESEARCH GROUP

Key Accounts Customers

Customer Priorities

Section 6.2

Online Survey

Importance of Customer Priorities

Key Accounts

Now, let's talk about our second topic – outcomes.

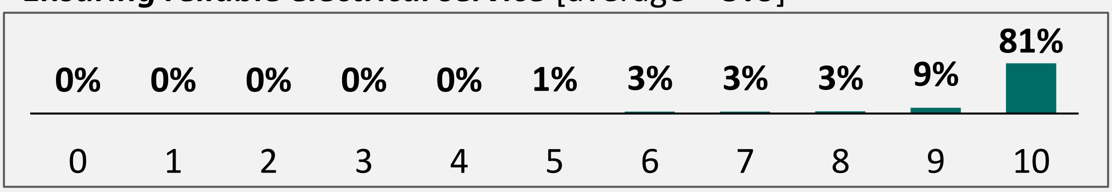
Toronto Hydro regularly holds discussions with its customers to better understand how it should set spending priorities with ratepayer dollars.

In a recent series of Key Account interviews**, several areas were identified as priorities** for Toronto Hydro.

Q

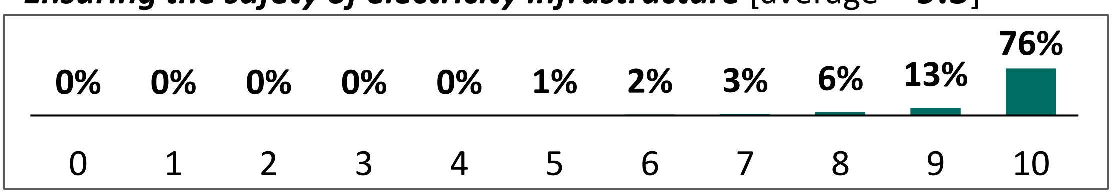
Using a scale from 0 to 10, where *0 means not important at all* and *10 means extremely important*, how important are each of the following **Toronto Hydro** priorities to you as a customer?

Ensuring reliable electrical service [average = **9.6**]



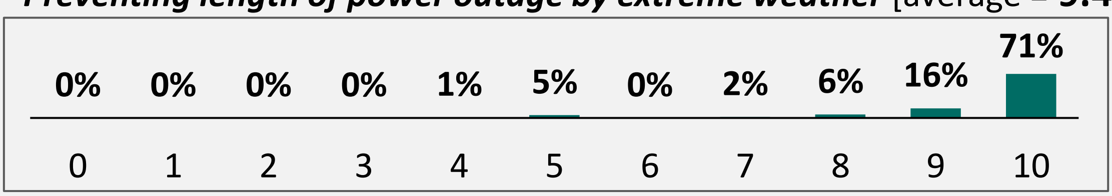
Not at all important — Extremely important

Ensuring the safety of electricity infrastructure [average = **9.5**]



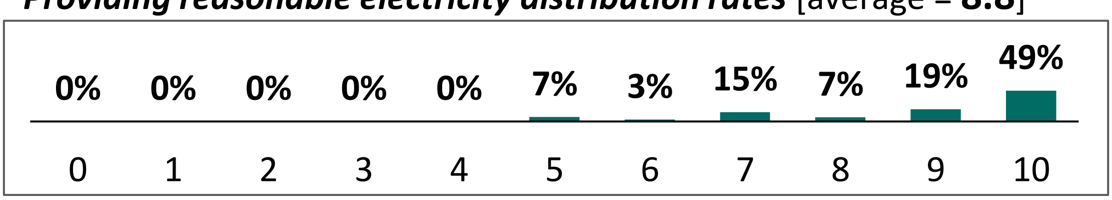
Not at all important — Extremely important

Preventing length of power outage by extreme weather [average = **9.4**]



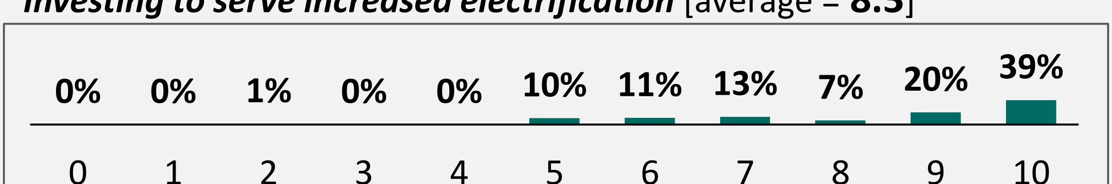
Not at all important — Extremely important

Providing reasonable electricity distribution rates [average = **8.8**]



Not at all important — Extremely important

Investing to serve increased electrification [average = **8.3**]



Not at all important — Extremely important

Online Survey

Importance of Customer Priorities (Cont'd)

Key Accounts

Q Using a scale from 0 to 10, where *0 means not important at all* and *10 means extremely important*, how important are each of the following **Toronto Hydro** priorities to you as a customer?

Providing reasonable costs for capital projects [average = **8.2**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	0%	3%	0%	0%	1%	13%	4%	8%	7%	23%	41%	Extremely important

Providing reasonable timelines for capital projects [average = **8.1**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	0%	3%	0%	0%	1%	11%	5%	6%	19%	22%	32%	Extremely important

Providing enhance advisory services [average = **7.9**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	0%	1%	1%	0%	2%	8%	17%	11%	14%	18%	28%	Extremely important

Investing in new technology [average = **7.6**]

	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	0%	0%	2%	2%	1%	16%	10%	11%	17%	20%	21%	Extremely important

"Behind the meter" electricity solutions & services [average = **7.4**]

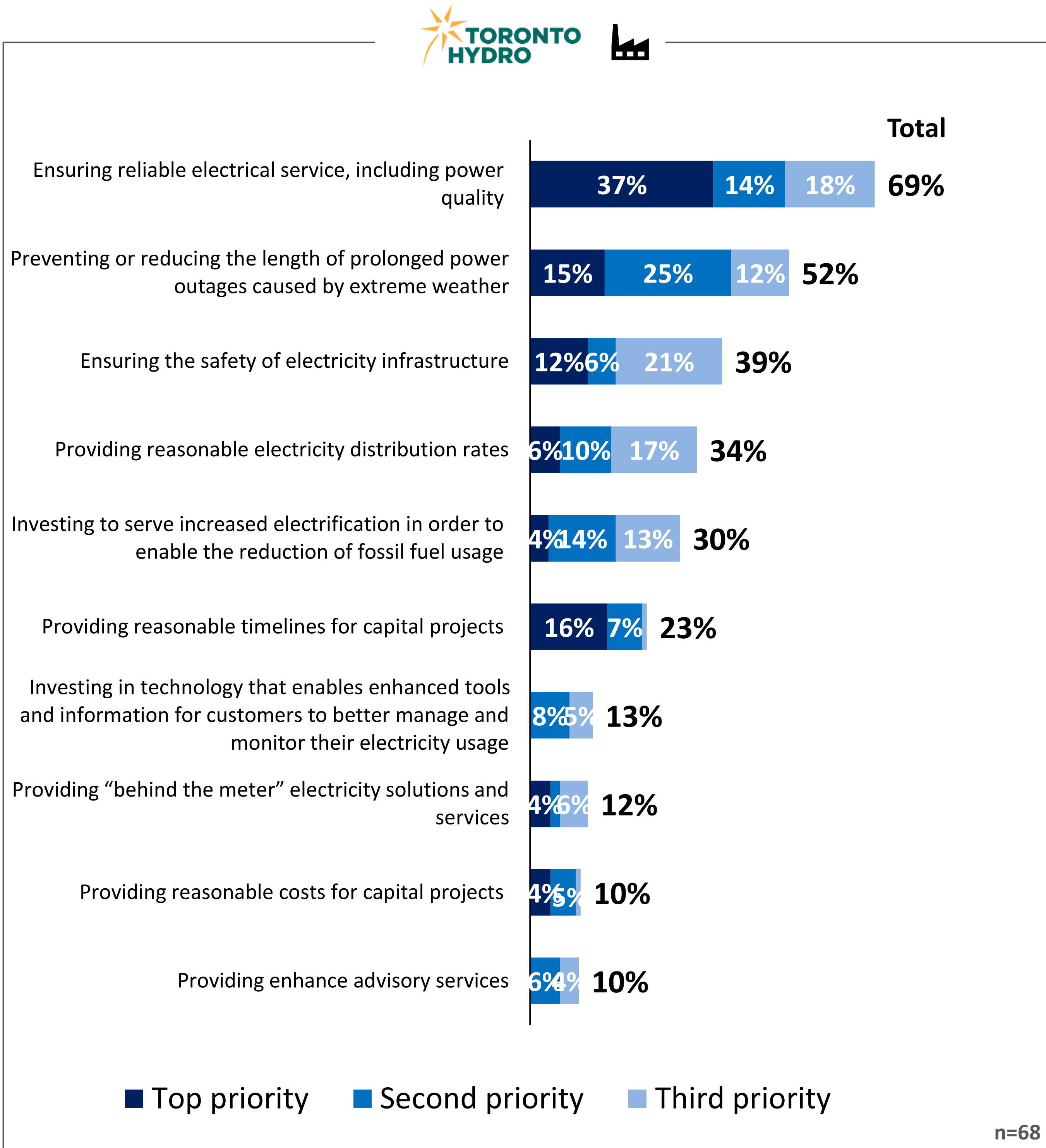
	0	1	2	3	4	5	6	7	8	9	10	
Not at all important	1%	0%	4%	0%	2%	17%	8%	7%	22%	21%	17%	Extremely important

INNOVATIVE RESEARCH GROUP

Online Survey
Ranking Customer Priorities

Key Accounts

Q Thinking of the priorities on the previous page, which would you say is the **most** important? What is the next most important priority you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



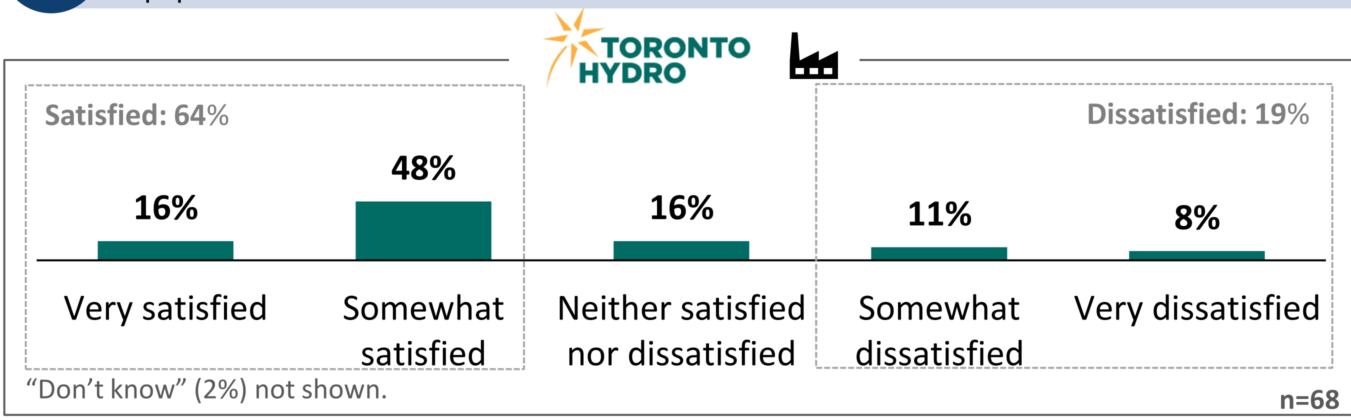
Online Survey

Power Quality and Reliability Outcomes

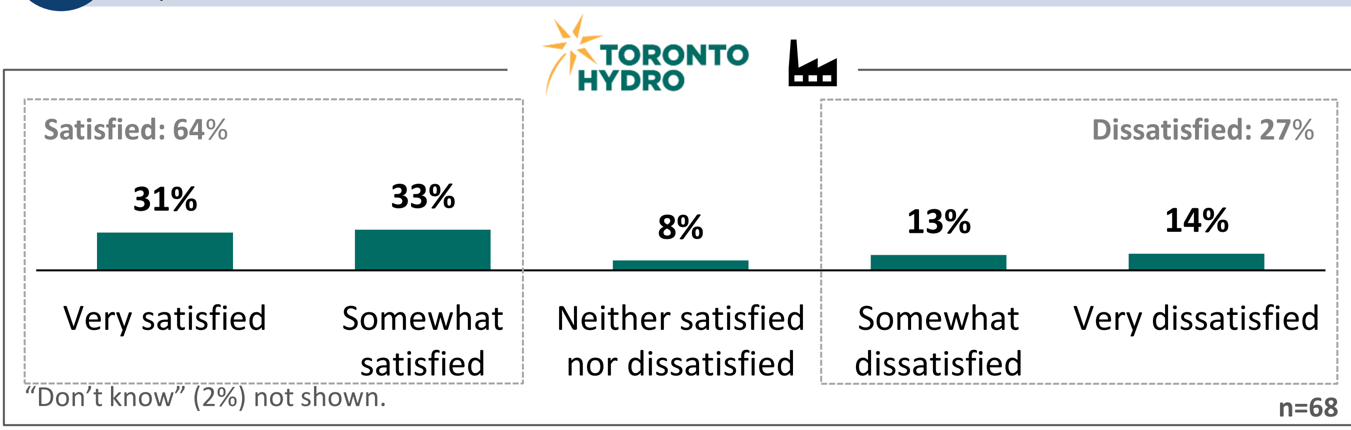
Key Accounts

The following statements are about the electrical service that your organization receives from Toronto Hydro. For each statement, please indicate your level of satisfaction or dissatisfaction.

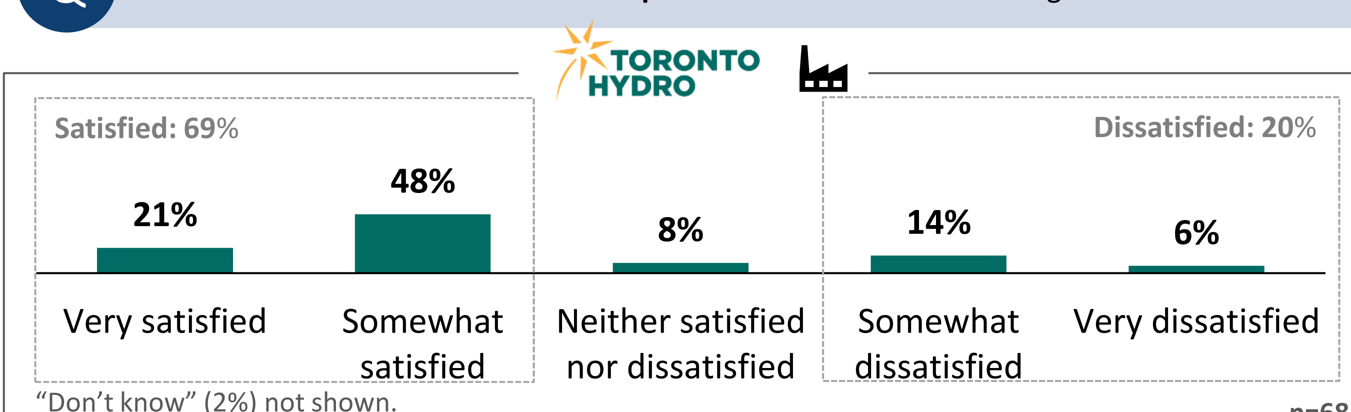
Q **Power quality** as judged by the absence of voltage fluctuations that may affect your equipment.



Q The **reliability of your electricity service** as judged by the number of power outages you experience.



Q The amount of **time it takes to restore power** when unscheduled outages occur.

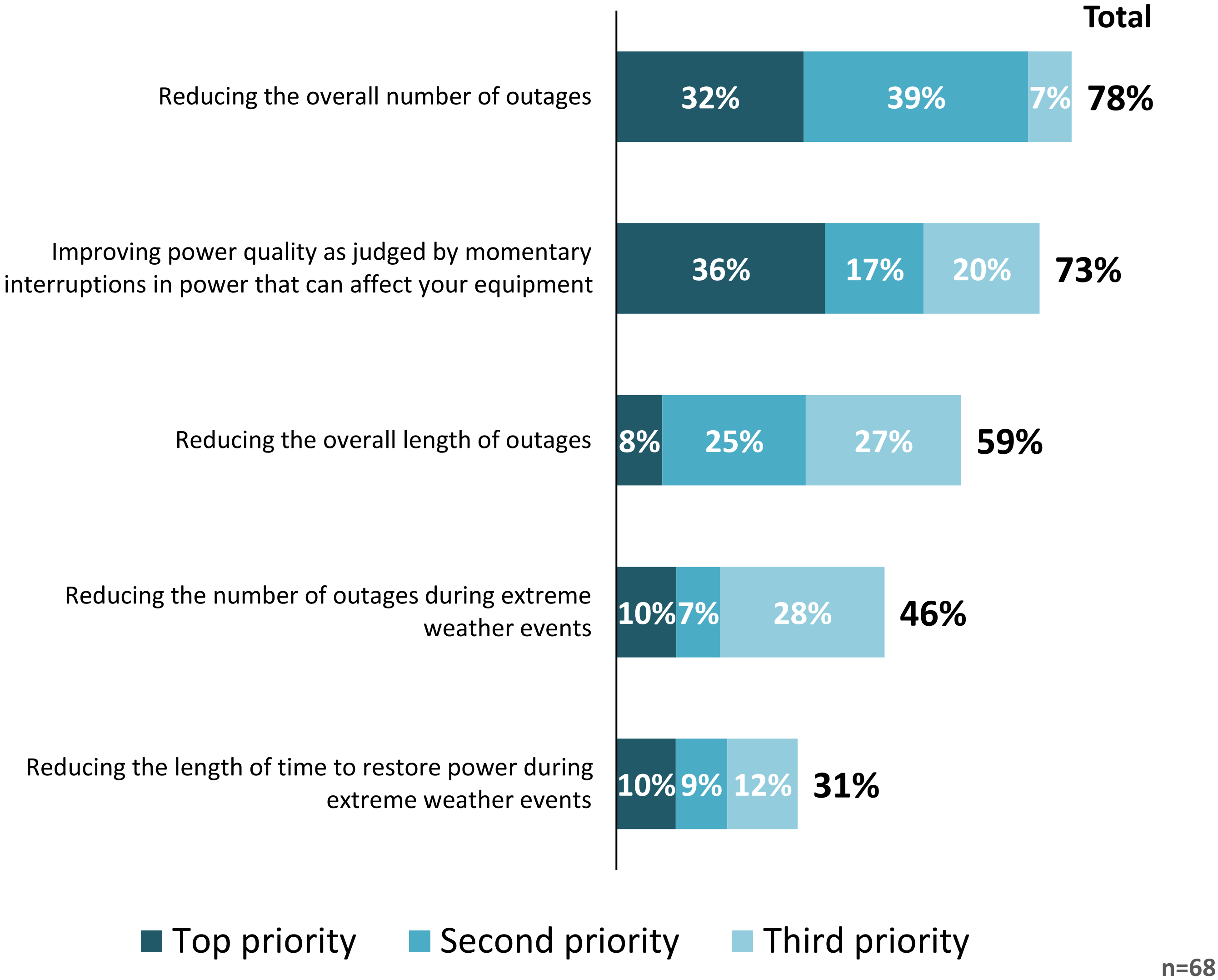


Online Survey
Ranking Reliability Priorities

Key Accounts

When it comes to reliability, there are a number of areas that **Toronto Hydro** could focus on.

Q Among the following reliability outcomes, which would you say is the **most** important? What is the next most important reliability outcome you think **Toronto Hydro** should focus on? And what do you consider the third most important priority?



Online Survey

Additional Priorities

Q Can you think of any other important priorities that **Toronto Hydro** should be focusing on, not listed on the previous pages?

Response	%
Communication	8%
Reliability	6%
Efficiency/Behind the Meter	6%
Billing	2%
Costs	2%
Other	4%
None	10%
Don't Know	62%

Online Survey

Additional Priorities

Key Accounts

Q Can you think of any other important priorities that **Toronto Hydro** should be focusing on, not listed on the previous pages?

Communication
"Providing notices of power outages for large consumption customers ahead of outage occurrence and overall trying to eliminate any power outage incidents. Also, essential service should be prioritized to not experience any outages 24/7."
"Perhaps an automated messaging system to key account holders when the system has experienced a blip that impacts these accounts. That would serve to provide us with the information that we require and free up your resources by not having us call for an update."
"Transparency and clarity on design/approval procedure and breakdown of billing/quotations."
"They are mostly included. The sub-metering portal user friendliness could be improved generally."
Reliability
"The fluctuations in power have had a negative impact on down time to our facility and increase cost of repairs to motors and drives."
"Minimizing power outages and the duration of power outages is the highest priority for us"
"Assist customers with understanding what is the reliability of their electrical supply, specifically if there is a need to upgrade their transformer."
"Although we have two supply lines they're fed from same breaker. So, the plan was put down several times until the defect was isolated. Unacceptable to have power on/off for 5 times into a short interval maybe 2 hours. Injection molding machines were impacted and decided to let them down although the power was back to protect for an outage every 15 minutes."
Efficiency/Behind the Meter
"From our understanding, in parts of the city, it is difficult to request new power for new large construction developments because the feeders are maxed out. If the city continues to redevelop, will Hydro be able to absorb the new power demands?"
"Aiding with incentive programs to reduce energy profile."
"Investing in the equipment necessary to allow large businesses to use co-generation to power their business. This is an important element in keeping businesses competitive that call Toronto home. Decreasing costs to industrial customers utilizing automation and streamlining business processes."
"Educational seminars on customer owned transformer."

Online Survey

Additional Priorities

Key Accounts

Q Can you think of any other important priorities that **Toronto Hydro** should be focusing on, not listed on the previous pages?

Costs
"Lower Rates."
Billing
"As mentioned earlier, consolidation of unmetered services on bills, to just provide summary information in the same manner as streetlighting."
"Understanding and working with clients to support their business back charges."
Other
"Work with University / industry tie up for better energy usage."
"Toronto Hydro is behind-the-times when it comes to data centers, which are one of the most important pieces of infrastructure in the post-pandemic world. The process to evaluate options efficiently and communicate with the client is horrendous."
"Decarbonization of electricity grid."

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Key Account Customers

Investment Trade-Offs

Section 6.3

Online Survey

System Renewal

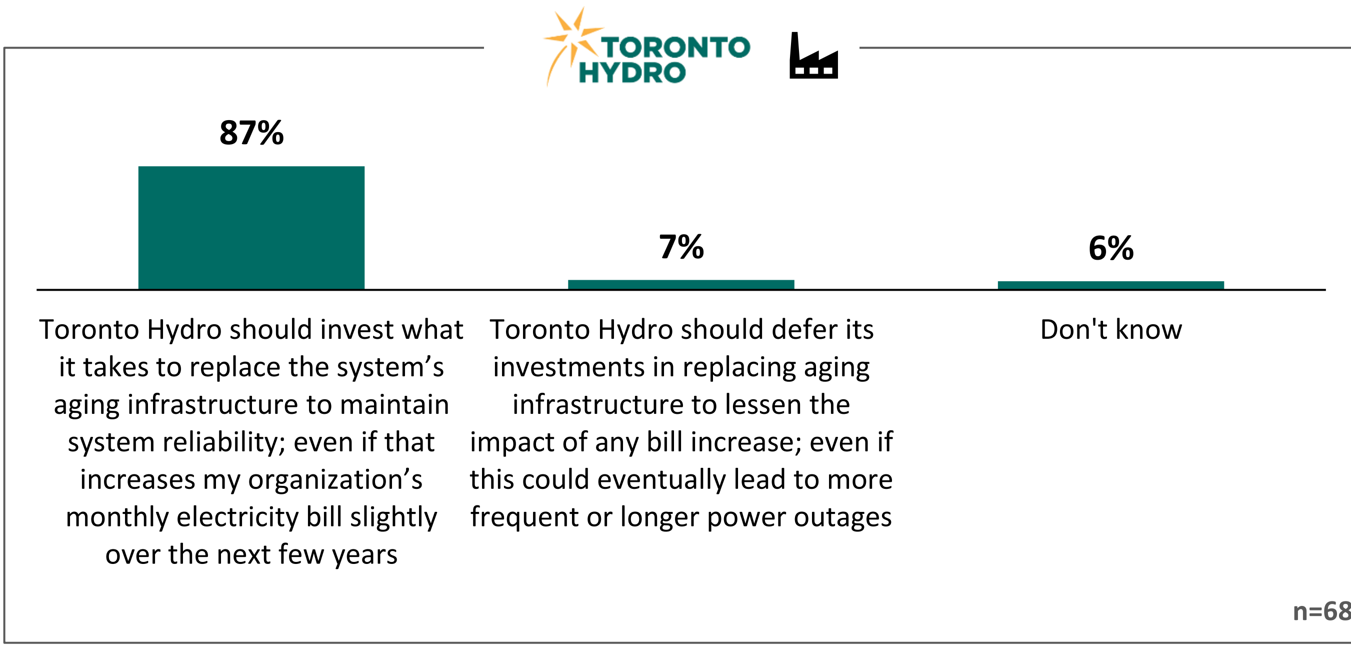
Now let's turn to our final topic – investment trade-offs.

Toronto Hydro is in the early stages of developing its investment plan for the five-year period between 2025 and 2029. While conversations with customers will continue over the next year, the utility wants to know your preferences when it comes to finding the right balance between costs and other outcomes.

There are four investment categories that we would like to discuss.

The first category focuses on projects that replace and restore aging electrical infrastructure, like overhead poles and underground cables.

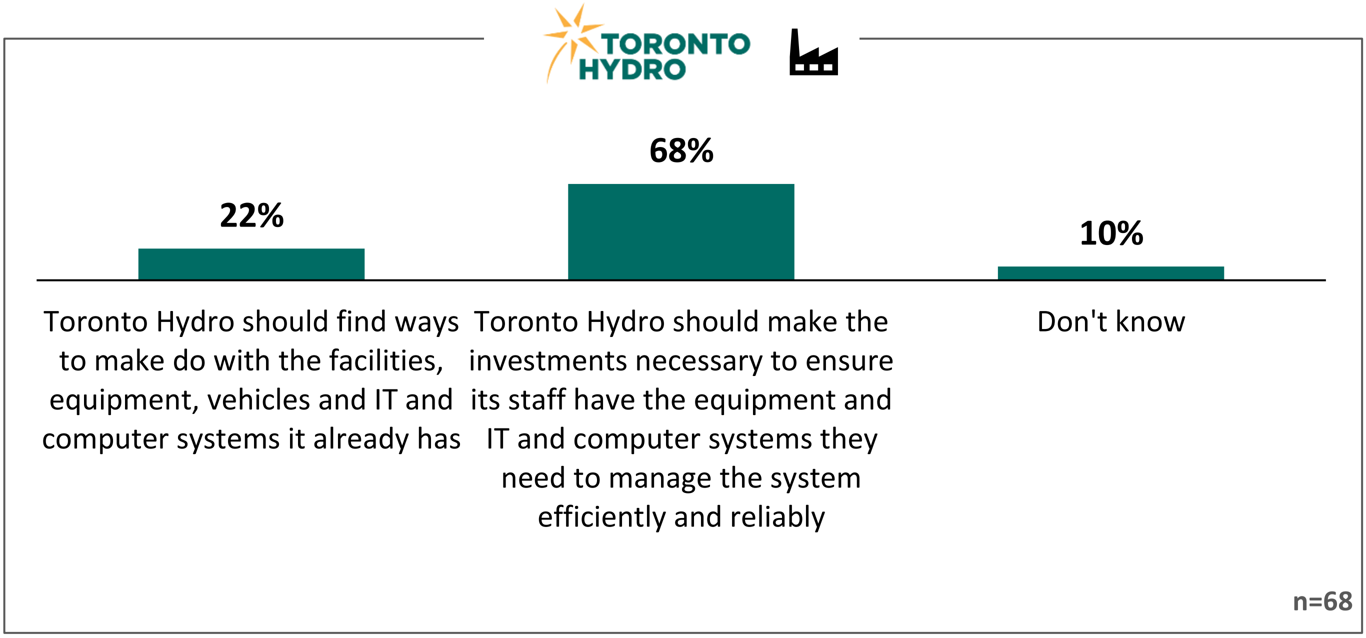
Q Regarding investments in aging infrastructure, which of the following statements best represents your point of view?



Online Survey
General Plant

The second category focuses on keeping **Toronto Hydro's** business running. This includes facilities to house staff and equipment, vehicles and tools to service equipment and IT systems to manage the system and customer information.

Q Regarding these types of investments, which of the following best represents your point of view?



Online Survey

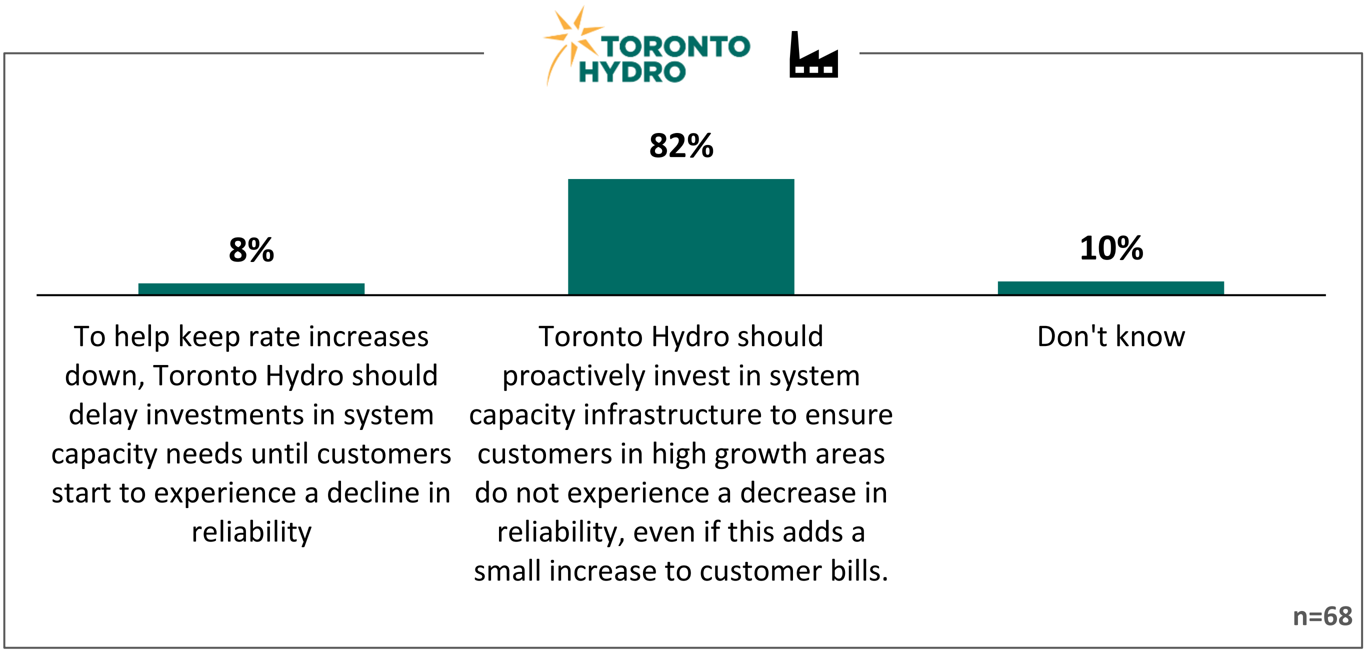
System Service

Key Accounts

The third investment category focuses on growth and greater demand for electricity in various parts of **Toronto Hydro's** service territory.

Increased demand for electricity puts pressure on existing electrical infrastructure. Eventually, further infrastructure investments are required to support increased demand for electricity.

Q With this in mind, which of the following statements best represents your point of view?



Online Survey
Grid Modernization

Key Accounts

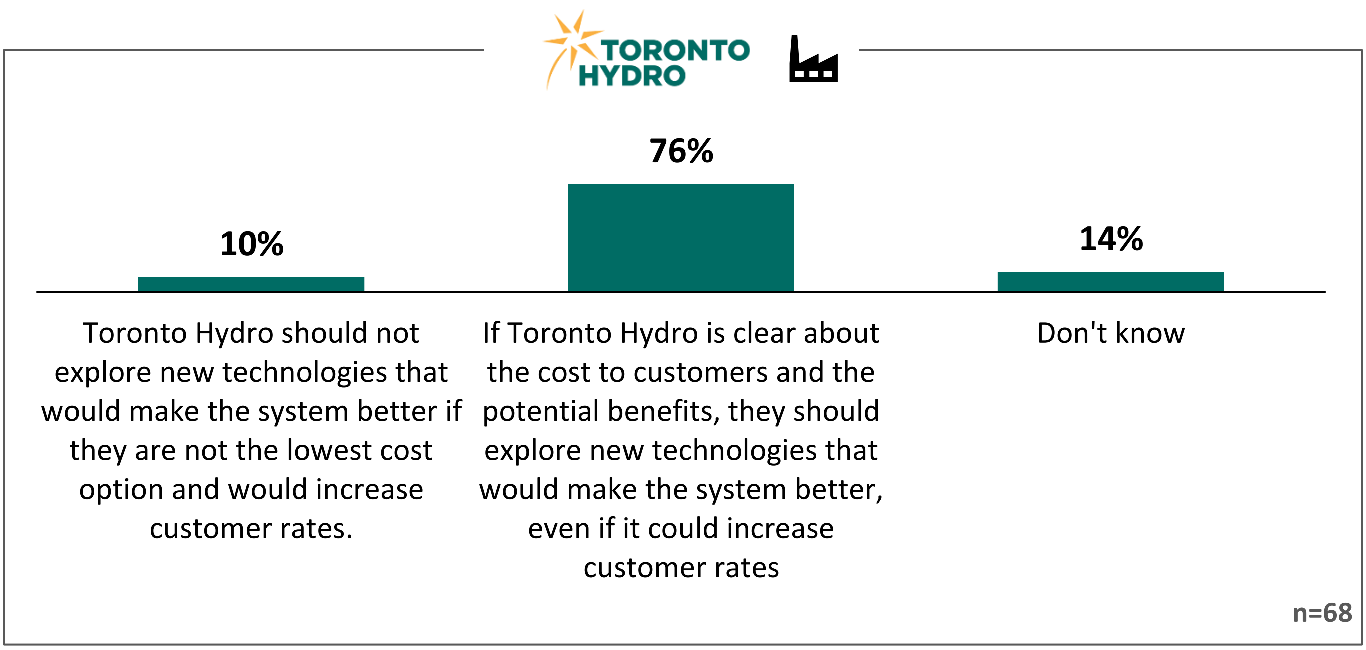
Toronto Hydro can invest in technology than can lead to a wide range of benefits including reliability, efficiency, customer service, and reducing environmental impacts.

When deemed the lowest cost option that will provide equal or improved service, Toronto Hydro will, in most cases, invest in technology.

However, there are two other scenarios where Toronto Hydro needs your feedback.

First, there are times when Toronto Hydro identifies new technology that can improve reliability or provide other benefits, but it will cost customers more. For instance, advanced customer meters that can measure when different home appliances or facility equipment is running, allowing Toronto Hydro to provide customers with better advice on how to manage their electricity usage and costs.

Q Regarding these types of investments, which of the following best represents your view?



Online Survey

Grid Modernization (Con't)

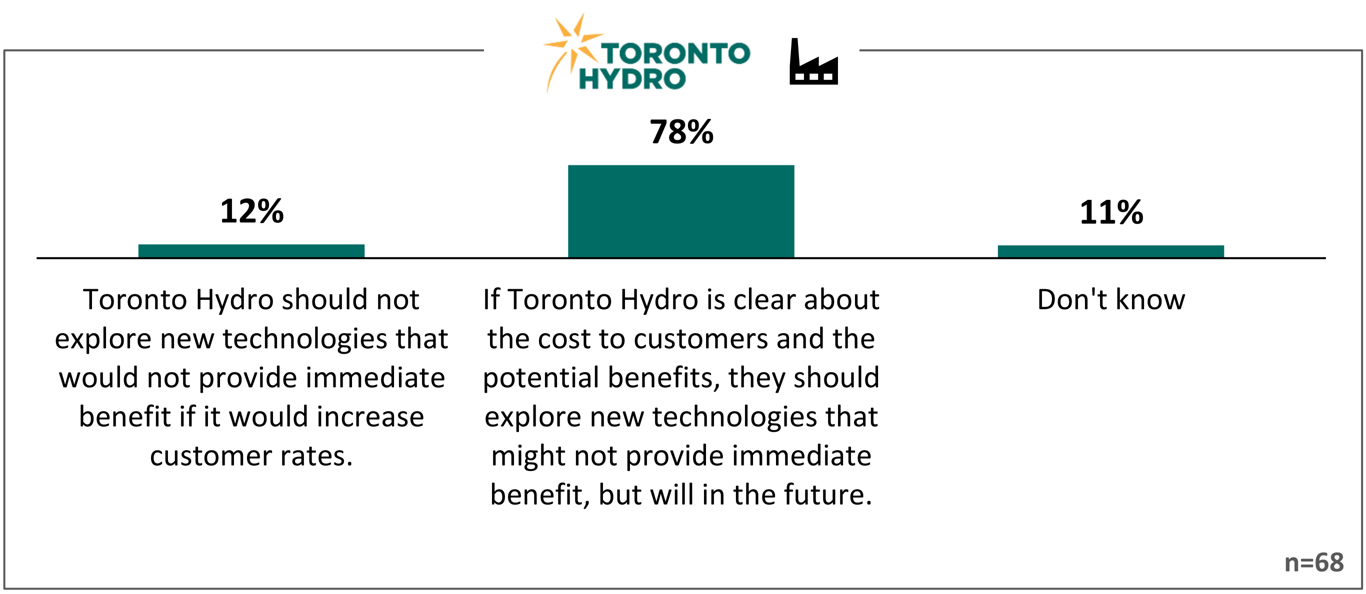
Key Accounts

The **second scenario** is where **Toronto Hydro** identifies new technology that is needed to improve the system in the future and would increase costs now, but the benefit might not be felt until later. This includes accommodating emerging technologies like solar power, battery storage, and electric vehicles.

Regardless of whether you are considering new energy choices like a battery storage, distributed energy resources (e.g. solar power), or onsite EV charging stations today, Toronto Hydro must be prepared as adoption becomes more widespread over the next 5-10 years.

For instance, charging each electric vehicle draws as much energy as two average homes. If a dozen or so people come home and start changing their vehicles at a period of peak demand, it could overload the grid in that neighbourhood. While Toronto Hydro cannot predict the exact rate of electric vehicle adoption in the City of Toronto, the utility must make certain investments today that will allow it to manage electric vehicle demand in the future.

Q Which of the following best represents your view?



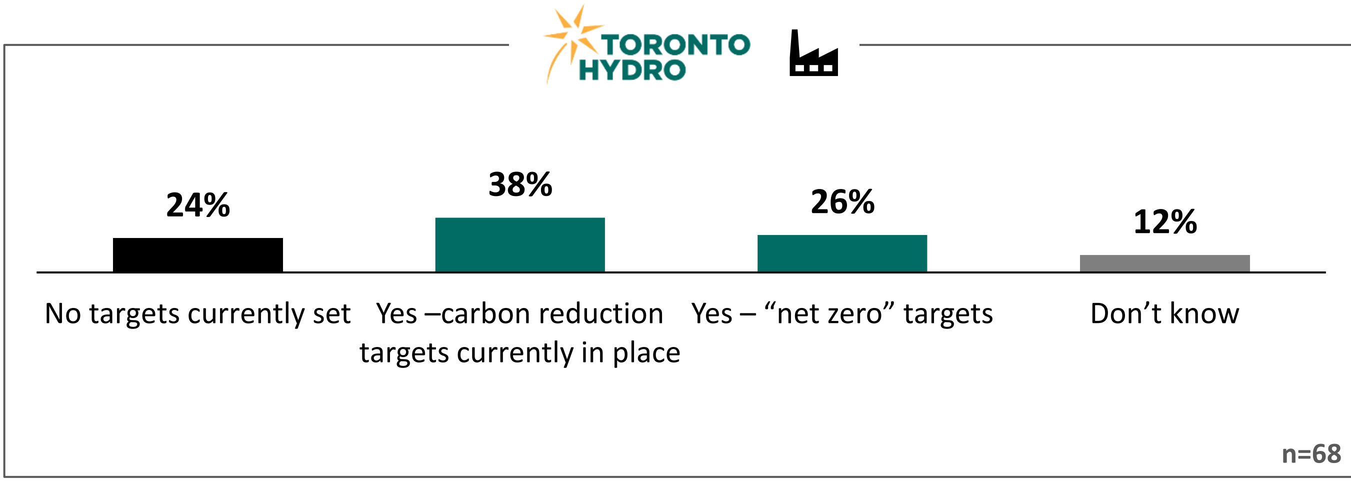
INNOVATIVE RESEARCH GROUP

Online Survey

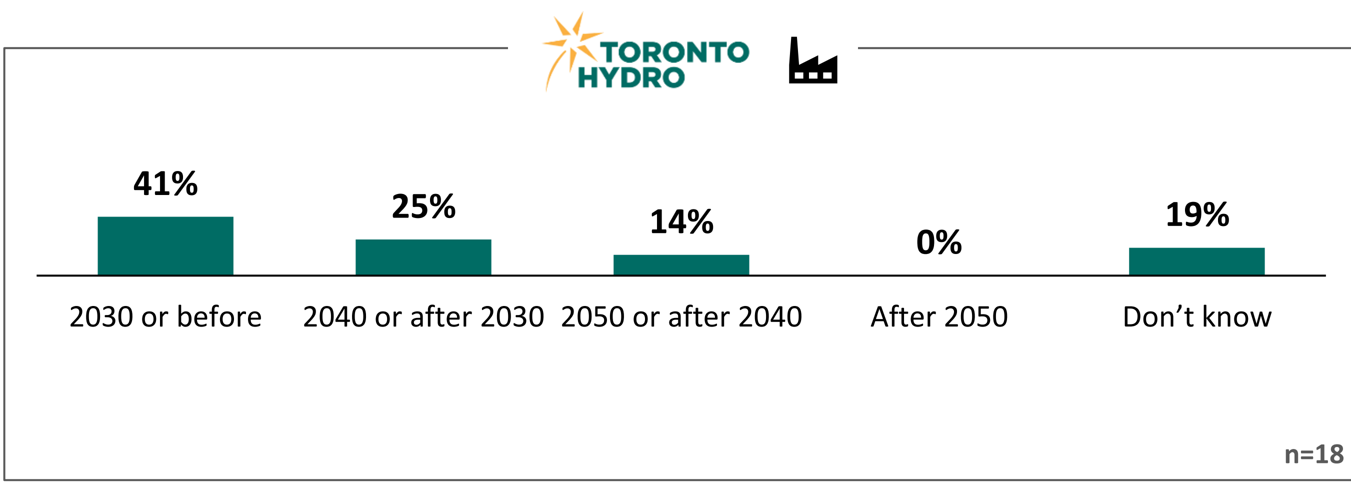
Carbon Reduction Initiatives

Key Accounts

Q Does your organization have a carbon reduction program in place?



Q What is your organization's "net zero" target date?



Online Survey

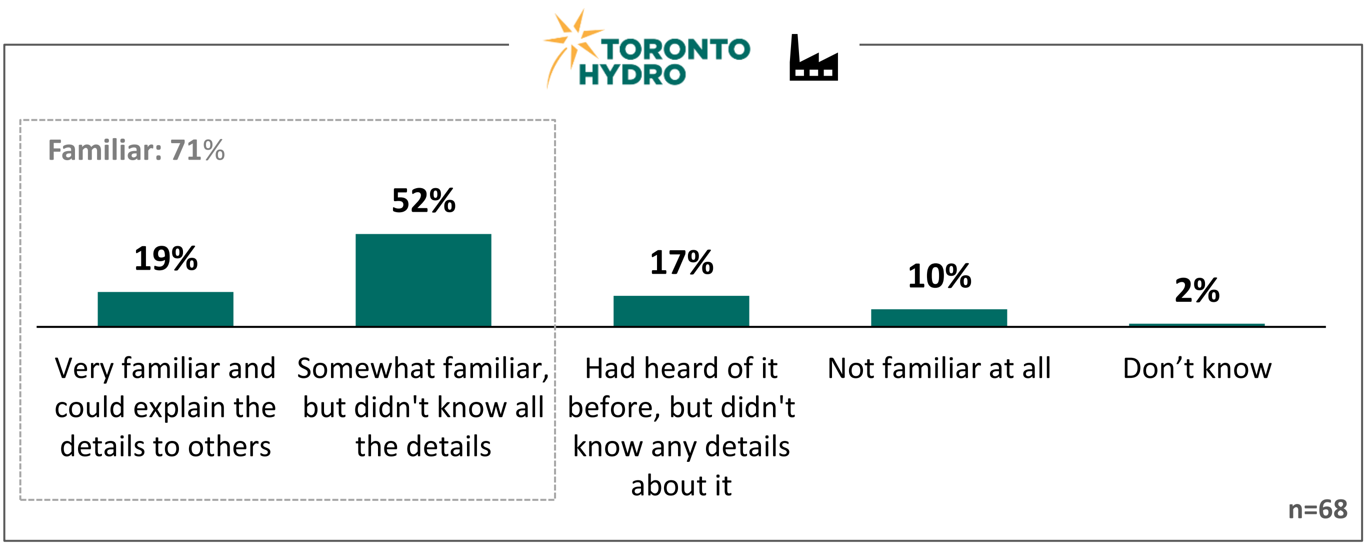
Familiarity with Sources of GHG Emissions

Key Accounts

In November 2021, the City of Toronto released its 2019 Greenhouse Gas (GHG) Inventory, which tracks Toronto's progress towards GHG reduction targets and identifies key emissions sources. GHG emissions have a wide variety of environmental impacts that lead to climate change and global warming.

This report notes that the **two primary sources of GHG emissions** in Toronto are: energy use in buildings (natural gas and electricity) and transportation fuels (primarily gasoline) – accounting for 93% of all emissions in the city.

Q Before this survey, how familiar would you say you were the primary sources of GHG emissions in Toronto?



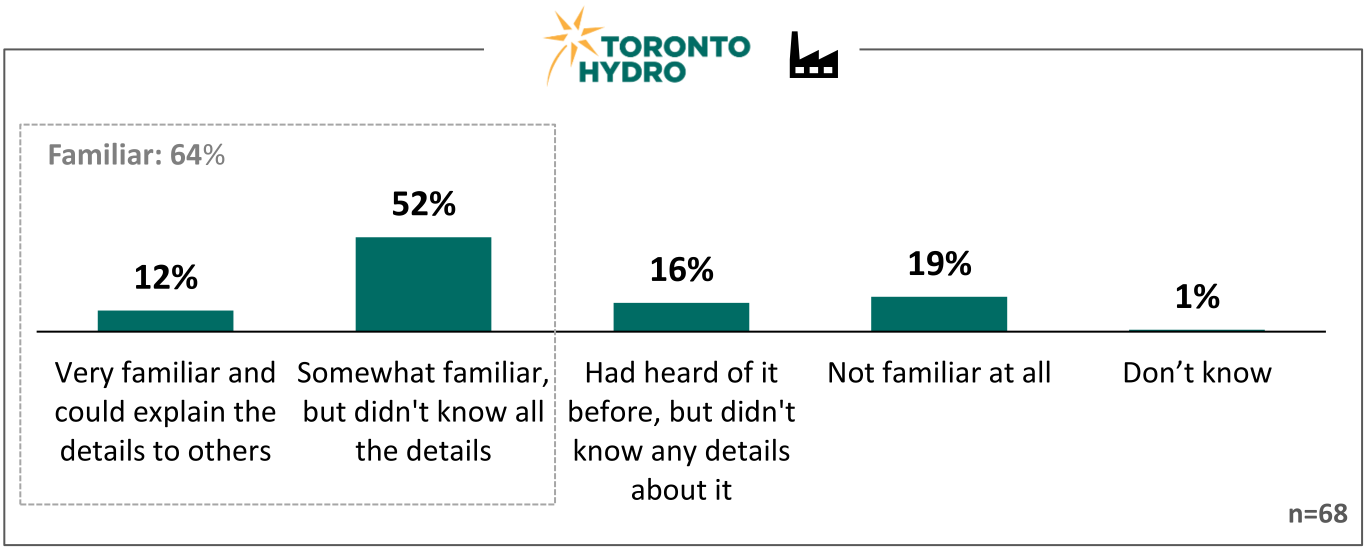
Online Survey
Familiarity with the City's Plan

In October 2019, Toronto City Council voted to accelerate its efforts to mitigate and adapt to climate change and adopt a stronger emissions target for Toronto: **net zero emissions by 2040.**

A key part of the City's "Net Zero Strategy" requires switching from gasoline in the transportation system and natural gas in home/building heating to electricity-powered alternatives, adopting renewable generation and using energy storage systems.

These initiatives will require Toronto Hydro to expand and modernize its existing electricity distribution grid to ensure that it is capable of helping achieve the City's targets.

Q Before this survey, how familiar were you with the City of Toronto's plan to use an expanded and modernized grid to reduce GHG emissions in Toronto to help address climate change?



Online Survey

Support for Bill Increase to Meet Emissions Targets

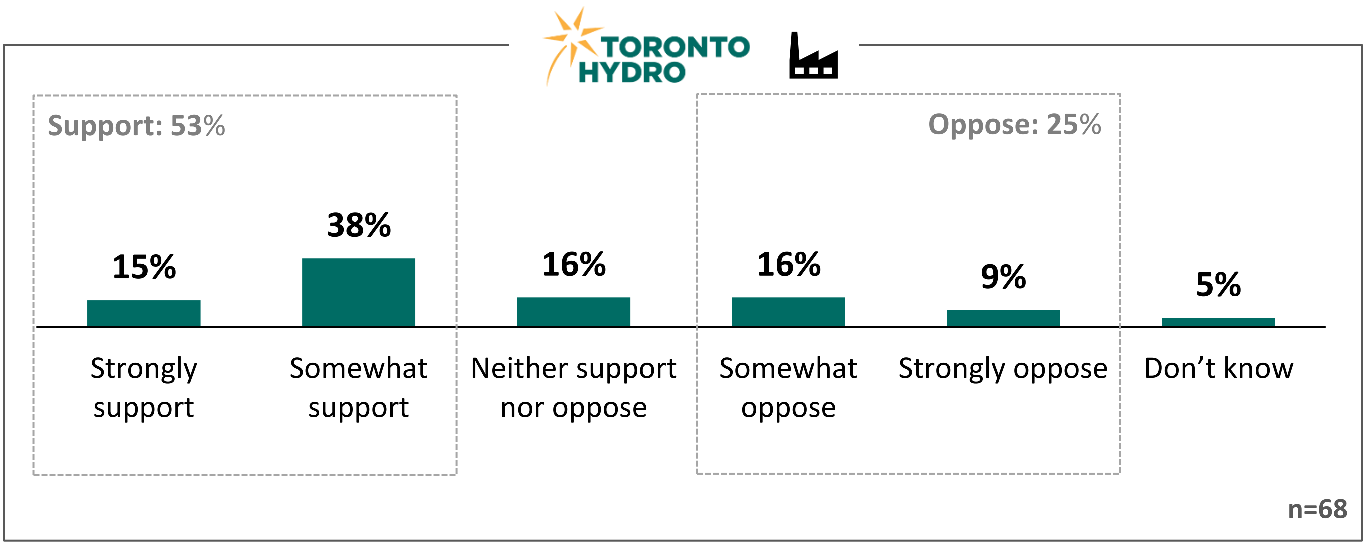
Key Accounts

As Toronto Hydro is 100% funded through the rates its customers pay, investing in an expanded and modernized electricity grid would mean that customers, like your organization, would pay more.

The sooner that Toronto Hydro expands and modernizes the grid, the sooner Toronto can reach its climate action goals.

Q Would you support or oppose a specific charge on the distribution portion of your monthly bill to help Toronto meet its future emissions targets if your electricity bill will increase by **5% a year for the next 10 years**?

*Recall, the distribution portion of your monthly bill is approximately **5-6%** of your total electricity bill.*



Online Survey

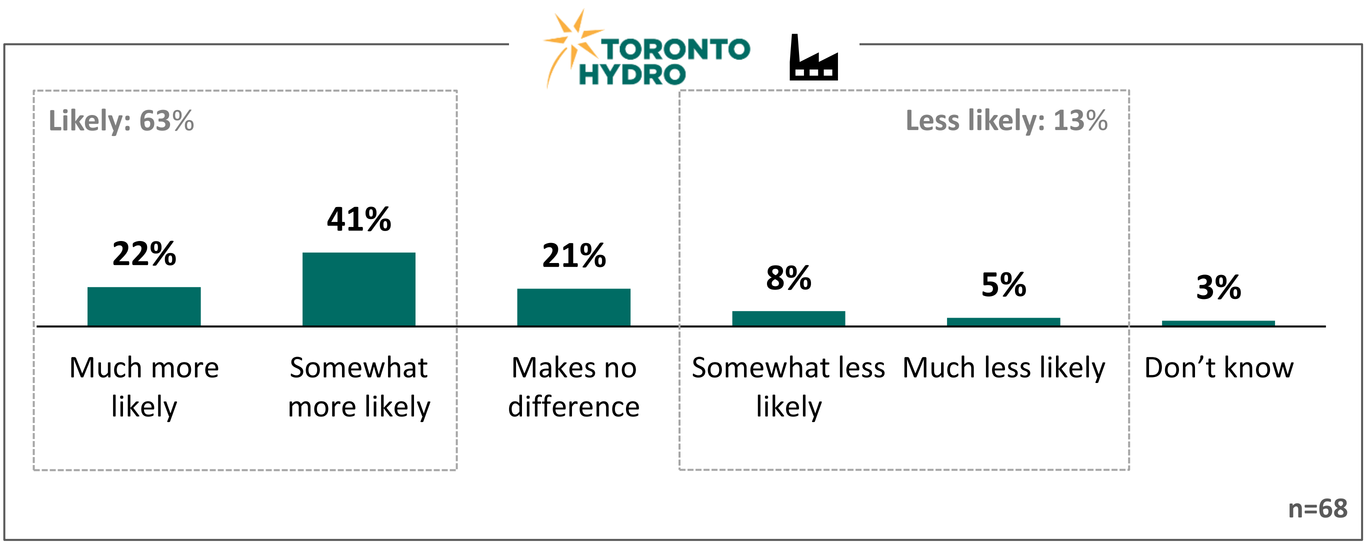
Potential for Rate Increase Offset

Key Accounts

Some studies have indicated that increasing customer bills to specifically help meet emissions targets could be offset in later years because of reductions in other types of energy bills. For example, as fuel-switching to electricity becomes more widespread, customers may experience cost reductions for fossil fuels, such as gasoline and natural gas.

Q

Does knowing that these rate increases could be offset in later years because of reduction in other types of energy bills make you more or less likely to support a specific charge on your monthly bill to help Toronto meet its future emissions targets?



Online Survey

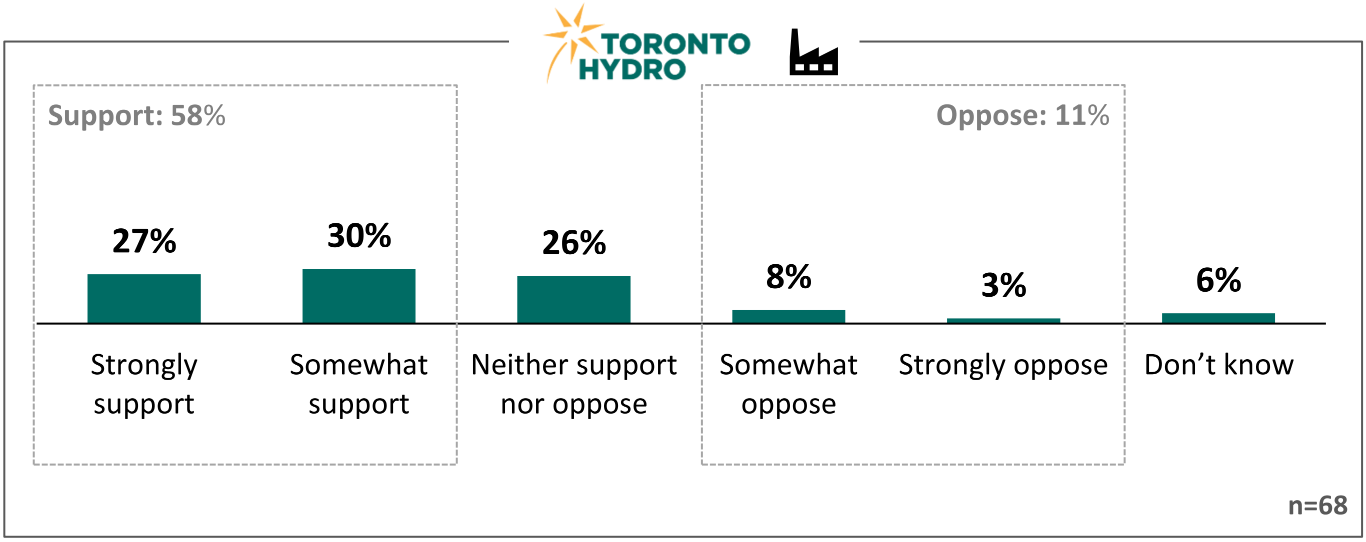
Support for Project Financing

Key Accounts

In a recent series of interviews with Key Account customers, the idea of **project financing** was discussed.

Q

Should Toronto Hydro help finance capital costs of energy transition projects through your monthly bills (i.e. finance behind-the-meter solutions and new equipment over an extended period to time through your organization's operating costs)?



Key Account Customers

Key Account Assessment

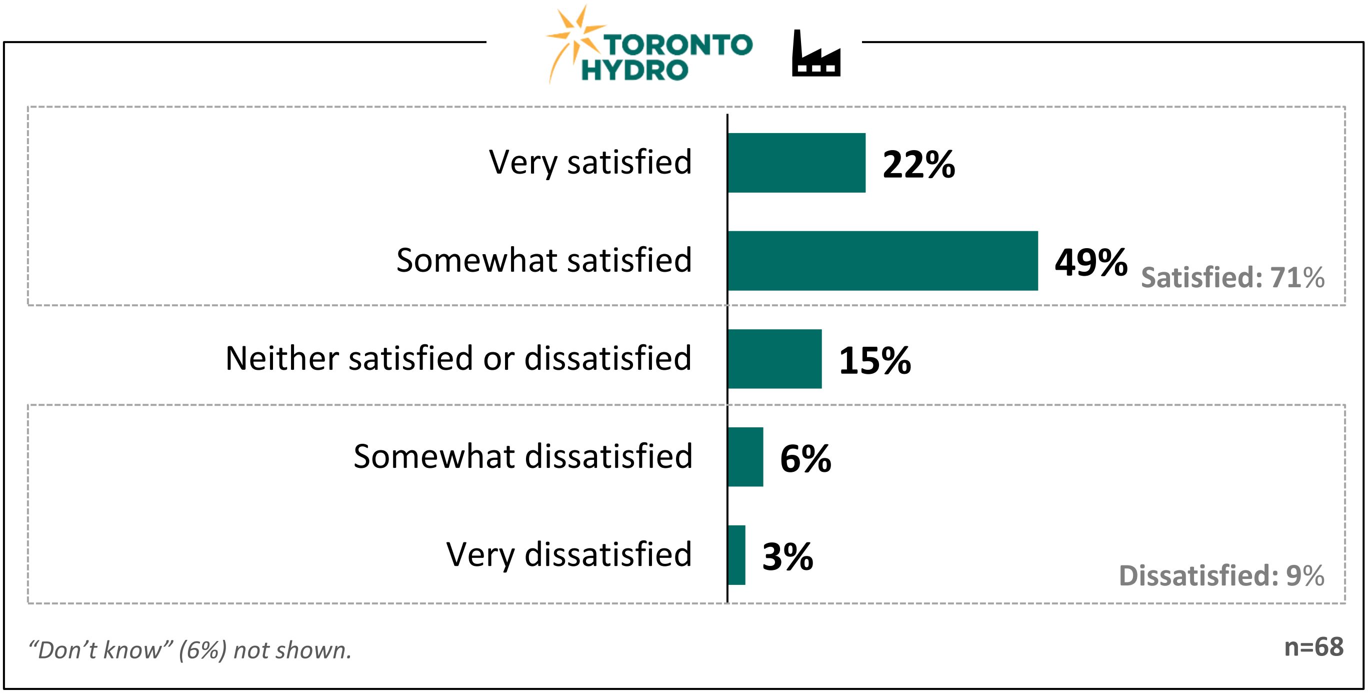
Section 6.4

Online Survey

Overall Satisfaction with Key Account Management Services

Key Accounts

Q Overall, how satisfied are you with **Toronto Hydro's** Key Account management services?

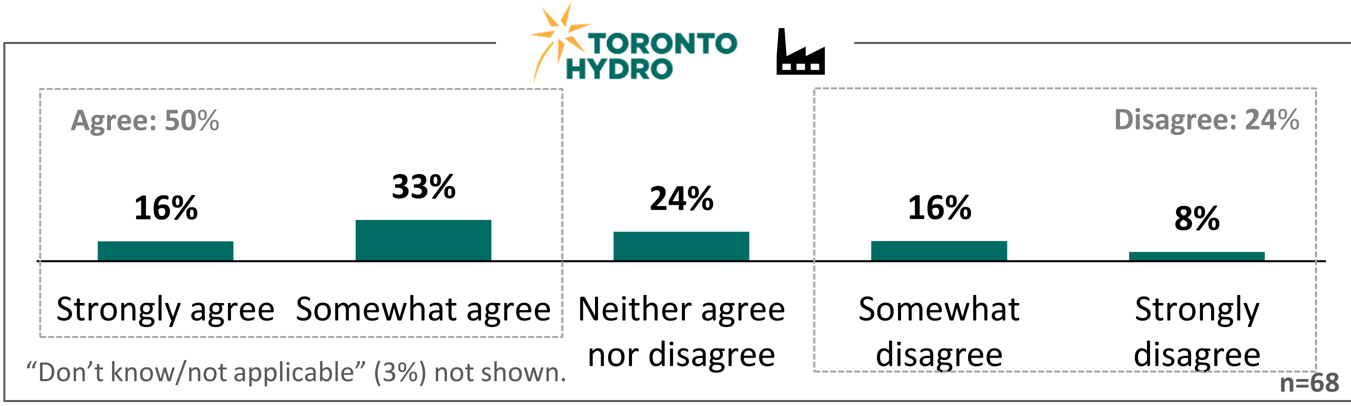


Online Survey

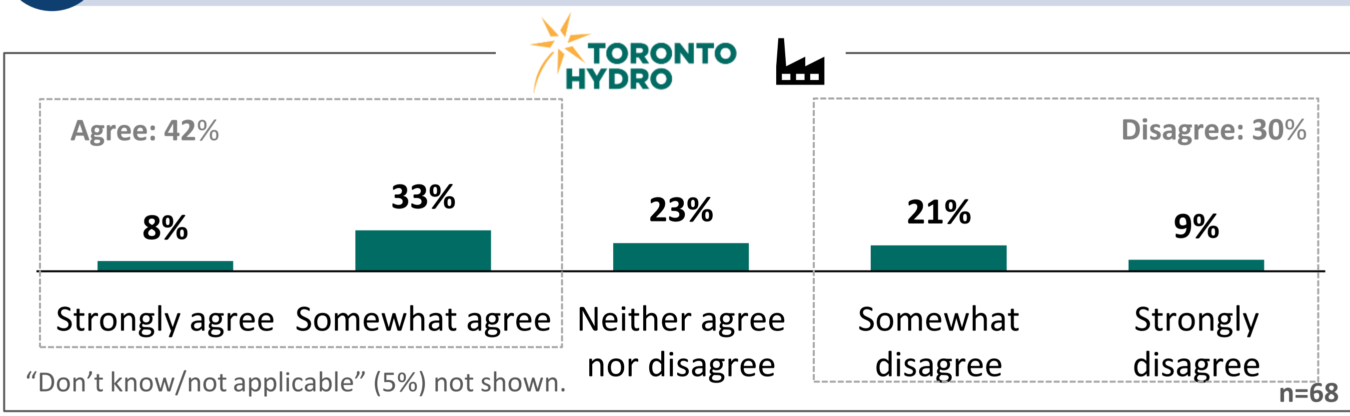
Key Account Assessment

Please indicate if you agree or disagree with the following statements.

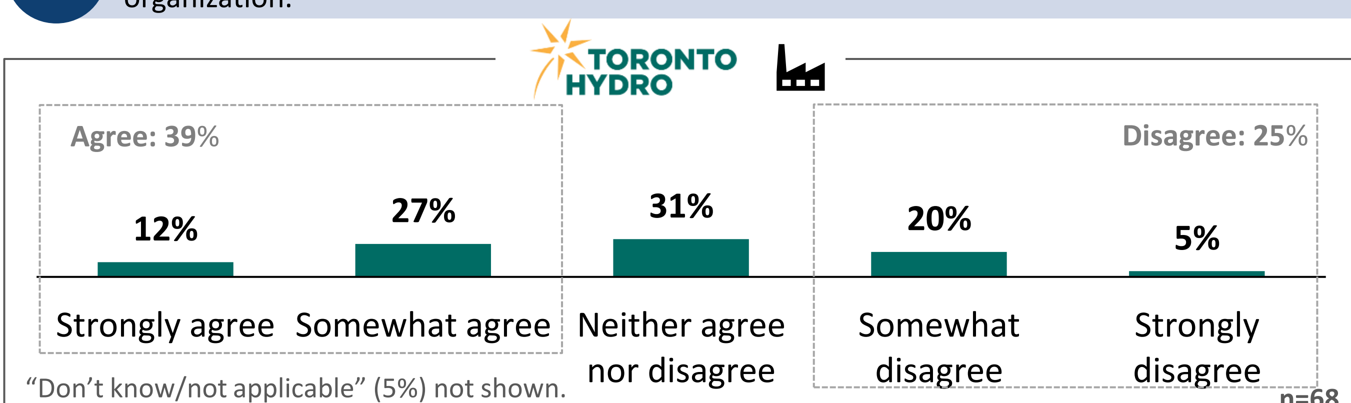
Q Toronto Hydro understands my organization and its challenges.



Q Toronto Hydro proactively provides my organization with business solutions.

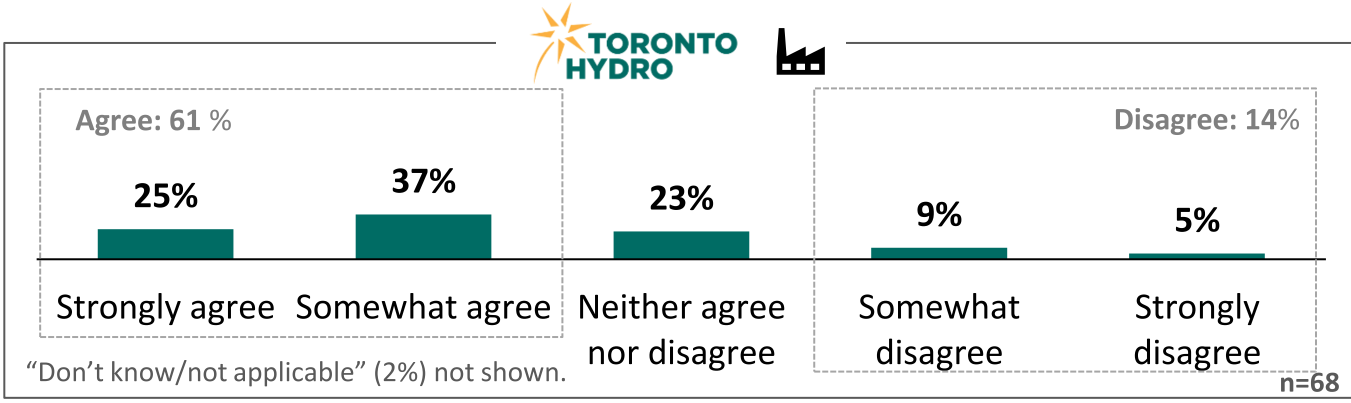


Q Toronto Hydro is more than an electricity distributor, it is a business partner to my organization.



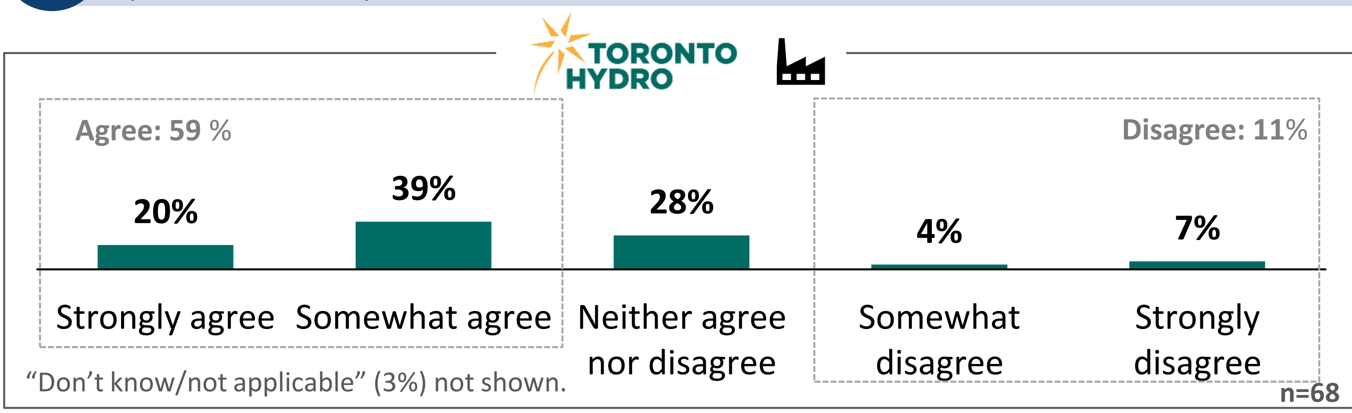
Please indicate if you agree or disagree with the following statements.

Q Toronto Hydro staff are easily accessible to my organization.



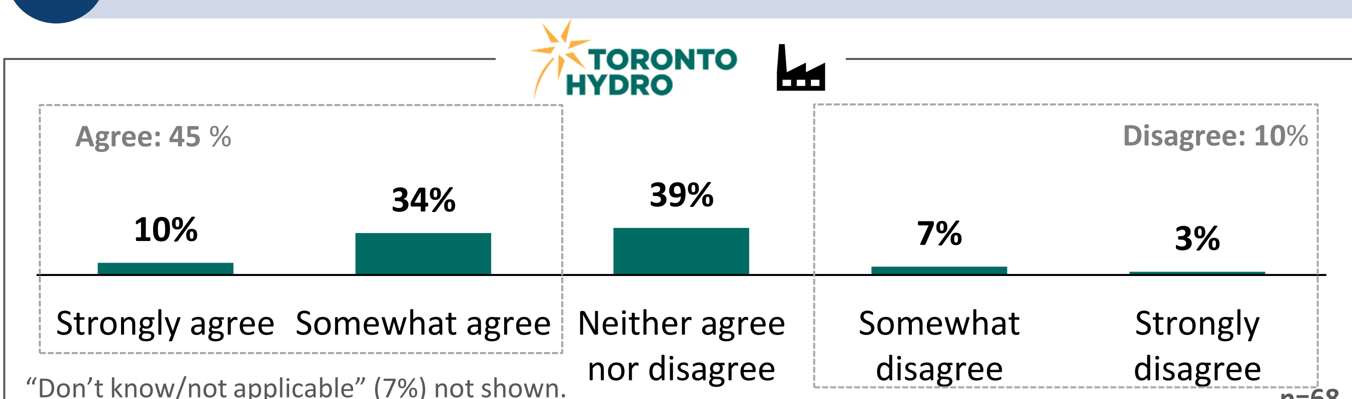
"Don't know/not applicable" (2%) not shown.

Q Toronto Hydro staff provide my organization with quality advice and guidance when I have questions about my service.



"Don't know/not applicable" (3%) not shown.

Q Toronto Hydro provides my organization with good value for money.



"Don't know/not applicable" (7%) not shown.

INNOVATIVE RESEARCH GROUP

Key Accounts Customers

Additional Services

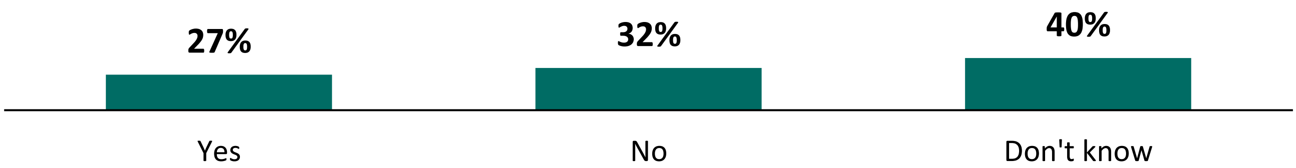
Section 6.5

Online Survey

Service Offered by Toronto Hydro's Key Account Team

Key Accounts

Q Are there services that are currently offered by Toronto Hydro's **Key Account Team** that could be done differently to better fit your needs?



n=68

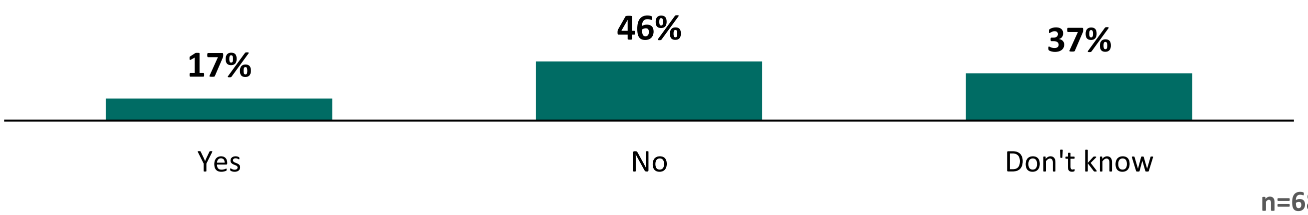
Responses from those who say "Yes"
Communication (13%)
"The communication with key accounts. I have never met anyone from the team, so not sure who they are."
"Communicate with me about my necessary support."
"Additional engagement with the plant to advise of upcoming initiatives/projects."
"A quicker response to metering issues is always good."
"Develop partnerships to understand your customer and their needs."
"Better interaction."
"Better customer support/management."
"A more pro-active approach."
"Our organization is not familiar with services offered by the Key Account Team so more could be done to push information about these services to our organization."
One Point of Contact (7%)
"One account manager/project manager for each project who can assist on all Hydro and Hydro Streetlighting related business throughout the course of the project."
"Singular Point of contact would be nice, I converse with relocation, OTC, all for the same project."
"Contact name"
Energy Conservation (5%)
"Incentives for energy conservation measures in commercial/industrial facilities."
"Provide more info on future energy projects and technology."
"Energy supported incentive programs."
Other (3%)
"New service process is slow and expensive."
"Make an arrangement for dedicated team for our Annual sub station shutdown in short notice."

Online Survey

Additional Services by Toronto Hydro's Key Account Team

Key Accounts

Q Are there any additional services that you would look to Toronto Hydro's **Key Account Team** to provide and would be willing to pay for?



Responses from those who say "Yes"
Service (5%)
"Project specific designers that are with project from start to finish."
"Customer audits."
"Provide engineering services at reasonable cost for adding second feed to the building."
Efficiency/Behind the Meter (3%)
"Facilities energy and conservation training."
"Help with battery storage solutions, or solar panels."
"Behind the meter solutions."
Communication (3%)
"Peak demand notification for Class A customers."
One Point of Contact (3%)
"Please refer to above comment." -- "One account manager/project manager for each project who can assist on all Hydro and Hydro Streetlighting related business throughout the course of the project."
Cost (1%)
"Power cost forecasts... forecasted rate changes and escalations (including GA and HOEP)."
Reliability (1%)
"Reduce power blips in our area leading to financial losses."
Other (1%)
"Possibly.....Would need to think about it."

Online Survey

Service Offered by Toronto Hydro's Key Account Team

Q Before this survey concludes, do you have any additional comments or feedback you'd like to share with Toronto Hydro?

Note: all feedback is anonymous and you will not be identified to Toronto Hydro without your expressed permission.

Response	%
Electrification/Reaching Net-Zero	6%
Communication	1%
Other	5%
None	88%

Electrification/Reaching Net-Zero
"Toronto Hydro historically and to this day does not seem like a willing partner in the move to decarbonize and distributed energy resources. They are a publicly owned utility, but does not act like one."
"I believe that T.H. should speed up their transition to LED lighting street lighting through the Toronto area this will go a long way to diminish the electrical consumption on the existing system and provide better lighting and diminish the costs of maintenance. With T.H. incentives my organization has realized good savings over the years with the IESO incentive programs for various projects."
"Fossil fuel does need to be phased out, but we need to do it in a way that allows businesses to compete internationally. Our business spends over $1M on electricity annually. It is a semi-major item on our cost breakdown. A 5 % increase in hydro rates for 10 years in a row would be very hurtful and if out of step with our business environment outside of Ontario could result in closure. It's delicate and must come with a balanced sensitive view."
"Most of the organizations are trying to reduce the energy and go to net zero in the near future. Hydro will be a key player. May need more technical support staff for further team work and also give guidance for the customers. Also there is a trend to move to Electricity from all sides, with all switching to electricity the load will shift from natural gas to electricity in all industry. May need to balance the same"
"Additional service (power requirements) to help us reach our zero carbon mandates set by our Company. This I will be connecting with Toronto Hydro in the short term to discuss."
Communication
"Email responses from directors would be nice."
Other
"The questions of this survey read as if there is another option to Toronto Hydro. What alternative do we have working in the city? Who are we to sway how you spend your funds? It's not like we can switch to geothermal, gas, or solar to circumvent or replace our dependency of this utility."
"The electricity service provided by Toronto Hydro is quite good. Impacts to our property due to electricity outages are minimal."

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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APPENDIX 07

Phase I Customer Engagement

Needs and Preferences Planning Placemat

TORONTO HYDRO

November 2, 2023

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APPENDICIES

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Phase I Customer Engagement

Toronto Hydro's 2025 Rate Application

Needs and Preferences Planning Placemat (March 2022)

INNOVATIVE RESEARCH GROUP

Rate Class Sample Size (Unweighted n)	Residential (n=1,685)	Small Business (n=430)	C&I* (n=48) *interpret as directional due to small 'n'	Key Accounts (n=68)

Needs

What are customer needs?

Most customers are generally satisfied with the service they receive from Toronto Hydro. When asked how Toronto Hydro can improve service, customers were not wedded to any specific needs or wants. Overall, the top customer needs continue to be "lower or reduce rates" and "ensure reliability" followed by "investing new technology" and "reducing restoration time".

	Residential	Small Business	C&I*	Key Accounts
Top Customer Needs	Rates	Rates	Rates	Reliability
	Reliability	Invest in new technology	Reliability	Reduce restoration time

Preferences

Prioritizing Outcomes

	Residential	Small Business	C&I*	Key Accounts
General Priorities (%) indicates total percentage by rate class that place specific priority in their top 3 outcomes	**Reasonable rates (46%)**	**Reasonable rates (54%)**	**Reasonable rates (50%)**	**Reliable service including power quality (69%)**
	Reliable service (45%)	**Invest in new technology (40%)** Reduce costs Withstand adverse weather	**Reliable service (48%)**	**Outage restoration in extreme weather (52%)**
	Invest in new technology (45%) Reduce costs Withstand adverse weather	**Reliable service (36%)**	**Grid capacity expansion for climate action (33%)**	**Safety of infrastructure (39%)**

Prioritizing Reliability Investments

	Residential	Small Business	C&I*	Key Accounts
Reliability (%) indicates total percentage by rate class that place specific priority in their top 3 outcomes	**Reduce restoration time in extreme weather (70%)**	**Reduce restoration time in extreme weather (60%)**	**Reduce restoration time (63%)**	**Reduce outages (78%)**
	Reduce outages in extreme weather (57%)	**Reduce outages (57%)**	**Reduce outages (56%)**	**Improve power quality (73%)**
	Reduce outages (56%)	**Reduce outages in extreme weather(56%)**	**Reduce outages in extreme weather (54%)**	**Reduce restoration time (59%)**

Prioritizing Technology Investments

	Residential	Small Business	C&I*	Key Accounts
Grid Modernization (%) indicate total percentage by rate class that place specific priority in their top 3 outcomes	**Find efficiencies and reduce customer costs (79%)**	**Find efficiencies and reduce customer costs (79%)**	**Find efficiencies and reduce customer costs (79%)**	N/A
	Reduce environmental impact of internal operations (56%)	**Reduce environmental impact of internal operations (51%)**	**Reduce environmental impact of internal operations (52%)**	
	Reduce both length and number of outages (54%)	**Help customers better manage electricity usage (50%)**	**Reduce both length and number of outages (54%)**	

INVESTMENT TRADE-OFFS

	% Total Support			
System Renewal Necessary investments in aging infrastructure to maintain system reliability.	**76%**	**69%**	**79%**	**87%**
General Plant Necessary investments to ensure staff have reliable equipment and IT systems.	**68%**	**59%**	**56%**	**68%**
System Capacity Proactive investments to ensure customers in high growth areas do not experience a decrease in reliability.	**66%**	**61%**	**73%**	**82%**

GRID MODERNIZATION

	% Total Support			
System Enhancements Explore new technologies that would make the system better even if they are not the lowest cost option.	**63%**	**59%**	**75%**	**76%**
Future Benefits Explore new technologies that will provide future (rather than immediate) benefits if the costs and benefits are clearly articulated.	**71%**	**67%**	**73%**	**78%**

CLIMATE ACTION

	% Total Support			
Electrification Willingness to pay extra to help the City of Toronto meet its future emissions targets.	**48%**	**47%**	**44%**	**53%**
Social Equity Willingness to pay extra to provide financial assistance to low-income customers.	**41%**	**42%**	**52%**	**N/A**

An estimated 64% of key accounts have "net zero" targets or carbon reduction initiatives currently in place.

For more information about this document or the Phase I customer engagement results please contact the Regulatory Applications and Business Support team.

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APPENDIX 08

Phase II Customer Engagement

Online Workbook Overview

TORONTO HYDRO

November 2, 2023

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Introduction

Phase II 2025-2029 Rate Application Customer Engagement

The *Renewed Regulatory Framework for Electricity Distributors*

Toronto Hydro Electric-System Ltd. (**Toronto Hydro**) engaged Innovative Research Group Inc. (**INNOVATIVE**) to design, execute, and document the results of its customer engagement process under the Renewed Regulatory Framework for Electricity Distributors (RRFE) as part of its business planning process for the 2025-2029 Custom Incentive Rate-Setting Application.

The key objectives of this customer engagement were to:

1. Solicit customer feedback on key investment areas based on pacing and bill impact.

2. Assess overall social permission for the draft plan.

INNOVATIVE and Toronto Hydro developed a two-phased engagement approach to achieve these objectives. Following the customer engagement in Phase I, Toronto Hydro developed a draft plan to align with identified customer needs, preferences, and expectations. Afterwards, INNOVATIVE worked with Toronto Hydro to translate the draft plan into engagement materials that a typical customer could understand. INNOVATIVE developed a workbook survey and tested it through a series of focus groups and one-on-one interviews. The workbook was then made available to all customers. It mainly focused on obtaining customer feedback on key investment areas based on pacing and bill impact.

Each participating customer received a workbook with bill impacts that reflected the circumstances of their rate class. Five workbooks were created. Since the number of key accounts and large use customers within Toronto Hydro's customer base was lower than the other rate classes, responses from these two rate classes were aggregated for reporting purposes. The table below summarizes the field dates and the sample sizes of each rate class.

Rate Class	Field Dates	Sample Size (Unweighted n)
Residential	March 22nd – May 1st, 2023	n=32,187
GS<50 kW (Small Business)	March 23rd – May 1st, 2023	n=695
GS 50-999 kW (Commercial & Industrial)	April 3rd – May 22nd, 2023	n=264
GS 1,000-4,999 kW (Key Accounts)	April 3rd – June 2nd, 2023	n=52
Large Use		

Workbook Pages

Pages with a watermark in Appendices 09 to 12 are the original workbook pages. Please note that some of these pages include graphs and charts which are used to explain concepts to customers. They do not represent the survey data. By way of example, the original residential workbook pages can be found in Appendix 13 to provide context.

Introduction

Phase II 2025-2029 Rate Application Customer Engagement

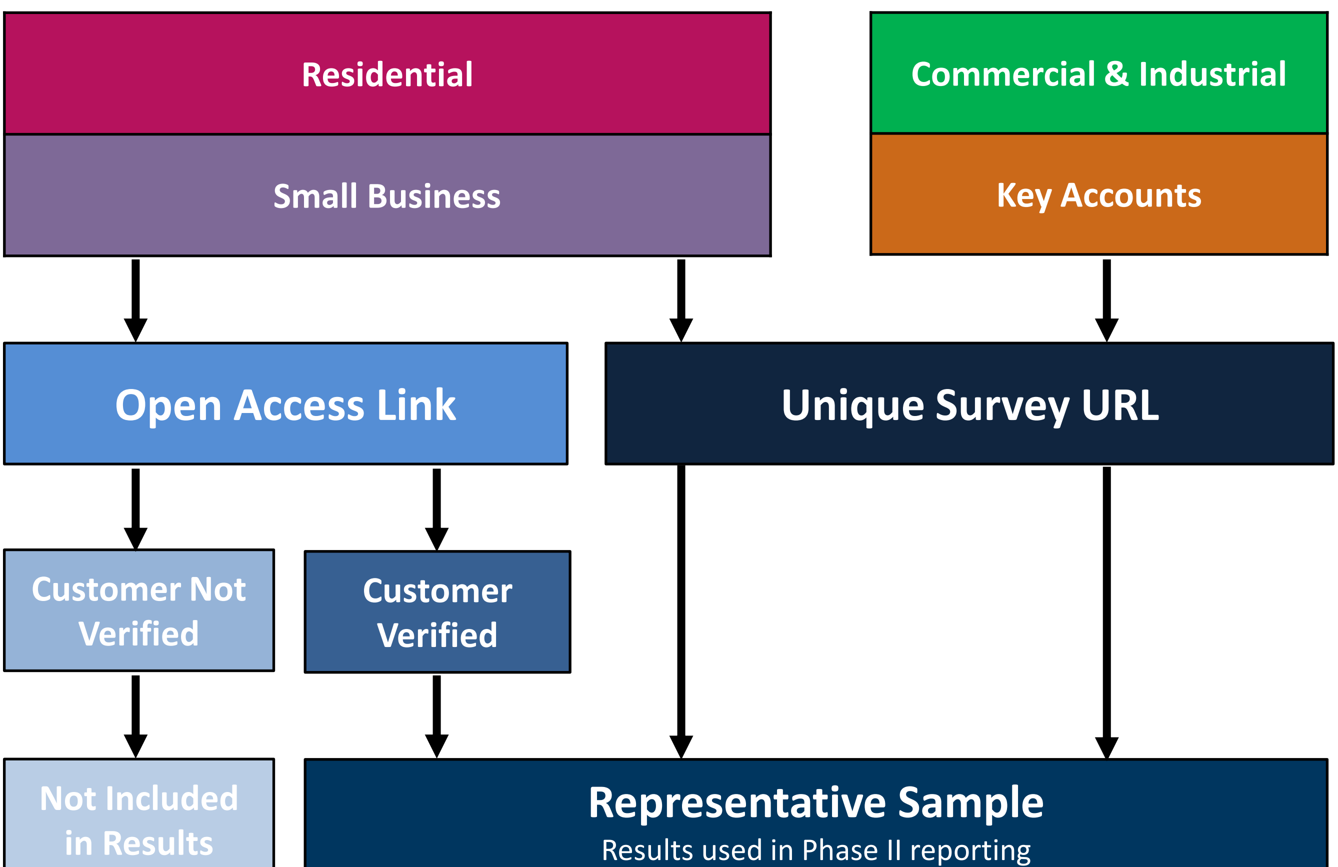
Customer Engagement

Customers with an email address on file received an email invitation. It included a **unique survey URL** that linked back to their annual consumption, region and rate class. INNOVATIVE administered all email invitations using a Toronto Hydro email address.

For residential and small business customers, an **open access link** was promoted through bill inserts, social and traditional media, as well as Toronto Hydro's website. This ensured all customers from these rate classes had the opportunity to participate in the survey. The open access link asked customers to enter their Toronto Hydro account number and the first three characters of the corresponding postal code (FSA) to verify their account information and direct them to the correct workbook version.

There are two main reasons why an open access link was only provided to the residential and small business customers. Firstly, these customers are a majority of the customer base. Secondly, based on our experience in engaging with electricity customers, it is more cost effective to invite C&I and key account customers through an email invite than providing an open access link to these customers.

The diagram below illustrates how residential and small business customers were verified in the open access link. It also illustrates how customers with an email address on file received an email invitation to enter the survey.



Sample Validation

Phase II 2025-2029 Rate Application Customer Engagement

Overall Coverage – Email Sample vs. Total Customer Accounts

64% of residential customers had an email address on file. 48% of small business customers had an email address on file. Both residential and small business customers were sent one survey invite (per account) regardless of whether they had more than one email address on file.

Rate Class	Total Accounts	Email Sample	Email Coverage (out of Total Accounts)	Unique Emails
Residential	802,645 records	510,227	**64%**	448,737
Small Business	80,538 records	38,819	**48%**	21,036
C&I	8,716 records	5,573	**64%**	2,841
Key Accounts	499 records	453	**91%**	311

Nearly all key account customers have an email contact on file. Toronto Hydro provided INNOVATIVE a list of the most up-to-date key account representative contact information. Based on this list, invites were sent to 311 unique key account customer emails.

Sample Validation

Phase II 2025-2029 Rate Application Customer Engagement

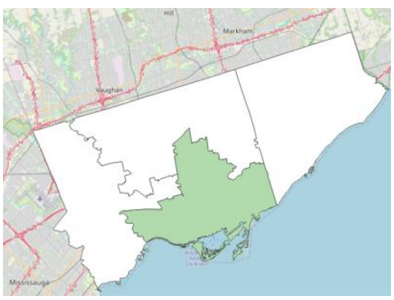
To ensure the residential and small business samples were representative of the customer base, attention was given to the distributions by (1) region and (2) consumption quartile between the full set of customer records and those with an email account on file.

(1) Regional Distribution by Rate Class

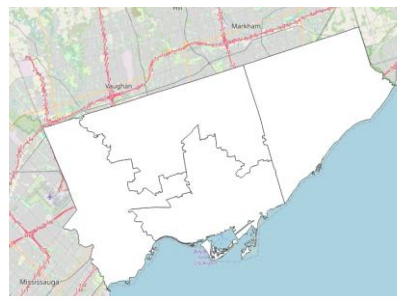
Using the first three characters of customer's postal codes (FSAs), the study grouped the customers into four unique regions within Toronto Hydro's service territory.

Across rate classes, the regional distribution between the full customer sample and those with an email address on file were within +/-4%. The exception was residential customers in Toronto/East York, who were +5% overrepresented among customers with an email address compared to the full set of customer records.

Residential



Small Business



Legend: Difference*
More than -10%
-10% to -5%
-4% to +4%
+5% to +10%
More than +10%

(2) Distribution of Consumption Quartile by Each Rate Class

Across consumption quartiles, the distribution of consumption between the full customer sample and those with an email address on file were within +/-4%. The exception was small business customers in the fourth quartile, who were +5% overrepresented among customers with an email address compared to the full set of customer records.

Quartiles	Total Accounts	Email Sample	Difference *	Total Accounts	Email Sample	Difference *
Rate Class	***Residential***			***Small Business***		
First	25%	28%	**+3%**	25%	24%	**-1%**
Second	25%	25%	**0%**	25%	22%	**-3%**
Third	25%	23%	**-2%**	25%	24%	**-1%**
Fourth	25%	24%	**-1%**	25%	30%	**+5%**

Survey Sample

To ensure the residential and small business samples were representative of the customer base, the samples were weighted proportionately by consumption quartiles and region. As such, no one area or consumption quartile was over or underrepresented in the survey samples.

For details of the sampling methodology of each rate class, please refer to the Survey Design & Methodology sections of Appendices 09 to 12.

Note: * The difference is the distribution in the email sample *minus* the distribution among total customer accounts.

Seven Key Investment Areas

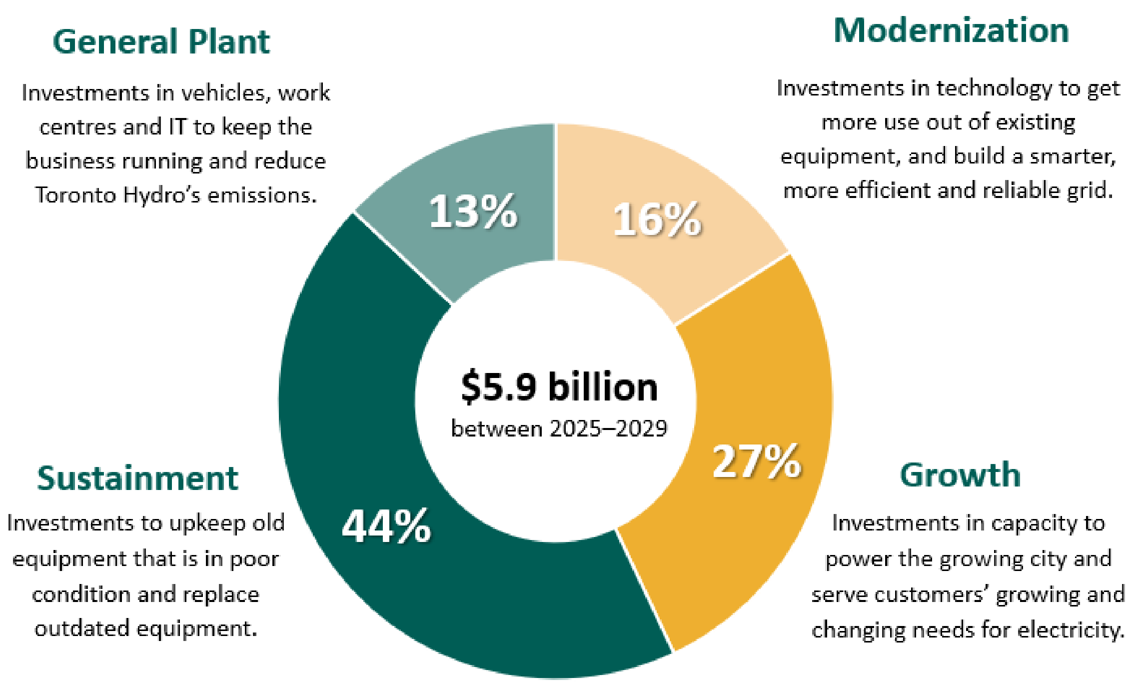
Phase II 2025-2029 Rate Application Customer Engagement

Workbook Design

The workbook first explained to customers what Toronto Hydro does and summarized some key planning considerations that Toronto Hydro's draft plan addresses. The workbook then presented customers with the impact of the draft plan on 2025-2029 rates. Finally, the workbook asked customers for input on seven key investment areas. Once customers were finished giving feedback – they were provided an opportunity to review and change their responses to find the right balance between price and other outcomes.

Core Investment Categories

Toronto Hydro's 2025–2029 draft plan was made up of four spending categories: *Modernization, Growth, Sustainment,* and *General Plant*.



Within these four categories, customers were asked to make choices on trade-offs consisting of seven key investment areas:

		Sustainment:	*General Plant*:
1. Modernization	**2. Growth**	**3. System Reliability**	**6. Running the Business**
		4. Grid Stewardship	**7. Decarbonization**
		5. Standardization	

Seven Key Investment Areas
Phase II 2025-2029 Rate Application Customer Engagement

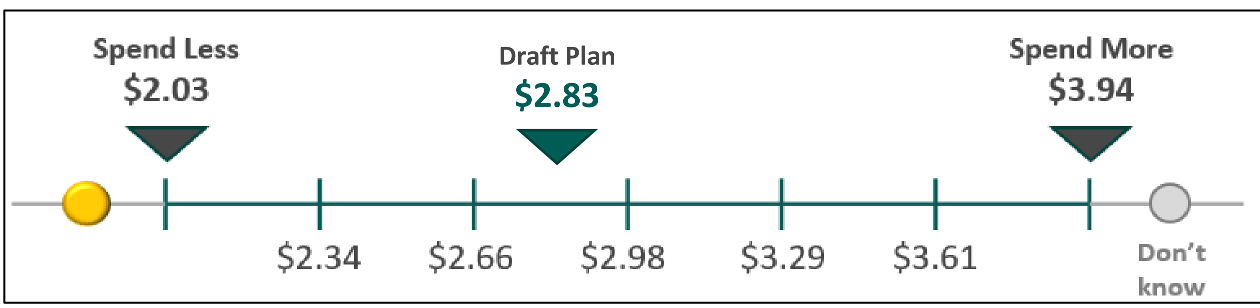
Data Collection: Understanding the Sliding Scale

For each of the seven key investment areas, after providing a detailed explanation of potential investments and expected outcomes, the survey provided customers with a **sliding scale** that gave customers flexibility to dial the draft plan up or down to indicate their **preference** between price and other outcomes. INNOVATIVE chose to use a dollar amount for customers to indicate their preference.

An image of the sliding scale from the **modernization** investment area (**residential** customers) is shown below as an example. This example is used in the next few pages for illustration purposes.

How much do you think Toronto Hydro should spend on its modernization plan?

Sliding scale:



Data Presentation Overview

As will be further discussed in the next section, INNOVATIVE used **two** analyses to present the survey responses.

1. Showing the **range of customer views**.

2. Providing a **general direction of customer preference**.

These analyses were done for each of the seven key investment areas.

Seven Key Investment Areas

Phase II 2025-2029 Rate Application Customer Engagement

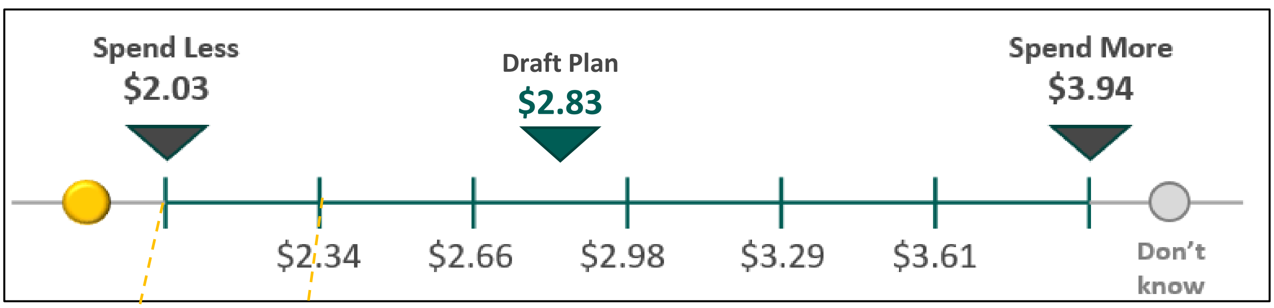
The Range of Customer Views

This analysis uses a **histogram** to show the distribution of customer preferences along the sliding scale and around the draft plan.

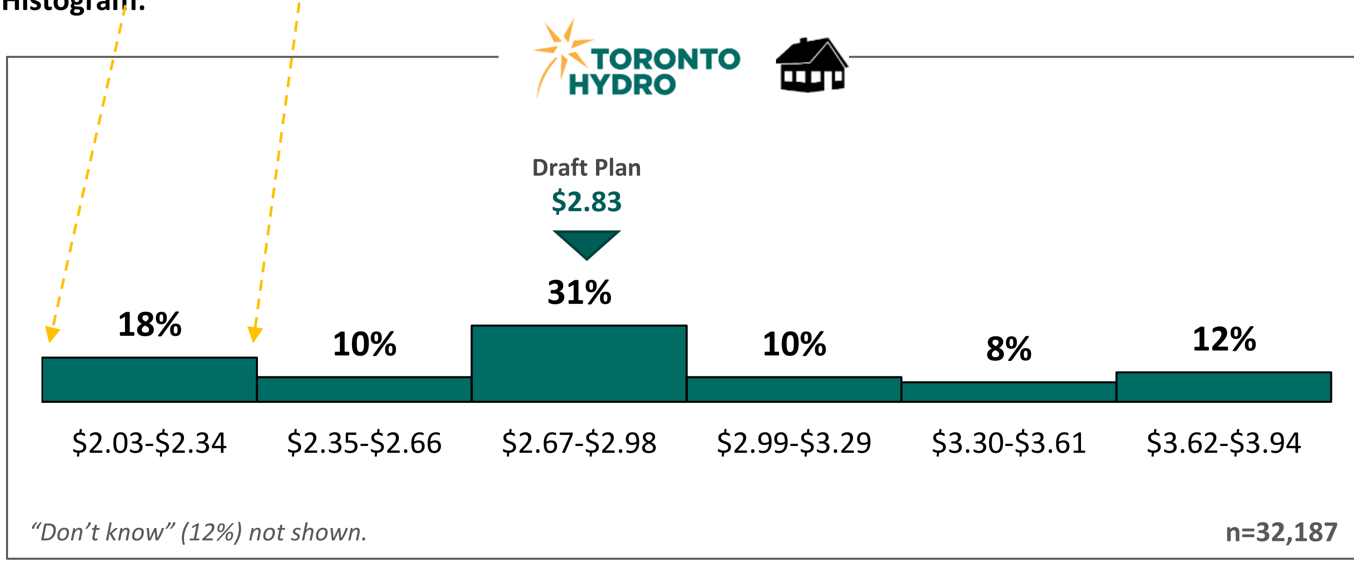
For this analysis, the sliding scale was divided into 6 equal divisions. Responses were then grouped into each division and presented in a bar.

How much do you think Toronto Hydro should spend on its modernization plan?

Sliding scale:



Histogram:



Seven Key Investment Areas

Phase II 2025-2029 Rate Application Customer Engagement

General Direction of Customer Preference

This analysis allowed Toronto Hydro to understand the direction of customer preferences on spending in order to inform decisions about finalizing the draft plan.

The sliding scale was divided into 100 equal divisions. Customers' responses were categorized as follows:

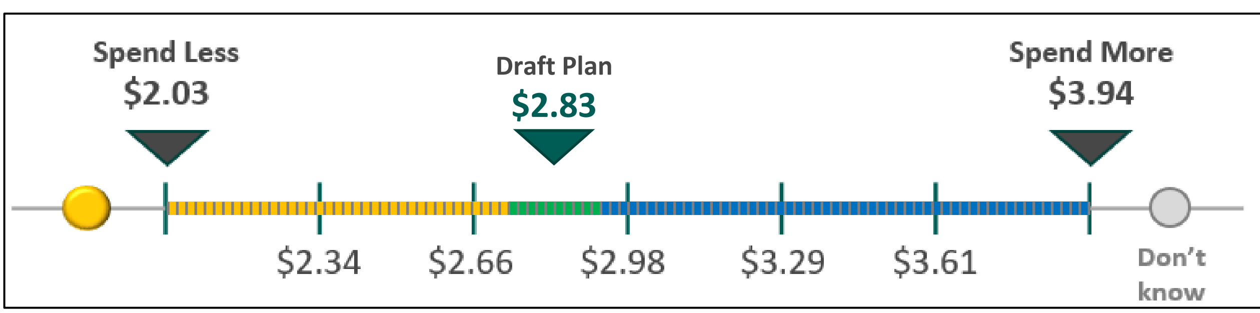
- **On Plan**: The study considered On Plan as responses that are within 5 divisions above (which corresponds to 5 percentage points above) or 5 divisions below (which corresponds to 5 percentage points below) the draft plan. For illustrative purposes, to put this in dollar terms, among residential customers, if the draft plan amount was $2.83, then selections between $2.73 and $2.93 (inclusive) were considered On Plan on the **modernization** investment area.

- **Below Plan**: The study considered Below Plan as responses that are more than 5 divisions (or percentage points) below the draft plan. This corresponds to values between $2.72 and $2.03 (inclusive) in the example below.

- **Above Plan**: The study considered Above Plan as responses that are more than 5 divisions (or percentage points) above the draft plan. This corresponds to values between $2.94 and $3.94 (inclusive) in the example below.

See the three colours on the sliding scale below for illustration.

How much do you think Toronto Hydro should spend on its modernization plan?



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Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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APPENDIX 09

Residential
Workbook Report

November 2, 2023

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PHASE II

Residential Customers

Online Workbook Report

Section 9.1

Online Survey

Survey Design & Methodology

Toronto Hydro Electric-System Ltd. (THESL) engaged Innovative Research Group (INNOVATIVE) to design, execute and document the results of THESL's customer engagement process as part of the development of its 2025–2029 business plan.

Field Dates

All Toronto Hydro residential customers with an email address on Toronto Hydro's file received the **Residential Online Workbook**. Customers had the opportunity to complete the survey between **March 22nd and May 1st, 2023**.

Incentives

Customers who completed the survey between March 23rd and May 1st were invited to enter a draw to win free electricity for a year, which was provided as a one-time, lump-sum credit valued at $1,500 to be applied to the winning customer's account. The incentive as it appeared to customers in the workbook is on pg.8 of this appendix.

Residential Online Survey Completes

A total of **32,187** (unweighted) Toronto Hydro residential customers completed the online survey. A total of 309 (unweighted) customers entered the survey through the open access link. All other remaining completes (31,878 (unweighted)) entered it via the unique URL.

Customers could complete the survey either via a unique URL sent to their emails or an open access link promoted by THESL. Customers with email addresses on file received an email invitation. It included a unique survey URL that linked back to their annual consumption, region and rate class.

Customers without email addresses on file received a paper bill insert that invited them to participate via an open access link. The open access link asked customers to enter their Toronto Hydro account number and the first three characters of the corresponding postal code. Once their account information was verified, their answers were linked back to their annual consumption, region and rate class.

Each customer was only permitted to complete the survey once, either through the unique URL or the open access link.

Online Survey
Survey Design & Methodology

Sample Weighting

The residential online survey sample was weighted proportionately by consumption quartile and region in order to be representative of the broader Toronto Hydro service territory.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	1,078 (1,346)	1,395 (1,422)	1,646 (1,621)	1,501 (1,608)	5,620 (5,997)
North York	1,646 (1,756)	1,757 (1,716)	1,632 (1,653)	1,641 (1,832)	6,676 (6,956)
Scarborough	379 (454)	1,581 (1,467)	2,193 (2,018)	1,846 (1,739)	5,999 (5,678)
Toronto/East York	4,187 (4,491)	3,921 (3,441)	3,125 (2,755)	2,659 (2,869)	13,892 (13,556)
Total	7,290 (8,047)	8,654 (8,047)	8,596 (8,047)	7,647 (8,047)	32,187 (32,187)

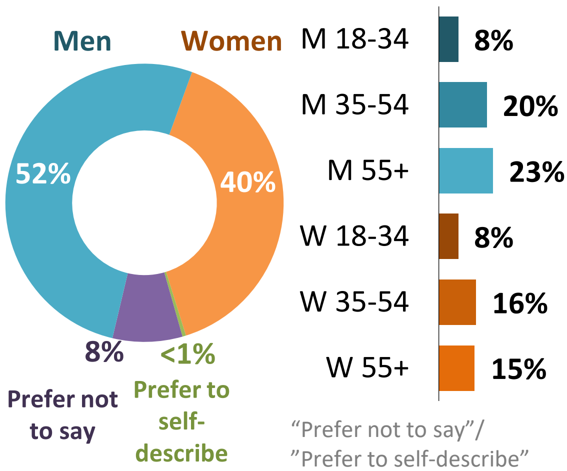
Graphs and tables may not always total 100% due to rounding values rather than any error in data.
Sums are added before rounding numbers.

Online Survey

Demographic breakdown

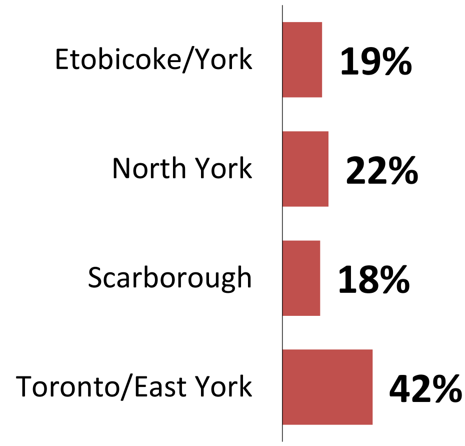
Residential

Gender & Age

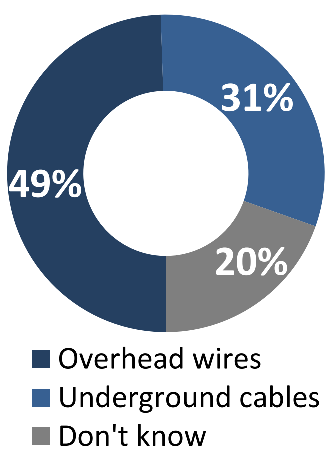


"Prefer not to say"/ "Prefer to self-describe" (10%) not shown.

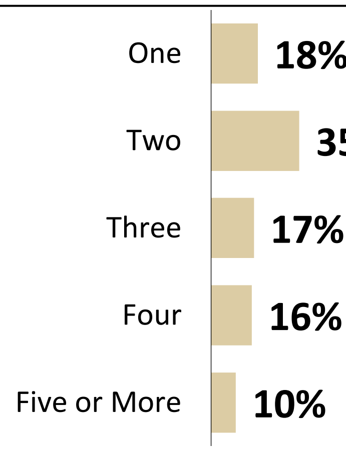
Region



Overhead Wires vs Underground Cables

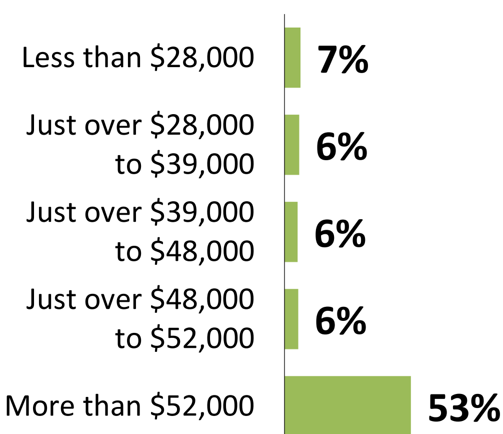


Household Size



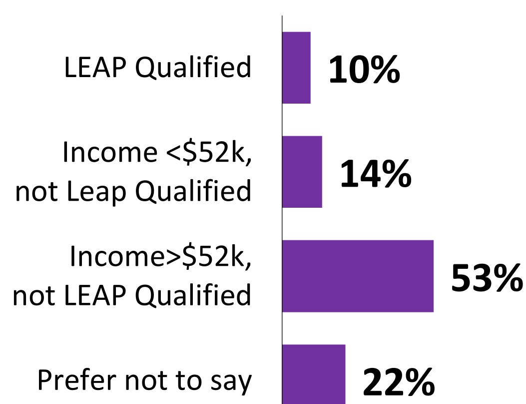
"Prefer not to say" (4%) not shown.

After Tax Household Income



"Prefer not to say" (22%) not shown.

LEAP Qualification*



*Calculation based on household size and after-tax income.

Online Survey
Environmental Controls

Residential

To what extent do you agree or disagree with the following statements?

Q The cost of my electricity bill has a major impact on my household finances and requires that I do without some other important priorities.

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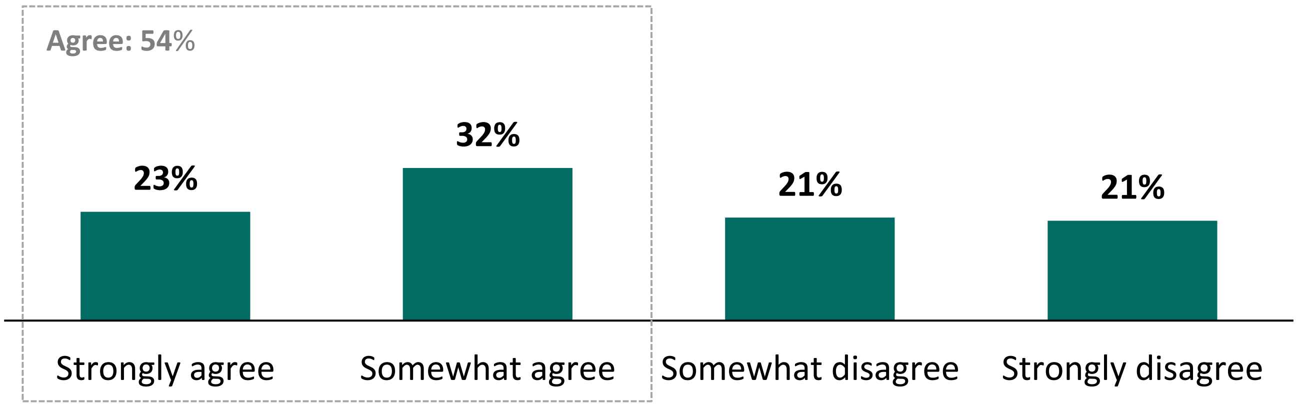
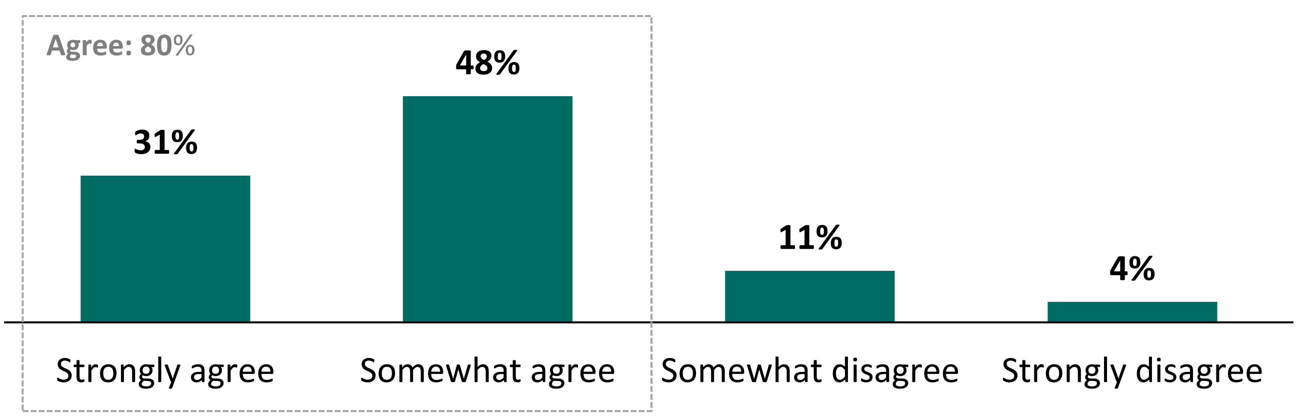


"Don't know/no opinion" (4%) not shown.

n=32,187

Q Customers are well-served by the electricity system in Ontario.

TORONTO HYDRO

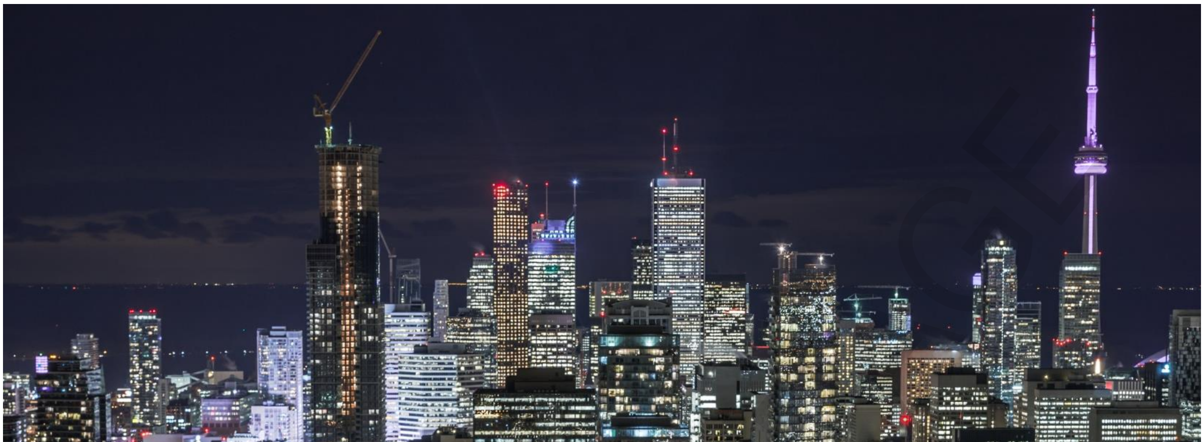


"Don't know/no opinion" (5%) not shown.

n=32,187

Welcome to Toronto Hydro's customer feedback survey!

Toronto Hydro needs your input to find the right balance between the services you receive and the price you pay.



Land Acknowledgement: Toronto Hydro's grid is located on the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples.

The purpose of this survey is to get your feedback on the draft 2025–2029 business plan. Your feedback will help Toronto Hydro align this plan with what you need and want.

1. Your electricity rates pay for this plan, so your views must be considered.
2. You don't need to be an electricity expert to participate. The survey is focused on basic choices and provides the background information you need to answer the questions.
3. Recognizing that people absorb information in different ways, Toronto Hydro and its research partner have designed this survey to include diagrams, charts, images and videos to help explain Toronto Hydro's draft plan and what it means for you. If you prefer to skip the videos, the content is also explained in the body of the survey.
4. Depending on how much feedback you wish to provide and the number of videos watched, this survey should take approximately **20-30 minutes** to complete. If you need to pause and return later to finish the survey, your completed answers will be saved.
5. Some of the survey content may not display correctly on a mobile browser. It is strongly recommended that you complete this workbook on a desktop or laptop computer.

Those who complete the survey will be invited to enter a draw to win one of 10 "*free electricity for a year*" prizes!

All individual responses will be kept confidential.
Innovative Research Group (www.innovativeresearch.ca), an independent research company, has been hired by Toronto Hydro to gather your feedback, while protecting your confidentiality. Your individual answers will not be shared with Toronto Hydro in any identifiable way.

INNOVATIVE RESEARCH GROUP

WORKBOOK

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Rate Application

Residential

What is this customer engagement about?

The goal of this engagement is to share Toronto Hydro's draft five-year business plan for the future of the city's electrical grid and collect your feedback. This will help Toronto Hydro align its plans with your needs and preferences.

Click on the video below to learn about Toronto Hydro's customer engagement.

Every five years, Toronto Hydro is required to submit a plan for its proposed prices (rates) and spending to the Ontario Energy Board (OEB) for approval.

- **In 2021 and 2022, thousands of its customers told Toronto Hydro about what they need and want** to help Toronto Hydro prepare the draft 2025–2029 business plan.
- **Toronto Hydro is now looking for your input on this draft business plan** to align its investments and spending decisions with what matters to you as its customers.
- **Later this year, Toronto Hydro will present its updated business plan to the independent regulator,** the OEB. Toronto Hydro is accountable to the OEB for considering your feedback.

How will this customer engagement work?

1. The workbook explains what Toronto Hydro does and summarizes the key planning considerations that Toronto Hydro's draft plan needs to address.
2. The workbook explains how much of your electricity bill goes to Toronto Hydro, how that money is spent, and the impact of the draft plan on your 2025–2029 prices.
3. The workbook asks for your input on seven key choices that will affect the services you receive and the price you pay from 2025–2029.

Once you have finished giving feedback on the key choices, **you will have an opportunity to review and change your responses** until you feel you have found the right balance.

Want to know more about Toronto Hydro's customer engagement process? Click here.

WORKBOOK PAGE

How will your feedback impact Toronto Hydro's plan and prices?

Toronto Hydro has a five-step approach to customer feedback.

✓ 1. Identify Customer Needs, Preferences, and Priorities

In 2022, Toronto Hydro asked many types of customers from across the city about their needs and priorities for electricity distribution service.

✓ 2. Use Customer Feedback to Guide Development of Draft Plan

Toronto Hydro planners were given summaries of the key findings from the initial customer engagement to consider as they began building their plans.

We are here

3. Collect Customer Feedback on the Draft Plan

Toronto Hydro is returning to customers to get feedback on the draft plan and ask customers how the draft plan could better meet their needs and preferences.

4. Use Customer Feedback to Finalize the Plan

Toronto Hydro will re-examine and make appropriate changes to the plan based on the feedback provided by customers in this engagement.

5. Submit the Plan to the Ontario Energy Board (OEB)

Toronto Hydro will file the plan with the OEB along with a report summarizing the results of this engagement. The OEB, consumer advocates and other interested groups will examine the plan in an open and transparent public process known as a rate application.

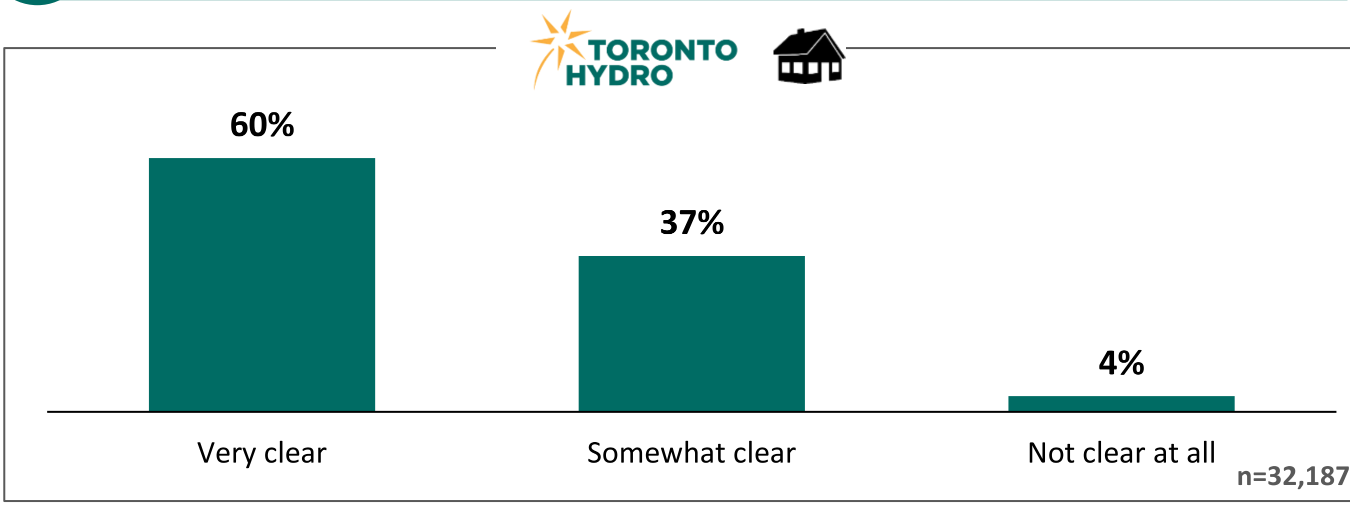
WORKBOOK PAGE

Online Workbook

Understanding the Purpose of the Customer Engagement

Residential

Q Do you feel that the purpose of Toronto Hydro's customer engagement is clear?



	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Very clear	60%	58%	59%	61%
Somewhat clear	36%	38%	38%	36%
Not clear at all	4%	4%	4%	4%

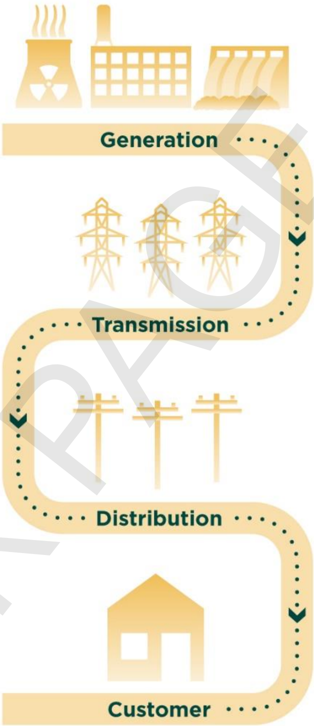
	LEAP Qualification			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income >$52k, not LEAP Qualified	Prefer not to say
Very clear	59%	58%	64%	51%
Somewhat clear	37%	38%	34%	43%
Not clear at all	4%	4%	3%	5%

	Consumption Quartiles			
	First	Second	Third	Fourth
Very clear	60%	59%	60%	59%
Somewhat clear	37%	37%	36%	36%
Not clear at all	3%	3%	4%	4%

Electricity 101

Toronto Hydro's role in Ontario's electricity system

Ontario's electricity system is made up of three parts: **generation**, **transmission** and **distribution**.



Generation

How electricity is made

About half of the electricity used in Ontario comes from nuclear power. The rest comes from a mix of hydroelectric, natural gas, wind and solar sources. Ontario Power Generation, a government-owned company, generates almost half of Ontario's electricity. The other half comes from other generators contracted by the grid operator.

Transmission

How electricity travels across Ontario

Once electricity is made, it must be sent to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. Ontario has approximately 30,000 kilometers of transmission lines, mostly owned and operated by Hydro One.

Distribution

How electricity is delivered to you

Toronto Hydro <u>is</u> responsible for the last step of the journey: distributing electricity locally to end-use customers.

- Toronto Hydro does <u>not</u> generate or transmit electricity — it owns and operates the local electricity system made up of approximately 183,620 poles, 61,300 distribution transformers, 17,060 primary switches, 15,393 kilometers of overhead wires and 13,765 kilometers of underground cables.
- Toronto Hydro is wholly owned by the City of Toronto, but it does <u>not</u> receive taxpayer money — it is entirely funded by the distribution rates that you pay on your electricity bill.
- Toronto Hydro provides power to roughly 2.8 million people across the city of Toronto.

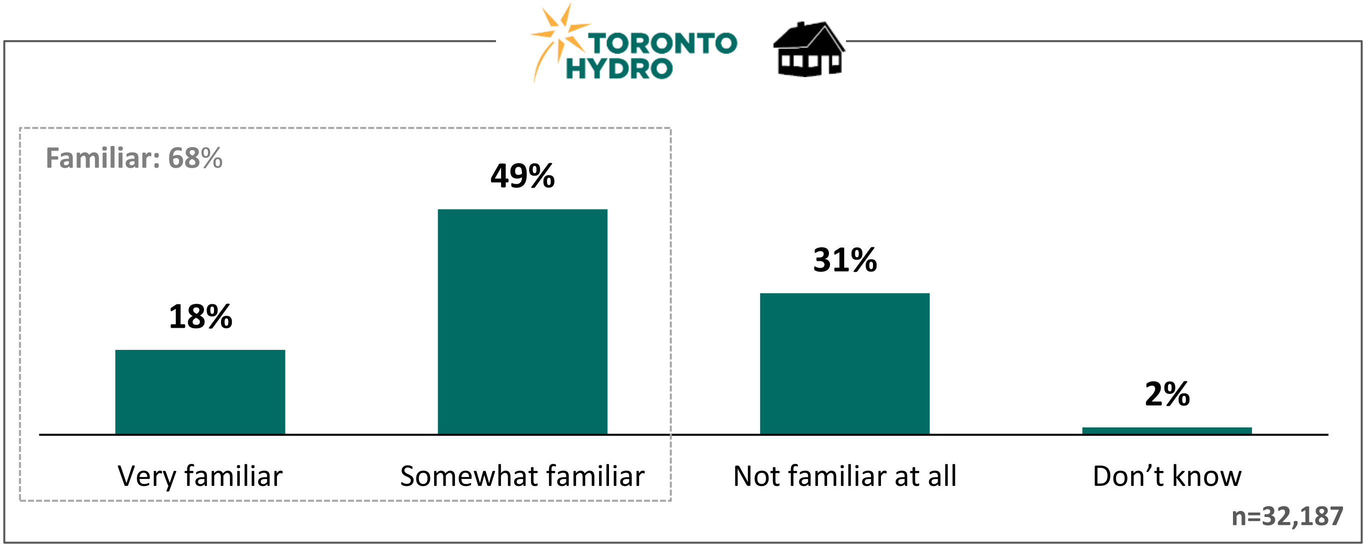
WORKBOOK PAGE

Online Workbook

Familiarity with Ontario's Electricity System

Residential

Q Before this engagement, how familiar were you with the various parts of the electricity system, how they work together and for which services Toronto Hydro is responsible?



	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Very familiar	20%	19%	21%	16%
Somewhat familiar	48%	50%	51%	48%
Not familiar at all	30%	29%	26%	34%
Don't know	2%	2%	2%	1%
Familiar (Very + Somewhat)	**69%**	**69%**	**72%**	**65%**

Online Workbook

Familiarity with Ontario's Electricity System

Residential

Q Before this engagement, how familiar were you with the various parts of the electricity system, how they work together and for which services Toronto Hydro is responsible?

	LEAP Qualification			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Very familiar	20%	17%	19%	17%
Somewhat familiar	46%	49%	49%	49%
Not familiar at all	30%	31%	30%	32%
Don't know	4%	2%	1%	2%
Familiar (Very + Somewhat)	**66%**	**67%**	**69%**	**66%**

	Consumption Quartiles			
	First	Second	Third	Fourth
Very familiar	15%	17%	20%	22%
Somewhat familiar	47%	50%	50%	49%
Not familiar at all	37%	31%	28%	27%
Don't know	2%	2%	1%	1%
Familiar (Very + Somewhat)	**61%**	**67%**	**71%**	**71%**

Toronto Hydro's Draft Plan

Planning Considerations

In preparing its plan, Toronto Hydro must consider many existing and emerging challenges of delivering safe, reliable and clean electricity at a reasonable price.

To learn more about what Toronto Hydro must consider in preparing its draft plan, click on the topics below.

Key challenges that Toronto Hydro's 2025–2029 draft plan addresses:

Keeping prices reasonable

- Many customers are concerned about the rising cost of living.
- Toronto Hydro must find the right balance between the investment needs of the local grid and the financial needs of its customers.

Responding to rising costs

- Like many companies, Toronto Hydro faces rising costs in purchasing equipment for the grid and doing construction work in the city.
- For example, from 2021 to 2022, the cost of buying electrical equipment increased by 9.9% while the cost of non-residential construction in the city of Toronto rose by 15.6%.

Powering a growing urban city

- Toronto is not just the largest city in Canada and an engine of the Canadian economy, it is also one of the fastest growing cities in North America.
- As the city continues to grow, the grid needs to be ready to power new condo towers, residential communities and businesses.

Fixing and replacing equipment in poor condition

- Much of Toronto Hydro's grid was installed in the 1950s and 1960s and needs to be replaced or upgraded.
- To keep the grid safe and reliable now and in the future, Toronto Hydro monitors the condition of its grid and uses this information to upgrade the equipment most at risk.

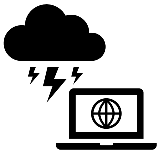
Reducing emissions from its own operations

- Toronto Hydro is committed to decarbonizing the company's footprint by 2040. To meet this goal, it must invest in reducing emissions from its vehicles and work centres.
- Toronto Hydro is expected to reduce its emissions by switching from oil and natural gas to clean electricity for powering its own operations.

Keeping up with the way customers use electricity

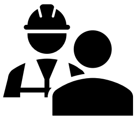
- Customers are using more electricity for their day-to-day energy needs, such as for transportation and electric heat pumps for home heating. They are also choosing new technologies such as solar panels and battery storage to manage their electricity usage and sell electricity to the local grid.
- To ensure customers can connect new technologies to the grid safely and reliably, Toronto Hydro needs to upgrade its equipment and modernize its systems.

WORKBOOK PAGE



Responding to extreme weather and cyber security attacks

- Extreme weather such as high heat, high winds, flooding and ice storms is increasingly straining and damaging to electricity grids.
- Cybercrime is on the rise across Canada. For example, Toronto Hydro is the target of around one million attempted cyber attacks each year, with attempts going over one million in 2022 (successfully deflected).
- Toronto Hydro needs to make the grid more resilient against extreme weather and cyber security attacks that could compromise reliability and put customers at risk.



Protecting public and employee safety

- Toronto Hydro and its customers have a strong safety record, but electricity is dangerous and safety cannot be taken for granted.
- As homes and businesses add new technologies that increase the amount of electricity flowing around us, Toronto Hydro must ensure that the grid remains safe for its employees and the public.

WORKBOOK PAGE

How much of my electricity bill goes to Toronto Hydro?

Every item on your bill is required by provincial regulation.

- Toronto Hydro collects payment for the entire electricity system, but only keeps the distribution portion of the "**Delivery**" charge. This charge pays for both Toronto Hydro's **distribution** system and Hydro One's **transmission** system, as well as line losses (power that is lost when electricity travels across the wires).
- **About 30% of the electricity bill goes to Toronto Hydro** to pay for the local distribution grid. The **remaining 70%** of the bill goes to generation companies, transmission companies, the federal and provincial governments, and regulatory agencies.

Typical Residential Bill

Sample Toronto Hydro Monthly Bill
(based on consumption of 750 kWh as of Jan. 1, 2023)

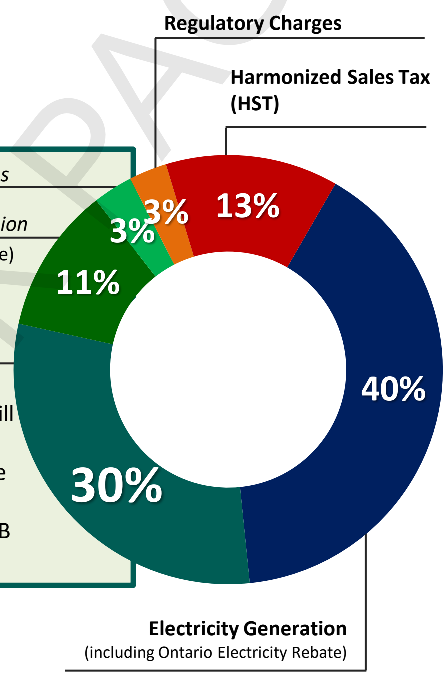
Account Number:
0000000000

Meter Number:
00000000

Your Electricity Charges	
Electricity	
On-Peak (highest price) @ 15.1 c/kWh	20.39
Mid-Peak (mid price) @ 10.2 c/kWh	13.77
Off-Peak (lowest price) @ 7.4 c/kWh	35.52
Delivery	60.05
Regulatory Charges	4.27
Total Electricity Charges	**$134.00**
HST	17.42
Ontario Electricity Rebate	(-$15.68)
Total Amount	**$135.74**

Delivery: *Line Losses*
$4.75
Delivery: *Transmission*
(varies based on usage)
$14.60

Delivery:
Distribution
Toronto Hydro's part of the total bill is **$40.70**. This charge is the same for all residential customers per OEB requirements.



Note: For time of use Off-/Mid-/On-peak split 64%/18%/18% according to the OEB rate model.
The Sample Bill is based on the OEB rates effective January 1, 2023.

Who holds Toronto Hydro accountable?

ONTARIO ENERGY BOARD

The **Ontario Energy Board (OEB)** is the public interest regulator responsible for setting electricity distribution rates (prices) and for protecting customers in Ontario.

The OEB holds Toronto Hydro accountable for:

- How it spends your money in current and future plans.
- Reporting on key outcomes (reliability) through an annual scorecard.
- Finding savings and efficiencies to absorb rising costs.

Want to know more about what Toronto Hydro has done to become more efficient? Click here.

WORKBOOK PAGE

What has Toronto Hydro done to become more efficient?

- Reduced the total number of facilities and gave back roughly $158 million to customers, resulting in a total credit of $104.66 on the average residential customer's bill from 2016 to 2021.
- Delivered approximately $10 million in reduced or avoided costs in this current 2020–2024 period by replacing outdated information systems with consolidated programs, enabling automation and lowering maintenance costs.
- Implemented new technology to automate crew scheduling, enabling Toronto Hydro to maximize crew working hours and respond to power outages quicker.

WORKBOOK PAGE

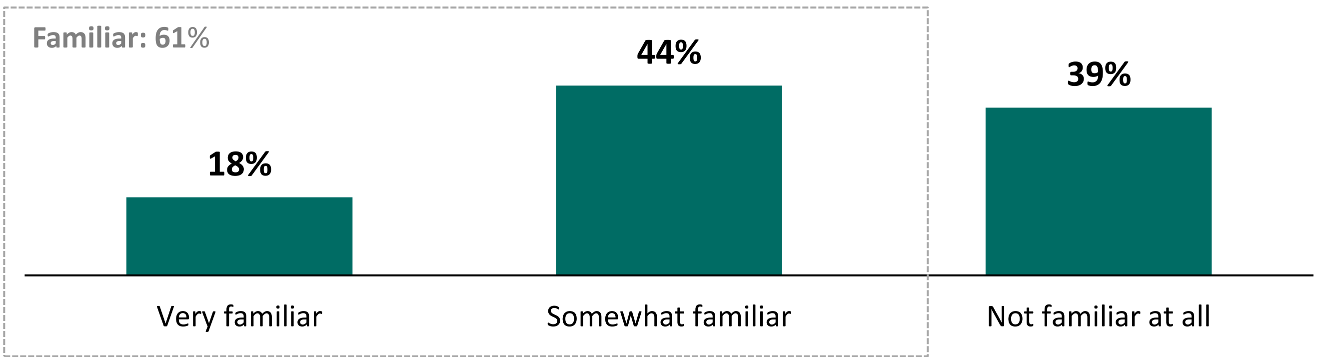
Online Workbook

Residential

Familiarity with the Percentage of Bill Remitted to Toronto Hydro

Q Before this customer engagement, how familiar were you with the amount of your electricity bill that went to Toronto Hydro?

TORONTO HYDRO



n=32,187

	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Very familiar	19%	20%	22%	15%
Somewhat familiar	44%	46%	45%	41%
Not familiar at all	37%	34%	33%	44%
Familiar (Very + Somewhat)	**63%**	**66%**	**67%**	**56%**

	LEAP Qualification			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Very familiar	24%	20%	17%	16%
Somewhat familiar	44%	45%	42%	46%
Not familiar at all	32%	35%	41%	38%
Familiar (Very + Somewhat)	**68%**	**65%**	**59%**	**62%**

	Consumption Quartiles			
	First	Second	Third	Fourth
Very familiar	17%	18%	18%	19%
Somewhat familiar	41%	43%	45%	45%
Not familiar at all	42%	39%	37%	36%
Familiar (Very + Somewhat)	**58%**	**61%**	**63%**	**64%**

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Rate Application

Residential

How does Toronto Hydro propose to spend the money?

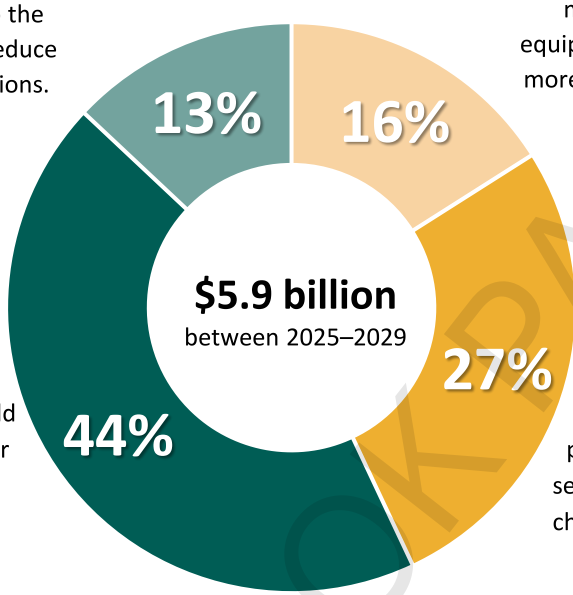
Toronto Hydro's five-year 2025–2029 draft plan is made up of four spending categories.

General Plant

Investments in vehicles, work centres and IT to keep the business running and reduce Toronto Hydro's emissions.

Modernization

Investments in technology to get more use out of existing equipment, and build a smarter, more efficient and reliable grid.



Sustainment

Investments to upkeep old equipment that is in poor condition and replace outdated equipment.

Growth

Investments in capacity to power the growing city and serve customers' growing and changing needs for electricity.

Want to know more about Toronto Hydro's current and future budgets? Click here.

How much will Toronto Hydro's draft plan cost me?

At the end of the five-year plan (2029), the typical residential customer would see the distribution portion of their electricity bill increase by **$17.18**: from an estimated rate (price) of $42.36 in 2024 to a proposed rate (price) of **$59.54 by 2029**.

				Toronto Hydro's Portion	
	Year	Avg. Monthly Bill	Toronto Hydro Portion	Annual Increase (%)	Annual Increase ($)
	2023	$135.74	$40.70	n/a	n/a
	2024	$135.11	$42.36	4%	$1.66
Rate Period	**2025**	$139.55	$46.76	10%	$4.40
Rate Period	**2026**	$142.10	$49.28	5%	$2.52
Rate Period	**2027**	$145.26	$52.39	6%	$3.11
Rate Period	**2028**	$150.04	$57.11	9%	$4.72
Rate Period	**2029**	$152.51	$59.54	4%	$2.43
	5-yr impact		**$17.18**	**41%**	**$17.18**

Note: These estimated rate increases are preliminary and are subject to change based on customer feedback and other factors. A typical residential customer is assumed to use 750 kWh per month and enrolled under Time-of-use Regulated Price Plan. Bill projections assume that other aspects of the electricity bill that are outside of Toronto Hydro's control (commodity, transmission, government, regulatory fees) remain constant.

WORKBOOK PAGE

Toronto Hydro Background

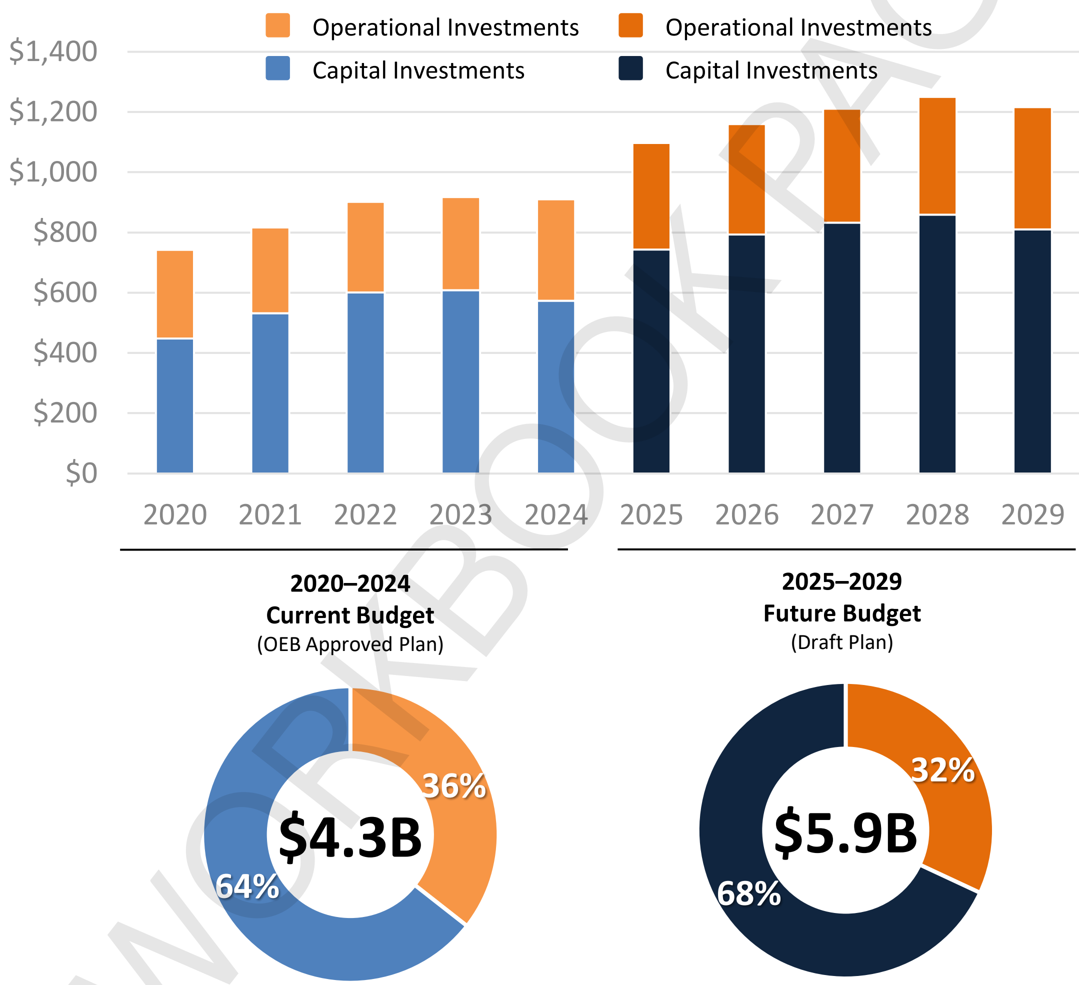
How much does it cost to run the local grid?

To run the local grid and serve customers, Toronto Hydro manages two budgets:

1. A **capital investment** budget which pays for the cost of buying and constructing physical infrastructure such as poles, wires, transformers, facilities, trucks and computers.

2. An **operational investment** budget which pays for maintenance and operation of the equipment, as well as the staff needed to manage the grid and serve customers daily.

Current and Future Budgets per year ($ millions)



The current five-year budget of **$4.3 billion** is based on the 2020–2024 plan approved by the OEB in a previous rate application. As mentioned earlier, this amount is funded by your 2020–2024 distribution rates.

The future five-year budget of **$5.9 billion** is based on the 2025–2029 draft plan presented in this customer feedback survey. The final budget for this next rate period will be adjusted to reflect customer feedback collected through this engagement and will be subject to extensive OEB review before rates are set for 2025–2029.

WORKBOOK PAGE

How does the survey work?

The next sections are about 7 key choices that Toronto Hydro needs to make to finalize its plan.

Each section provides some key background information. We encourage you to take the time to learn about your local electricity grid and where your money is going.

We also understand that life is busy. Many people find this information interesting — but if you would prefer to skip over the videos or the background information, you can jump right to the key choices.

How do I make choices?

Each choice has a summary of three options that Toronto Hydro considered:

- **Spend Less:** A minimum spending option that keeps prices lower and meets the basic performance requirements but may entail some trade-offs on key outcomes, such as reliability.
- **Toronto Hydro's Draft Plan:** An option currently in the draft plan which makes additional progress toward key outcomes but delays some important work.
- **Spend More:** A faster paced spending option that makes additional progress towards better outcomes while recognizing practical limits due to resources and construction issues.

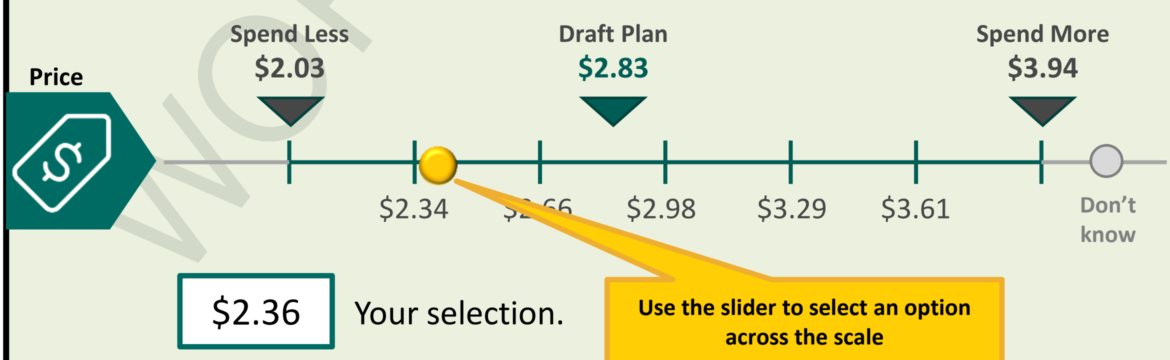
In each option, there is a sliding scale that enables you to dial the draft plan up or down. While Toronto Hydro's technical experts can tell us the maximum and minimum amounts we can practically spend, the balance of how much Toronto Hydro spends on the spectrum is up to customers like you.

At the end of the survey, you will get a summary of your choices and you will have the opportunity to change your answers to find the right balance for you.

SAMPLE OPTIONALITY SLIDER QUESTION (data not recorded)

How much do you think Toronto Hydro should spend on this part of its draft plan?

Please use the slider below to make a selection.



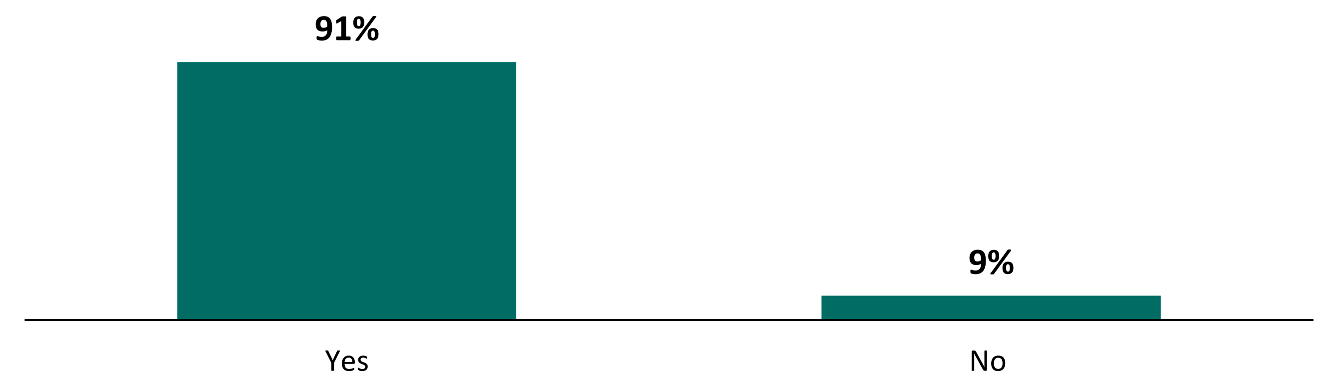
WORKBOOK PAGE

Online Workbook

Understanding the Slider

Residential

Q Is it clear that you can move the slider to any amount you feel best reflects your personal view of the best balance between lower costs and faster improvements?



	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Yes	91%	90%	90%	93%
No	9%	10%	10%	7%

	LEAP Qualification			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income >$52k, not LEAP Qualified	Prefer not to say
Yes	86%	91%	94%	88%
No	14%	9%	6%	12%

	Consumption Quartiles			
	First	Second	Third	Fourth
Yes	90%	91%	92%	92%
No	10%	9%	8%	8%

Draft Modernization Plan

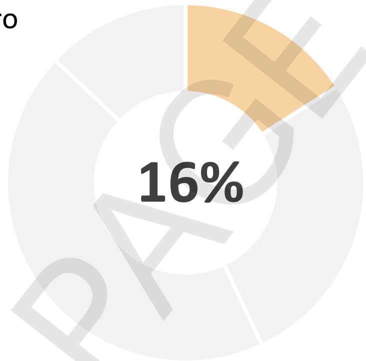
Build a Smarter, More Efficient and Resilient Grid

What is this section about?

- This section explains how technology is changing the way customers use electricity and how Toronto Hydro operates and manages the grid to make it smarter, more efficient and resilient for customers.

  Want to learn more about how grid modernization benefits you? Click on the topics below.

- **Toronto Hydro's draft modernization plan enables:**
  - Faster and cheaper power restoration
  - More efficient use of existing equipment
  - Customer choice to adopt new technologies
  - Resilience against weather and cyber attacks



- This spending category makes up **16% of the draft plan** and would add **$2.83** on the average residential customer's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft modernization plan**.*

WORKBOOK PAGE

Modernization Plan

Building a Smarter, more Efficient and Reliable Grid

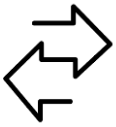
Toronto Hydro's Modernization Plan has four main objectives:

Faster and cheaper power restoration

- Through automation, the smart grid can achieve self-healing capabilities. This means that the distribution grid on your street will be able to locate outages and restore power automatically.
- The smart grid enables Toronto Hydro to reduce the number and length of outages customers experience. It also reduces manual costs (trucks and crews) of responding to power outage events.

More efficient use of existing equipment

- As customers use more electricity, some equipment will reach its limits. Sensors and meters detect when and where these limits are approaching, enabling Toronto Hydro to make better decisions.
- The smart grid enables Toronto Hydro to get more use out of the existing equipment so that it can serve a greater customer need for electricity without having to build as much new infrastructure.



Customer choice to adopt new technologies

- Sensors, switches and software enable Toronto Hydro to monitor and control the flow of electricity so that customers can choose technologies to produce, store and sell power to the grid.
- The smart grid is designed to allow safe and reliable two-way power flow — from the grid to the customers and from customers to the grid. This system can reduce costs and makes the local grid more resilient to outages.

Resilience against weather and cyber attacks

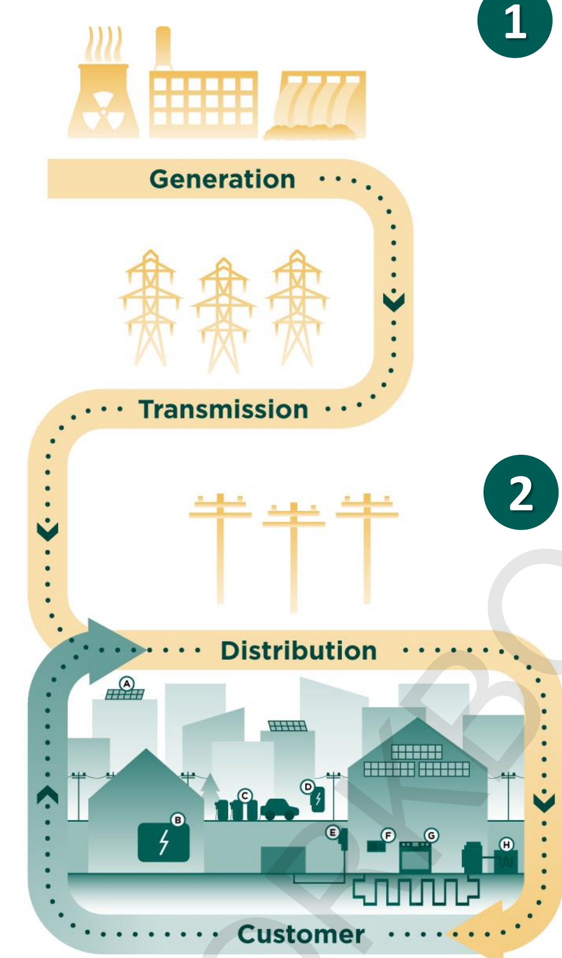
- Cyber attacks are increasing and getting more complex. Toronto Hydro must be prepared to respond to these threats to maintain reliable service and protect customer information.
- In addition to being able to restore power quicker, the smart grid can sense when environmental conditions like flooding pose a risk. This enables grid operators to strengthen the grid.

WORKBOOK PAGE

Modernization: Changing Technology, Changing Needs

For more than 100 years, things changed relatively slowly in terms of grid technology. Electricity was generated in large power stations and transmitted from around the province to Toronto Hydro's grid, and ultimately to homes and businesses. That is all changing, and because of technological advancement, the pace of change could be fast.

Toronto Hydro's 2025–2029 plan is shaped by two key changes in technology:



A. Solar panel
B. Battery storage
C. Public electric vehicle charging station
D. On-site backup generation
E. Smart meter
F. Home energy manager
G. Energy-efficient appliances
H. Heat pump

1 **Technologies that change how customers use electricity.** These include:

- Electricity products like electric vehicles, heat pumps and electric stoves that enable customers to use less fossil fuels (oil and gas), which contribute to climate change.
- Technologies like solar panels and battery energy storage that allow customers to produce and manage their electricity as well as sell it back onto the grid.

2 **Technologies that change how Toronto Hydro operates the grid**. These key changes are:

- The grid must shift from a **one-way system** that only sends electricity to customers to a **two-way system** that allows customers to generate and sell electricity to the grid.
- **Smart grid technology like sensors and automation** enables Toronto Hydro to monitor key equipment to prevent outages and get better use out of existing equipment. When outages do occur, this technology can re-route the grid to restore power much more quickly and at a lower cost than today.

How much electricity does it take to charge an Electric Vehicle (EV)?

Did you know that when an EV is charging it can use as much electricity as two average homes? If everyone in a neighbourhood came home from work or school and started charging their EVs at the same time, the electricity demand could overload the grid.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Modernization Plan

Residential

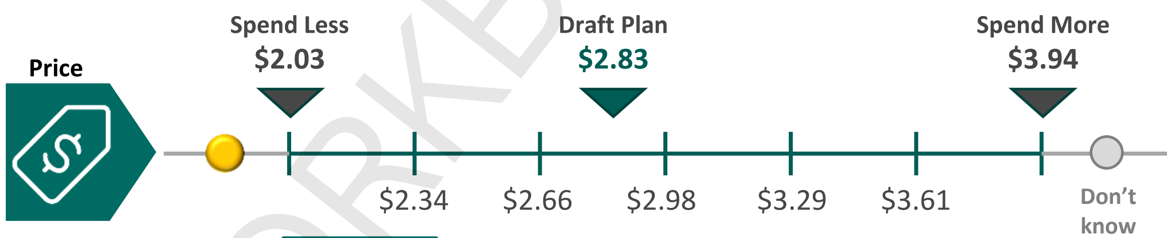
16%

Making Choices: **Modernization**

By 2029, Toronto Hydro's draft **modernization plan** would cost the typical residential customer **$2.83** more per month on their monthly electricity bill. Toronto Hydro could spend more to increase the pace of modernizing the grid to get better reliability sooner, or it could spend less and slow down the progress.

	Spend Less	Draft Plan	Spend More
Reliability	Being ready to automate the grid by 2035 means that better reliability won't happen until the end of the next decade or beyond.	Being ready to automate the grid by 2030 means that better reliability will happen in the earlier part of the next decade.	Faster progress towards grid automation means better reliability earlier and improved reliability for critical loads located in the downtown area.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	Same as draft plan.
Efficiency	It will take longer for the grid to become more efficient. This may lead to higher costs in the next decade.	The grid will become more efficient in the next decade, which will help reduce costs.	Same as draft plan.

Choice 1 of 7:



$-.-- Your selection.

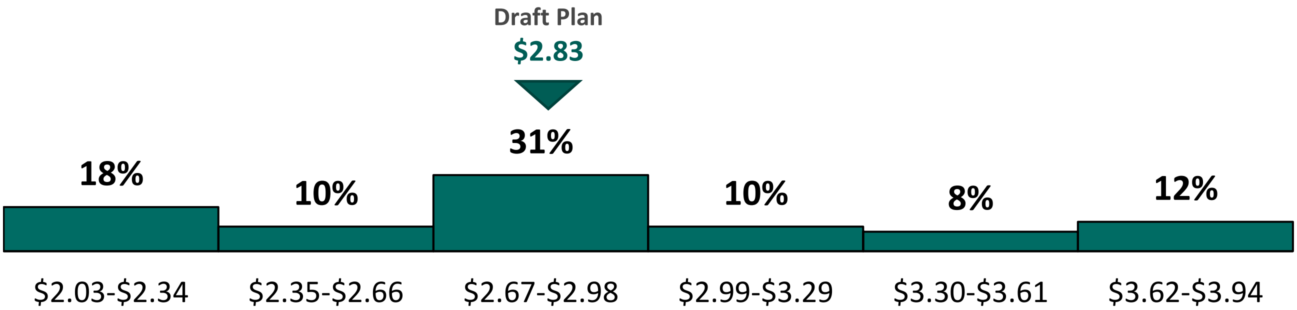
WORKBOOK PAGE

Online Workbook

Amount Spent on the Modernization Plan

Residential

Q How much do you think Toronto Hydro should spend on its modernization plan?



"Don't know" (12%) not shown.

n=32,187

	Overall	Region			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York
Below Plan	30%	31%	33%	35%	27%
On Plan	26%	26%	25%	24%	27%
Above Plan	32%	31%	26%	26%	38%
Don't Know	12%	11%	16%	15%	8%
TOTAL On Plan + Above Plan	58%	57%	51%	50%	65%

Online Workbook

Amount Spent on the Modernization Plan

Residential

Q How much do you think Toronto Hydro should spend on its modernization plan?

	Overall	LEAP Qualification			
		LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Below Plan	30%	37%	34%	26%	37%
On Plan	26%	20%	23%	28%	26%
Above Plan	32%	19%	26%	39%	25%
Don't Know	12%	25%	16%	7%	13%
TOTAL On Plan + Above Plan	58%	38%	50%	67%	51%

	Overall	Consumption Quartiles			
		First	Second	Third	Fourth
Below Plan	30%	33%	31%	30%	28%
On Plan	26%	26%	26%	26%	25%
Above Plan	32%	28%	31%	33%	36%
Don't Know	12%	13%	12%	11%	11%
TOTAL On Plan + Above Plan	58%	54%	58%	60%	61%

Online Workbook

Additional Feedback on the Modernization Plan

Residential

Q Do you have additional feedback on Toronto Hydro’s draft modernization plan?

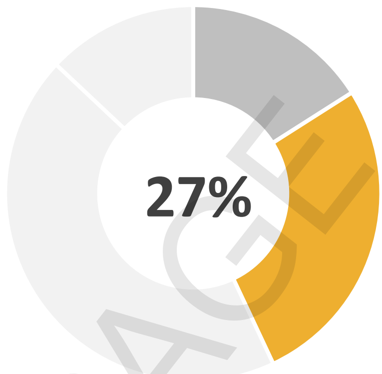
Response	%
Modernize, be proactive, invest for the long term	2.7%
Prioritize renewables, solar/wind, and electric vehicles	1.7%
Prevent outages, stable power, system reliability	1.4%
Find efficiencies, cut wasteful spending, lower salaries	1.2%
Costs are too high already, cost of living, struggling to pay bills	1.1%
Need more information	1.0%
Support the increase (general)	0.9%
Oppose the increase, increase is too high (general)	0.8%
Cost shouldn't be borne by all customers	0.6%
Support developing new technology and innovation	0.3%
Should be funded by tax dollars/government	0.3%
Address equity, protect low-income customers	0.2%
Should be funded by developers	0.1%
Other	0.6%
No response	87.2%

Note: Responses were optional. Only responses > 0.1% are shown.

Draft Growth Plan
Increase Capacity to Serve Customers

What is this section about?

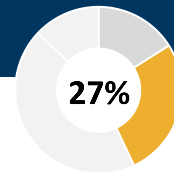
- This section explains how fast the city of Toronto is growing and what it takes for the grid to serve customers' needs for more electricity.
- Toronto Hydro's draft growth plan is about increasing grid capacity to serve customers reliably now and in the future.



- This spending category makes up **27% of the draft plan** and would add **$4.62** on the average residential customer's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft growth plan**.*

WORKBOOK PAGE



Growing City, Growing Needs

1 Toronto is growing, fast.

Toronto is one of the fastest growing cities in North America. A growing city means that we need a bigger local grid so that homes and businesses can get the power they need, when they need it.

Population Growth

Toronto will add approximately 500,000 more people this decade. To put this into context, Toronto is growing five times faster than Los Angeles.

230 Cranes
Toronto has led the crane count in North America since 2015.

2,114 Projects
including residential and non-residential in development in the city of Toronto.

+$1B in Construction
work planned for city infrastructure in Toronto annually (transportation and water).

2 Individual customers will use more electricity than ever before.

The average customer will use more electricity in the next 10–15 years, as governments encourage businesses and communities to use less fossil fuels (oil and gas) to address climate change. Here are the key government policies that drive the need for more electricity in Toronto:

2026 — The Government of Canada may require 20% of all new car sales to be zero emission and is working towards a target of 60% by 2030.

2028 — The City of Toronto Green Building Standard requires all new mid- and high-rise buildings to be near zero GHG emissions.

2030 — The carbon tax may increase 161% by 2030 so customers use less oil and gas, and switch to clean electricity for cooking, heating and transportation.

23% **Forecasted increase in customers' need for electricity by the year 2030.**

Conservation and energy efficiency has helped manage electricity use over the past 20 years and will continue to play an important role in the future. But conservation alone is not enough. We need a bigger grid to serve customers in the long term.

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Online Workbook

Amount Spent on Growth Plan

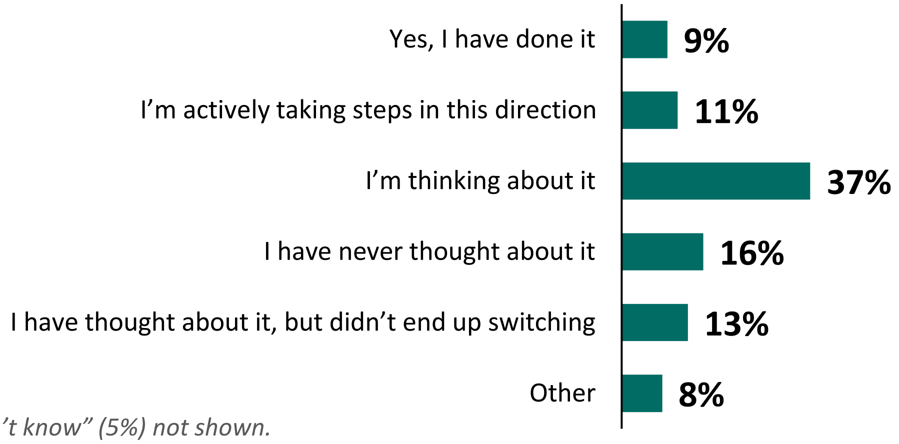
Residential

Q

When you think about all your energy bills, has your household ever considered shifting from one energy source to another to save money or reduce your impact on the environment?

For example, changing from a natural gas-fuelled furnace to an electric heat pump, or from a gas-fuelled vehicle to an electric vehicle?

TORONTO HYDRO



"Don't know" (5%) not shown.

n=31,615

	Region			
	Etobicoke/York	**North York**	**Scarborough**	**Toronto/East York**
Yes, I have done it	9%	9%	9%	10%
Actively taking steps	10%	11%	11%	11%
I'm thinking about it	38%	38%	40%	36%
I have never thought about it	16%	17%	17%	15%
I didn't end up switching	14%	14%	15%	12%
Other	8%	6%	4%	11%

Note: Responses were optional.

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Online Workbook

Amount Spent on Growth Plan

Residential

Q

When you think about all your energy bills, has your household ever considered shifting from one energy source to another to save money or reduce your impact on the environment?

For example, changing from a natural gas-fuelled furnace to an electric heat pump, or from a gas-fuelled vehicle to an electric vehicle?

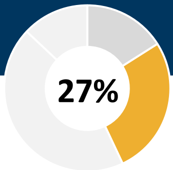
	LEAP Qualification			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Yes, I have done it	11%	9%	10%	8%
Actively taking steps	12%	11%	11%	8%
I'm thinking about it	33%	34%	40%	36%
I have never thought about it	18%	18%	15%	17%
I didn't end up switching	10%	12%	14%	16%
Other	7%	11%	8%	9%

	Consumption Quartiles			
	First	Second	Third	Fourth
Yes, I have done it	8%	8%	9%	13%
Actively taking steps	10%	11%	11%	11%
I'm thinking about it	32%	38%	41%	38%
I have never thought about it	19%	17%	15%	14%
I didn't end up switching	10%	14%	15%	15%
Other	14%	8%	6%	5%

Note: Responses were optional.

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Growth Plan

Residential



Building a bigger grid takes time

It's easy to say Toronto needs more electricity, but meeting this need requires Toronto Hydro to make major investments in the grid, including:

Expand Transformer Stations

Bring more power into the city from the provincial grid to serve growing communities along the new transit corridors (Eglinton LRT, Finch LRT, Ontario Line) and the redevelopment of areas like Downsview Park and the Portlands.

Upgrade and Reconfigure the Grid

Make more space on the grid to enable customers to plug in. Upgrade equipment like cables and transformers and reconfigure how the existing system serves customers to make more space on the grid to accommodate new services like electric vehicle charging stations and solar panels.

Major Infrastructure Developments

Connect major projects like the Finch Light Rail Transit system and the Ontario Line, and relocate Toronto Hydro's grid equipment to enable these and other major infrastructure developments to be constructed in the city.

This work cannot happen quickly. Toronto is densely populated and congested. **Building new power lines and stations takes years of planning and construction.** There are also equipment and resource constraints that limit how quickly Toronto Hydro can build a bigger grid.

Managing Uncertainty

Toronto Hydro develops its forecast from information such as building permits and projected electric vehicle sales. However, customer adoption of new technology is uncertain due to:

Supply chain issues such as equipment and resource shortages can affect the availability of customer technologies.

Technological advancements can lead to fast cost reductions. For example, the price of lithium ion batteries (EVs) decreased by 79% from 2013 to 2022.

Government policies such as rebates for electric vehicles and solar panels drive customers and suppliers to make certain choices.

If Toronto Hydro invests too quickly to build a bigger grid, it means customers' rates will go up to pay for equipment that will not be used for some time. On the other hand, if it doesn't do enough to expand the grid for higher use of electricity, customers could experience less reliability (brownouts) and delays when they want to connect to the grid or plug in new technologies. Toronto Hydro needs your input on the pace for these investments.

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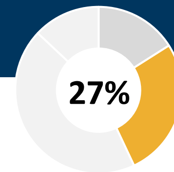


Making Choices: **Growth**

By 2029, Toronto Hydro's draft **growth plan** would cost the typical residential customer **$4.62** more per month on their monthly electricity bill. Toronto Hydro could spend more to better prepare the grid to serve customers' changing needs, or could spend less and wait and see if customers adopt new technologies over the 2025–2029 plan.

	Spend Less	Draft Plan	Spend More
Reliability	May lead to less reliability for customers in high-growth neighbourhoods. Increases reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Manages reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Improves reliability risk for the next decade.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	May improve service levels (shorter waits and lower costs) for some customers connecting new services to the grid. Improves customer choice for new technologies.
Efficiency	May lead to less efficient work if Toronto Hydro has to build a bigger grid reactively to serve customers.	Supports the ability to serve customers efficiently in the five-year plan based on the projected demand.	Supports the ability to serve customers efficiently in the five-year plan and beyond in the next decade.

Choice 2 of 7:

Price

Spend Less **$3.40** | Draft Plan **$4.62** | Spend More **$5.81**

$3.79 | $4.19 | $4.60 | $5.00 | $5.40 | Don't know

$-.-- Your selection.

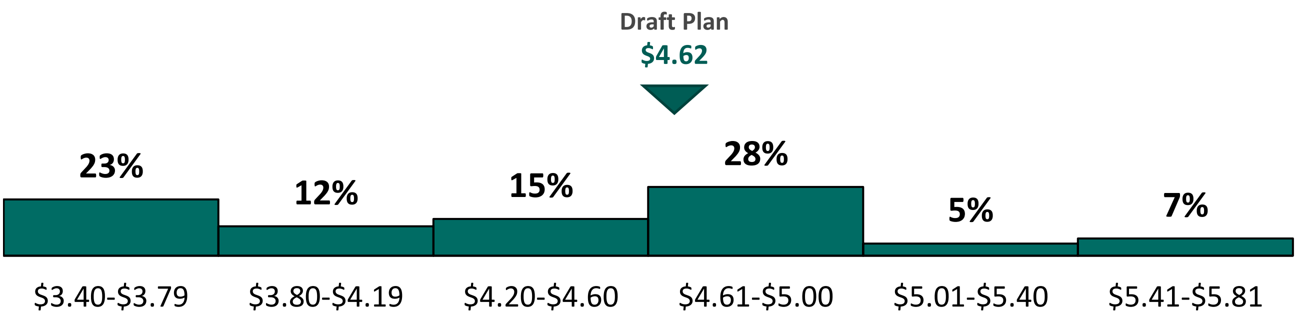
WORKBOOK PAGE

Online Workbook

Amount Spent on the Growth Plan

Residential

Q How much do you think Toronto Hydro should spend on its growth plan?



"Don't know" (10%) not shown.

n=32,187

	Overall	Region			
		Etobicoke/York	North York	Scarborough	Toronto/East York
Below Plan	42%	43%	45%	45%	39%
On Plan	28%	27%	25%	24%	31%
Above Plan	20%	19%	16%	17%	23%
Don't Know	10%	10%	14%	14%	7%
TOTAL On Plan + Above Plan	47%	47%	40%	41%	54%

Online Workbook

Amount Spent on Growth Plan

Residential

Q How much do you think Toronto Hydro should spend on its growth plan?

	Overall	LEAP Qualification			
		LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Below Plan	42%	47%	45%	38%	48%
On Plan	28%	18%	24%	31%	26%
Above Plan	20%	12%	16%	25%	14%
Don't Know	10%	23%	15%	6%	12%
TOTAL On Plan + Above Plan	47%	30%	40%	56%	40%

	Overall	Consumption Quartiles			
		First	Second	Third	Fourth
Below Plan	42%	46%	42%	41%	40%
On Plan	28%	25%	28%	28%	28%
Above Plan	20%	17%	19%	21%	22%
Don't Know	10%	12%	11%	10%	10%
TOTAL On Plan + Above Plan	47%	43%	47%	49%	50%

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Online Workbook

Additional Feedback on the Growth Plan

Residential

Q Do you have additional feedback on Toronto Hydro's draft growth plan?

Response	%
Modernize, be proactive, invest for the long term	1.5%
Prioritize renewables, solar/wind, and electric vehicles	1.0%
Find efficiencies, cut wasteful spending, lower salaries	0.9%
Should be funded by developers	0.9%
Costs are too high already, cost of living, struggling to pay bills	0.8%
Need more information	0.7%
Oppose the increase, increase is too high (general)	0.7%
Prevent outages, stable power, system reliability	0.7%
Cost shouldn't be borne by all customers	0.5%
Support the increase (general)	0.5%
Should be funded by tax dollars/government	0.3%
Support developing new technology and innovation	0.2%
Address equity, protect low-income customers	0.1%
Other	0.5%
No response	90.7%

Note: Responses were optional. Only responses > 0.1% are shown.

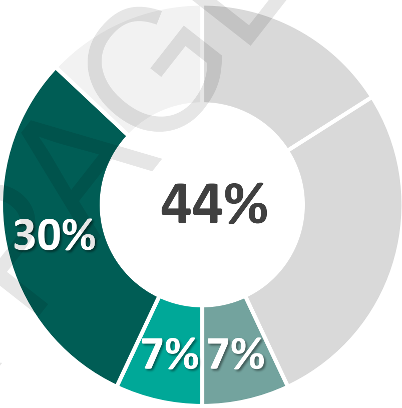
Draft Sustainment Plan

Replacing and Updating Equipment

What is this section about?

- This section is about upkeeping the grid to manage reliability and maintain safe and efficient operations.
- Toronto Hydro's draft sustainment plan section seeks your input in three areas:

1. Managing equipment in very poor condition with a high risk of failure.
2. Pacing the upkeep of equipment near the end of its expected life.
3. Standardizing outdated equipment.



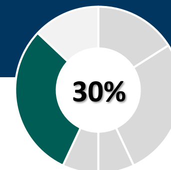
- This spending category makes up **44% of the draft plan** and would add **$7.52** on the average residential customer's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft sustainment plan**.*

WORKBOOK PAGE

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

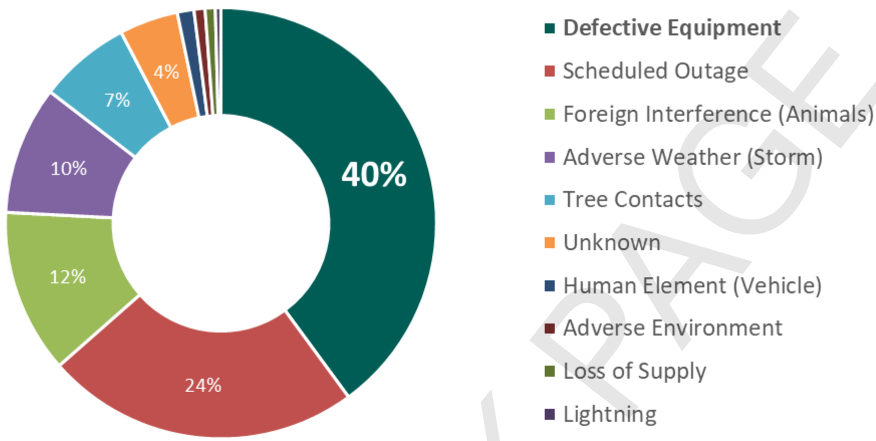
Residential



1 Reliability: Managing Equipment Failure Risk

While many power outages are caused by external events such as weather and falling trees, roughly **40%** of customer outages are caused by equipment failure. This is the largest single cause of outages, and customers look to Toronto Hydro to manage this risk.

Customer Outage Duration (Hours) by Cause 2018-2022



Toronto Hydro manages failure risk by:

- Inspecting equipment condition regularly, so that maintenance or replacement can be done before the equipment fails.
- Replacing and repairing equipment that is in bad condition or performing poorly. This includes replacing lines with a high number of outages or replacing transformers with visible signs of wear and tear such as rust.

Since 2014, Toronto Hydro's work to upkeep the grid has delivered a 13% reduction in the average number of outages experienced by customers and a 25% reduction in the length of those outages. Toronto Hydro's draft plan is to maintain these reliability results for customers.

Want to learn more about grid reliability and what causes power outages? Click here.

What type of work is Toronto Hydro doing to manage equipment failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to prevent increased outages due to equipment failure.

Replacing Direct-Buried Cable

In parts of the grid that were built a long time ago, cables are laid directly in underground trenches without any protective barrier. **Underground equipment failures contribute to 57% of defective equipment failures, the large majority of which (75%) are due to cables.** Toronto Hydro's draft plan intends to replace 182 kilometers of direct buried cables by 2029 to manage the risk of power outages caused by this equipment.

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System reliability

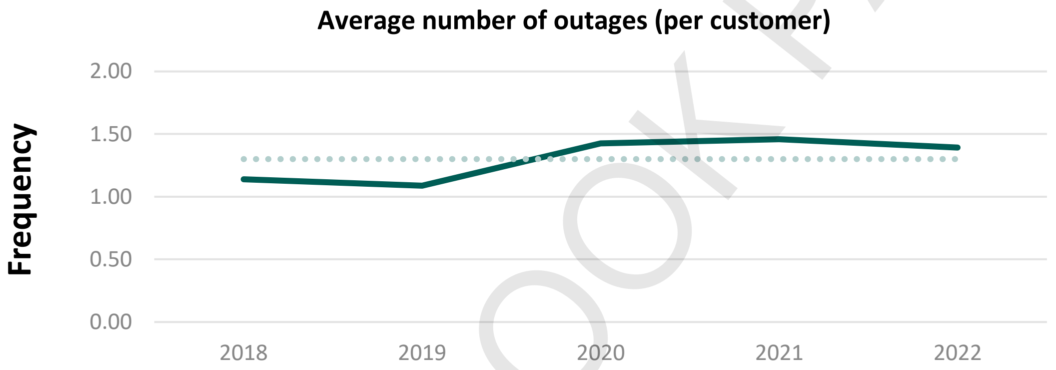
In order to provide feedback on Toronto Hydro's plans, it's important to understand how the distribution system has performed in the past, as well as what's expected in the future.

A core objective of Toronto Hydro's plan is to maintain current levels of reliability over the 2025–2029 plan period, while making foundational technology investments to reduce the length of power outages in the long-term.

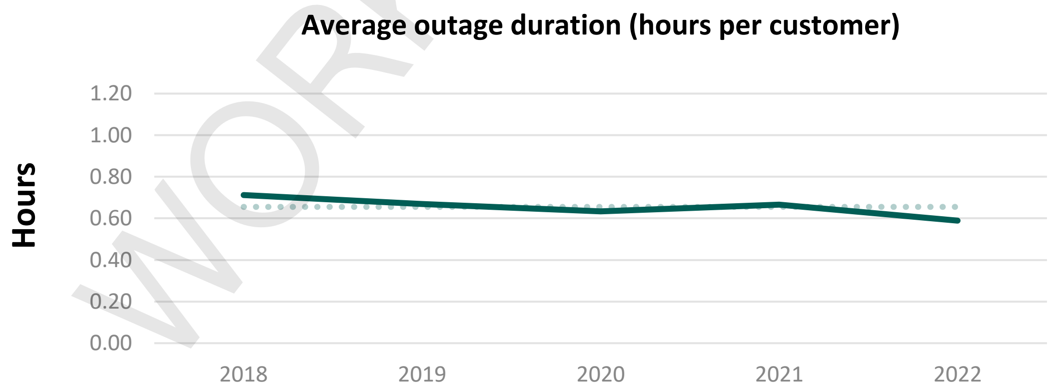
Toronto Hydro recognizes that power interruptions are inconvenient for residential customers and can be very costly for commercial and industrial customers.

Toronto Hydro tracks both the average number of power outages per customer and how long those interruptions last.

Between 2018 and 2022, the typical Toronto Hydro customer has experienced about two outages per year (*or 1.3 outages per customer to be exact*).



Over the same period, the average **duration** of an outage has been about 0.62 hours. Meaning, when the power does go out, Toronto Hydro is typically able to restore power in about 35 minutes.



It's important to keep in mind that these are system averages, and that your actual experience may be different. Some customers connected to newer lines may not experience any outages, while others are experiencing more than the average number of outages each year.

WORKBOOK PAGE

What is most likely to cause an outage?

Although both the number and length of outages have decreased compared to the previous five-year average, equipment failure remains the top cause of outages within Toronto Hydro's control.

That said, in 2022, severe weather presented a unique set of challenges for Toronto Hydro's distribution system.

Causes of Unscheduled Power Outages (five-year average: 2018 to 2022)

12%

Animal Contact: Outages caused by animals such as racoons, squirrels and birds coming in contact with overhead powerlines or transformers.

10%

Weather-Related Events: Adverse weather such as heavy rain, lightning strikes, ice, snow, wind, extreme temperatures, and freezing rain can disrupt the distribution system.

40%

Equipment Failure: Unscheduled power outages from equipment failure usually occur with distribution equipment that's beyond or approaching the end of their expected useful lives.

14%

Other: Includes tree contact (7%) and human interference (1%), such as construction workers accidentally cutting powerlines or motor vehicle accidents involving contact with distribution equipment. 4% of outages are unknown, but most are likely caused by animal contact.

Note: *statistics do not include loss of supply from Hydro One.*

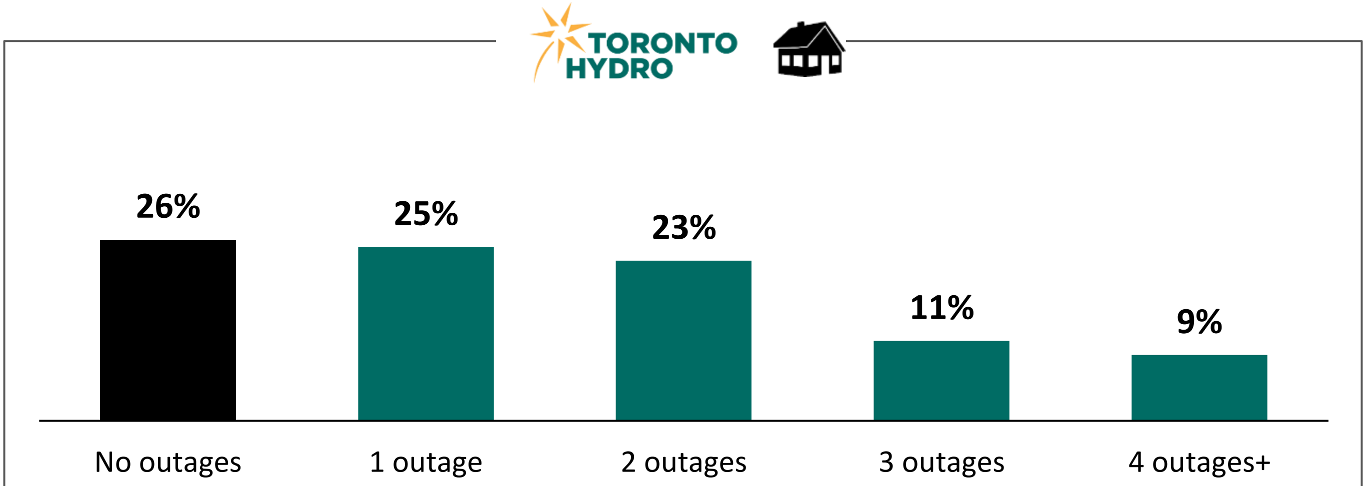
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Reliability Plan

Residential

Q Over the past 12 months, have you experienced any power outages at your home which lasted longer than one minute?



"Don't know" (7%) not shown. **n=31,963**

	Region			
	Etobicoke/York	**North York**	**Scarborough**	**Toronto/East York**
No outages	19%	21%	19%	34%
1 outage	24%	25%	22%	26%
2 outages	26%	24%	24%	20%
3 outages	14%	13%	14%	8%
4 outages+	12%	10%	14%	6%

Note: Responses were optional.

Online Workbook

Amount Spent on the Grid Reliability Plan

Residential

Q Over the past 12 months, have you experienced any power outages at your home which lasted longer than one minute?

	LEAP Qualification			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
No outages	31%	28%	26%	21%
1 outage	23%	25%	26%	22%
2 outages	20%	21%	23%	23%
3 outages	11%	11%	11%	12%
4 outages+	7%	8%	9%	12%

	Consumption Quartiles			
	First	Second	Third	Fourth
No outages	35%	27%	22%	20%
1 outage	24%	25%	25%	24%
2 outages	20%	22%	24%	25%
3 outages	9%	11%	12%	13%
4 outages+	6%	9%	11%	13%

Note: Responses were optional.

Making Choices: **Managing Equipment Failure Risk**

By 2029, Toronto Hydro's draft plan to manage equipment failure risk would cost the typical residential customer **$5.20** more per month on their monthly electricity bill. Toronto Hydro could spend more to improve reliability, or it could spend less and take on more risk of outages.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Reduces reliability compared to current levels. This means more power outages due to equipment failure.	Maintains reliability at current levels. This means holding steady on power outages due to equipment failure.	Improves reliability compared to current levels. This means less power outages due to equipment failure.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 3 of 7:

Price

Spend Less **$3.53** — $4.02 — $4.51 — $5.01 — **Draft Plan** **$5.20** — $5.50 — $6.00 — **Spend More** **$6.50** — Don't know

$-.-- Your selection.

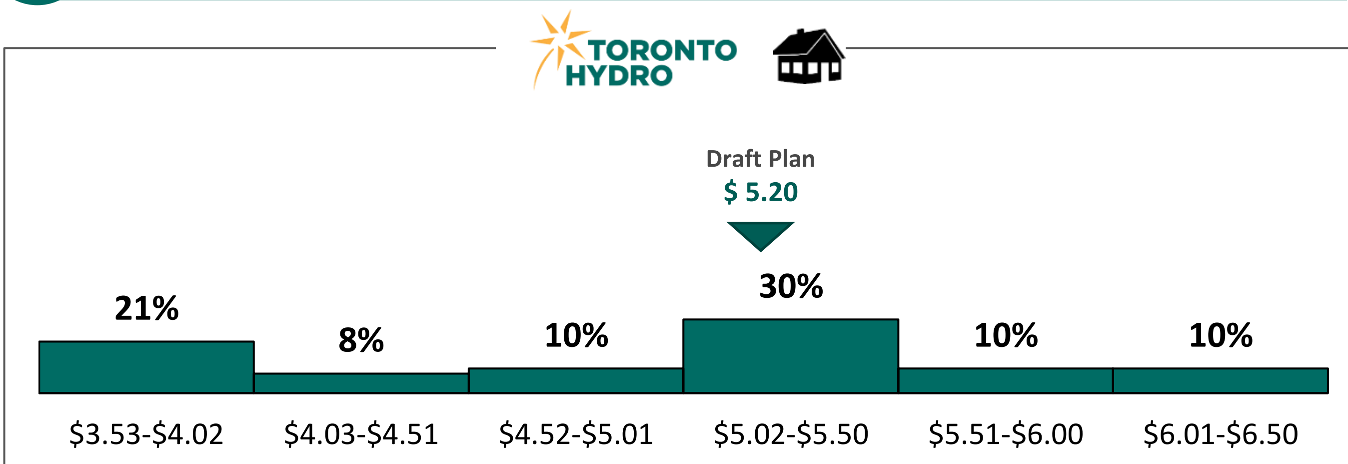
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Reliability Plan

Residential

Q How much do you think Toronto Hydro should spend on its grid reliability plan?



"Don't know" (10%) not shown.

n=32,187

	Overall	Region			
		Etobicoke/York	North York	Scarborough	Toronto/East York
Below Plan	41%	41%	44%	45%	37%
On Plan	25%	24%	22%	21%	28%
Above Plan	24%	25%	20%	20%	27%
Don't Know	10%	10%	14%	14%	7%
TOTAL On Plan + Above Plan	49%	49%	42%	41%	56%

Online Workbook

Amount Spent on the Grid Reliability Plan

Residential

Q How much do you think Toronto Hydro should spend on its grid reliability plan?

	Overall	LEAP Qualification			
		LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Below Plan	41%	48%	46%	36%	46%
On Plan	25%	17%	22%	28%	24%
Above Plan	24%	13%	18%	30%	19%
Don't Know	10%	22%	14%	6%	12%
TOTAL On Plan + Above Plan	49%	30%	40%	57%	42%

	Overall	Consumption Quartiles			
		First	Second	Third	Fourth
Below Plan	41%	44%	42%	39%	38%
On Plan	25%	23%	25%	26%	25%
Above Plan	24%	20%	23%	25%	27%
Don't Know	10%	12%	10%	10%	10%
TOTAL On Plan + Above Plan	49%	44%	48%	51%	52%

Online Workbook

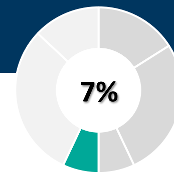
Additional Feedback on the Grid Reliability Plan

Residential

Q Do you have additional feedback on Toronto Hydro's draft grid reliability plan?

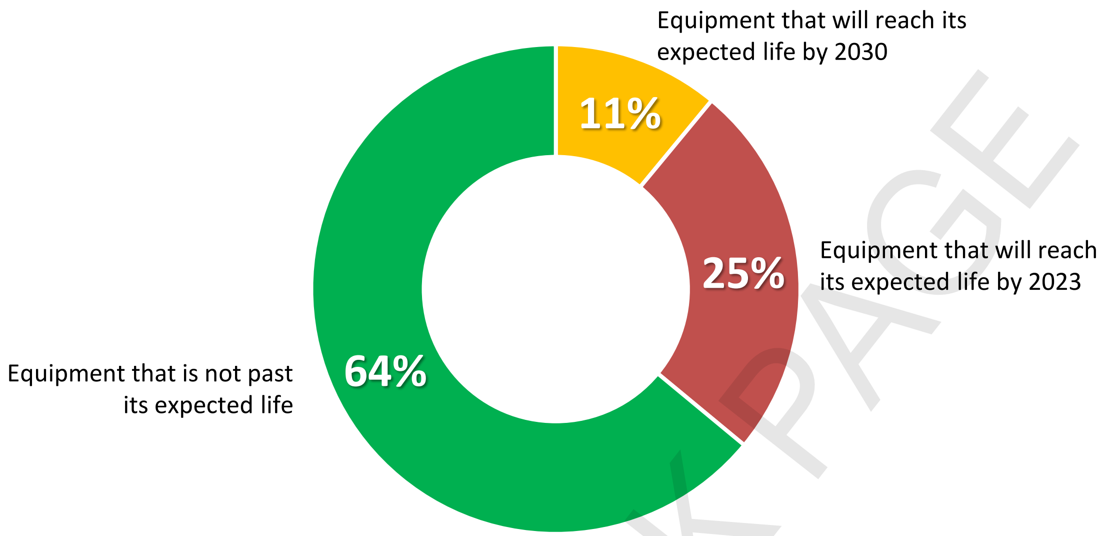
Response	%
Prevent outages, stable power, system reliability	2.8%
Modernize, be proactive, invest for the long term	1.2%
Find efficiencies, cut wasteful spending, lower salaries	0.8%
Need more information	0.4%
Support the increase (general)	0.4%
Costs are too high already, cost of living, struggling to pay bills	0.4%
Oppose the increase, increase is too high (general)	0.3%
Prioritize renewables, solar/wind, and electric vehicles	0.2%
Cost shouldn't be borne by all customers	0.2%
Make use of existing infrastructure, past spending	0.1%
Should be funded by tax dollars/government	0.1%
Other	0.4%
No response	92.6%

Note: Responses were optional. Only responses > 0.1% are shown.



2 Paced Upkeep of the Grid

About 25% of Toronto Hydro's equipment is operating past its expected life and an additional 11% is estimated to reach that point by 2030.



In this part of the plan, the key question is whether Toronto Hydro should wait until there are clear signs of equipment failure risk (such as rust or oil leaks), or whether it should get ahead of the problem by replacing old equipment proactively.

If Toronto Hydro waits, it can keep prices lower in the short term. However, this could create a surge of work in future years that will spike prices in the 2030s. There is also a risk that Toronto Hydro will not be able to do the amount of work required to deal with this equipment in the future, which could lead to more outages and higher safety risks due to equipment failures.

Want to learn more about Toronto Hydro's distribution grid? Click here.

What type of work is Toronto Hydro doing to upkeep the grid?

Below is an example of key investments that Toronto Hydro needs to make in a paced way to upkeep the grid and prevent a surge of work to address equipment failure risk in the future.

Paced Replacement of Network Vaults

This equipment is located in underground vaults in the downtown area, which serves many critical customers, such as hospitals and financial institutions. A very large portion of this equipment is going to be in poor condition and past its expected life in the 2030-34 period. To manage this risk, Toronto Hydro's draft plan intends to replace network vaults in a paced manner.

WORKBOOK PAGE

Renewing and replacing infrastructure

Toronto Hydro’s grid is a mix of overhead, underground, network and station infrastructure. It operates at three different voltages (27.6kV, 13.8kV, and 4.16kV) and includes approximately:

- 61,300 distribution transformers
- 17,060 primary switches
- 15,393 km of overhead wires
- 13,765 km of underground wires
- 37 transformer stations

Overhead Infrastructure

The overhead system is made up of poles, wires, transformers, switches and other equipment. They are easier to replace, repair and inspect.

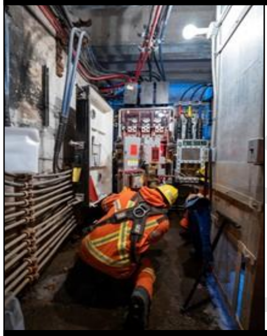
However, they are also more prone to foreign interference such as vehicles, trees, animals and weather-related outages.

This system consists of three different types of configurations two of which are outdated configurations from the 1950s and 1960s, making them more challenging to replace and restore particularly after a weather-related outage.

Underground Infrastructure

Toronto Hydro’s underground system consists of cables, transformers, switches and civil infrastructures (like manholes). They can be placed either at ground level (green box above ground in your neighbourhood), underground, or inside building vaults (typical for multi-storey buildings). This system is made up of two different types of configurations where the downtown Toronto area consists of lead-covered cable, an outdated equipment with little to no suppliers.

While underground equipment is more resilient during weather-related events, it is more susceptible to flooding and at risk of faster deterioration due to moisture build-up.



Network Infrastructure

Toronto Hydro’s network system, predominantly found in the downtown Toronto area, was installed in the early-to-mid 1900s to improve reliability (service levels) for critical loads (like financial institutions) and serves medium-sized loads in high-density areas, and areas with small and narrow sidewalks. It consists of interconnected low-voltage cables, vaults and network units.

While this system is better at handling normal equipment failures, proactive replacement and maintenance of this equipment are critical to avoid vault fires from occurring.

Station Infrastructure

Toronto Hydro’s distribution stations receive the transmission supply from Hydro One at very high voltages. Station infrastructure consists of switchgear, power transformers, circuit breakers, remote terminal units (station computers) and battery systems. Toronto Hydro proactively replaces this equipment, as failure at the station level can cause widespread and lengthy power outages.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Sustainment Plan

Residential

7%

Making Choices: **Paced Upkeep of the Grid**

By 2029, Toronto Hydro's draft plan to ensure paced upkeep of the grid would cost the typical residential customer **$1.15** more on their monthly electricity bill. Toronto Hydro could spend more to get ahead of future equipment failure risk, or it could spend less and defer some of this work at the risk of managing more power outages due to equipment failure in the next decade.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Higher risk of power outages due to equipment failure in the next decade.	Manages the risk of power outages due to equipment failure in the next decade.	Reduces the risk of power outages due to equipment failure in the next decade.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 4 of 7:

$-.-- Your selection.

WORKBOOK PAGE

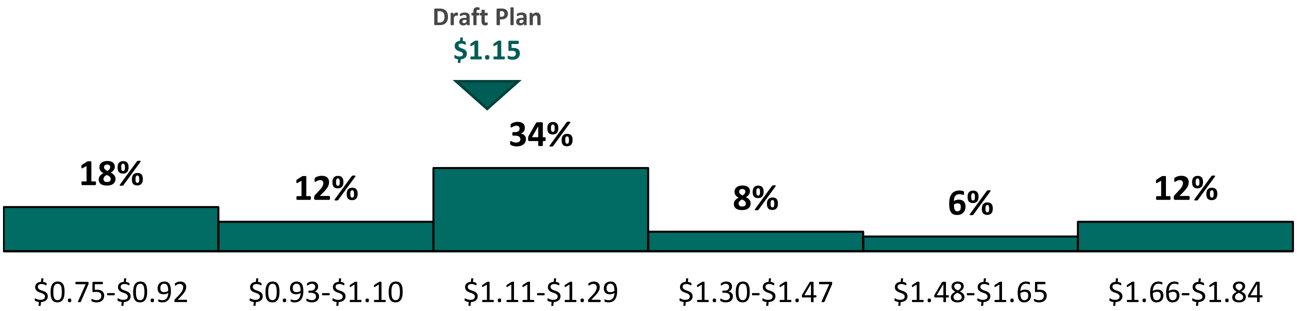
Online Workbook

Amount Spent on the Grid Stewardship Plan

Residential

Q How much do you think Toronto Hydro should spend on its grid stewardship plan?

TORONTO HYDRO



"Don't know" (10%) not shown.

n=32,187

	Overall	Region			
		Etobicoke/York	North York	Scarborough	Toronto/East York
Below Plan	29%	30%	32%	33%	26%
On Plan	30%	29%	29%	27%	32%
Above Plan	31%	31%	25%	27%	35%
Don't Know	10%	10%	14%	13%	7%
TOTAL On Plan + Above Plan	61%	61%	54%	54%	68%

INNOVATIVE RESEARCH GROUP

Online Workbook

Amount Spent on the Grid Stewardship Plan

Residential

Q How much do you think Toronto Hydro should spend on its grid stewardship plan?

	Overall	LEAP Qualification			
		LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Below Plan	29%	34%	32%	25%	35%
On Plan	30%	23%	27%	32%	29%
Above Plan	31%	21%	27%	36%	24%
Don't Know	10%	22%	14%	6%	11%
TOTAL On Plan + Above Plan	61%	44%	54%	69%	54%

	Overall	Consumption Quartiles			
		First	Second	Third	Fourth
Below Plan	29%	32%	29%	28%	28%
On Plan	30%	29%	31%	31%	29%
Above Plan	31%	27%	30%	32%	34%
Don't Know	10%	12%	10%	9%	9%
TOTAL On Plan + Above Plan	61%	56%	61%	63%	63%

INNOVATIVE RESEARCH GROUP

Online Workbook

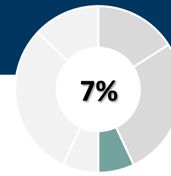
Additional Feedback on the Grid Stewardship Plan

Residential

Q Do you have additional feedback on Toronto Hydro's draft grid stewardship plan?

Response	%
Modernize, be proactive, invest for the long term	1.2%
Find efficiencies, cut wasteful spending, lower salaries	0.6%
Prevent outages, stable power, system reliability	0.6%
Need more information	0.4%
Support the increase (general)	0.4%
Oppose the increase, increase is too high (general)	0.3%
Costs are too high already, cost of living, struggling to pay bills	0.3%
Cost shouldn't be borne by all customers	0.2%
Make use of existing infrastructure, past spending	0.2%
Other	0.6%
No response	95.3%

Note: Responses were optional. Only responses > 0.1% are shown.

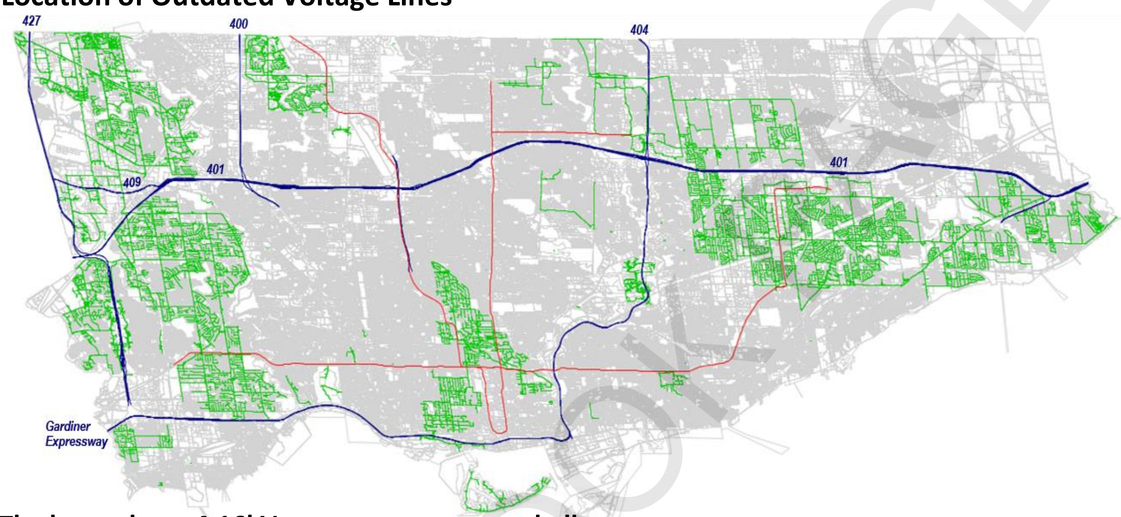


3 Standardize the Grid

Because of its history, Toronto Hydro has an old and diverse grid. Toronto Hydro is made up of 6 municipal utilities that were joined in 1998 when the City of Toronto was formed. Each utility owned and operated different types of equipment. As a result, Toronto Hydro's grid has three different voltage levels: 4.16kV, 13.8kV and 27.6kV.

The 27.6kV voltage level is the current standard for local grids. However, a large part of Toronto Hydro's grid is served at 4.16kV and 13.8kV.

Location of Outdated Voltage Lines



The low voltage 4.16kV system poses many challenges:

- Long outages for customers and higher cost to restore power – in 2022, the longest outage on the 4.16 kV system was 80 hours.
- Less efficient at carrying power over long distances, which means more electricity is lost as it travels from point A to point B (line losses).
- Less capacity to serve customers' growing electricity needs, which means longer waits and higher costs to connect new services such as electric vehicles and solar panels.
- Risk of supply chain and labour shortages as manufacturers stop making this equipment and technicians trained on this equipment retire.

What type of work is Toronto Hydro doing to standardize the grid?

Below is an example of a key investment to replace outdated equipment.

Voltage Conversion from 4.16kV/13.8kV to 27.6kV

Voltage conversion entails a full rebuild of outdated equipment such as rear lot construction (poles and wires in customers' backyards). This work improves reliability, safety and makes the grid more efficient. Toronto Hydro's draft plan intends to convert 1400 customers from rear lot service and works to eliminate rear lot construction from the grid by the late 2040s.

WORKBOOK PAGE

Making Choices: **Standardize the Grid**

By 2029, Toronto Hydro's draft **plan to standardize the grid** would cost the typical residential customer **$1.17** more on their monthly electricity bill. Toronto Hydro could spend more to speed up the pace of replacing outdated equipment or it could spend less to slow down the pace and delay the benefits of this work. For example, under spend more Toronto Hydro would convert all rear lot customers by the early 2040s, and under spend less by the 2050s.

	Spend Less	Draft Plan	Spend More
Reliability	Slower progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Steady progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Faster progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.
Customer Service	Less progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.	Steady progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels	Faster progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.
Efficiency	Slower progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Steady progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Faster progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.

Choice 5 of 7:

Price

Spend Less $0.89 | Draft Plan $1.17 | Spend More $1.52

$0.99 | $1.09 | $1.20 | $1.30 | $1.41 | Don't know

$-.-- Your selection.

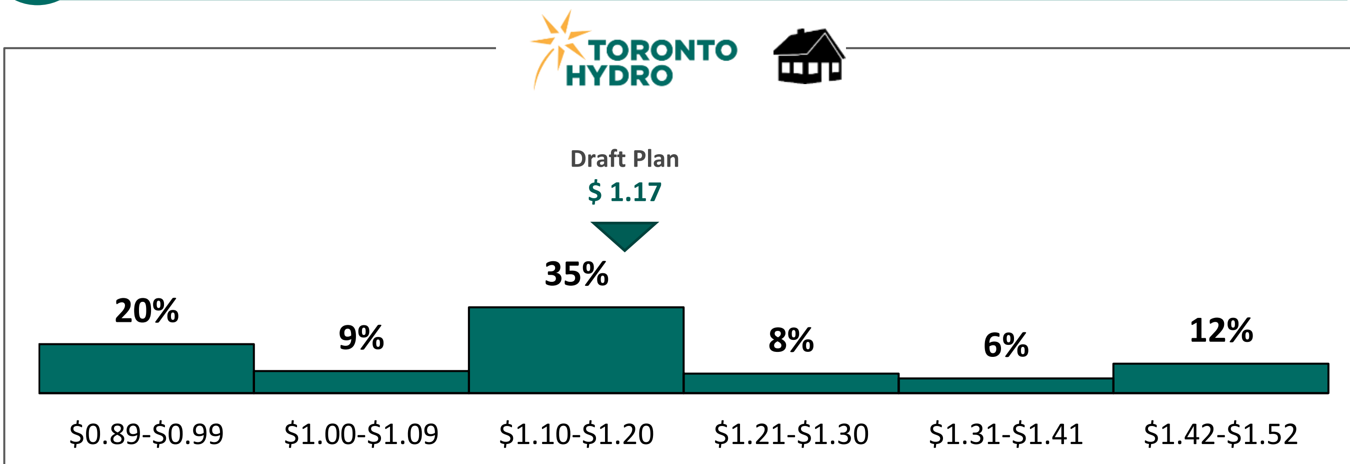
WORKBOOK PAGE

Online Workbook

Amount Spent on the Equipment Standardization Plan

Residential

Q How much do you think Toronto Hydro should spend on its equipment standardization plan?



"Don't know" (10%) not shown.

n=32,187

	Overall	Region			
		Etobicoke/York	North York	Scarborough	Toronto/East York
Below Plan	34%	34%	37%	36%	31%
On Plan	30%	29%	27%	27%	32%
Above Plan	27%	28%	22%	24%	30%
Don't Know	10%	9%	14%	13%	7%
TOTAL On Plan + Above Plan	57%	57%	49%	51%	63%

Online Workbook

Amount Spent on the Equipment Standardization Plan

Residential

Q How much do you think Toronto Hydro should spend on its equipment standardization plan?

	Overall	LEAP Qualification			
		LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Below Plan	34%	38%	36%	30%	40%
On Plan	30%	21%	27%	32%	28%
Above Plan	27%	19%	24%	32%	21%
Don't Know	10%	22%	13%	6%	11%
TOTAL On Plan + Above Plan	57%	40%	50%	65%	49%

	Overall	Consumption Quartiles			
		First	Second	Third	Fourth
Below Plan	34%	37%	33%	32%	32%
On Plan	30%	28%	30%	30%	29%
Above Plan	27%	24%	26%	29%	29%
Don't Know	10%	11%	10%	9%	9%
TOTAL On Plan + Above Plan	57%	52%	57%	59%	59%

Online Workbook

Additional Feedback on the Equipment Standardization Plan

Residential

Q Do you have additional feedback on Toronto Hydro's draft equipment standardization plan?

Response	%
Modernize, be proactive, invest for the long term	1.2%
Prevent outages, stable power, system reliability	0.7%
Find efficiencies, cut wasteful spending, lower salaries	0.5%
Need more information	0.4%
Support the increase (general)	0.4%
Oppose the increase, increase is too high (general)	0.4%
Cost shouldn't be borne by all customers	0.2%
Costs are too high already, cost of living, struggling to pay bills	0.2%
Prioritize renewables, solar/wind, and electric vehicles	0.2%
Should be funded by tax dollars/government	0.2%
Make use of existing infrastructure, past spending	0.1%
Other	0.4%
No response	95.1%

Note: Responses were optional. Only responses > 0.1% are shown.

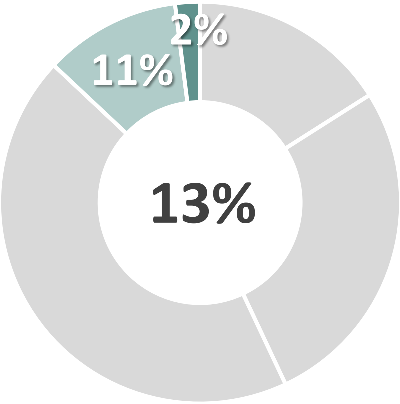
Draft General Plant Plan

Keeping the Business Running

What is this section about?

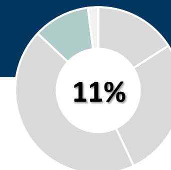
- This section is about the vehicles, work centres and IT systems that keep Toronto Hydro's business running efficiently.
- Toronto Hydro seeks your input on two choices within this part of the plan:

1. The pace of replacing the equipment needed to keep the business running.
2. The pace of reducing Toronto Hydro's emissions from its own operations.



- This spending category makes up **13% of the draft plan** and would add **$2.21** on the average residential customer's monthly bill by 2029.

WORKBOOK



1 Keep the Business Running

Work centres, vehicles and information technology systems are the backbone of Toronto Hydro's day-to-day operations. This equipment must be maintained in good working condition for efficient and reliable operations so that crews can restore power and customers can access key services like their online account and the outage restoration map.

- As with grid equipment, Toronto Hydro uses information such as age and condition data from inspections to decide which equipment should be replaced versus repaired.
- Toronto Hydro repairs equipment in poor condition such as leaking roofs, failed furnaces and worn-out vehicle braking systems. It also replaces equipment like software programs and hardware servers that are past expected useful life.

What type of work is Toronto Hydro doing to manage failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to keep the business running and manage the risk of equipment failure.

Station Buildings

Toronto Hydro has approximately 250 properties that either house distribution stations equipment such as cables and transformers or support the distribution system.

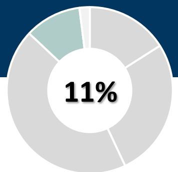
Over 80% of station buildings are older than 40 years and require repairs and investments to address the following types of problems:

- Structural damage to the building (cracked foundations, leaking roofs)
- Mechanical, electrical and plumbing equipment in poor condition
- Compliance with building and fire code requirements

This work ensures safe and efficient operations and minimizes the risk of outages that can affect many customers. For example, structural damage to a station building poses a direct risk to distribution equipment such as power transformers.

So, how much and how quickly Toronto Hydro decides to invest in keeping their business running has a direct impact on customers. While this equipment may remain in service for a long time, when they unexpectedly fail, the costs incurred usually far exceed proactive investments (repairs and replacements) and can have a significant impact on system reliability and customer service.

WORKBOOK PAGE

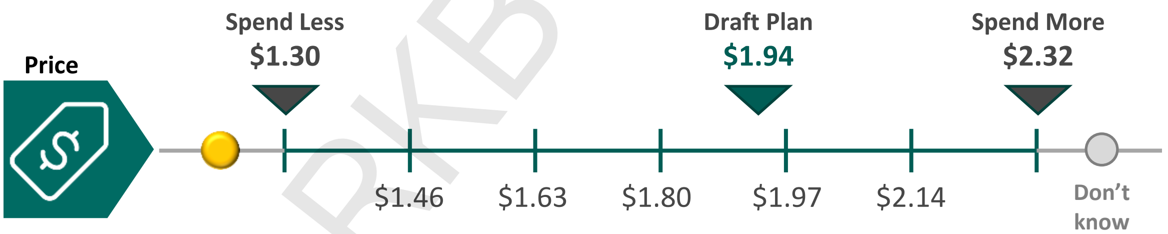


Making Choices: **Keep the Business Running**

By 2029, Toronto Hydro's draft plan to keep the business running would cost the typical residential customer **$1.94** more on their monthly electricity bill. Toronto Hydro could spend more to improve equipment health (age and condition) and functionality (better safety features) or spend less and take on more risk of equipment downtime.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of general plant equipment by 2029.	Maintains the overall health (age and condition) of general plant equipment by 2029.	Improves the overall health (age and condition) of general plant equipment by 2029.
Reliability & Service	Reduces equipment availability, which could mean longer outages or lower levels of customer service.	Maintains equipment availability consistent with current levels.	Improves equipment availability and functionality, which could mean better reliability and customer service levels.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work, which is more costly and increases equipment downtime.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work, and better equipment functionality.

Choice 6 of 7:



$-.-- Your selection.

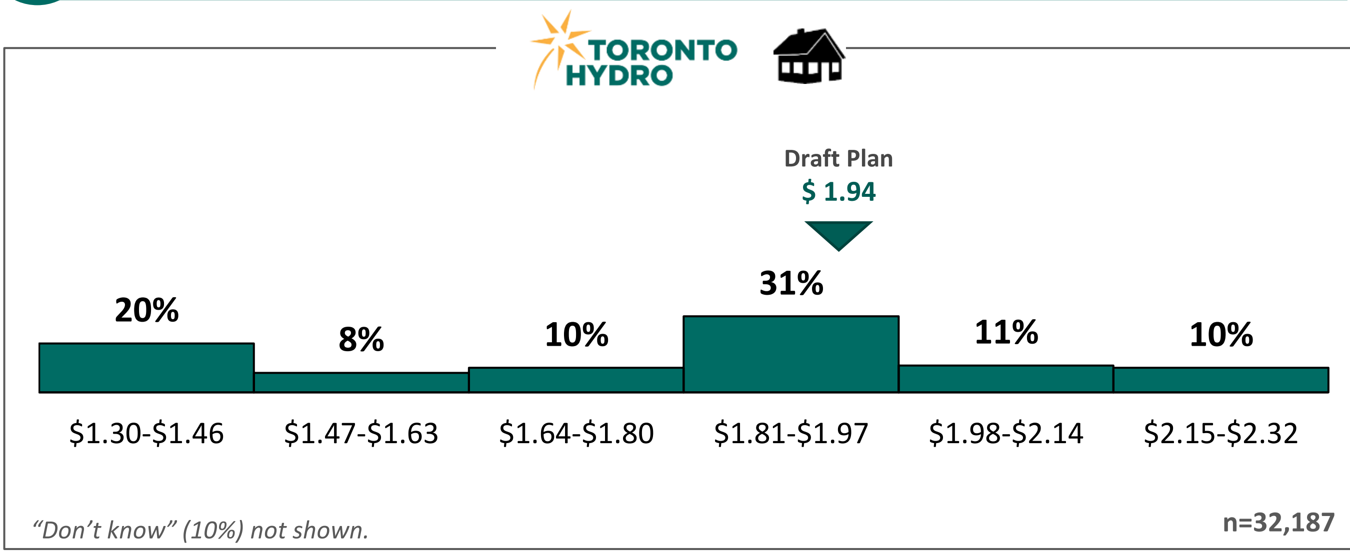
WORKBOOK PAGE

Online Workbook

Amount Spent on Keeping the Business Running

Residential

Q How much do you think Toronto Hydro should spend to keep the business running?



	Overall	Region			
		Etobicoke/York	North York	Scarborough	Toronto/East York
Below Plan	43%	43%	46%	47%	40%
On Plan	29%	29%	25%	24%	32%
Above Plan	19%	19%	15%	17%	21%
Don't Know	10%	9%	13%	13%	7%
TOTAL On Plan + Above Plan	47%	47%	40%	40%	54%

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Online Workbook

Amount Spent on the Keeping the Business Running

Residential

Q How much do you think Toronto Hydro should spend to keep the business running?

	Overall	LEAP Qualification			
		LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Below Plan	43%	47%	47%	39%	49%
On Plan	29%	18%	24%	33%	26%
Above Plan	19%	13%	16%	22%	14%
Don't Know	10%	22%	13%	6%	11%
TOTAL On Plan + Above Plan	47%	31%	40%	55%	40%

	Overall	Consumption Quartiles			
		First	Second	Third	Fourth
Below Plan	43%	46%	43%	41%	41%
On Plan	29%	26%	28%	30%	29%
Above Plan	19%	16%	18%	19%	21%
Don't Know	10%	11%	10%	9%	9%
TOTAL On Plan + Above Plan	47%	43%	47%	50%	50%

Online Workbook

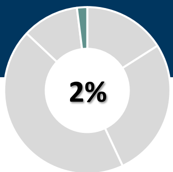
Additional Feedback on Keeping the Business Running

Residential

Q Do you have additional feedback on Toronto Hydro's draft for keeping the business running?

Response	%
Find efficiencies, cut wasteful spending, lower salaries	1.2%
Modernize, be proactive, invest for the long term	0.7%
Prevent outages, stable power, system reliability	0.4%
Support the increase (general)	0.4%
Need more information	0.3%
Oppose the increase, increase is too high (general)	0.3%
Costs are too high already, cost of living, struggling to pay bills	0.3%
Cost shouldn't be borne by all customers	0.2%
Should be funded by tax dollars/government	0.2%
Make use of existing infrastructure, past spending	0.1%
Prioritize renewables, solar/wind, and electric vehicles	0.1%
Other	0.4%
No response	95.4%

Note: Responses were optional. Only responses > 0.1% are shown.



2 Reducing Toronto Hydro's Emissions

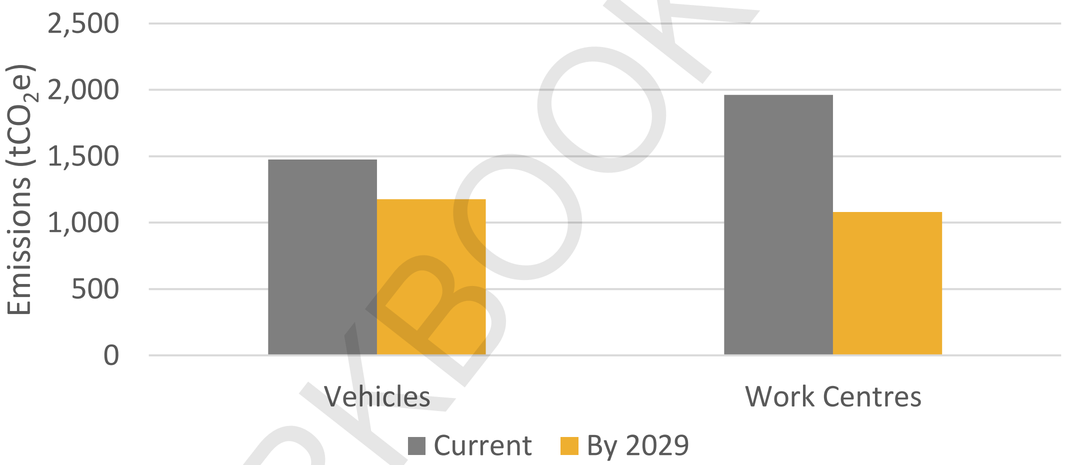
To address climate change, companies around the world are setting targets to reduce greenhouse gas (GHG) emissions from fossil fuels — a pledge commonly known as Net Zero.

Moving toward Net Zero has increasingly become the expectation of governments, financial markets, stakeholders and customers. For example, in October 2019, Toronto City Council unanimously voted to accelerate efforts to reduce emissions across the city.

To do its part in addressing climate change, Toronto Hydro is committed to reducing emissions from its vehicles and work centres by:

- Replacing gasoline and diesel power vehicles with hybrid and electric vehicles
- Converting natural gas boilers and heaters in its work centres to electric ones.

Toronto Hydro's Draft Plan to Reduce Emissions



Carbon Tax Savings

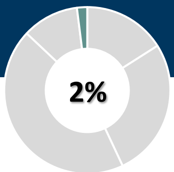
Reducing carbon emissions from vehicles and work centres could help Toronto Hydro manage rising costs due to the carbon tax (recall that the carbon tax may increase by 161% from 2023 to 2030). **Over the 2025–2029 period, Toronto Hydro's draft plan could reduce carbon tax payments by roughly half a million dollars.**

With your feedback, Toronto Hydro needs to decide how quickly to transition to cleaner sources of energy for its operations. In the next section, you will be presented these options.

WORKBOOK PAGE

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft General Plant Plan

Residential

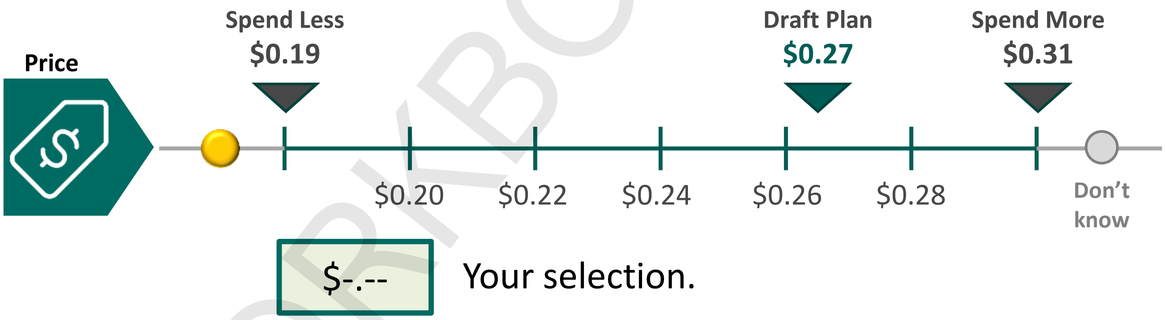


Making Choices: **Reducing Toronto Hydro's Emissions**

By 2029, Toronto Hydro's draft plan to reduce emissions would cost the typical residential customer **$0.27** more on their monthly electricity bill. Toronto Hydro could spend more for faster progress towards reducing its emissions, or spend less to slow down the progress.

	Spend Less	Draft Plan	Spend More
Environment	Less progress to reduce emissions — about 27% reduction by the end of the decade.	Steady progress to reduce emissions — about 35% reduction by the end of the decade.	Faster progress to reduce emissions — about 36% reduction by the end of the decade.
Efficiency	Higher exposure to rising energy costs (oil and gas) due to the carbon taxes and other pressures.	Managed exposure to rising energy costs (oil and gas) due to the carbon tax and other pressures.	Less exposure to rising energy costs (oil and gas) due to carbon taxes and other pressures.

Choice 7 of 7:



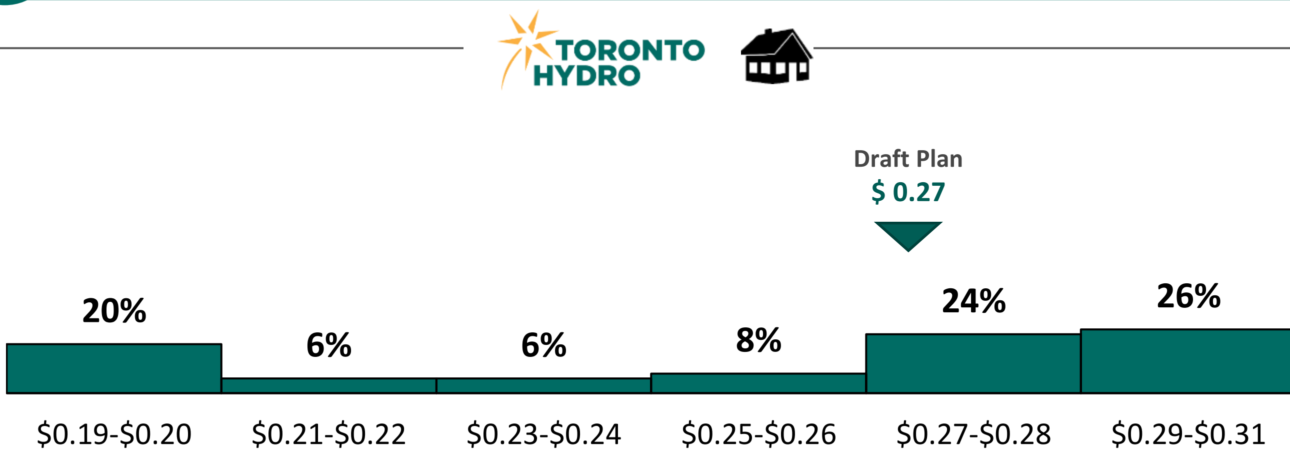
WORKBOOK PAGE

Online Workbook

Amount Spent on Decarbonization

Residential

Q How much do you think Toronto Hydro should spend to reduce its own emissions?



"Don't know" (10%) not shown.

n=32,187

	Overall	Region			
		Etobicoke/York	North York	Scarborough	Toronto/East York
Below Plan	37%	39%	43%	42%	32%
On Plan	27%	27%	25%	26%	28%
Above Plan	26%	24%	18%	18%	34%
Don't Know	10%	9%	14%	13%	7%
TOTAL On Plan + Above Plan	53%	52%	43%	45%	62%

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Amount Spent on Decarbonization

Residential

Q How much do you think Toronto Hydro should spend to reduce its own emissions?

	Overall	LEAP Qualification			
		LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Below Plan	37%	40%	39%	34%	44%
On Plan	27%	22%	27%	29%	26%
Above Plan	26%	16%	21%	32%	19%
Don't Know	10%	21%	13%	6%	11%
TOTAL On Plan + Above Plan	53%	38%	47%	60%	45%

	Overall	Consumption Quartiles			
		First	Second	Third	Fourth
Below Plan	37%	38%	37%	36%	38%
On Plan	27%	26%	27%	28%	27%
Above Plan	26%	25%	26%	27%	26%
Don't Know	10%	11%	10%	9%	9%
TOTAL On Plan + Above Plan	53%	51%	53%	54%	53%

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Online Workbook

Additional Feedback on Decarbonization

Residential

Q Do you have additional feedback on Toronto Hydro's draft decarbonization plan?

Response	%
Prioritize renewables, solar/wind, and electric vehicles	1.9%
Oppose the increase, increase is too high (general)	0.8%
Support the increase (general)	0.6%
Modernize, be proactive, invest for the long term	0.5%
Find efficiencies, cut wasteful spending, lower salaries	0.5%
Need more information	0.3%
Should be funded by tax dollars/government	0.3%
Cost shouldn't be borne by all customers	0.2%
Costs are too high already, cost of living, struggling to pay bills	0.2%
Other	0.6%
No response	94.1%

Note: Responses were optional. Only responses > 0.1% are shown.

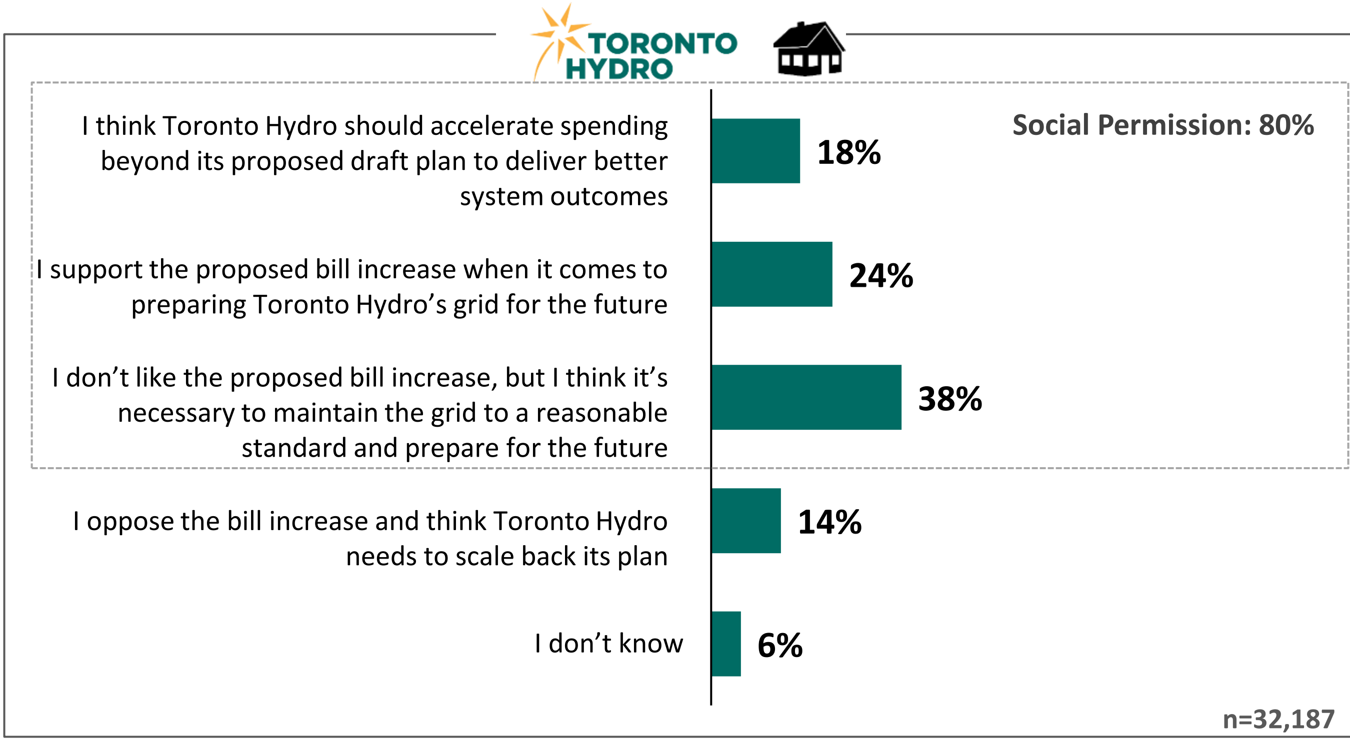
Online Workbook

Social Permission

Residential

Q Toronto Hydro has calculated an overall cost for its draft plan. While the plan may change based on feedback from the earlier questions in this survey, Toronto Hydro would like to know how you feel about the total rate impact of its current draft plan.

Considering what you have learned about Toronto Hydro's 2025–2029 draft plan and that this may result in a **$17.18 increase** in the distribution portion of your monthly electricity bill by 2029, which of the following best represents your point of view?



	Region			
	Etobicoke/York	**North York**	**Scarborough**	**Toronto/East York**
Accelerate spending	16%	16%	16%	20%
Support proposed bill	24%	23%	24%	26%
Necessary to maintain grid	39%	40%	41%	36%
Oppose the bill increase	15%	15%	13%	13%
I don't know	6%	7%	6%	5%
Social Permission	**79%**	**78%**	**80%**	**82%**

Online Workbook

Social Permission

Residential

Q

Toronto Hydro has calculated an overall cost for its draft plan. While the plan may change based on feedback from the earlier questions in this survey, Toronto Hydro would like to know how you feel about the total rate impact of its current draft plan.

Considering what you have learned about Toronto Hydro's 2025–2029 draft plan and that this may result in a **$17.18 increase** in the distribution portion of your monthly electricity bill by 2029, which of the following best represents your point of view?

	Region			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Accelerate spending	16%	14%	22%	11%
Support proposed bill	18%	25%	28%	18%
Necessary to maintain grid	38%	40%	36%	41%
Oppose the bill increase	16%	14%	11%	21%
I don't know	13%	7%	3%	9%
Social Permission	**72%**	**79%**	**86%**	**71%**

	Consumption Quartiles			
	First	Second	Third	Fourth
Accelerate spending	15%	17%	19%	21%
Support proposed bill	24%	25%	25%	23%
Necessary to maintain grid	39%	39%	38%	36%
Oppose the bill increase	16%	13%	13%	14%
I don't know	7%	6%	6%	5%
Social Permission	**77%**	**81%**	**81%**	**81%**

Online Workbook

Final Comments for the Draft Plan & Proposed Rate Increase

Residential

Q Do you have any final comments regarding Toronto Hydro's draft plan for 2025–2029 and the proposed rate increase?

Response	%
Find efficiencies, cut wasteful spending, lower salaries	2.1%
Costs are too high already, cost of living, struggling to pay bills	2.0%
Modernize, be proactive, invest for the long term	1.8%
Support the increase (general)	0.9%
Prioritize renewables, solar/wind, and electric vehicles	0.9%
Need more information	0.8%
Oppose the increase, increase is too high (general)	0.7%
Prevent outages, stable power, system reliability	0.6%
Should be funded by tax dollars/government	0.6%
Cost shouldn't be borne by all customers	0.5%
Address equity, protect low-income customers	0.4%
Should be funded by developers	0.2%
Good information	0.2%
Other	0.6%
No response	87.9%

Note: Responses were optional. Only responses > 0.1% are shown.

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Residential Customers

Online Workbook Diagnostics

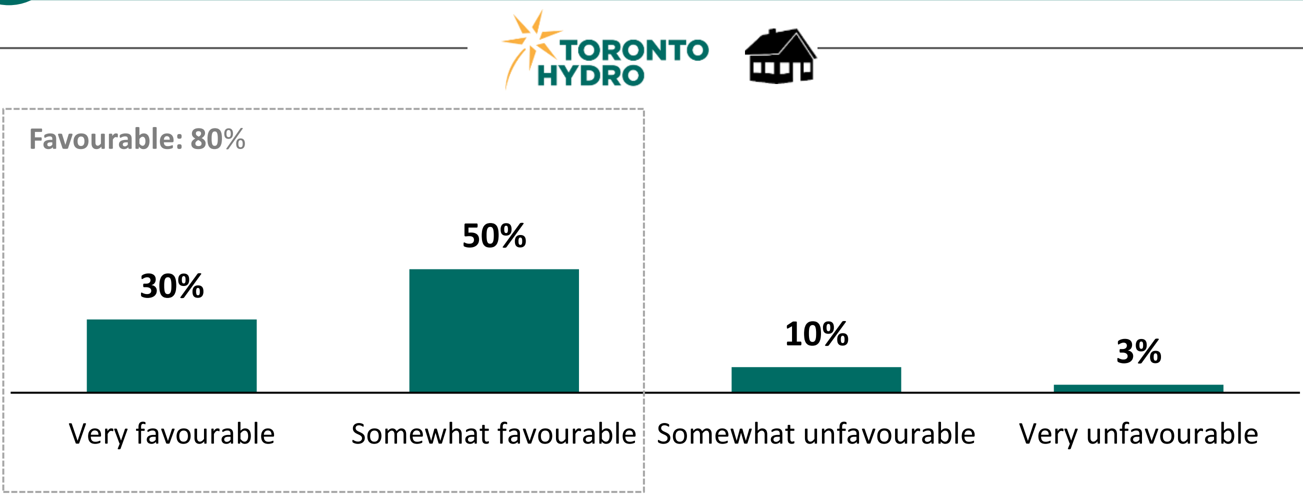
Section 9.2

Online Workbook

Workbook Impression

Residential

Q Overall, what is your impression of the survey you just completed?



"Don't know" (6%) not shown.

n=32,187

	Region			
	Etobicoke/York	**North York**	**Scarborough**	**Toronto/East York**
Very favourable	31%	28%	30%	30%
Somewhat favourable	49%	52%	51%	50%
Somewhat unfavourable	11%	10%	9%	11%
Very unfavourable	4%	3%	3%	3%
Don't know	6%	7%	7%	5%
Favourable (Very + Somewhat)	**80%**	**80%**	**82%**	**80%**
Unfavourable (Very + Somewhat)	**14%**	**13%**	**12%**	**15%**

INNOVATIVE RESEARCH GROUP

Online Workbook

Workbook Impression

Residential

Q Overall, what is your impression of the survey you just completed?

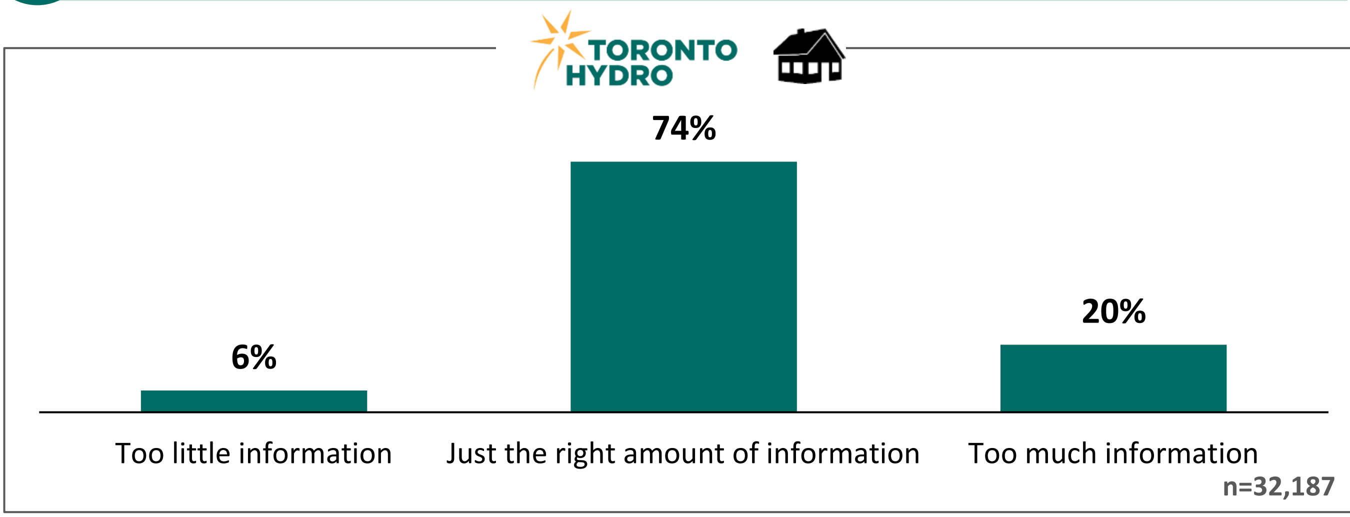
	Region			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Very favourable	28%	30%	34%	22%
Somewhat favourable	48%	52%	51%	49%
Somewhat unfavourable	11%	10%	9%	13%
Very unfavourable	3%	3%	2%	5%
Don't know	9%	6%	4%	10%
Favourable (Very + Somewhat)	**77%**	**81%**	**85%**	**71%**
Unfavourable (Very + Somewhat)	**14%**	**13%**	**12%**	**19%**

	Consumption Quartiles			
	First	Second	Third	Fourth
Very favourable	28%	29%	31%	31%
Somewhat favourable	50%	51%	51%	50%
Somewhat unfavourable	11%	10%	10%	10%
Very unfavourable	3%	3%	3%	4%
Don't know	7%	6%	6%	6%
Favourable (Very + Somewhat)	**79%**	**80%**	**81%**	**81%**
Unfavourable (Very + Somewhat)	**15%**	**13%**	**13%**	**14%**

Online Workbook
Amount of Information

Residential

Q In this survey, do you feel that Toronto Hydro provided too much information, not enough, or just the right amount?



	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Too little information	7%	7%	7%	6%
Just the right amount of information	73%	74%	77%	73%
Too much information	20%	19%	17%	21%

	LEAP Qualification			
	LEAP Qualified	Income <$52k, not Leap Qualified	Income>$52k, not LEAP Qualified	Prefer not to say
Too little information	9%	7%	5%	9%
Just the right amount of information	73%	76%	75%	69%
Too much information	18%	18%	20%	22%

	Consumption Quartiles			
	First	Second	Third	Fourth
Too little information	7%	6%	6%	7%
Just the right amount of information	72%	73%	75%	75%
Too much information	21%	21%	19%	18%

Online Workbook

Content Missing from Engagement

Residential

Q Was there any content missing that you would have liked to have seen included in this survey?

Response	%
Operational efficiencies (salaries, spending) and accountability	3.8%
Environmental sustainability, info about EVs/charging	1.7%
More information on the costs, breakdown of either the plan or bill	1.4%
Confusing, navigational issues in the survey	1.0%
Delivery charges	0.7%
Satisfied with the information presented	0.5%
Information about power generation	0.5%
Comparison to other regions or utilities	0.4%
Ways to reduce usage, save money on bill	0.3%
More historic context, past rate increases and spending	0.3%
Reliability (e.g. Plans for underground cables)	0.3%
How this benefits customers	0.3%
Survey is biased	0.3%
Other	0.7%
No response	87.7%

Note: Responses were optional. Only responses > 0.1% are shown.

Online Workbook

Outstanding Questions

Residential

Q Is there anything that you would still like answered?

Response	%
More information on the costs, breakdown of either the plan or bill	2.0%
Operational efficiencies (salaries, spending) and accountability	1.6%
Environmental sustainability, info about EVs/charging	1.1%
Reliability (e.g. Plans for underground cables)	1.1%
Ways to reduce usage, save money on bill	0.9%
Confusing, navigational issues in the survey	0.3%
Delivery charges	0.3%
Satisfied with the information presented	0.2%
Comparison to other regions or utilities	0.2%
Information about power generation	0.1%
Other	0.5%
No response	91.8%

Note: Responses were optional. Only responses > 0.1% are shown.

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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CONFIDENTIAL

APPENDIX 10

Small Business
Workbook Report

TORONTO HYDRO

November 2, 2023

STRICTLY CONFIDENTIAL

2025 – 2029 Rate Application

Report Navigation

APPENDICIES

PHASE I

PHASE II

Small Business Customers

Online Workbook Report

Section 10.1

Online Survey

Survey Design & Methodology

Toronto Hydro Electric-System Ltd. (THESL) engaged Innovative Research Group (INNOVATIVE) to design, execute and document the results of THESL's customer engagement process as part of the development of its 2025–2029 business plan.

Field Dates

All Toronto Hydro GS<50 kW (small business) customers with an email address on Toronto Hydro's file received the **Small Business Online Workbook**. Customers had the opportunity to complete the survey between **March 23rd and May 1st, 2023**.

Incentives

Customers who completed the survey between March 23rd and May 1st were invited to enter a draw to win free electricity for a year, which was provided as a lump-sum credit valued at $1,500 to be applied to the winning customer's account. The incentive as it appeared to customers in the workbook is on pg.8 of this appendix.

Small Business Online Survey Completes

A total of **695** (unweighted) Toronto Hydro small business customers completed the online survey.

Customers could complete the survey either via a unique URL sent to their emails or an open access link promoted by THESL. Customers with email addresses on file received an email invitation. It included a unique survey URL that linked back to their annual consumption, region and rate class.

Customers without email addresses on file received a paper bill insert that invited them to participate via an open access link. The open access link asked customers to enter their Toronto Hydro account number and the first three characters of the corresponding postal code. Once their account information was verified, their answers were linked back to their annual consumption, region and rate class.

Each customer was only able to complete the survey once, be it through the unique URL or the open access link.

A total of 2 (unweighted) customers entered the survey through the open access link. All other remaining completes (693 (unweighted)) entered it via the unique URL.

Online Survey

Survey Design & Methodology

Sample Weighting

The small business online survey sample has been weighted proportionately by consumption quartiles and region in order to be representative of the broader Toronto Hydro service territory.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	29 (27)	34 (31)	38 (33)	22 (32)	123 (123)
North York	35 (37)	40 (41)	34 (40)	36 (40)	145 (159)
Scarborough	22 (33)	54 (41)	32 (37)	31 (37)	139 (147)
Toronto/East York	80 (76)	70 (61)	73 (64)	65 (65)	288 (266)
Total	166 (174)	198 (174)	177 (174)	154 (174)	695 (695)

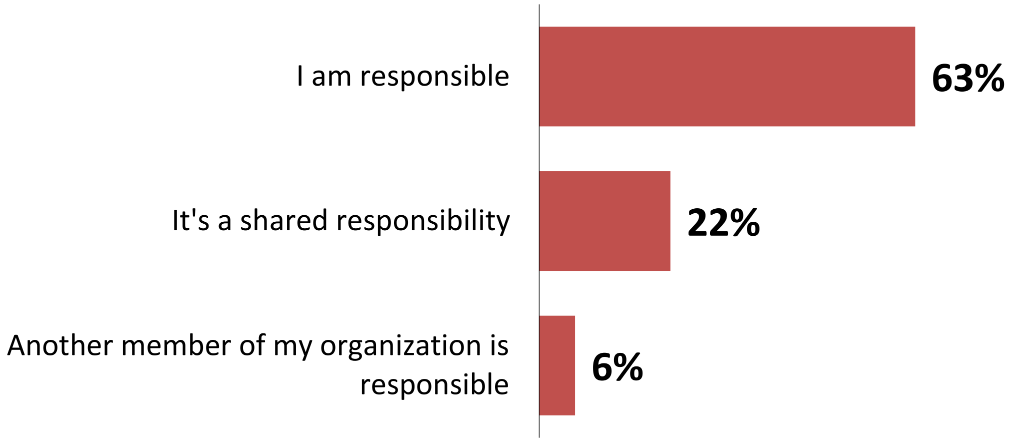
Graphs and tables may not always total 100% due to rounding values rather than any error in data.
Sums are added before rounding numbers.

Online Survey

Firmographic breakdown

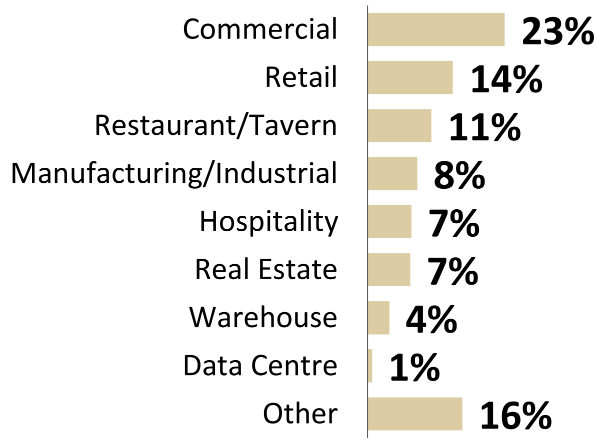
Small Business

Managing/Overseeing Organization’s Electrical or Hydro Bill



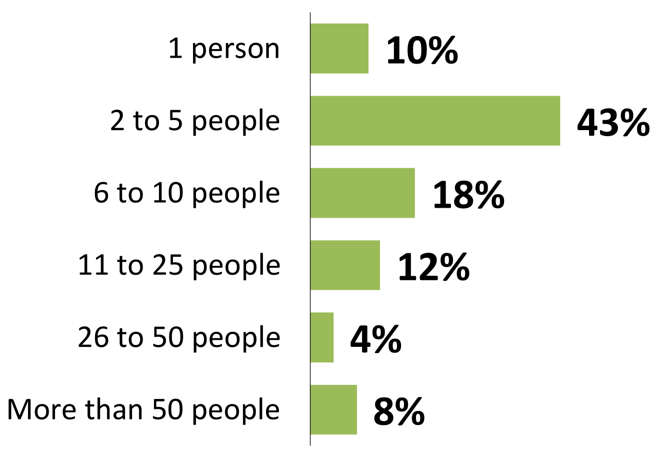
“Prefer not to say” (5%) and “Don’t know” (4%) not shown.

Sector



“Prefer not to say” (6%) and “Don’t know” (2%) not shown.

Number of Employees at the Organization



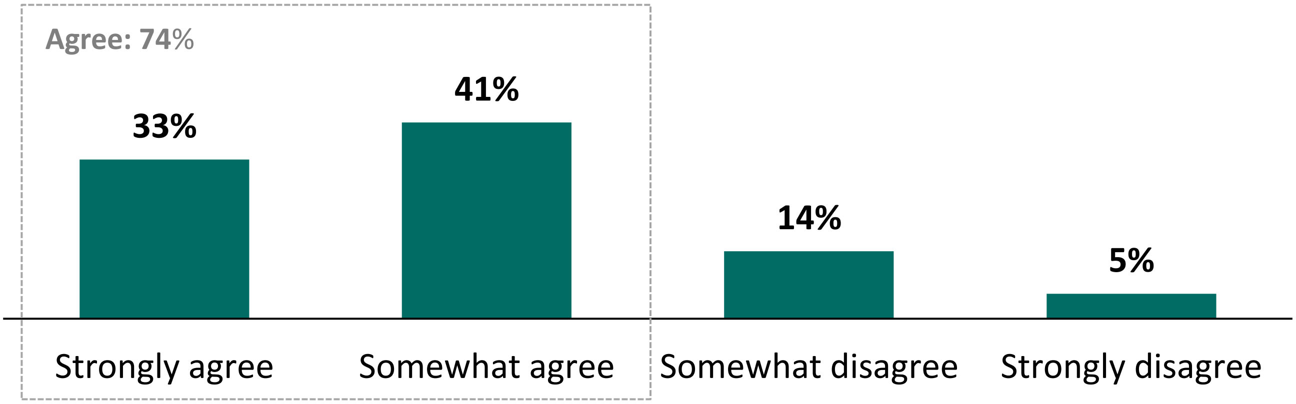
“Prefer not to say” (4%) and “Don't know” (1%) not shown.

Online Survey
Environmental Controls

Small Business

To what extent do you agree or disagree with the following statements?

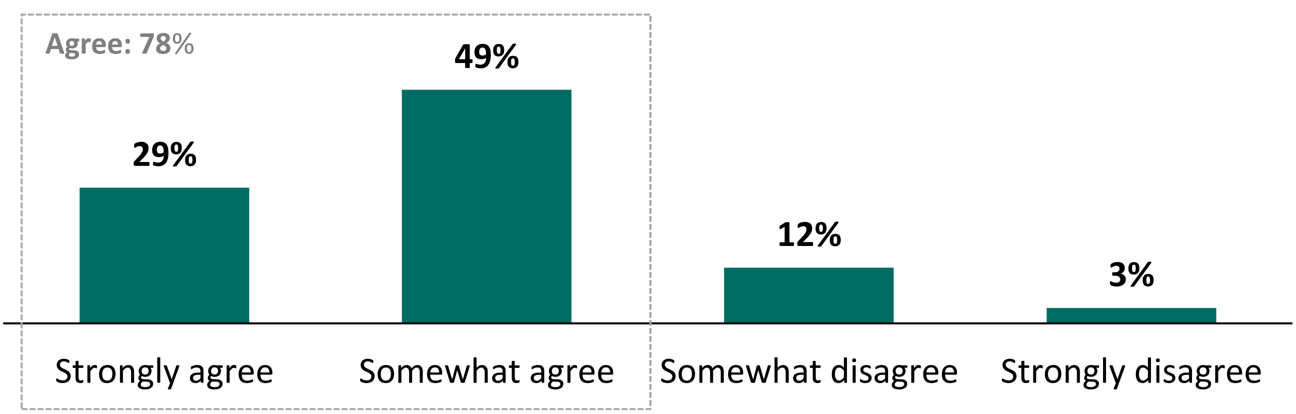
Q The cost of my organization's electricity bill has a major impact on the bottom line of my organization and results in some important spending priorities and investments being put off.



"Don't know/no opinion" (7%) not shown.

n=695

Q Customers are well-served by the electricity system in Ontario.

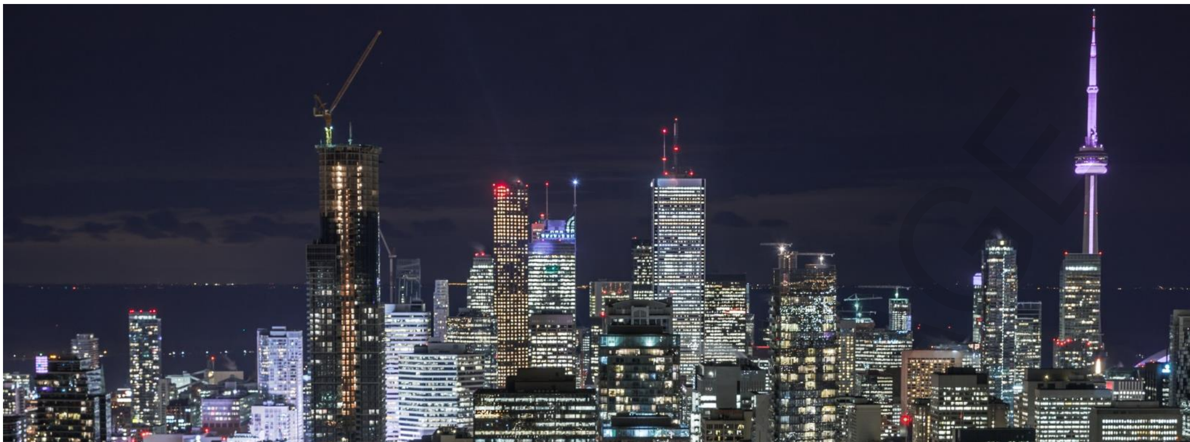


"Don't know/no opinion" (7%) not shown.

n=695

Welcome to Toronto Hydro's customer feedback survey!

Toronto Hydro needs your input to find the right balance between the services you receive and the price you pay.



Land Acknowledgement: Toronto Hydro's grid is located on the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples.

The purpose of this survey is to get your feedback on the draft 2025–2029 business plan. Your feedback will help Toronto Hydro align this plan with what you need and want.

1. Your electricity rates pay for this plan, so your views must be considered.
2. You don't need to be an electricity expert to participate. The survey is focused on basic choices and provides the background information you need to answer the questions.
3. Recognizing that people absorb information in different ways, Toronto Hydro and its research partner have designed this survey to include diagrams, charts, images and videos to help explain Toronto Hydro's draft plan and what it means for you. If you prefer to skip the videos, the content is also explained in the body of the survey.
4. Depending on how much feedback you wish to provide and the number of videos watched, this survey should take approximately **20-30 minutes** to complete. If you need to pause and return later to finish the survey, your completed answers will be saved.
5. Some of the survey content may not display correctly on a mobile browser. It is strongly recommended that you complete this workbook on a desktop or laptop computer.

Those who complete the survey will be invited to enter a draw to win one of 10 "*free electricity for a year*" prizes!

All individual responses will be kept confidential.
Innovative Research Group (www.innovativeresearch.ca), an independent research company, has been hired by Toronto Hydro to gather your feedback, while protecting your confidentiality. Your individual answers will not be shared with Toronto Hydro in any identifiable way.

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WORKBOOK

What is this customer engagement about?

The goal of this engagement is to share Toronto Hydro's draft five-year business plan for the future of the city's electrical grid and collect your feedback. This will help Toronto Hydro align its plans with your needs and preferences.

Click on the video below to learn about Toronto Hydro's customer engagement.

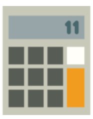
Every five years, Toronto Hydro is required to submit a plan for its proposed prices (rates) and spending to the Ontario Energy Board (OEB) for approval.

- **In 2021 and 2022, thousands of its customers told Toronto Hydro about what they need and want** to help Toronto Hydro prepare the draft 2025–2029 business plan.
- **Toronto Hydro is now looking for your input on this draft business plan** to align its investments and spending decisions with what matters to you as its customers.
- **Later this year, Toronto Hydro will present its updated business plan to the independent regulator,** the OEB. Toronto Hydro is accountable to the OEB for considering your feedback.

How will this customer engagement work?

1. The workbook explains what Toronto Hydro does and summarizes the key planning considerations that Toronto Hydro's draft plan needs to address.

2. The workbook explains how much of your electricity bill goes to Toronto Hydro, how that money is spent, and the impact of the draft plan on your 2025–2029 prices.
3. The workbook asks for your input on seven key choices that will affect the services you receive and the price you pay from 2025–2029.



Once you have finished giving feedback on the key choices, **you will have an opportunity to review and change your responses** until you feel you have found the right balance.

Want to know more about Toronto Hydro's customer engagement process? Click here.

WORKBOOK PAGE

How will your feedback impact Toronto Hydro's plan and prices?

Toronto Hydro has a five-step approach to customer feedback.

We are here

✓ 1. Identify Customer Needs, Preferences, and Priorities

In 2022, Toronto Hydro asked many types of customers from across the city about their needs and priorities for electricity distribution service.

✓ 2. Use Customer Feedback to Guide Development of Draft Plan

Toronto Hydro planners were given summaries of the key findings from the initial customer engagement to consider as they began building their plans.

3. Collect Customer Feedback on the Draft Plan

Toronto Hydro is returning to customers to get feedback on the draft plan and ask customers how the draft plan could better meet their needs and preferences.

4. Use Customer Feedback to Finalize the Plan

Toronto Hydro will re-examine and make appropriate changes to the plan based on the feedback provided by customers in this engagement.

5. Submit the Plan to the Ontario Energy Board (OEB)

Toronto Hydro will file the plan with the OEB along with a report summarizing the results of this engagement. The OEB, consumer advocates and other interested groups will examine the plan in an open and transparent public process known as a rate application.

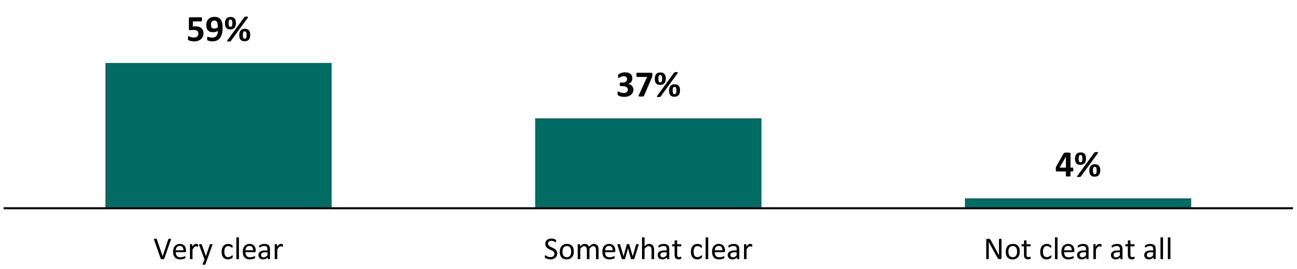
WORKBOOK PAGE

Online Workbook

Small Business

Understanding the Purpose of the Customer Engagement

Q Do you feel that the purpose of Toronto Hydro's customer engagement is clear?



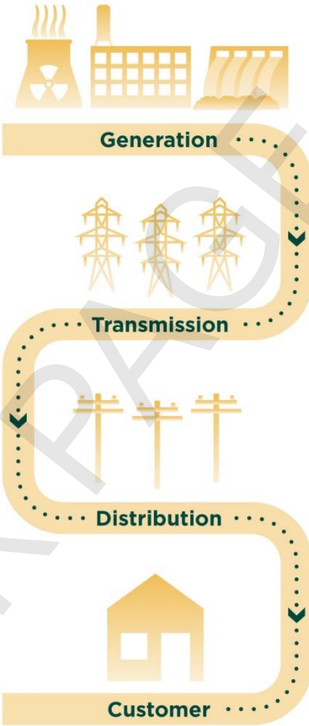
	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Very clear	52%	56%	60%	65%	59%	61%	58%	60%
Somewhat clear	45%	41%	36%	31%	35%	36%	41%	34%
Not clear at all	3%	3%	4%	5%	6%	3%	2%	6%

INNOVATIVE RESEARCH GROUP

Electricity 101

Toronto Hydro's role in Ontario's electricity system

Ontario's electricity system is made up of three parts: **generation**, **transmission** and **distribution**.



Generation

How electricity is made

About half of the electricity used in Ontario comes from nuclear power. The rest comes from a mix of hydroelectric, natural gas, wind and solar sources. Ontario Power Generation, a government-owned company, generates almost half of Ontario's electricity. The other half comes from other generators contracted by the grid operator.

Transmission

How electricity travels across Ontario

Once electricity is made, it must be sent to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. Ontario has approximately 30,000 kilometers of transmission lines, mostly owned and operated by Hydro One.

Distribution

How electricity is delivered to you

Toronto Hydro is responsible for the last step of the journey: distributing electricity locally to end-use customers.

- Toronto Hydro does not generate or transmit electricity — it owns and operates the local electricity system made up of approximately 183,620 poles, 61,300 distribution transformers, 17,060 primary switches, 15,393 kilometers of overhead wires and 13,765 kilometers of underground cables.
- Toronto Hydro is wholly owned by the City of Toronto, but it does not receive taxpayer money — it is entirely funded by the distribution rates that you pay on your electricity bill.
- Toronto Hydro provides power to roughly 2.8 million people across the city of Toronto.

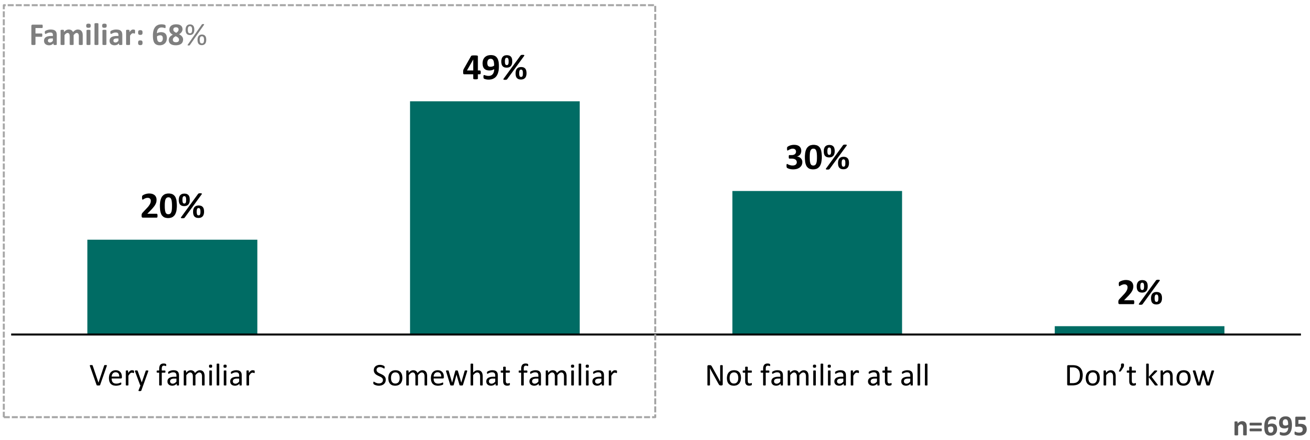
WORKBOOK PAGE

Online Workbook

Familiarity with Ontario's Electricity System

Small Business

Q Before this engagement, how familiar were you with the various parts of the electricity system, how they work together and for which services Toronto Hydro is responsible?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Very familiar	22%	23%	18%	17%	17%	21%	17%	23%
Somewhat familiar	46%	48%	50%	50%	50%	51%	47%	47%
Not familiar at all	29%	27%	31%	31%	32%	27%	33%	28%
Don't know	3%	1%	1%	2%	1%	1%	2%	2%
Familiar (Very + Somewhat)	**68%**	**72%**	**68%**	**67%**	**67%**	**72%**	**65%**	**70%**

INNOVATIVE RESEARCH GROUP

Toronto Hydro's Draft Plan

Planning Considerations

In preparing its plan, Toronto Hydro must consider many existing and emerging challenges of delivering safe, reliable and clean electricity at a reasonable price.

To learn more about what Toronto Hydro must consider in preparing its draft plan, click on the topics below.

Key challenges that Toronto Hydro's 2025–2029 draft plan addresses:

Keeping prices reasonable

- Many customers are concerned about the rising cost of doing business
- Toronto Hydro must find the right balance between the investment needs of the local grid and the financial needs of its customers.

Responding to rising costs

- Like many companies, Toronto Hydro faces rising costs in purchasing equipment for the grid and doing construction work in the city.
- For example, from 2021 to 2022, the cost of buying electrical equipment increased by 9.9% while the cost of non-residential construction in the city of Toronto rose by 15.6%.

Powering a growing urban city

- Toronto is not just the largest city in Canada and an engine of the Canadian economy, it is also one of the fastest growing cities in North America.
- As the city continues to grow, the grid needs to be ready to power new condo towers, residential communities and businesses.

Fixing and replacing equipment in poor condition

- Much of Toronto Hydro's grid was installed in the 1950s and 1960s and needs to be replaced or upgraded.
- To keep the grid safe and reliable now and in the future, Toronto Hydro monitors the condition of its grid and uses this information to upgrade the equipment most at risk.

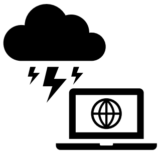
Reducing emissions from its own operations

- Toronto Hydro is committed to decarbonizing the company's footprint by 2040. To meet this goal, it must invest in reducing emissions from its vehicles and work centres.
- Toronto Hydro is expected to reduce its emissions by switching from oil and natural gas to clean electricity for powering its own operations.

Keeping up with the way customers use electricity

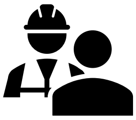
- Customers are using more electricity for their day-to-day energy needs such as electric vehicles for transportation and electric heat pumps for heating. They are also choosing new technologies such as solar panels and battery storage to manage their electricity use and sell electricity to the local grid.
- To ensure customers can connect new technologies to the grid safely and reliably, Toronto Hydro needs to upgrade its equipment and modernize its systems.

WORKBOOK PAGE



Responding to extreme weather and cyber security attacks

- Extreme weather such as high heat, high winds, flooding and ice storms is increasingly straining and damaging to electricity grids.
- Cybercrime is on the rise across Canada. For example, Toronto Hydro is the target of around one million attempted cyber attacks each year, with attempts going over one million in 2022 (successfully deflected).
- Toronto Hydro needs to make the grid more resilient against extreme weather and cyber security attacks that could compromise reliability and put customers at risk.



Protecting public and employee safety

- Toronto Hydro and its customers have a strong safety record, but electricity is dangerous and safety cannot be taken for granted.
- As homes and businesses add new technologies that increase the amount of electricity flowing around us, Toronto Hydro must ensure that the grid remains safe for its employees and the public.

WORKBOOK PAGE

How much of my electricity bill goes to Toronto Hydro?

Every item on your bill is required by provincial regulation.

- Toronto Hydro collects payment for the entire electricity system, but only keeps the distribution portion of the "**Delivery**" charge. This charge pays for both Toronto Hydro's **distribution** system and Hydro One's **transmission** system, as well as line losses (power that is lost when electricity travels across the wires).
- **About 31% of the electricity bill goes to Toronto Hydro** to pay for the local distribution grid. The **remaining 69%** of the bill goes to generation companies, transmission companies, the federal and provincial governments, and regulatory agencies.

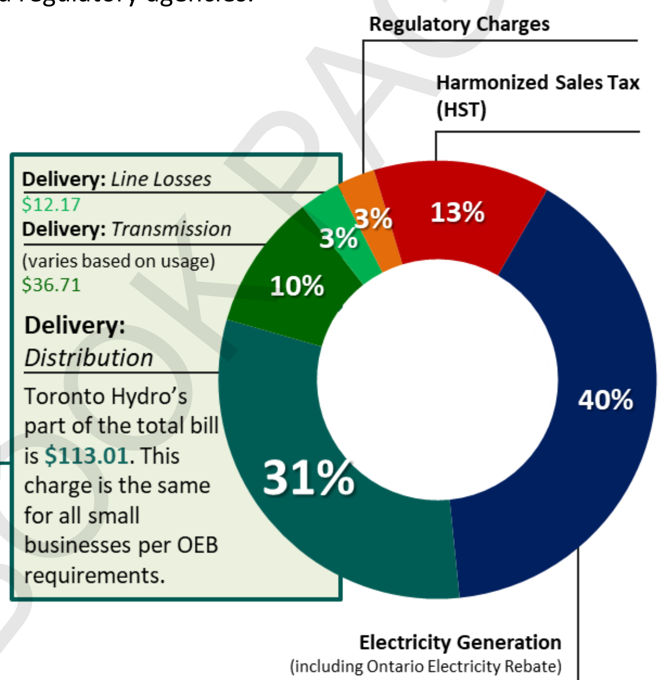
Typical Small Business Bill

Sample Toronto Hydro Monthly Bill
(based on consumption of 2,000 kWh as of Jan. 1, 2023)

Account Number:
0000000000

Meter Number:
00000000

Your Electricity Charges	
Electricity	
On-Peak (highest price) @ 15.1 c/kWh	54.36
Mid-Peak (mid price) @ 10.2 c/kWh	36.72
Off-Peak (lowest price) @ 7.4 c/kWh	94.72
Delivery	161.89
Regulatory Charges	10.96
Total Electricity Charges	**$358.65**
HST	46.62
Ontario Electricity Rebate	**(-$41.96)**
Total Amount	**$363.31**



Note: For time of use Off-/Mid-/On-peak split 64%/18%/18% according to the OEB rate model.
The Sample Bill is based on the OEB rates effective January 1, 2023.

Who holds Toronto Hydro accountable?

ONTARIO ENERGY BOARD

The **Ontario Energy Board (OEB)** is the public interest regulator responsible for setting electricity distribution rates (prices) and for protecting customers in Ontario.

The OEB holds Toronto Hydro accountable for:

- How it spends your money in current and future plans.
- Reporting on key outcomes (reliability) through an annual scorecard.
- Finding savings and efficiencies to absorb rising costs.

Want to know more about what Toronto Hydro has done to become more efficient? Click here.

WORKBOOK PAGE

What has Toronto Hydro done to become more efficient?

- Reduced the total number of facilities and gave back roughly $158 million to customers, resulting in a total credit of $232.80 on the average customer's bill in this rate class from 2016 to 2021.
- Delivered approximately $10 million in reduced or avoided costs in this current 2020–2024 period by replacing outdated information systems with consolidated programs, enabling automation and lowering maintenance costs.
- Implemented new technology to automate crew scheduling, enabling Toronto Hydro to maximize crew working hours and respond to power outages quicker.

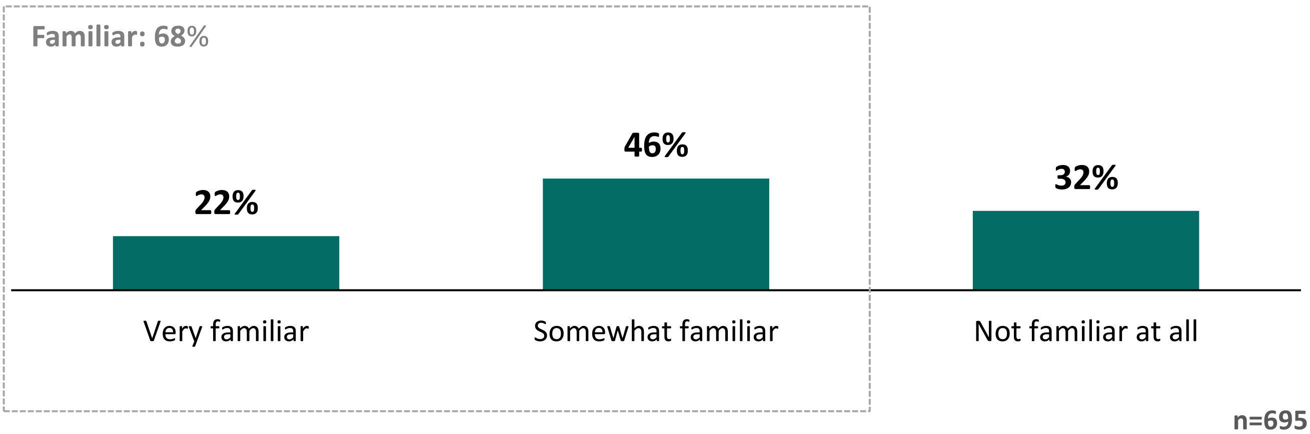
WORKBOOK PAGE

Online Workbook

Small Business

Familiarity with the Percentage of Bill Remitted to Toronto Hydro

Q Before this customer engagement, how familiar were you with the amount of your electricity bill that went to Toronto Hydro?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Very familiar	24%	27%	19%	20%	17%	27%	17%	28%
Somewhat familiar	46%	46%	44%	46%	49%	45%	50%	39%
Not familiar at all	29%	27%	38%	34%	34%	29%	34%	33%
Familiar (Very + Somewhat)	**71%**	**73%**	**62%**	**66%**	**66%**	**71%**	**66%**	**67%**

How does Toronto Hydro propose to spend the money?

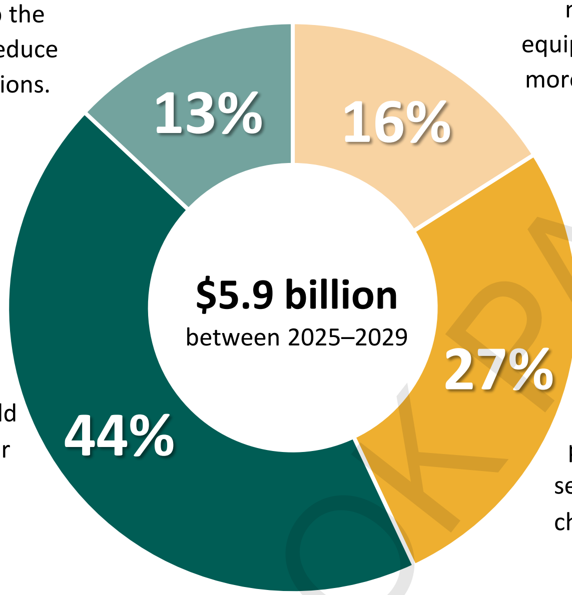
Toronto Hydro's five-year 2025–2029 draft plan is made up of four spending categories.

General Plant

Investments in vehicles, work centres and IT to keep the business running and reduce Toronto Hydro's emissions.

Modernization

Investments in technology to get more use out of existing equipment, and build a smarter, more efficient and reliable grid.



Sustainment

Investments to upkeep old equipment that is in poor condition and replace outdated equipment.

Growth

Investments in capacity to power the growing city and serve customers' growing and changing needs for electricity.

Want to know more about Toronto Hydro's current and future budgets? Click here.

How much will Toronto Hydro's draft plan cost me?

At the end of the five-year plan (2029), the typical customer in this rate class would see the distribution portion of their electricity bill increase by **$50.88**: from an estimated rate (price) of $117.57 in 2024 to a proposed rate (price) of **$168.45 by 2029.**

	Year	Avg. Monthly Bill	Toronto Hydro Portion	Toronto Hydro's Portion: Annual Increase (%)	Toronto Hydro's Portion: Annual Increase ($)
	2023	$363.31	$113.01	n/a	n/a
	2024	$361.57	$117.57	4%	$4.56
Rate Period	**2025**	$376.64	$132.47	13%	$14.90
Rate Period	**2026**	$383.83	$139.56	5%	$7.09
Rate Period	**2027**	$392.73	$148.33	6%	$8.77
Rate Period	**2028**	$406.18	$161.61	9%	$13.28
Rate Period	**2029**	$413.12	$168.45	4%	$6.84
5-yr impact			**$50.88**	**43%**	**$50.88**

Note: These estimated rate increases are preliminary and are subject to change based on customer feedback and other factors. A typical customer in this rate class is assumed to use 2,000 kWh per month and enrolled under Time-of-use Regulated Price Plan. Bill projections assume that other aspects of the electricity bill that are outside of Toronto Hydro's control (commodity, transmission, government, regulatory fees) remain constant.

Toronto Hydro Background

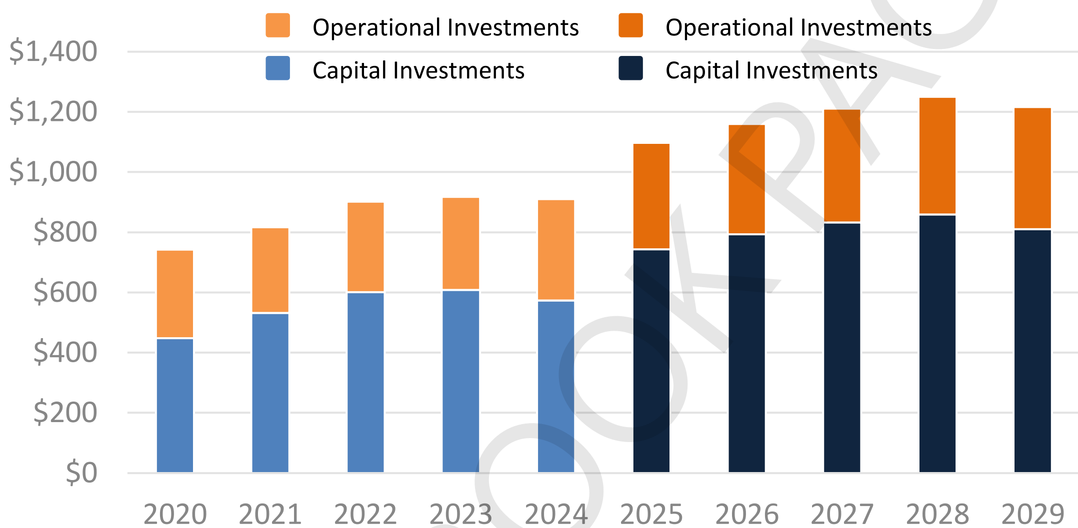
How much does it cost to run the local grid?

To run the local grid and serve customers, Toronto Hydro manages two budgets:

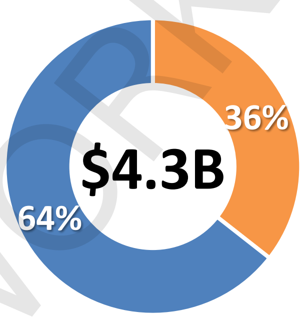
1. A **capital investment** budget which pays for the cost of buying and constructing physical infrastructure such as poles, wires, transformers, facilities, trucks and computers.

2. An **operational investment** budget which pays for maintenance and operation of the equipment, as well as the staff needed to manage the grid and serve customers daily.

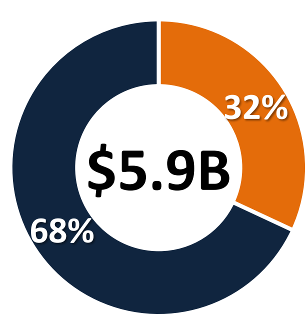
Current and Future Budgets per year ($ millions)



2020–2024
Current Budget
(OEB Approved Plan)



2025–2029
Future Budget
(Draft Plan)



The current five-year budget of **$4.3 billion** is based on the 2020–2024 plan approved by the OEB in a previous rate application. As mentioned earlier, this amount is funded by your 2020–2024 distribution rates.

The future five-year budget of **$5.9 billion** is based on the 2025–2029 draft plan presented in this customer feedback survey. The final budget for this next rate period will be adjusted to reflect customer feedback collected through this engagement and will be subject to extensive OEB review before rates are set for 2025–2029.

WORKBOOK PAGE

How does the survey work?

The next sections are about 7 key choices that Toronto Hydro needs to make to finalize its plan.

Each section provides some key background information. We encourage you to take the time to learn about your local electricity grid and where your money is going.

We also understand that life is busy. Many people find this information interesting — but if you would prefer to skip over the videos or the background information, you can jump right to the key choices.

How do I make choices?

Each choice has a summary of three options that Toronto Hydro considered:

- **Spend Less:** A minimum spending option that keeps prices lower and meets the basic performance requirements but may entail some trade-offs on key outcomes, such as reliability.
- **Toronto Hydro's Draft Plan:** An option currently in the draft plan which makes additional progress toward key outcomes but delays some important work.
- **Spend More:** A faster paced spending option that makes additional progress towards better outcomes while recognizing practical limits due to resources and construction issues.

In each option, there is a sliding scale that enables you to dial the draft plan up or down. While Toronto Hydro's technical experts can tell us the maximum and minimum amounts we can practically spend, the balance of how much Toronto Hydro spends on the spectrum is up to customers like you.

At the end of the survey, you will get a summary of your choices and you will have the opportunity to change your answers to find the right balance for you.

BOOK PAGE

SAMPLE OPTIONALITY SLIDER QUESTION (data not recorded)

How much do you think Toronto Hydro should spend on this part of its draft plan?

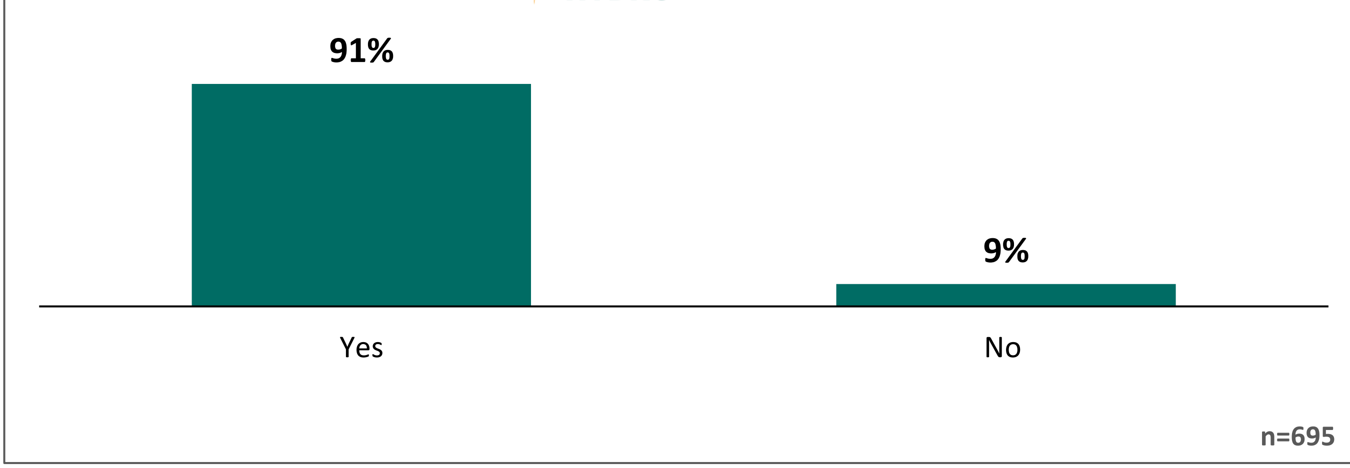
Please use the slider below to make a selection.

Online Workbook

Understanding the Slider

Small Business

Q Is it clear that you can move the slider to any amount you feel best reflects your personal view of the best balance between lower costs and faster improvements?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Yes	88%	89%	91%	93%	90%	91%	92%	90%
No	12%	11%	9%	7%	10%	9%	8%	10%

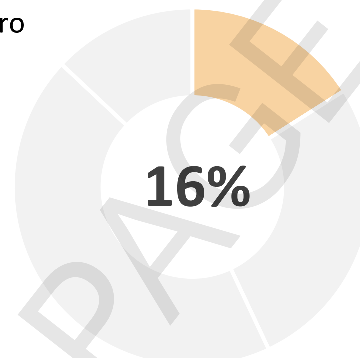
Draft Modernization Plan

Build a Smarter, More Efficient and Resilient Grid

What is this section about?

- This section explains how technology is changing the way customers use electricity and how Toronto Hydro operates and manages the grid to make it smarter, more efficient and resilient for customers.

  Want to learn more about how grid modernization benefits you? Click on the topics below.



- **Toronto Hydro's draft modernization plan enables:**
  - Faster and cheaper power restoration
  - More efficient use of existing equipment
  - Customer choice to adopt new technologies
  - Resilience against weather and cyber attacks

- This spending category makes up **16% of the draft plan** and would add **$8.39** on the average customer in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft modernization plan**.*

WORKBOOK PAGE

Modernization Plan

Building a Smarter, more Efficient and Reliable Grid

Toronto Hydro's Modernization Plan has four main objectives:

Faster and cheaper power restoration

- Through automation, the smart grid can achieve self-healing capabilities. This means that the distribution grid on your street will be able to locate outages and restore power automatically.
- The smart grid enables Toronto Hydro to reduce the number and length of outages customers experience. It also reduces manual costs (trucks and crews) of responding to power outage events.

More efficient use of existing equipment

- As customers use more electricity, some equipment will reach its limits. Sensors and meters detect when and where these limits are approaching, enabling Toronto Hydro to make better decisions.
- The smart grid enables Toronto Hydro to get more use out of the existing equipment so that it can serve a greater customer need for electricity without having to build as much new infrastructure.

Customer choice to adopt new technologies

- Sensors, switches and software enable Toronto Hydro to monitor and control the flow of electricity so that customers can choose technologies to produce, store and sell power to the grid.
- The smart grid is designed to allow safe and reliable two-way power flow — from the grid to the customers and from customers to the grid. This system can reduce costs and makes the local grid more resilient to outages.

Resilience against weather and cyber attacks

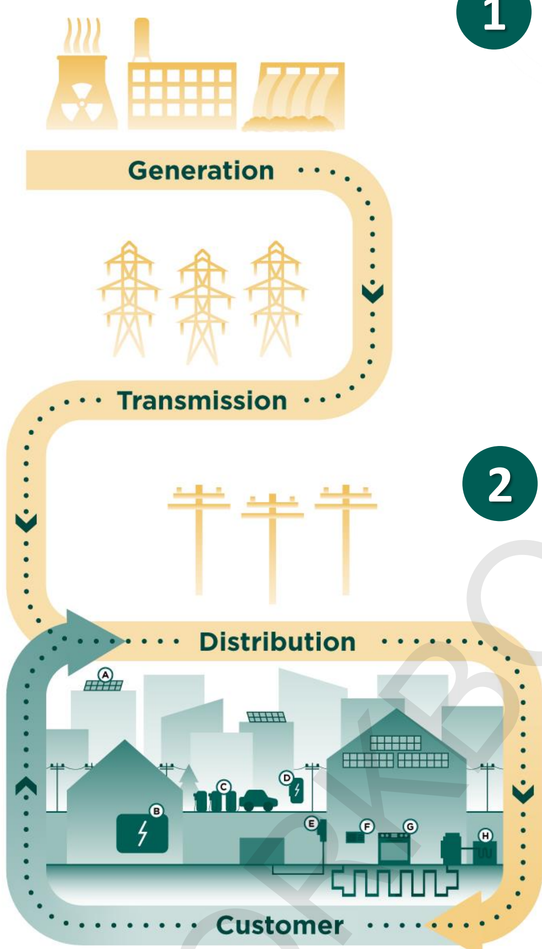
- Cyber attacks are increasing and getting more complex. Toronto Hydro must be prepared to respond to these threats to maintain reliable service and protect customer information.
- In addition to being able to restore power quicker, the smart grid can sense when environmental conditions like flooding pose a risk. This enables grid operators to strengthen the grid.

WORKBOOK PAGE

Modernization: Changing Technology, Changing Needs

For more than 100 years, things changed relatively slowly in terms of grid technology. Electricity was generated in large power stations and transmitted from around the province to Toronto Hydro's grid, and ultimately to homes and businesses. That is all changing, and because of technological advancement, the pace of change could be fast.

Toronto Hydro's 2025–2029 plan is shaped by two key changes in technology:



A. Solar panel
B. Battery storage
C. Public electric vehicle charging station
D. On-site backup generation
E. Smart meter
F. Home energy manager
G. Energy-efficient appliances
H. Heat pump

1 **Technologies that change how customers use electricity.** These include:

- Electricity products like electric vehicles, heat pumps and electric stoves that enable customers to use less fossil fuels (oil and gas), which contribute to climate change.
- Technologies like solar panels and battery energy storage that allow customers to produce and manage their electricity as well as sell it back onto the grid.

2 **Technologies that change how Toronto Hydro operates the grid**. These key changes are:

- The grid must shift from a **one-way system** that only sends electricity to customers to a **two-way system** that allows customers to generate and sell electricity to the grid.
- **Smart grid technology like sensors and automation** enables Toronto Hydro to monitor key equipment to prevent outages and get better use out of existing equipment. When outages do occur, this technology can re-route the grid to restore power much more quickly and at a lower cost than today.

WORKBOOK PAGE

How much electricity does it take to charge an Electric Vehicle (EV)?

Did you know that when an EV is charging it can use as much electricity as two average homes? If everyone in a neighbourhood came home from work or school and started charging their EVs at the same time, the electricity demand could overload the grid.

Making Choices: **Modernization**

By 2029, Toronto Hydro's draft **modernization plan** would cost the typical customer in this rate class **$8.39** more per month on their monthly electricity bill. Toronto Hydro could spend more to increase the pace of modernizing the grid to get better reliability sooner, or it could spend less and slow down the progress.

	Spend Less	Draft Plan	Spend More
Reliability	Being ready to automate the grid by 2035 means that better reliability won't happen until the end of the next decade or beyond.	Being ready to automate the grid by 2030 means that better reliability will happen in the earlier part of the next decade.	Faster progress towards grid automation means better reliability earlier and improved reliability for critical loads located in the downtown area.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	Same as draft plan.
Efficiency	It will take longer for the grid to become more efficient. This may lead to higher costs in the next decade.	The grid will become more efficient in the next decade, which will help reduce costs.	Same as draft plan.

Choice 1 of 7:

Price

Spend Less **$6.15** | Draft Plan **$8.39** | Spend More **$11.53**

$7.04 | $7.93 | $8.83 | $9.73 | $10.62 | Don't know

$-.-- Your selection.

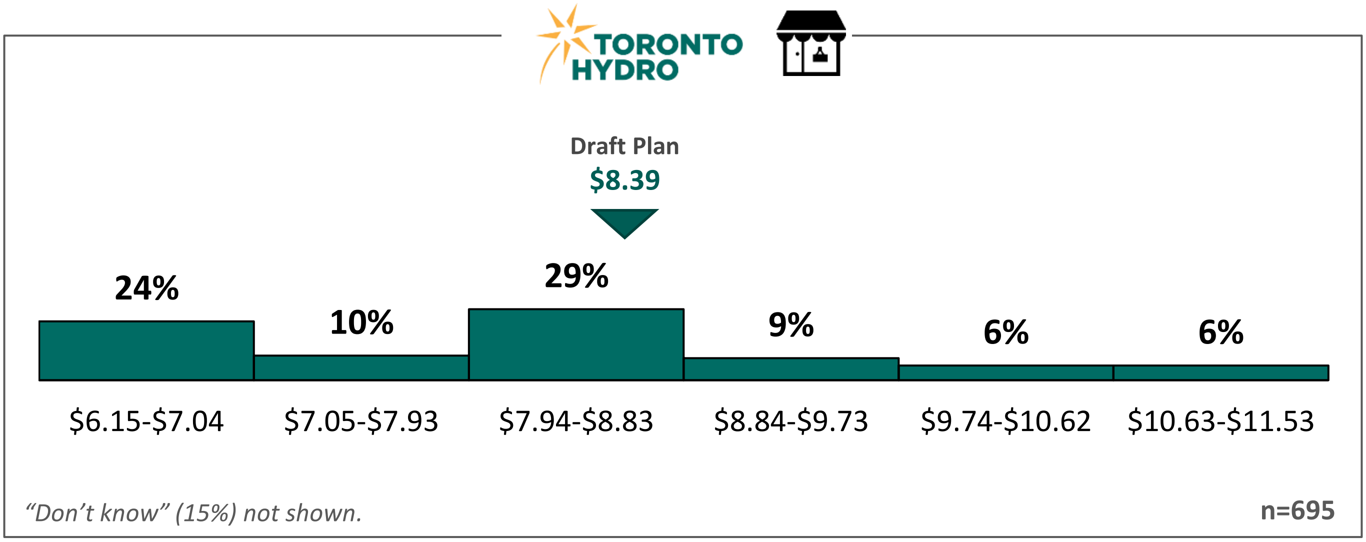
WORKBOOK PAGE

Online Workbook

Amount Spent on the Modernization Plan

Small Business

Q How much do you think Toronto Hydro should spend on its modernization plan?



	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	38%	39%	39%	38%	38%	44%	41%	40%	29%
On Plan	22%	20%	23%	20%	24%	20%	14%	24%	30%
Above Plan	24%	27%	20%	22%	27%	22%	31%	22%	22%
Don't Know	15%	14%	18%	20%	11%	13%	15%	15%	18%
TOTAL On Plan + Above Plan	46%	47%	43%	42%	51%	43%	45%	46%	53%

Online Workbook

Additional Feedback on the Modernization Plan

Small Business

Q Do you have additional feedback on Toronto Hydro's draft modernization plan?

Response	%
Modernize, be proactive, invest for the long term	2.8%
Costs are too high already, cost of living, struggling to pay bills	1.6%
Prioritize renewables, solar/wind, and electric vehicles	1.4%
Oppose the increase, increase is too high (general)	1.1%
Need more information	0.8%
Should be funded by tax dollars/government	0.8%
Cost shouldn't be borne by all customers	0.7%
Support the increase (general)	0.6%
Find efficiencies, cut wasteful spending, lower salaries	0.6%
Prevent outages, stable power, system reliability	0.6%
Support developing new technology and innovation	0.4%
Good information	0.3%
Other	0.3%
No response	88.1%

Note: Responses were optional. Only responses > 0.1% are shown.

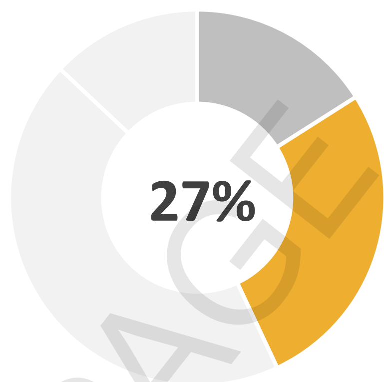
Draft Growth Plan

Increase Capacity to Serve Customers

What is this section about?

- This section explains how fast the city of Toronto is growing and what it takes for the grid to serve customers' needs for more electricity.

- Toronto Hydro's draft growth plan is about increasing grid capacity to serve customers reliably now and in the future.



- This spending category makes up **27% of the draft plan** and would add **$13.67** on the average customer in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft growth plan**.*

WORKBOOK PAGE

Growing City, Growing Needs

1 Toronto is growing, fast.

Toronto is one of the fastest growing cities in North America. A growing city means that we need a bigger local grid so that homes and businesses can get the power they need, when they need it.

Population Growth

Toronto will add approximately 500,000 more people this decade. To put this into context, Toronto is growing five times faster than Los Angeles.

230 Cranes
Toronto has led the crane count in North America since 2015.

2,114 Projects
including residential and non-residential in development in the city of Toronto.

+$1B in Construction
work planned for city infrastructure in Toronto annually (transportation and water).

2 Individual customers will use more electricity than ever before.

The average customer will use more electricity in the next 10–15 years, as governments encourage businesses and communities to use less fossil fuels (oil and gas) to address climate change. Here are the key government policies that drive the need for more electricity in Toronto:

2026
The Government of Canada may require 20% of all new car sales to be zero emission and is working towards a target of 60% by 2030.

2028
The City of Toronto Green Building Standard requires all new mid- and high-rise buildings to be near zero GHG emissions.

2030
The carbon tax may increase 161% by 2030 so customers use less oil and gas, and switch to clean electricity for cooking, heating and transportation.

23% **Forecasted increase in customers' need for electricity by the year 2030.**

Conservation and energy efficiency has helped manage electricity use over the past 20 years and will continue to play an important role in the future. But conservation alone is not enough. We need a bigger grid to serve customers in the long term.

WORKBOOK PAGE

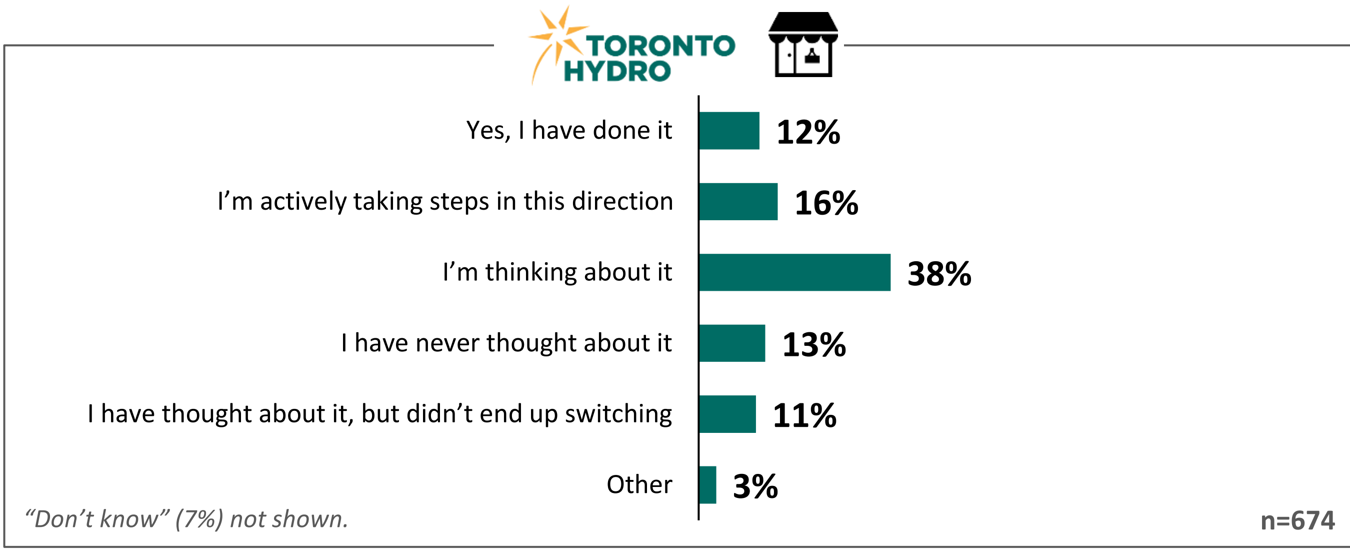
Online Workbook

Amount Spent on Growth Plan

Small Business

Q

When you think about all your energy bills, has your organization ever considered shifting from one energy source to another to save money or reduce your impact on the environment?
For example, changing from a natural gas-fuelled furnace to an electric heat pump, or from a gas-fuelled vehicle to an electric vehicle?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Yes, I have done it	11%	13%	14%	11%	16%	13%	11%	8%
Actively taking steps	14%	17%	14%	16%	17%	12%	15%	18%
I'm thinking about it	40%	39%	39%	35%	32%	45%	38%	36%
I have never thought about it	12%	11%	14%	14%	11%	12%	16%	13%
I didn't end up switching	13%	11%	12%	10%	12%	10%	12%	11%
Other	7%	7%	3%	9%	8%	4%	6%	10%

Note: Responses were optional.

Building a bigger grid takes time

It's easy to say Toronto needs more electricity, but meeting this need requires Toronto Hydro to make major investments in the grid, including:

Expand Transformer Stations

Bring more power into the city from the provincial grid to serve growing communities along the new transit corridors (Eglinton LRT, Finch LRT, Ontario Line) and the redevelopment of areas like Downsview Park and the Portlands.

Upgrade and Reconfigure the Grid

Make more space on the grid to enable customers to plug in. Upgrade equipment like cables and transformers and reconfigure how the existing system serves customers to make more space on the grid to accommodate new services like electric vehicle charging stations and solar panels.

Major Infrastructure Developments

Connect major projects like the Finch Light Rail Transit system and the Ontario Line, and relocate Toronto Hydro's grid equipment to enable these and other major infrastructure developments to be constructed in the city.

This work cannot happen quickly. Toronto is densely populated and congested. **Building new power lines and stations takes years of planning and construction.** There are also equipment and resource constraints that limit how quickly Toronto Hydro can build a bigger grid.

Managing Uncertainty

Toronto Hydro develops its forecast from information such as building permits and projected electric vehicle sales. However, customer adoption of new technology is uncertain due to:

Supply chain issues such as equipment and resource shortages can affect the availability of customer technologies.

Technological advancements can lead to fast cost reductions. For example, the price of lithium ion batteries (EVs) decreased by 79% from 2013 to 2022.

Government policies such as rebates for electric vehicles and solar panels drive customers and suppliers to make certain choices.

If Toronto Hydro invests too quickly to build a bigger grid, it means customers' rates will go up to pay for equipment that will not be used for some time. On the other hand, if it doesn't do enough to expand the grid for higher use of electricity, customers could experience less reliability (brownouts) and delays when they want to connect to the grid or plug in new technologies. Toronto Hydro needs your input on the pace for these investments.

WORKBOOK PAGE

Making Choices: **Growth**

By 2029, Toronto Hydro's draft **growth plan** would cost the typical customer in this rate class **$13.67** more per month on their monthly electricity bill. Toronto Hydro could spend more to better prepare the grid to serve customers' changing needs, or could spend less and wait and see if customers adopt new technologies over the 2025–2029 plan.

	Spend Less	Draft Plan	Spend More
Reliability	May lead to less reliability for customers in high-growth neighbourhoods. Increases reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Manages reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Improves reliability risk for the next decade.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	May improve service levels (shorter waits and lower costs) for some customers connecting new services to the grid. Improves customer choice for new technologies.
Efficiency	May lead to less efficient work if Toronto Hydro has to build a bigger grid reactively to serve customers.	Supports the ability to serve customers efficiently in the five-year plan based on the projected demand.	Supports the ability to serve customers efficiently in the five-year plan and beyond in the next decade.

Choice 2 of 7:

Price

Spend Less **$10.30** | **Draft Plan** **$13.67** | **Spend More** **$17.00**

$11.41 | $12.52 | $13.64 | $14.76 | $15.87 | Don't know

$-.-- Your selection.

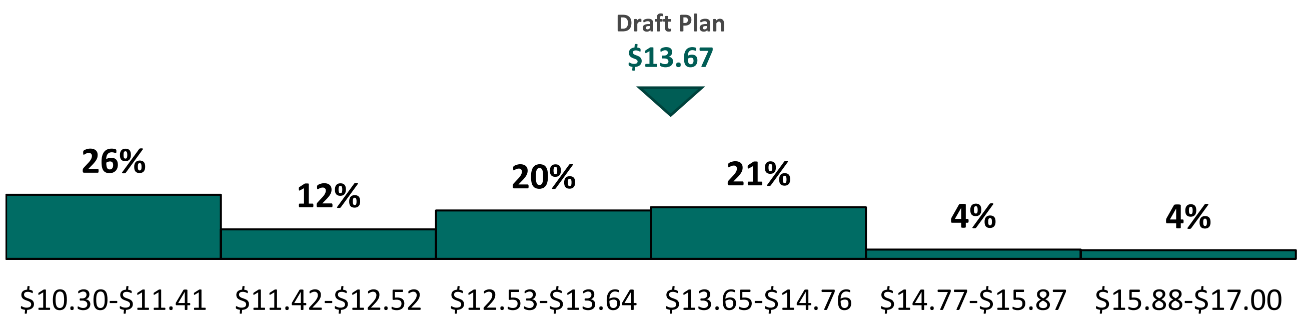
WORKBOOK PAGE

Online Workbook

Amount Spent on the Growth Plan

Small Business

Q How much do you think Toronto Hydro should spend on its growth plan?



"Don't know" (13%) not shown.

n=695

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	51%	54%	47%	54%	50%	57%	52%	53%	41%
On Plan	25%	22%	27%	23%	26%	22%	21%	26%	30%
Above Plan	11%	12%	9%	7%	14%	9%	14%	9%	12%
Don't know	13%	13%	17%	16%	11%	12%	12%	13%	17%
TOTAL On Plan + Above Plan	36%	34%	36%	30%	40%	31%	36%	34%	42%

INNOVATIVE RESEARCH GROUP

Online Workbook

Additional Feedback on the Growth Plan

Small Business

Q Do you have additional feedback on Toronto Hydro's draft growth plan?

Response	%
Costs are too high already, cost of living, struggling to pay bills	1.4%
Prioritize renewables, solar/wind, and electric vehicles	1.4%
Find efficiencies, cut wasteful spending, lower salaries	1.2%
Should be funded by developers	1.0%
Oppose the increase, increase is too high (general)	0.6%
Should be funded by tax dollars/government	0.6%
Cost shouldn't be borne by all customers	0.5%
Modernize, be proactive, invest for the long term	0.4%
Prevent outages, stable power, system reliability	0.3%
Need more information	0.3%
Address equity, protect low-income customers	0.2%
Make use of existing infrastructure, past spending	0.1%
Other	0.4%
No response	91.8%

Note: Responses were optional. Only responses > 0.1% are shown.

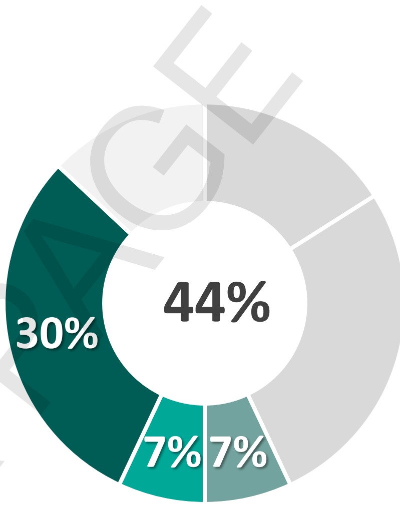
Draft Sustainment Plan

Replacing and Updating Equipment

What is this section about?

- This section is about upkeeping the grid to manage reliability and maintain safe and efficient operations.
- Toronto Hydro's draft sustainment plan section seeks your input in three areas:

1. Managing equipment in very poor condition with a high risk of failure.
2. Pacing the upkeep of equipment near the end of its expected life.
3. Standardizing outdated equipment.



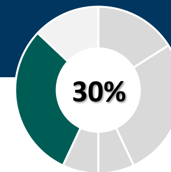
- This spending category makes up **44% of the draft plan** and would add **$22.28** on the average customer in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft sustainment plan**.*

WORKBOOK PAGE

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

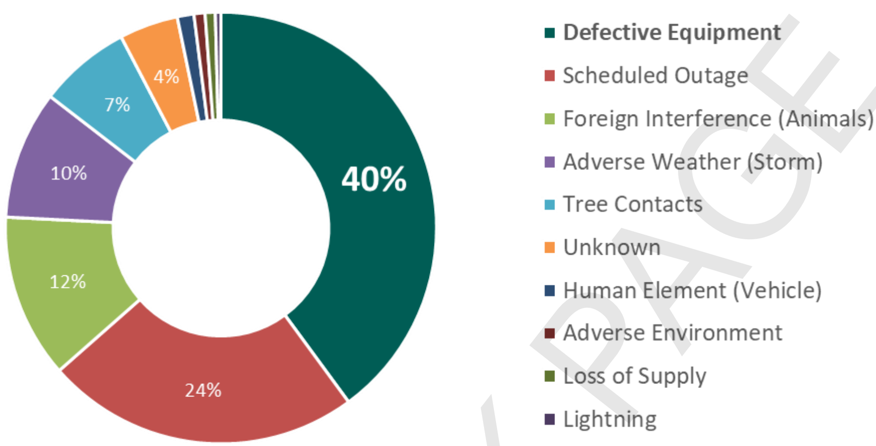
Small Business



1 Reliability: Managing Equipment Failure Risk

While many power outages are caused by external events such as weather and falling trees, roughly **40%** of customer outages are caused by equipment failure. This is the largest single cause of outages, and customers look to Toronto Hydro to manage this risk.

Customer Outage Duration (Hours) by Cause 2018-2022



Toronto Hydro manages failure risk by:

- Inspecting equipment condition regularly, so that maintenance or replacement can be done before the equipment fails.
- Replacing and repairing equipment that is in bad condition or performing poorly. This includes replacing lines with a high number of outages or replacing transformers with visible signs of wear and tear such as rust.

Since 2014, Toronto Hydro's work to upkeep the grid has delivered a 13% reduction in the average number of outages experienced by customers and a 25% reduction in the length of those outages. Toronto Hydro's draft plan is to maintain these reliability results for customers.

Want to learn more about grid reliability and what causes power outages? Click here.

What type of work is Toronto Hydro doing to manage equipment failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to prevent increased outages due to equipment failure.

Replacing Direct-Buried Cable

In parts of the grid that were built a long time ago, cables are laid directly in underground trenches without any protective barrier. **Underground equipment failures contribute to 57% of defective equipment failures, the large majority of which (75%) are due to cables.** Toronto Hydro's draft plan intends to replace 182 kilometers of direct buried cables by 2029 to manage the risk of power outages caused by this equipment.

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System reliability

In order to provide feedback on Toronto Hydro's plans, it's important to understand how the distribution system has performed in the past, as well as what's expected in the future.

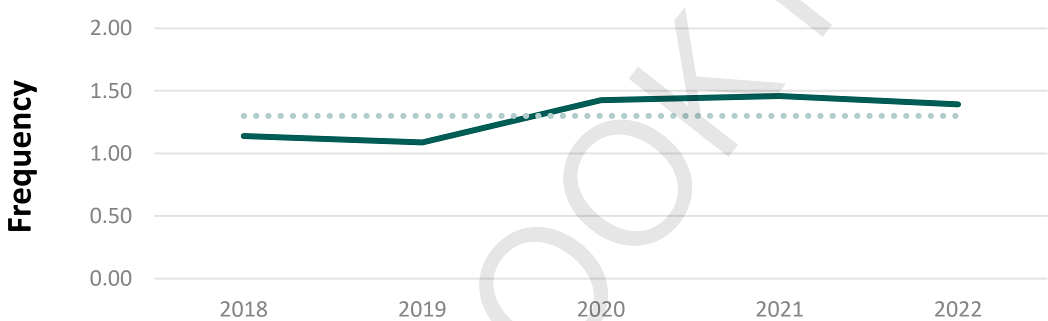
A core objective of Toronto Hydro's plan is to maintain current levels of reliability over the 2025–2029 plan period, while making foundational technology investments to reduce the length of power outages in the long-term.

Toronto Hydro recognizes that power interruptions are inconvenient for residential customers and can be very costly for commercial and industrial customers.

Toronto Hydro tracks both the average number of power outages per customer and how long those interruptions last.

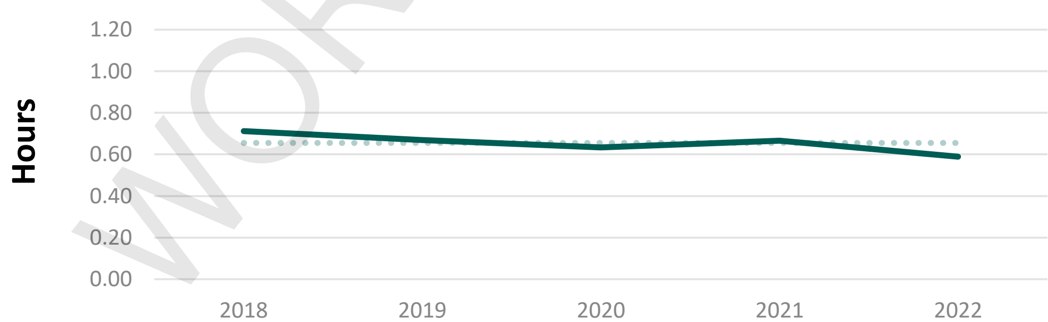
Between 2018 and 2022, the typical Toronto Hydro customer has experienced about two outages per year (*or 1.3 outages per customer to be exact*).

Average number of outages (per customer)



Over the same period, the average **duration** of an outage has been about 0.62 hours. Meaning, when the power does go out, Toronto Hydro is typically able to restore power in about 35 minutes.

Average outage duration (hours per customer)



It's important to keep in mind that these are system averages, and that your actual experience may be different. Some customers connected to newer lines may not experience any outages, while others are experiencing more than the average number of outages each year.

WORKBOOK PAGE

What is most likely to cause an outage?

Although both the number and length of outages have decreased compared to the previous five-year average, equipment failure remains the top cause of outages within Toronto Hydro's control.

That said, in 2022, severe weather presented a unique set of challenges for Toronto Hydro's distribution system.

Causes of Unscheduled Power Outages (five-year average: 2018 to 2022)

12% — **Animal Contact:** Outages caused by animals such as racoons, squirrels and birds coming in contact with overhead powerlines or transformers.

40% — **Equipment Failure:** Unscheduled power outages from equipment failure usually occur with distribution equipment that's beyond or approaching the end of their expected useful lives.

10% — **Weather-Related Events:** Adverse weather such as heavy rain, lightning strikes, ice, snow, wind, extreme temperatures, and freezing rain can disrupt the distribution system.

14% — **Other:** Includes tree contact (7%) and human interference (1%), such as construction workers accidentally cutting powerlines or motor vehicle accidents involving contact with distribution equipment. 4% of outages are unknown, but most are likely caused by animal contact.

Note: *statistics do not include loss of supply from Hydro One.*

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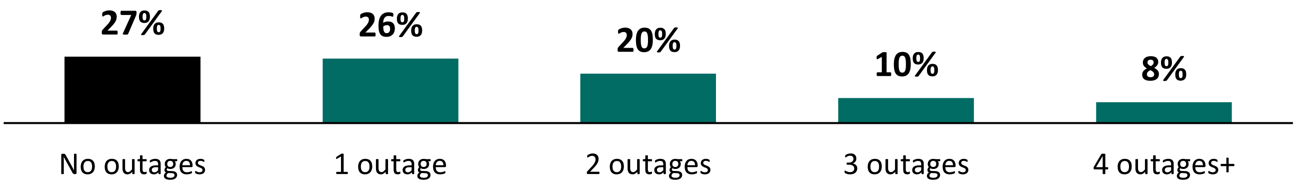
Amount Spent on the Grid Reliability Plan

Small Business

Q Over the past 12 months, have you experienced any power outages at your organization which lasted longer than one minute?



"Don't know" (8%) not shown.

n=694

	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
No outages	20%	24%	21%	35%	32%	24%	28%	24%
1 outage	23%	26%	27%	28%	23%	28%	30%	24%
2 outages	24%	21%	24%	15%	17%	25%	16%	22%
3 outages	11%	14%	9%	8%	9%	7%	12%	13%
4 outages+	10%	9%	10%	6%	7%	8%	7%	12%

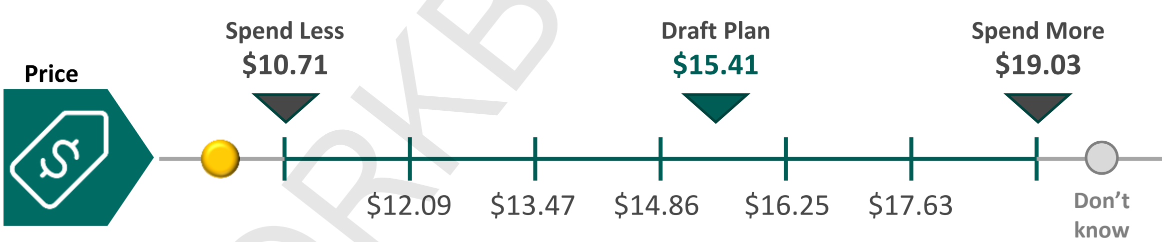
Note: Responses were optional.

Making Choices: Managing Equipment Failure Risk

By 2029, Toronto Hydro's draft plan to manage equipment failure risk would cost the typical customer in this rate class **$15.41** more per month on their monthly electricity bill. Toronto Hydro could spend more to improve reliability, or it could spend less and take on more risk of outages.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Reduces reliability compared to current levels. This means more power outages due to equipment failure.	Maintains reliability at current levels. This means holding steady on power outages due to equipment failure.	Improves reliability compared to current levels. This means less power outages due to equipment failure.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 3 of 7:



$-.-- Your selection.

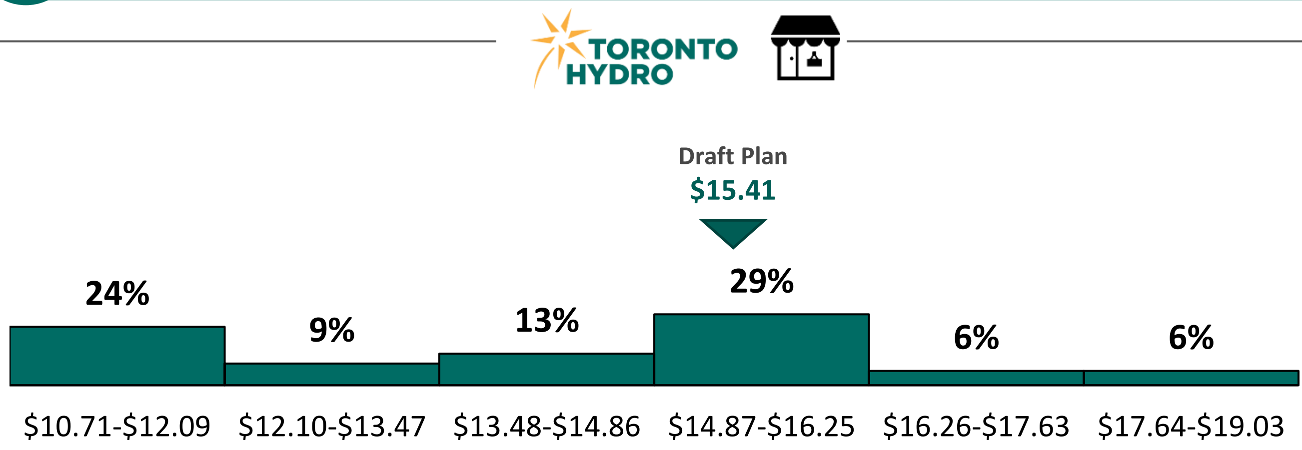
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Reliability Plan

Small Business

Q How much do you think Toronto Hydro should spend on its grid reliability plan?



"Don't know" (14%) not shown.

n=695

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	48%	50%	48%	52%	46%	54%	46%	55%	38%
On Plan	24%	23%	24%	19%	27%	22%	22%	24%	28%
Above Plan	14%	14%	12%	11%	17%	12%	16%	11%	17%
Don't Know	14%	13%	17%	18%	10%	12%	16%	10%	17%
TOTAL On Plan + Above Plan	38%	37%	36%	30%	44%	34%	38%	35%	45%

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Additional Feedback on the Grid Reliability Plan

Small Business

Q Do you have additional feedback on Toronto Hydro's draft grid reliability plan?

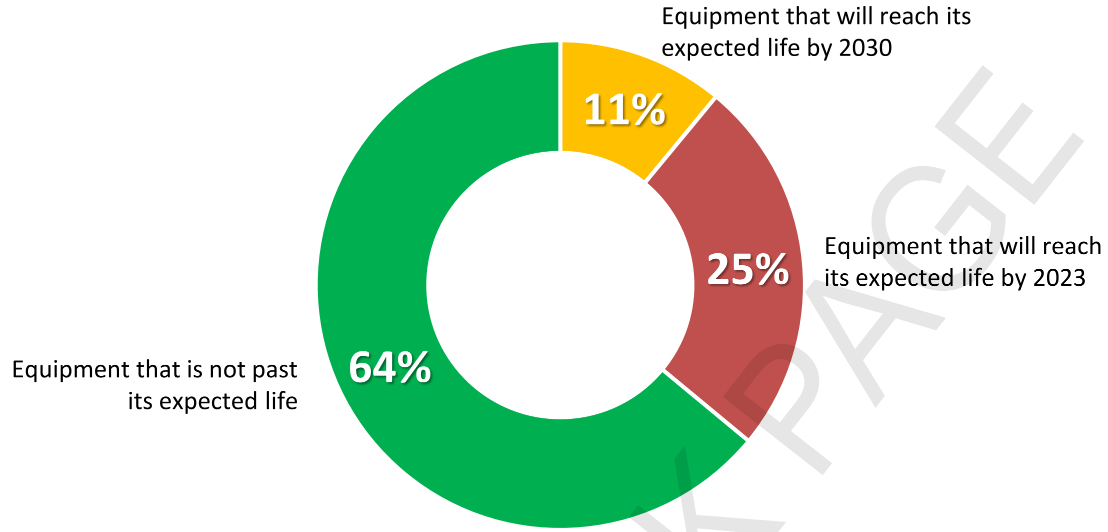
Response	%
Prevent outages, stable power, system reliability	2.0%
Find efficiencies, cut wasteful spending, lower salaries	1.0%
Modernize, be proactive, invest for the long term	0.9%
Need more information	0.5%
Should be funded by tax dollars/government	0.4%
Oppose the increase, increase is too high (general)	0.4%
Make use of existing infrastructure, past spending	0.3%
Costs are too high already, cost of living, struggling to pay bills	0.3%
Address equity, protect low-income customers	0.2%
Cost shouldn't be borne by all customers	0.1%
Prioritize renewables, solar/wind, and electric vehicles	0.1%
Support the increase (general)	0.1%
Support developing new technology and innovation	0.1%
Other	0.2%
No response	93.5%

Note: Responses were optional. Only responses > 0.1% are shown.

7%

2 Paced Upkeep of the Grid

About 25% of Toronto Hydro's equipment is operating past its expected life and an additional 11% is estimated to reach that point by 2030.



In this part of the plan, the key question is whether Toronto Hydro should wait until there are clear signs of equipment failure risk (such as rust or oil leaks), or whether it should get ahead of the problem by replacing old equipment proactively.

If Toronto Hydro waits, it can keep prices lower in the short term. However, this could create a surge of work in future years that will spike prices in the 2030s. There is also a risk that Toronto Hydro will not be able to do the amount of work required to deal with this equipment in the future, which could lead to more outages and higher safety risks due to equipment failures.

Want to learn more about Toronto Hydro's distribution grid? Click here.

What type of work is Toronto Hydro doing to upkeep the grid?

Below is an example of key investments that Toronto Hydro needs to make in a paced way to upkeep the grid and prevent a surge of work to address equipment failure risk in the future.

Paced Replacement of Network Vaults

This equipment is located in underground vaults in the downtown area, which serves many critical customers, such as hospitals and financial institutions. A very large portion of this equipment is going to be in poor condition and past its expected life in the 2030-34 period. To manage this risk, Toronto Hydro's draft plan intends to replace network vaults in a paced manner.

WORKBOOK PAGE

Renewing and replacing infrastructure

Toronto Hydro's grid is a mix of overhead, underground, network and station infrastructure. It operates at three different voltages (27.6kV, 13.8kV, and 4.16kV) and includes approximately:

- 61,300 distribution transformers
- 17,060 primary switches
- 15,393 km of overhead wires
- 13,765 km of underground wires
- 37 transformer stations

Overhead Infrastructure

The overhead system is made up of poles, wires, transformers, switches and other equipment. They are easier to replace, repair and inspect.

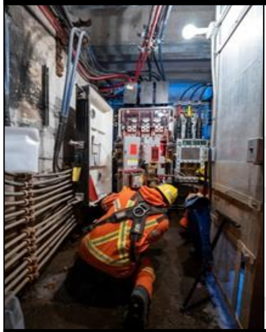
However, they are also more prone to foreign interference such as vehicles, trees, animals and weather-related outages.

This system consists of three different types of configurations two of which are outdated configurations from the 1950s and 1960s, making them more challenging to replace and restore particularly after a weather-related outage.

Underground Infrastructure

Toronto Hydro's underground system consists of cables, transformers, switches and civil infrastructures (like manholes). They can be placed either at ground level (green box above ground in your neighbourhood), underground, or inside building vaults (typical for multi-storey buildings). This system is made up of two different types of configurations where the downtown Toronto area consists of lead-covered cable, an outdated equipment with little to no suppliers.

While underground equipment is more resilient during weather-related events, it is more susceptible to flooding and at risk of faster deterioration due to moisture build-up.



Network Infrastructure

Toronto Hydro's network system, predominantly found in the downtown Toronto area, was installed in the early-to-mid 1900s to improve reliability (service levels) for critical loads (like financial institutions) and serves medium-sized loads in high-density areas, and areas with small and narrow sidewalks. It consists of interconnected low-voltage cables, vaults and network units.

While this system is better at handling normal equipment failures, proactive replacement and maintenance of this equipment are critical to avoid vault fires from occurring.

Station Infrastructure

Toronto Hydro's distribution stations receive the transmission supply from Hydro One at very high voltages. Station infrastructure consists of switchgear, power transformers, circuit breakers, remote terminal units (station computers) and battery systems. Toronto Hydro proactively replaces this equipment, as failure at the station level can cause widespread and lengthy power outages.

Making Choices: **Paced Upkeep of the Grid**

By 2029, Toronto Hydro's draft plan to ensure paced upkeep of the grid would cost the typical customer in this rate class **$3.40** more on their monthly electricity bill. Toronto Hydro could spend more to get ahead of future equipment failure risk, or it could spend less and defer some of this work at the risk of managing more power outages due to equipment failure in the next decade.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Higher risk of power outages due to equipment failure in the next decade.	Manages the risk of power outages due to equipment failure in the next decade.	Reduces the risk of power outages due to equipment failure in the next decade.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 4 of 7:

Price

Spend Less **$2.29** | Draft Plan **$3.40** | Spend More **$5.38**

$2.80 | $3.31 | $3.83 | $4.35 | $4.86 | Don't know

$-.-- Your selection.

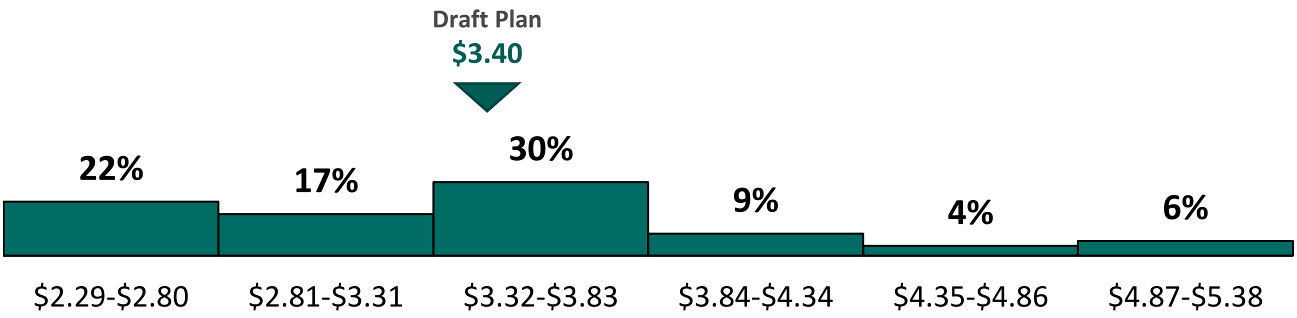
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Stewardship Plan

Small Business

Q How much do you think Toronto Hydro should spend on its grid stewardship plan?



"Don't know" (13%) not shown.

n=695

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	36%	38%	38%	34%	36%	44%	37%	38%	27%
On Plan	28%	24%	29%	28%	29%	23%	23%	32%	33%
Above Plan	23%	28%	17%	21%	25%	21%	27%	20%	24%
Don't Know	13%	10%	16%	18%	10%	12%	14%	10%	16%
TOTAL On Plan + Above Plan	51%	52%	46%	48%	54%	44%	49%	52%	57%

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Additional Feedback on the Grid Stewardship Plan

Small Business

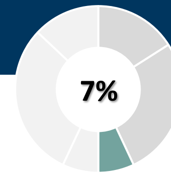
Q Do you have additional feedback on Toronto Hydro's draft grid stewardship plan?

Response	%
Modernize, be proactive, invest for the long term	1.0%
Find efficiencies, cut wasteful spending, lower salaries	0.5%
Support the increase (general)	0.5%
Prevent outages, stable power, system reliability	0.5%
Should be funded by tax dollars/government	0.2%
Should be funded by developers	0.2%
Prioritize renewables, solar/wind, and electric vehicles	0.2%
Focus on demand side management/provide education about reducing usage	0.2%
Need more information	0.1%
Costs are too high already, cost of living, struggling to pay bills	0.1%
Cost shouldn't be borne by all customers	0.1%
Other	0.1%
No response	96.2%

Note: Responses were optional. Only responses > 0.1% are shown.

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

Small Business

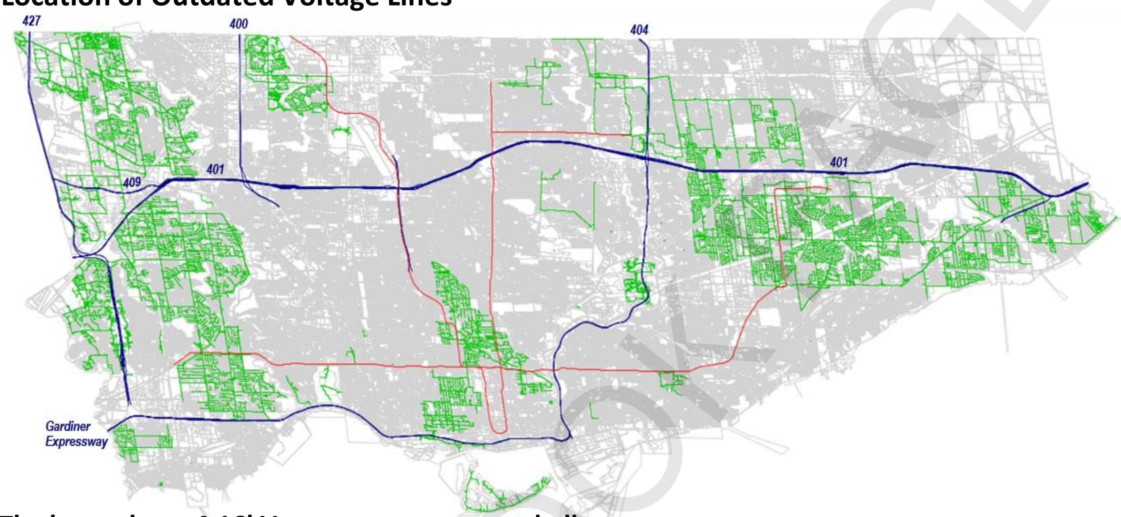


3 Standardize the Grid

Because of its history, Toronto Hydro has an old and diverse grid. Toronto Hydro is made up of 6 municipal utilities that were joined in 1998 when the City of Toronto was formed. Each utility owned and operated different types of equipment. As a result, Toronto Hydro's grid has three different voltage levels: 4.16kV, 13.8kV and 27.6kV.

The 27.6kV voltage level is the current standard for local grids. However, a large part of Toronto Hydro's grid is served at 4.16kV and 13.8kV.

Location of Outdated Voltage Lines



The low voltage 4.16kV system poses many challenges:

- Long outages for customers and higher cost to restore power – in 2022, the longest outage on the 4.16 kV system was 80 hours.
- Less efficient at carrying power over long distances, which means more electricity is lost as it travels from point A to point B (line losses).
- Less capacity to serve customers' growing electricity needs, which means longer waits and higher costs to connect new services such as electric vehicles and solar panels.
- Risk of supply chain and labour shortages as manufacturers stop making this equipment and technicians trained on this equipment retire.

What type of work is Toronto Hydro doing to standardize the grid?

Below is an example of a key investment to replace outdated equipment.

Voltage Conversion from 4.16kV/13.8kV to 27.6kV

Voltage conversion entails a full rebuild of outdated equipment such as rear lot construction (poles and wires in customers' backyards). This work improves reliability, safety and makes the grid more efficient. Toronto Hydro's draft plan intends to convert 1400 customers from rear lot service and works to eliminate rear lot construction from the grid by the late 2040s.

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

Small Business

7%

Making Choices: **Standardize the Grid**

By 2029, Toronto Hydro's draft **plan to standardize the grid** would cost the typical customer in this rate class **$3.47** more on their monthly electricity bill. Toronto Hydro could spend more to speed up the pace of replacing outdated equipment or it could spend less to slow down the pace and delay the benefits of this work. For example, under spend more Toronto Hydro would convert all rear lot customers by the early 2040s, and under spend less by the 2050s.

	Spend Less	Draft Plan	Spend More
Reliability	Slower progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Steady progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Faster progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.
Customer Service	Less progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.	Steady progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels	Faster progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.
Efficiency	Slower progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Steady progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Faster progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.

Choice 5 of 7:

Price

Spend Less $2.69 | Draft Plan $3.47 | Spend More $4.46

$2.98 | $3.27 | $3.57 | $3.86 | $4.16 | Don't know

$-.-- Your selection.

WORKBOOK PAGE

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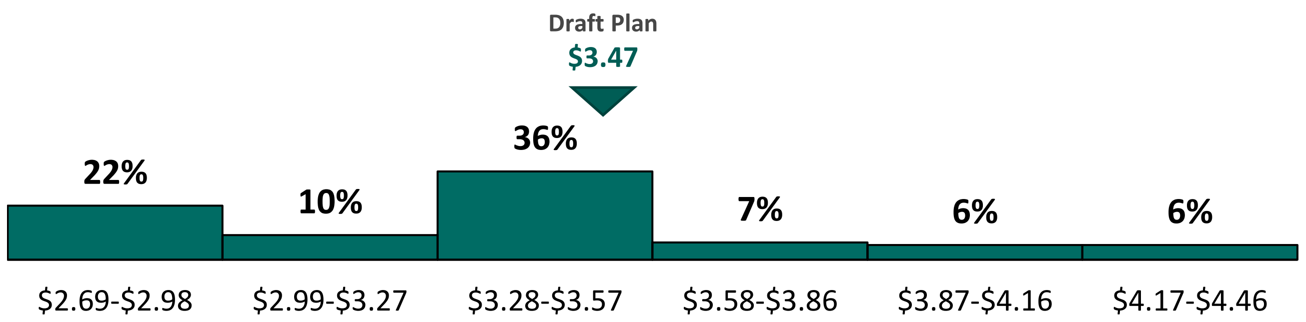
Small Business

Amount Spent on the Equipment Standardization Plan

Q How much do you think Toronto Hydro should spend on its equipment standardization plan?

TORONTO HYDRO



"Don't know" (13%) not shown.

n=695

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	38%	42%	39%	37%	37%	45%	37%	42%	30%
On Plan	28%	23%	32%	25%	30%	28%	25%	29%	30%
Above Plan	20%	25%	13%	18%	24%	15%	23%	19%	23%
Don't Know	13%	10%	16%	20%	9%	12%	15%	10%	17%
TOTAL On Plan + Above Plan	48%	47%	46%	43%	54%	43%	48%	48%	54%

Online Workbook

Additional Feedback on the Equipment Standardization Plan

Small Business

Q Do you have additional feedback on Toronto Hydro's draft equipment standardization plan?

Response	%
Modernize, be proactive, invest for the long term	1.3%
Find efficiencies, cut wasteful spending, lower salaries	0.7%
Need more information	0.6%
Should be funded by tax dollars/government	0.5%
Prioritize renewables, solar/wind, and electric vehicles	0.4%
Costs are too high already, cost of living, struggling to pay bills	0.3%
Cost shouldn't be borne by all customers	0.3%
Other	0.1%
No response	95.9%

Note: Responses were optional. Only responses > 0.1% are shown.

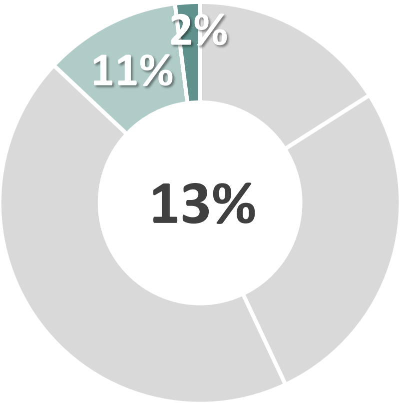
Draft General Plant Plan

Keeping the Business Running

What is this section about?

- This section is about the vehicles, work centres and IT systems that keep Toronto Hydro's business running efficiently.
- Toronto Hydro seeks your input on two choices within this part of the plan:

1. The pace of replacing the equipment needed to keep the business running.
2. The pace of reducing Toronto Hydro's emissions from its own operations.

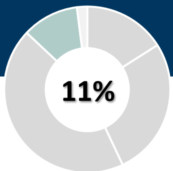


- This spending category makes up **13% of the draft plan** and would add **$6.53** on the average customer in this rate class's monthly bill by 2029.

WORKBOOK

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft General Plant Plan

Small Business



1 Keep the Business Running

Work centres, vehicles and information technology systems are the backbone of Toronto Hydro's day-to-day operations. This equipment must be maintained in good working condition for efficient and reliable operations so that crews can restore power and customers can access key services like their online account and the outage restoration map.

- As with grid equipment, Toronto Hydro uses information such as age and condition data from inspections to decide which equipment should be replaced versus repaired.
- Toronto Hydro repairs equipment in poor condition such as leaking roofs, failed furnaces and worn-out vehicle braking systems. It also replaces equipment like software programs and hardware servers that are past expected useful life.

What type of work is Toronto Hydro doing to manage failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to keep the business running and manage the risk of equipment failure.

Station Buildings

Toronto Hydro has approximately 250 properties that either house distribution stations equipment such as cables and transformers or support the distribution system.

Over 80% of station buildings are older than 40 years and require repairs and investments to address the following types of problems:

- Structural damage to the building (cracked foundations, leaking roofs)
- Mechanical, electrical and plumbing equipment in poor condition
- Compliance with building and fire code requirements

This work ensures safe and efficient operations and minimizes the risk of outages that can affect many customers. For example, structural damage to a station building poses a direct risk to distribution equipment such as power transformers.

So, how much and how quickly Toronto Hydro decides to invest in keeping their business running has a direct impact on customers. While this equipment may remain in service for a long time, when they unexpectedly fail, the costs incurred usually far exceed proactive investments (repairs and replacements) and can have a significant impact on system reliability and customer service.

WORKBOOK PAGE

Making Choices: **Keep the Business Running**

By 2029, Toronto Hydro's draft plan to keep the business running would cost the typical customer in this rate class **$5.73** more on their monthly electricity bill. Toronto Hydro could spend more to improve equipment health (age and condition) and functionality (better safety features) or spend less and take on more risk of equipment downtime.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of general plant equipment by 2029.	Maintains the overall health (age and condition) of general plant equipment by 2029.	Improves the overall health (age and condition) of general plant equipment by 2029.
Reliability & Service	Reduces equipment availability, which could mean longer outages or lower levels of customer service.	Maintains equipment availability consistent with current levels.	Improves equipment availability and functionality, which could mean better reliability and customer service levels.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work, which is more costly and increases equipment downtime.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work, and better equipment functionality.

Choice 6 of 7:

Price

Spend Less $3.96 — Draft Plan $5.73 — Spend More $6.78

$4.42 | $4.89 | $5.36 | $5.83 | $6.30 | Don't know

$-.-- Your selection.

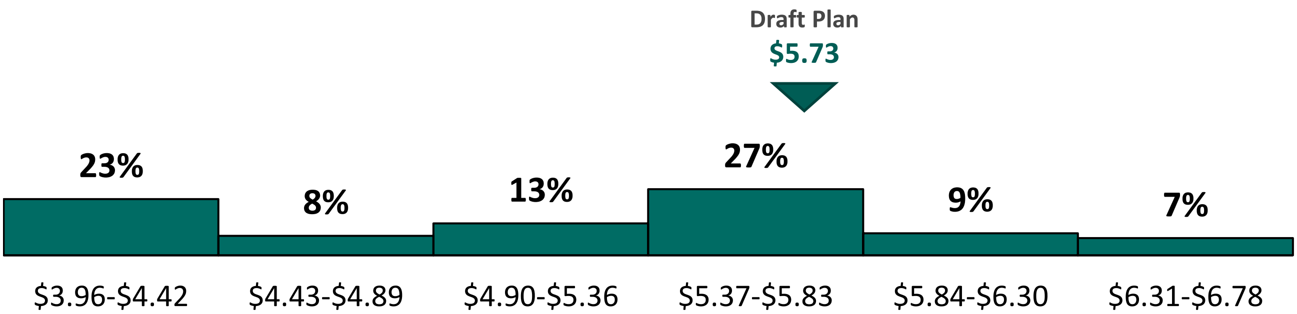
WORKBOOK PAGE

Online Workbook

Amount Spent on Keeping the Business Running

Small Business

Q How much do you think Toronto Hydro should spend to keep the business running?



"Don't know" (13%) not shown. **n=695**

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	51%	51%	50%	50%	51%	57%	48%	54%	44%
On Plan	22%	24%	23%	21%	21%	18%	21%	24%	25%
Above Plan	14%	15%	12%	11%	17%	13%	17%	11%	15%
Don't Know	13%	11%	15%	18%	11%	11%	15%	10%	16%
TOTAL On Plan + Above Plan	36%	38%	36%	32%	38%	32%	37%	36%	40%

Online Workbook

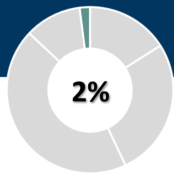
Additional Feedback on Keeping the Business Running

Small Business

Q Do you have additional feedback on Toronto Hydro's draft plan for keeping the business running?

Response	%
Find efficiencies, cut wasteful spending, lower salaries	1.5%
Modernize, be proactive, invest for the long term	0.6%
Costs are too high already, cost of living, struggling to pay bills	0.3%
Should be funded by tax dollars/government	0.2%
Make use of existing infrastructure, past spending	0.1%
Cost shouldn't be borne by all customers	0.1%
Prioritize renewables, solar/wind, and electric vehicles	0.1%
Need more information	0.1%
Other	0.2%
No response	96.8%

Note: Responses were optional. Only responses > 0.1% are shown.



2 Reducing Toronto Hydro's Emissions

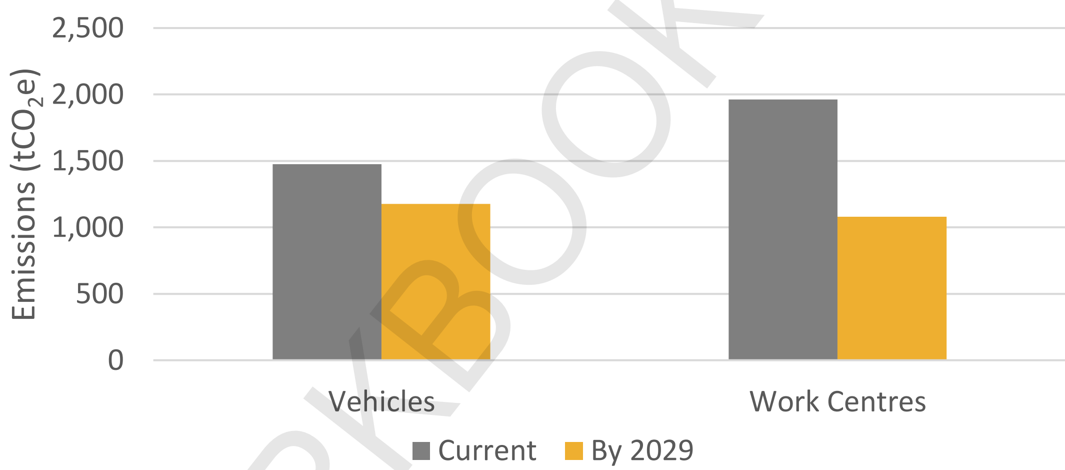
To address climate change, companies around the world are setting targets to reduce greenhouse gas (GHG) emissions from fossil fuels — a pledge commonly known as Net Zero.

Moving toward Net Zero has increasingly become the expectation of governments, financial markets, stakeholders and customers. For example, in October 2019, Toronto City Council unanimously voted to accelerate efforts to reduce emissions across the city.

To do its part in addressing climate change, Toronto Hydro is committed to reducing emissions from its vehicles and work centres by:

- Replacing gasoline and diesel power vehicles with hybrid and electric vehicles
- Converting natural gas boilers and heaters in its work centres to electric ones.

Toronto Hydro's Draft Plan to Reduce Emissions



Carbon Tax Savings

Reducing carbon emissions from vehicles and work centres could help Toronto Hydro manage rising costs due to the carbon tax (recall that the carbon tax may increase by 161% from 2023 to 2030). **Over the 2025–2029 period, Toronto Hydro's draft plan could reduce carbon tax payments by roughly half a million dollars.**

With your feedback, Toronto Hydro needs to decide how quickly to transition to cleaner sources of energy for its operations. In the next section, you will be presented these options.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft General Plant Plan

Small Business

2%

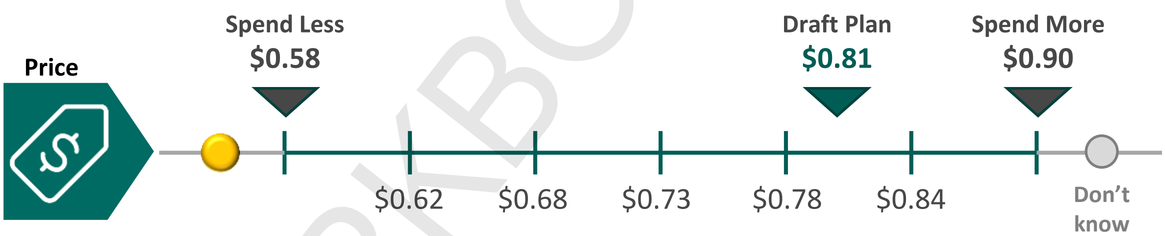
Making Choices: **Reducing Toronto Hydro's Emissions**

By 2029, Toronto Hydro's draft plan to reduce emissions would cost the typical customer in this rate class **$0.81** more on their monthly electricity bill. Toronto Hydro could spend more for faster progress towards reducing its emissions, or spend less to slow down the progress.

	Spend Less	Draft Plan	Spend More
Environment	Less progress to reduce emissions — about 27% reduction by the end of the decade.	Steady progress to reduce emissions — about 35% reduction by the end of the decade.	Faster progress to reduce emissions — about 36% reduction by the end of the decade.
Efficiency	Higher exposure to rising energy costs (oil and gas) due to the carbon taxes and other pressures.	Managed exposure to rising energy costs (oil and gas) due to the carbon tax and other pressures.	Less exposure to rising energy costs (oil and gas) due to carbon taxes and other pressures.

WORKBOOK PAGE

Choice 7 of 7:



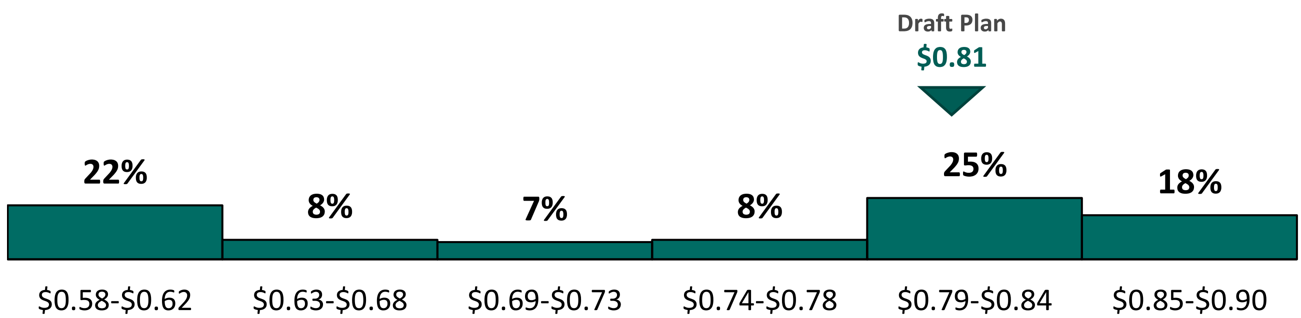
$-.-- Your selection.

Online Workbook

Amount Spent on Decarbonization

Small Business

Q How much do you think Toronto Hydro should spend to reduce its own emissions?



"Don't know" (13%) not shown.

n=695

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	45%	54%	43%	45%	41%	50%	43%	46%	41%
On Plan	23%	15%	25%	21%	25%	18%	24%	23%	26%
Above Plan	20%	19%	16%	17%	25%	23%	20%	22%	16%
Don't Know	13%	12%	16%	16%	9%	10%	14%	10%	17%
TOTAL On Plan + Above Plan	43%	34%	41%	38%	50%	40%	43%	45%	42%

Online Workbook

Additional Feedback on Decarbonization

Small Business

Q Do you have additional feedback on Toronto Hydro's draft decarbonization plan?

Response	%
Prioritize renewables, solar/wind, and electric vehicles	1.6%
Support the increase (general)	0.4%
Find efficiencies, cut wasteful spending, lower salaries	0.4%
Modernize, be proactive, invest for the long term	0.3%
Cost shouldn't be borne by all customers	0.3%
Should be funded by tax dollars/government	0.3%
Oppose the increase, increase is too high (general)	0.3%
Need more information	0.2%
Other	0.1%
No response	96.2%

Note: Responses were optional. Only responses > 0.1% are shown.

Online Workbook

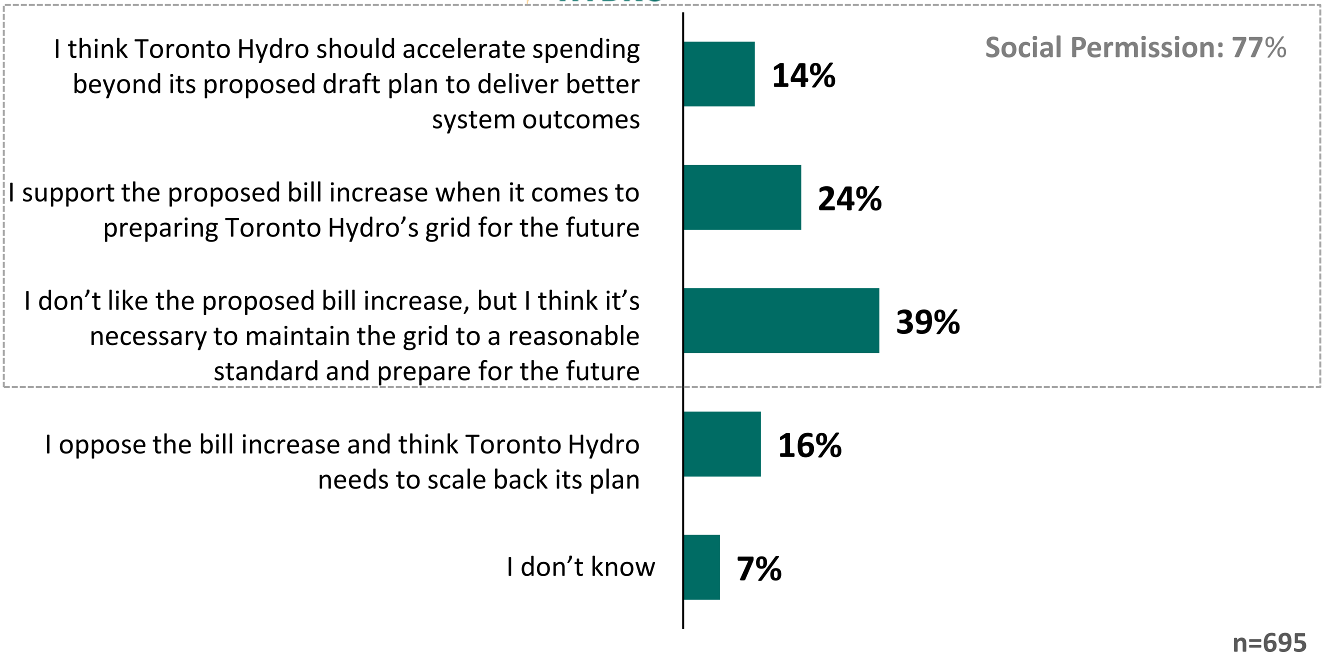
Social Permission

Small Business

Q

Toronto Hydro has calculated an overall cost for its draft plan. While the plan may change based on feedback from the earlier questions in this survey, Toronto Hydro would like to know how you feel about the total rate impact of its current draft plan.

Considering what you have learned about Toronto Hydro's 2025–2029 draft plan and that this may result in a **$50.88 increase** in the distribution portion of your monthly electricity bill by 2029, which of the following best represents your point of view?



Online Workbook

Social Permission

Q

Toronto Hydro has calculated an overall cost for its draft plan. While the plan may change based on feedback from the earlier questions in this survey, Toronto Hydro would like to know how you feel about the total rate impact of its current draft plan.

Considering what you have learned about Toronto Hydro's 2025–2029 draft plan and that this may result in a **$50.88 increase** in the distribution portion of your monthly electricity bill by 2029, which of the following best represents your point of view?

	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Accelerate spending	16%	14%	18%	12%
Support proposed bill	23%	22%	19%	27%
Necessary to maintain grid	35%	41%	45%	37%
Oppose the bill increase	17%	16%	12%	17%
I don't know	9%	8%	5%	7%
Social Permission	**74%**	**77%**	**82%**	**76%**

	Consumption Quartiles			
	First	Second	Third	Fourth
Accelerate spending	14%	17%	9%	18%
Support proposed bill	21%	21%	27%	25%
Necessary to maintain grid	40%	39%	47%	31%
Oppose the bill increase	19%	17%	12%	13%
I don't know	6%	6%	5%	13%
Social Permission	**74%**	**77%**	**83%**	**74%**

Online Workbook

Final Comments for the Draft Plan & Proposed Rate Increase

Small Business

Q Do you have any final comments regarding Toronto Hydro's draft plan for 2025–2029 and the proposed rate increase?

Response	%
Find efficiencies, cut wasteful spending, lower salaries	1.5%
Modernize, be proactive, invest for the long term	1.5%
Costs are too high already, cost of living, struggling to pay bills	1.2%
Should be funded by tax dollars/government	1.0%
Need more information	0.8%
Support the increase (general)	0.7%
Prioritize renewables, solar/wind, and electric vehicles	0.7%
Oppose the increase, increase is too high (general)	0.7%
Address equity, protect low-income customers	0.5%
Should be funded by developers	0.3%
Prevent outages, stable power, system reliability	0.3%
Cost shouldn't be borne by all customers	0.1%
Other	0.1%
No response	90.5%

Small Business Customers

Online Workbook Diagnostics

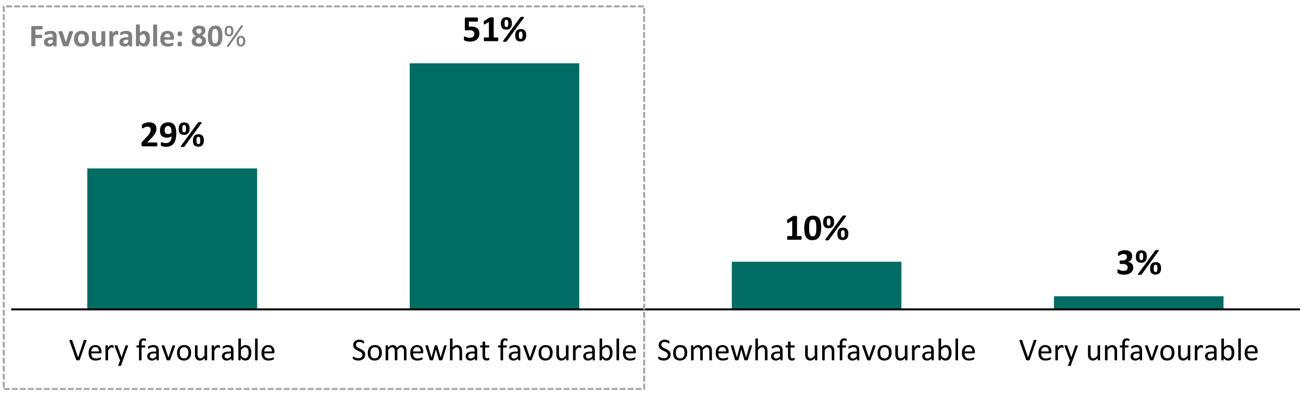
Section 10.2

Online Workbook

Workbook Impression

Small Business

Q Overall, what is your impression of the survey you just completed?



"Don't know" (7%) not shown.

n=695

Online Workbook
Workbook Impression

Small Business

Q Overall, what is your impression of the survey you just completed?

	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Very favourable	24%	25%	34%	31%
Somewhat favourable	50%	57%	50%	49%
Somewhat unfavourable	15%	10%	5%	10%
Very unfavourable	4%	1%	1%	4%
Don’t know	6%	7%	9%	6%
Favourable (Very + Somewhat)	**74%**	**82%**	**84%**	**80%**
Unfavourable (Very + Somewhat)	**19%**	**11%**	**6%**	**14%**

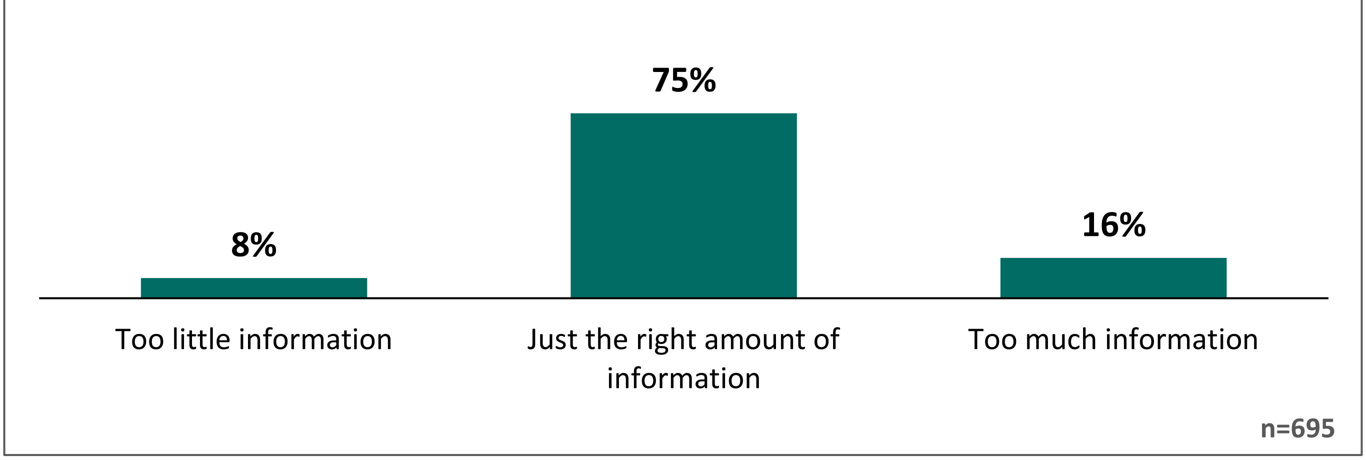
	Consumption Quartiles			
	First	Second	Third	Fourth
Very favourable	26%	31%	28%	32%
Somewhat favourable	51%	50%	56%	47%
Somewhat unfavourable	13%	12%	6%	9%
Very unfavourable	4%	4%	2%	2%
Don’t know	6%	4%	8%	11%
Favourable (Very + Somewhat)	**77%**	**81%**	**84%**	**79%**
Unfavourable (Very + Somewhat)	**17%**	**15%**	**8%**	**11%**

Online Workbook

Amount of Information

Small Business

Q In this survey, do you feel that Toronto Hydro provided too much information, not enough, or just the right amount?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Too little information	10%	7%	8%	8%	11%	6%	8%	7%
Just the right amount of information	75%	77%	79%	73%	74%	80%	74%	73%
Too much information	15%	17%	13%	19%	16%	13%	17%	19%

Online Workbook

Content Missing from Engagement

Q Was there any content missing that you would have liked to have seen included in this survey?

Response	%
Operational efficiencies (salaries, spending) and accountability	3.9%
Environmental sustainability, info about EVs/charging	1.4%
More information on the costs, breakdown of either the plan or bill	0.6%
Confusing, navigational issues in the survey	0.6%
How this benefits customers	0.6%
Ways to reduce usage, save money on bill	0.5%
Satisfied with the information presented	0.4%
Comparison to other regions or utilities	0.4%
Information about power generation	0.2%
Reliability (e.g. Plans for underground cables)	0.1%
Delivery charges	0.1%
Other	0.6%
No response	90.6%

Online Workbook
Outstanding Questions

Q Is there anything that you would still like answered?

Response	%
More information on the costs, breakdown of either the plan or bill	2.4%
Environmental sustainability, info about EVs/charging	1.1%
Operational efficiencies (salaries, spending) and accountability	1.0%
Reliability (e.g. Plans for underground cables)	0.5%
Ways to reduce usage, save money on bill	0.3%
Delivery charges	0.2%
Satisfied with the information presented	0.2%
More historic context, past rate increases and spending	0.2%
Confusing, navigational issues in the survey	0.1%
Comparison to other regions or utilities	0.1%
Other	0.3%
No response	93.6%

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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APPENDIX 11

Commercial & Industrial
Workbook Report

November 2, 2023

CONFIDENTIAL

STRICTLY CONFIDENTIAL

Report Navigation

APPENDICIES

PHASE I

PHASE II

Commercial & Industrial Customers

Online Workbook Report

Section 11.1

Online Survey
Survey Design & Methodology

C&I

Toronto Hydro Electric-System Ltd. (THESL) engaged Innovative Research Group (INNOVATIVE) to design, execute and document the results of THESL's customer engagement process as part of the development of its 2025–2029 business plan.

Field Dates

All Toronto Hydro GS 50-999kW (commercial & industrial) customers with an email address on Toronto Hydro's file received the **Commercial & Industrial Online Workbook**. Customers had the opportunity to complete the survey between **April 3rd and May 22nd, 2023**.

Incentives

Customers who completed the survey from April 3rd to May 10th were invited to enter a draw to win a $5,000 donation to a charity of the organization's choosing (as shown on pg.7). To increase the response rate, INNOVATIVE structured a more direct incentive for customers who filled out the survey from May 11th to May 22nd. Those who completed the survey then received a $50 Uber Eats gift card.

Commercial & Industrial Online Survey Completes

Customers with email addresses on file received an email invitation. It included a unique survey URL that linked back to their annual consumption, region and rate class.

A total of **264** (unweighted) Toronto Hydro commercial & industrial customers completed the online survey.

Sample Weighting

The commercial & industrial online survey sample has been weighted proportionately by consumption quartiles and region in order to be representative of the broader Toronto Hydro service territory.

The table below summarizes the unweighted and weighted (in brackets) sample breakdown by consumption quartile and region.

Region	Consumption Quartiles				Total
	First	Second	Third	Fourth	
Etobicoke/York	15 (11)	14 (14)	7 (13)	14 (15)	50 (53)
North York	25 (15)	22 (19)	15 (19)	21 (19)	83 (73)
Scarborough	17 (15)	15 (12)	8 (13)	13 (12)	53 (52)
Toronto/East York	28 (24)	20 (21)	10 (21)	20 (20)	78 (86)
Total	85 (66)	71 (66)	40 (66)	68 (66)	264 (264)

Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers.

Online Survey

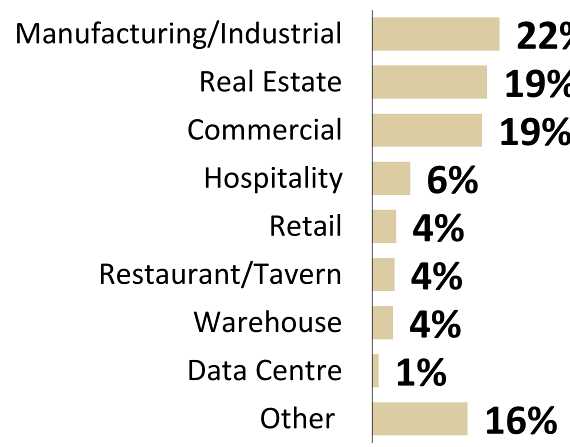
Firmographics breakdown

C&I

Managing/Overseeing Organization's Electrical or Hydro Bill

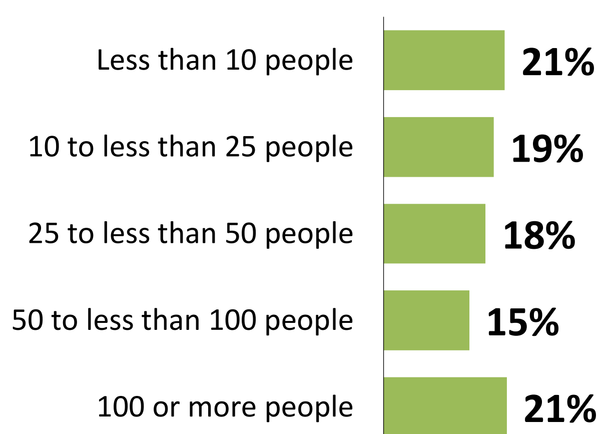
"Prefer not to say" (9%) and "Don't know" (2%) not shown.

Sector



"Prefer not to say" (5%) and "Don't know" (1%) not shown.

Number of Employees at the Organization



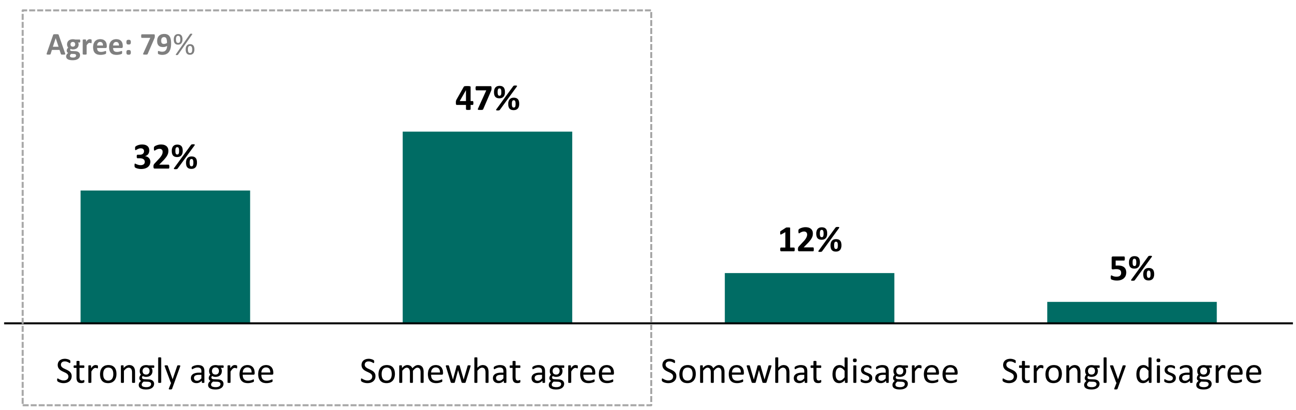
"Prefer not to say" (5%) and "Don't know" (2%) not shown.

Online Survey
Environmental Controls

C&I

To what extent do you agree or disagree with the following statements?

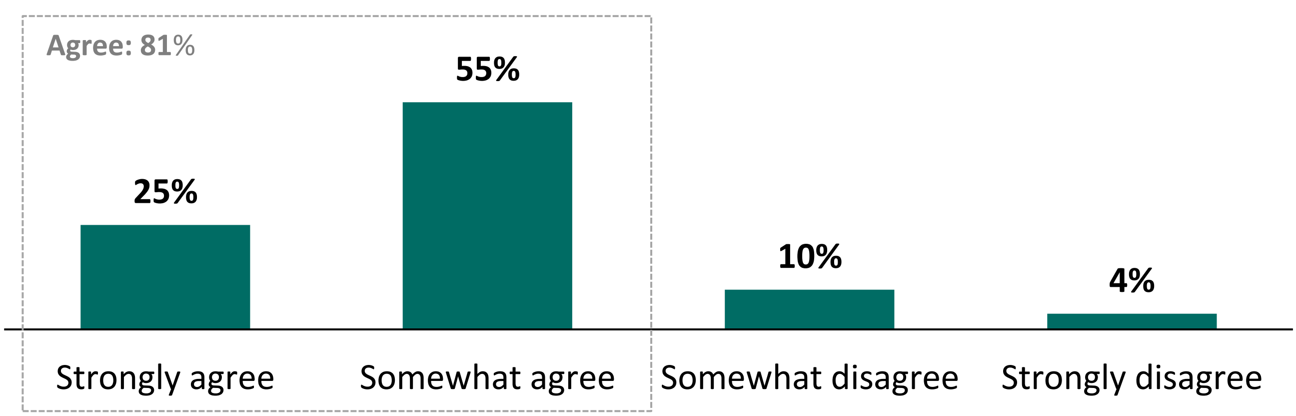
Q The cost of my organization's electricity bill has a major impact on the bottom line of my organization and results in some important spending priorities and investments being put off.



"Don't know/no opinion" (4%) not shown.

n=264

Q Customers are well-served by the electricity system in Ontario.



"Don't know/no opinion" (6%) not shown.

n=264

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Rate Application

C&I

Welcome to Toronto Hydro's customer feedback survey!

Toronto Hydro needs your input to find the right balance between the services you receive and the price you pay.

Land Acknowledgement: Toronto Hydro's grid is located on the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples.

The purpose of this survey is to get your feedback on the draft 2025–2029 business plan. Your feedback will help Toronto Hydro align this plan with what you need and want.

1. Your electricity rates pay for this plan, so your views must be considered.
2. You don't need to be an electricity expert to participate. The survey is focused on basic choices and provides the background information you need to answer the questions.
3. Recognizing that people absorb information in different ways, Toronto Hydro and its research partner have designed this survey to include diagrams, charts, images and videos to help explain Toronto Hydro's draft plan and what it means for you. If you prefer to skip the videos, the content is also explained in the body of the survey.
4. Depending on how much feedback you wish to provide and the number of videos watched, this survey should take approximately **20-30 minutes** to complete. If you need to pause and return later to finish the survey, your completed answers will be saved.
5. Some of the survey content may not display correctly on a mobile browser. It is strongly recommended that you complete this workbook on a desktop or laptop computer.

Those who complete the survey will be invited to enter a draw to win a $5,000 donation to a charity of your organization's choosing!

All individual responses will be kept confidential.
Innovative Research Group (www.innovativeresearch.ca), an independent research company, has been hired by Toronto Hydro to gather your feedback, while protecting your confidentiality. Your individual answers will not be shared with Toronto Hydro in any identifiable way.

INNOVATIVE RESEARCH GROUP

WORKBOOK

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Rate Application

What is this customer engagement about?

The goal of this engagement is to share Toronto Hydro's draft five-year business plan for the future of the city's electrical grid and collect your feedback. This will help Toronto Hydro align its plans with your needs and preferences.

Click on the video below to learn about Toronto Hydro's customer engagement.

Every five years, Toronto Hydro is required to submit a plan for its proposed prices (rates) and spending to the Ontario Energy Board (OEB) for approval.

- **In 2021 and 2022, thousands of its customers told Toronto Hydro about what they need and want** to help Toronto Hydro prepare the draft 2025–2029 business plan.
- **Toronto Hydro is now looking for your input on this draft business plan** to align its investments and spending decisions with what matters to you as its customers.
- **Later this year, Toronto Hydro will present its updated business plan to the independent regulator,** the OEB. Toronto Hydro is accountable to the OEB for considering your feedback.

How will this customer engagement work?

1. The workbook explains what Toronto Hydro does and summarizes the key planning considerations that Toronto Hydro's draft plan needs to address.
2. The workbook explains how much of your electricity bill goes to Toronto Hydro, how that money is spent, and the impact of the draft plan on your 2025–2029 prices.
3. The workbook asks for your input on seven key choices that will affect the services you receive and the price you pay from 2025–2029.

Once you have finished giving feedback on the key choices, **you will have an opportunity to review and change your responses** until you feel you have found the right balance.

Want to know more about Toronto Hydro's customer engagement process? Click here.

WORKBOOK PAGE

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Rate Application

C&I

How will your feedback impact Toronto Hydro's plan and prices?

Toronto Hydro has a five-step approach to customer feedback.

We are here

✓ 1. Identify Customer Needs, Preferences, and Priorities
In 2022, Toronto Hydro asked many types of customers from across the city about their needs and priorities for electricity distribution service.

✓ 2. Use Customer Feedback to Guide Development of Draft Plan
Toronto Hydro planners were given summaries of the key findings from the initial customer engagement to consider as they began building their plans.

3. Collect Customer Feedback on the Draft Plan
Toronto Hydro is returning to customers to get feedback on the draft plan and ask customers how the draft plan could better meet their needs and preferences.

4. Use Customer Feedback to Finalize the Plan
Toronto Hydro will re-examine and make appropriate changes to the plan based on the feedback provided by customers in this engagement.

5. Submit the Plan to the Ontario Energy Board (OEB)
Toronto Hydro will file the plan with the OEB along with a report summarizing the results of this engagement. The OEB, consumer advocates and other interested groups will examine the plan in an open and transparent public process known as a rate application.

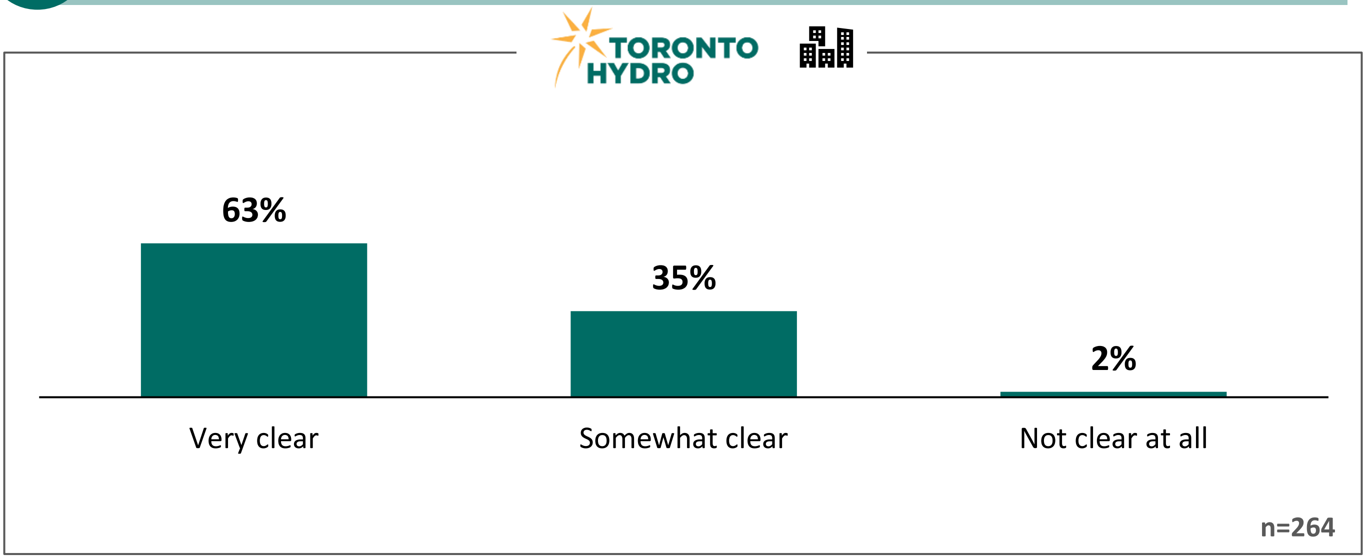
WORKBOOK PAGE

Online Workbook

Understanding the Purpose of the Customer Engagement

C&I

Q Do you feel that the purpose of Toronto Hydro's customer engagement is clear?

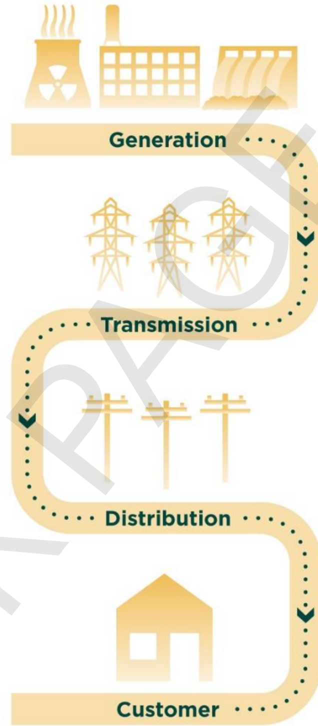


	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Very clear	70%	49%	72%	64%	70%	68%	58%	55%
Somewhat clear	28%	48%	23%	36%	30%	30%	37%	42%
Not clear at all	2%	3%	5%	0%	0%	1%	4%	3%

Electricity 101

Toronto Hydro's role in Ontario's electricity system

Ontario's electricity system is made up of three parts: **generation**, **transmission** and **distribution**.



Generation

How electricity is made

About half of the electricity used in Ontario comes from nuclear power. The rest comes from a mix of hydroelectric, natural gas, wind and solar sources. Ontario Power Generation, a government-owned company, generates almost half of Ontario's electricity. The other half comes from other generators contracted by the grid operator.

Transmission

How electricity travels across Ontario

Once electricity is made, it must be sent to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. Ontario has approximately 30,000 kilometers of transmission lines, mostly owned and operated by Hydro One.

Distribution

How electricity is delivered to you

Toronto Hydro <u>is</u> responsible for the last step of the journey: distributing electricity locally to end-use customers.

- Toronto Hydro does <u>not</u> generate or transmit electricity — it owns and operates the local electricity system made up of approximately 183,620 poles, 61,300 distribution transformers, 17,060 primary switches, 15,393 kilometers of overhead wires and 13,765 kilometers of underground cables.
- Toronto Hydro is wholly owned by the City of Toronto, but it does <u>not</u> receive taxpayer money — it is entirely funded by the distribution rates that you pay on your electricity bill.
- Toronto Hydro provides power to roughly 2.8 million people across the city of Toronto.

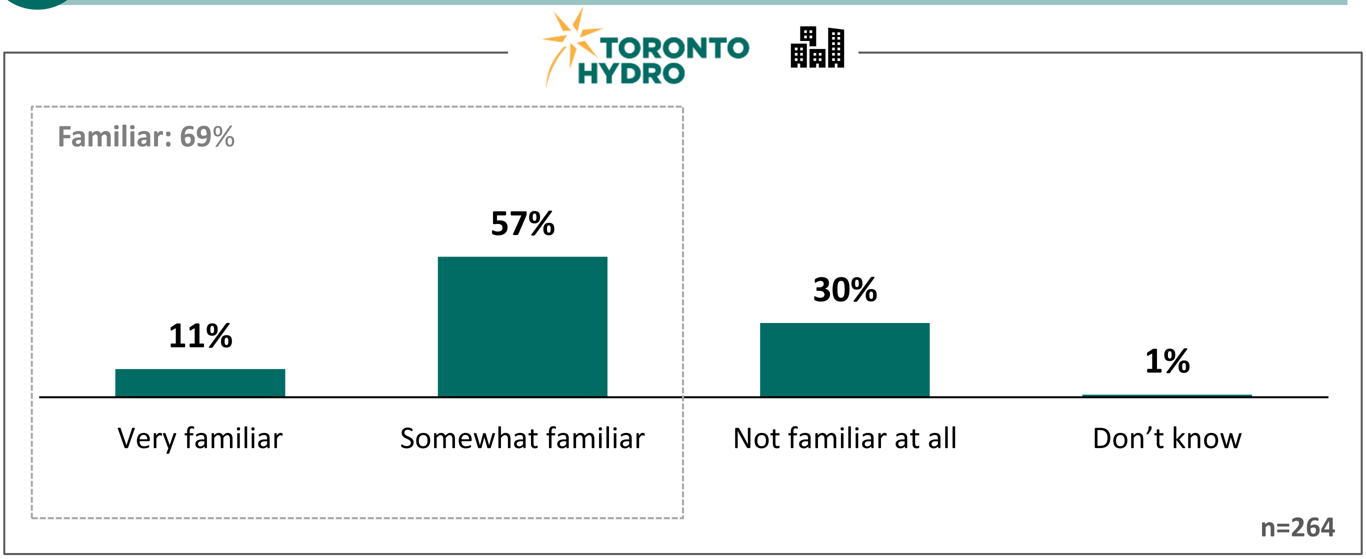
WORKBOOK PAGE

Online Workbook

Familiarity with Ontario's Electricity System

C&I

Q Before this engagement, how familiar were you with the various parts of the electricity system, how they work together and for which services Toronto Hydro is responsible?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Very familiar	13%	9%	10%	13%	15%	8%	15%	9%
Somewhat familiar	57%	67%	53%	53%	53%	49%	61%	66%
Not familiar at all	28%	23%	37%	34%	33%	40%	24%	23%
Don't know	2%	1%	0%	1%	0%	3%	0%	2%
Familiar (Very + Somewhat)	70%	76%	63%	65%	67%	57%	76%	75%

Toronto Hydro's Draft Plan

Planning Considerations

In preparing its plan, Toronto Hydro must consider many existing and emerging challenges of delivering safe, reliable and clean electricity at a reasonable price.

To learn more about what Toronto Hydro must consider in preparing its draft plan, click on the topics below.

Key challenges that Toronto Hydro's 2025–2029 draft plan addresses:

Keeping prices reasonable

- Many customers are concerned about the rising cost of doing business.
- Toronto Hydro must find the right balance between the investment needs of the local grid and the financial needs of its customers.

Responding to rising costs

- Like many companies, Toronto Hydro faces rising costs in purchasing equipment for the grid and doing construction work in the city.
- For example, from 2021 to 2022, the cost of buying electrical equipment increased by 9.9% while the cost of non-residential construction in the city of Toronto rose by 15.6%.

Powering a growing urban city

- Toronto is not just the largest city in Canada and an engine of the Canadian economy, it is also one of the fastest growing cities in North America.
- As the city continues to grow, the grid needs to be ready to power new condo towers, residential communities and businesses.

Fixing and replacing equipment in poor condition

- Much of Toronto Hydro's grid was installed in the 1950s and 1960s and needs to be replaced or upgraded.
- To keep the grid safe and reliable now and in the future, Toronto Hydro monitors the condition of its grid and uses this information to upgrade the equipment most at risk.

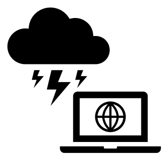
Reducing emissions from its own operations

- Toronto Hydro is committed to decarbonizing the company's footprint by 2040. To meet this goal, it must invest in reducing emissions from its vehicles and work centres.
- Toronto Hydro is expected to reduce its emissions by switching from oil and natural gas to clean electricity for powering its own operations.

Keeping up with the way customers use electricity

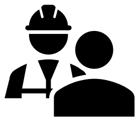
- Customers are using more electricity for their day-to-day energy needs, such as for transportation and electric heat pumps for heating. They are also choosing new technologies such as solar panels and battery storage to manage their electricity usage and sell electricity to the local grid.
- To ensure customers can connect new technologies to the grid safely and reliably, Toronto Hydro needs to upgrade its equipment and modernize its systems.

WORKBOOK PAGE



Responding to extreme weather and cyber security attacks

- Extreme weather such as high heat, high winds, flooding and ice storms is increasingly straining and damaging to electricity grids.
- Cybercrime is on the rise across Canada. For example, Toronto Hydro is the target of around one million attempted cyber attacks each year, with attempts going over one million in 2022 (successfully deflected).
- Toronto Hydro needs to make the grid more resilient against extreme weather and cyber security attacks that could compromise reliability and put customers at risk.



Protecting public and employee safety

- Toronto Hydro and its customers have a strong safety record, but electricity is dangerous and safety cannot be taken for granted.
- As homes and businesses add new technologies that increase the amount of electricity flowing around us, Toronto Hydro must ensure that the grid remains safe for its employees and the public.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Rate Application

C&I

How much of my electricity bill goes to Toronto Hydro?

Every item on your bill is required by provincial regulation.

- Toronto Hydro collects payment for the entire electricity system, but only keeps the distribution portion of the "**Delivery**" charge. This charge pays for both Toronto Hydro's **distribution** system and Hydro One's **transmission** system, as well as line losses (power that is lost when electricity travels across the wires).
- **About 14% of the electricity bill goes to Toronto Hydro** to pay for the local distribution grid. The **remaining 86%** of the bill goes to generation companies, transmission companies, the federal and provincial governments, and regulatory agencies.

Typical Bill

Sample Toronto Hydro Monthly Bill

Account Number:
0000000000

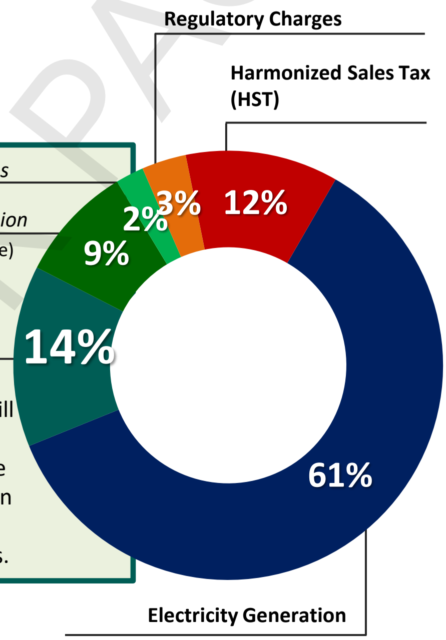
Meter Number:
00000000

Your Electricity Charges	
Electricity	7,639.30
Delivery	3,105.41
Regulatory Charges	423.17
Total Electricity Charges	**$11,167.88**
HST	1,451.82
Total Amount	**$12,619.71**

Delivery: *Line Losses*
$269.01

Delivery: *Transmission*
(varies based on usage)
$1,112.63

Delivery: *Distribution*
Toronto Hydro's part of the total bill is **$1,723.77**. This charge is the same for all customers in this rate class per OEB requirements.



Who holds Toronto Hydro accountable?

ONTARIO ENERGY BOARD

The **Ontario Energy Board (OEB)** is the public interest regulator responsible for setting electricity distribution rates (prices) and for protecting customers in Ontario.

The OEB holds Toronto Hydro accountable for:

- How it spends your money in current and future plans.
- Reporting on key outcomes (reliability) through an annual scorecard.
- Finding savings and efficiencies to absorb rising costs.

Want to know more about what Toronto Hydro has done to become more efficient?
Click here.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Rate Application

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WORKBOOK PAGE

What has Toronto Hydro done to become more efficient?

- Reduced the total number of facilities and gave back roughly $158 million to customers, resulting in a total credit of $3,905.52 on the average customer's bill in this rate class from 2016 to 2021.
- Delivered approximately $10 million in reduced or avoided costs in this current 2020–2024 period by replacing outdated information systems with consolidated programs, enabling automation and lowering maintenance costs.
- Implemented new technology to automate crew scheduling, enabling Toronto Hydro to maximize crew working hours and respond to power outages quicker.

Online Workbook

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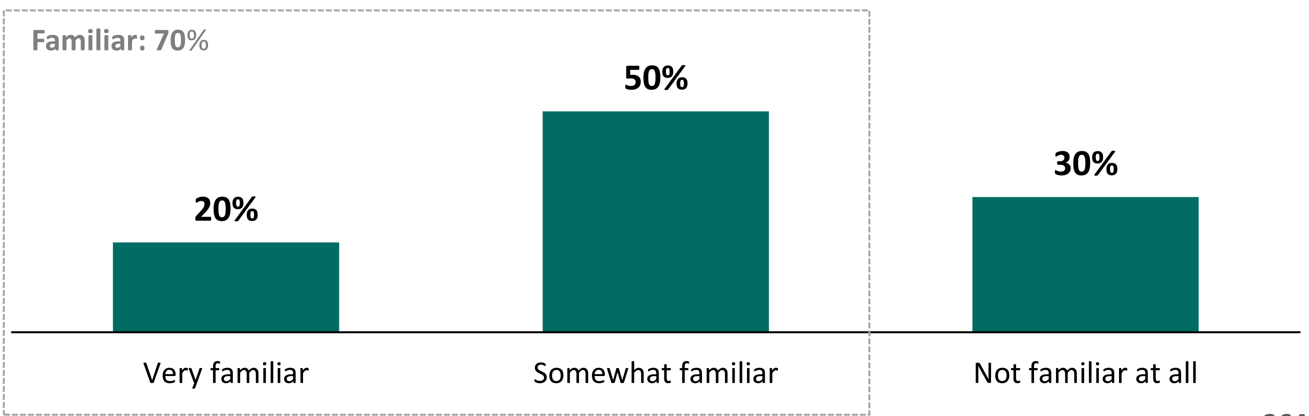
Familiarity with the Percentage of Bill Remitted to Toronto Hydro

Q Before this customer engagement, how familiar were you with the amount of your electricity bill that went to Toronto Hydro?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Very familiar	23%	20%	25%	15%	16%	16%	25%	23%
Somewhat familiar	48%	44%	46%	58%	48%	50%	51%	50%
Not familiar at all	29%	37%	29%	27%	36%	35%	24%	27%
Familiar (Very + Somewhat)	71%	63%	71%	73%	64%	65%	76%	73%

How does Toronto Hydro propose to spend the money?

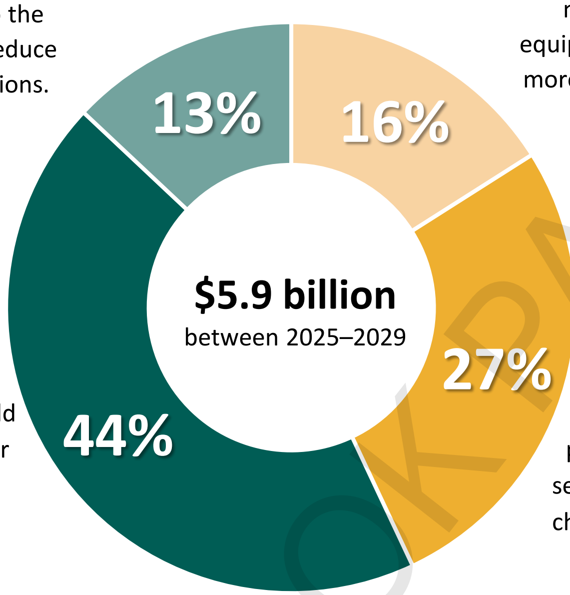
Toronto Hydro's five-year 2025–2029 draft plan is made up of four spending categories.

General Plant

Investments in vehicles, work centres and IT to keep the business running and reduce Toronto Hydro's emissions.

Modernization

Investments in technology to get more use out of existing equipment, and build a smarter, more efficient and reliable grid.



Sustainment

Investments to upkeep old equipment that is in poor condition and replace outdated equipment.

Growth

Investments in capacity to power the growing city and serve customers' growing and changing needs for electricity.

Want to know more about Toronto Hydro's current and future budgets? Click here.

How much will Toronto Hydro's draft plan cost me?

At the end of the five-year plan (2029), the typical customer in this rate class would see the distribution portion of their electricity bill increase by **$870.85**: from an estimated rate (price) of $1,794.37 in 2024 to a proposed rate (price) of **$2,665.22 by 2029.**

	Year	Avg. Monthly Bill	Toronto Hydro Portion	Toronto Hydro's Portion: Annual Increase (%)	Toronto Hydro's Portion: Annual Increase ($)
	2023	$12,619.71	$1,723.77	n/a	n/a
	2024	$12,650.16	$1,794.37	4%	$70.60
Rate Period	**2025**	$12,988.01	$2,093.35	17%	$298.98
Rate Period	**2026**	$13,115.22	$2,205.93	5%	$112.58
Rate Period	**2027**	$13,272.78	$2,345.36	6%	$139.43
Rate Period	**2028**	$13,511.20	$2,556.35	9%	$210.99
Rate Period	**2029**	$13,634.22	$2,665.22	4%	$108.87
5-yr impact			**$870.85**	**49%**	**$870.85**

Note: These estimated rate increases are preliminary and are subject to change based on customer feedback and other factors. A typical customer in this rate class is assumed to use 2,000 kWh per month and enrolled under Time-of-use Regulated Price Plan. Bill projections assume that other aspects of the electricity bill that are outside of Toronto Hydro's control (commodity, transmission, government, regulatory fees) remain constant.

WORKBOOK PAGE

Toronto Hydro Background

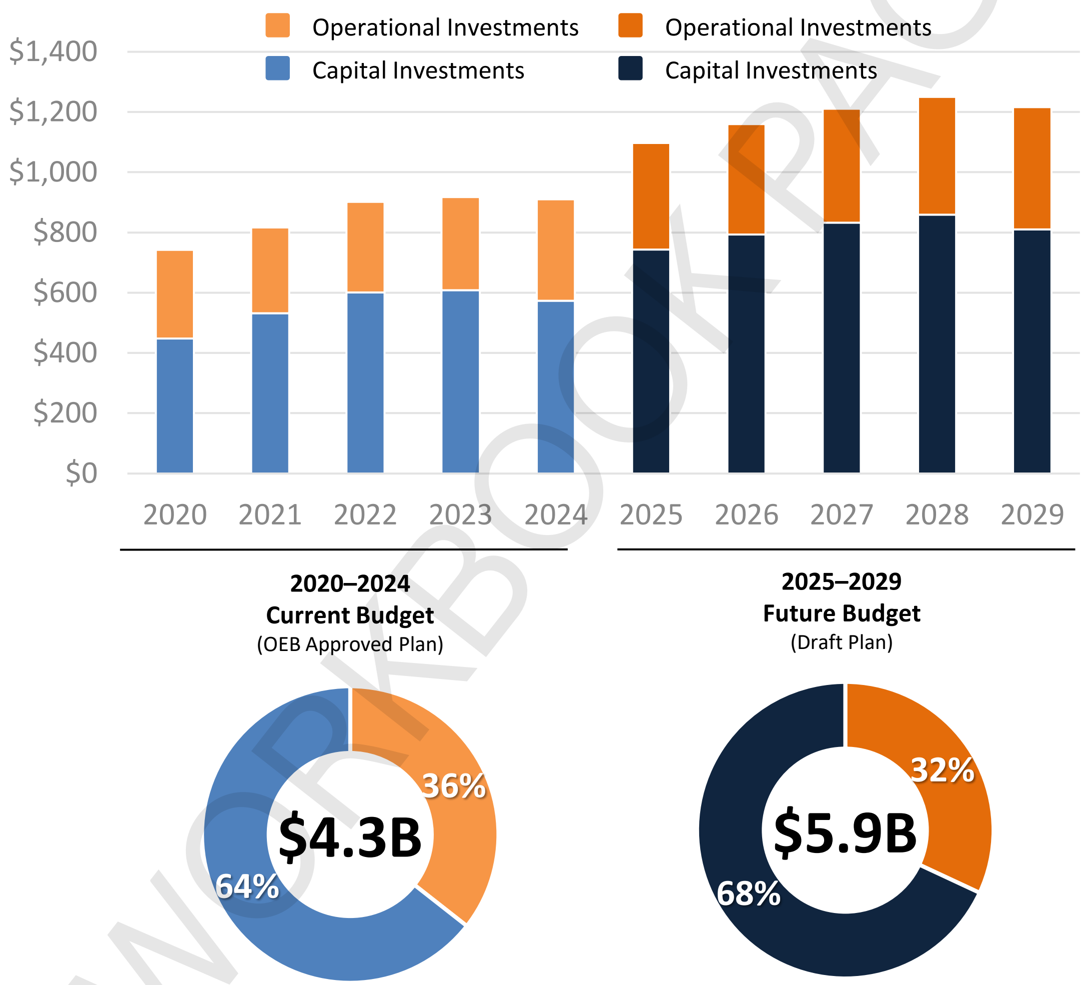
How much does it cost to run the local grid?

To run the local grid and serve customers, Toronto Hydro manages two budgets:

1. A **capital investment** budget which pays for the cost of buying and constructing physical infrastructure such as poles, wires, transformers, facilities, trucks and computers.

2. An **operational investment** budget which pays for maintenance and operation of the equipment, as well as the staff needed to manage the grid and serve customers daily.

Current and Future Budgets per year ($ millions)



The current five-year budget of **$4.3 billion** is based on the 2020–2024 plan approved by the OEB in a previous rate application. As mentioned earlier, this amount is funded by your 2020–2024 distribution rates.

The future five-year budget of **$5.9 billion** is based on the 2025–2029 draft plan presented in this customer feedback survey. The final budget for this next rate period will be adjusted to reflect customer feedback collected through this engagement and will be subject to extensive OEB review before rates are set for 2025–2029.

WORKBOOK PAGE

How does the survey work?

The next sections are about 7 key choices that Toronto Hydro needs to make to finalize its plan.

Each section provides some key background information. We encourage you to take the time to learn about your local electricity grid and where your money is going.

We also understand that life is busy. Many people find this information interesting — but if you would prefer to skip over the videos or the background information, you can jump right to the key choices.

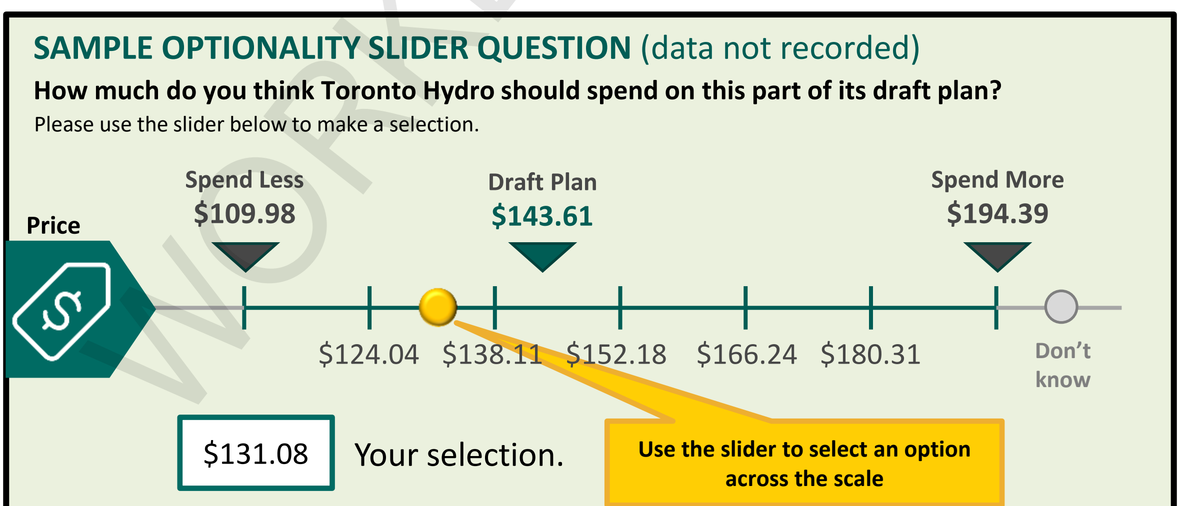
How do I make choices?

Each choice has a summary of three options that Toronto Hydro considered:

- **Spend Less:** A minimum spending option that keeps prices lower and meets the basic performance requirements but may entail some trade-offs on key outcomes, such as reliability.
- **Toronto Hydro's Draft Plan:** An option currently in the draft plan which makes additional progress toward key outcomes but delays some important work.
- **Spend More:** A faster paced spending option that makes additional progress towards better outcomes while recognizing practical limits due to resources and construction issues.

In each option, there is a sliding scale that enables you to dial the draft plan up or down. While Toronto Hydro's technical experts can tell us the maximum and minimum amounts we can practically spend, the balance of how much Toronto Hydro spends on the spectrum is up to customers like you.

At the end of the survey, you will get a summary of your choices and you will have the opportunity to change your answers to find the right balance for you.



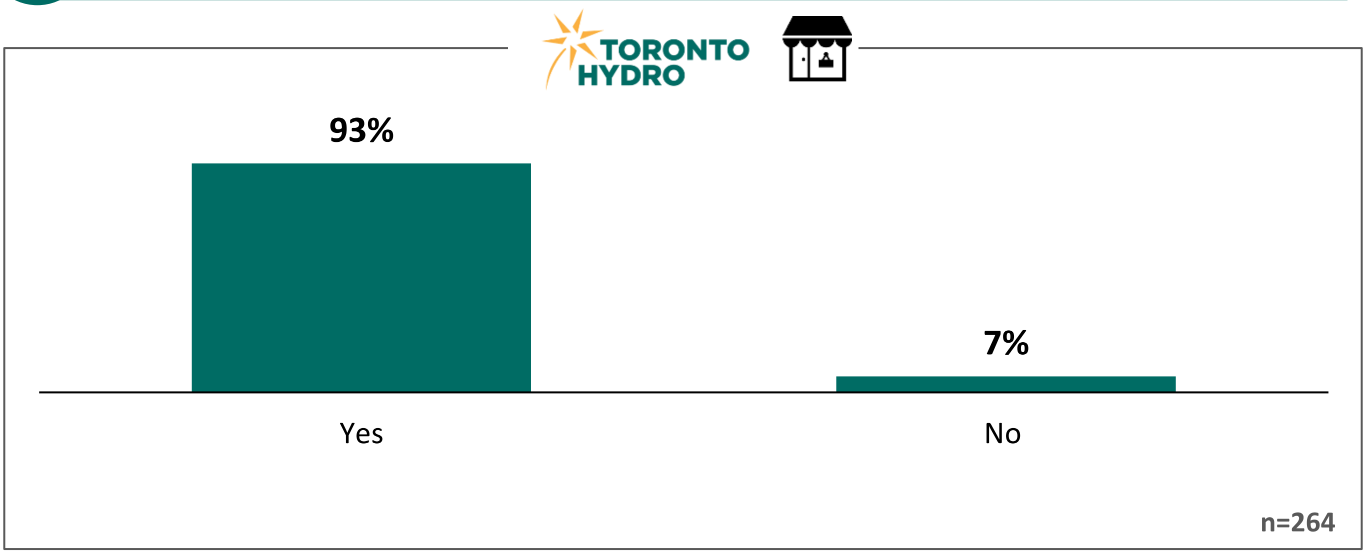
WORKBOOK PAGE

Online Workbook

Understanding the Slider

C&I

Q Is it clear that you can move the slider to any amount you feel best reflects your personal view of the best balance between lower costs and faster improvements?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Yes	94%	92%	97%	92%	90%	95%	92%	96%
No	6%	8%	3%	8%	10%	5%	8%	4%

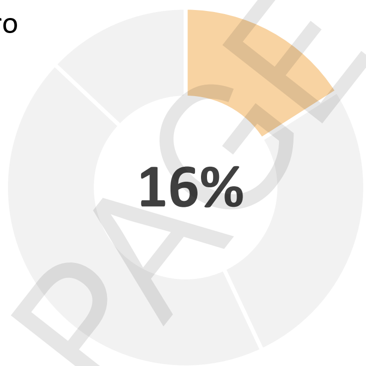
Draft Modernization Plan

Build a Smarter, More Efficient and Resilient Grid

What is this section about?

- This section explains how technology is changing the way customers use electricity and how Toronto Hydro operates and manages the grid to make it smarter, more efficient and resilient for customers.

  Want to learn more about how grid modernization benefits you? Click on the topics below.



- **Toronto Hydro's draft modernization plan enables:**
  - Faster and cheaper power restoration
  - More efficient use of existing equipment
  - Customer choice to adopt new technologies
  - Resilience against weather and cyber attacks

- This spending category makes up **16% of the draft plan** and would add **$143.61** on the average customer in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft modernization plan**.*

WORKBOOK PAGE

Modernization Plan

Building a Smarter, more Efficient and Reliable Grid

Toronto Hydro's Modernization Plan has four main objectives:

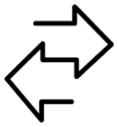
Faster and cheaper power restoration

- Through automation, the smart grid can achieve self-healing capabilities. This means that the distribution grid on your street will be able to locate outages and restore power automatically.
- The smart grid enables Toronto Hydro to reduce the number and length of outages customers experience. It also reduces manual costs (trucks and crews) of responding to power outage events.

More efficient use of existing equipment

- As customers use more electricity, some equipment will reach its limits. Sensors and meters detect when and where these limits are approaching, enabling Toronto Hydro to make better decisions.
- The smart grid enables Toronto Hydro to get more use out of the existing equipment so that it can serve a greater customer need for electricity without having to build as much new infrastructure.

Customer choice to adopt new technologies



- Sensors, switches and software enable Toronto Hydro to monitor and control the flow of electricity so that customers can choose technologies to produce, store and sell power to the grid.
- The smart grid is designed to allow safe and reliable two-way power flow — from the grid to the customers and from customers to the grid. This system can reduce costs and makes the local grid more resilient to outages.

Resilience against weather and cyber attacks

- Cyber attacks are increasing and getting more complex. Toronto Hydro must be prepared to respond to these threats to maintain reliable service and protect customer information.
- In addition to being able to restore power quicker, the smart grid can sense when environmental conditions like flooding pose a risk. This enables grid operators to strengthen the grid.

WORKBOOK PAGE

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Modernization Plan

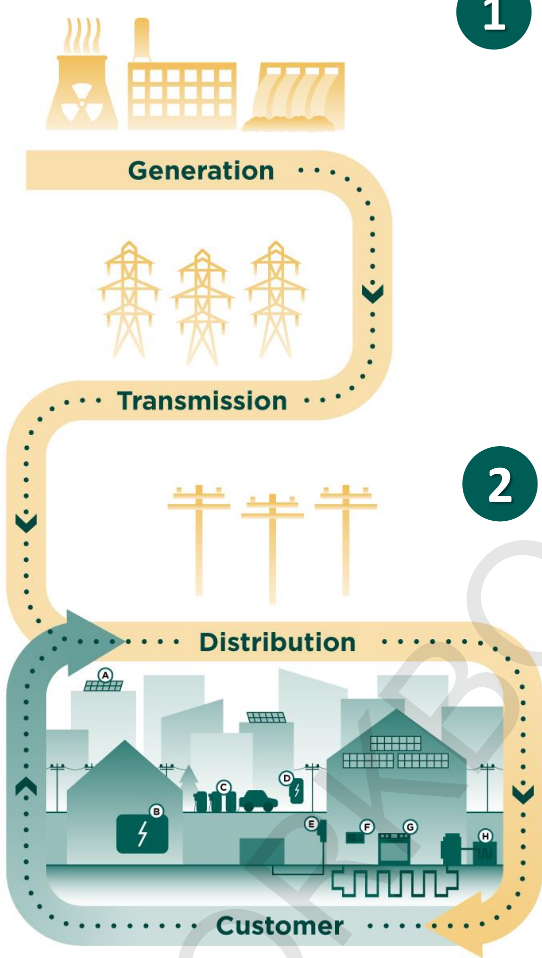
C&I

16%

Modernization: Changing Technology, Changing Needs

For more than 100 years, things changed relatively slowly in terms of grid technology. Electricity was generated in large power stations and transmitted from around the province to Toronto Hydro's grid, and ultimately to homes and businesses. That is all changing, and because of technological advancement, the pace of change could be fast.

Toronto Hydro's 2025–2029 plan is shaped by two key changes in technology:



A. Solar panel
B. Battery storage
C. Public electric vehicle charging station
D. On-site backup generation
E. Smart meter
F. Home energy manager
G. Energy-efficient appliances
H. Heat pump

1. **Technologies that change how customers use electricity.** These include:
   - Electricity products like electric heating, battery storage, and vehicles that enable customers to use less fossil fuels (oil and gas), which contribute to climate change.
   - Technologies like solar panels and battery energy storage that allow customers to produce and manage their electricity as well as sell it back onto the grid.

2. **Technologies that change how Toronto Hydro operates the grid**. These key changes are:
   - The grid must shift from a **one-way system** that only sends electricity to customers to a **two-way system** that allows customers to generate and sell electricity to the grid.
   - **Smart grid technology like sensors and automation** enables Toronto Hydro to monitor key equipment to prevent outages and get better use out of existing equipment. When outages do occur, this technology can re-route the grid to restore power much more quickly and at a lower cost than today.

How much electricity does it take to charge an Electric Vehicle (EV)?

Did you know that when an EV is charging it can use as much electricity as two average homes? If everyone in a neighbourhood came home from work or school and started charging their EVs at the same time, the electricity demand could overload the grid.

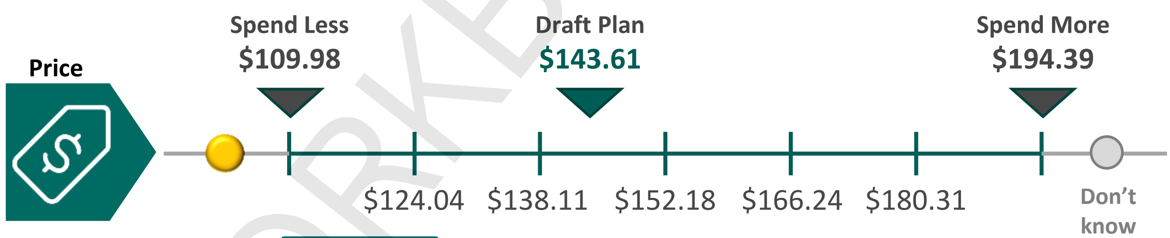
WORKBOOK PAGE

Making Choices: **Modernization**

By 2029, Toronto Hydro's draft **modernization plan** would cost the typical customer in this rate class **$143.61** more per month on their monthly electricity bill. Toronto Hydro could spend more to increase the pace of modernizing the grid to get better reliability sooner, or it could spend less and slow down the progress.

	Spend Less	Draft Plan	Spend More
Reliability	Being ready to automate the grid by 2035 means that better reliability won't happen until the end of the next decade or beyond.	Being ready to automate the grid by 2030 means that better reliability will happen in the earlier part of the next decade.	Faster progress towards grid automation means better reliability earlier and improved reliability for critical loads located in the downtown area.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	Same as draft plan.
Efficiency	It will take longer for the grid to become more efficient. This may lead to higher costs in the next decade.	The grid will become more efficient in the next decade, which will help reduce costs.	Same as draft plan.

Choice 1 of 7:



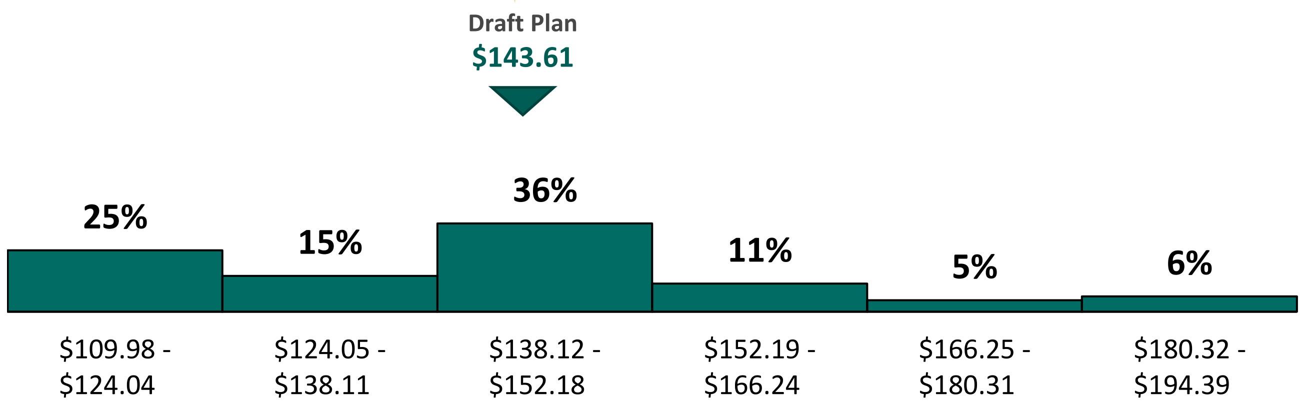
$-.-- Your selection.

WORKBOOK PAGE

Online Workbook
Amount Spent on the Modernization Plan

C&I

Q How much do you think Toronto Hydro should spend on its modernization plan?



"Don't know" (2%) not shown.

n=264

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	41%	45%	40%	40%	40%	36%	40%	41%	47%
On Plan	29%	30%	28%	29%	31%	33%	29%	37%	19%
Above Plan	28%	21%	31%	28%	28%	28%	27%	22%	34%
Don't Know	2%	4%	1%	3%	1%	4%	4%	0%	0%
TOTAL On Plan + Above Plan	57%	51%	59%	57%	59%	61%	55%	59%	53%

INNOVATIVE RESEARCH GROUP

Online Workbook

Additional Feedback on the Modernization Plan

C&I

Q Do you have additional feedback on Toronto Hydro's draft modernization plan?

Response	%
Costs are too high already, cost of living, struggling to pay bills	1.9%
Good information	1.1%
Support the increase (general)	1.1%
Modernize, be proactive, invest for the long term	1.0%
Support developing new technology and innovation	0.7%
Prioritize renewables, solar/wind, and electric vehicles	0.5%
Make use of existing infrastructure, past spending	0.5%
Prevent outages, stable power, system reliability	0.4%
Need more information	0.3%
Find efficiencies, cut wasteful spending, lower salaries	0.2%
Other	0.4%
No response	91.8%

Note: Responses were optional. Only responses > 0.1% are shown.

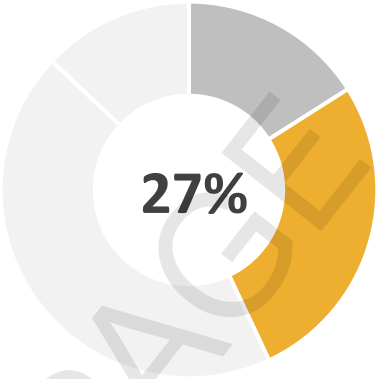
Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Growth Plan

C&I

Draft Growth Plan
Increase Capacity to Serve Customers

What is this section about?

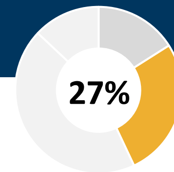
- This section explains how fast the city of Toronto is growing and what it takes for the grid to serve customers' needs for more electricity.
- Toronto Hydro's draft growth plan is about increasing grid capacity to serve customers reliably now and in the future.



- This spending category makes up **27% of the draft plan** and would add **$233.98** on the average customer in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft growth plan**.*

WORKBOOK PAGE



Growing City, Growing Needs

1 Toronto is growing, fast.

Toronto is one of the fastest growing cities in North America. A growing city means that we need a bigger local grid so that homes and businesses can get the power they need, when they need it.

Population Growth

Toronto will add approximately 500,000 more people this decade. To put this into context, Toronto is growing five times faster than Los Angeles.

230 Cranes
Toronto has led the crane count in North America since 2015.

2,114 Projects
including residential and non-residential in development in the city of Toronto.

+$1B in Construction
work planned for city infrastructure in Toronto annually (transportation and water).

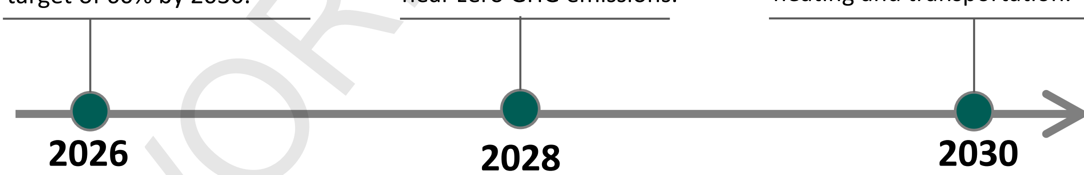
2 Individual customers will use more electricity than ever before.

The average customer will use more electricity in the next 10–15 years, as governments encourage businesses and communities to use less fossil fuels (oil and gas) to address climate change. Here are the key government policies that drive the need for more electricity in Toronto:

The Government of Canada may require 20% of all new car sales to be zero emission and is working towards a target of 60% by 2030.

The City of Toronto Green Building Standard requires all new mid- and high-rise buildings to be near zero GHG emissions.

The carbon tax may increase 161% by 2030 so customers use less oil and gas, and switch to clean electricity for cooking, heating and transportation.



23% **Forecasted increase in customers' need for electricity by the year 2030.**

Conservation and energy efficiency has helped manage electricity use over the past 20 years and will continue to play an important role in the future. But conservation alone is not enough. We need a bigger grid to serve customers in the long term.

WORKBOOK PAGE

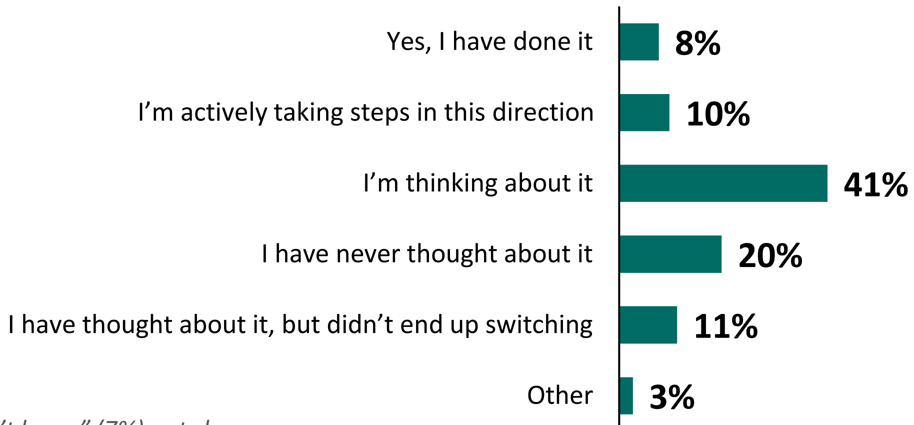
Online Workbook

Amount Spent on Modernization Plan

C&I

Q When you think about all your energy bills, has your organization ever considered shifting from one energy source to another to save money or reduce your impact on the environment?
For example, changing from a natural gas-fuelled furnace to an electric heat pump, or from a gas-fuelled vehicle to an electric vehicle?

TORONTO HYDRO



"Don't know" (7%) not shown.

n=251

	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Yes, I have done it	7%	6%	10%	8%	8%	4%	10%	10%
Actively taking steps	9%	12%	7%	10%	6%	9%	10%	15%
I'm thinking about it	41%	37%	31%	49%	44%	32%	43%	44%
I have never thought about it	20%	24%	31%	11%	19%	27%	17%	17%
I didn't end up switching	8%	12%	12%	13%	8%	12%	16%	9%
Other	0%	3%	2%	5%	4%	3%	2%	2%

Note: Responses were optional.

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Growth Plan

C&I

27%

Building a bigger grid takes time

It's easy to say Toronto needs more electricity, but meeting this need requires Toronto Hydro to make major investments in the grid, including:

Expand Transformer Stations

Bring more power into the city from the provincial grid to serve growing communities along the new transit corridors (Eglinton LRT, Finch LRT, Ontario Line) and the redevelopment of areas like Downsview Park and the Portlands.

Upgrade and Reconfigure the Grid

Make more space on the grid to enable customers to plug in. Upgrade equipment like cables and transformers and reconfigure how the existing system serves customers to make more space on the grid to accommodate new services like electric vehicle charging stations and solar panels.

Major Infrastructure Developments

Connect major projects like the Finch Light Rail Transit system and the Ontario Line, and relocate Toronto Hydro's grid equipment to enable these and other major infrastructure developments to be constructed in the city.

This work cannot happen quickly. Toronto is densely populated and congested. **Building new power lines and stations takes years of planning and construction.** There are also equipment and resource constraints that limit how quickly Toronto Hydro can build a bigger grid.

Managing Uncertainty

Toronto Hydro develops its forecast from information such as building permits and projected electric vehicle sales. However, customer adoption of new technology is uncertain due to:

Supply chain issues such as equipment and resource shortages can affect the availability of customer technologies.

Technological advancements can lead to fast cost reductions. For example, the price of lithium ion batteries (EVs) decreased by 79% from 2013 to 2022.

Government policies such as rebates for electric vehicles and solar panels drive customers and suppliers to make certain choices.

If Toronto Hydro invests too quickly to build a bigger grid, it means customers' rates will go up to pay for equipment that will not be used for some time. On the other hand, if it doesn't do enough to expand the grid for higher use of electricity, customers could experience less reliability (brownouts) and delays when they want to connect to the grid or plug in new technologies. Toronto Hydro needs your input on the pace for these investments.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Growth Plan

C&I

27%

Making Choices: **Growth**

By 2029, Toronto Hydro's draft **growth plan** would cost the typical customer in this rate class **$233.98** more per month on their monthly electricity bill. Toronto Hydro could spend more to better prepare the grid to serve customers' changing needs, or could spend less and wait and see if customers adopt new technologies over the 2025-2029 plan.

	Spend Less	Draft Plan	Spend More
Reliability	May lead to less reliability for customers in high-growth neighbourhoods. Increases reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Manages reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Improves reliability risk for the next decade.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	May improve service levels (shorter waits and lower costs) for some customers connecting new services to the grid. Improves customer choice for new technologies.
Efficiency	May lead to less efficient work if Toronto Hydro has to build a bigger grid reactively to serve customers.	Supports the ability to serve customers efficiently in the five-year plan based on the projected demand.	Supports the ability to serve customers efficiently in the five-year plan and beyond in the next decade.

Choice 2 of 7:

Price

Spend Less **$184.17** — **Draft Plan** **$233.98** — **Spend More** **$286.62**

$201.24 $218.31 $235.39 $252.46 $269.54 Don't know

$-.-- Your selection.

WORKBOOK PAGE

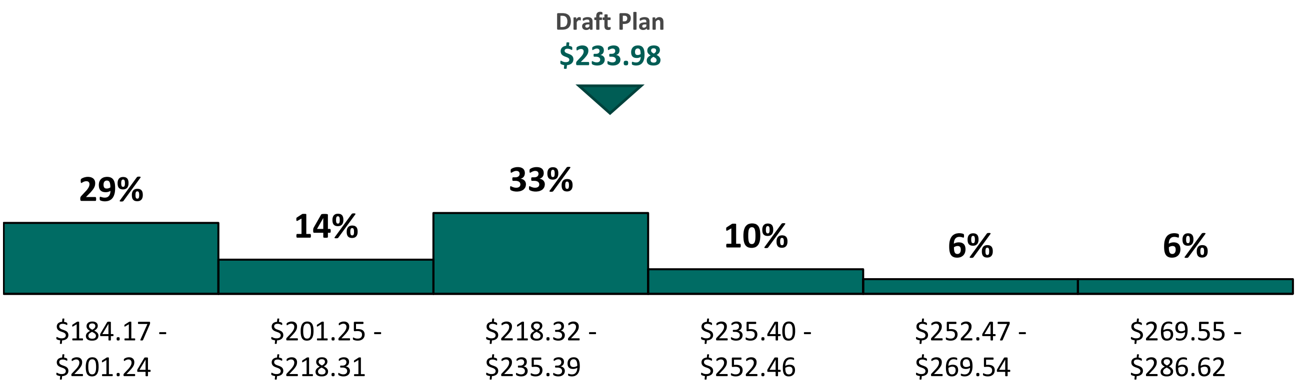
Online Workbook

Amount Spent on the Growth Plan

C&I

Q How much do you think Toronto Hydro should spend on its growth plan?

TORONTO HYDRO



"Don't know" (1%) not shown.

n=264

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	54%	57%	51%	63%	47%	50%	53%	58%	53%
On Plan	28%	22%	29%	22%	35%	33%	28%	30%	22%
Above Plan	17%	19%	18%	13%	16%	15%	16%	11%	25%
Don't Know	1%	2%	1%	2%	1%	2%	3%	0%	0%
TOTAL On Plan + Above Plan	45%	41%	48%	35%	52%	48%	44%	42%	47%

Online Workbook

Additional Feedback on the Growth Plan

C&I

Q Do you have additional feedback on Toronto Hydro's draft growth plan?

Response	%
Should be funded by developers	1.1%
Find efficiencies, cut wasteful spending, lower salaries	0.7%
Costs are too high already, cost of living, struggling to pay bills	0.7%
Support developing new technology and innovation	0.4%
Modernize, be proactive, invest for the long term	0.3%
Should be funded by tax dollars/government	0.3%
Prioritize renewables, solar/wind, and electric vehicles	0.3%
Need more information	0.2%
No response	95.9%

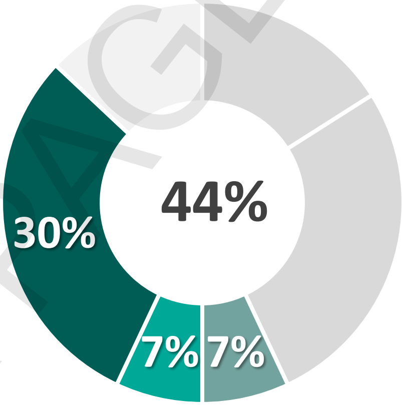
Note: Responses were optional. Only responses > 0.1% are shown.

Draft Sustainment Plan
Replacing and Updating Equipment

What is this section about?

- This section is about upkeeping the grid to manage reliability and maintain safe and efficient operations.
- Toronto Hydro's draft sustainment plan section seeks your input in three areas:

1. Managing equipment in very poor condition with a high risk of failure.
2. Pacing the upkeep of equipment near the end of its expected life.
3. Standardizing outdated equipment.



- This spending category makes up **44% of the draft plan** and would add **$381.41** on the average customer in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft sustainment plan**.*

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Sustainment Plan

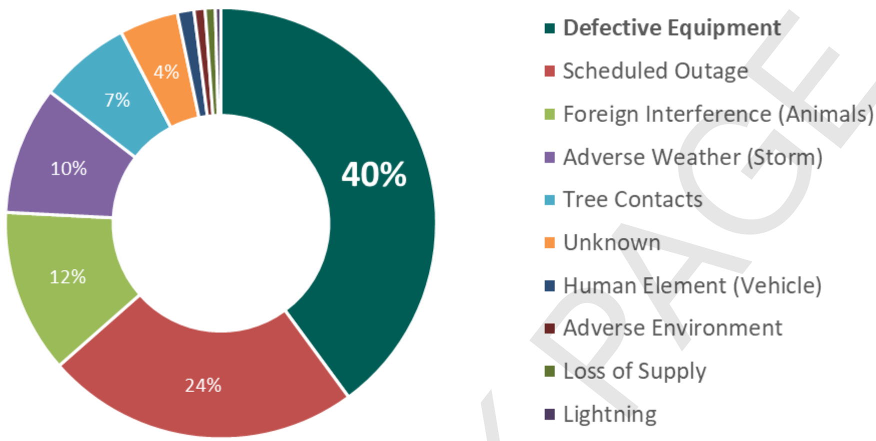
C&I

30%

1 Reliability: Managing Equipment Failure Risk

While many power outages are caused by external events such as weather and falling trees, roughly **40%** of customer outages are caused by equipment failure. This is the largest single cause of outages, and customers look to Toronto Hydro to manage this risk.

Customer Outage Duration (Hours) by Cause 2018-2022



Toronto Hydro manages failure risk by:

- Inspecting equipment condition regularly, so that maintenance or replacement can be done before the equipment fails.
- Replacing and repairing equipment that is in bad condition or performing poorly. This includes replacing lines with a high number of outages or replacing transformers with visible signs of wear and tear such as rust.

Since 2014, Toronto Hydro's work to upkeep the grid has delivered a 13% reduction in the average number of outages experienced by customers and a 25% reduction in the length of those outages. Toronto Hydro's draft plan is to maintain these reliability results for customers.

Want to learn more about grid reliability and what causes power outages? Click here.

What type of work is Toronto Hydro doing to manage equipment failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to prevent increased outages due to equipment failure.

Replacing Direct-Buried Cable

In parts of the grid that were built a long time ago, cables are laid directly in underground trenches without any protective barrier. **Underground equipment failures contribute to 57% of defective equipment failures, the large majority of which (75%) are due to cables**. Toronto Hydro's draft plan intends to replace 182 kilometers of direct buried cables by 2029 to manage the risk of power outages caused by this equipment.

WORKBOOK PAGE

System reliability

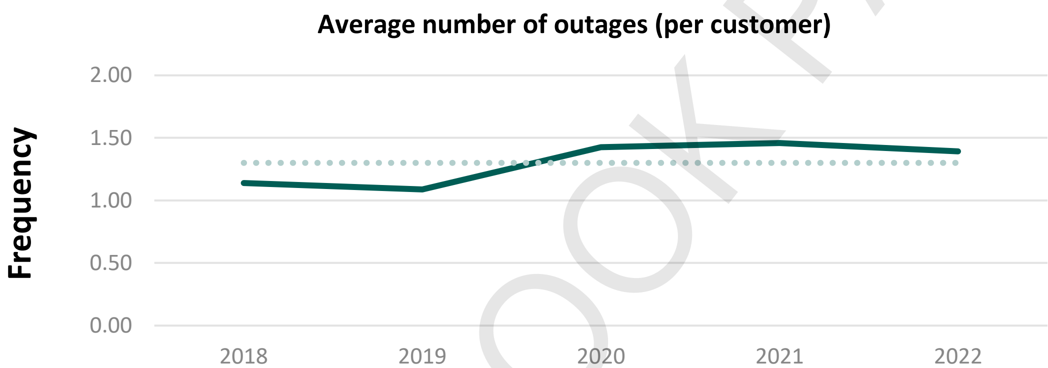
In order to provide feedback on Toronto Hydro's plans, it's important to understand how the distribution system has performed in the past, as well as what's expected in the future.

A core objective of Toronto Hydro's plan is to maintain current levels of reliability over the 2025–2029 plan period, while making foundational technology investments to reduce the length of power outages in the long-term.

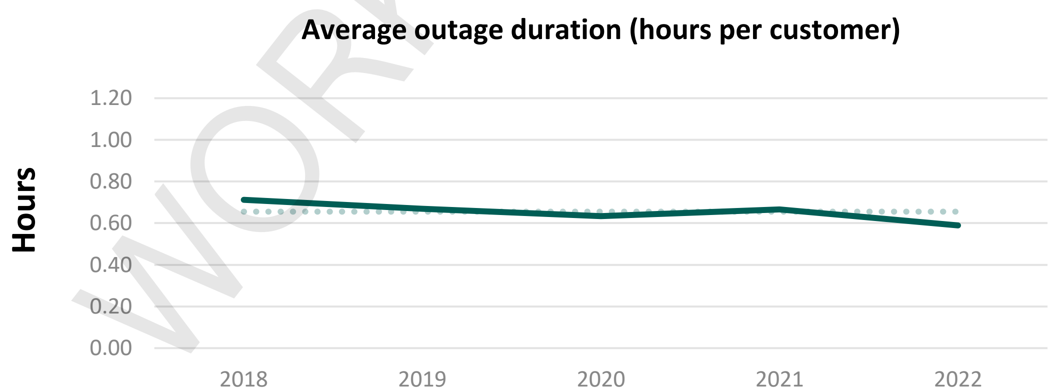
Toronto Hydro recognizes that power interruptions are inconvenient for residential customers and can be very costly for commercial and industrial customers.

Toronto Hydro tracks both the average number of power outages per customer and how long those interruptions last.

Between 2018 and 2022, the typical Toronto Hydro customer has experienced about two outages per year (*or 1.3 outages per customer to be exact*).



Over the same period, the average **duration** of an outage has been about 0.62 hours. Meaning, when the power does go out, Toronto Hydro is typically able to restore power in about 35 minutes.



It's important to keep in mind that these are system averages, and that your actual experience may be different. Some customers connected to newer lines may not experience any outages, while others are experiencing more than the average number of outages each year.

WORKBOOK PAGE

What is most likely to cause an outage?

Although both the number and length of outages have decreased compared to the previous five-year average, equipment failure remains the top cause of outages within Toronto Hydro's control.

That said, in 2022, severe weather presented a unique set of challenges for Toronto Hydro's distribution system.

Causes of Unscheduled Power Outages (five-year average: 2018 to 2022)

12% **Animal Contact:** Outages caused by animals such as racoons, squirrels and birds coming in contact with overhead powerlines or transformers.

40% **Equipment Failure:** Unscheduled power outages from equipment failure usually occur with distribution equipment that's beyond or approaching the end of their expected useful lives.

10% **Weather-Related Events:** Adverse weather such as heavy rain, lightning strikes, ice, snow, wind, extreme temperatures, and freezing rain can disrupt the distribution system.

14% **Other:** Includes tree contact (7%) and human interference (1%), such as construction workers accidentally cutting powerlines or motor vehicle accidents involving contact with distribution equipment. 4% of outages are unknown, but most are likely caused by animal contact.

Note: *statistics do not include loss of supply from Hydro One.*

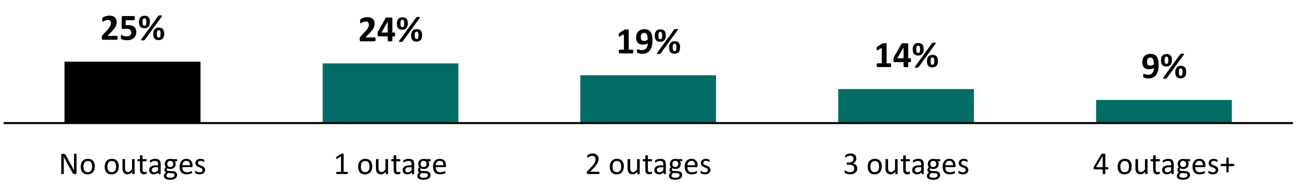
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Reliability Plan

C&I

Q Over the past 12 months, have you experienced any power outages at your organization which lasted longer than one minute?



"Don't know" (8%) not shown.

n=261

	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
No outages	17%	25%	20%	33%	29%	35%	15%	21%
1 outage	21%	36%	10%	25%	13%	20%	42%	23%
2 outages	27%	16%	26%	13%	24%	20%	8%	26%
3 outages	5%	13%	21%	15%	11%	16%	18%	9%
4 outages+	10%	8%	18%	5%	9%	4%	8%	16%

Note: Responses were optional.

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Sustainment Plan

C&I

30%

Making Choices: Managing Equipment Failure Risk

By 2029, Toronto Hydro's draft plan to manage equipment failure risk would cost the typical customer in this rate class **$263.75** more per month on their monthly electricity bill. Toronto Hydro could spend more to improve reliability, or it could spend less and take on more risk of outages.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Reduces reliability compared to current levels. This means more power outages due to equipment failure.	Maintains reliability at current levels. This means holding steady on power outages due to equipment failure.	Improves reliability compared to current levels. This means less power outages due to equipment failure.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 3 of 7:

Price

Spend Less **$191.43** — Draft Plan **$263.75** — Spend More **$320.84**

$212.99 — $234.56 — $256.13 — $277.69 — $299.26 — Don't know

$-.-- Your selection.

WORKBOOK PAGE

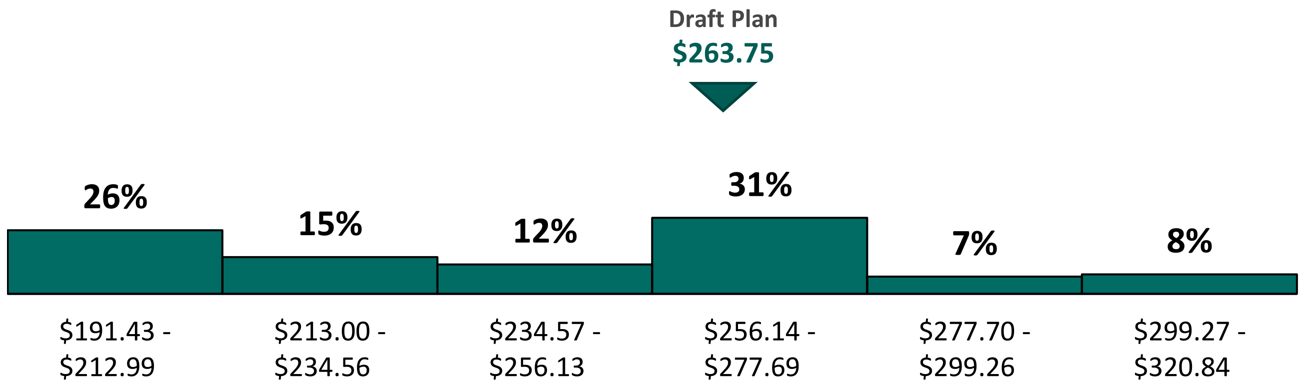
Online Workbook

Amount Spent on the Grid Reliability Plan

C&I

Q How much do you think Toronto Hydro should spend on its grid reliability plan?

TORONTO HYDRO



"Don't know" (2%) not shown.

n=264

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	55%	59%	53%	64%	49%	57%	57%	56%	51%
On Plan	25%	24%	27%	20%	27%	26%	26%	25%	23%
Above Plan	18%	16%	18%	16%	20%	15%	14%	19%	24%
Don't Know	2%	2%	2%	0%	3%	2%	3%	0%	3%
TOTAL On Plan + Above Plan	43%	39%	45%	36%	47%	41%	40%	44%	46%

Online Workbook

Additional Feedback on the Grid Reliability Plan

C&I

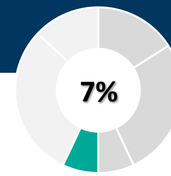
Q Do you have additional feedback on Toronto Hydro's draft grid reliability plan?

Response	%
Modernize, be proactive, invest for the long term	1.2%
Prevent outages, stable power, system reliability	0.8%
Make use of existing infrastructure, past spending	0.3%
Costs are too high already, cost of living, struggling to pay bills	0.3%
Support the increase (general)	0.3%
Find efficiencies, cut wasteful spending, lower salaries	0.2%
No response	96.8%

Note: Responses were optional. Only responses > 0.1% are shown.

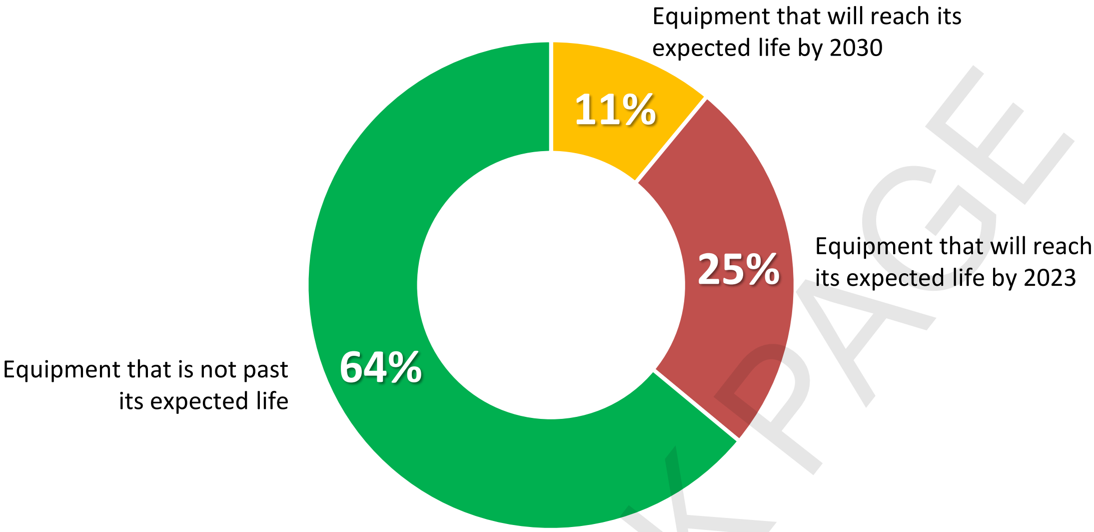
Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

C&I



2 Paced Upkeep of the Grid

About 25% of Toronto Hydro's equipment is operating past its expected life and an additional 11% is estimated to reach that point by 2030.



In this part of the plan, the key question is whether Toronto Hydro should wait until there are clear signs of equipment failure risk (such as rust or oil leaks), or whether it should get ahead of the problem by replacing old equipment proactively.

If Toronto Hydro waits, it can keep prices lower in the short term. However, this could create a surge of work in future years that will spike prices in the 2030s. There is also a risk that Toronto Hydro will not be able to do the amount of work required to deal with this equipment in the future, which could lead to more outages and higher safety risks due to equipment failures.

Want to learn more about Toronto Hydro's distribution grid? Click here.

What type of work is Toronto Hydro doing to upkeep the grid?

Below is an example of key investments that Toronto Hydro needs to make in a paced way to upkeep the grid and prevent a surge of work to address equipment failure risk in the future.

Paced Replacement of Network Vaults

This equipment is located in underground vaults in the downtown area, which serves many critical customers, such as hospitals and financial institutions. A very large portion of this equipment is going to be in poor condition and past its expected life in the 2030-34 period. To manage this risk, Toronto Hydro's draft plan intends to replace network vaults in a paced manner.

WORKBOOK PAGE

Renewing and replacing infrastructure

Toronto Hydro's grid is a mix of overhead, underground, network and station infrastructure. It operates at three different voltages (27.6kV, 13.8kV, and 4.16kV) and includes approximately:

- 61,300 distribution transformers
- 17,060 primary switches
- 15,393 km of overhead wires
- 13,765 km of underground wires
- 37 transformer stations

Overhead Infrastructure

The overhead system is made up of poles, wires, transformers, switches and other equipment. They are easier to replace, repair and inspect.

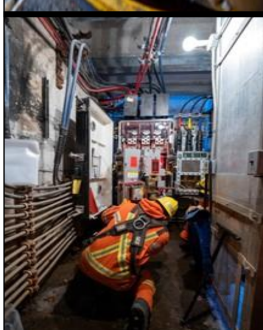
However, they are also more prone to foreign interference such as vehicles, trees, animals and weather-related outages.

This system consists of three different types of configurations two of which are outdated configurations from the 1950s and 1960s, making them more challenging to replace and restore particularly after a weather-related outage.

Underground Infrastructure

Toronto Hydro's underground system consists of cables, transformers, switches and civil infrastructures (like manholes). They can be placed either at ground level (green box above ground in your neighbourhood), underground, or inside building vaults (typical for multi-storey buildings). This system is made up of two different types of configurations where the downtown Toronto area consists of lead-covered cable, an outdated equipment with little to no suppliers.

While underground equipment is more resilient during weather-related events, it is more susceptible to flooding and at risk of faster deterioration due to moisture build-up.



Network Infrastructure

Toronto Hydro's network system, predominantly found in the downtown Toronto area, was installed in the early-to-mid 1900s to improve reliability (service levels) for critical loads (like financial institutions) and serves medium-sized loads in high-density areas, and areas with small and narrow sidewalks. It consists of interconnected low-voltage cables, vaults and network units.

While this system is better at handling normal equipment failures, proactive replacement and maintenance of this equipment are critical to avoid vault fires from occurring.

Station Infrastructure

Toronto Hydro's distribution stations receive the transmission supply from Hydro One at very high voltages. Station infrastructure consists of switchgear, power transformers, circuit breakers, remote terminal units (station computers) and battery systems. Toronto Hydro proactively replaces this equipment, as failure at the station level can cause widespread and lengthy power outages.

WORKBOOK PAGE

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

C&I

7%

Making Choices: **Paced Upkeep of the Grid**

By 2029, Toronto Hydro's draft plan to ensure paced upkeep of the grid would cost the typical customer in this rate class **$58.27** more on their monthly electricity bill. Toronto Hydro could spend more to get ahead of future equipment failure risk, or it could spend less and defer some of this work at the risk of managing more power outages due to equipment failure in the next decade.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Higher risk of power outages due to equipment failure in the next decade.	Manages the risk of power outages due to equipment failure in the next decade.	Reduces the risk of power outages due to equipment failure in the next decade.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 4 of 7:

Price

Spend Less $40.88 | Draft Plan $58.27 | Spend More $90.75

$49.18 | $57.49 | $65.81 | $74.12 | $82.43 | Don't know

$-.-- Your selection.

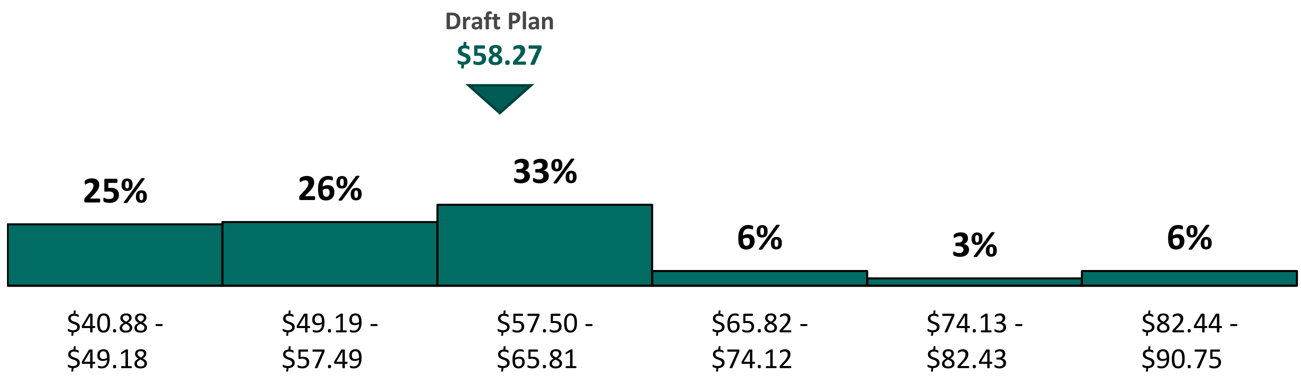
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Stewardship Plan

C&I

Q How much do you think Toronto Hydro should spend on its grid stewardship plan?



"Don't know" (1%) not shown.

n=264

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	42%	47%	46%	44%	33%	41%	48%	35%	42%
On Plan	34%	33%	29%	31%	40%	34%	32%	44%	25%
Above Plan	23%	19%	22%	24%	25%	22%	18%	21%	31%
Don't Know	1%	2%	3%	0%	1%	3%	1%	0%	1%
TOTAL On Plan + Above Plan	57%	52%	51%	56%	66%	56%	50%	65%	57%

Online Workbook

Additional Feedback on the Grid Stewardship Plan

C&I

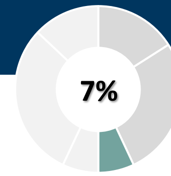
Q Do you have additional feedback on Toronto Hydro's draft grid stewardship plan?

Response	%
Support the increase (general)	0.5%
Make use of existing infrastructure, past spending	0.5%
Should be funded by tax dollars/government	0.4%
Modernize, be proactive, invest for the long term	0.3%
Costs are too high already, cost of living, struggling to pay bills	0.3%
Find efficiencies, cut wasteful spending, lower salaries	0.2%
Prevent outages, stable power, system reliability	0.2%
No response	97.5%

Note: Responses were optional. Only responses > 0.1% are shown.

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

C&I

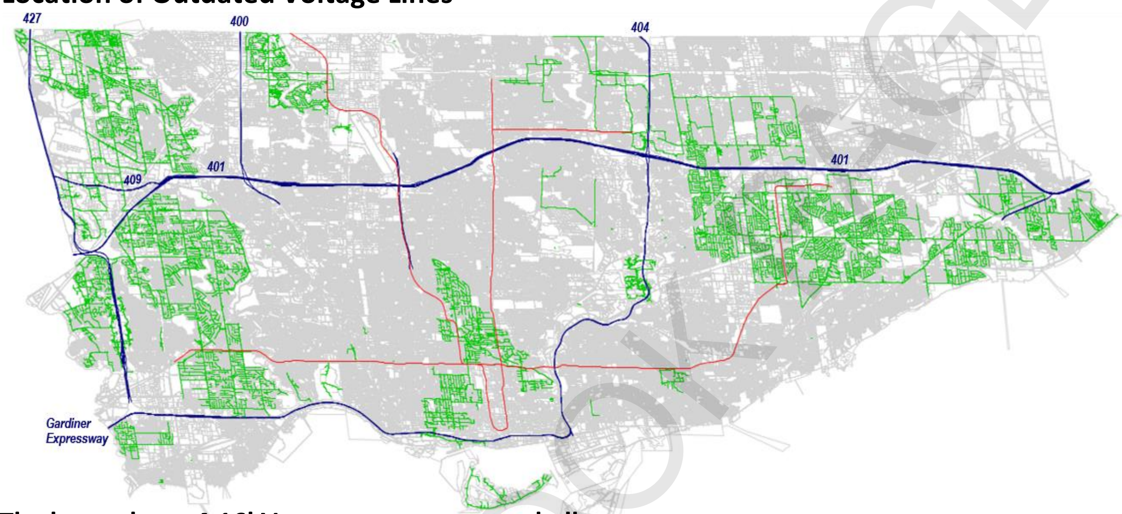


3 Standardize the Grid

Because of its history, Toronto Hydro has an old and diverse grid. Toronto Hydro is made up of 6 municipal utilities that were joined in 1998 when the City of Toronto was formed. Each utility owned and operated different types of equipment. As a result, Toronto Hydro's grid has three different voltage levels: 4.16kV, 13.8kV and 27.6kV.

The 27.6kV voltage level is the current standard for local grids. However, a large part of Toronto Hydro's grid is served at 4.16kV and 13.8kV.

Location of Outdated Voltage Lines



The low voltage 4.16kV system poses many challenges:

- Long outages for customers and higher cost to restore power – in 2022, the longest outage on the 4.16 kV system was 80 hours.
- Less efficient at carrying power over long distances, which means more electricity is lost as it travels from point A to point B (line losses).
- Less capacity to serve customers' growing electricity needs, which means longer waits and higher costs to connect new services such as electric vehicles and solar panels.
- Risk of supply chain and labour shortages as manufacturers stop making this equipment and technicians trained on this equipment retire.

What type of work is Toronto Hydro doing to standardize the grid?

Below is an example of a key investment to replace outdated equipment.

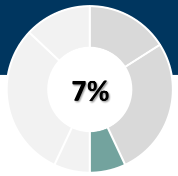
Voltage Conversion from 4.16kV/13.8kV to 27.6kV

Voltage conversion entails a full rebuild of outdated equipment such as rear lot construction (poles and wires in customers' backyards). This work improves reliability, safety and makes the grid more efficient. Toronto Hydro's draft plan intends to convert 1400 customers from rear lot service and works to eliminate rear lot construction from the grid by the late 2040s.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Sustainment Plan

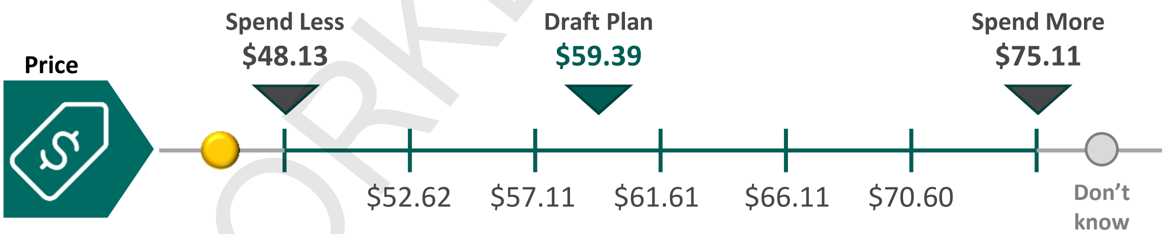


Making Choices: **Standardize the Grid**

By 2029, Toronto Hydro's draft **plan to standardize the grid** would cost the typical customer in this rate class **$59.39** more on their monthly electricity bill. Toronto Hydro could spend more to speed up the pace of replacing outdated equipment or it could spend less to slow down the pace and delay the benefits of this work. For example, under spend more Toronto Hydro would convert all rear lot customers by the early 2040s, and under spend less by the 2050s.

	Spend Less	Draft Plan	Spend More
Reliability	Slower progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Steady progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Faster progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.
Customer Service	Less progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.	Steady progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.	Faster progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.
Efficiency	Slower progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Steady progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Faster progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.

Choice 5 of 7:



$-.-- Your selection.

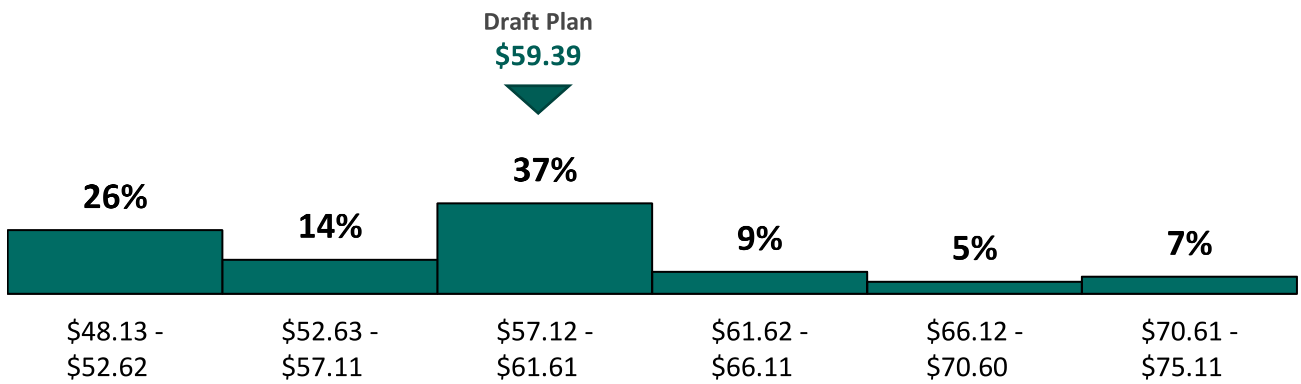
WORKBOOK PAGE

Online Workbook

Amount Spent on the Equipment Standardization Plan

C&I

Q How much do you think Toronto Hydro should spend on its equipment standardization plan?



"Don't know" (2%) not shown.

n=264

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	44%	47%	52%	41%	38%	49%	43%	37%	47%
On Plan	31%	24%	25%	31%	39%	31%	36%	32%	24%
Above Plan	24%	28%	20%	26%	22%	17%	19%	29%	29%
Don't Know	2%	2%	3%	2%	1%	2%	3%	2%	0%
TOTAL On Plan + Above Plan	54%	51%	46%	57%	61%	48%	54%	61%	53%

Online Workbook

Additional Feedback on the Equipment Standardization Plan

C&I

Q Do you have additional feedback on Toronto Hydro's draft equipment standardization plan?

Response	%
Modernize, be proactive, invest for the long term	0.7%
Support the increase (general)	0.7%
Costs are too high already, cost of living, struggling to pay bills	0.5%
Oppose the increase, increase is too high (general)	0.3%
Find efficiencies, cut wasteful spending, lower salaries	0.2%
No response	97.6%

Note: Responses were optional. Only responses > 0.1% are shown.

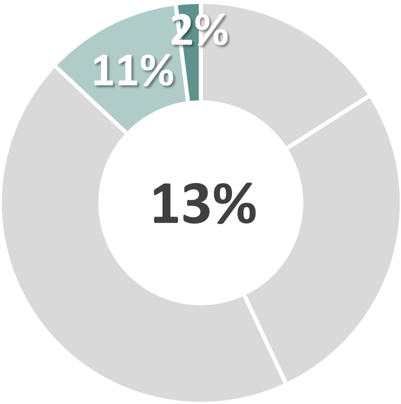
Draft General Plant Plan

Keeping the Business Running

What is this section about?

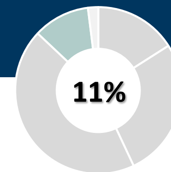
- This section is about the vehicles, work centres and IT systems that keep Toronto Hydro's business running efficiently.
- Toronto Hydro seeks your input on two choices within this part of the plan:

1. The pace of replacing the equipment needed to keep the business running.
2. The pace of reducing Toronto Hydro's emissions from its own operations.



- This spending category makes up **13% of the draft plan** and would add **$111.85** on the average customer in this rate class's monthly bill by 2029.

WORKBOOK



1 Keep the Business Running

Work centres, vehicles and information technology systems are the backbone of Toronto Hydro's day-to-day operations. This equipment must be maintained in good working condition for efficient and reliable operations so that crews can restore power and customers can access key services like their online account and the outage restoration map.

- As with grid equipment, Toronto Hydro uses information such as age and condition data from inspections to decide which equipment should be replaced versus repaired.
- Toronto Hydro repairs equipment in poor condition such as leaking roofs, failed furnaces and worn-out vehicle braking systems. It also replaces equipment like software programs and hardware servers that are past expected useful life.

What type of work is Toronto Hydro doing to manage failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to keep the business running and manage the risk of equipment failure.

Station Buildings

Toronto Hydro has approximately 250 properties that either house distribution stations equipment such as cables and transformers or support the distribution system.

Over 80% of station buildings are older than 40 years and require repairs and investments to address the following types of problems:

- Structural damage to the building (cracked foundations, leaking roofs)
- Mechanical, electrical and plumbing equipment in poor condition
- Compliance with building and fire code requirements

This work ensures safe and efficient operations and minimizes the risk of outages that can affect many customers. For example, structural damage to a station building poses a direct risk to distribution equipment such as power transformers.

So, how much and how quickly Toronto Hydro decides to invest in keeping their business running has a direct impact on customers. While this equipment may remain in service for a long time, when they unexpectedly fail, the costs incurred usually far exceed proactive investments (repairs and replacements) and can have a significant impact on system reliability and customer service.

WORKBOOK PAGE

Making Choices: **Keep the Business Running**

By 2029, Toronto Hydro's draft plan to keep the business running would cost the typical customer in this rate class **$98.05** more on their monthly electricity bill. Toronto Hydro could spend more to improve equipment health (age and condition) and functionality (better safety features) or spend less and take on more risk of equipment downtime.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of general plant equipment by 2029.	Maintains the overall health (age and condition) of general plant equipment by 2029.	Improves the overall health (age and condition) of general plant equipment by 2029.
Reliability & Service	Reduces equipment availability, which could mean longer outages or lower levels of customer service.	Maintains equipment availability consistent with current levels.	Improves equipment availability and functionality, which could mean better reliability and customer service levels.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work, which is more costly and increases equipment downtime.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work, and better equipment functionality.

Choice 6 of 7:

Price

Spend Less $70.76

Draft Plan $98.05

Spend More $114.27

$78.00 $85.25 $92.51 $99.76 $107.01

Don't know

$-.-- Your selection.

WORKBOOK PAGE

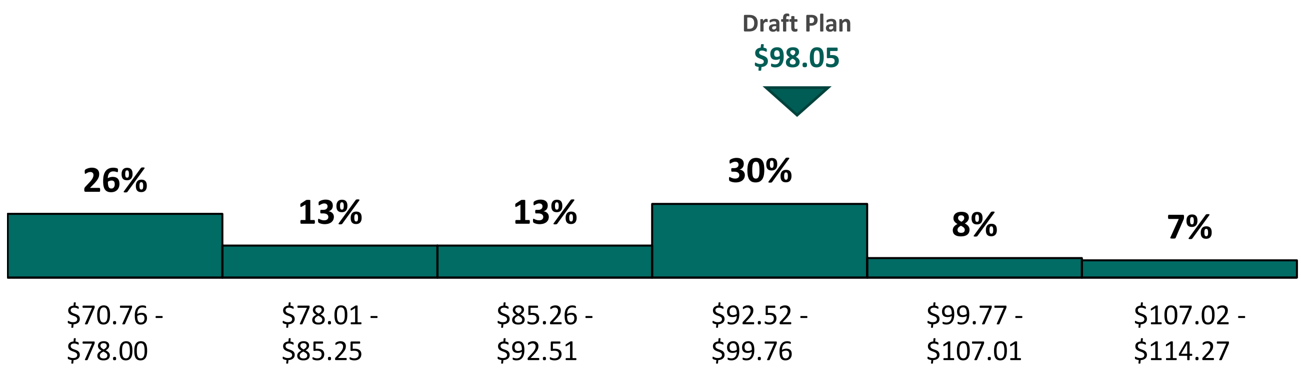
Online Workbook

Amount Spent on Keeping the Business Running

C&I

Q How much do you think Toronto Hydro should spend to keep the business running?

TORONTO HYDRO



"Don't know" (2%) not shown.

n=264

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	59%	57%	57%	62%	61%	62%	59%	61%	56%
On Plan	25%	27%	22%	22%	27%	23%	29%	22%	24%
Above Plan	14%	15%	19%	15%	8%	12%	10%	14%	21%
Don't Know	2%	2%	2%	2%	3%	3%	3%	3%	0%
TOTAL On Plan + Above Plan	39%	42%	41%	36%	36%	35%	39%	36%	44%

Online Workbook

Additional Feedback on Keeping the Business Running

C&I

Q

Do you have additional feedback on Toronto Hydro's draft plan for keeping the business running?

Response	%
Find efficiencies, cut wasteful spending, lower salaries	1.0%
Support the increase (general)	0.7%
Prevent outages, stable power, system reliability	0.5%
Make use of existing infrastructure, past spending	0.4%
Oppose the increase, increase is too high (general)	0.3%
Modernize, be proactive, invest for the long term	0.2%
No response	96.9%

Note: Responses were optional. Only responses > 0.1% are shown.

2 Reducing Toronto Hydro's Emissions

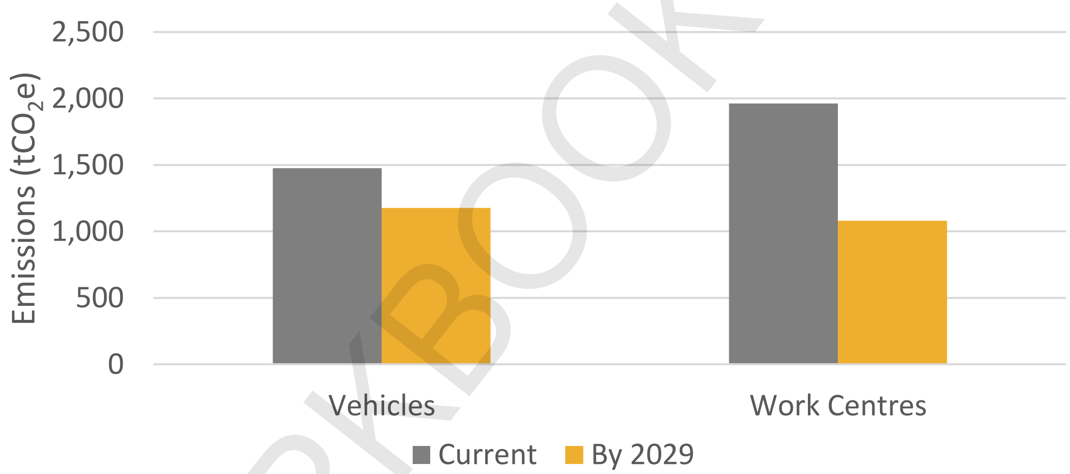
To address climate change, companies around the world are setting targets to reduce greenhouse gas (GHG) emissions from fossil fuels — a pledge commonly known as Net Zero.

Moving toward Net Zero has increasingly become the expectation of governments, financial markets, stakeholders and customers. For example, in October 2019, Toronto City Council unanimously voted to accelerate efforts to reduce emissions across the city.

To do its part in addressing climate change, Toronto Hydro is committed to reducing emissions from its vehicles and work centres by:

- Replacing gasoline and diesel power vehicles with hybrid and electric vehicles.
- Converting natural gas boilers and heaters in its work centres to electric ones.

Toronto Hydro's Draft Plan to Reduce Emissions



Carbon Tax Savings

Reducing carbon emissions from vehicles and work centres could help Toronto Hydro manage rising costs due to the carbon tax (recall that the carbon tax may increase by 161% from 2023 to 2030). **Over the 2025-2029 period, Toronto Hydro's draft plan could reduce carbon tax payments by roughly half a million dollars.**

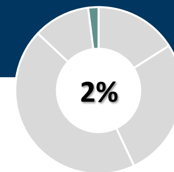
With your feedback, Toronto Hydro needs to decide how quickly to transition to cleaner sources of energy for its operations. In the next section, you will be presented these options.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft General Plant Plan

C&I

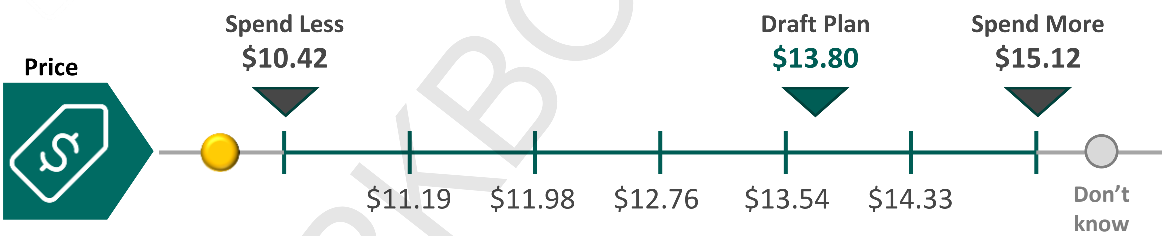


Making Choices: **Reducing Toronto Hydro's Emissions**

By 2029, Toronto Hydro's draft plan to reduce emissions would cost the typical customer in this rate class **$13.80** more on their monthly electricity bill. Toronto Hydro could spend more for faster progress towards reducing its emissions, or spend less to slow down the progress.

	Spend Less	Draft Plan	Spend More
Environment	Less progress to reduce emissions — about 27% reduction by the end of the decade.	Steady progress to reduce emissions — about 35% reduction by the end of the decade.	Faster progress to reduce emissions — about 36% reduction by the end of the decade.
Efficiency	Higher exposure to rising energy costs (oil and gas) due to the carbon taxes and other pressures.	Managed exposure to rising energy costs (oil and gas) due to the carbon tax and other pressures.	Less exposure to rising energy costs (oil and gas) due to carbon taxes and other pressures.

Choice 7 of 7:



$-.-- Your selection.

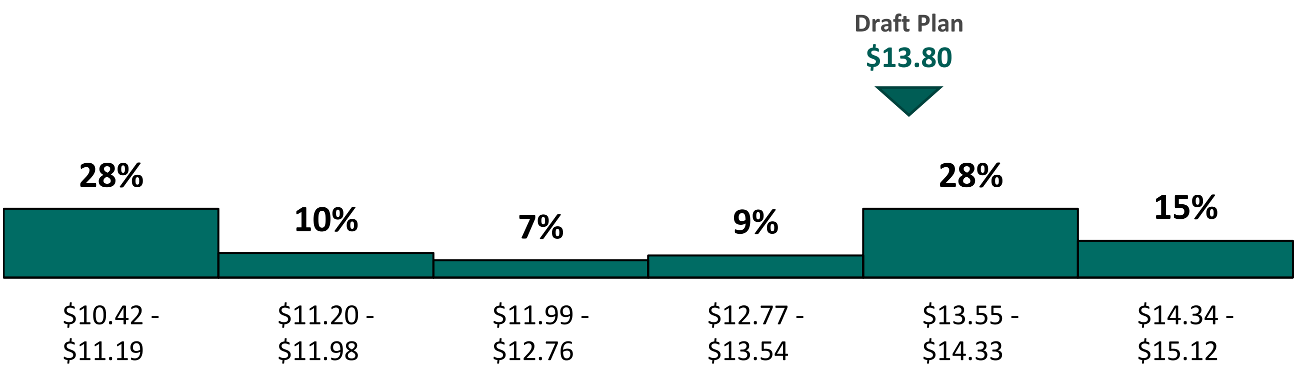
WORKBOOK PAGE

Online Workbook

Amount Spent on Decarbonization

C&I

Q How much do you think Toronto Hydro should spend to reduce its own emissions?



"Don't know" (3%) not shown.

n=264

	Overall	Region				Consumption Quartiles			
		Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Below Plan	56%	57%	58%	54%	55%	56%	57%	57%	55%
On Plan	22%	24%	21%	20%	22%	25%	22%	21%	18%
Above Plan	20%	18%	19%	23%	19%	16%	17%	19%	26%
Don't Know	3%	2%	2%	3%	3%	3%	4%	3%	0%
TOTAL On Plan + Above Plan	41%	41%	40%	43%	41%	41%	39%	40%	45%

Online Workbook

Additional Feedback on Decarbonization

C&I

Q Do you have additional feedback on Toronto Hydro's draft decarbonization plan?

Response	%
Oppose the increase, increase is too high (general)	0.7%
Cost shouldn't be borne by all customers	0.5%
Costs are too high already, cost of living, struggling to pay bills	0.4%
Should be funded by tax dollars/government	0.3%
Other	0.2%
No response	97.9%

Note: Responses were optional. Only responses > 0.1% are shown.

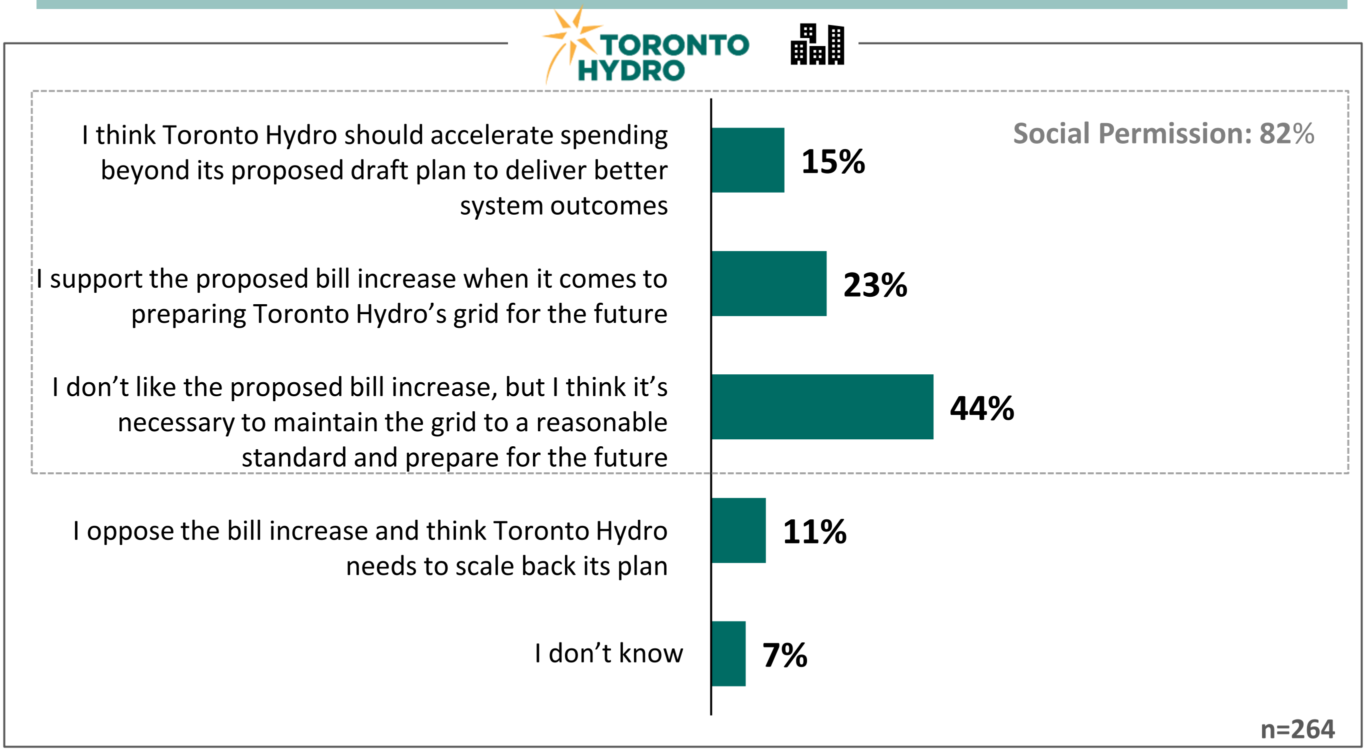
Online Workbook
Social Permission

C&I

Q

Toronto Hydro has calculated an overall cost for its draft plan. While the plan may change based on feedback from the earlier questions in this survey, Toronto Hydro would like to know how you feel about the total rate impact of its current draft plan.

Considering what you have learned about Toronto Hydro's 2025–2029 draft plan and that this may result in a **$870.85 increase** in the distribution portion of your monthly electricity bill by 2029, which of the following best represents your point of view?



Online Workbook

Social Permission

C&I

Q

Toronto Hydro has calculated an overall cost for its draft plan. While the plan may change based on feedback from the earlier questions in this survey, Toronto Hydro would like to know how you feel about the total rate impact of its current draft plan.

Considering what you have learned about Toronto Hydro's 2025–2029 draft plan and that this may result in a **$870.85 increase** in the distribution portion of your monthly electricity bill by 2029, which of the following best represents your point of view?

	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Accelerate spending	14%	22%	12%	11%
Support proposed bill	19%	19%	33%	23%
Necessary to maintain grid	48%	40%	39%	50%
Oppose the bill increase	12%	13%	9%	10%
I don't know	7%	7%	8%	6%
Social Permission	82%	80%	83%	83%

	Consumption Quartiles			
	First	Second	Third	Fourth
Accelerate spending	14%	11%	11%	23%
Support proposed bill	25%	21%	28%	18%
Necessary to maintain grid	42%	48%	53%	35%
Oppose the bill increase	10%	16%	2%	16%
I don't know	8%	4%	6%	9%
Social Permission	81%	80%	92%	76%

Online Workbook

Final Comments for the Draft Plan & Proposed Rate Increase

C&I

Q Do you have any final comments regarding Toronto Hydro's draft plan for 2025–2029 and the proposed rate increase?

Response	%
Modernize, be proactive, invest for the long term	3.3%
Find efficiencies, cut wasteful spending, lower salaries	1.4%
Oppose the increase, increase is too high (general)	1.1%
Costs are too high already, cost of living, struggling to pay bills	0.7%
Need more information	0.3%
Support the increase (general)	0.3%
Address equity, protect low-income customers	0.3%
No response	92.6%

Commercial & Industrial Customers

Online Workbook Diagnostics

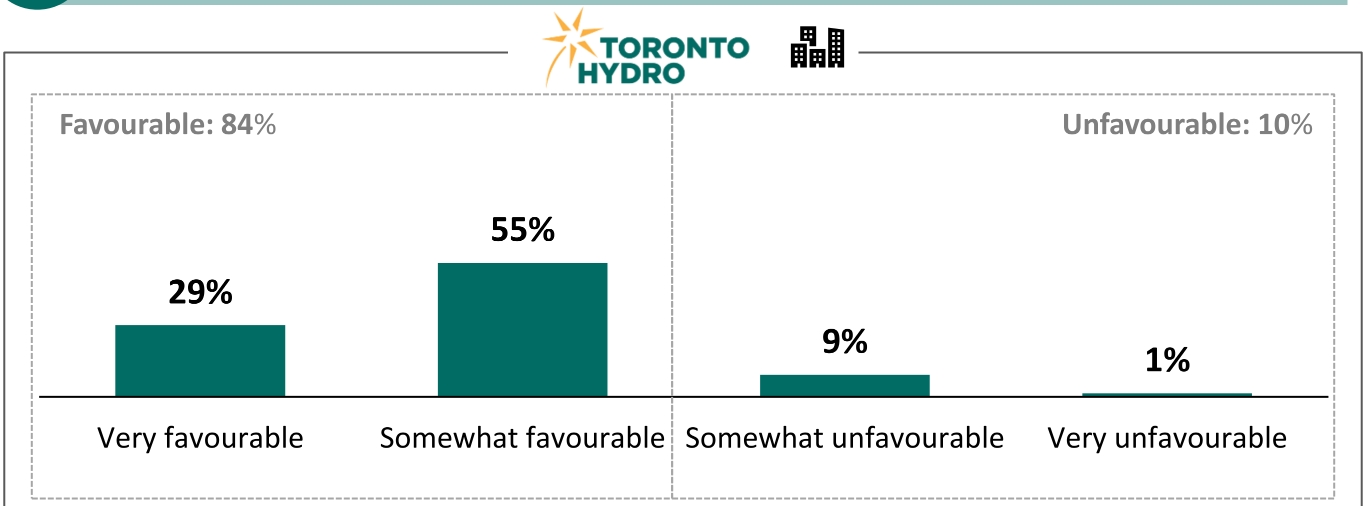
Section 11.2

Online Workbook

Workbook Impression

C&I

Q Overall, what is your impression of the survey you just completed?



"Don't know" (6%) not shown.

n=264

Online Workbook

Workbook Impression

C&I

Q Overall, what is your impression of the survey you just completed?

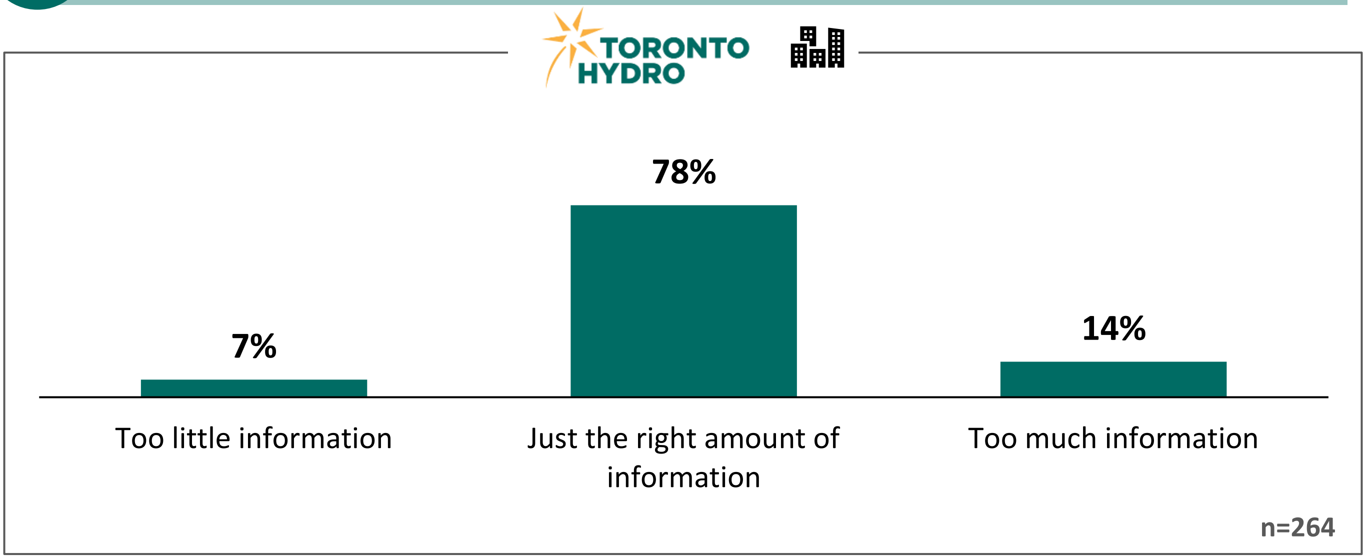
	Region			
	Etobicoke/York	North York	Scarborough	Toronto/East York
Very favourable	23%	21%	40%	34%
Somewhat favourable	63%	61%	44%	51%
Somewhat unfavourable	8%	10%	8%	9%
Very unfavourable	0%	2%	2%	2%
Don't know	6%	6%	7%	4%
Favourable (Very + Somewhat)	86%	82%	83%	85%
Unfavourable (Very + Somewhat)	8%	12%	10%	11%

	Consumption Quartiles			
	First	Second	Third	Fourth
Very favourable	24%	26%	43%	24%
Somewhat favourable	56%	56%	51%	56%
Somewhat unfavourable	10%	10%	4%	11%
Very unfavourable	3%	0%	2%	1%
Don't know	7%	8%	0%	7%
Favourable (Very + Somewhat)	80%	82%	94%	80%
Unfavourable (Very + Somewhat)	13%	10%	6%	13%

Online Workbook
Amount of Information

C&I

Q In this survey, do you feel that Toronto Hydro provided too much information, not enough, or just the right amount?



	Region				Consumption Quartiles			
	Etobicoke/ York	North York	Scarborough	Toronto/ East York	First	Second	Third	Fourth
Too little information	10%	5%	5%	8%	5%	8%	5%	10%
Just the right amount of information	78%	78%	79%	79%	79%	77%	83%	74%
Too much information	12%	16%	16%	13%	16%	14%	12%	16%

Online Workbook

Content Missing from Engagement

Q Was there any content missing that you would have liked to have seen included in this survey?

Response	%
Operational efficiencies (salaries, spending) and accountability	3.0%
Reliability (e.g. Plans for underground cables)	1.1%
Delivery charges	0.8%
More information on the costs, breakdown of either the plan or bill	0.7%
Confusing, navigational issues in the survey	0.5%
More historic context, past rate increases and spending	0.3%
Comparison to other regions or utilities	0.3%
Satisfied with the information presented	0.3%
How this benefits customers	0.2%
Other	0.6%
No response	92.1%

Online Workbook

Outstanding Questions

C&I

Q Is there anything that you would still like answered?

Response	%
More information on the costs, breakdown of either the plan or bill	0.8%
Operational efficiencies (salaries, spending) and accountability	0.6%
Environmental sustainability, info about EVs/charging	0.3%
Ways to reduce usage, save money on bill	0.3%
Reliability (e.g. Plans for underground cables)	0.3%
Other	0.4%
No response	97.2%

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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RESEARCH GROUP

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APPENDIX 12

Key Accounts
Workbook Report

November 2, 2023

TORONTO HYDRO

STRICTLY CONFIDENTIAL

Report Navigation

APPENDICIES

Key Account Customers

Online Workbook Report

Section 12.1

Online Survey

Survey Design & Methodology

Toronto Hydro Electric-System Ltd. (THESL) engaged Innovative Research Group (INNOVATIVE) to design, execute and document the results of THESL's customer engagement process as part of the development of its 2025–2029 business plan.

Field Dates

There were two versions of the workbook; one for GS 1,000-4,999kW and the other one for large use, as indicated on the top right corner of the workbook pages. Since the number of key accounts and large use customers within Toronto Hydro's customer base was limited, this report aggregates the responses from these two rate classes for reporting purposes.

All Toronto Hydro GS 1,000-4,999kW (key accounts) customers with an email address on Toronto Hydro's file received the **Key Accounts Online Workbook**. All Toronto Hydro large use customers with an email address on Toronto Hydro's file received the **Large Use Online Workbook**. Customers had the opportunity to complete the survey between **April 3rd and June 2nd, 2023**.

Incentives

Customers who completed the survey were invited to enter a draw to win a $5,000 donation to a charity of the organization's choosing (as shown on pg.7).

Key Accounts Online Survey Completes

All customers with email addresses on file received an email invitation, which included a unique survey URL that linked back to their annual consumption, region and rate class. A total of **52** (unweighted) Toronto Hydro key account customers completed the online survey.

Sample Weighting

The key account online survey sample has been weighted proportionately by sector in order to be representative of the broader Toronto Hydro service territory. *The table below summarizes the unweighted and weighted (in brackets) sample breakdown by sector.*

Sector	Total
MASH (Municipalities, Academic Institutions, Schools and Hospitals)	15 (8)
Commercial/MURB (Multi-Unit Residential Buildings)	21 (28)
Industrial	16 (16)
Total	52 (52)

Note: *Due to the small sample size, the findings should be interpreted as directional only. In most cases, the section uses frequencies instead of percentages to present the data.*

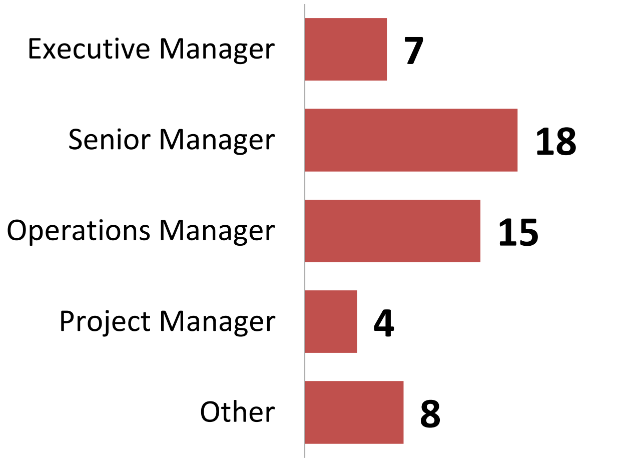
Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers.

Online Survey

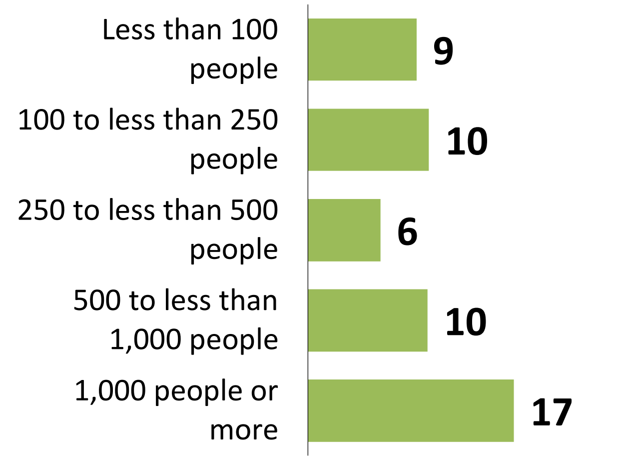
Firmographics breakdown

Key Accounts

Role at Organization

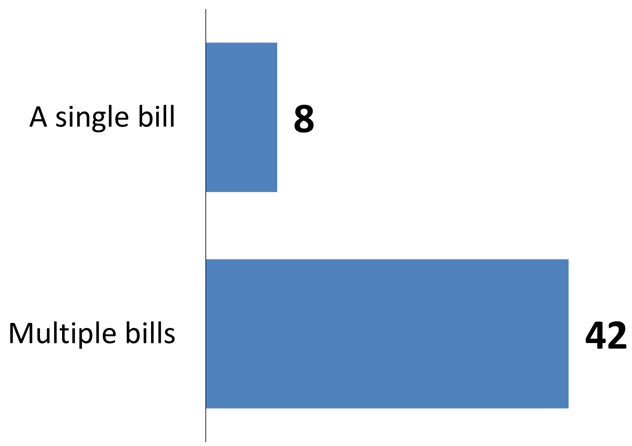


Number of Employees at the Organization



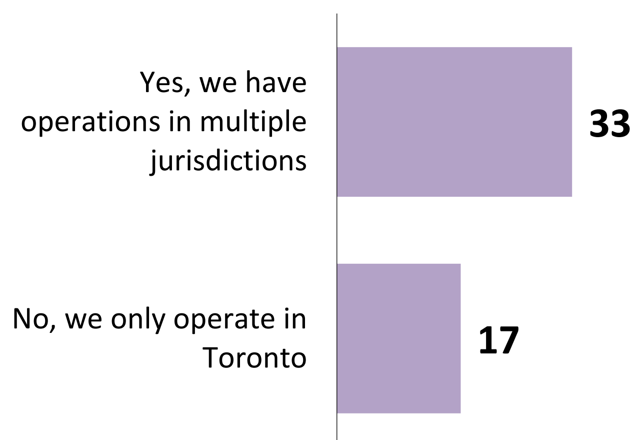
“Don't know” (1) not shown.

Number of Bills



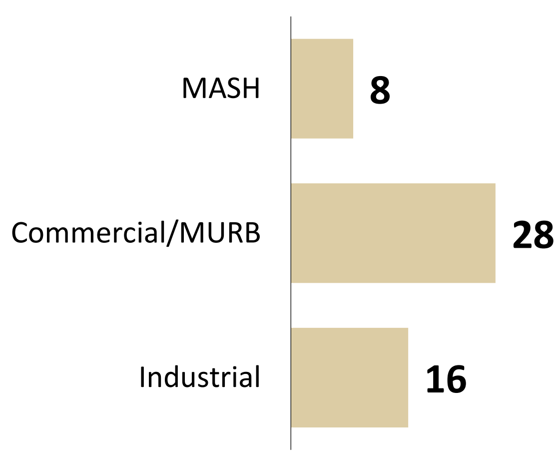
“Don't know” (2) not shown.

Bills from other Utilities



“Don't know” (2) not shown.

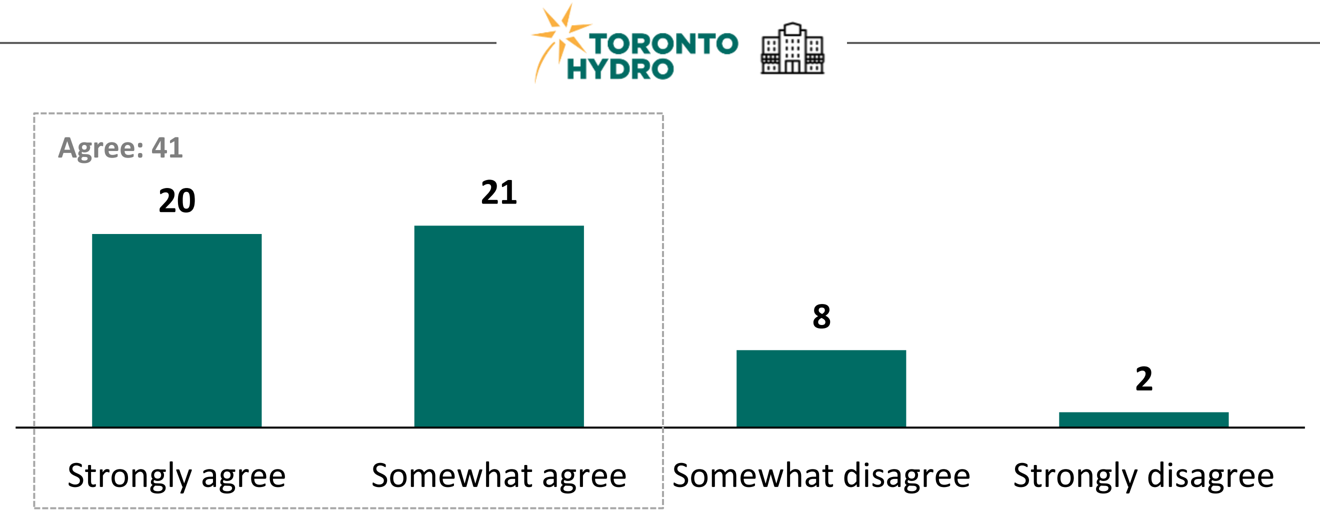
Sector



Online Survey
Environmental Controls

To what extent do you agree or disagree with the following statements?

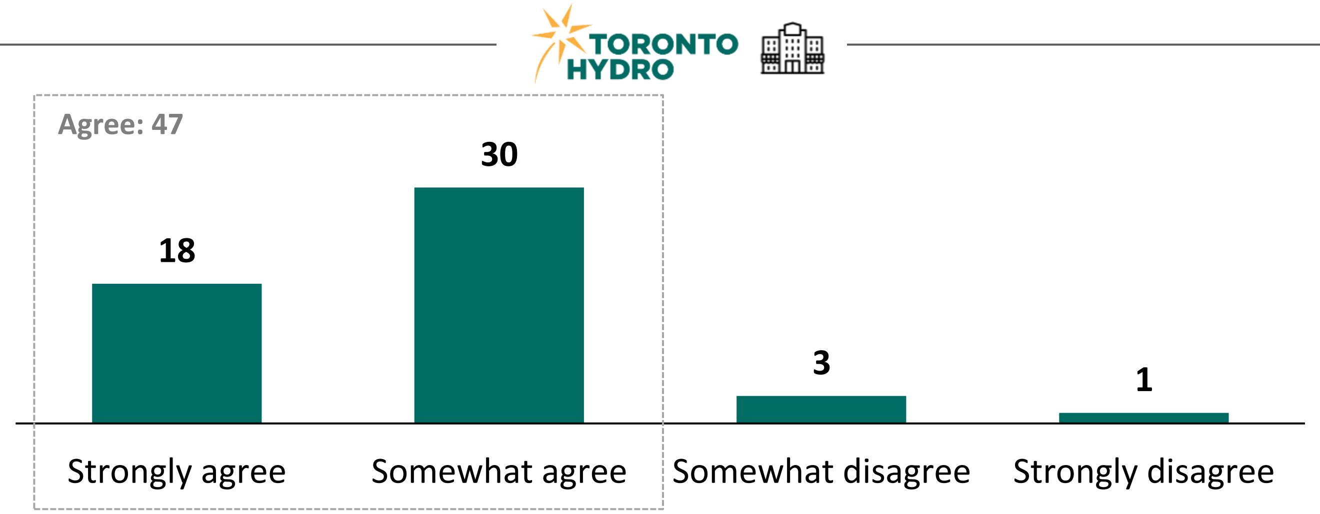
Q The cost of my organization's electricity bill has a major impact on the bottom line of my organization and results in some important spending priorities and investments being put off.



"Don't know/no opinion" (2) not shown.

n=52

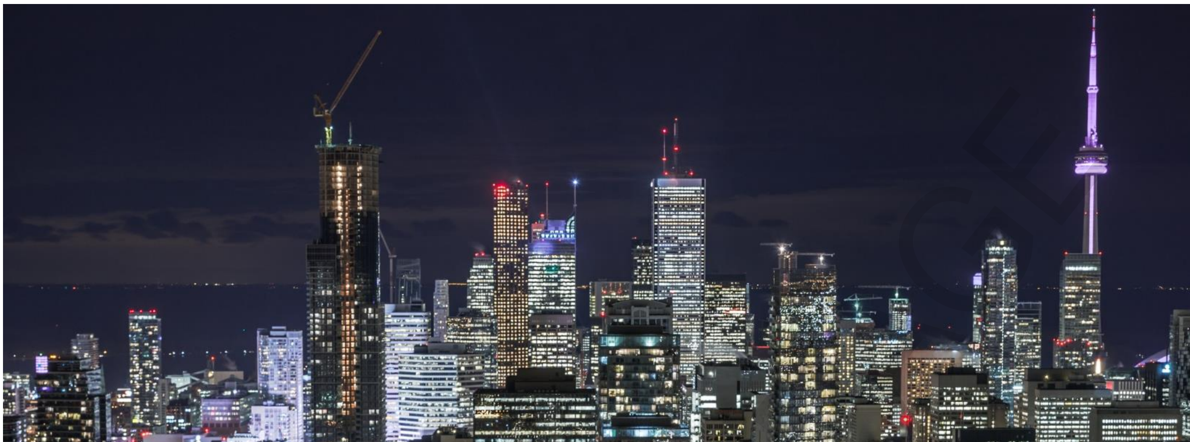
Q Customers are well-served by the electricity system in Ontario.



n=52

Welcome to Toronto Hydro's customer feedback survey!

Toronto Hydro needs your input to find the right balance between the services you receive and the price you pay.



Land Acknowledgement: Toronto Hydro's grid is located on the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples.

The purpose of this survey is to get your feedback on the draft 2025–2029 business plan. Your feedback will help Toronto Hydro align this plan with what you need and want.

1. Your electricity rates pay for this plan, so your views must be considered.
2. You don't need to be an electricity expert to participate. The survey is focused on basic choices and provides the background information you need to answer the questions.
3. Recognizing that people absorb information in different ways, Toronto Hydro and its research partner have designed this survey to include diagrams, charts, images and videos to help explain Toronto Hydro's draft plan and what it means for you. If you prefer to skip the videos, the content is also explained in the body of the survey.
4. Depending on how much feedback you wish to provide and the number of videos watched, this survey should take approximately **20-30 minutes** to complete. If you need to pause and return later to finish the survey, your completed answers will be saved.
5. Some of the survey content may not display correctly on a mobile browser. It is strongly recommended that you complete this workbook on a desktop or laptop computer.

Those who complete the survey will be invited to enter a draw to win a $5,000 donation to a charity of your organization's choosing!

All individual responses will be kept confidential.
Innovative Research Group (www.innovativeresearch.ca), an independent research company, has been hired by Toronto Hydro to gather your feedback, while protecting your confidentiality. Your individual answers will not be shared with Toronto Hydro in any identifiable way.

INNOVATIVE
RESEARCH GROUP

WORKBOOK

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Rate Application

Key Accounts

What is this customer engagement about?

The goal of this engagement is to share Toronto Hydro's draft five-year business plan for the future of the city's electrical grid and collect your feedback. This will help Toronto Hydro align its plans with your needs and preferences.

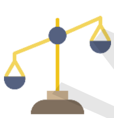
Click on the video below to learn about Toronto Hydro's customer engagement.

Every five years, Toronto Hydro is required to submit a plan for its proposed prices (rates) and spending to the Ontario Energy Board (OEB) for approval.

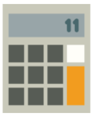
- **In 2021 and 2022, thousands of its customers told Toronto Hydro about what they need and want** to help Toronto Hydro prepare the draft 2025–2029 business plan.
- **Toronto Hydro is now looking for your input on this draft business plan** to align its investments and spending decisions with what matters to you as its customers.
- **Later this year, Toronto Hydro will present its updated business plan to the independent regulator,** the OEB. Toronto Hydro is accountable to the OEB for considering your feedback.

How will this customer engagement work?

1. The workbook explains what Toronto Hydro does and summarizes the key planning considerations that Toronto Hydro's draft plan needs to address.



2. The workbook explains how much of your electricity bill goes to Toronto Hydro, how that money is spent, and the impact of the draft plan on your 2025–2029 prices.
3. The workbook asks for your input on seven key choices that will affect the services you receive and the price you pay from 2025–2029.



Once you have finished giving feedback on the key choices, **you will have an opportunity to review and change your responses** until you feel you have found the right balance.

Want to know more about Toronto Hydro's customer engagement process? [Click here].

WORKBOOK PAGE

How will your feedback impact Toronto Hydro's plan and prices?

Toronto Hydro has a five-step approach to customer feedback.

We are here

✓ 1. Identify Customer Needs, Preferences, and Priorities
In 2022, Toronto Hydro asked many types of customers from across the city about their needs and priorities for electricity distribution service.

✓ 2. Use Customer Feedback to Guide Development of Draft Plan
Toronto Hydro planners were given summaries of the key findings from the initial customer engagement to consider as they began building their plans.

3. Collect Customer Feedback on the Draft Plan
Toronto Hydro is returning to customers to get feedback on the draft plan and ask customers how the draft plan could better meet their needs and preferences.

4. Use Customer Feedback to Finalize the Plan
Toronto Hydro will re-examine and make appropriate changes to the plan based on the feedback provided by customers in this engagement.

5. Submit the Plan to the Ontario Energy Board (OEB)
Toronto Hydro will file the plan with the OEB along with a report summarizing the results of this engagement. The OEB, consumer advocates and other interested groups will examine the plan in an open and transparent public process known as a rate application.

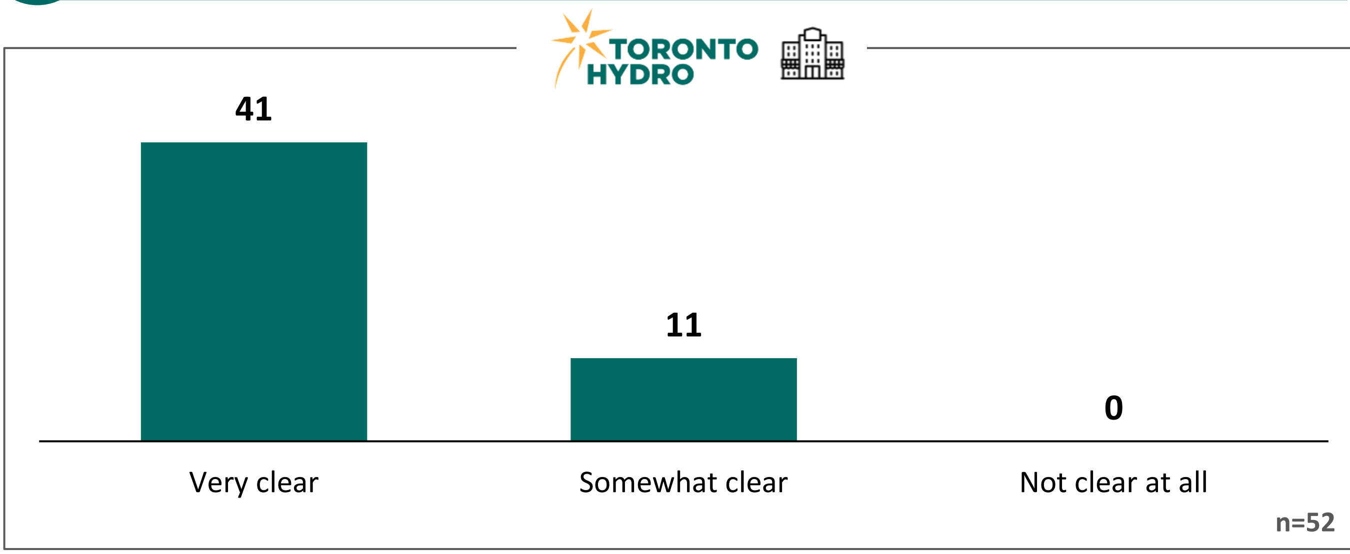
WORKBOOK PAGE

Online Workbook

Understanding the Purpose of the Customer Engagement

Key Accounts

Q Do you feel that the purpose of Toronto Hydro's customer engagement is clear?



	Sector		
	MASH	Commercial/MURB	Industrial
Very clear	5	24	12
Somewhat clear	3	4	4
Not clear at all	-	-	-

Electricity 101

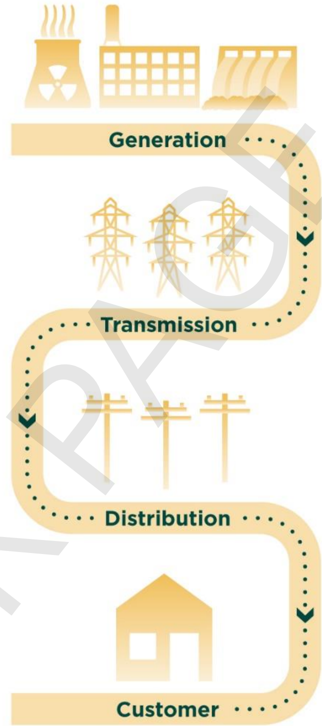
Toronto Hydro's role in Ontario's electricity system

Ontario's electricity system is made up of three parts: **generation**, **transmission** and **distribution**.

Generation

How electricity is made

About half of the electricity used in Ontario comes from nuclear power. The rest comes from a mix of hydroelectric, natural gas, wind and solar sources. Ontario Power Generation, a government-owned company, generates almost half of Ontario's electricity. The other half comes from other generators contracted by the grid operator.



Transmission

How electricity travels across Ontario

Once electricity is made, it must be sent to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. Ontario has approximately 30,000 kilometers of transmission lines, mostly owned and operated by Hydro One.

Distribution

How electricity is delivered to you

Toronto Hydro is responsible for the last step of the journey: distributing electricity locally to end-use customers.

- Toronto Hydro does not generate or transmit electricity — it owns and operates the local electricity system made up of approximately 183,620 poles, 61,300 distribution transformers, 17,060 primary switches, 15,393 kilometers of overhead wires and 13,765 kilometers of underground cables.
- Toronto Hydro is wholly owned by the City of Toronto, but it does not receive taxpayer money — it is entirely funded by the distribution rates that you pay on your electricity bill.
- Toronto Hydro provides power to roughly 2.8 million people across the city of Toronto.

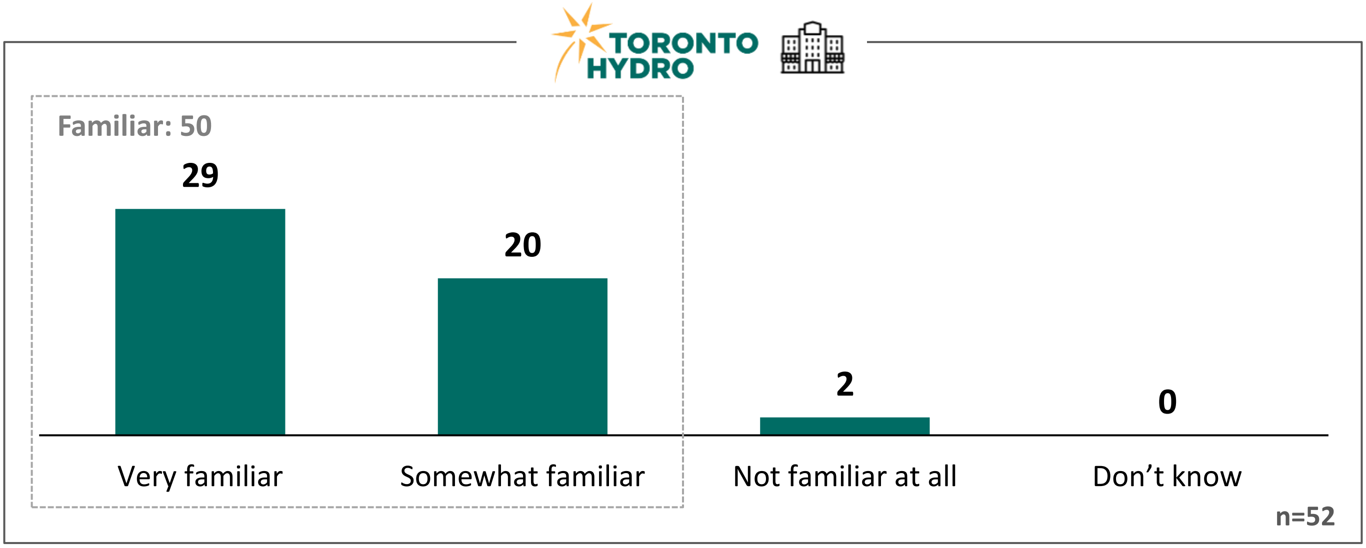
WORKBOOK PAGE

Online Workbook

Familiarity with Ontario's Electricity System

Key Accounts

Q Before this engagement, how familiar were you with the various parts of the electricity system, how they work together and for which services Toronto Hydro is responsible?



	Sector		
	MASH	**Commercial/MURB**	**Industrial**
Very familiar	4	18	7
Somewhat familiar	5	8	8
Not familiar at all	-	1	1
Familiar (Very + Somewhat)	**8**	**26**	**15**

Toronto Hydro's Draft Plan

Planning Considerations

In preparing its plan, Toronto Hydro must consider many existing and emerging challenges of delivering safe, reliable and clean electricity at a reasonable price.

To learn more about what Toronto Hydro must consider in preparing its draft plan, click on the topics below.

Key challenges that Toronto Hydro's 2025–2029 draft plan addresses:

Keeping prices reasonable

- Many customers are concerned about the rising cost of doing business.
- Toronto Hydro must find the right balance between the investment needs of the local grid and the financial needs of its customers.

Responding to rising costs

- Like many companies, Toronto Hydro faces rising costs in purchasing equipment for the grid and doing construction work in the city.
- For example, from 2021 to 2022, the cost of buying electrical equipment increased by 9.9% while the cost of non-residential construction in the city of Toronto rose by 15.6%.

Powering a growing urban city

- Toronto is not just the largest city in Canada and an engine of the Canadian economy, it is also one of the fastest growing cities in North America.
- As the city continues to grow, the grid needs to be ready to power new condo towers, residential communities and businesses.

Fixing and replacing equipment in poor condition

- Much of Toronto Hydro's grid was installed in the 1950s and 1960s and needs to be replaced or upgraded.
- To keep the grid safe and reliable now and in the future, Toronto Hydro monitors the condition of its grid and uses this information to upgrade the equipment most at risk.

Reducing emissions from its own operations

- Toronto Hydro is committed to decarbonizing the company's footprint by 2040. To meet this goal, it must invest in reducing emissions from its vehicles and work centres.
- Toronto Hydro is expected to reduce its emissions by switching from oil and natural gas to clean electricity for powering its own operations.

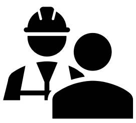
Keeping up with the way customers use electricity

- Customers are using more electricity for their day-to-day energy needs such as electric vehicles for transportation and electric heat pumps for heating. They are also choosing new technologies such as solar panels and battery storage to manage their electricity use and sell electricity to the local grid.
- To ensure customers can connect new technologies to the grid safely and reliably, Toronto Hydro needs to upgrade its equipment and modernize its systems.

WORKBOOK PAGE

Responding to extreme weather and cyber security attacks

- Extreme weather such as high heat, high winds, flooding and ice storms is increasingly straining and damaging to electricity grids.
- Cybercrime is on the rise across Canada. For example, Toronto Hydro is the target of around one million attempted cyber attacks each year, with attempts going over one million in 2022 (successfully deflected).
- Toronto Hydro needs to make the grid more resilient against extreme weather and cyber security attacks that could compromise reliability and put customers at risk.



Protecting public and employee safety

- Toronto Hydro and its customers have a strong safety record, but electricity is dangerous and safety cannot be taken for granted.
- As homes and businesses add new technologies that increase the amount of electricity flowing around us, Toronto Hydro must ensure that the grid remains safe for its employees and the public.

WORKBOOK PAGE

How much of my electricity bill goes to Toronto Hydro?

Every item on your bill is required by provincial regulation.

- Toronto Hydro collects payment for the entire electricity system, but only keeps the distribution portion of the "**Delivery**" charge. This charge pays for both Toronto Hydro's **distribution** system and Hydro One's **transmission** system, as well as line losses (power that is lost when electricity travels across the wires).
- **About 11% of the electricity bill goes to Toronto Hydro** to pay for the local distribution grid. The **remaining 89%** of the bill goes to generation companies, transmission companies, the federal and provincial governments, and regulatory agencies.

Typical Bill

Sample Toronto Hydro Monthly Bill
(based on demand of 2,000 kVA as of Jan. 1, 2023)

Account Number:
0000000000

Meter Number:
00000000

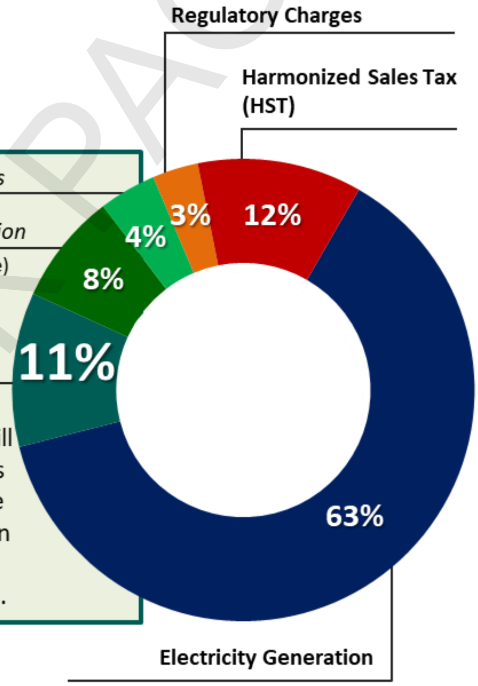
Your Electricity Charges	
Electricity	87,030.00
Delivery	31,345.40
Regulatory Charges	4,447.69
Total Electricity Charges	**$122,823.09**
HST	15,967.00
Total Amount	**$138,790.09**

Delivery: *Line Losses*
$5,534.79

Delivery: *Transmission*
(varies based on usage)
$10,890.18

Delivery:
Distribution

Toronto Hydro's part of the total bill is **$14,920.43**. This charge is the same for all customers in this rate class per OEB requirements.



Who holds Toronto Hydro accountable?

The **Ontario Energy Board (OEB)** is the public interest regulator responsible for setting electricity distribution rates (prices) and for protecting customers in Ontario.

The OEB holds Toronto Hydro accountable for:

- How it spends your money in current and future plans.
- Reporting on key outcomes (reliability) through an annual scorecard.
- Finding savings and efficiencies to absorb rising costs.

Want to know more about what Toronto Hydro has done to become more efficient? Click here.

WORKBOOK PAGE

How much of my electricity bill goes to Toronto Hydro?

Every item on your bill is required by provincial regulation.

- Toronto Hydro collects payment for the entire electricity system, but only keeps the distribution portion of the "**Delivery**" charge. This charge pays for both Toronto Hydro's **distribution** system and Hydro One's **transmission** system, as well as line losses (power that is lost when electricity travels across the wires).
- **About 12% of the electricity bill goes to Toronto Hydro** to pay for the local distribution grid. The **remaining 88%** of the bill goes to generation companies, transmission companies, the federal and provincial governments, and regulatory agencies.

Typical Bill

Sample Toronto Hydro Monthly Bill
(based on demand of 9,700 kVA as of Jan. 1, 2023)

Account Number:
0000000000

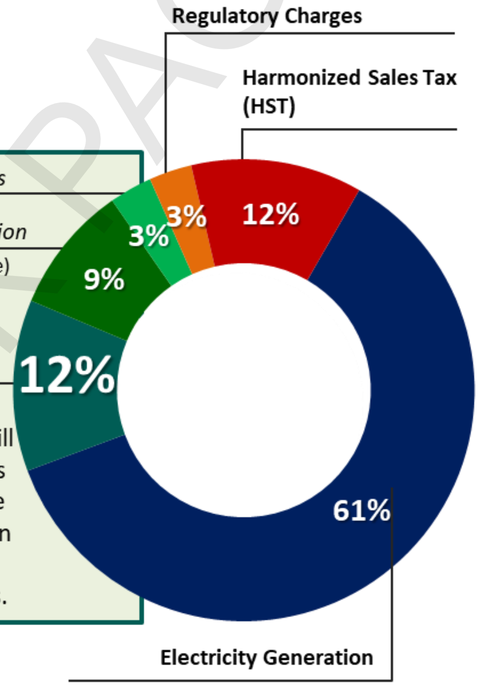
Meter Number:
00000000

Your Electricity Charges	
Electricity	396,470.00
Delivery	158,804.92
Regulatory Charges	20,018.75
Total Electricity Charges	**$575,293.67**
HST	74,788.18
Total Amount	**$582,772.49**

Delivery: *Line Losses*
$20,893.98

Delivery: *Transmission*
(varies based on usage)
$60,770.98

Delivery: *Distribution*
Toronto Hydro's part of the total bill is $77,139.96. This charge is the same for all customers in this rate class per OEB requirements.



WORKBOOK PAGE

Who holds Toronto Hydro accountable?

ONTARIO ENERGY BOARD

The **Ontario Energy Board (OEB)** is the public interest regulator responsible for setting electricity distribution rates (prices) and for protecting customers in Ontario.

The OEB holds Toronto Hydro accountable for:

- How it spends your money in current and future plans.
- Reporting on key outcomes (reliability) through an annual scorecard.
- Finding savings and efficiencies to absorb rising costs.

Want to know more about what Toronto Hydro has done to become more efficient? Click here.

What has Toronto Hydro done to become more efficient?

- Reduced the total number of facilities and gave back roughly $158 million to customers, resulting in a total credit of [GS 1,000-4,999kW: $30,277.20 / Large Use: $163,479.92] on the average customer's bill in this rate class from 2016 to 2021.
- Delivered approximately $10 million in reduced or avoided costs in this current 2020–2024 period by replacing outdated information systems with consolidated programs, enabling automation and lowering maintenance costs.
- Implemented new technology to automate crew scheduling, enabling Toronto Hydro to maximize crew working hours and respond to power outages quicker.

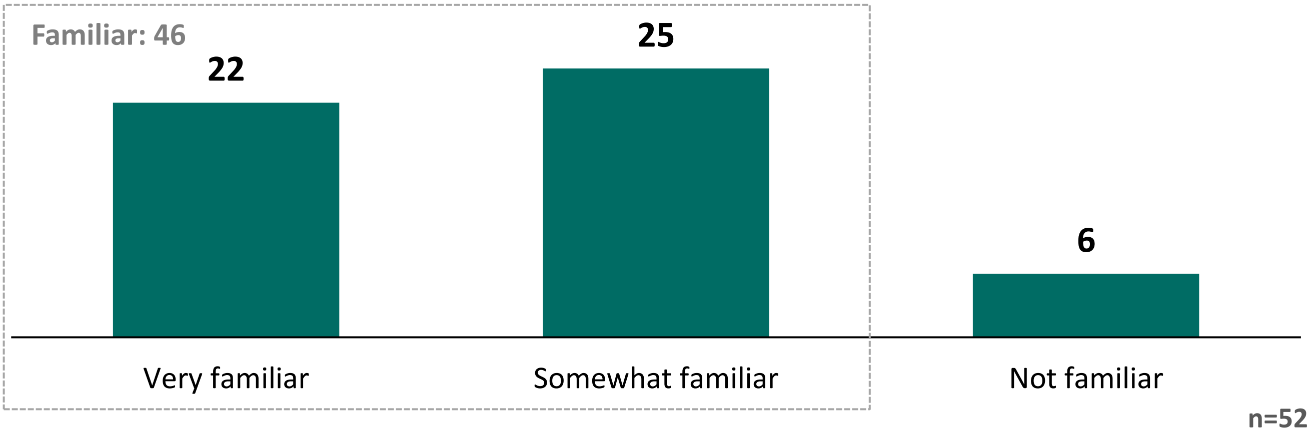
WORKBOOK PAGE

Online Workbook

Key Accounts

Familiarity with the Percentage of Bill Remitted to Toronto Hydro

Q Before this customer engagement, how familiar were you with the amount of your electricity bill that went to Toronto Hydro?



	Sector		
	MASH	**Commercial/MURB**	**Industrial**
Very familiar	3	13	5
Somewhat familiar	5	9	11
Not familiar at all	1	5	-
Familiar (Very + Somewhat)	**8**	**22**	**16**

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Rate Application

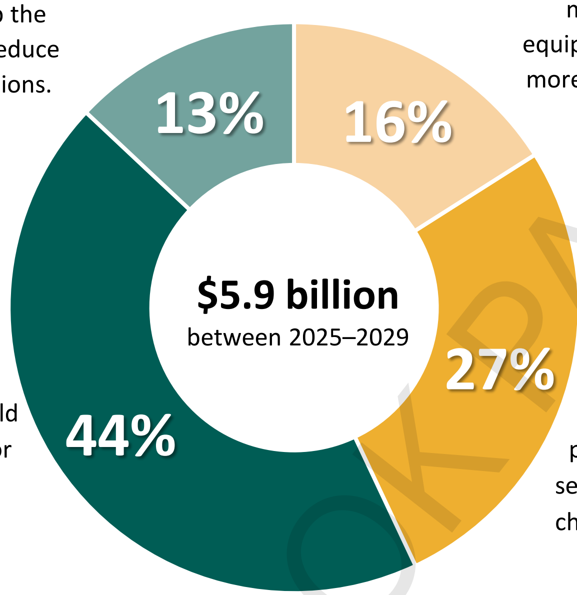
Key Accounts
GS 1,000-4,999kW

How does Toronto Hydro propose to spend the money?

Toronto Hydro's five-year 2025–2029 draft plan is made up of four spending categories.

General Plant
Investments in vehicles, work centres and IT to keep the business running and reduce Toronto Hydro's emissions.

Modernization
Investments in technology to get more use out of existing equipment, and build a smarter, more efficient and reliable grid.



Sustainment
Investments to upkeep old equipment that is in poor condition and replace outdated equipment.

Growth
Investments in capacity to power the growing city and serve customers' growing and changing needs for electricity.

Want to know more about Toronto Hydro's current and future budgets? Click here.

How much will Toronto Hydro's draft plan cost me?

At the end of the five-year plan (2029), the typical customer in this rate class would see the distribution portion of their electricity bill increase by **$7,480.60**: from an estimated rate (price) of $15,526.40 in 2024 to a proposed rate (price) of **$23,007.00 by 2029.**

				Toronto Hydro's Portion	
	Year	Avg. Monthly Bill	Toronto Hydro Portion	Annual Increase (%)	Annual Increase ($)
	2023	$138,790.09	$14,920.43	n/a	n/a
	2024	$136,540.47	$15,526.40	4%	$605.97
Rate Period	**2025**	$139,426.14	$18,080.09	16%	$2,553.69
Rate Period	**2026**	$140,521.98	$19,049.86	5%	$969.77
Rate Period	**2027**	$141,879.48	$20,251.19	6%	$1,201.33
Rate Period	**2028**	$143,933.51	$22,068.91	9%	$1,817.72
Rate Period	**2029**	$144,993.55	$23,007.00	4%	$938.09
5-yr impact			**$7,480.60**	**49%**	**$7,480.60**

Note: These estimated rate increases are preliminary and are subject to change based on customer feedback and other factors. A typical customer in this rate class is assumed to use 2,000 kWh per month and enrolled under Time-of-use Regulated Price Plan. Bill projections assume that other aspects of the electricity bill that are outside of Toronto Hydro's control (commodity, transmission, government, regulatory fees) remain constant.

WORKBOOK PAGE

How does Toronto Hydro propose to spend the money?

Toronto Hydro's five-year 2025–2029 draft plan is made up of four spending categories.

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Investments in vehicles, work centres and IT to keep the business running and reduce Toronto Hydro's emissions.

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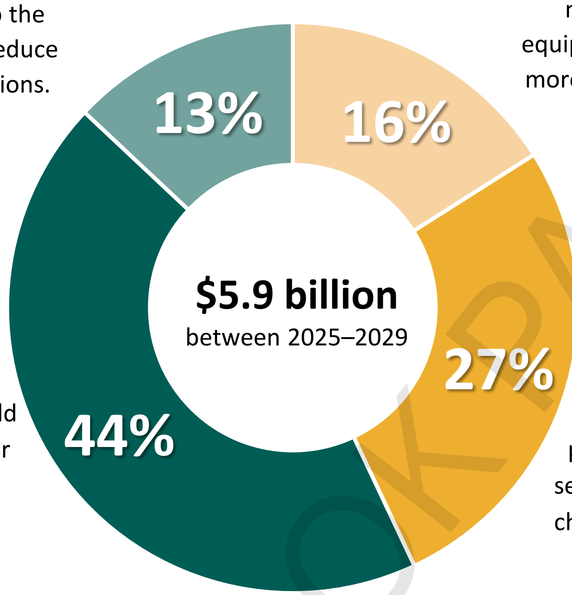


Sustainment

Investments to upkeep old equipment that is in poor condition and replace outdated equipment.

Growth

Investments in capacity to power the growing city and serve customers' growing and changing needs for electricity.

Want to know more about Toronto Hydro's current and future budgets? Click here.

How much will Toronto Hydro's draft plan cost me?

At the end of the five-year plan (2029), the typical customer in this rate class would see the distribution portion of their electricity bill increase by **$39,221.50**: from an estimated rate (price) of $80,290.82 in 2024 to a proposed rate (price) of **$119,512.32 by 2029.**

	Year	Avg. Monthly Bill	Toronto Hydro Portion	Toronto Hydro's Portion: Annual Increase (%)	Toronto Hydro's Portion: Annual Increase ($)
	2023	$650,081.85	$77,139.96	n/a	n/a
	2024	$637,737.91	$80,290.82	4%	$3,150.86
Rate Period	**2025**	$653,074.77	$93,862.29	17%	$13,571.47
Rate Period	**2026**	$658,780.67	$98,911.76	5%	$5,049.47
Rate Period	**2027**	$665,846.91	$105,166.04	6%	$6,254.28
Rate Period	**2028**	$676,540.22	$114,629.15	9%	$9,463.11
Rate Period	**2029**	$682,058.20	$119,512.32	4%	$4,883.17
5-yr impact			**$39,221.50**	**49%**	**$39,221.50**

Note: These estimated rate increases are preliminary and are subject to change based on customer feedback and other factors. A typical customer in this rate class is assumed to use 2,000 kWh per month and enrolled under Time-of-use Regulated Price Plan. Bill projections assume that other aspects of the electricity bill that are outside of Toronto Hydro's control (commodity, transmission, government, regulatory fees) remain constant.

WORKBOOK PAGE

Toronto Hydro Background

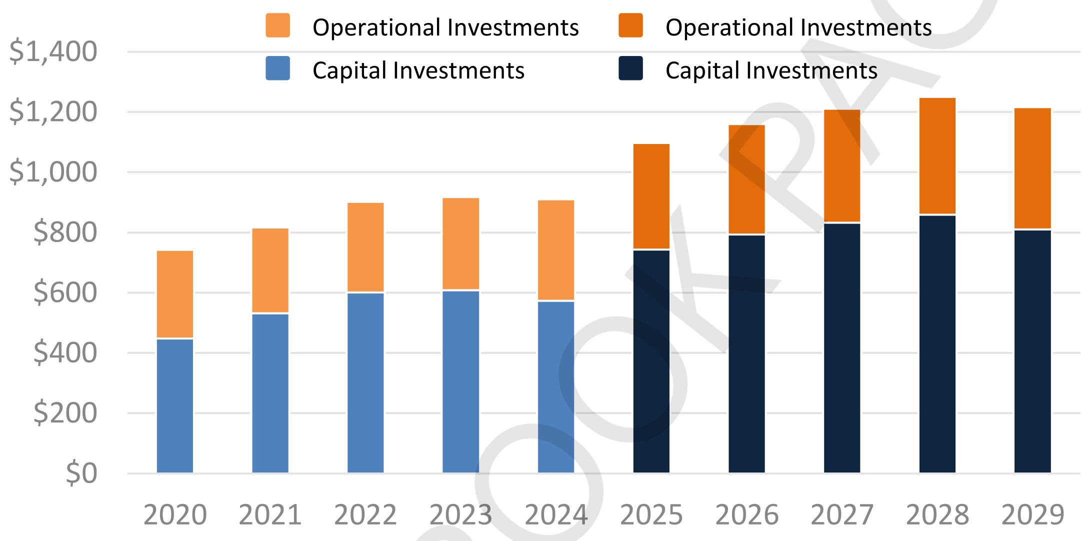
How much does it cost to run the local grid?

To run the local grid and serve customers, Toronto Hydro manages two budgets:

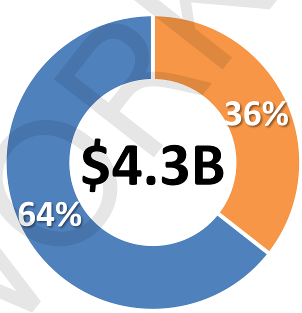
1. A **capital investment** budget which pays for the cost of buying and constructing physical infrastructure such as poles, wires, transformers, facilities, trucks and computers.

2. An **operational investment** budget which pays for maintenance and operation of the equipment, as well as the staff needed to manage the grid and serve customers daily.

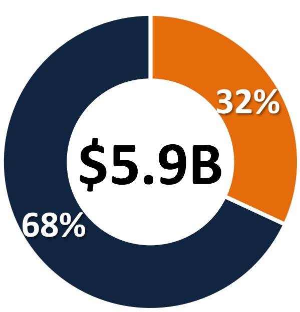
Current and Future Budgets per year ($ millions)



2020–2024
Current Budget
(OEB Approved Plan)



2025–2029
Future Budget
(Draft Plan)



The current five-year budget of **$4.3 billion** is based on the 2020–2024 plan approved by the OEB in a previous rate application. As mentioned earlier, this amount is funded by your 2020–2024 distribution rates.

The future five-year budget of **$5.9 billion** is based on the 2025–2029 draft plan presented in this customer feedback survey. The final budget for this next rate period will be adjusted to reflect customer feedback collected through this engagement and will be subject to extensive OEB review before rates are set for 2025–2029.

WORKBOOK PAGE

How does the survey work?

The next sections are about 7 key choices that Toronto Hydro needs to make to finalize its plan.

Each section provides some key background information. We encourage you to take the time to learn about your local electricity grid and where your money is going.

We also understand that life is busy. Many people find this information interesting — but if you would prefer to skip over the videos or the background information, you can jump right to the key choices.

How do I make choices?

Each choice has a summary of three options that Toronto Hydro considered:

- **Spend Less:** A minimum spending option that keeps prices lower and meets the basic performance requirements but may entail some trade-offs on key outcomes, such as reliability.
- **Toronto Hydro's Draft Plan:** An option currently in the draft plan which makes additional progress toward key outcomes but delays some important work.
- **Spend More:** A faster paced spending option that makes additional progress towards better outcomes while recognizing practical limits due to resources and construction issues.

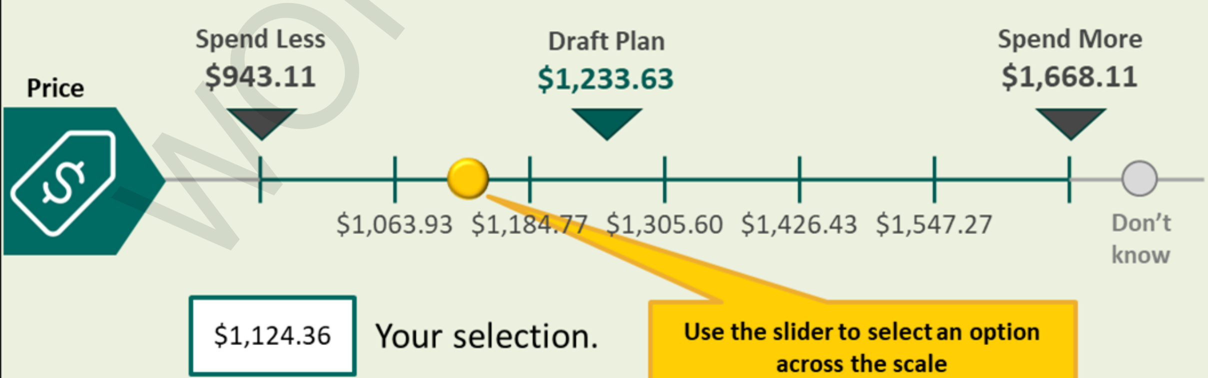
In each option, there is a sliding scale that enables you to dial the draft plan up or down. While Toronto Hydro's technical experts can tell us the maximum and minimum amounts we can practically spend, the balance of how much Toronto Hydro spends on the spectrum is up to customers like you.

At the end of the survey, you will get a summary of your choices and you will have the opportunity to change your answers to find the right balance for you.

SAMPLE OPTIONALITY SLIDER QUESTION (data not recorded)

How much do you think Toronto Hydro should spend on this part of its draft plan?

Please use the slider below to make a selection.



WORKBOOK PAGE

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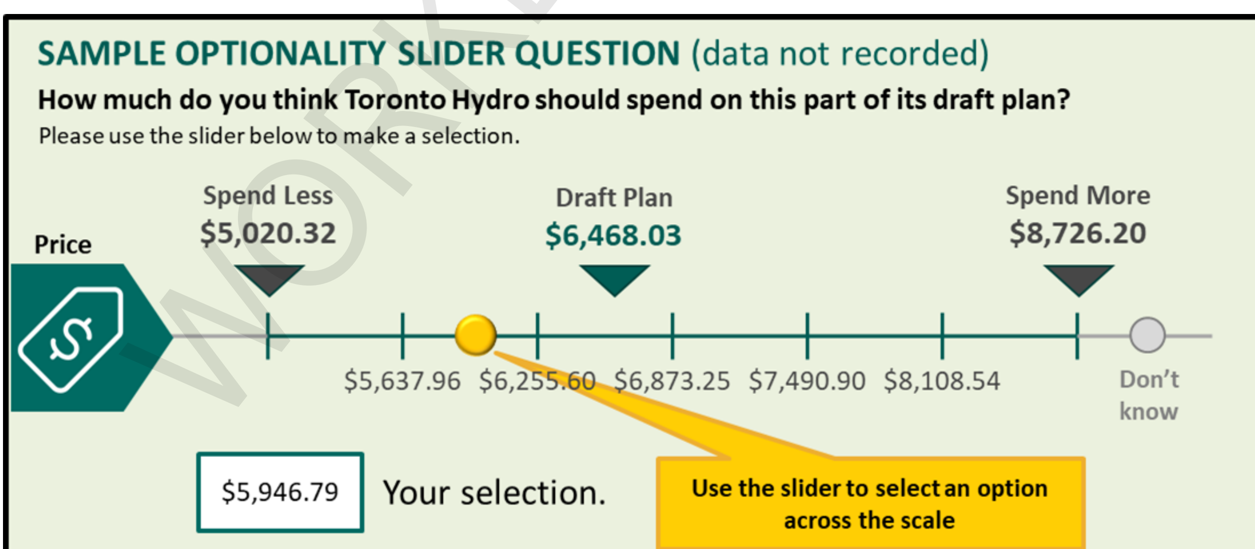


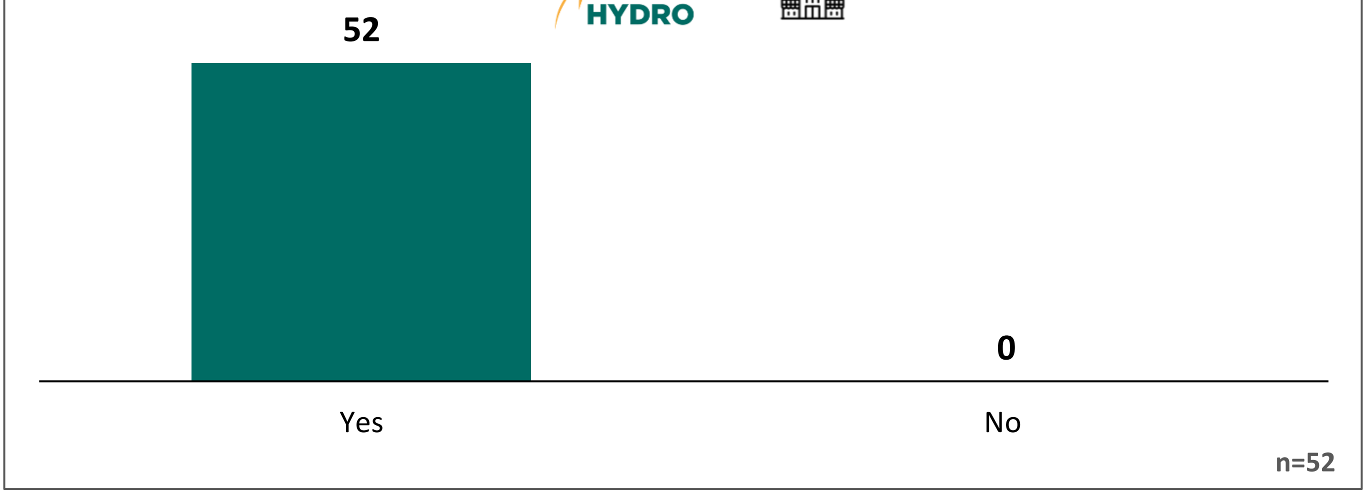
WORKBOOK PAGE

Online Workbook

Understanding the Slider

Key Accounts

Q Is it clear that you can move the slider to any amount you feel best reflects your personal view of the best balance between lower costs and faster improvements?



	Sector		
	MASH	Commercial/MURB	Industrial
Yes	8	28	16
No	-	-	-

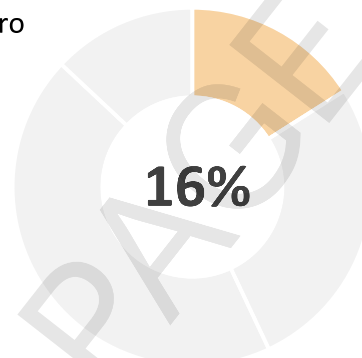
Draft Modernization Plan

Build a Smarter, More Efficient and Resilient Grid

What is this section about?

- This section explains how technology is changing the way customers use electricity and how Toronto Hydro operates and manages the grid to make it smarter, more efficient and resilient for customers.

  Want to learn more about how grid modernization benefits you? Click on the topics below.



- **Toronto Hydro's draft modernization plan enables:**
  - Faster and cheaper power restoration
  - More efficient use of existing equipment
  - Customer choice to adopt new technologies
  - Resilience against weather and cyber attacks

- This spending category makes up **16% of the draft plan** and would add **[GS 1,000-4,999kW: $1,233.63 / Large Use: $6,468.03]** on the average customer's in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft modernization plan**.*

WORKBOOK PAGE

Modernization Plan

Building a Smarter, more Efficient and Reliable Grid

Toronto Hydro's Modernization Plan has four main objectives:

Faster and cheaper power restoration

- Through automation, the smart grid can achieve self-healing capabilities. This means that the distribution grid on your street will be able to locate outages and restore power automatically.
- The smart grid enables Toronto Hydro to reduce the number and length of outages customers experience. It also reduces manual costs (trucks and crews) of responding to power outage events.

More efficient use of existing equipment

- As customers use more electricity, some equipment will reach its limits. Sensors and meters detect when and where these limits are approaching, enabling Toronto Hydro to make better decisions.
- The smart grid enables Toronto Hydro to get more use out of the existing equipment so that it can serve a greater customer need for electricity without having to build as much new infrastructure.

Customer choice to adopt new technologies

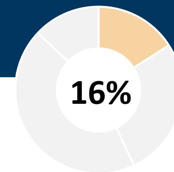
- Sensors, switches and software enable Toronto Hydro to monitor and control the flow of electricity so that customers can choose technologies to produce, store and sell power to the grid.
- The smart grid is designed to allow safe and reliable two-way power flow — from the grid to the customers and from customers to the grid. This system can reduce costs and makes the local grid more resilient to outages.

Resilience against weather and cyber attacks

- Cyber attacks are increasing and getting more complex. Toronto Hydro must be prepared to respond to these threats to maintain reliable service and protect customer information.
- In addition to being able to restore power quicker, the smart grid can sense when environmental conditions like flooding pose a risk. This enables grid operators to strengthen the grid.

WORKBOOK PAGE

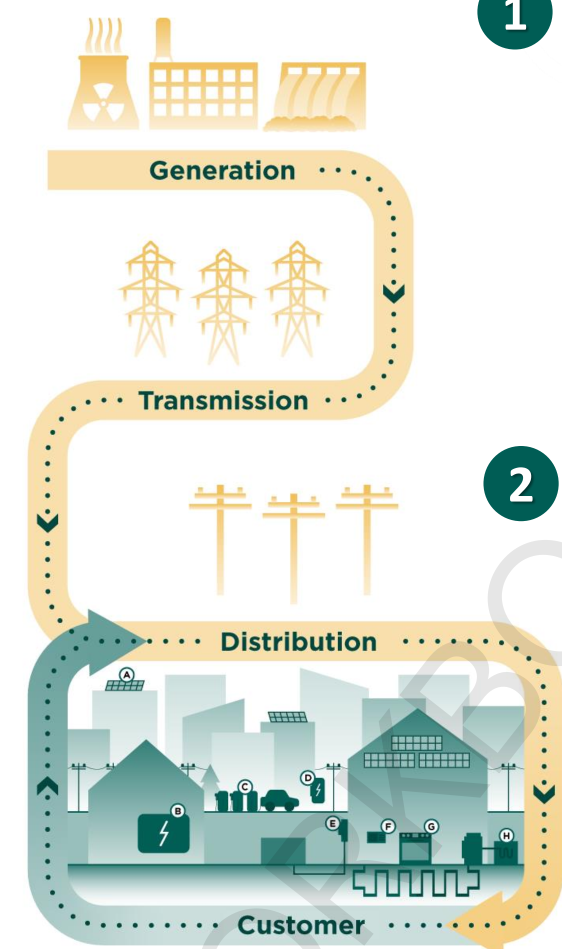
Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Modernization Plan



Modernization: Changing Technology, Changing Needs

For more than 100 years, things changed relatively slowly in terms of grid technology. Electricity was generated in large power stations and transmitted from around the province to Toronto Hydro's grid, and ultimately to homes and businesses. That is all changing, and because of technological advancement, the pace of change could be fast.

Toronto Hydro's 2025–2029 plan is shaped by two key changes in technology:



A. Solar panel
B. Battery storage
C. Public electric vehicle charging station
D. On-site backup generation
E. Smart meter
F. Home energy manager
G. Energy-efficient appliances
H. Heat pump

1 **Technologies that change how customers use electricity.** These include:

- Electricity products like electric heating, battery storage, and vehicles that enable customers to use less fossil fuels (oil and gas) which contribute to climate change
- Technologies like solar panels and battery energy storage that allow customers to produce and manage their electricity as well as sell it back onto the grid.

2 **Technologies that change how Toronto Hydro operates the grid**. These key changes are:

- The grid must shift from a **one-way system** that only sends electricity to customers to a **two-way system** that allows customers to generate and sell electricity to the grid.
- **Smart grid technology like sensors and automation** enables Toronto Hydro to monitor key equipment to prevent outages and get better use out of existing equipment. When outages do occur, this technology can re-route the grid to restore power much more quickly and at a lower cost than today.

How much electricity does it take to charge an Electric Vehicle (EV)?

Did you know that when an EV is charging it can use as much electricity as two average homes? If everyone in a neighbourhood came home from work or school and started charging their EVs at the same time, the electricity demand could overload the grid.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Modernization Plan

Key Accounts

16%

Making Choices: **Modernization**

By 2029, Toronto Hydro's draft **modernization plan** would cost the typical small business customer **[GS 1,000-4,999kW: $1,233.63 / Large Use: $6,468.03]** more per month on their monthly electricity bill. Toronto Hydro could spend more to increase the pace of modernizing the grid to get better reliability sooner, or it could spend less and slow down the progress.

	Spend Less	Draft Plan	Spend More
Reliability	Being ready to automate the grid by 2035 means that better reliability won't happen until the end of the next decade or beyond.	Being ready to automate the grid by 2030 means that better reliability will happen in the earlier part of the next decade.	Faster progress towards grid automation means better reliability earlier and improved reliability for critical loads located in the downtown area.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	Same as draft plan.
Efficiency	It will take longer for the grid to become more efficient. This may lead to higher costs in the next decade.	The grid will become more efficient in the next decade, which will help reduce costs.	Same as draft plan.

Choice 1 of 7:

	Spend Less	Draft Plan	Spend More
GS 1,000-4,999kW	$943.11	$1,233.63	$1,668.11
Large Use	$5,020.32	$6,468.03	$8,726.20

Price

GS 1,000-4,999kW	$1,063.93	$1,184.77	$1,305.60	$1,426.43	$1,547.27	Don't know
Large Use	$5,637.96	$6,255.60	$6,873.25	$7,490.90	$8,108.54	

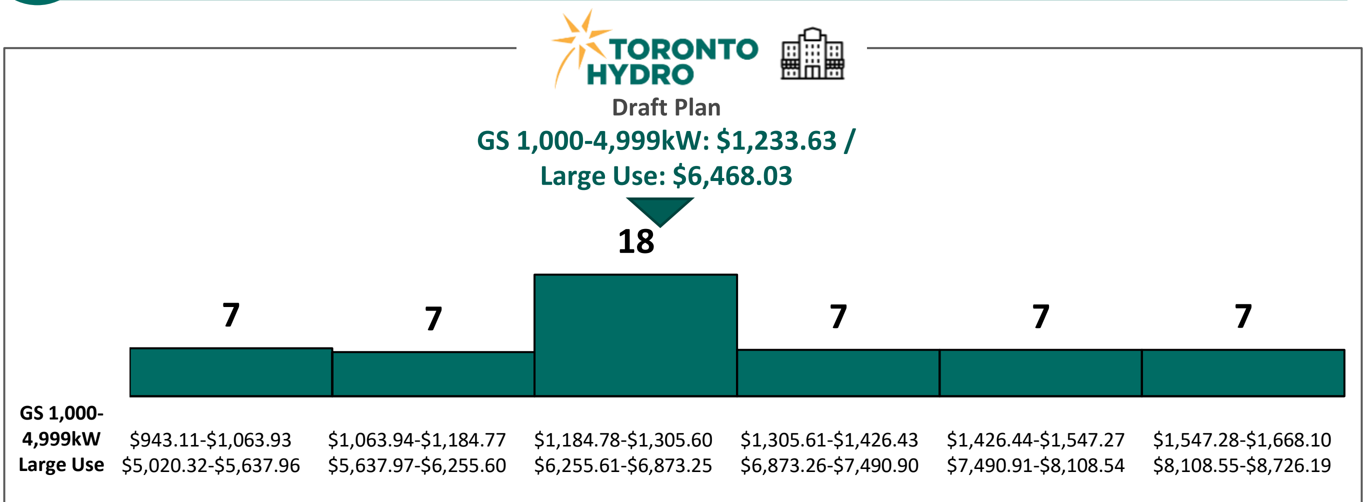
$-.-- Your selection.

Online Workbook

Amount Spent on the Modernization Plan

Key Accounts

Q How much do you think Toronto Hydro should spend on its modernization plan?



"Don't know" (0) not shown.

	Overall	Sector		
		MASH	Commercial/MURB	Industrial
Below Plan	14	2	8	4
On Plan	18	3	7	8
Above Plan	21	3	13	4

Online Workbook

Additional Feedback on the Modernization Plan

Key Accounts

Q Do you have additional feedback on Toronto Hydro's draft modernization plan?

Response	Count
Modernize, be proactive, invest for the long term	5
Prevent outages, stable power, system reliability	3
Oppose the increase, increase is too high (general)	1
Support the increase (general)	1
Prioritize renewables, solar/wind, and electric vehicles	1
Focus on demand side management/provide education about reducing usage	1
No response	41

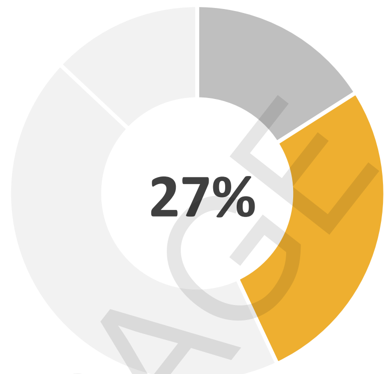
Note: Responses were optional.

Draft Growth Plan

Increase Capacity to Serve Customers

What is this section about?

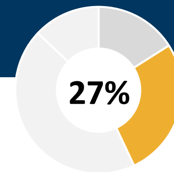
- This section explains how fast the city of Toronto is growing and what it takes for the grid to serve customers' needs for more electricity.
- Toronto Hydro's draft growth plan is about increasing grid capacity to serve customers reliably now and in the future.



- This spending category makes up **27% of the draft plan** and would add **[GS 1,000-4,999kW: $2,009.85 / Large Use: $10,537.81]** on the average customer's in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft growth plan**.*

WORKBOOK PAGE



Growing City, Growing Needs

1 Toronto is growing, fast.

Toronto is one of the fastest growing cities in North America. A growing city means that we need a bigger local grid so that homes and businesses can get the power they need, when they need it.

Population Growth

Toronto will add approximately 500,000 more people this decade. To put this into context, Toronto is growing five times faster than Los Angeles.

230 Cranes
Toronto has led the crane count in North America since 2015.

2,114 Projects
including residential and non-residential in development in the city of Toronto.

+$1B in Construction
work planned for city infrastructure in Toronto annually (transportation and water).

2 Individual customers will use more electricity than ever before.

The average customer will use more electricity in the next 10–15 years, as governments encourage businesses and communities to use less fossil fuels (oil and gas) to address climate change. Here are the key government policies that drive the need for more electricity in Toronto:

2026 – The Government of Canada may require 20% of all new car sales to be zero emission and is working towards a target of 60% by 2030.

2028 – The City of Toronto Green Building Standard requires all new mid- and high-rise buildings to be near zero GHG emissions.

2030 – The carbon tax may increase 161% by 2030 so customers use less oil and gas, and switch to clean electricity for cooking, heating and transportation.

23% **Forecasted increase in customers' need for electricity by the year 2030.**

Conservation and energy efficiency has helped manage electricity use over the past 20 years and will continue to play an important role in the future. But conservation alone is not enough. We need a bigger grid to serve customers in the long term.

WORKBOOK PAGE

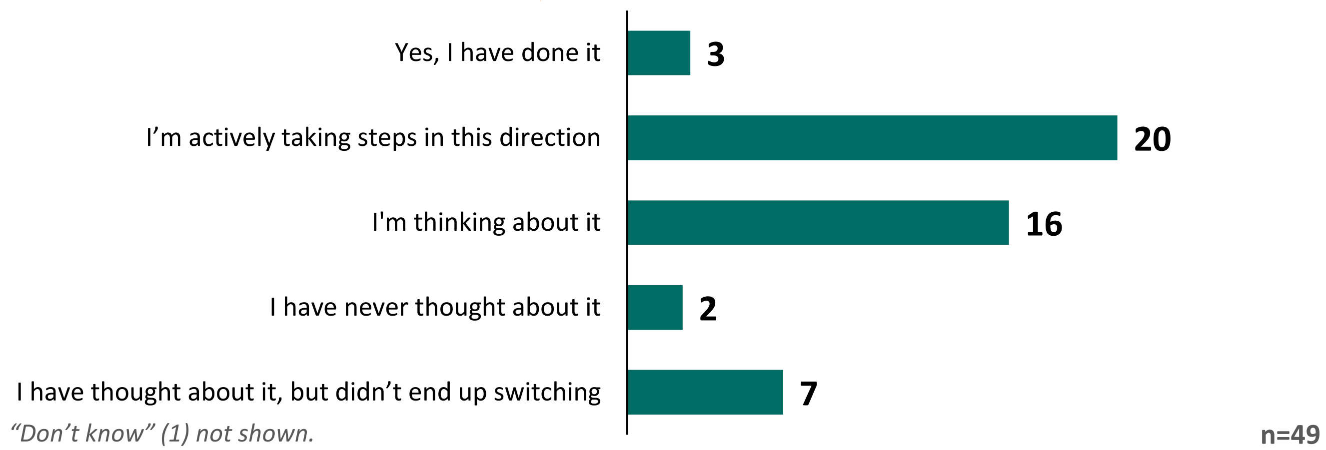
Online Workbook

Amount Spent on Modernization Plan

Key Accounts

Q

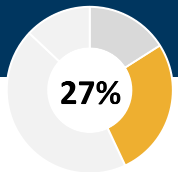
When you think about all your energy bills, has your organization ever considered shifting from one energy source to another to save money or reduce your impact on the environment?
For example, changing from a natural gas-fuelled furnace to an electric heat pump, or from a gas-fuelled vehicle to an electric vehicle?



	Sector		
	MASH	Commercial/MURB	Industrial
Yes, I have done it	-	3	-
Actively taking steps	4	11	6
I'm thinking about it	3	7	6
I have never thought about it	-	1	1
I didn't end up switching	1	4	2

Note: Responses were optional.

INNOVATIVE RESEARCH GROUP



Building a bigger grid takes time

It's easy to say Toronto needs more electricity, but meeting this need requires Toronto Hydro to make major investments in the grid, including:

Expand Transformer Stations

Bring more power into the city from the provincial grid to serve growing communities along the new transit corridors (Eglinton LRT, Finch LRT, Ontario Line) and the redevelopment of areas like Downsview Park and the Portlands.

Upgrade and Reconfigure the Grid

Make more space on the grid to enable customers to plug in. Upgrade equipment like cables and transformers and reconfigure how the existing system serves customers to make more space on the grid to accommodate new services like electric vehicle charging stations and solar panels.

Major Infrastructure Developments

Connect major projects like the Finch Light Rail Transit system and the Ontario Line, and relocate Toronto Hydro's grid equipment to enable these and other major infrastructure developments to be constructed in the city.

This work cannot happen quickly. Toronto is densely populated and congested. **Building new power lines and stations takes years of planning and construction.** There are also equipment and resource constraints that limit how quickly Toronto Hydro can build a bigger grid.

Managing Uncertainty

Toronto Hydro develops its forecast from information such as building permits and projected electric vehicle sales. However, customer adoption of new technology is uncertain due to:

Supply chain issues such as equipment and resource shortages can affect the availability of customer technologies.

Technological advancements can lead to fast cost reductions. For example, the price of lithium ion batteries (EVs) decreased by 79% from 2013 to 2022.

Government policies such as rebates for electric vehicles and solar panels drive customers and suppliers to make certain choices.

If Toronto Hydro invests too quickly to build a bigger grid, it means customers' rates will go up to pay for equipment that will not be used for some time. On the other hand, if it doesn't do enough to expand the grid for higher use of electricity, customers could experience less reliability (brownouts) and delays when they want to connect to the grid or plug in new technologies. Toronto Hydro needs your input on the pace for these investments.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Growth Plan

Key Accounts

27%

Making Choices: **Growth**

By 2029, Toronto Hydro's draft **growth plan** would cost the typical small business customer **[GS 1,000-4,999kW: $2,009.85 / Large Use: $10,537.81]** more per month on their monthly electricity bill. Toronto Hydro could spend more to better prepare the grid to serve customers' changing needs, or could spend less and wait and see if customers adopt new technologies over the 2025–2029 plan.

	Spend Less	Draft Plan	Spend More
Reliability	May lead to less reliability for customers in high-growth neighbourhoods. Increases reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Manages reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Improves reliability risk for the next decade.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	May improve service levels (shorter waits and lower costs) for some customers connecting new services to the grid. Improves customer choice for new technologies.
Efficiency	May lead to less efficient work if Toronto Hydro has to build a bigger grid reactively to serve customers.	Supports the ability to serve customers efficiently in the five-year plan based on the projected demand.	Supports the ability to serve customers efficiently in the five-year plan and beyond in the next decade.

WORKBOOK PAGE

Choice 2 of 7:

	Spend Less	Draft Plan	Spend More
GS 1,000-4,999kW	$1,579.26	$2,009.85	$2,459.58
Large Use	$8,406.67	$10,537.81	$12,866.56

Price

GS 1,000-4,999kW	$1,725.97	$1,872.69	$2,019.41	$2,166.13	$2,312.85
Large Use	$9,149.98	$9,893.29	10,636.61	11,379.92	12,123.24

Don't know

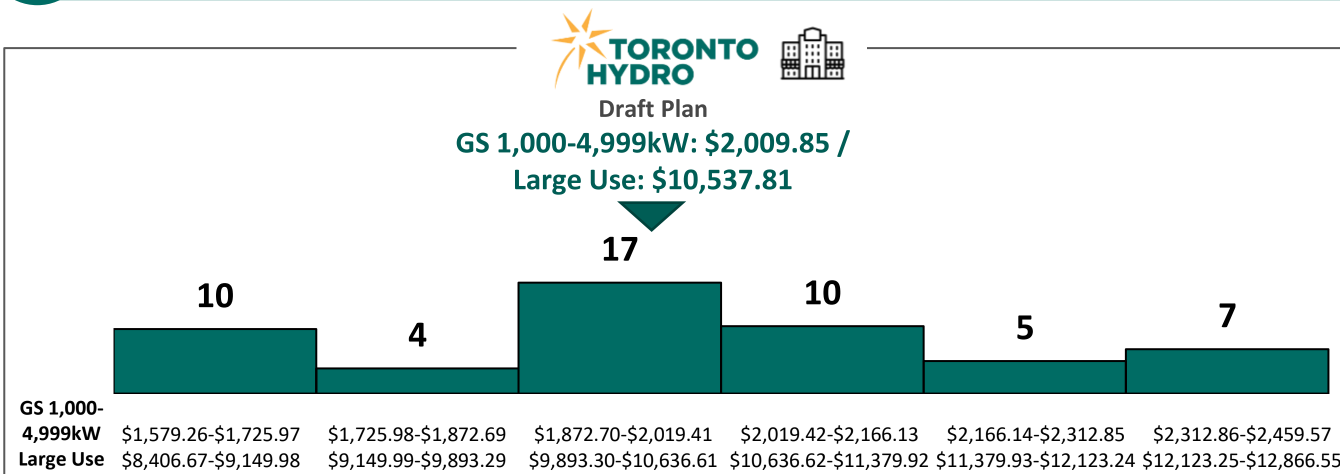
$-.-- Your selection.

Online Workbook

Amount Spent on the Growth Plan

Key Accounts

Q How much do you think Toronto Hydro should spend on its growth plan?



"Don't know" (1) not shown.

n=52

	Overall	Sector		
		MASH	Commercial/MURB	Industrial
Below Plan	13	3	7	4
On Plan	22	2	15	5
Above Plan	16	3	7	7

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Online Workbook

Additional Feedback on the Growth Plan

Key Accounts

Q Do you have additional feedback on Toronto Hydro's draft growth plan?

Response	Count
Modernize, be proactive, invest for the long term	3
Prioritize renewables, solar/wind, and electric vehicles	2
Should be funded by developers	2
Focus on demand side management/provide education about reducing usage	1
Prevent outages, stable power, system reliability	1
No response	43

Note: Responses were optional.

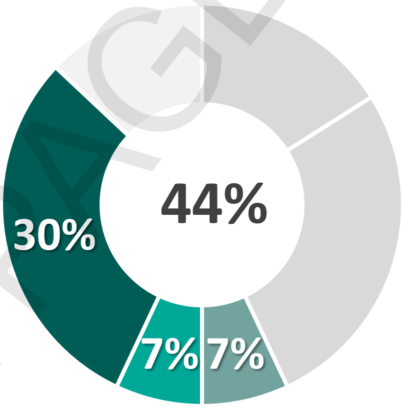
Draft Sustainment Plan

Replacing and Updating Equipment

What is this section about?

- This section is about upkeeping the grid to manage reliability and maintain safe and efficient operations.
- Toronto Hydro's draft sustainment plan section seeks your input in three areas:

1. Managing equipment in very poor condition with a high risk of failure.
2. Pacing the upkeep of equipment near the end of its expected life.
3. Standardizing outdated equipment.

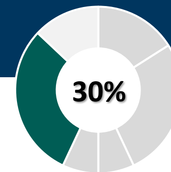


- This spending category makes up **44% of the draft plan** and would add **[GS 1,000-4,999kW: $3,276.35 / Large Use: $17,178.24]** on the average customer's in this rate class's monthly bill by 2029.

*Click on the video below to learn about Toronto Hydro's **draft sustainment plan**.*

WORKBOOK PAGE

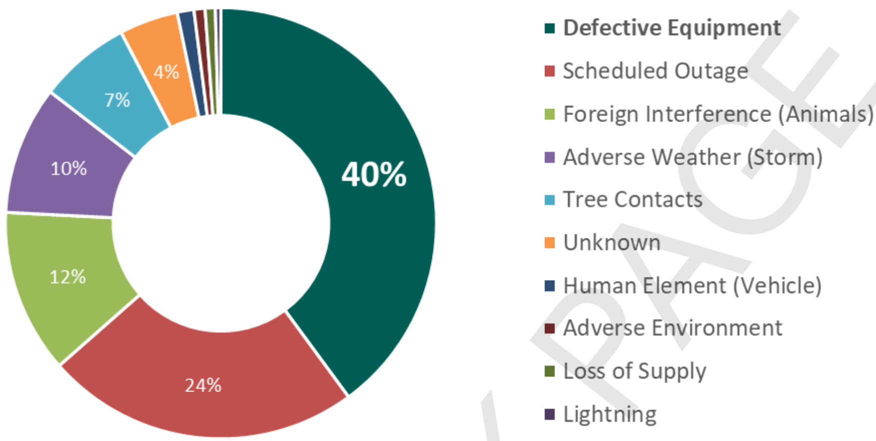
Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan



1 Reliability: Managing Equipment Failure Risk

While many power outages are caused by external events such as weather and falling trees, roughly **40%** of customer outages are caused by equipment failure. This is the largest single cause of outages, and customers look to Toronto Hydro to manage this risk.

Customer Outage Duration (Hours) by Cause 2018-2022



Toronto Hydro manages failure risk by:

- Inspecting equipment condition regularly, so that maintenance or replacement can be done before the equipment fails.
- Replacing and repairing equipment that is in bad condition or performing poorly. This includes replacing lines with a high number of outages or replacing transformers with visible signs of wear and tear such as rust.

Since 2014, Toronto Hydro's work to upkeep the grid has delivered a 13% reduction in the average number of outages experienced by customers and a 25% reduction in the length of those outages. Toronto Hydro's draft plan is to maintain these reliability results for customers.

Want to learn more about grid reliability and what causes power outages? Click here.

What type of work is Toronto Hydro doing to manage equipment failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to prevent increased outages due to equipment failure.

Replacing Direct-Buried Cable

In parts of the grid that were built a long time ago, cables are laid directly in underground trenches without any protective barrier. **Underground equipment failures contribute to 57% of defective equipment failures, the large majority of which (75%) are due to cables.** Toronto Hydro's draft plan intends to replace 182 kilometers of direct buried cables by 2029 to manage the risk of power outages caused by this equipment.

WORKBOOK PAGE

System reliability

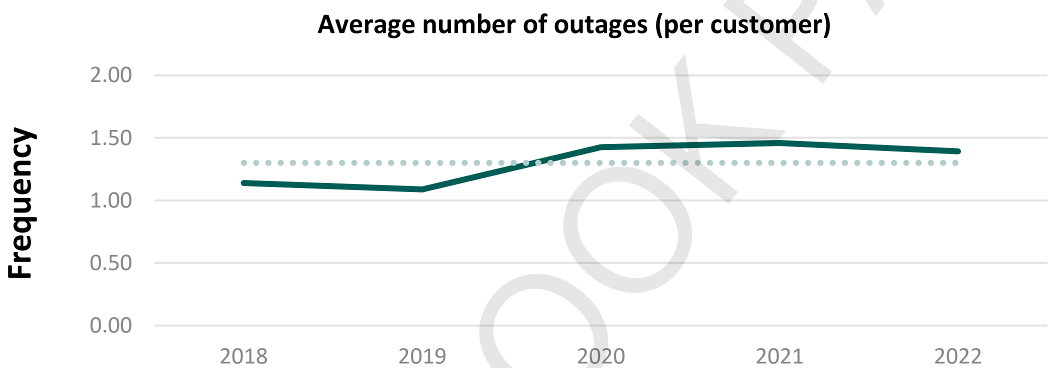
In order to provide feedback on Toronto Hydro's plans, it's important to understand how the distribution system has performed in the past, as well as what's expected in the future.

A core objective of Toronto Hydro's plan is to maintain current levels of reliability over the 2025–2029 plan period, while making foundational technology investments to reduce the length of power outages in the long-term.

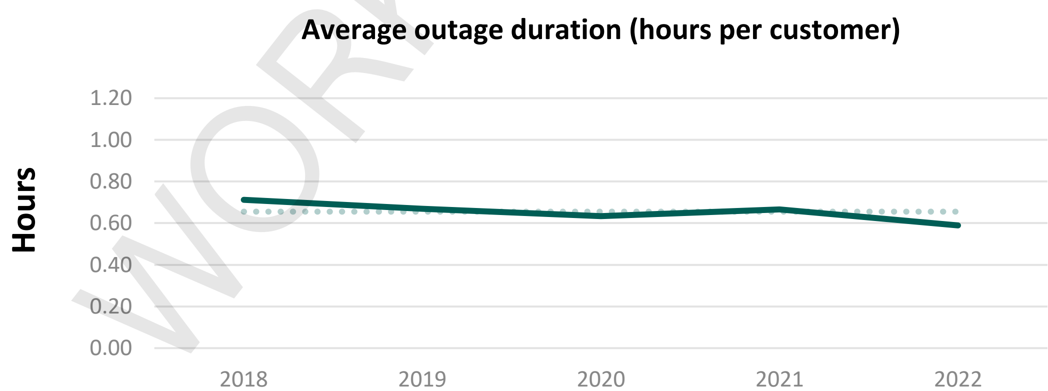
Toronto Hydro recognizes that power interruptions are inconvenient for residential customers and can be very costly for commercial and industrial customers.

Toronto Hydro tracks both the average number of power outages per customer and how long those interruptions last.

Between 2018 and 2022, the typical Toronto Hydro customer has experienced about two outages per year (*or 1.3 outages per customer to be exact*).



Over the same period, the average **duration** of an outage has been about 0.62 hours. Meaning, when the power does go out, Toronto Hydro is typically able to restore power in about 35 minutes.



It's important to keep in mind that these are system averages, and that your actual experience may be different. Some customers connected to newer lines may not experience any outages, while others are experiencing more than the average number of outages each year.

WORKBOOK PAGE

What is most likely to cause an outage?

Although both the number and length of outages have decreased compared to the previous five-year average, equipment failure remains the top cause of outages within Toronto Hydro's control.

That said, in 2022, severe weather presented a unique set of challenges for Toronto Hydro's distribution system.

Causes of Unscheduled Power Outages (five-year average: 2018 to 2022)

12%

Animal Contact: Outages caused by animals such as racoons, squirrels and birds coming in contact with overhead powerlines or transformers.

40%

Equipment Failure: Unscheduled power outages from equipment failure usually occur with distribution equipment that's beyond or approaching the end of their expected useful lives.

10%

Weather-Related Events: Adverse weather such as heavy rain, lightning strikes, ice, snow, wind, extreme temperatures, and freezing rain can disrupt the distribution system.

14%

Other: Includes tree contact (7%) and human interference (1%), such as construction workers accidentally cutting powerlines or motor vehicle accidents involving contact with distribution equipment. 4% of outages are unknown, but most are likely caused by animal contact.

Note: *statistics do not include loss of supply from Hydro One.*

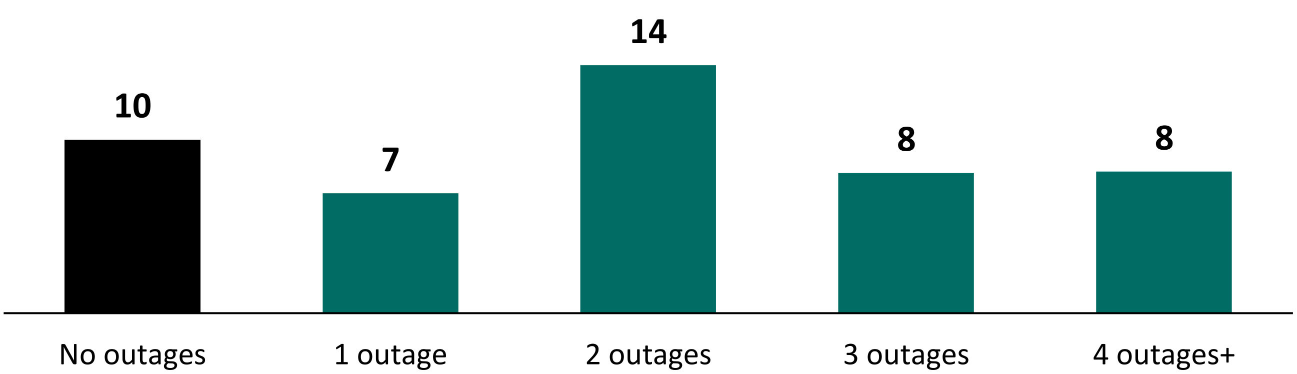
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Reliability Plan

Key Accounts

Q Over the past 12 months, have you experienced any power outages at your organization which lasted longer than one minute?



"Don't know" (6) not shown.

n=52

	Sector		
	MASH	Commercial/MURB	Industrial
No outages	1	5	4
1 outage	3	4	-
2 outages	1	8	5
3 outages	-	4	4
4 outages+	3	3	2

Note: Responses were optional.

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

Making Choices: **Managing Equipment Failure Risk**

By 2029, Toronto Hydro's draft plan to manage equipment failure risk would cost the typical small business customer **[GS 1,000-4,999kW: $2,265.64 / Large Use: $11,878.96]** more per month on their monthly electricity bill. Toronto Hydro could spend more to improve reliability, or it could spend less and take on more risk of outages.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Reduces reliability compared to current levels. This means more power outages due to equipment failure.	Maintains reliability at current levels. This means holding steady on power outages due to equipment failure.	Improves reliability compared to current levels. This means less power outages due to equipment failure.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 3 of 7:

Price	Spend Less	Draft Plan	Spend More
GS 1,000-4,999kW	$1,641.50	$2,265.64	$2,753.26
Large Use	$8,737.96	$11,878.96	$14,402.85

GS 1,000-4,999kW	$1,826.78	$2,012.08	$2,197.37	$2,382.66	$2,567.96	Don't know
Large Use	$9,682.10	$10,626.25	$11,570.40	$12,514.54	$13,458.69	

$-.-- Your selection.

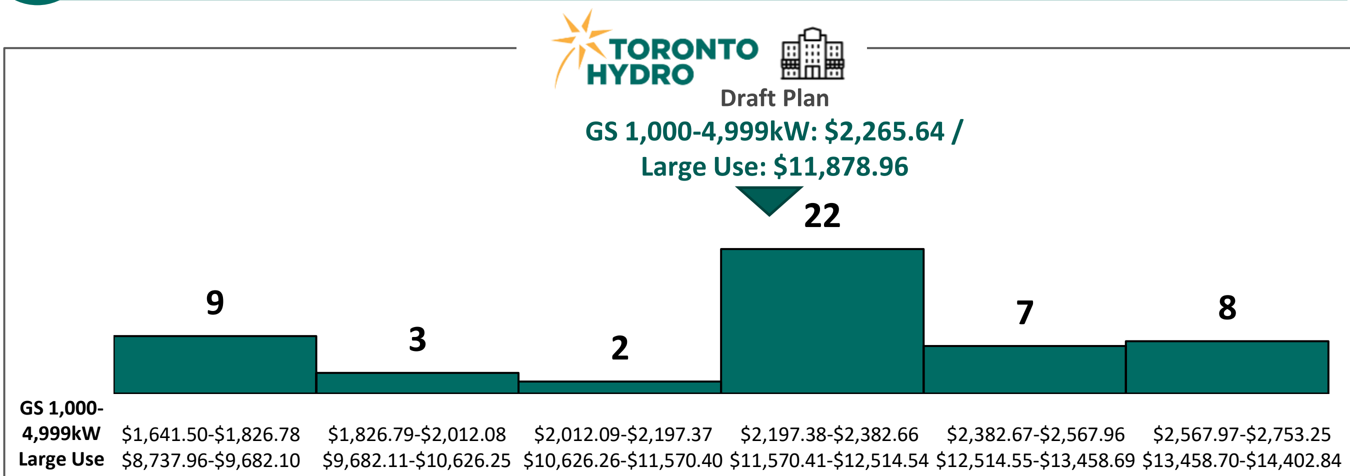
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Reliability Plan

Key Accounts

Q How much do you think Toronto Hydro should spend on its grid reliability plan?



"Don't know" (1) not shown.

n=52

	Overall	Sector		
		MASH	Commercial/MURB	Industrial
Below Plan	14	2	9	3
On Plan	19	3	11	5
Above Plan	19	3	8	8

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Online Workbook

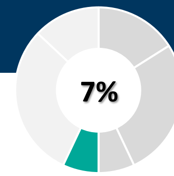
Additional Feedback on the Grid Reliability Plan

Key Accounts

Q Do you have additional feedback on Toronto Hydro's draft grid reliability plan?

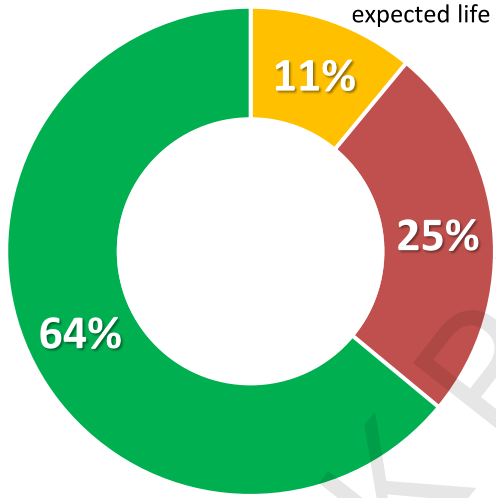
Response	Count
Prevent outages, stable power, system reliability	6
Modernize, be proactive, invest for the long term	2
Find efficiencies, cut wasteful spending, lower salaries	1
Support the increase (general)	1
No response	44

Note: Responses were optional.



2 Paced Upkeep of the Grid

About 25% of Toronto Hydro's equipment is operating past its expected life and an additional 11% is estimated to reach that point by 2030.



In this part of the plan, the key question is whether Toronto Hydro should wait until there are clear signs of equipment failure risk (such as rust or oil leaks), or whether it should get ahead of the problem by replacing old equipment proactively.

If Toronto Hydro waits, it can keep prices lower in the short term. However, this could create a surge of work in future years that will spike prices in the 2030s. There is also a risk that Toronto Hydro will not be able to do the amount of work required to deal with this equipment in the future, which could lead to more outages and higher safety risks due to equipment failures.

Want to learn more about Toronto Hydro's distribution grid? Click here.

What type of work is Toronto Hydro doing to upkeep the grid?

Below is an example of key investments that Toronto Hydro needs to make in a paced way to upkeep the grid and prevent a surge of work to address equipment failure risk in the future.

Paced Replacement of Network Vaults

This equipment is located in underground vaults in the downtown area, which serves many critical customers, such as hospitals and financial institutions. A very large portion of this equipment is going to be in poor condition and past its expected life in the 2030-34 period. To manage this risk, Toronto Hydro's draft plan intends to replace network vaults in a paced manner.

WORKBOOK PAGE

Renewing and replacing infrastructure

Toronto Hydro’s grid is a mix of overhead, underground, network and station infrastructure. It operates at three different voltages (27.6kV, 13.8kV, and 4.16kV) and includes approximately:

- 61,300 distribution transformers
- 17,060 primary switches
- 15,393 km of overhead wires
- 13,765 km of underground wires
- 37 transformer stations

Overhead Infrastructure

The overhead system is made up of poles, wires, transformers, switches and other equipment. They are easier to replace, repair and inspect.

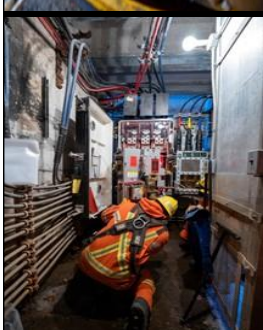
However, they are also more prone to foreign interference such as vehicles, trees, animals and weather-related outages.

This system consists of three different types of configurations two of which are outdated configurations from the 1950s and 1960s, making them more challenging to replace and restore particularly after a weather-related outage.

Underground Infrastructure

Toronto Hydro’s underground system consists of cables, transformers, switches and civil infrastructures (like manholes). They can be placed either at ground level (green box above ground in your neighbourhood), underground, or inside building vaults (typical for multi-storey buildings). This system is made up of two different types of configurations where the downtown Toronto area consists of lead-covered cable, an outdated equipment with little to no suppliers.

While underground equipment is more resilient during weather-related events, it is more susceptible to flooding and at risk of faster deterioration due to moisture build-up.



Network Infrastructure

Toronto Hydro’s network system, predominantly found in the downtown Toronto area, was installed in the early-to-mid 1900s to improve reliability (service levels) for critical loads (like financial institutions) and serves medium-sized loads in high-density areas, and areas with small and narrow sidewalks. It consists of interconnected low-voltage cables, vaults and network units.

While this system is better at handling normal equipment failures, proactive replacement and maintenance of this equipment are critical to avoid vault fires from occurring.

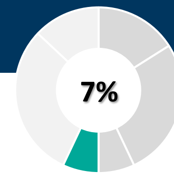
Station Infrastructure

Toronto Hydro’s distribution stations receive the transmission supply from Hydro One at very high voltages. Station infrastructure consists of switchgear, power transformers, circuit breakers, remote terminal units (station computers) and battery systems. Toronto Hydro proactively replaces this equipment, as failure at the station level can cause widespread and lengthy power outages.

WORKBOOK PAGE

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

Key Accounts



Making Choices: **Paced Upkeep of the Grid**

By 2029, Toronto Hydro's draft plan to ensure paced upkeep of the grid would cost the typical small business customer **[GS 1,000-4,999kW: $500.55 / Large Use: $2,624.45]** more on their monthly electricity bill. Toronto Hydro could spend more to get ahead of future equipment failure risk, or it could spend less and defer some of this work at the risk of managing more power outages due to equipment failure in the next decade.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Higher risk of power outages due to equipment failure in the next decade.	Manages the risk of power outages due to equipment failure in the next decade.	Reduces the risk of power outages due to equipment failure in the next decade.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 4 of 7:

	Spend Less	Draft Plan	Spend More
GS 1,000-4,999kW	$350.51	$500.55	$778.73
Large Use	$1,865.83	$2,624.46	$4,073.70

Price

GS 1,000-4,999kW	$421.87	$493.24	$564.61	$635.98	$707.35	Don't know
Large Use	$2,233.80	$2,601.78	$2,969.76	$3,337.73	$3,705.71	

$-.-- Your selection.

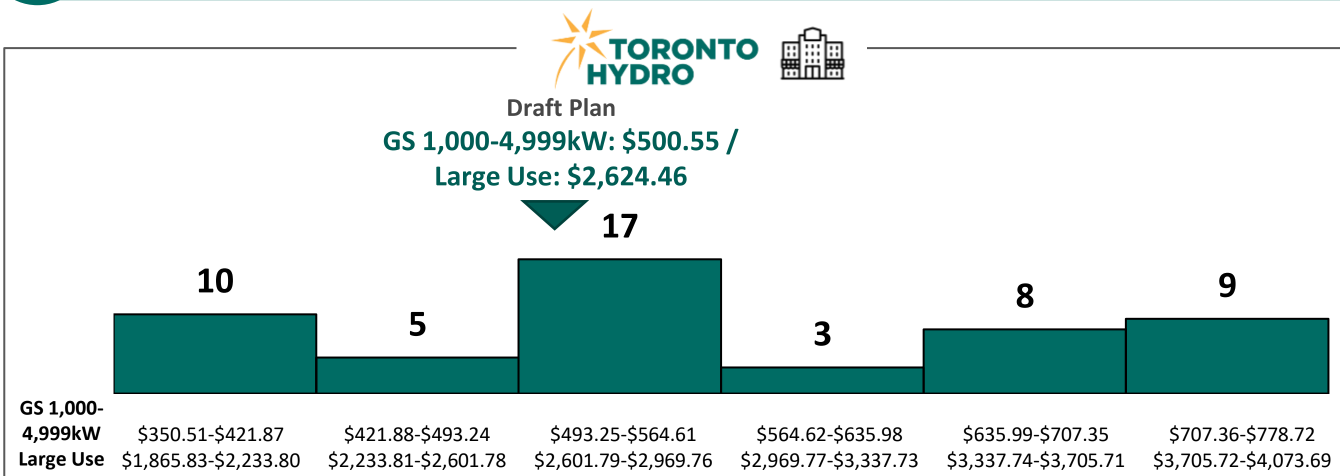
WORKBOOK PAGE

Online Workbook

Amount Spent on the Grid Stewardship Plan

Key Accounts

Q How much do you think Toronto Hydro should spend on its grid stewardship plan?



"Don't know" (0) not shown.

n=52

	Overall	Sector		
		MASH	Commercial/MURB	Industrial
Below Plan	12	2	7	3
On Plan	17	3	9	4
Above Plan	24	3	12	9

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Online Workbook

Additional Feedback on the Grid Stewardship Plan

Key Accounts

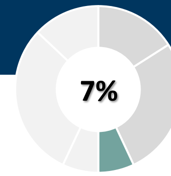
Q Do you have additional feedback on Toronto Hydro's draft grid stewardship plan?

Response	Count
Prevent outages, stable power, system reliability	2
Modernize, be proactive, invest for the long term	2
Find efficiencies, cut wasteful spending, lower salaries	2
Support developing new technology and innovation	1
Make use of existing infrastructure, past spending	1
No response	45

Note: Responses were optional.

Toronto Hydro Customer Engagement
Planning Process: 2025–2029 Draft Sustainment Plan

Key Accounts

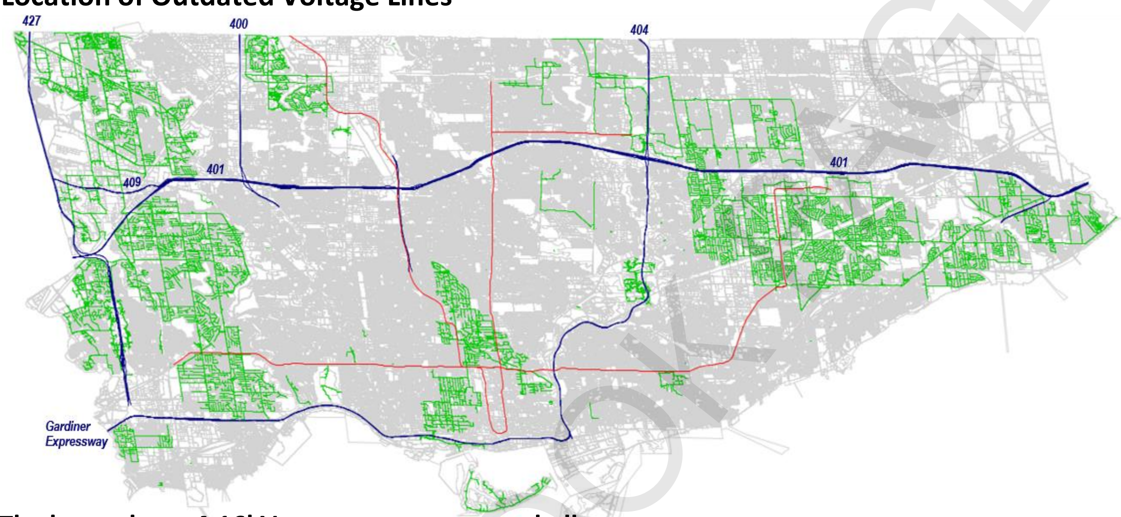


3 Standardize the Grid

Because of its history, Toronto Hydro has an old and diverse grid. Toronto Hydro is made up of 6 municipal utilities that were joined in 1998 when the City of Toronto was formed. Each utility owned and operated different types of equipment. As a result, Toronto Hydro's grid has three different voltage levels: 4.16kV, 13.8kV and 27.6kV.

The 27.6kV voltage level is the current standard for local grids. However, a large part of Toronto Hydro's grid is served at 4.16kV and 13.8kV.

Location of Outdated Voltage Lines



The low voltage 4.16kV system poses many challenges:

- Long outages for customers and higher cost to restore power – in 2022, the longest outage on the 4.16 kV system was 80 hours.
- Less efficient at carrying power over long distances, which means more electricity is lost as it travels from point A to point B (line losses).
- Less capacity to serve customers' growing electricity needs, which means longer waits and higher costs to connect new services such as electric vehicles and solar panels.
- Risk of supply chain and labour shortages as manufacturers stop making this equipment and technicians trained on this equipment retire.

What type of work is Toronto Hydro doing to standardize the grid?

Below is an example of a key investment to replace outdated equipment.

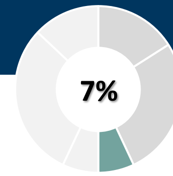
Voltage Conversion from 4.16kV/13.8kV to 27.6kV

Voltage conversion entails a full rebuild of outdated equipment such as rear lot construction (poles and wires in customers' backyards). This work improves reliability, safety and makes the grid more efficient. Toronto Hydro's draft plan intends to convert 1400 customers from rear lot service and works to eliminate rear lot construction from the grid by the late 2040s.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Sustainment Plan



Making Choices: **Standardize the Grid**

By 2029, Toronto Hydro's draft **plan to standardize the grid** would cost the typical small business customer **[GS 1,000-4,999kW: $510.16 / Large Use: $2,674.82]** more on their monthly electricity bill. Toronto Hydro could spend more to speed up the pace of replacing outdated equipment or it could spend less to slow down the pace and delay the benefits of this work. For example, under spend more Toronto Hydro would convert all rear lot customers by the early 2040s, and under spend less by the 2050s.

	Spend Less	Draft Plan	Spend More
Reliability	Slower progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Steady progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Faster progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.
Customer Service	Less progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.	Steady progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels	Faster progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.
Efficiency	Slower progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Steady progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Faster progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.

Choice 5 of 7:

	Spend Less	Draft Plan	Spend More
GS 1,000-4,999kW	$412.76	$510.16	$644.56
Large Use	$ 2,197.16	$2,674.82	$3,371.82

Price

GS 1,000-4,999kW	$451.38	$490.02	$528.65	$567.28	$605.92	Don't know
Large Use	$2,392.93	$2,588.70	$2,784.48	$2,980.26	$3,176.03	

$-.-- Your selection.

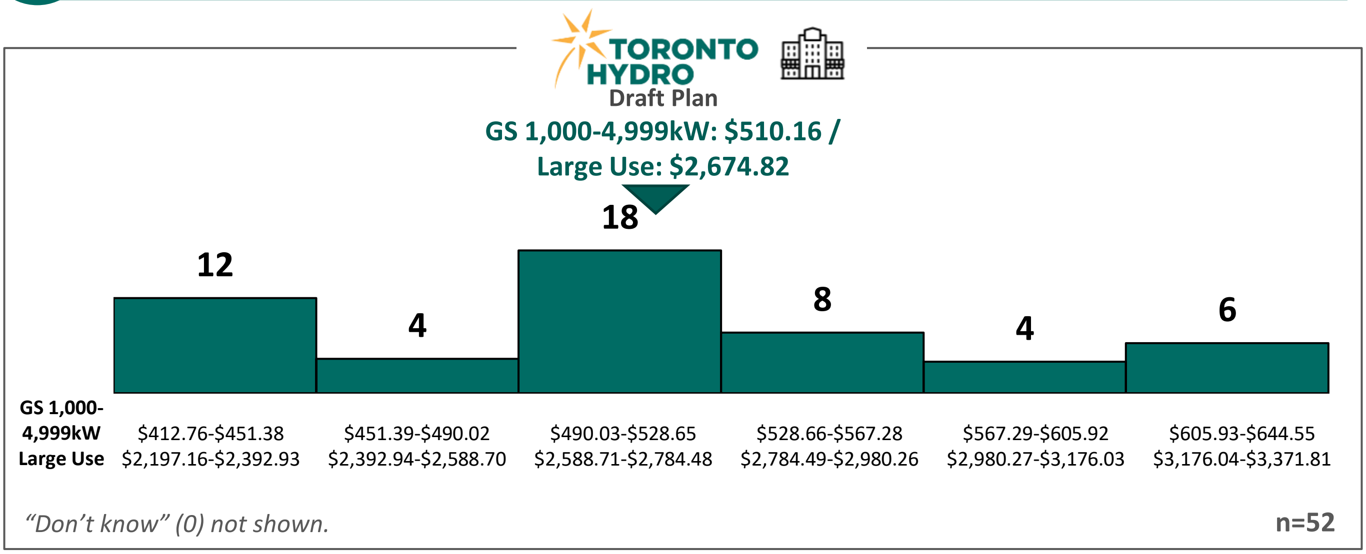
WORKBOOK PAGE

Online Workbook

Amount Spent on the Equipment Standardization Plan

Key Accounts

Q How much do you think Toronto Hydro should spend on its equipment standardization plan?



	Overall	Sector		
		MASH	Commercial/MURB	Industrial
Below Plan	16	3	8	5
On Plan	17	3	9	4
Above Plan	19	2	11	7

INNOVATIVE RESEARCH GROUP

Online Workbook

Additional Feedback on the Equipment Standardization Plan

Key Accounts

Q Do you have additional feedback on Toronto Hydro's draft equipment standardization plan?

Response	Count
Modernize, be proactive, invest for the long term	4
Find efficiencies, cut wasteful spending, lower salaries	1
Prevent outages, stable power, system reliability	1
Other	1
No response	46

Note: Responses were optional.

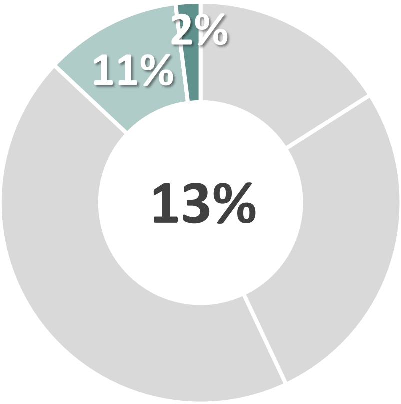
Draft General Plant Plan

Keeping the Business Running

What is this section about?

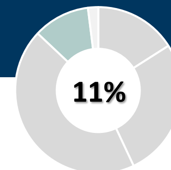
- This section is about the vehicles, work centres and IT systems that keep Toronto Hydro's business running efficiently.
- Toronto Hydro seeks your input on two choices within this part of the plan:

1. The pace of replacing the equipment needed to keep the business running.
2. The pace of reducing Toronto Hydro's emissions from its own operations.



- This spending category makes up **13% of the draft plan** and would add **[GS 1,000-4,999kW: $960.77 / Large Use: $5,037.42]** on the average customer's in this rate class's monthly bill by 2029.

WORKBOOK



1 Keep the Business Running

Work centres, vehicles and information technology systems are the backbone of Toronto Hydro's day-to-day operations. This equipment must be maintained in good working condition for efficient and reliable operations so that crews can restore power and customers can access key services like their online account and the outage restoration map.

- As with grid equipment, Toronto Hydro uses information such as age and condition data from inspections to decide which equipment should be replaced versus repaired.
- Toronto Hydro repairs equipment in poor condition such as leaking roofs, failed furnaces and worn-out vehicle braking systems. It also replaces equipment like software programs and hardware servers that are past expected useful life.

What type of work is Toronto Hydro doing to manage failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to keep the business running and manage the risk of equipment failure.

Station Buildings

Toronto Hydro has approximately 250 properties that either house distribution stations equipment such as cables and transformers or support the distribution system.

Over 80% of station buildings are older than 40 years and require repairs and investments to address the following types of problems:

- Structural damage to the building (cracked foundations, leaking roofs)
- Mechanical, electrical and plumbing equipment in poor condition
- Compliance with building and fire code requirements

This work ensures safe and efficient operations and minimizes the risk of outages that can affect many customers. For example, structural damage to a station building poses a direct risk to distribution equipment such as power transformers.

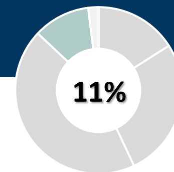
So, how much and how quickly Toronto Hydro decides to invest in keeping their business running has a direct impact on customers. While this equipment may remain in service for a long time, when they unexpectedly fail, the costs incurred usually far exceed proactive investments (repairs and replacements) and can have a significant impact on system reliability and customer service.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft General Plant Plan

Key Accounts



Making Choices: Keep the Business Running

By 2029, Toronto Hydro's draft plan to keep the business running would cost the typical small business customer **[GS 1,000-4,999kW: $842.21 / Large Use: $4,415.78]** more on their monthly electricity bill. Toronto Hydro could spend more to improve equipment health (age and condition) and functionality (better safety features) or spend less and take on more risk of equipment downtime.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of general plant equipment by 2029.	Maintains the overall health (age and condition) of general plant equipment by 2029.	Improves the overall health (age and condition) of general plant equipment by 2029.
Reliability & Service	Reduces equipment availability, which could mean longer outages or lower levels of customer service.	Maintains equipment availability consistent with current levels.	Improves equipment availability and functionality, which could mean better reliability and customer service levels.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work, which is more costly and increases equipment downtime.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work, and better equipment functionality.

Choice 6 of 7:

	Spend Less	Draft Plan	Spend More
GS 1,000-4,999kW	$606.80	$842.21	$980.59
Large Use	$3,230.08	$4,415.78	$ 5,129.64

Price

GS 1,000-4,999kW	$669.09	$731.39	$793.69	$855.98	$918.28	Don't know
Large Use	$3,546.66	$3,863.26	$4,179.85	$4,496.44	$4,813.04	

$-.-- Your selection.

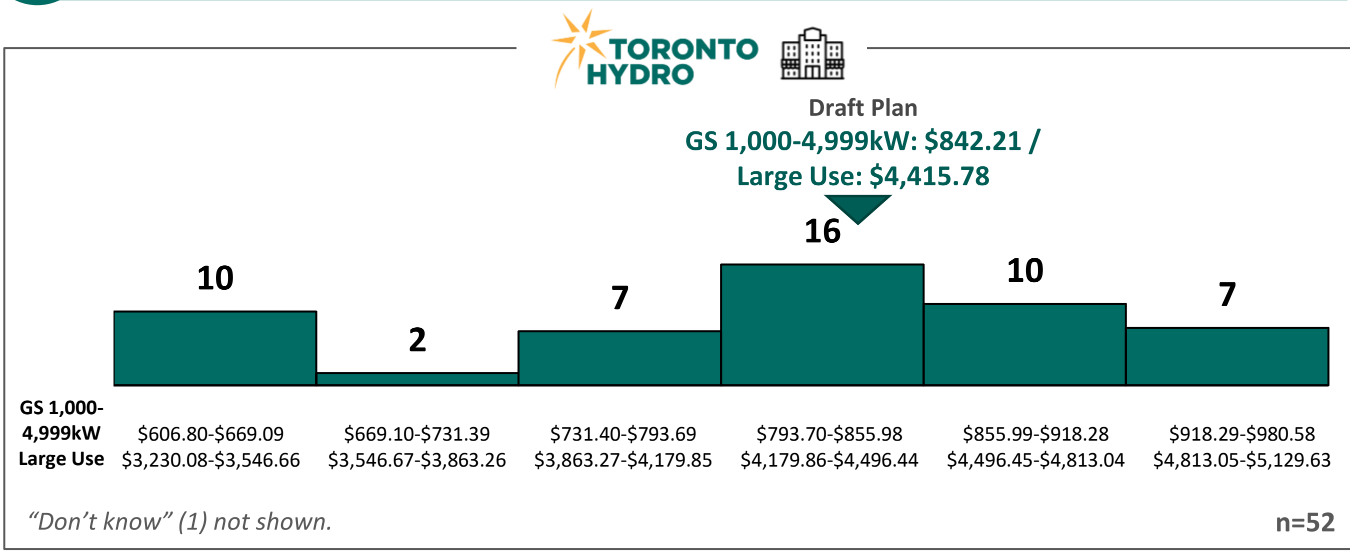
WORKBOOK PAGE

Online Workbook

Amount Spent on Keeping the Business Running

Key Accounts

Q How much do you think Toronto Hydro should spend to keep the business running?



	Overall	Sector		
		MASH	Commercial/MURB	Industrial
Below Plan	23	5	15	4
On Plan	17	2	7	8
Above Plan	12	1	7	4

Online Workbook

Additional Feedback on Keeping the Business Running

Key Accounts

Q Do you have additional feedback on Toronto Hydro's draft plan for keeping the business running?

Response	Count
Find efficiencies, cut wasteful spending, lower salaries	3
Make use of existing infrastructure, past spending	2
Modernize, be proactive, invest for the long term	1
Oppose the increase, increase is too high (general)	1
Support the increase (general)	1
No response	45

Note: Responses were optional.

2 Reducing Toronto Hydro's Emissions

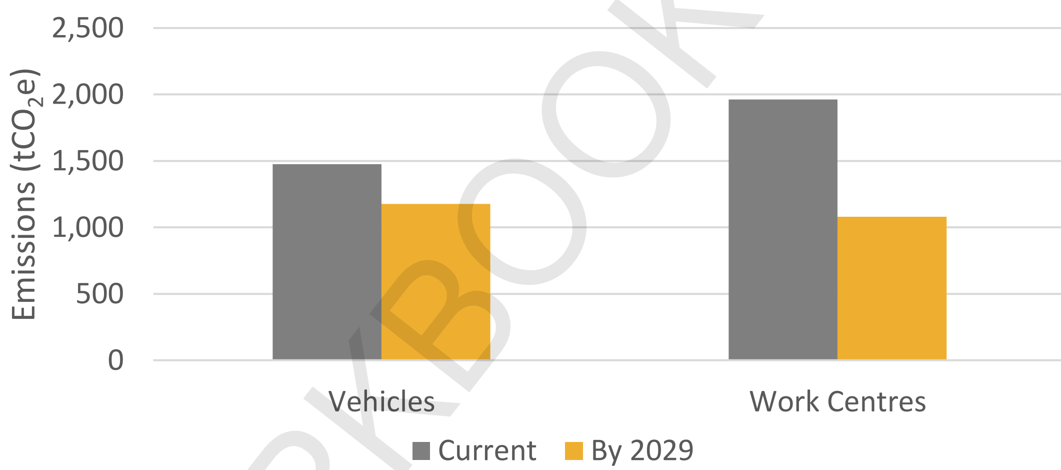
To address climate change, companies around the world are setting targets to reduce greenhouse gas (GHG) emissions from fossil fuels — a pledge commonly known as Net Zero.

Moving toward Net Zero has increasingly become the expectation of governments, financial markets, stakeholders and customers. For example, in October 2019, Toronto City Council unanimously voted to accelerate efforts to reduce emissions across the city.

To do its part in addressing climate change, Toronto Hydro is committed to reducing emissions from its vehicles and work centres by:

- Replacing gasoline and diesel power vehicles with hybrid and electric vehicles
- Converting natural gas boilers and heaters in its work centres to electric ones.

Toronto Hydro's Draft Plan to Reduce Emissions



Carbon Tax Savings

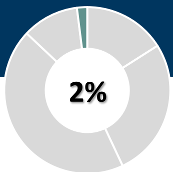
Reducing carbon emissions from vehicles and work centres could help Toronto Hydro manage rising costs due to the carbon tax (recall that the carbon tax may increase by 161% from 2023 to 2030). **Over the 2025–2029 period, Toronto Hydro's draft plan could reduce carbon tax payments by roughly half a million dollars.**

With your feedback, Toronto Hydro needs to decide how quickly to transition to cleaner sources of energy for its operations. In the next section, you will be presented these options.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft General Plant Plan



Making Choices: **Reducing Toronto Hydro's Emissions**

By 2029, Toronto Hydro's draft plan to reduce emissions would cost the typical small business customer **[GS 1,000-4,999kW: $118.56 / Large Use: $621.64]** more on their monthly electricity bill. Toronto Hydro could spend more for faster progress towards reducing its emissions, or spend less to slow down the progress.

	Spend Less	Draft Plan	Spend More
Environment	Less progress to reduce emissions — about 27% reduction by the end of the decade.	Steady progress to reduce emissions — about 35% reduction by the end of the decade.	Faster progress to reduce emissions — about 36% reduction by the end of the decade.
Efficiency	Higher exposure to rising energy costs (oil and gas) due to the carbon taxes and other pressures.	Managed exposure to rising energy costs (oil and gas) due to the carbon tax and other pressures.	Less exposure to rising energy costs (oil and gas) due to carbon taxes and other pressures.

Choice 7 of 7:

	Spend Less	Draft Plan	Spend More
GS 1,000-4,999kW	$89.39	$118.56	$129.73
Large Use	$475.86	$621.64	$678.65

Price

GS 1,000-4,999kW	$96.10	$102.83	$109.55	$116.27	$123.00	Don't know
Large Use	$509.65	$543.45	$577.25	$611.04	$644.84	

$-.-- Your selection.

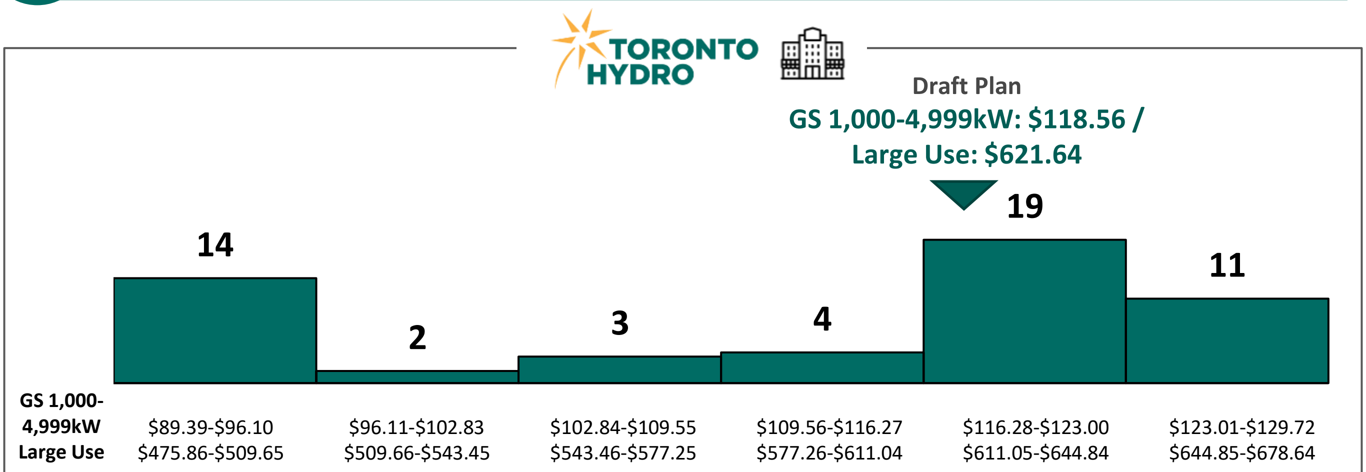
WORKBOOK PAGE

Online Workbook

Amount Spent on Reducing Emissions & Feedback

Key Accounts

Q How much do you think Toronto Hydro should spend to reduce its own emissions?



"Don't know" (0) not shown.

n=52

	Overall	Sector		
		MASH	Commercial/MURB	Industrial
Below Plan	23	3	13	6
On Plan	19	3	9	6
Above Plan	11	2	5	4

Online Workbook

Amount Spent on Reducing Emissions & Feedback

Q Do you have additional feedback on Toronto Hydro's draft decarbonization plan?

Response	Count
Modernize, be proactive, invest for the long term	2
Support the increase (general)	2
Find efficiencies, cut wasteful spending, lower salaries	2
Prioritize renewables, solar/wind, and electric vehicles	1
Costs are too high already, cost of living, struggling to pay bills	1
Prevent outages, stable power, system reliability	1
No response	44

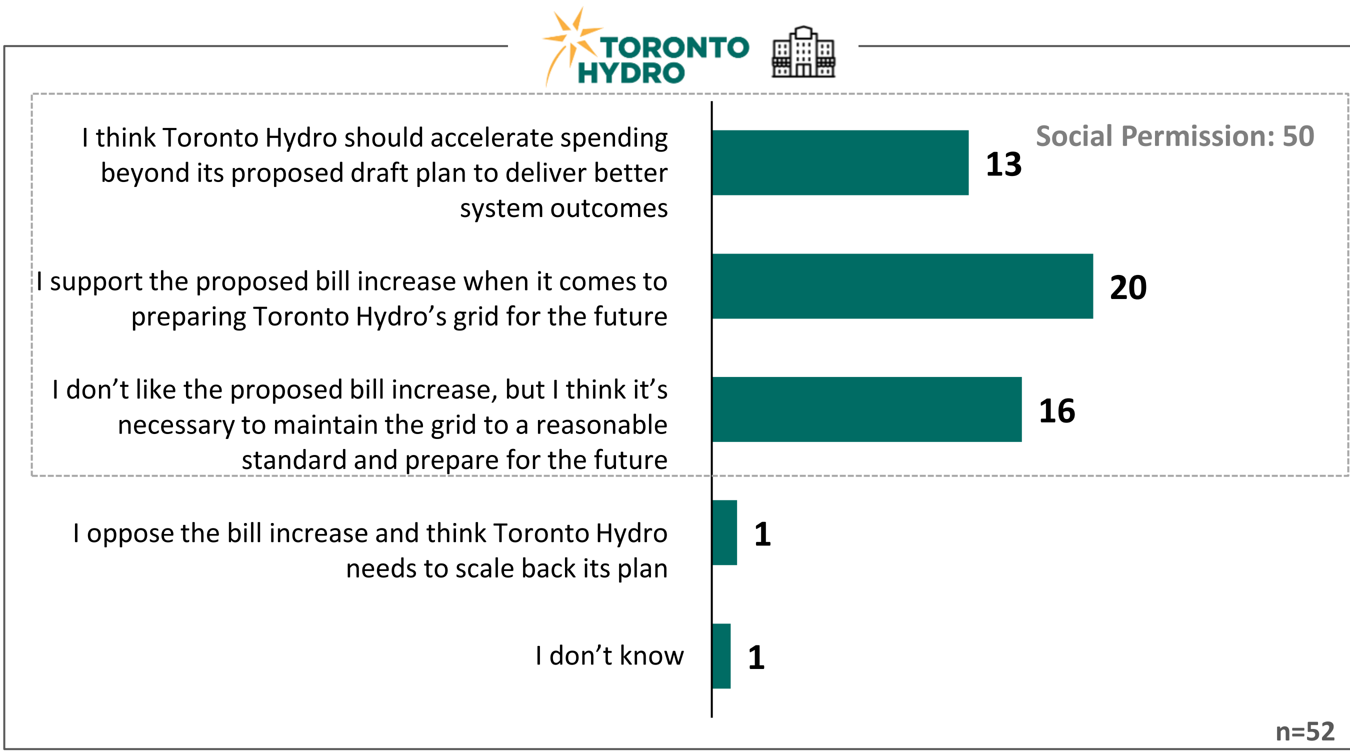
Online Workbook

Social Permission

Q

Toronto Hydro has calculated an overall cost for its draft plan. While the plan may change based on feedback from the earlier questions in this survey, Toronto Hydro would like to know how you feel about the total rate impact of its current draft plan.

Considering what you have learned about Toronto Hydro's 2025–2029 draft plan and that this may result in a **[GS 1,000-4,999kW: $7,480.60 / Large Use $39,221.50]** **increase** in the distribution portion of your monthly electricity bill by 2029, which of the following best represents your point of view?



	Sector		
	MASH	Commercial/MURB	Industrial
Accelerate spending	2	9	2
Support proposed bill	3	9	8
Necessary to maintain grid	3	8	5
Oppose the bill increase	-	1	-
I don't know	-	-	1
Social Permission	**8**	**26**	**15**

Online Workbook

Final Comments for the Draft Plan & Proposed Rate Increase

Key Accounts

Q Do you have any final comments regarding Toronto Hydro's draft plan for 2025–2029 and the proposed rate increase?

Response	Count
Prevent outages, stable power, system reliability	3
Find efficiencies, cut wasteful spending, lower salaries	1
Should be funded by tax dollars/government	1
Prioritize renewables, solar/wind, and electric vehicles	1
Modernize, be proactive, invest for the long term	1
Support the increase (general)	1
Other	2
No response	42

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Key Account Customers

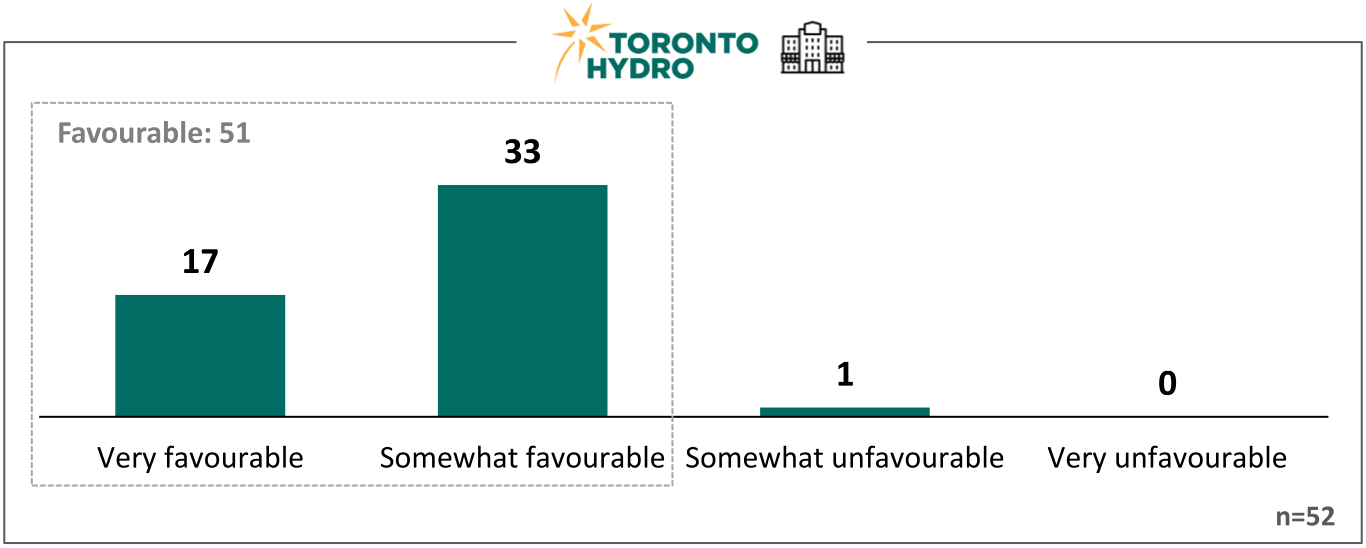
Online Workbook Diagnostics

Section 12.2

Online Workbook

Workbook Impression

Q Overall, what is your impression of the survey you just completed?



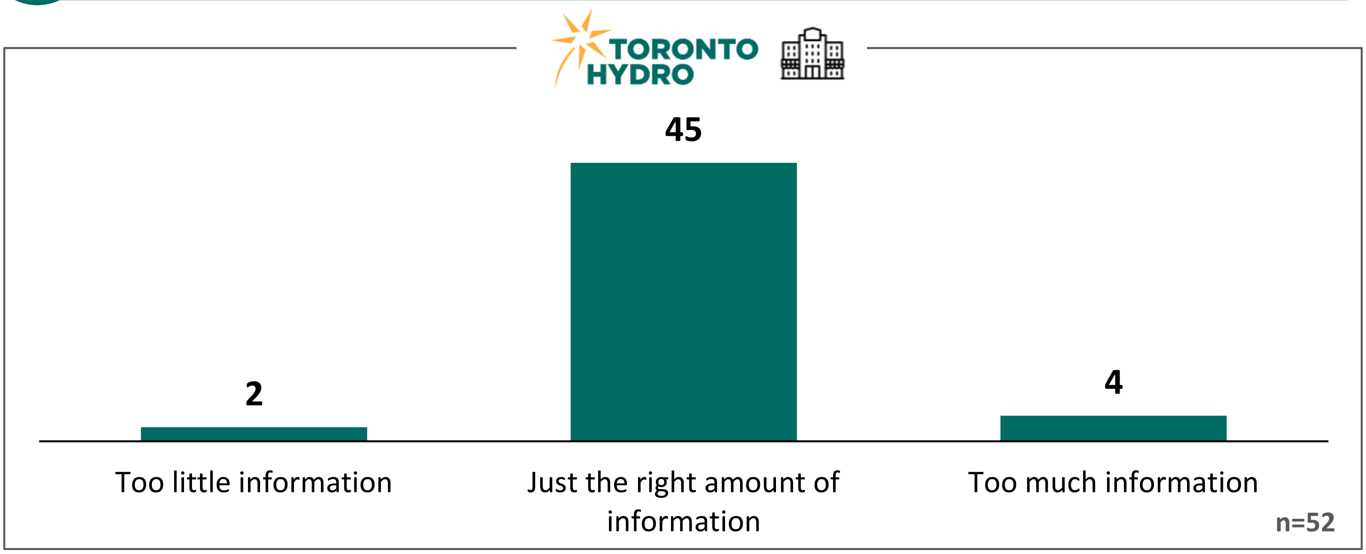
	Sector		
	MASH	Commercial/MURB	Industrial
Very favourable	4	11	3
Somewhat favourable	5	16	13
Somewhat unfavourable	-	1	-
Very unfavourable	-	-	-
Favourable (Very + Somewhat)	**8**	**26**	**16**
Unfavourable (Very + Somewhat)	**-**	**1**	**-**

Online Workbook

Amount of Information

Key Accounts

Q In this survey, do you feel that Toronto Hydro provided too much information, not enough, or just the right amount?



	Sector		
	MASH	Commercial/MURB	Industrial
Too little information	-	1	1
Just the right amount of information	8	24	14
Too much information	1	3	1

Online Workbook

Content Missing from Engagement

Q Was there any content missing that you would have liked to have seen included in this survey?

Response	Count
Operational efficiencies (salaries, spending) and accountability	6
How this benefits customers	1
Other	1
No response	44

Q Is there anything that you would still like answered?

Response	Count
Operational efficiencies (salaries, spending) and accountability	1
Reliability (e.g. Plans for underground cables)	1
More information on the costs, breakdown of either the plan or bill	1
No response	48

Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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CONFIDENTIAL

APPENDIX 13

Customer Engagement Workbook

Residential Version

November 2, 2023

STRICTLY CONFIDENTIAL

Report Navigation

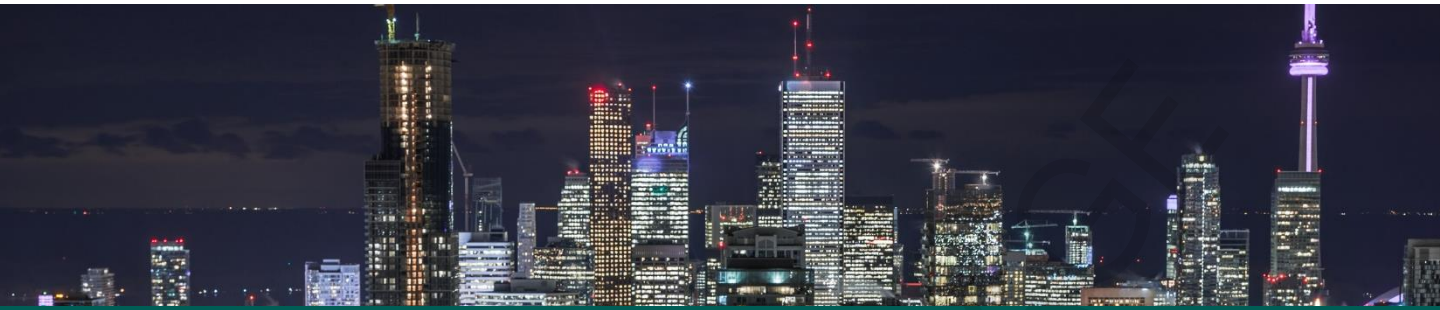
APPENDICIES

PHASE I

PHASE II

Welcome to Toronto Hydro's customer feedback survey!

Toronto Hydro needs your input to find the right balance between the services you receive and the price you pay.



Land Acknowledgement: Toronto Hydro's grid is located on the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples.

The purpose of this survey is to get your feedback on the draft 2025–2029 business plan. Your feedback will help Toronto Hydro align this plan with what you need and want.

1. Your electricity rates pay for this plan, so your views must be considered.
2. You don't need to be an electricity expert to participate. The survey is focused on basic choices and provides the background information you need to answer the questions.
3. Recognizing that people absorb information in different ways, Toronto Hydro and its research partner have designed this survey to include diagrams, charts, images and videos to help explain Toronto Hydro's draft plan and what it means for you. If you prefer to skip the videos, the content is also explained in the body of the survey.
4. Depending on how much feedback you wish to provide and the number of videos watched, this survey should take approximately **20-30 minutes** to complete. If you need to pause and return later to finish the survey, your completed answers will be saved.
5. Some of the survey content may not display correctly on a mobile browser. It is strongly recommended that you complete this workbook on a desktop or laptop computer.

Those who complete the survey will be invited to enter a draw to win one of 10 "*free electricity for a year*" prizes!

All individual responses will be kept confidential.
Innovative Research Group (www.innovativeresearch.ca), an independent research company, has been hired by Toronto Hydro to gather your feedback, while protecting your confidentiality. Your individual answers will not be shared with Toronto Hydro in any identifiable way.

INNOVATIVE RESEARCH GROUP

WORKBOOK PAGE

What is this customer engagement about?

The goal of this engagement is to share Toronto Hydro's draft five-year business plan for the future of the city's electrical grid and collect your feedback. This will help Toronto Hydro align its plans with your needs and preferences.

Every five years, Toronto Hydro is required to submit a plan for its proposed prices (rates) and spending to the Ontario Energy Board (OEB) for approval.

- **In 2021 and 2022, thousands of its customers told Toronto Hydro about what they need and want** to help Toronto Hydro prepare the draft 2025–2029 business plan.
- **Toronto Hydro is now looking for your input on this draft business plan** to align its investments and spending decisions with what matters to you as its customers.
- **Later this year, Toronto Hydro will present its updated business plan to the independent regulator**, the OEB. Toronto Hydro is accountable to the OEB for considering your feedback.

How will this customer engagement work?

1. The workbook explains what Toronto Hydro does and summarizes the key planning considerations that Toronto Hydro's draft plan needs to address.
2. The workbook explains how much of your electricity bill goes to Toronto Hydro, how that money is spent, and the impact of the draft plan on your 2025–2029 prices.
3. The workbook asks for your input on seven key choices that will affect the services you receive and the price you pay from 2025–2029.

Once you have finished giving feedback on the key choices, **you will have an opportunity to review and change your responses** until you feel you have found the right balance.

Want to know more about Toronto Hydro's customer engagement process?
See the next page for more.

Do you feel that the purpose of Toronto Hydro's customer engagement is clear?

- ☐ Very clear
- ☐ Somewhat clear
- ☐ Not clear at all

WORKBOOK PAGE

How will your feedback impact Toronto Hydro's plan and prices?

Toronto Hydro has a five-step approach to customer feedback.

We are here

✓ 1. Identify Customer Needs, Preferences and Priorities

In 2022, Toronto Hydro asked many types of customers from across the city about their needs and priorities for electricity distribution service.

✓ 2. Use Customer Feedback to Guide Development of Draft Plan

Toronto Hydro planners were given summaries of the key findings from the initial customer engagement to consider as they began building their plans.

3. Collect Customer Feedback on Draft Plan

Toronto Hydro is returning to customers to get feedback on the draft plan and ask customers how the draft plan could better meet their needs and preferences.

4. Use Customer Feedback to Finalize the Plan

Toronto Hydro will re-examine and make appropriate changes to the plan based on the feedback provided by customers in this engagement.

5. Submit the Plan to the Ontario Energy Board (OEB)

Toronto Hydro will file the plan with the OEB along with a report summarizing the results of this engagement. The OEB, consumer advocates and other interested groups will examine the plan in an open and transparent public process known as a rate application.

WORKBOOK PAGE

Electricity 101

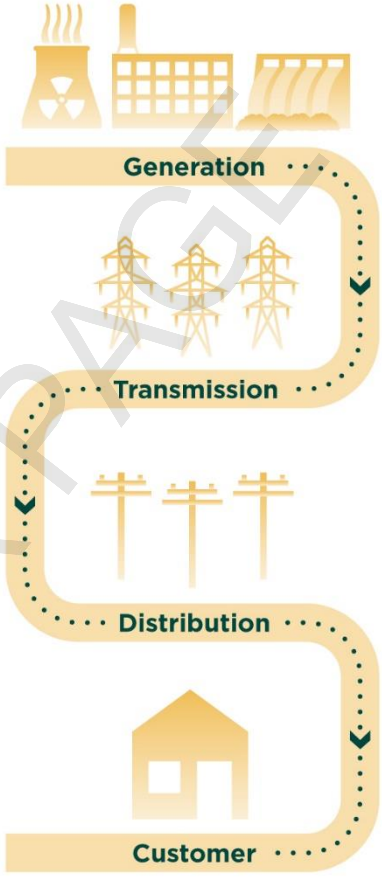
Toronto Hydro's role in Ontario's electricity system

Ontario's electricity system is made up of three parts: **generation**, **transmission** and **distribution**.

Generation

How electricity is made

About half of the electricity used in Ontario comes from nuclear power. The rest comes from a mix of hydroelectric, natural gas, wind and solar sources. Ontario Power Generation, a government-owned company, generates almost half of Ontario's electricity. The other half comes from other generators contracted by the grid operator.



Transmission

How electricity travels across Ontario

Once electricity is made, it must be sent to urban and rural areas across the province. This happens by way of high voltage transmission lines that serve as highways for electricity. Ontario has approximately 30,000 kilometers of transmission lines, mostly owned and operated by Hydro One.

WORKBOOK PAGE

Distribution

How electricity is delivered to you

Toronto Hydro <u>is</u> responsible for the last step of the journey: distributing electricity locally to end-use customers.

- Toronto Hydro does <u>not</u> generate or transmit electricity — it owns and operates the local electricity system made up of approximately 183,620 poles, 61,300 distribution transformers, 17,060 primary switches, 15,393 kilometers of overhead wires and 13,765 kilometers of underground cables.
- Toronto Hydro is wholly owned by the City of Toronto, but it does <u>not</u> receive taxpayer money — it is entirely funded by the distribution rates that you pay on your electricity bill.
- Toronto Hydro provides power to roughly 2.8 million people across the city of Toronto.

Before this engagement, how familiar were you with the various parts of the electricity system, how they work together and for which services Toronto Hydro is responsible?

☐ Very familiar
☐ Somewhat familiar
☐ Not familiar at all
☐ Don't know

Toronto Hydro's Draft Plan

Planning Considerations

In preparing its plan, Toronto Hydro must consider many existing and emerging challenges of delivering safe, reliable and clean electricity at a reasonable price.

To learn more about what Toronto Hydro must consider in preparing its draft plan, see the next two pages for more.

Key challenges that Toronto Hydro's 2025–2029 draft plan addresses:

- **Keeping prices reasonable**
- **Responding to rising costs**
- **Powering a growing urban city**
- **Fixing and replacing equipment in poor condition**
- **Reducing emissions from its own operations**
- **Keeping up with the way customers use electricity**
- **Responding to extreme weather and cyber security attacks**
- **Protecting public and employee safety**

WORKBOOK PAGE

Toronto Hydro's Draft Plan

Planning Considerations

In preparing its plan, Toronto Hydro must consider many existing and emerging challenges of delivering safe, reliable and clean electricity at a fair price.

Key challenges that Toronto Hydro's 2025–2029 draft plan addresses:

Keeping prices reasonable

- Many customers are concerned about the rising cost of living.
- Toronto Hydro must find the right balance between the investment needs of the local grid and the financial needs of its customers.

Responding to rising costs

- Like many companies, Toronto Hydro faces rising costs in purchasing equipment for the grid and doing construction work in the city.
- For example, from 2021 to 2022, the cost of buying electrical equipment increased by 9.9% while the cost of non-residential construction in the city of Toronto rose by 15.6%.

Powering a growing urban city

- Toronto is not just the largest city in Canada and an engine of the Canadian economy, it is also one of the fastest growing cities in North America.
- As the city continues to grow, the grid needs to be ready to power new condo towers, residential communities and businesses.

Fixing and replacing equipment in poor condition

- Much of Toronto Hydro's grid was installed in the 1950s and 1960s and needs to be replaced or upgraded.
- To keep the grid safe and reliable now and in the future, Toronto Hydro monitors the condition of its grid and uses this information to upgrade the equipment most at risk.

Reducing emissions from its own operations

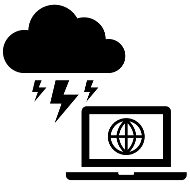
- Toronto Hydro is committed to decarbonizing the company's footprint by 2040. To meet this goal, it must invest in reducing emissions from its vehicles and work centres.
- Toronto Hydro is expected to reduce its emissions by switching from oil and natural gas to clean electricity for powering its own operations.

Keeping up with the way customers use electricity

- Customers are using more electricity for their day-to-day energy needs, such as for transportation and electric heat pumps for home heating. They are also choosing new technologies such as solar panels and battery storage to manage their electricity usage and sell electricity to the local grid.
- To ensure customers can connect new technologies to the grid safely and reliably, Toronto Hydro needs to upgrade its equipment and modernize its systems.

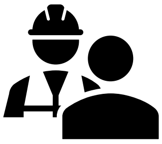
WORKBOOK PAGE

Planning Considerations (continued)



Responding to extreme weather and cyber security attacks

- Extreme weather such as high heat, high winds, flooding and ice storms is increasingly straining and damaging to electricity grids.
- Cybercrime is on the rise across Canada. For example, Toronto Hydro is the target of around one million attempted cyber attacks each year, with attempts going over one million in 2022 (successfully deflected).
- Toronto Hydro needs to make the grid more resilient against extreme weather and cyber security attacks that could compromise reliability and put customers at risk.



Protecting public and employee safety

- Toronto Hydro and its customers have a strong safety record, but electricity is dangerous and safety cannot be taken for granted.
- As homes and businesses add new technologies that increase the amount of electricity flowing around us, Toronto Hydro must ensure that the grid remains safe for its employees and the public.

WORKBOOK PAGE

How much of my electricity bill goes to Toronto Hydro?

Every item on your bill is required by provincial regulation.

- Toronto Hydro collects payment for the entire electricity system, but only keeps the distribution portion of the "**Delivery**" charge. This charge pays for both Toronto Hydro's **distribution** system and Hydro One's **transmission** system, as well as line losses (power that is lost when electricity travels across the wires).
- **About 30% of the electricity bill goes to Toronto Hydro** to pay for the local distribution grid. The **remaining 70%** of the bill goes to generation companies, transmission companies, the federal and provincial governments, and regulatory agencies.

Typical Residential Bill

Sample Toronto Hydro Monthly Bill
(based on consumption of 750 kWh as of Jan. 1, 2023)

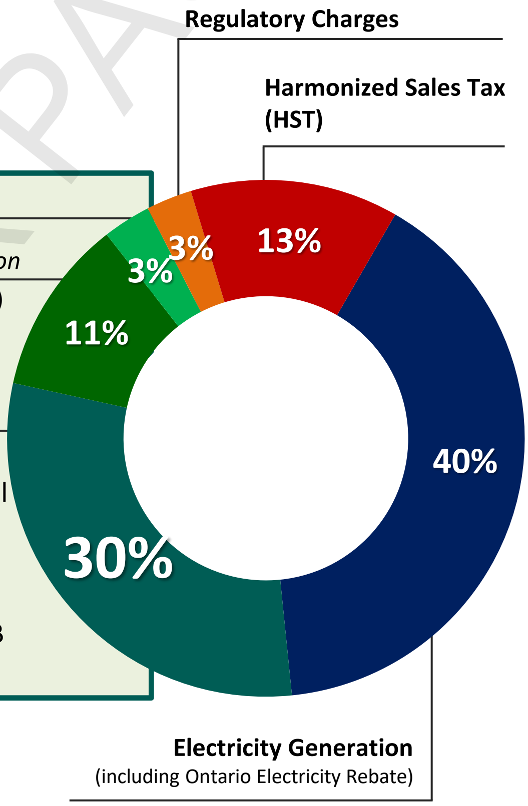
Account Number:
0000000000

Meter Number:
00000000

Your Electricity Charges	
Electricity	
On-Peak (highest price) @ 15.1 c/kWh	20.39
Mid-Peak (mid price) @ 10.2 c/kWh	13.77
Off-Peak (lowest price) @ 7.4 c/kWh	35.52
Delivery	60.05
Regulatory Charges	4.27
Total Electricity Charges	**$134.00**
HST	17.42
Ontario Electricity Rebate	(-$15.68)
Total Amount	**$135.74**

Delivery: *Line Losses*
$4.75
Delivery: *Transmission*
(varies based on usage)
$14.60

Delivery: *Distribution*
Toronto Hydro's part of the total bill is **$40.70**. This charge is the same for all residential customers per OEB requirements.



Note: For time of use Off-/Mid-/On-peak split 64%/18%/18% according to the OEB rate model. The Sample Bill is based on the OEB rates effective January 1, 2023.

Who holds Toronto Hydro accountable?

ONTARIO ENERGY BOARD

The **Ontario Energy Board (OEB)** is the public interest regulator responsible for setting electricity distribution rates (prices) and for protecting customers in Ontario.

The OEB holds Toronto Hydro accountable for:

- How it spends your money in current and future plans.
- Reporting on key outcomes (reliability) through an annual scorecard.
- Finding savings and efficiencies to absorb rising costs.

Want to know more about what Toronto Hydro has done to become more efficient? See the next page for more.

Before this customer engagement, how familiar were you with the amount of your electricity bill that went to Toronto Hydro?

☐ Very familiar
☐ Somewhat familiar
☐ Not familiar

WORKBOOK PAGE

What has Toronto Hydro done to become more efficient?

- Reduced the total number of facilities and gave back roughly $158 million to customers, resulting in a total credit of $104.66 on the average residential customer's bill from 2016 to 2021.
- Delivered approximately $10 million in reduced or avoided costs in this current 2020–2024 period by replacing outdated information systems with consolidated programs, enabling automation and lowering maintenance costs.
- Implemented new technology to automate crew scheduling, enabling Toronto Hydro to maximize crew working hours and respond to power outages quicker.

WORKBOOK PAGE

How does Toronto Hydro propose to spend the money?

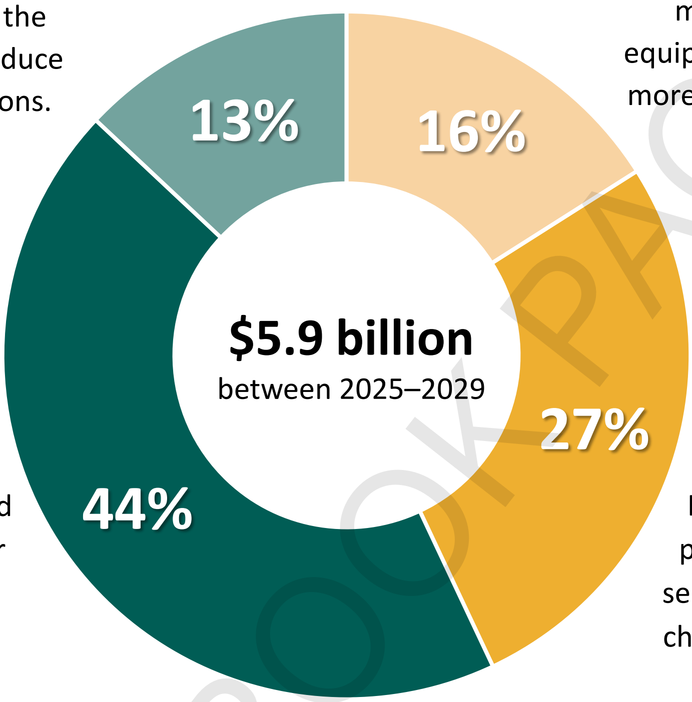
Toronto Hydro's five-year 2025–2029 draft plan is made up of four spending categories.

General Plant

Investments in vehicles, work centres and IT to keep the business running and reduce Toronto Hydro's emissions.

Modernization

Investments in technology to get more use out of existing equipment, and build a smarter, more efficient and reliable grid.



Sustainment

Investments to upkeep old equipment that is in poor condition and replace outdated equipment.

Growth

Investments in capacity to power the growing city and serve customers' growing and changing needs for electricity.

Want to know more about Toronto Hydro's current and future budgets? See the next page for more.

How much will Toronto Hydro's draft plan cost me?

At the end of the five-year plan (2029), the typical residential customer would see the distribution portion of their electricity bill increase by **$17.18**: from an estimated rate (price) of $42.36 in 2024 to a proposed rate (price) of **$59.54 by 2029.**

				Toronto Hydro's Portion	
	Year	Avg. Monthly Bill	Toronto Hydro Portion	Annual Increase (%)	Annual Increase ($)
	2023	$135.74	$40.70	n/a	n/a
	2024	$135.11	$42.36	4%	$1.66
Rate Period	**2025**	$139.55	$46.76	10%	$4.40
Rate Period	**2026**	$142.10	$49.28	5%	$2.52
Rate Period	**2027**	$145.26	$52.39	6%	$3.11
Rate Period	**2028**	$150.04	$57.11	9%	$4.72
Rate Period	**2029**	$152.51	$59.54	4%	$2.43
	5-yr impact		**$17.18**	**41%**	**$17.18**

Note: These estimated rate increases are preliminary and are subject to change based on customer feedback and other factors. A typical residential customer is assumed to use 750 kWh per month and enrolled under Time-of-use Regulated Price Plan. Bill projections assume that other aspects of the electricity bill that are outside of Toronto Hydro's control (commodity, transmission, government, regulatory fees) remain constant.

WORKBOOK PAGE

Toronto Hydro Background

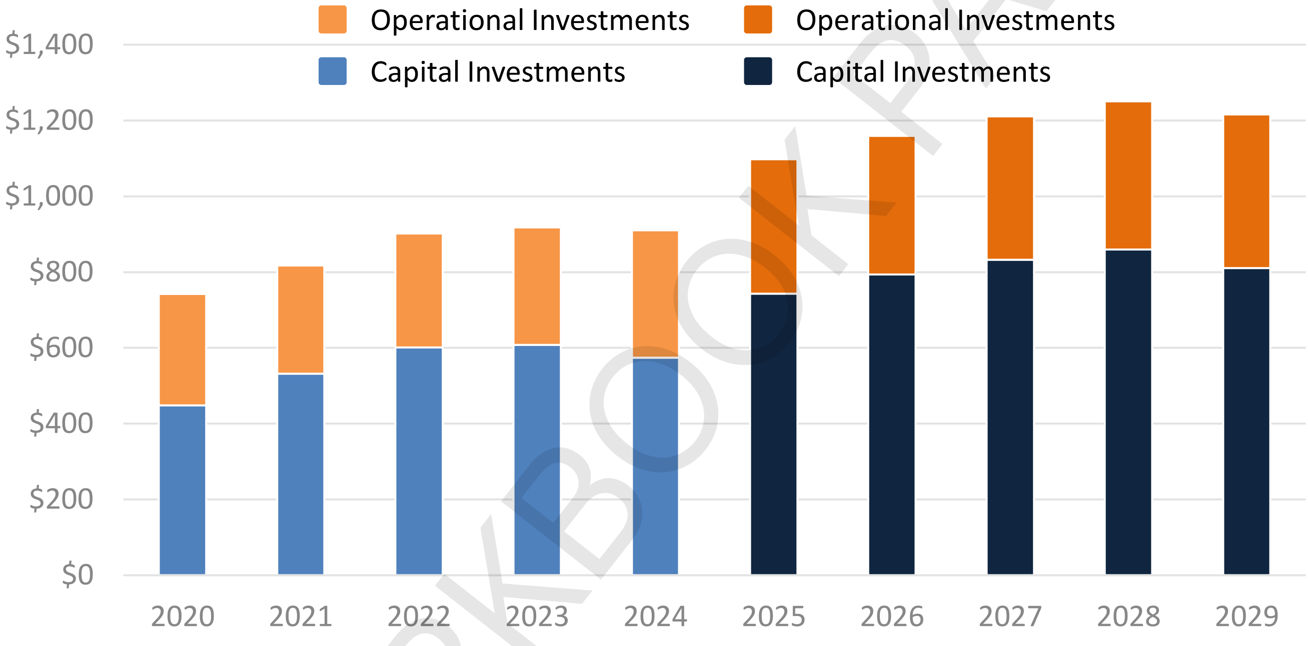
How much does it cost to run the local grid?

To run the local grid and serve customers, Toronto Hydro manages two budgets:

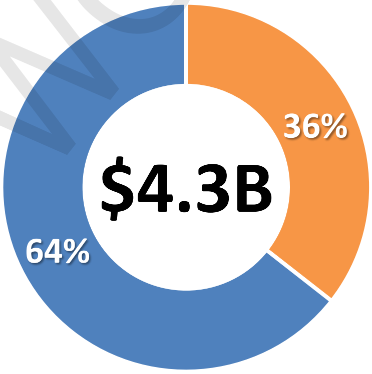
1. A **capital investment** budget which pays for the cost of buying and constructing physical infrastructure such as poles, wires, transformers, facilities, trucks and computers.

2. An **operational investment** budget which pays for maintenance and operation of the equipment, as well as the staff needed to manage the grid and serve customers daily.

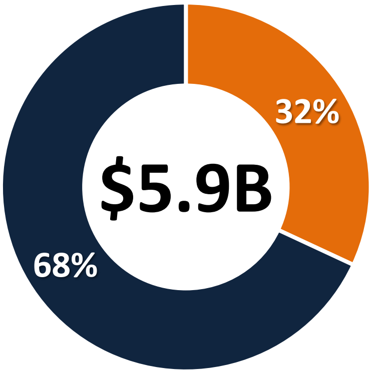
Current and Future Budgets per year ($ millions)



2020–2024
Current Budget
(OEB Approved Plan)



2025–2029
Future Budget
(Draft Plan)



The current five-year budget of **$4.3 billion** is based on the 2020–2024 plan approved by the OEB in a previous rate application. As mentioned earlier, this amount is funded by your 2020–2024 distribution rates.

The future five-year budget of **$5.9 billion** is based on the 2025–2029 draft plan presented in this customer feedback survey. The final budget for this next rate period will be adjusted to reflect customer feedback collected through this engagement and will be subject to extensive OEB review before rates are set for 2025–2029.

WORKBOOK PAGE

How does the survey work?

The next sections are about 7 key choices that Toronto Hydro needs to make to finalize its plan.

Each section provides some key background information. We encourage you to take the time to learn about your local electricity grid and where your money is going.

We also understand that life is busy. Many people find this information interesting — but if you would prefer to skip over the background information, you can jump right to the key choices.

How do I make choices?

Each choice has a summary of three options that Toronto Hydro considered:

- **Spend Less:** A minimum spending option that keeps prices lower and meets the basic performance requirements but may entail some trade-offs on key outcomes, such as reliability.
- **Toronto Hydro's Draft Plan:** An option currently in the draft plan which makes additional progress toward key outcomes but delays some important work.
- **Spend More:** A faster paced spending option that makes additional progress towards better outcomes while recognizing practical limits due to resources and construction issues.

In each option, there is a sliding scale that enables you to dial the draft plan up or down. While Toronto Hydro's technical experts can tell us the maximum and minimum amounts we can practically spend, the balance of how much Toronto Hydro spends on the spectrum is up to customers like you.

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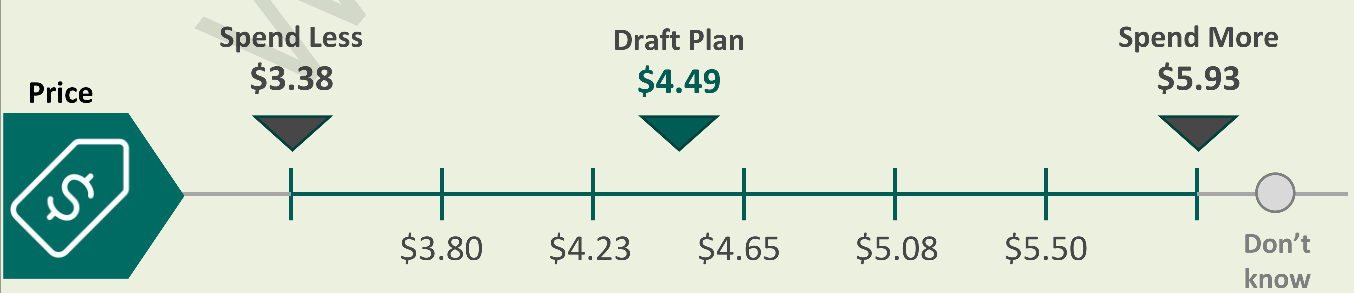
SAMPLE OPTIONALITY SLIDER QUESTION (data not recorded)

How much do you think Toronto Hydro should spend on this part of its draft plan?

Please write down the $ amount within the ranges on the slider in the blank fill.



$\_\_.\_\_$ Your selection.

Is it clear that you can enter the $ amount within the ranges on the slider to any amount you feel best reflects your personal view of the best balance between lower costs and faster improvements?

- ☐ Yes
- ☐ No

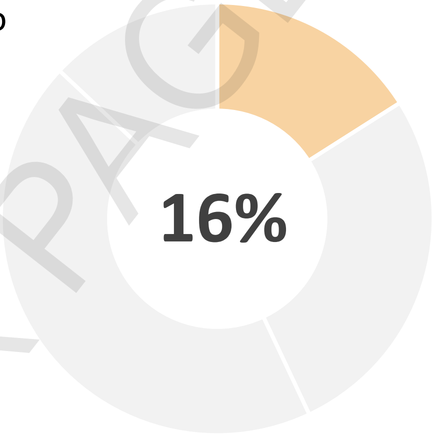
Draft Modernization Plan

Build a Smarter, More Efficient and Resilient Grid

What is this section about?

- This section explains how technology is changing the way customers use electricity and how Toronto Hydro operates and manages the grid to make it smarter, more efficient and resilient for customers.

  Want to learn more about how grid modernization benefits you? See the next page for more.



- **Toronto Hydro's draft modernization plan enables:**
  - Faster and cheaper power restoration
  - More efficient use of existing equipment
  - Customer choice to adopt new technologies
  - Resilience against weather and cyber attacks

- This spending category makes up **16% of the draft plan** and would add **$2.83** on the average residential customer's monthly bill by 2029.

WORKBOOK PAGE

Modernization Plan

Building a Smarter, more Efficient and Reliable Grid

Toronto Hydro's Modernization Plan has four main objectives:

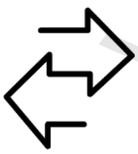
WORKBOOK PAGE

Faster and cheaper power restoration

- Through automation, the smart grid can achieve self-healing capabilities. This means that the distribution grid on your street will be able to locate outages and restore power automatically.
- The smart grid enables Toronto Hydro to reduce the number and length of outages customers experience. It also reduces manual costs (trucks and crews) of responding to power outage events.

More efficient use of existing equipment

- As customers use more electricity, some equipment will reach its limits. Sensors and meters detect when and where these limits are approaching, enabling Toronto Hydro to make better decisions.
- The smart grid enables Toronto Hydro to get more use out of the existing equipment so that it can serve a greater customer need for electricity without having to build as much new infrastructure.



Customer choice to adopt new technologies

- Sensors, switches and software enable Toronto Hydro to monitor and control the flow of electricity so that customers can choose technologies to produce, store and sell power to the grid.
- The smart grid is designed to allow safe and reliable two-way power flow — from the grid to the customers and from customers to the grid. This system can reduce costs and makes the local grid more resilient to outages.

Resilience against weather and cyber attacks

- Cyber attacks are increasing and getting more complex. Toronto Hydro must be prepared to respond to these threats to maintain reliable service and protect customer information.
- In addition to being able to restore power quicker, the smart grid can sense when environmental conditions like flooding pose a risk. This enables grid operators to strengthen the grid.

Modernization: Changing Technology, Changing Needs

For more than 100 years, things changed relatively slowly in terms of grid technology. Electricity was generated in large power stations and transmitted from around the province to Toronto Hydro's grid, and ultimately to homes and businesses. That is all changing, and because of technological advancement, the pace of change could be fast.

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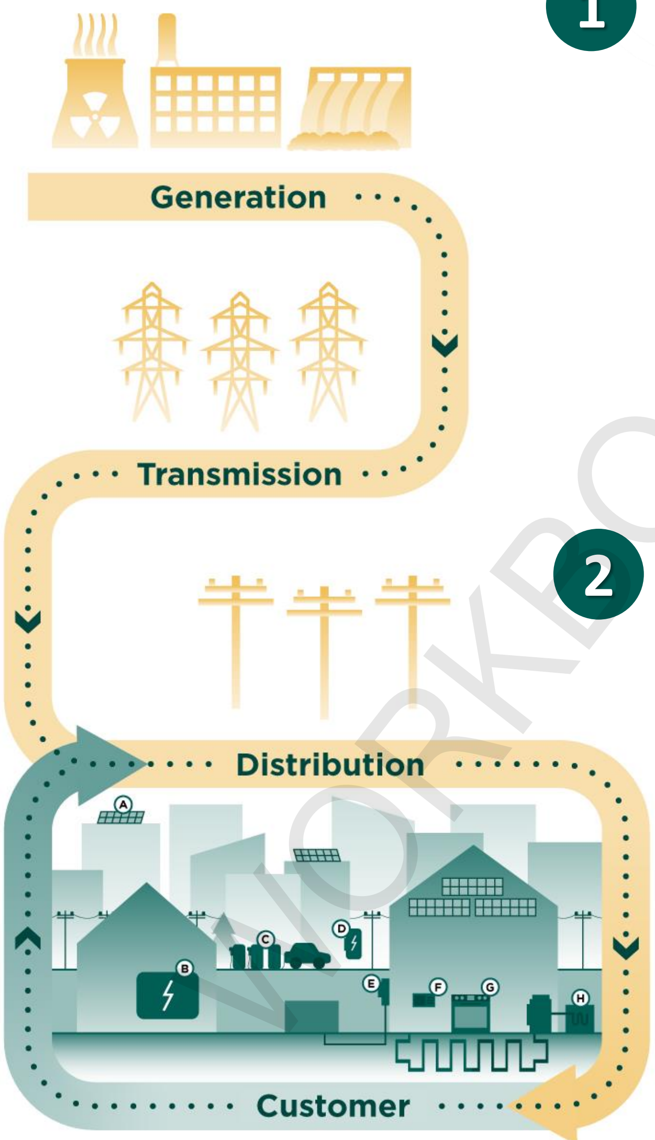
Toronto Hydro's 2025–2029 plan is shaped by two key changes in technology:



A. Solar panel
B. Battery storage
C. Public electric vehicle charging station
D. On-site backup generation
E. Smart meter
F. Home energy manager
G. Energy-efficient appliances
H. Heat pump

1. **Technologies that change how customers use electricity.** These include:
   - Electricity products like electric vehicles, heat pumps and electric stoves that enable customers to use less fossil fuels (oil and gas), which contribute to climate change.
   - Technologies like solar panels and battery energy storage that allow customers to produce and manage their electricity as well as sell it back onto the grid.
2. **Technologies that change how Toronto Hydro operates the grid**. These key changes are:
   - The grid must shift from a **one-way system** that only sends electricity to customers to a **two-way system** that allows customers to generate and sell electricity to the grid.
   - **Smart grid technology like sensors and automation** enables Toronto Hydro to monitor key equipment to prevent outages and get better use out of existing equipment. When outages do occur, this technology can re-route the grid to restore power much more quickly and at a lower cost than today.

How much electricity does it take to charge an Electric Vehicle (EV)?

Did you know that when an EV is charging it can use as much electricity as two average homes? If everyone in a neighbourhood came home from work or school and started charging their EVs at the same time, the electricity demand could overload the grid.

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Modernization Plan

16%

Making Choices: Modernization

By 2029, Toronto Hydro's draft **modernization plan** would cost the typical residential customer **$2.83** more per month on their monthly electricity bill. Toronto Hydro could spend more to increase the pace of modernizing the grid to get better reliability sooner, or it could spend less and slow down the progress.

	Spend Less	Draft Plan	Spend More
Reliability	Being ready to automate the grid by 2035 means that better reliability won't happen until the end of the next decade or beyond.	Being ready to automate the grid by 2030 means that better reliability will happen in the earlier part of the next decade.	Faster progress towards grid automation means better reliability earlier and improved reliability for critical loads located in the downtown area.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	Same as draft plan.
Efficiency	It will take longer for the grid to become more efficient. This may lead to higher costs in the next decade.	The grid will become more efficient in the next decade, which will help reduce costs.	Same as draft plan.

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Choice 1 of 7:

Price

Spend Less **$2.03** | Draft Plan **$2.83** | Spend More **$3.94**

$2.35 | $2.66 | $2.98 | $3.30 | $3.62 | Don't know

$__.__ Your selection.

How much do you think Toronto Hydro should spend on its modernization plan?

Please write down the $ amount within the ranges on the slider in the blank fill.

Do you have additional feedback on Toronto Hydro's draft modernization plan?

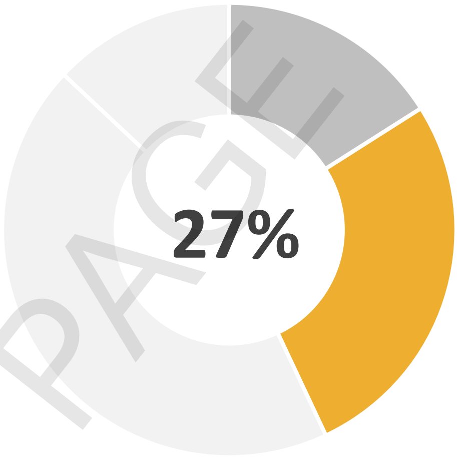
(Response optional)

Confirm selection above to continue.

Draft Growth Plan

Increase Capacity to Serve Customers

What is this section about?



- This section explains how fast the city of Toronto is growing and what it takes for the grid to serve customers' needs for more electricity.

- Toronto Hydro's draft growth plan is about increasing grid capacity to serve customers reliably now and in the future.

- This spending category makes up **27% of the draft plan** and would add **$4.62** on the average residential customer's monthly bill by 2029.

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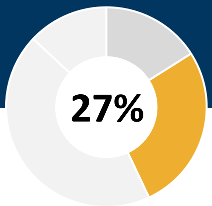

Growing City, Growing Needs

1 Toronto is growing, fast.

Toronto is one of the fastest growing cities in North America. A growing city means that we need a bigger local grid so that homes and businesses can get the power they need, when they need it.

Population Growth

Toronto will add approximately 500,000 more people this decade. To put this into context, Toronto is growing five times faster than Los Angeles.

230 Cranes
Toronto has led the crane count in North America since 2015.

2,114 Projects
including residential and non-residential in development in the city of Toronto.

+$1B in Construction
work planned for city infrastructure in Toronto annually (transportation and water).

2 Individual customers will use more electricity than ever before.

The average customer will use more electricity in the next 10–15 years, as governments encourage businesses and communities to use less fossil fuels (oil and gas) to address climate change. Here are the key government policies that drive the need for more electricity in Toronto:

2026
The Government of Canada may require 20% of all new car sales to be zero emission and is working towards a target of 60% by 2030.

2028
The City of Toronto Green Building Standard requires all new mid- and high-rise buildings to be near zero GHG emissions.

2030
The carbon tax may increase 161% by 2030 so customers use less oil and gas, and switch to clean electricity for cooking, heating and transportation.

23% **Forecasted increase in customers' need for electricity by the year 2030.**

Conservation and energy efficiency has helped manage electricity use over the past 20 years and will continue to play an important role in the future. But conservation alone is not enough. We need a bigger grid to serve customers in the long term.

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Growing City, Growing Need (continued)

When you think about all your energy bills, has your household ever considered shifting from one energy source to another to save money or reduce your impact on the environment?

For example, changing from a natural gas-fuelled furnace to an electric heat pump, or from a gas-fuelled vehicle to an electric vehicle?

- ☐ Yes, I have done it
- ☐ I'm actively taking steps in this direction
- ☐ I'm thinking about it
- ☐ I have never thought about it
- ☐ I have thought about it, but didn't end up switching
- ☐ Other [please specify:______________________________]
- ☐ Don't know

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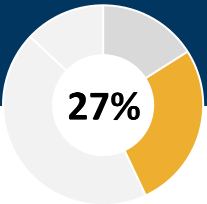


Building a bigger grid takes time

It’s easy to say Toronto needs more electricity, but meeting this need requires Toronto Hydro to make major investments in the grid, including:

Expand Transformer Stations

Bring more power into the city from the provincial grid to serve growing communities along the new transit corridors (Eglinton LRT, Finch LRT, Ontario Line) and the redevelopment of areas like Downsview Park and the Portlands.

Upgrade and Reconfigure the Grid

Make more space on the grid to enable customers to plug in. Upgrade equipment like cables and transformers and reconfigure how the existing system serves customers to make more space on the grid to accommodate new services like electric vehicle charging stations and solar panels.

Major Infrastructure Developments

Connect major projects like the Finch Light Rail Transit system and the Ontario Line, and relocate Toronto Hydro’s grid equipment to enable these and other major infrastructure developments to be constructed in the city.

This work cannot happen quickly. Toronto is densely populated and congested. **Building new power lines and stations takes years of planning and construction**. There are also equipment and resource constraints that limit how quickly Toronto Hydro can build a bigger grid.

Managing Uncertainty

Toronto Hydro develops its forecast from information such as building permits and projected electric vehicle sales. However, customer adoption of new technology is uncertain due to:

Supply chain issues such as equipment and resource shortages can affect the availability of customer technologies.

Technological advancements can lead to fast cost reductions. For example, the price of lithium ion batteries (EVs) decreased by 79% from 2013 to 2022.

Government policies such as rebates for electric vehicles and solar panels drive customers and suppliers to make certain choices.

If Toronto Hydro invests too quickly to build a bigger grid, it means customers’ rates will go up to pay for equipment that will not be used for some time. On the other hand, if it doesn’t do enough to expand the grid for higher use of electricity, customers could experience less reliability (brownouts) and delays when they want to connect to the grid or plug in new technologies. Toronto Hydro needs your input on the pace for these investments.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Growth Plan

27%

Making Choices: **Growth**

By 2029, Toronto Hydro's draft **growth plan** would cost the typical residential customer **$4.62** more per month on their monthly electricity bill. Toronto Hydro could spend more to better prepare the grid to serve customers' changing needs, or could spend less and wait and see if customers adopt new technologies over the 2025–2029 plan.

	Spend Less	Draft Plan	Spend More
Reliability	May lead to less reliability for customers in high-growth neighbourhoods. Increases reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Manages reliability risk for the next decade.	Maintains reliability for customers in high-growth neighbourhoods. Improves reliability risk for the next decade.
Customer Service	May reduce service levels (longer waits and higher costs) for some customers connecting new services. May reduce customer choice for new technologies.	Maintains service levels for customers connecting new services to the grid. Enables customer choice for new technologies such as solar panels.	May improve service levels (shorter waits and lower costs) for some customers connecting new services to the grid. Improves customer choice for new technologies.
Efficiency	May lead to less efficient work if Toronto Hydro has to build a bigger grid reactively to serve customers.	Supports the ability to serve customers efficiently in the five-year plan based on the projected demand.	Supports the ability to serve customers efficiently in the five-year plan and beyond in the next decade.

WORKBOOK PAGE

Choice 2 of 7:

Price

Spend Less **$3.40** | Draft Plan **$4.62** | Spend More **$5.81**

$3.80 | $4.20 | $4.60 | $5.00 | $5.41 | Don't know

$__.__ Your selection.

How much do you think Toronto Hydro should spend on its growth plan?

Please write down the $ amount within the ranges on the slider in the blank fill.

Do you have additional feedback on Toronto Hydro's draft growth plan?

(Response optional)

Confirm selection above to continue.

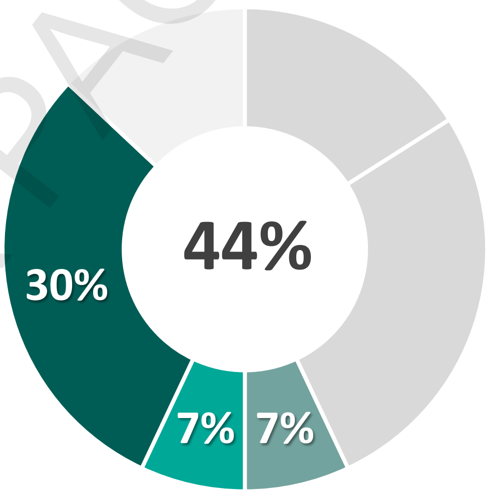
Draft Sustainment Plan

Replacing and Updating Equipment

What is this section about?

- This section is about upkeeping the grid to manage reliability and maintain safe and efficient operations.
- Toronto Hydro's draft sustainment plan section seeks your input in three areas:

1. Managing equipment in very poor condition with a high risk of failure.
2. Pacing the upkeep of equipment near the end of its expected life.
3. Standardizing outdated equipment.



- This spending category makes up **44% of the draft plan** and would add **$7.52** on the average residential customer's monthly bill by 2029.

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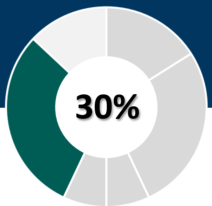
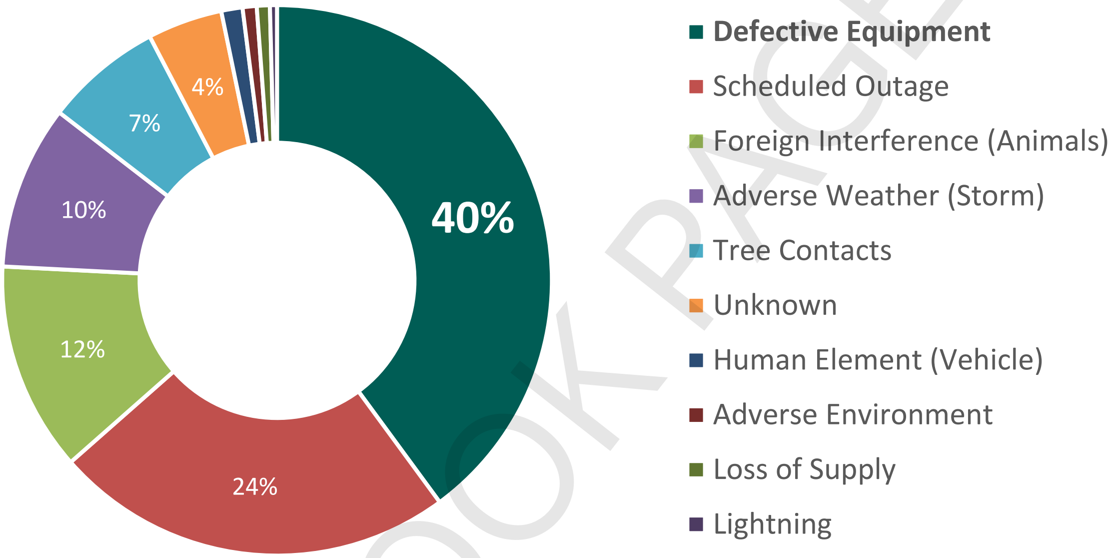


1 Reliability: Managing Equipment Failure Risk

While many power outages are caused by external events such as weather and falling trees, roughly **40%** of customer outages are caused by equipment failure. This is the largest single cause of outages, and customers look to Toronto Hydro to manage this risk.

Customer Outage Duration (Hours) by Cause 2018-2022



Toronto Hydro manages failure risk by:

- Inspecting equipment condition regularly, so that maintenance or replacement can be done before the equipment fails.
- Replacing and repairing equipment that is in bad condition or performing poorly. This includes replacing lines with a high number of outages or replacing transformers with visible signs of wear and tear such as rust.

Since 2014, Toronto Hydro's work to upkeep the grid has delivered a 13% reduction in the average number of outages experienced by customers and a 25% reduction in the length of those outages. Toronto Hydro's draft plan is to maintain these reliability results for customers.

Want to learn more about grid reliability and what causes power outages? See the next page for more.

What type of work is Toronto Hydro doing to manage equipment failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to prevent increased outages due to equipment failure.

Replacing Direct-Buried Cable

In parts of the grid that were built a long time ago, cables are laid directly in underground trenches without any protective barrier. **Underground equipment failures contribute to 57% of defective equipment failures, the large majority of which (75%) are due to cables.** Toronto Hydro's draft plan intends to replace 182 kilometers of direct buried cables by 2029 to manage the risk of power outages caused by this equipment.

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System reliability

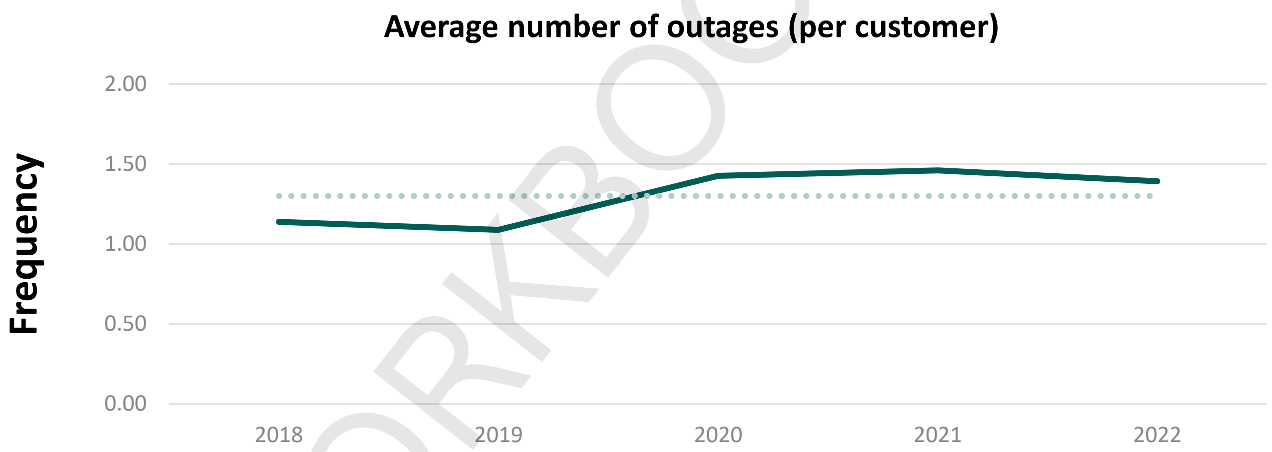
In order to provide feedback on Toronto Hydro's plans, it's important to understand how the distribution system has performed in the past, as well as what's expected in the future.

A core objective of Toronto Hydro's plan is to maintain current levels of reliability over the 2025-2029 plan period, while making foundational technology investments to reduce the length of power outages in the long-term.

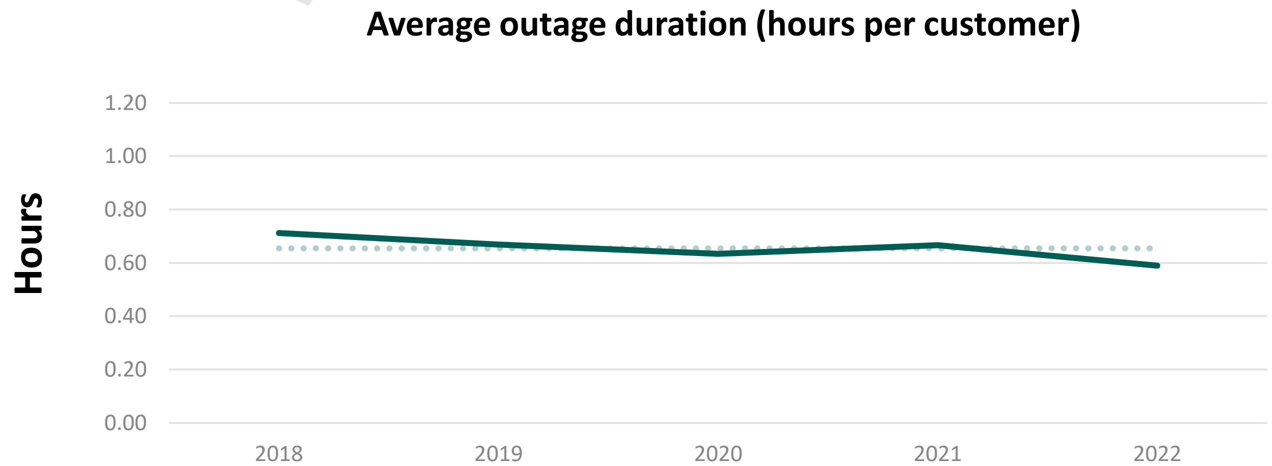
Toronto Hydro recognizes that power interruptions are inconvenient for residential customers and can be very costly for commercial and industrial customers.

Toronto Hydro tracks both the average number of power outages per customer and how long those interruptions last.

Between 2018 and 2022, the typical Toronto Hydro customer has experienced about two outages per year (*or 1.3 outages per customer to be exact*).



Over the same period, the average **duration** of an outage has been about 0.62 hours. Meaning, when the power does go out, Toronto Hydro is typically able to restore power in about 35 minutes.



It's important to keep in mind that these are system averages, and that your actual experience may be different. Some customers connected to newer lines may not experience any outages, while others are experiencing more than the average number of outages each year.

WORKBOOK PAGE

What is most likely to cause an outage?

Although both the number and length of outages have decreased compared to the previous five-year average, equipment failure remains the top cause of outages within Toronto Hydro's control.

That said, in 2022, severe weather presented a unique set of challenges for Toronto Hydro's distribution system.

Causes of Unscheduled Power Outages (five-year average: 2018 to 2022)

12%

Animal Contact: Outages caused by animals such as racoons, squirrels and birds coming in contact with overhead powerlines or transformers.

40%

Equipment Failure: Unscheduled power outages from equipment failure usually occur with distribution equipment that's beyond or approaching the end of their expected useful lives.

10%

Weather-Related Events: Adverse weather such as heavy rain, lightning strikes, ice, snow, wind, extreme temperatures, and freezing rain can disrupt the distribution system.

14%

Other: Includes tree contact (7%) and human interference (1%), such as construction workers accidentally cutting powerlines or motor vehicle accidents involving contact with distribution equipment. 4% of outages are unknown, but most are likely caused by animal contact.

Note: *statistics do not include loss of supply from Hydro One.*

WORKBOOK PAGE

Over the past 12 months, have you experienced any power outages at your home which lasted longer than one minute?

- ☐ No outages
- ☐ 1 outage
- ☐ 2 outages
- ☐ 3 outages
- ☐ 4 outages or more
- ☐ Don’t know

WORKBOOK PAGE

Making Choices: Managing Equipment Failure Risk

By 2029, Toronto Hydro's draft plan to manage equipment failure risk would cost the typical residential customer **$5.20** more per month on their monthly electricity bill. Toronto Hydro could spend more to improve reliability, or it could spend less and take on more risk of outages.

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	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Reduces reliability compared to current levels. This means more power outages due to equipment failure.	Maintains reliability at current levels. This means holding steady on power outages due to equipment failure.	Improves reliability compared to current levels. This means less power outages due to equipment failure.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 3 of 7:

Price

Spend Less $3.53 | Draft Plan $5.20 | Spend More $6.50

$4.02 | $4.52 | $5.02 | $5.51 | $6.01 | Don't know

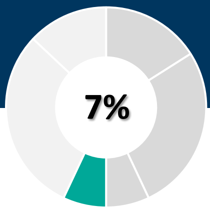
$__.__ Your selection.

How much do you think Toronto Hydro should spend on its grid reliability plan?
Please write down the $ amount within the ranges on the slider in the blank fill.

Do you have additional feedback on Toronto Hydro's draft grid reliability plan?
(Response optional)

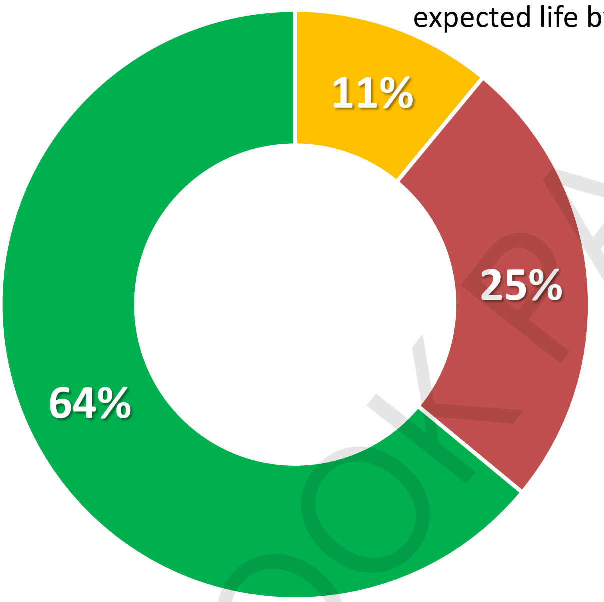
Confirm selection above to continue.

Confirm



2 Paced Upkeep of the Grid

About 25% of Toronto Hydro's equipment is operating past its expected life and an additional 11% is estimated to reach that point by 2030.



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In this part of the plan, the key question is whether Toronto Hydro should wait until there are clear signs of equipment failure risk (such as rust or oil leaks), or whether it should get ahead of the problem by replacing old equipment proactively.

If Toronto Hydro waits, it can keep prices lower in the short term. However, this could create a surge of work in future years that will spike prices in the 2030s. There is also a risk that Toronto Hydro will not be able to do the amount of work required to deal with this equipment in the future, which could lead to more outages and higher safety risks due to equipment failures.

i

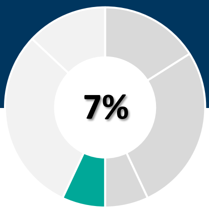
Want to learn more about Toronto Hydro's distribution grid?
See the next page fore more.

What type of work is Toronto Hydro doing to upkeep the grid?

Below is an example of key investments that Toronto Hydro needs to make in a paced way to upkeep the grid and prevent a surge of work to address equipment failure risk in the future.

Paced Replacement of Network Vaults

This equipment is located in underground vaults in the downtown area, which serves many critical customers, such as hospitals and financial institutions. A very large portion of this equipment is going to be in poor condition and past its expected life in the 2030-34 period. To manage this risk, Toronto Hydro's draft plan intends to replace network vaults in a paced manner.



Renewing and replacing infrastructure

Toronto Hydro's grid is a mix of overhead, underground, network and station infrastructure. It operates at three different voltages (27.6kV, 13.8kV, and 4.16kV) and includes approximately:

- 61,300 distribution transformers
- 17,060 primary switches
- 15,393 km of overhead wires
- 13,765 km of underground wires
- 37 transformer stations

WORKBOOK PAGE

Overhead Infrastructure

The overhead system is made up of poles, wires, transformers, switches and other equipment. They are easier to replace, repair and inspect.

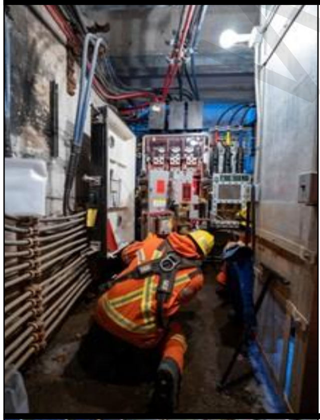
However, they are also more prone to foreign interference such as vehicles, trees, animals and weather-related outages.

This system consists of three different types of configurations two of which are outdated configurations from the 1950s and 1960s, making them more challenging to replace and restore particularly after a weather-related outage.

Underground Infrastructure

Toronto Hydro's underground system consists of cables, transformers, switches and civil infrastructures (like manholes). They can be placed either at ground level (green box above ground in your neighbourhood), underground, or inside building vaults (typical for multi-storey buildings). This system is made up of two different types of configurations where the downtown Toronto area consists of lead-covered cable, an outdated equipment with little to no suppliers.

While underground equipment is more resilient during weather-related events, it is more susceptible to flooding and at risk of faster deterioration due to moisture build-up.



Network Infrastructure

Toronto Hydro's network system, predominantly found in the downtown Toronto area, was installed in the early-to-mid 1900s to improve reliability (service levels) for critical loads (like financial institutions) and serves medium-sized loads in high-density areas, and areas with small and narrow sidewalks. It consists of interconnected low-voltage cables, vaults and network units.

While this system is better at handling normal equipment failures, proactive replacement and maintenance of this equipment are critical to avoid vault fires from occurring.

Station Infrastructure

Toronto Hydro's distribution stations receive the transmission supply from Hydro One at very high voltages. Station infrastructure consists of switchgear, power transformers, circuit breakers, remote terminal units (station computers) and battery systems. Toronto Hydro proactively replaces this equipment, as failure at the station level can cause widespread and lengthy power outages.

Making Choices: Paced Upkeep of the Grid

By 2029, Toronto Hydro's draft plan to ensure paced upkeep of the grid would cost the typical residential customer **$1.15** more on their monthly electricity bill. Toronto Hydro could spend more to get ahead of future equipment failure risk, or it could spend less and defer some of this work at the risk of managing more power outages due to equipment failure in the next decade.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of the grid by 2029.	Maintains the overall health (age and condition) of the grid by 2029.	Improves the overall health (age and condition) of the grid by 2029.
Reliability	Higher risk of power outages due to equipment failure in the next decade.	Manages the risk of power outages due to equipment failure in the next decade.	Reduces the risk of power outages due to equipment failure in the next decade.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work. Increases work volumes and costs for the next decade.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work. Reduces work volumes and costs for the next decade.

Choice 4 of 7:

Price

Spend Less **$0.75** | Toronto Hydro's Plan **$1.15** | Spend More **$1.84**

$0.93 | $1.12 | $1.30 | $1.48 | $1.66 | Don't know

$_.__ Your selection.

How much do you think Toronto Hydro should spend on its grid stewardship plan?
Please write down the $ amount within the ranges on the slider in the blank fill.

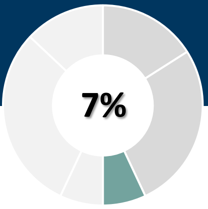
Do you have additional feedback on Toronto Hydro's draft grid stewardship plan?
(Response optional)

Confirm selection above to continue.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Sustainment Plan

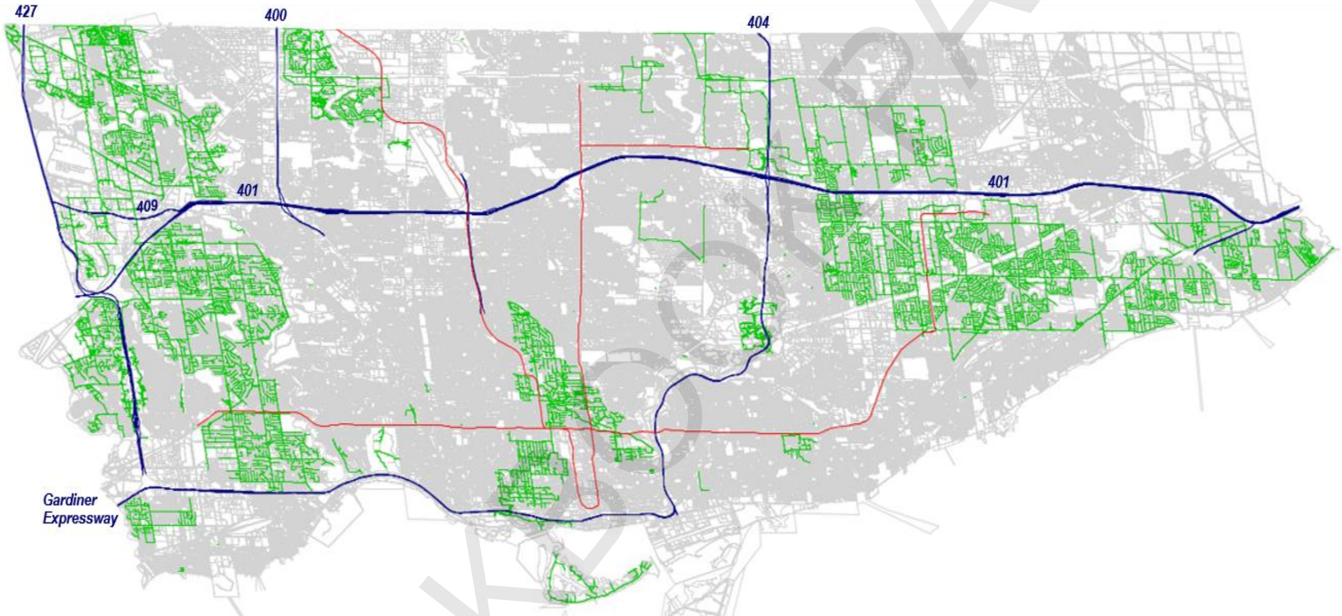


3 Standardize the Grid

Because of its history, Toronto Hydro has an old and diverse grid. Toronto Hydro is made up of 6 municipal utilities that were joined in 1998 when the City of Toronto was formed. Each utility owned and operated different types of equipment. As a result, Toronto Hydro's grid has three different voltage levels: 4.16kV, 13.8kV and 27.6kV.

The 27.6kV voltage level is the current standard for local grids. However, a large part of Toronto Hydro's grid is served at 4.16kV and 13.8kV.

Location of Outdated Voltage Lines



The low voltage 4.16kV system poses many challenges:

- Long outages for customers and higher cost to restore power – in 2022, the longest outage on the 4.16 kV system was 80 hours.
- Less efficient at carrying power over long distances, which means more electricity is lost as it travels from point A to point B (line losses).
- Less capacity to serve customers' growing electricity needs, which means longer waits and higher costs to connect new services such as electric vehicles and solar panels.
- Risk of supply chain and labour shortages as manufacturers stop making this equipment and technicians trained on this equipment retire.

What type of work is Toronto Hydro doing to standardize the grid?

Below is an example of a key investment to replace outdated equipment.

Voltage Conversion from 4.16kV/13.8kV to 27.6kV

Voltage conversion entails a full rebuild of outdated equipment such as rear lot construction (poles and wires in customers' backyards). This work improves reliability, safety and makes the grid more efficient. Toronto Hydro's draft plan intends to convert 1400 customers from rear lot service and works to eliminate rear lot construction from the grid by the late 2040s.

WORKBOOK PAGE

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft Sustainment Plan

7%

Making Choices: **Standardize the Grid**

By 2029, Toronto Hydro's draft **plan to standardize the grid** would cost the typical residential customer **$1.17** more on their monthly electricity bill. Toronto Hydro could spend more to speed up the pace of replacing outdated equipment or it could spend less to slow down the pace and delay the benefits of this work. For example, under spend more Toronto Hydro would convert all rear lot customers by the early 2040s, and under spend less by the 2050s.

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	Spend Less	Draft Plan	Spend More
Reliability	Slower progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Steady progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.	Faster progress to improve reliability (shorter and fewer outages) for customers who are currently connected to outdated equipment.
Customer Service	Less progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.	Steady progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels	Faster progress to improve service levels for customers connecting new services or choosing new technologies such as solar panels.
Efficiency	Slower progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Steady progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.	Faster progress in making the grid more efficient, such as reducing line losses and long outages, which are more costly to restore.

Choice 5 of 7:

Price

Spend Less **$0.89** | Draft Plan **$1.17** | Spend More **$1.52**

$0.99 | $1.10 | $1.20 | $1.31 | $1.42 | Don't know

$__.__ Your selection.

How much do you think Toronto Hydro should spend on its equipment standardization plan?

Please write down the $ amount within the ranges on the slider in the blank fill.

Do you have additional feedback on Toronto Hydro's draft equipment standardization plan?
(Response optional)

Confirm selection above to continue.

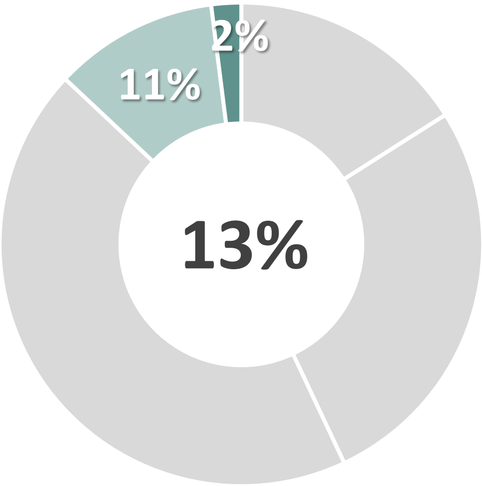
Draft General Plant Plan

Keeping the Business Running

What is this section about?

- This section is about the vehicles, work centres and IT systems that keep Toronto Hydro's business running efficiently.
- Toronto Hydro seeks your input on two choices within this part of the plan:

1. The pace of replacing the equipment needed to keep the business running.
2. The pace of reducing Toronto Hydro's emissions from its own operations.



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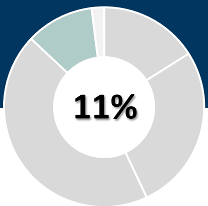
- This spending category makes up **13% of the draft plan** and would add **$2.21** on the average residential customer's monthly bill by 2029.



1 Keep the Business Running

Work centres, vehicles and information technology systems are the backbone of Toronto Hydro's day-to-day operations. This equipment must be maintained in good working condition for efficient and reliable operations so that crews can restore power and customers can access key services like their online account and the outage restoration map.

- As with grid equipment, Toronto Hydro uses information such as age and condition data from inspections to decide which equipment should be replaced versus repaired.
- Toronto Hydro repairs equipment in poor condition such as leaking roofs, failed furnaces and worn-out vehicle braking systems. It also replaces equipment like software programs and hardware servers that are past expected useful life.

What type of work is Toronto Hydro doing to manage failure risk?

Below is an example of a key investment that Toronto Hydro needs to make to keep the business running and manage the risk of equipment failure.

Station Buildings

Toronto Hydro has approximately 250 properties that either house distribution stations equipment such as cables and transformers or support the distribution system.

Over 80% of station buildings are older than 40 years and require repairs and investments to address the following types of problems:

- Structural damage to the building (cracked foundations, leaking roofs)
- Mechanical, electrical and plumbing equipment in poor condition
- Compliance with building and fire code requirements

This work ensures safe and efficient operations and minimizes the risk of outages that can affect many customers. For example, structural damage to a station building poses a direct risk to distribution equipment such as power transformers.

So, how much and how quickly Toronto Hydro decides to invest in keeping their business running has a direct impact on customers. While this equipment may remain in service for a long time, when they unexpectedly fail, the costs incurred usually far exceed proactive investments (repairs and replacements) and can have a significant impact on system reliability and customer service.

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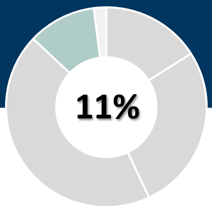
Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft General Plant Plan



Making Choices: Keep the Business Running

By 2029, Toronto Hydro's draft plan to keep the business running would cost the typical residential customer **$1.94** more on their monthly electricity bill. Toronto Hydro could spend more to improve equipment health (age and condition) and functionality (better safety features) or spend less and take on more risk of equipment downtime.

	Spend Less	Draft Plan	Spend More
Health	Reduces the overall health (age and condition) of general plant equipment by 2029.	Maintains the overall health (age and condition) of general plant equipment by 2029.	Improves the overall health (age and condition) of general plant equipment by 2029.
Reliability & Service	Reduces equipment availability, which could mean longer outages or lower levels of customer service.	Maintains equipment availability consistent with current levels.	Improves equipment availability and functionality, which could mean better reliability and customer service levels.
Efficiency	Reduces efficiency with higher amounts of reactive and emergency work, which is more costly and increases equipment downtime.	Maintains efficiency with stable amounts of reactive and emergency work. Manages work volumes and costs for the next decade.	Improves efficiency with lower amounts of reactive and emergency work, and better equipment functionality.

WORKBOOK PAGE

Choice 6 of 7:

Price

Spend Less **$1.30**

Toronto Hydro's Plan **$1.94**

Spend More **$2.32**

$1.47 | $1.64 | $1.81 | $1.98 | $2.15 | Don't know

$__.__ Your selection.

How much do you think Toronto Hydro should spend to keep the business running?

Please write down the $ amount within the ranges on the slider in the blank fill.

Do you have additional feedback on Toronto Hydro's draft plan for keeping the business running?

(Response optional)

Confirm selection above to continue.

2 Reducing Toronto Hydro's Emissions

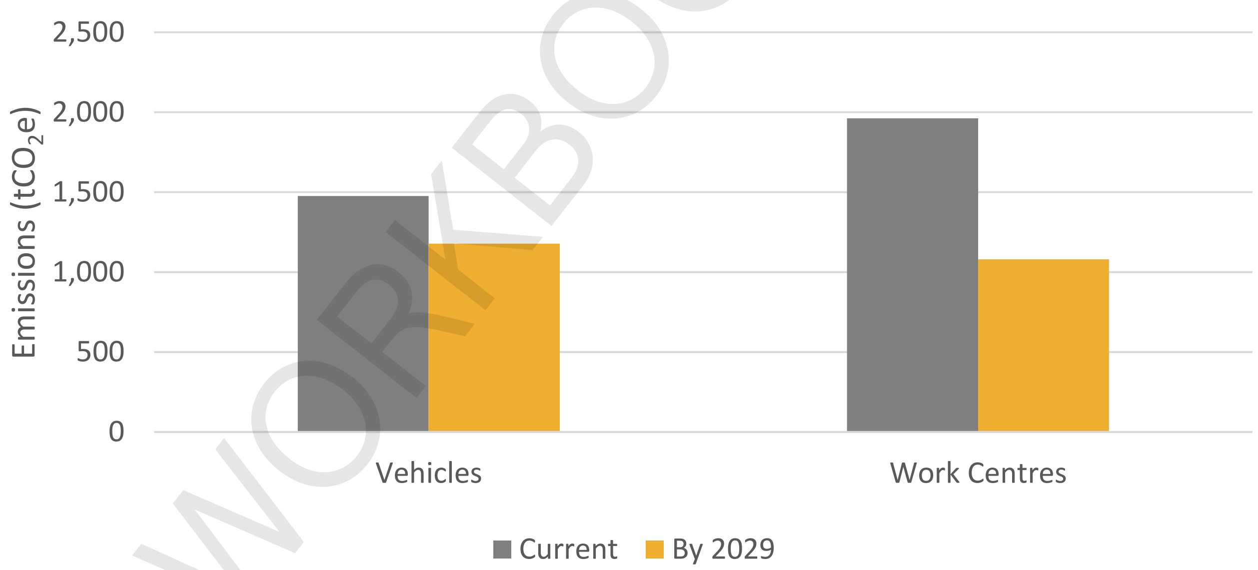
To address climate change, companies around the world are setting targets to reduce greenhouse gas (GHG) emissions from fossil fuels — a pledge commonly known as Net Zero.

Moving toward Net Zero has increasingly become the expectation of governments, financial markets, stakeholders and customers. For example, in October 2019, Toronto City Council unanimously voted to accelerate efforts to reduce emissions across the city.

To do its part in addressing climate change, Toronto Hydro is committed to reducing emissions from its vehicles and work centres by:

- Replacing gasoline and diesel power vehicles with hybrid and electric vehicles
- Converting natural gas boilers and heaters in its work centres to electric ones.

Toronto Hydro's Draft Plan to Reduce Emissions



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Carbon Tax Savings

Reducing carbon emissions from vehicles and work centres could help Toronto Hydro manage rising costs due to the carbon tax (recall that the carbon tax may increase by 161% from 2023 to 2030). **Over the 2025-2029 period, Toronto Hydro's draft plan could reduce carbon tax payments by roughly half a million dollars.**

With your feedback, Toronto Hydro needs to decide how quickly to transition to cleaner sources of energy for its operations. In the next section, you will be presented these options.

Toronto Hydro Customer Engagement

Planning Process: 2025–2029 Draft General Plant Plan

2%

Making Choices: Reducing Toronto Hydro's Emissions

By 2029, Toronto Hydro's draft plan to reduce emissions would cost the typical residential customer **$0.27** more on their monthly electricity bill. Toronto Hydro could spend more for faster progress towards reducing its emissions, or spend less to slow down the progress.

WORKBOOK PAGE

	Spend Less	Draft Plan	Spend More
Environment	Less progress to reduce emissions — about 27% reduction by the end of the decade.	Steady progress to reduce emissions — about 35% reduction by the end of the decade.	Faster progress to reduce emissions — about 36% reduction by the end of the decade.
Efficiency	Higher exposure to rising energy costs (oil and gas) due to the carbon taxes and other pressures.	Managed exposure to rising energy costs (oil and gas) due to the carbon tax and other pressures.	Less exposure to rising energy costs (oil and gas) due to carbon taxes and other pressures.

Choice 7 of 7:

Price

Spend Less $0.19 | Draft Plan $0.27 | Spend More $0.31

$0.21 $0.23 $0.25 $0.27 $0.29 Don't know

$\_\_.\_\_$ Your selection.

How much do you think Toronto Hydro should spend to reduce its own emissions?

Please write down the $ amount within the ranges on the slider in the blank fill.

Do you have additional feedback on Toronto Hydro's draft decarbonization plan?

(Response optional)

Confirm selection above to continue.

Toronto Hydro has calculated an overall cost for its draft plan. While the plan may change based on feedback from the earlier questions in this survey, Toronto Hydro would like to know how you feel about the total rate impact of its current draft plan.

Considering what you have learned about Toronto Hydro's 2025–2029 draft plan and that this may result in a $17.18 increase in the distribution portion of your monthly electricity bill by 2029, which of the following best represents your point of view?

- ☐ I think Toronto Hydro should accelerate spending beyond its proposed draft plan to deliver better system outcomes
- ☐ I support the proposed bill increase when it comes to preparing Toronto Hydro's grid for the future
- ☐ I don't like the proposed bill increase, but I think it's necessary to maintain the grid to a reasonable standard and prepare for the future
- ☐ I oppose the bill increase and think Toronto Hydro needs to scale back its plan
- ☐ I don't know

Do you have any final comments regarding Toronto Hydro's draft plan for 2025–2029 and the proposed rate increase?

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Survey Feedback

The following questions are for statistical purposes only. This information is used to segment and group similar people together when the survey results are analyzed.

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To the best of your knowledge, does your home receive electrical service via overhead wires or underground cables?

- ☐ Overhead wires
- ☐ Underground cables
- ☐ Don’t know

Do you identify as …

- ☐ Man
- ☐ Woman
- ☐ Prefer to self describe [______________________]
- ☐ Prefer not to say

What age category do you fall into?

- ☐ Under 18
- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65-74
- ☐ 75 or older
- ☐ Prefer not to say

Including yourself, how many people live in your household?

- ☐ Single person household
- ☐ 2 people
- ☐ 3 people
- ☐ 4 people
- ☐ 5 people
- ☐ 6 people
- ☐ 7 or more people
- ☐ Prefer not to say

Which of the following categories best describes the total annual income, after taxes, of all the members of your household?

- ☐ Less than $28,000
- ☐ $28,000 to less than $39,000
- ☐ $39,000 to less than $48,000
- ☐ $48,000 to less than $52,000
- ☐ $52,000 or more
- ☐ Prefer not to say

Thinking generally about the electricity system in Ontario, including *generation*, *transmission* and *local distribution*, do you agree or disagree with the following statements?

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	Don't Know/No opinion
The cost of my electricity bill has a major impact on my household finances and requires that I do without some other important priorities.					
Customers are well-served by the electricity system in Ontario.					

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Final Thoughts

Feedback on Toronto Hydro's survey

Toronto Hydro values your feedback. This is the first time the utility has conducted a review about its upcoming plans in this type of format.

Overall, what is your impression of the survey you just completed?
☐ Very favourable ☐ Somewhat favourable ☐ Somewhat unfavourable ☐ Very unfavourable ☐ Don't know
In this survey, do you feel that Toronto Hydro provided too much information, not enough, or just the right amount?
☐ Too little information ☐ Just the right amount of information ☐ Too much information
Was there any content missing that you would have liked to have seen included in this survey?
☐ None
Is there anything that you would still like answered?
☐ None

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Thanks for Participating!

You have now completed Toronto Hydro's survey.

As indicated at the start, your individual responses are confidential and will only be shared with Toronto Hydro in aggregate, combined with the answers from all other respondents to this survey.

Keeping You Informed: If you would like Toronto Hydro to share the findings of this engagement and let you know how it will be responding to your input, please check the box below and confirm what email address is best used to contact you.

□ *I would like to learn about the findings of this engagement.*

Contest Draw: If you wish to be entered into the draw for your chance to win 1 of 10 prizes of "free electricity for a year," please check the box below and confirm what email address is best used to contact you.

□ *I would like to be entered into the draw.*

Email Address: ___________________________

Confirm Email: ___________________________

If you have any additional questions or comments about this survey, please email:
survey@innovativeresearch.ca

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Building Understanding.

Acknowledgement

This report has been prepared by Innovative Research Group Inc. (INNOVATIVE) for Toronto Hydro. The conclusions drawn and opinions expressed are those of the authors.

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STAKEHOLDER ENGAGEMENT

This brief schedule presents an overview of the engagement sessions held by Toronto Hydro in connection with the Application. These sessions were distinct from the Customer Engagement activities described in Exhibit 1B, Tab 5, Schedule 1.

Toronto Hydro respects and values the regulatory process, and is committed to fostering and maintaining constructive relationships with the stakeholders that participate in this process. The utility invited parties that frequently intervene in the utility's rate applications, and other major rate applications before the Ontario Energy Board ("OEB"), to attend and participate in two facilitated stakeholder engagement sessions: the first on April 25, 2023 and the second on October 4, 2023. The second session was broken out into two parts with the first portion, led by Toronto Hydro, related to application substance and the second, led by the OEB Registrar, to discuss procedural timelines.

Prior to each session, Toronto Hydro's facilitator conducted preliminary meetings with one or more representatives from each party to understand the stakeholder expectations for the session, and get feedback with respect to areas or topic of particular interest. This feedback informed the development of content and materials for the sessions. Appendices to this schedule contain the facilitator's report for each session, including a list of participants, agenda, and a brief summary of the content presented and the discussions exchanged.

With the intention of facilitating a more effective and efficient adjudicative process, Toronto Hydro employed an open dialogue approach in conducting the stakeholder engagements that took place in the lead up to this Application. The utility approached the sessions as forum to inform parties about the status and evolution of its Application, share insights about the plan, discuss rate-setting approaches, methodological and procedural aspects of the application, and identify novel issues or matters to be addressed in the application. To that end, the utility shared relevant information and provided interested parties an opportunity to engage with business and regulatory subject matter experts via questions, clarifications and other dialogue. This approach:

- provided parties a pre-emptive understanding of form and substance of this application, including the utility's investment plans and rate-setting proposals;
- solicited perspectives to help inform Toronto Hydro's proposals and evidence;
- explored procedural considerations, and the potential for consensus with respect to timelines for the adjudicative process; and
- established and reinforced lines of communication to facilitate ongoing constructive dialogue during the hearing process, hopefully minimizing the need for incremental procedural steps.

The discussions were courteous, constructive and overall helpful in providing the utility feedback and perspectives on range of topics that are relevant to the Application. Toronto Hydro thanks the participants for their attendance and contributions, and invites continued engagement and open dialogue throughout the proceeding.

Toronto Hydro Stakeholder Engagement Session
25 April 2023

Report of the Facilitator

Prepared by Cynthia Chaplin ICD.D

Toronto Hydro held a facilitated Stakeholder Engagement Session on 25 April 2023. This report presents background information, describes the process, and provides a summary of the session.

Background and Process

The following intervenors were invited to attend the Toronto Hydro Engagement Session:

- Association of Major Power Consumers of Ontario (AMPCO)
- Building Owners and Management Association (BOMA)
- Consumers' Council of Canada (CCC)
- Direct Resources Coalition (DRC)
- Energy Probe
- Environmental Defence
- Power Workers' Union (PWU)
- School Energy Coalition (SEC)
- Vulnerable Energy Consumers Council (VECC)

The Ontario Energy Board was also invited to attend.

I was retained by Toronto Hydro on 9 March 2023 to act as a facilitator.[1] Between April 4 and April 11, 2023, I conducted brief pre-meetings with one or more representatives from each intervenor. The purpose of these meetings was to:

- receive input on the issues that should be addressed
- receive input on how the session should be run

I prepared a brief report summarizing the input I received, and identified three key themes:

1. Toronto Hydro's objectives for the session should be clear and transparent.
2. The key issue is the energy transition/electrification/net-zero, with varying perspectives amongst intervenors.

[1] As a neutral facilitator, I did not provide any strategic advice to Toronto Hydro regarding the session, nor did I provide a substantive review of the materials prepared by Toronto Hydro.

3. Materials should be aligned with the session objectives and circulated in advance if possible.

Prior to the session, Toronto Hydro circulated an agenda which set out a description of each module and a statement of the type of input/feedback that it would find most useful as it works to finalize its proposals and complete its application.

The following intervenor representatives attended the engagement session:

- Shelley Grice – AMPCO
- Gillian Henderson – BOMA
- Julie Girvan – CCC
- Nicholas Daube – DRC
- Thomas Ladanyi – Energy Probe
- Daniel Rosenbluth – PWU
- Mark Rubenstein – SEC
- Mark Garner – VECC
- Bill Harper – VECC

The following OEB representatives attended:

- Ted Antonopoulos
- Michael Millar
- Alex Share
- Mima Micic
- Musab Qureshi

The following Toronto Hydro representatives attended:

- Amanda Klein
- Daliana Coban
- Matthew Higgins
- Hani Taki
- Kaleb Ruch
- Zoë Thoms
- Alana Spira
- Kiran Waterhouse
- Oluwanifemi Atanda
- Charles Keizer, external counsel
- MaryAnne Aldred, strategic advisor

Summary of the Session

Amanda Klein of Toronto Hydro provided introductory remarks to kick off the session. I then explained the process for the day, setting out the timing and approach. The session consisted of four modules, each with a presentation from Toronto Hydro, followed by time dedicated for questions and discussion.

Module 1 – 2025-2029 Application Process and Business Plan Overview

Daliana Coban and Matthew Higgins of Toronto Hydro provided an overview of the rate application process, and presented the investment categories, priorities and outcomes that comprise the 2025-2029 draft business plan, with particular emphasis on investment priorities that are driven by the need to prepare the grid for the energy transition. For this module, attendees were asked to:

- Ask questions about the rate application process or the investment priorities and outcomes.
- Identify specific information or analysis that would be helpful to have on the record.

Intervenors suggested several areas where specific data should be filed with the application, notably in relation to DERs, EVs, electrification, and load (including information on the data sources for related forecasts), as well as labour costs. It was also recommended that Toronto Hydro review the interrogatories in the prior hearing and consider filing the requested studies and reports as part of the application, rather than waiting until the interrogatory phase.

Module 2 – Future Energy Scenarios

Hani Taki of Toronto Hydro provided an overview of a new study that will be featured in the rate application: the *Future Energy Scenarios* study. Toronto Hydro explained the methodology used in this study, provided an overview of the results and explained how this study has been integrated into the capacity planning process. For this module, attendees were asked to:

- Ask questions about the Future Energy Scenarios study.
- Identify specific information or analysis that would be helpful to have on the record.

Discussion focused on how Toronto Hydro intends to use the results of the study in its planning and at the hearing. There were questions about the underlying methodology, the assumptions used, and how the study compares with other similar types of work (e.g., Enbridge's work in the area). Intervenors indicated they would want to see the model.

Module 3 – Distributed Energy Resources (DERs) Incentives

Kaleb Ruch of Toronto Hydro provided an overview of how the utility is leveraging behind the meter DERs to provide services to the grid as non-wires solutions, to set the context for a discussion about DER Incentives. This module then explored the OEB's newly released *Filing Guidelines for Incentives for LDCs to use Third-Party DERs as Non-Wires Solutions* and sought input on the incentive options and guidelines. This feedback was intended to help shape Toronto Hydro's proposals.

Questions and discussion focused on the various measures of costs and benefits associated with DERs. There was some discussion of incentives, and it was noted that Toronto Hydro would likely be one of the first LDCs to file under the new guidelines.

Module 4 – Regulatory Evolutions – Funding, Flexibility and Incentives

Daliana Coban of Toronto Hydro built on the context set in the previous modules and distilled the challenges that Toronto Hydro faces in the 2025-2029 period and identified the regulatory evolutions that it is considering to addresses these challenges, including:

- Funding adders to address multi-year investment needs
- Better incentives to recalibrate the risk/reward paradigm
- Flexibility mechanisms to manage uncertainty and protect customers.

In this module attendees were asked to provide feedback and ask questions about the challenges that the utility faces. Toronto Hydro sought input on the solutions/evolutions that it is contemplating to address these challenges. This input was intended to help shape Toronto Hydro's proposals.

There was discussion about incentives, what behaviours they are intended to drive and what behaviours they actually drive, the various attributes of "carrots" and "sticks", the specifications of outcomes, and the need for accountability if a utility is to get funding in advance of investment. Regarding the regulatory framework, the discussion focused on whether the appropriate evolution was toward a multi-year cost-of-service approach or an enhanced customer incentive regulation approach. The impact of the energy transition was noted as a key factor driving many of the challenges related to the level of investment required, the costs, and uncertainty about policy and customer decisions.

Observations

It was a productive engagement session. Useful information was conveyed from Toronto Hydro to the intervenor representatives, and the intervenor representatives were frank and respectful in their questions and comments to Toronto Hydro. Productive exploratory discussions took place around several foundational issues, particularly related to the energy transition and what it means for Toronto Hydro and its customers.

My recommendation is that Toronto Hydro consider hosting a further engagement session or sessions in the period leading up to the filing of the application in October 2023. This would allow intervenors to get substantive information about how Toronto Hydro's thinking and the application are developing and could foster ongoing productive discussions around the foundational issues.

Report of the Facilitator

Toronto Hydro Stakeholder Engagement Session

4 October 2023

Prepared by Cynthia Chaplin ICD.D

Toronto Hydro held a facilitated Stakeholder Engagement Session on 4 October 2023. At the session Toronto Hydro presented key information about its 2025-2029 rate application and took questions from intervenors. The objective was to provide early information to intervenors to enhance the efficiency of the overall rate application process.

This report presents background information, describes the process, and provides a summary of the session.

Background and Process

The following intervenors were invited to attend the Engagement Session:

- Association of Major Power Consumers of Ontario (AMPCO)
- Building Owners and Managers Association (BOMA)
- Consumers' Council of Canada (CCC)
- Direct Resources Coalition (DRC)
- Energy Probe
- Environmental Defence
- Power Workers' Union (PWU)
- School Energy Coalition (SEC)
- Vulnerable Energy Consumers Council (VECC)

The Ontario Energy Board was also invited to attend.

I was retained by Toronto Hydro in August 2023 to act as a facilitator for the session. As a neutral facilitator, I did not provide any strategic advice to Toronto Hydro, nor did I provide a substantive review of the materials prepared by Toronto Hydro.

Between 1 September 2023 and 11 September 2023, I conducted pre-meetings with representatives from most intervenors to brief them on Toronto Hydro's objectives and approach for the 4 October session. I also sought input on the issues/topics that should be addressed and input on the format for the session. I prepared a report summarizing the input received which identified the following key messages:

- The energy transition remains the key issue, with a variety of views.
- It is helpful if materials are circulated in advance, and specific numbers should be provided during the session.
- Toronto Hydro should identify any unusual aspects of the application, including any items needing specific OEB approval.
- Participants want to know the timing for the application and the planned OEB schedule, and how Toronto Hydro would handle evidence updates.
- Participants were pleased with the April session, and there were no recommendations for changes to the format for 4 October.

Prior to the session, Toronto Hydro circulated an agenda and materials.

The following intervenor representatives attended the engagement session:

- Shelley Grice – AMPCO
- Gillian Henderson – BOMA
- Daniel Vollmer – DRC
- Tom Ladanyi – Energy Probe
- Daniel Rosenbluth – PWU
- Mark Rubenstein – SEC
- Mark Garner – VECC
- Bill Harper – VECC

The following OEB representatives attended:

- Ted Antonopoulos
- Ravi Baichan
- Ceiran Bishop
- Thomas Eminowicz
- Donald Lau
- Nancy Marconi
- Mima Micic

- Lawren Murray
- Fiona O'Connell
- Ashley Sanasie

The following Toronto Hydro representatives attended:

- Amanda Klein
- Daliana Coban
- Matthew Higgins
- Elissar El-Hage
- Nathan Lev
- Courtney Fleury
- Deniz Oktem
- Zoë Thoms
- Charles Keizer, external counsel
- MaryAnne Aldred, strategic advisor

Summary of the Session

Amanda Klein of Toronto Hydro provided introductory remarks. I then explained the process for the day, setting out the timing and approach.

The session consisted of three modules. The first two included presentations from Toronto Hydro, followed by questions and discussion. The third module included a presentation by Toronto Hydro and a presentation by the Ontario Energy Board, followed by questions and discussion.

Module 1 – 2025-2029 Investment Plan

Daliana Coban and Matthew Higgins of Toronto Hydro provided an overview of the 2025-2029 investment plan and the associated residential rate impacts. They also described the Customer Engagement process and Phase 2 results, as well as a recap of the investment plan priorities. Toronto Hydro explained that the data presented has not yet been released publicly and requested that attendees keep the data in confidence and only use it for purposes of preparing for the application process. No concerns were raised about this request.

There was a wide range of questions. Topics included rate impacts for other customer classes, forecasting methodologies, the impacts of electric vehicles and data centres, the ADMS project, and the reporting of board approved and actual results.

Module 2 – Rate Framework Evolution

Daliana Coban presented the proposed custom incentive rate-setting (CIR) framework and explained how the elements of the framework work together to address the challenges of managing funding, performance and uncertainty.

Most questions related to Toronto Hydro's Performance Incentive Proposal, including timing, measurement, interdependencies, and risk allocation. There were also questions about the inflation factor, earnings sharing mechanism, feeder performance, and the variance account proposed for demand-related uncertainty.

Module 3 – Application Administration

Daliana Coban provided an overview of the structure of the application, a list of novel issues that will be addressed, and a register of third-party expert evidence that will be filed. Nancy Marconi, Registrar at the Ontario Energy Board, presented information on potential schedules for the proceeding, under various assumptions regarding a settlement. All are designed to meet the OEB's performance metric of 355 days. Based on an intended application filing date of 17 November 2023, the targeted decision date would be 19 December 2024.[1]

There was substantial discussion about where parties need more time, particularly between interrogatory answers and the technical conference, and for the settlement conference (the conference itself and for preparation of the document). There was also substantial discussion about where time could be reduced, including the timing for interventions, the filing of interrogatories, the overall issues process, and the Argument-in-Chief. Parties also discussed the plan for any evidence updates after 2023 actuals are known and the process of accessing confidential data.

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[1] This is longer than 355 days because the OEB holds the schedule in abeyance for 23 days over the holiday period. In addition, decisions are only released on Tuesdays and Thursdays.

The attendees requested that the OEB consider a summer abeyance or a hearing schedule that facilitates some ability to make summer plans outside the hearing. Attendees also noted the importance of having the Panel's commitment to the established schedule to facilitate overall planning and scheduling by all the parties.

Observations

It was a productive session. Important information was conveyed from Toronto Hydro to the intervenor representatives regarding the upcoming application, and the intervenor representatives were frank and respectful in their questions and comments to Toronto Hydro.

It was helpful to have the OEB's Registrar attend so that the day could include a discussion of the potential application schedule. There was substantive input offered on how the schedule could be improved for parties while still meeting the OEB's performance metric.

LETTERS OF COMMENT RESPONSES

Further to section 2.1.5 of the OEB's Chapter 2 of the Filing Requirements for Electricity Distribution Rate Applications (December 22, 2022), this schedule is filed as a placeholder for Toronto Hydro's future responses to matters raised in letters of comment filed with the OEB during the course of the application (when available).