2020-2024 Custom Incentive Rate-Setting Application

EXECUTIVE SUMMARY AND BUSINESS PLAN OVERVIEW

1. OVERVIEW

Toronto Hydro Electric-System Limited ("Toronto Hydro" or the "utility") distributes electricity in the City of Toronto. The utility and its predecessors have met the electricity needs of the residents, businesses, and institutions of the municipality (and its predecessors) for over 100 years, performing a critical role in the community. In planning and carrying out its work, the utility is guided by the needs, preferences, and priorities of its customers and other stakeholders. Meeting Toronto's electricity requirements remains central to Toronto Hydro's purpose.

This Application covers the 2020-2024 period. The proposed rates are necessary to fund the utility's business plan for that period. For a residential customer, the utility's 5-year proposal would result in an average annual increase of $0.77 (1.7 percent) on Toronto Hydro's distribution portion of the bill, or a $0.56 (0.4 percent) increase on the overall electricity bill. For the first year of the plan, 2020, residential customers will experience a decrease of $3.10 on the overall electricity bill.[1]

Toronto Hydro's plan was developed in consultation with its customers, having regard to how the utility's costs and performance compare with its peers (i.e. benchmarking), and with the objective of producing outcomes that customers value. These external inputs were combined with Toronto Hydro's knowledge and experience of the state of its distribution system infrastructure, and the other considerations that inform good utility practice and long-term performance. As part of its due diligence, and recognizing the

[1] All figures in this paragraph are for the monthly bill of a customer in the Residential rate class who uses 750 kWh of electricity. Bill impacts for other Residential customer profiles and other customer classes, and the only tariff (Wireline Attachment Rate) being updated in this Application, are explained in detail at Exhibit 1B, Tab 5, Schedule 1; and Exhibit 8, Tab 1, Schedule 1, and for quick reference, are included in a summary chart as Appendix "A" to this Exhibit.

value of third party perspective, Toronto Hydro engaged external experts to review significant parts of the plan and is filing their work product as part of the Application.

This is the second five-year plan filed by Toronto Hydro. The plan largely continues the methodology approved by the OEB for the 2015-2019 period. As with the 2015-2019 plan, the 2020-2024 plan reflects a Custom Incentive Rate-setting ("CIR") methodology that is aligned with OEB policy guidance.

This plan continues the utility's effort to renew a significant backlog of deteriorated and obsolete assets at risk of failure, and to adapt to the continuously evolving challenge of serving, and operating within a dense, mature, and growing major city. Efforts to date have resulted in gradual improvements to reliability, the overall age of the system, and other performance indicators.

Despite these indicators of progress, investing in the short-term performance and long-term viability of an aged, deteriorated, and highly utilized system remains an urgent priority for the utility (see Figure 1, below). Recent extreme weather events, accompanied by growing evidence of the impact of climate change on weather patterns in Toronto, have amplified this need, underscoring the challenge to build a resilient system for the long-term. At the same time, technology and innovation are driving a more dynamic system that is transitioning away from the usual patterns of supply and demand, adding additional complexity and urgency to the challenge of modernizing the grid, which in turn is driving investment needs in information technology and cyber security solutions.

Figure 1: Toronto Hydro at Work

The evidence that supports the Application is the utility's business plan. Organized according and in response to the OEB's Filing Requirements, Toronto Hydro's plan for 2020-2024 is the result of thorough business planning in which customers' needs and preferences were integrated from start to finish. The plan is expected to produce performance outcomes that customers value and are willing to financially support through their distribution rates. With the funding that these rates would provide, Toronto Hydro expects to continue to meet the needs of its customers.

Toronto Hydro is continuing the commitments made in its last application, while remaining responsive to challenges inherent in its operating environment. This performance-based plan is about ensuring Toronto Hydro is able to meet the needs and preferences of its customers today and in the future, including maintaining overall system performance and addressing specific areas requiring improvement.

2. ABOUT TORONTO HYDRO

Toronto Hydro is licensed by the OEB to serve the City of Toronto.[2] See Figure 2, below, for a map of Toronto Hydro's service territory. Toronto Hydro is the successor to the six former hydro-electric commissions of the municipalities which amalgamated on January 1, 1998 to form the City of Toronto. The utility is a wholly-owned subsidiary of Toronto Hydro Corporation, whose sole shareholder is the City of Toronto.[3]

Figure 2: Toronto Hydro's Service Territory

As of 2020, Toronto Hydro forecasts distributing electricity to 784,330 customers who are forecasted to consume over 24 TWh[4] of power that year.[5] Toronto Hydro serves them using approximately 30,000 kilometres of wire and cable, 180,000 poles, and over

[2] Electricity Distribution Licence ED-2002-0497.
[3] To learn more about Toronto Hydro's Corporate Structure and Governance, please refer to Exhibit 1C, Tab 2, Schedule 1.
[4] 24 TWh (terawatt hours) is equal to 24,000,000,000,000 watt hours of electricity. It is the equivalent of running 1 million 60 watt light bulbs non-stop for over 45 years.
[5] For more information about Toronto Hydro's load forecast, please refer to Exhibit 3, Tab 1, Schedule 1.

200 stations and substations. This is a 4.9 percent increase in customer count but a 4.0 percent decrease in power consumption over 2015.[6]

Toronto Hydro's customers range from residential consumers in single family dwellings and multi-unit buildings to large industrial and commercial businesses. These include the country's largest banks, stock exchanges and other large customers that are sensitive to service interruptions. The utility powers non-residential customers from a wide variety of sectors, including: dozens of accounts for hospitals and healthcare and long-term care facilities; hundreds of accounts for schools, colleges, and universities; data centres; and large industrial and manufacturing facilities. Toronto Hydro also supplies electricity to Ontario's Provincial Legislature and Ministries, as well as Toronto's municipal government. The utility also serves thousands of multi-unit residential condominium and apartment buildings, each of which can have dozens or hundreds of units.[7]

3. CUSTOMER ENGAGEMENT AND THE BUSINESS PLAN

Toronto Hydro began the process of developing its business plan by engaging its customers. Feedback from customers was that price, reliability, and safety were their top three priorities. Their other priorities related to customer service, environment, and public policy.[8] Considering this feedback and other inputs (as discussed below), Toronto Hydro established the following strategic parameters for its business plan:

1) **Price Limit:** Toronto Hydro set an upper limit of 3.5 percent as a cap on the average annual increase to base distribution rates.[9]

[6] For more information about Toronto Hydro's distribution system, please refer to Exhibit 1C, Tab 1, Schedules 1 and 2; and Exhibit 2B, Section D2.
[7] To learn more about the breadth and diversity of Toronto Hydro's customer base, please refer to Exhibit 1B, Tab 3.
[8] Please see Customer Engagement evidence at Exhibit 1B, Tab 3, Schedule 1.
[9] As calculated for the monthly bill of a Residential customer using 750 kWh.

2) **Budget Limits**: Toronto Hydro set upper limits of approximately $560 million for the average annual capital plan budget and $277 million for the 2020 operational plan budget, which corresponded with capping infrastructure and operations spending predominantly at sustainment levels.
3) **Performance:** Toronto Hydro developed an Outcomes Framework that established a lens through which the utility could express its plans and performance in terms that demonstrate value for customers, and are meaningful to its operations.

Toronto Hydro's business plan and this Application are aligned with these strategic parameters:

- The average annual increase to base distribution rates associated with Toronto Hydro's plan is approximately 3.0 percent;[10]
- Toronto Hydro's capital and operational budgets that underlie the plan are consistent with the caps the utility established; and
- Toronto Hydro's Outcomes Framework reflects customer priorities, Toronto Hydro's operational pillars, and the OEB's performance categories, and includes 44 measures to track its performance.[11]

Customer preferences and priorities informed Toronto Hydro's development of its business plan throughout the preparation of the utility's capital and operational plans. For example, Toronto Hydro eliminated approximately $75 million per year from its capital plan in response to the price limit noted above.

[10] As calculated for the monthly bill of a Residential customer using 750 kWh. When rate riders are included, the impact drops to 1.7 percent.
[11] For more information on Toronto Hydro's Outcomes Framework, please see Exhibit 1B, Tab 2, Schedule 1.

Prior to filing this Application, Toronto Hydro returned to customers with the key details of its penultimate plan and asked customers for their feedback. Customers were also provided with options of supporting more or less investment, including with respect to the plans for specific types of work, such as Rear-Lot Conversions, Underground Network Transformers, and Microgrids. See Figure 3, below, for an example of the type of work addressed as part of Rear-Lot Conversions.

After making their own preliminary choices, customers were provided with the total price implications of those choices and invited to change their selections.

Figure 3: Legacy Rear Lot Supply Conversion

Through this interactive, iterative customer engagement process, Toronto Hydro obtained valuable insights about the plan at the aggregate and detailed levels. A majority of customers in all customer classes supported the plan or an accelerated

version of it, including the associated price increase.[12] Many customers were willing to pay for an accelerated plan with a higher price impact. However, certain parts of the plan, such as Microgrids, did not receive strong customer support.[13] This customer feedback assisted Toronto Hydro in further refining and finalizing its plan: the result is this business plan and Application.[14]

4. MAJOR CHALLENGES

Toronto Hydro faces a number of significant and urgent challenges in building and operating its distribution system, and responding to the outcomes that customers prioritized. In order to ensure that overall system performance is maintained and specific areas requiring improvement are addressed in 2020 to 2024 and beyond, Toronto Hydro has developed capital and operating plans focused on managing a number of challenges and associated risks.[15] In developing its 2020-2024 business plan, the utility took into account a large number of operating considerations and investment drivers, which are discussed within each of the programs.[16] There are also a number of significant macro challenges that affect the broader business plan. These include deteriorating infrastructure, the growing city, extreme weather, workforce retirements, and technology advancements (including cyber threats), which are discussed in turn below.

[12] Telephone survey results for the plan received 71 percent Residential, 55 percent Small Business and 73 percent Mid-Market customer support. The majority of Key Account customers interviewed (25 out of 37) supported the utility's plan. See Exhibit 1B, Tab 3, Schedule 1, Appendix A.
[13] Phase 1 feedback from customers indicated that microgrids had a degree of customer support. Through Phase 2, Toronto Hydro tested the statistical significance of that support.
[14] Details of Toronto Hydro's customer engagement process and the ways in which it integrated its results into its business plan and this Application can be found throughout the evidence (especially Exhibit 1B, Tab 3, Schedule 1; and Exhibit 2B, Section E2).
[15] For a comprehensive overview of Toronto Hydro's 2020-2024 Distribution System Plan and the key elements driving the level and mix of capital expenditures, please refer to Exhibit 2B, Section A.
[16] To learn more about Toronto Hydro's challenges and cost drivers, please refer to Exhibit 2B, Sections D2 and E; and Exhibit 4A, Tab 2.

4.1 Deteriorating Infrastructure

Toronto Hydro operates in a mature, congested urban environment, which presents significant cost and operating challenges. For instance, Figure 4, below, provides an example of aging box construction feeders from the pre-amalgamation City of Toronto.

In undertaking its capital and operational work, the utility contends with complexities including:

- The intensification of development (such as condominium complexes, transit extensions, and community redevelopments);
- Limited space for utility equipment installation, over a century of construction by various agencies in the public right-of-way and on private properties, often with missing or inaccurate historical records;
- Coordination with other City and utility reconstruction programs; and
- A densely populated downtown core, served by a complex arrangement of equipment that is unique in its span and configuration in Ontario's distribution sector.

Figure 4: Box Construction in a Backyard with Leaking Equipment

Toronto Hydro's distribution system faces a number of significant and evolving challenges that drive the need for the proposed level of investment. As seen in Figure 5, below, approximately a quarter of the utility's asset base continues to operate beyond useful life, and an estimated 9 percent will reach that point by 2025, indicating that a significant, proactive renewal program is necessary to prevent the investment backlog from increasing. Toronto Hydro anticipates that an increase in the backlog of assets past useful life would result in a deterioration in reliability, safety, and other outcomes driven by asset failure. Defective equipment continues to be, by far, the largest contributor to the frequency (36 percent), and duration (44 percent) of outages.

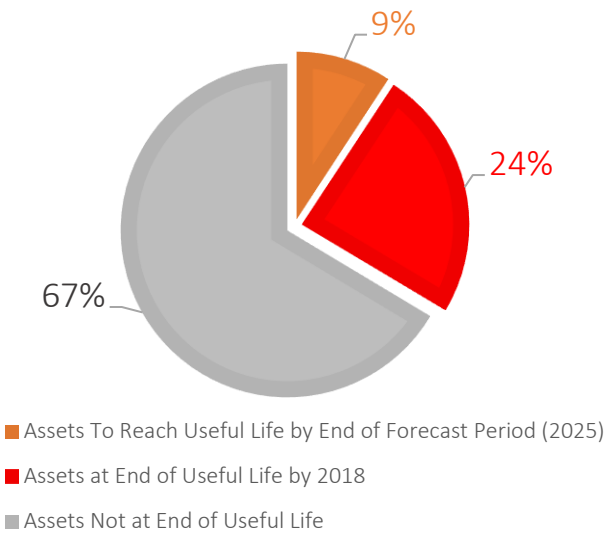

Figure 5: Percentage of Assets Past Useful Life

Asset Condition Assessment demographic results also indicate substantial asset investment needs for a number of critical asset classes over the plan period. Among the subset of asset classes that Toronto Hydro analyzed, major civil assets like poles and vaults, and major stations electrical assets are showing the greatest signs of material

deterioration. These types of assets are the backbone of a safe and viable distribution system, and tend to have a high reliability effect on the system.

4.2 Growing City

By 2020, Toronto Hydro expects to be distributing 24 TWh of electricity to approximately 784,000 customers. This continues a steady trajectory of customer growth and it is expected to continue. Further, Toronto continues to experience concentrated load growth in certain areas of the City, primarily due to the high number of large condominium developments. This concentrated growth is mainly observed in the downtown area, but also along major transit corridors such as Yonge Street and Sheppard Avenue (and in the near future other corridors, such as Eglinton Avenue and Finch Avenue). This growth is pushing certain distribution equipment to capacity. Infrastructure renewal and upgrades are urgently required to support that growth while maintaining reliability and safety outcomes.

Toronto's concentrated load growth is due in part to the high number of large condominium developments in certain parts of the city. Figure 6, below, illustrates that Toronto has more buildings under construction than most North American cities, and a number of high-rise and mid-rise buildings under construction at a rate comparable to New York.

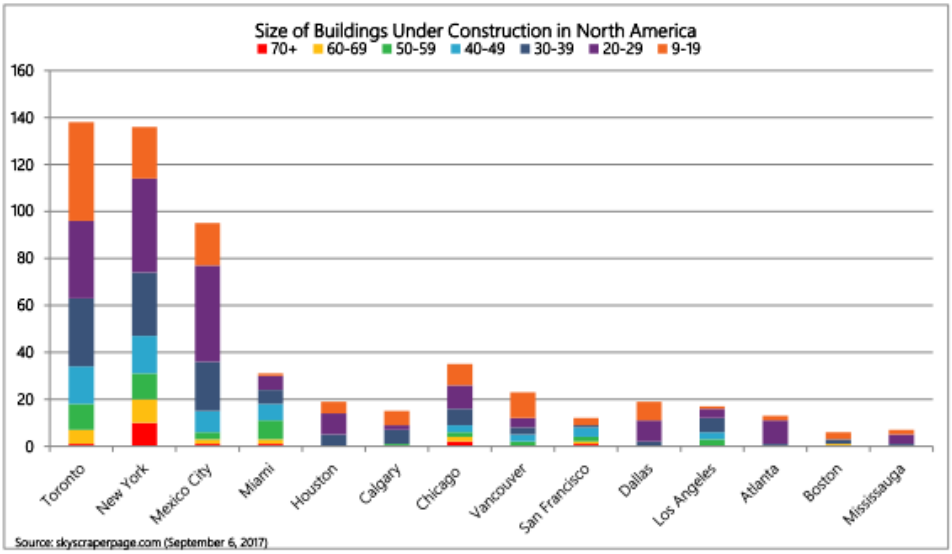

Figure 6: Number of Floors in High-Rise & Mid-Rise Buildings under Construction[17]

4.3 Extreme Weather

Distributing electricity to a city of Toronto's size and complexity is operationally challenging. When extreme weather is factored in, this challenge is amplified. As evidenced by recent events, extreme weather is no longer an infrequent experience; it has become a regular condition of operating a distribution system. It necessarily changes how the utility must plan its infrastructure, execute its plans, and respond to emergencies.

Recent extreme weather events such as wind and ice storms outlined in Table 1, below, have repeatedly and pervasively affected Toronto Hydro's customers.

[17] Toronto Economic Bulletin (September 26, 2017), available at: <https://www.toronto.ca/legdocs/mmis/2017/ed/bgrd/backgroundfile-107204.pdf>.

Table 1: 18 Months of Extreme Weather (January 2017 through June 2018)

Event	Description
Freezing Rain (February 2017)	• Approximately 2-6 mm of freezing rain followed by additional heavy rain. • Estimated 9,200 customers out at peak; all customers restored within 24 hours of the start of the freezing rain event.
High-water/flooding (May - June 2017)	• Heavy rainfall in southern Ontario exceeded the yearly average for an entire summer. • Numerous incidents of high-water/flooding reported across Toronto. • No customers were directly impacted during this 55-day incident due to the utility's proactive damage assessment and DPM mitigation measures, including flood mitigation efforts.
Wind Storm (October 2017)	• Strong wind gusts approaching 100 km/h in some areas and lasting approximately 3 hours. • Estimated 43,000 customers out at peak. • 90 percent of customers restored within 11 hours of event; all customers restored within 48 hours of the end of the event.
Wind storm (April 2018)	• Sustained 65 km/h winds, with gusts approaching 90 km/h. • Estimated 24,000 customers out at peak; all customers restored within 48 hours of the end of the event.
Ice Storm (April 2018)	• Approximately 10-20 mm of freezing rain, 20-25 mm rain, sustained winds of 70 km/h with gusts up to 110 km/h. • Estimated 51,000 customers out at peak. • 99 percent of customers restored within first two days of response; all impacted customers restored within 5 days of the start of the event.
Wind Storm (May 2018)	• High winds reported throughout service territory with gusts reaching approximately 120 km/h. • Estimated 68,000 customers out at peak. • 96 percent of customers restored within 48 hours of the start of the event.
Flash Storm (June 2018)	• High winds reported throughout service territory with gusts reaching approximately 90-100 km/h. • Estimated 16,500 customers out at peak. • 86 percent of customers restored within the first 12 hours and 97 percent of customers restored within the first 24 hours of the event.

Extreme weather events in 2017 resulted in a 72 percent increase in the number of customer interruptions attributed to tree contacts compared to the average of the previous five years. Similarly, in 2018, Toronto Hydro experienced four extreme storms during the first half of the year, leaving nearly 160,000 customers without electricity.

Figure 7: Damage due to Weather Events

Climate change affects different parts of the distribution system in different ways. 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. Figure 7, above, are some examples of line damage caused by the recent weather-related events in the City of Toronto. The underground system is vulnerable to flooding from extreme rainfall. For instance, extreme rainfall in April and May of 2017 caused a number of Toronto Hydro's vaults and cable chambers in the underground system to flood. One particular network vault in Toronto's downtown core experienced severe flooding, causing a network protector to fail. This resulted in a lengthy outage in the financial district with significant disruption to customers, a closure of a busy arterial road during afternoon rush hour, and significant public and media attention.

In addition to extreme weather events, Toronto experiences a wide range of weather conditions that may not be classified as extreme, but nevertheless have the potential to adversely affect the distribution system at various times during the year. Heat, high winds, heavy rainfall, freezing rain, and heavy snowfall cause major system damage. They also make restoration more challenging, and prolong outages.

4.4 Workforce Retirements

Toronto Hydro employees are essential in executing planned and reactive work programs that are necessary to maintain the distribution system's integrity, mitigate unacceptable risks in the areas of reliability and safety, and operate the system. Toronto Hydro is in the midst of a significant renewal of its workforce, with approximately 23 percent of its workforce (or approximately 340 FTEs) forecasted to retire between 2020 and 2024. Of that number, approximately 80 percent are from the utility's staffing categories that directly maintain and operate the distribution system (e.g. certified and skilled trades, designated and technical professionals, and supervisory positions). These personnel are critical to maintaining and operating the distribution system in a safe and efficient manner, and filling these roles can be especially challenging and can take up to six years to train. Recruitment and retention are particularly challenging in Toronto's competitive job market and with quickly escalating costs of living in the City and neighbouring communities.

4.5 Technology Advancements

Technology advancements are a major challenge in the electricity distribution sector globally, and is in many ways greater for distributors in major urban centres. A prominent example of that challenge is the complexity of integrating distributed energy

resources on heavily loaded feeders in dense areas that serve customers sensitive to power quality. A dangerous example of that challenge is cyber threats.[18]

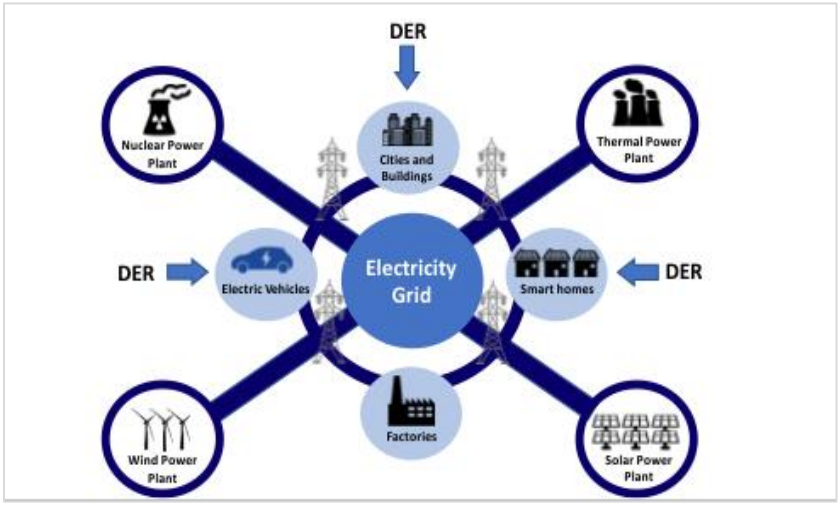

Figure 8: Distributed Energy Resources Interacting with the Electricity Grid[19]

Technology and innovation are driving 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 (Figure 8, above). The role of the utility continues to evolve to support the new smart grid ecosystem, comprising renewable and other distributed energy resources, microgrids, electric vehicles, and growing interest in energy storage for power quality, off-peak storage, and grid resilience. See Figure 9, below, for an example of Toronto Hydro crews installing a pole-mounted

[18] Toronto Hydro works closely with the OEB on regulatory policy with respect to these challenges. In particular, on the OEB Chair's Advisory Committee on Innovation:
< https://www.oeb.ca/sites/default/files/Advisory-Committee-on-Innovation-terms-of-reference.pdf> and the OEB Policy Steering Committee that helped develop the Ontario Cyber Security Framework (December 6, 2017): <https://www.oeb.ca/sites/default/files/Ontario-Cyber-Security-Framework-20171206.pdf>.
[19] Exhibit 2B, Section 8.1, Appendix A.

energy storage system. This dynamic introduces new variables that the utility proposes to address through its business plan.

Figure 9: Installation of Pole-Mounted Energy Storage Systems

Interest in generation projects within Toronto Hydro's service territory has steadily increased in recent years, and Toronto Hydro expects it to continue into the future: the utility has connected approximately 1,800 distributed generation connections. Toronto Hydro is regularly approached by its customers to discuss utility options for or capacity to facilitate net metering and battery energy storage. Inquiries regarding conventional generators have also increased as micro-turbine based installations become more economically viable and commercial and industrial customers attempt to increase site reliability and operational cost savings. These developments require Toronto Hydro to take on functions historically managed by transmission utilities.[20]

[20] Discussed further in Exhibit 2B, Section E8.1, Appendix A.

Another type of technological advancement challenge is protecting the utility and its customers from cyber threats, which has emerged in recent years as an urgent challenge for Toronto Hydro.[21] While smart grid systems, infrastructure automation, and other technological advancements by Toronto Hydro and its customers offer significant opportunities, they also increase the exposure of the grid and those connected to it to greater risk of attack by hostile actors. This global challenge is particularly acute in major economic centres, such as Toronto. Electric utilities are targets for security breaches because of the critical role they play in enabling essential service providers (e.g. hospitals, public transit, water treatment systems, communications, and traffic management) and the vast databases of confidential customer information they possess.[22]

5. PERFORMANCE AND CONTINUOUS IMPROVEMENT

Toronto Hydro has created a customer-focused outcomes framework (the "Outcomes Framework") for the 2020-2024 period that facilitates continuous improvement and measures the effectiveness of the utility's plans through the implementation of 15 custom performance measures for a total of 44 unique measures to be reported to the OEB annually (see discussion below). These outcomes are expressions of the utility's goals and objectives. As set out in Figure 10, the Outcomes Framework links customer priorities with the programs that constitute the capital and operational plans.

[21] For more information on Toronto Hydro's proposed investments to assist with cyber security, please refer to Exhibit 2B, Section E8.2; Exhibit 2B Section E8.4; and Exhibit 4A, Tab 2, Schedule 17.
[22] The OEB recently issued a regulatory response through its Cyber Security Framework (December 6, 2017) : <https://www.oeb.ca/sites/default/files/Ontario-Cyber-Security-Framework-20171206.pdf>.

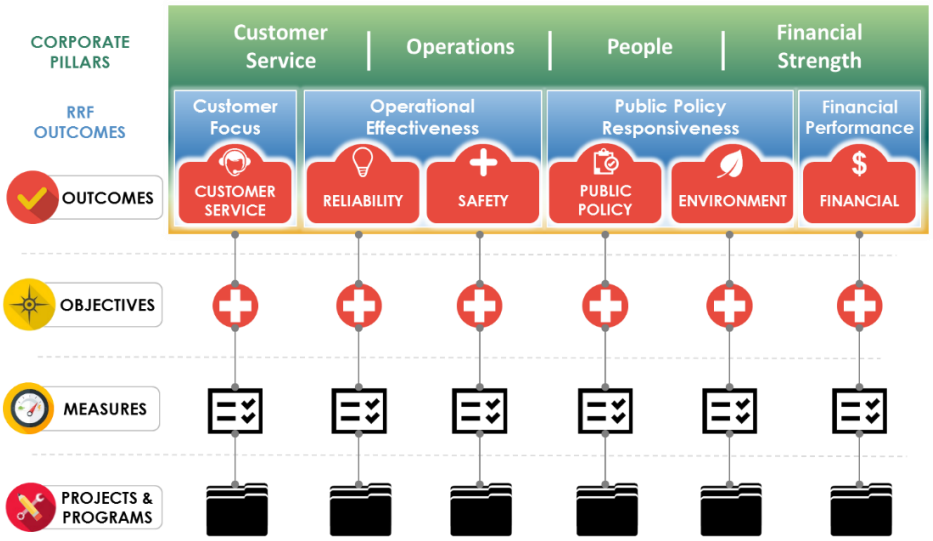

Figure 10: Outcomes Framework

This framework and its associated measures provides customers, the OEB and other stakeholders, both qualitative and quantitative assessment tools for Toronto Hydro's performance during this plan period (2020 to 2024), as well as quantitative insight into Toronto Hydro's strong performance during the last plan period (2015 to 2019).

5.1 Performance-Based Plan

To remain responsive to customer needs and preferences and demonstrate continuous improvement in performance setting and tracking, Toronto Hydro has proposed 15 custom measures within its Outcomes Framework that are incremental to measures tracked and assessed by the OEB, for a total of 44 measures to be reported annually. Table 2, below, shows the number of performance measures within each Outcomes categories. Toronto Hydro's proposed custom measures reflect a thorough understanding of customer priorities and provide assurance that value for money will be achieved through the utility's capital and operational plans.

Table 2: Outcomes and Performance Measures

Toronto Hydro Outcome	OEB Reporting Category	Performance Measures
Customer Service	Service Quality	9
	Customer Satisfaction	5
Safety	Safety	7
Reliability	System Reliability	6
	Asset Management	4
Financial	Cost Control	5
	Financial Ratios	3
Public Policy	Conservation and Demand Management	1
	Connecting Renewable Generation	2
Environment	Environment	2
Total Performance Measures		44

Toronto Hydro has proposed a ratemaking framework for this Application that provides incentives for the utility to seek out further productivity and efficiency improvements over the 2020-2024 period. This framework also requires the utility to share the benefits of these improvements with its customers.

As discussed above, Toronto Hydro structured the business plan around the Outcomes Framework. The capital and operational plans, aligned with that framework, are focused on advancing objectives for the outcome categories, as assessed using performance measures.

5.2 Performance Measurement and Management

Toronto Hydro is an efficient organization that strives to continue its history of performance, productivity, and customer cost savings, including its commitment to a strong performance management culture. Inherent in its focus on outputs and value is

an emphasis on measuring and tracking performance, using internal and external benchmarking.

The OEB established performance metrics for electricity distributors through its Electricity Distributor Scorecard ("EDS") to assess utility performance over time and to compare performance across utilities. Toronto Hydro's performance on the EDS has been strong, including improvements in customer first contact resolution, telephone calls answered on time, new residential and small business services completed on time, and billing accuracy. Table 3, below, provides a snapshot of Toronto Hydro's strong performance, indicating that the utility has met or exceeded OEB standards over the last five years.

Table 3: Snapshot of Toronto Hydro's Strong Performance in the Last Five Years

Performance Categories	Measures	2013	2014	2015	2016	2017	Industry
Service Quality	New Residential/Small Business Services Connected on Time	94.2%	91.5%	96.9%	97.0%	**98.3%**	90.0%
	Scheduled Appointments Met On Time	99.6%	99.8%	99.9%	99.5%	**99.4%**	90.0%
	Telephone Calls Answered On Time	82.0%	71.9%	76.8%	64.7%	**77.9%**	65.0%
Customer Satisfaction	Billing Accuracy	-	96.6%	97.5%	98.8%	**99.2%**	98.0%

In addition, from 2013-2017, Toronto Hydro achieved or exceeded the OEB's Electricity Service Quality Requirements ("ESQR") standards 85 percent of the time. In 2017, for instance, the utility met or surpassed the OEB's standards for 11 out of the 12 measures (92 percent). In respect of outages, Toronto Hydro's has slightly improved its number and frequency of customer interruptions in the last five years, and its performance has been equal to or better than the distributor target from 2013-2017. This achievement is attributable to the investments the utility has made in the system.

Further, in addition to its performance on scorecard and service quality measures, Toronto Hydro's framework of current and future productivity processes and initiatives emphasize increasingly sophisticated performance measurement tools, including new efficiency opportunities such as reducing manual, labour-intensive processes through streamlining and technological improvements. Most recently, Toronto Hydro has improved its processes and provided demonstrable cost savings in areas such as safety, facilities management, fleet size, feeder scheduling, and eBilling.[23]

5.3 Completing Major Capital Programs

For several years, Toronto Hydro has focussed on delivering a significant and ongoing capital plan to improve the safety and reliability of the distribution system and deliver service levels aligned with the needs and preferences of its customers. By the end of 2019, a number of the utility's initiatives are on-track to be substantially complete, including:[24]

- The Operating Cost Centre Consolidation Program ("OCCP"), which involved the consolidation of Toronto Hydro's operating centres to optimize the utility's use of space and decrease property costs, as well as return net gains on sales to ratepayers. [25]
- Paper-Insulated Lead-Covered ("PILC") Cable Leakers and Piece-Outs Program, which involved replacing and repairing aging and defective PILC cables, reducing reliability, safety, and environmental risks.[26]

[23] For further details, please see Exhibit 2B, Sections E8.2 and 8.3; and Exhibit 4A, Tab 2, Schedule 1-3, 11-15.
[24] For a complete list of programs to be completed during 2015-2019, please see Exhibit 2B, Section E4.
[25] EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 5, 2016), Exhibit 2B, Section E8.3.
[26] EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 5, 2016), Exhibit 2B, Section E6.2.

- Overhead Infrastructure Relocation Program, which involved replacing feeders that were in difficult to access locations or high-risk location (e.g. ravines and overhead highway crossings), reducing system reliability and safety risks. [27]
- Copeland Station, an underground transformer station (see Figure 11, below) that will add capacity equivalent to 70 skyscrapers to the downtown core, helping to ensure that Toronto continues to receive safe and reliable electricity in the face of growth and pressures on system capacity.[28]

Figure 11: Copeland TS

[27] EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 5, 2016), Exhibit 2B, Section E6.5.
[28] EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 5, 2016), Exhibit 2B, Section E7.9.

5.4 System Stewardship

To assess the age demographics of its distribution system, Toronto Hydro examines the proportion of assets past useful life ("APUL"). In 2015, Toronto Hydro's percentage of APUL was 26 percent, with an additional 7 percent forecasted to reach the end of their expected useful life by 2020. As a result of Toronto Hydro's ongoing renewal programs, the APUL measure is no longer deteriorating as it did prior to 2014. A continued decline in APUL would have led to a corresponding deterioration in reliability, safety risk, reactive replacement costs, and other outcomes driven by asset failure.

The decrease in APUL has also strengthened the reliability of the system, which is one of the top three priorities of customers. Since the mid-2000s, reliability had been deteriorating. However, through investments in these assets, reliability has stabilized. As shown in Figures 12 and 13, below, the frequency and duration of outages have essentially plateaued, with slight improvements in the last five years.

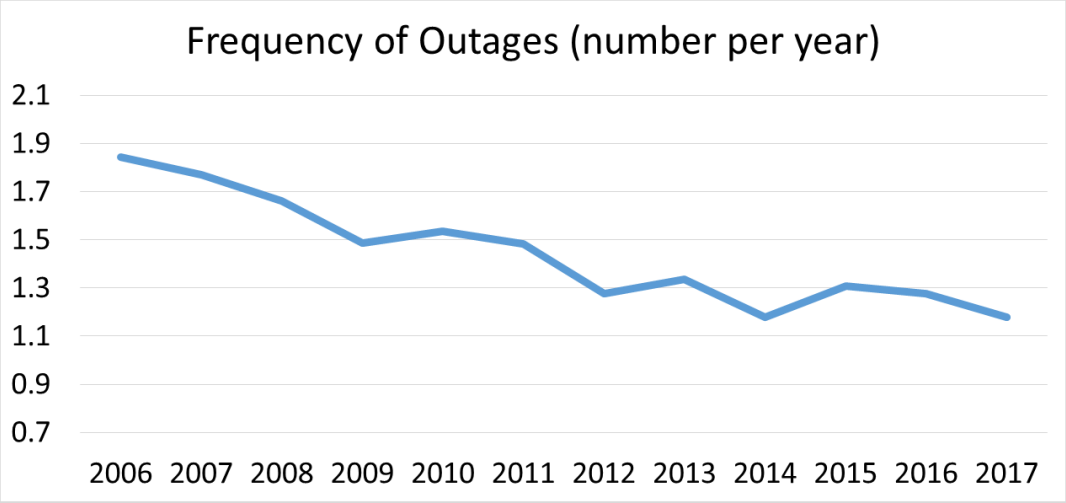

Figure 12: Historical SAIFI[29]

[29] Excluding MEDs and Loss of Supply.

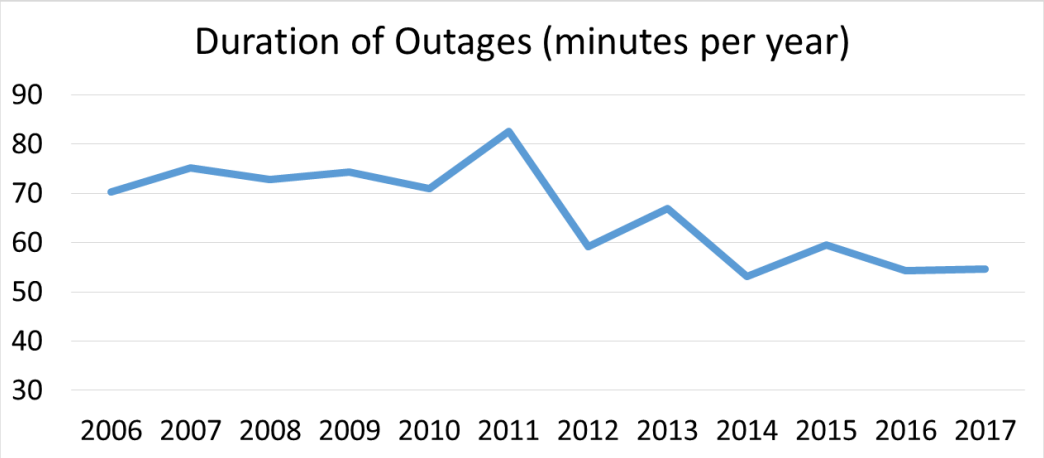

Figure 13: Historical SAIDI[30]

There is still a large population of assets past their useful life. Continued investment is required to ensure there is no deterioration in recently stabilized system performance.

5.5 Analytic Tools

Toronto Hydro also took a significant step forward in further establishing the link between its capital plans, operational plans, and asset condition by adopting a best in class methodology which has helped improve the sophistication of Toronto Hydro's plans, consistent with the utility's drive for continuous improvement. It is also responsive to guidance received from the OEB that such deeper analysis would be helpful to understanding and supporting Toronto Hydro's large, complex capital plan.[31]

6. OVERVIEW OF THE 2020 TO 2024 CAPITAL AND OPERATIONAL PLANS

The plans for Toronto Hydro's capital and operational programs included in this Application are central elements of the utility's business plan. Capital plans address

[30] Excluding MEDs and Loss of Supply.
[31] For a detailed discussion on Toronto Hydro's ACA methodology (the Common Network Assets Indices Methodology), please see Exhibit 2B, Section D, Appendix C.

investments in distribution system infrastructure as well as other investments in supporting facilities and equipment, such as system control centres, fleet vehicles (see Figure 14, below), and data management software.[32] Operational plans address day-to-day activities, such as emergency response to outages, system infrastructure inspections, and employee training.[33]

Figure 14: Example of Toronto Hydro's Fleet Vehicles

The 2020-2024 plan strikes a balance between these pressing needs and customer preferences for: (i) keeping prices as low as possible; (ii) maintaining average reliability; (iii) improving reliability for customers experiencing below-average service; and (iv) balancing other priorities (e.g. customer service) with the need to contain rate increases. The resulting five-year plan represents the minimum level of investment

[32] See Exhibit 2B, Section E.
[33] See Exhibit 4A, Tab 2.

needed to ensure this balance is achieved, while avoiding the accumulation of risk and associated declines in performance over the long-term.

These plans are driven by urgent needs that, if not adequately addressed, will create significant risks to Toronto Hydro's ability to meet customer-valued outcomes, including maintaining the safety and reliability of the distribution system. In some cases, these risks will materialize in the near term, such as lack of capacity to connect new customers or accommodate urban intensification. However, in many cases, the risks will materialize in the medium or long term, such as more outages that are more frequent, longer, and more expensive to resolve. If its plans are not completed, Toronto Hydro could fall out of compliance with new or existing legislative and regulatory obligations.

6.1 Price Constrained Plans

Toronto Hydro developed and refined its capital and operational plans having regard to customer feedback that limiting price increases was a paramount concern, to the degree that doing so would not adversely affect service performance, and that performance would improve in certain areas.

Accordingly, Toronto Hydro's plans do not include all the reasonable funding requests that it would propose as appropriate given the needs of the system. For example, Toronto Hydro has constrained its capital plan that underlies its proposed rate increase to an annual average of $562 million average per year, even though a higher level is preferable from an asset management perspective to better manage certain elevated asset risks such as those associated with rear lot plant and direct-buried cable.[34]

[34] To learn more about the details of Toronto Hydro's approach to business and financial planning, as well as its specific approaches to building the capital and OM&A proposals contained within this application, please see Exhibit 2B; and Exhibit 4A.

Reducing these risks sooner would support lower total asset lifecycle costs over the longer-term by mitigating higher reactive replacement costs and the avoidable costs associated with repeatedly visiting project areas to repair assets that could be rebuilt more economically on a planned basis.

Nevertheless, Toronto Hydro has calibrated a plan that strikes an appropriate balance: the plans propose the minimum level of investment needed to ensure this balance, while managing the major challenges facing the utility and achieving long-term performance. Customers agreed: majority of residential, small business, mid-market and large (i.e. key account) customers supported the plan, or one that does even more.

6.2 Capital Plan

Toronto Hydro's capital plan is set out in the Distribution System Plan ("DSP").[35] This part of its business plan is organized into 20 programs, each of which is driven by similar urgent system needs and customer priorities. These programs address direct distribution needs such as ensuring that customers can connect to the distribution system (i.e. system access),[36] continuing the needed repairs and replacements of deteriorating infrastructure (i.e. system renewal),[37] and enhancing the functionality of the system, such as by increasing what it can receive from the transmission system and through better monitoring equipment (i.e. system service).[38] Figure 15, below, provides an example of a vault with Network Condition Monitoring and Control equipment installed.

[35] See Exhibit 2B.
[36] See Exhibit 2B, Section E5.
[37] See Exhibit 2B, Section E6.
[38] See Exhibit 2B, Section E7.

These programs also address supportive distribution needs such as investments in fleet vehicles, data management systems, and other assets that indirectly support the distribution system (i.e. general plant).[39] All these programs are necessary to safely and reliability power the City of Toronto and to be responsive to other customer needs, preferences, and priorities.

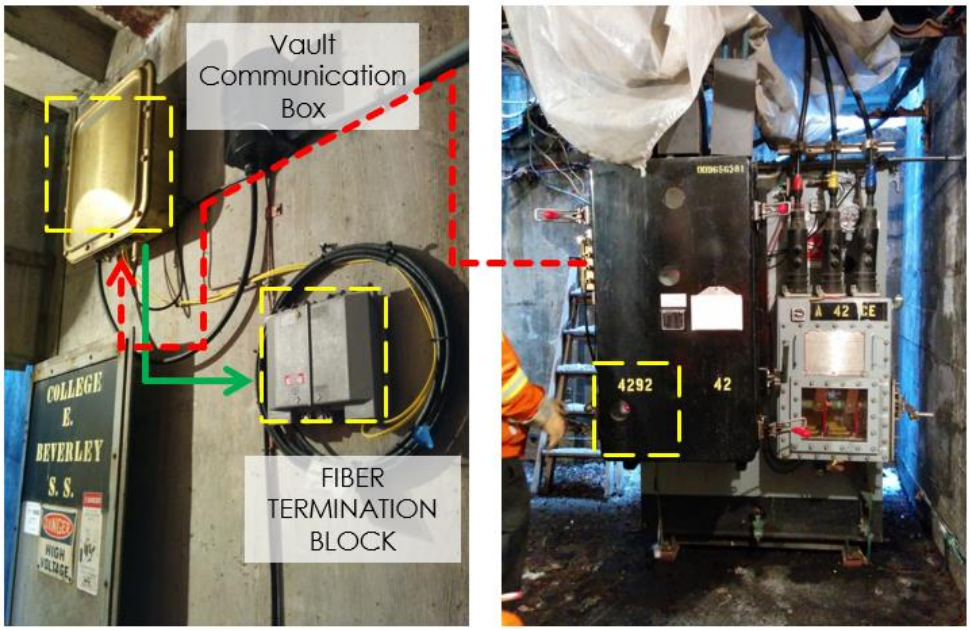

Figure 15: Vault Layout with Network Condition Monitoring and Control Equipment Installed

The 2020-2024 capital plan continues the utility's effort to renew a significant backlog of deteriorated and obsolete assets at risk of failure, adapt the system to handle a growing and intensifying major city, and harden the system to make it more resilient when extreme weather hits and expedite restoration capabilities when outages do occur. This plan will enable the utility to keep pace with technological advancements, and enable

[39] See Exhibit 2B, Section E8.

the security investments proportionate to the risks of cyber-attack. The proposed pace for this plan is expected to sustain current age and condition, which will help to maintain system performance over the 2020-2024 period and mitigate the risks of it worsening during this period and in the future.[40]

Despite the success of Toronto Hydro's 2015-2019 plan, its distribution system's need for continued and increased capital investment as proposed in this plan, remains urgent in the 2020-2024 period. In light of the risks of age, condition, and obsolete infrastructure, Toronto Hydro concluded that taking a more reactive approach to infrastructure renewal (i.e. allowing more assets to run to failure) would reduce reliability over the near and long-terms. See Figure 16, below, for examples of the types of reactive work Toronto Hydro completes. In addition to hurting performance, a reactive renewal approach would also increase costs.

Figure 16: Examples of Reactive Work: Pole Fire Caused by Tracking (left), Exposed and Rusted Rebar in Network Vault (right)

[40] For instance, in 2017, 14 percent of pole top transformers had reached or exceeded their expected useful life. Without this plan, that will increase to approximately 40 percent by 2024. Similarly, the percentage of underground transformers and cable chambers at reached or exceeding estimated useful life will increase from approximately 20 percent to 35 percent and 30 percent respectively by 2024.

The risk to the utility's deteriorating infrastructure is compounded by increases in the frequency and magnitude of extreme weather. Toronto Hydro continues to emphasize plans and programs that facilitate and improve its system resiliency, and ability to respond to these events.[41]

With more than 1,800 distributed energy resources connected to Toronto Hydro's system,[42] reducing risks to the grid requires Toronto Hydro to enhance its visibility of them and put in appropriate safety equipment and protocols. To this end, the utility plan includes a number of investments to assist in managing evolving system requirements and technological landscape.[43]

6.3 Operating, Maintenance & Administration ("OM&A" or "Operational") Plan

Toronto Hydro's operational plan is organized into 21 programs, each of which advances similar outcomes in similar ways. Some programs work directly with the distribution system, such as preventative maintenance, emergency response, and the control centre.[44] Other programs provide support to operations and customers, such as fleet, facilities, and supply chain,[45] customer service and support,[46] human resources, finance, and information technology.[47] All these programs are necessary to safely and reliably

[41] These programs include the Control Operations Reinforcement program (Exhibit 2B, Section E8.1), Area Conversions (Exhibit 2B, E6.1), System Enhancements (Exhibit 2B, E7.1), and Overhead System Renewal (Exhibit 2B, Section E6.5).
[42] There are likely dozens, perhaps even hundreds more of these micro-generation, storage, and other devices that are installed without notice to Toronto Hydro, the operation of which by the customer can affect the distribution system and other customers connected to it (e.g. power quality fluctuations, back-flow of power, spikes up and down in demand).
[43] See Exhibit 2B, Section E7.1 (System Enhancements); Exhibit 2B, Section E7.2 (Energy Storage Systems); Exhibit 2B, Section E7.3 (Network Condition Monitoring and Control); and Exhibit 2B, Section E8.1 (Control Operations Reinforcement program).
[44] See Exhibit 4A, Tab 2, Schedules 1-10.
[45] See Exhibit 4A, Tab 2, Schedules 11-13.
[46] See Exhibit 4A, Tab 2, Schedules 14 and 19.
[47] See Exhibit 4A, Tab 2, Schedules 15-18, 20-21.

power the City of Toronto and be responsive to other customer needs, preferences, and priorities.

Toronto Hydro's operational plan largely continues its 2015-2019 programs. These programs provide functions that address relatively consistent needs over time, such as supporting the safe and reliable operation of the distribution system, delivering customer-facing services that respond to customer expectations and improve ratepayer value, and providing critical corporate functions that allow the utility to operate in a financially responsible and policy-responsive manner.

This plan continues the utility's effort to extract the full value out of distribution equipment through programs that perform preventative, predictive, and corrective maintenance on the deteriorating infrastructure.[48] The Customer-Driven Work Program is at the centre of responding to Toronto's growth and intensification.[49] The utility readies itself for extreme weather through the Disaster Preparedness Management Program and deals with those challenging events through the Emergency Response Program.[50] Keeping pace with external technological advancements and using those advancements to better meet customer needs and protect the utility and customers from cyber threats are major concerns of multiple programs.[51]

6.4 Third Party Input and Review

As part of its business plan, Toronto Hydro retained external experts to conduct assessments of its current performance, including benchmarking with respect to

[48] See Exhibit 4A, Tab 2, Schedules 1-4.
[49] See Exhibit 4A, Tab 2, Schedule 8.
[50] See Exhibit 4A, Tab 2, Schedules 5-6.
[51] For example, see Exhibit 4A, Tab 2, Schedules 7 (Control Centre Operations), 14 (Customer Care), and 17 (Information Technology).

productivity, reliability, and unit/cost efficiency. The results of those studies, filed with this Application, determined that Toronto Hydro's performance is comparable to that of its peers, and in some cases out-performs its peers.

In this Application, the utility has also filed third party assessments of its plans, including a review of its asset management, benchmarking the IT function against peers, and an analysis of the proposal underlying the Control Operations Reinforcement Program. These studies provided Toronto Hydro with important insights and the reports are filed with the Application as commentary and support for the associated plans.

APPENDIX A: SUMMARY OF TOTAL BILL IMPACTS AND UPDATED TARIFF CHARGES

	Change in bill	2020 Proposed	2021 Proposed	2022 Proposed	2023 Proposed	2024 Proposed
Residential	$/30 days	-3.10	1.44	1.12	1.40	1.92
	%	-2.4	1.1	0.9	1.1	1.5
Competitive Sector Multi-Unit Residential	$/30 days	-1.19	1.14	0.89	0.99	1.52
	%	-1.7	1.7	1.3	1.4	2.1
General Service <50 kW	$/30 days	-6.60	3.62	2.81	4.39	4.82
	%	-2.0	1.1	0.9	1.3	1.4
General Service 50-999 kW	$/30 days	-156.17	63.57	49.55	87.48	84.52
	%	-1.1	0.5	0.4	0.6	0.6
General Service 1,000-4,999 kW	$/30 days	-1,452.01	521.66	406.45	717.98	693.76
	%	-0.9	0.3	0.3	0.5	0.5
Large Use	$/30 days	-3,187.65	2,692.82	2,098.05	3,704.72	3,579.26
	%	-0.5	0.4	0.3	0.5	0.5
Street Lighting	$/30 days	-0.15	0.28	0.22	0.39	0.38
	%	-0.8	1.5	1.2	2.1	2.0
Unmetered Scattered Load	$/30 days	-1.23	1.19	0.93	1.62	1.57
	%	-1.9	1.9	1.4	2.5	2.3

Specific charge for access to the power poles	per pole/year	44.15
(wireline attachments)	%	5.1