



2020-2024 Custom Incentive Rate-Setting Application

EXECUTIVE SUMMARY AND BUSINESS PLAN OVERVIEW



1 **1. OVERVIEW**

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

9
10 This Application covers the 2020-2024 period. The proposed rates are necessary to fund
11 the utility’s business plan for that period. For a residential customer, the utility’s 5-year
12 proposal would result in an average annual increase of \$0.77 (1.7 percent) on Toronto
13 Hydro’s distribution portion of the bill, or a \$0.56 (0.4 percent) increase on the overall
14 electricity bill. For the first year of the plan, 2020, residential customers will experience
15 a decrease of \$3.10 on the overall electricity bill.¹

16
17 Toronto Hydro’s plan was developed in consultation with its customers, having regard to
18 how the utility’s costs and performance compare with its peers (i.e. benchmarking), and
19 with the objective of producing outcomes that customers value. These external inputs
20 were combined with Toronto Hydro’s knowledge and experience of the state of its
21 distribution system infrastructure, and the other considerations that inform good utility
22 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.

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

3

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

8

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

14

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



Figure 1: Toronto Hydro at Work

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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.

1 **2. ABOUT TORONTO HYDRO**

2 Toronto Hydro is licensed by the OEB to serve the City of Toronto.² See Figure 2, below,
3 for a map of Toronto Hydro's service territory. Toronto Hydro is the successor to the six
4 former hydro-electric commissions of the municipalities which amalgamated on January
5 1, 1998 to form the City of Toronto. The utility is a wholly-owned subsidiary of Toronto
6 Hydro Corporation, whose sole shareholder is the City of Toronto.³

7



8 **Figure 2: Toronto Hydro's Service Territory**

9

10 As of 2020, Toronto Hydro forecasts distributing electricity to 784,330 customers who
11 are forecasted to consume over 24 TWh⁴ of power that year.⁵ Toronto Hydro serves
12 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.

1 200 stations and substations. This is a 4.9 percent increase in customer count but a 4.0
2 percent decrease in power consumption over 2015.⁶

3
4 Toronto Hydro's customers range from residential consumers in single family dwellings
5 and multi-unit buildings to large industrial and commercial businesses. These include
6 the country's largest banks, stock exchanges and other large customers that are
7 sensitive to service interruptions. The utility powers non-residential customers from a
8 wide variety of sectors, including: dozens of accounts for hospitals and healthcare and
9 long-term care facilities; hundreds of accounts for schools, colleges, and universities;
10 data centres; and large industrial and manufacturing facilities. Toronto Hydro also
11 supplies electricity to Ontario's Provincial Legislature and Ministries, as well as Toronto's
12 municipal government. The utility also serves thousands of multi-unit residential
13 condominium and apartment buildings, each of which can have dozens or hundreds of
14 units.⁷

15 16 **3. CUSTOMER ENGAGEMENT AND THE BUSINESS PLAN**

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

- 22 1) **Price Limit:** Toronto Hydro set an upper limit of 3.5 percent as a cap on the
23 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.

1 2) **Budget Limits:** Toronto Hydro set upper limits of approximately \$560 million for
2 the average annual capital plan budget and \$277 million for the 2020 operational
3 plan budget, which corresponded with capping infrastructure and operations
4 spending predominantly at sustainment levels.

5 3) **Performance:** Toronto Hydro developed an Outcomes Framework that
6 established a lens through which the utility could express its plans and
7 performance in terms that demonstrate value for customers, and are meaningful
8 to its operations.

9
10 Toronto Hydro's business plan and this Application are aligned with these strategic
11 parameters:

- 12 • The average annual increase to base distribution rates associated with Toronto
13 Hydro's plan is approximately 3.0 percent;¹⁰
- 14 • Toronto Hydro's capital and operational budgets that underlie the plan are
15 consistent with the caps the utility established; and
- 16 • Toronto Hydro's Outcomes Framework reflects customer priorities, Toronto
17 Hydro's operational pillars, and the OEB's performance categories, and includes
18 44 measures to track its performance.¹¹

19
20 Customer preferences and priorities informed Toronto Hydro's development of its
21 business plan throughout the preparation of the utility's capital and operational plans.
22 For example, Toronto Hydro eliminated approximately \$75 million per year from its
23 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.

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

7

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

10



11

Figure 3: Legacy Rear Lot Supply Conversion

12

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

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

6

7 **4. MAJOR CHALLENGES**

8 Toronto Hydro faces a number of significant and urgent challenges in building and
9 operating its distribution system, and responding to the outcomes that customers
10 prioritized. In order to ensure that overall system performance is maintained and
11 specific areas requiring improvement are addressed in 2020 to 2024 and beyond,
12 Toronto Hydro has developed capital and operating plans focused on managing a
13 number of challenges and associated risks.¹⁵ In developing its 2020-2024 business plan,
14 the utility took into account a large number of operating considerations and investment
15 drivers, which are discussed within each of the programs.¹⁶ There are also a number of
16 significant macro challenges that affect the broader business plan. These include
17 deteriorating infrastructure, the growing city, extreme weather, workforce retirements,
18 and technology advancements (including cyber threats), which are discussed in turn
19 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.

1 **4.1 Deteriorating Infrastructure**

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

5

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

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

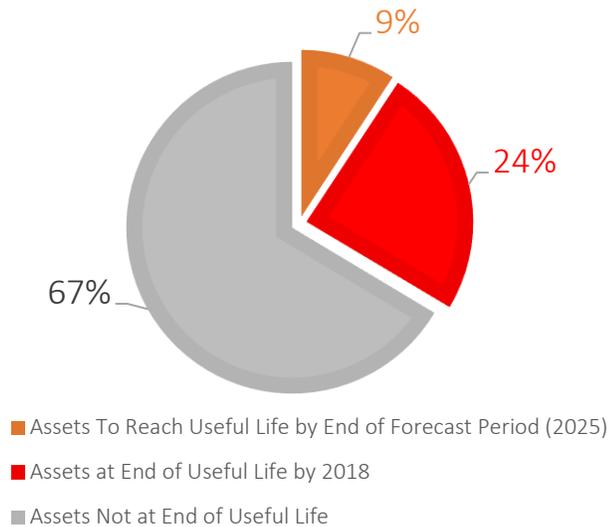
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18

Figure 4: Box Construction in a Backyard with Leaking Equipment

1 Toronto Hydro’s distribution system faces a number of significant and evolving
2 challenges that drive the need for the proposed level of investment. As seen in Figure 5,
3 below, approximately a quarter of the utility’s asset base continues to operate beyond
4 useful life, and an estimated 9 percent will reach that point by 2025, indicating that a
5 significant, proactive renewal program is necessary to prevent the investment backlog
6 from increasing. Toronto Hydro anticipates that an increase in the backlog of assets
7 past useful life would result in a deterioration in reliability, safety, and other outcomes
8 driven by asset failure. Defective equipment continues to be, by far, the largest
9 contributor to the frequency (36 percent), and duration (44 percent) of outages.
10



11 **Figure 5: Percentage of Assets Past Useful Life**

12
13 Asset Condition Assessment demographic results also indicate substantial asset
14 investment needs for a number of critical asset classes over the plan period. Among the
15 subset of asset classes that Toronto Hydro analyzed, major civil assets like poles and
16 vaults, and major stations electrical assets are showing the greatest signs of material

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

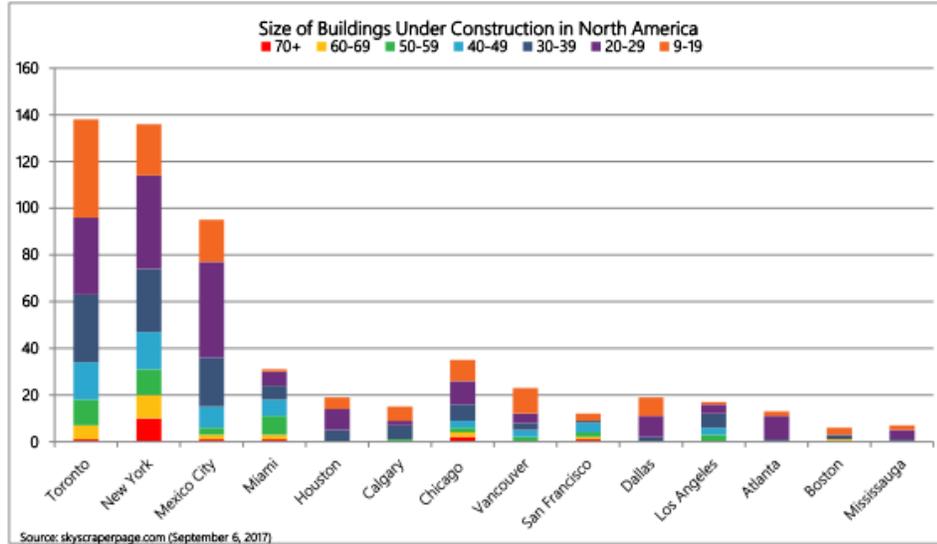
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4 **4.2 Growing City**

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

15

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



1 **Figure 6: Number of Floors in High-Rise & Mid-Rise Buildings under Construction¹⁷**

2

3 **4.3 Extreme Weather**

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

10

11 Recent extreme weather events such as wind and ice storms outlined in Table 1, below,
 12 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>>.

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

Event	Description
Freezing Rain (February 2017)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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.

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

5



6

Figure 7: Damage due to Weather Events

7

8 Climate change affects different parts of the distribution system in different ways. The
9 overhead system is susceptible to extreme winds, freezing rain and wet snow resulting
10 in damage and outages. Broken trees and the weight of ice and snow accretions can
11 bring lines, poles and associated equipment to the ground. Figure 7, above, are some
12 examples of line damage caused by the recent weather-related events in the City of
13 Toronto. The underground system is vulnerable to flooding from extreme rainfall. For
14 instance, extreme rainfall in April and May of 2017 caused a number of Toronto Hydro's
15 vaults and cable chambers in the underground system to flood. One particular network
16 vault in Toronto's downtown core experienced severe flooding, causing a network
17 protector to fail. This resulted in a lengthy outage in the financial district with
18 significant disruption to customers, a closure of a busy arterial road during afternoon
19 rush hour, and significant public and media attention.

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

6

7 **4.4 Workforce Retirements**

8 Toronto Hydro employees are essential in executing planned and reactive work
9 programs that are necessary to maintain the distribution system's integrity, mitigate
10 unacceptable risks in the areas of reliability and safety, and operate the system.

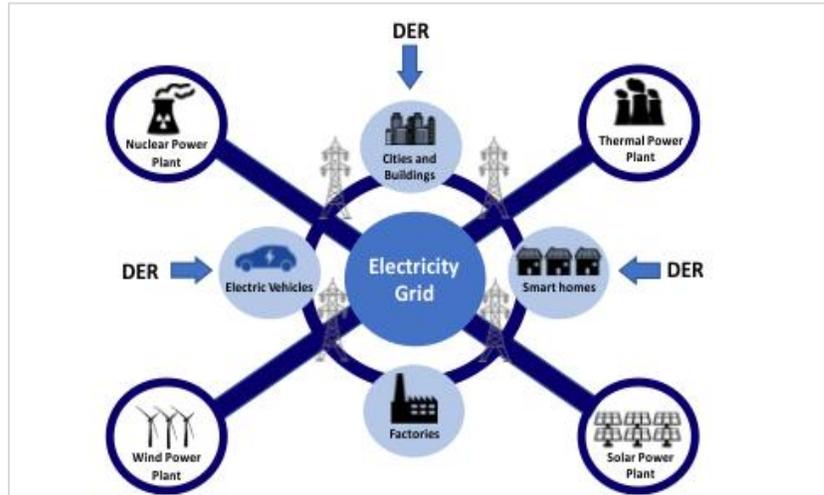
11 Toronto Hydro is in the midst of a significant renewal of its workforce, with
12 approximately 23 percent of its workforce (or approximately 340 FTEs) forecasted to
13 retire between 2020 and 2024. Of that number, approximately 80 percent are from the
14 utility's staffing categories that directly maintain and operate the distribution system
15 (e.g. certified and skilled trades, designated and technical professionals, and supervisory
16 positions). These personnel are critical to maintaining and operating the distribution
17 system in a safe and efficient manner, and filling these roles can be especially
18 challenging and can take up to six years to train. Recruitment and retention are
19 particularly challenging in Toronto's competitive job market and with quickly escalating
20 costs of living in the City and neighbouring communities.

21

22 **4.5 Technology Advancements**

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

1 resources on heavily loaded feeders in dense areas that serve customers sensitive to
2 power quality. A dangerous example of that challenge is cyber threats.¹⁸
3



4 **Figure 8: Distributed Energy Resources Interacting with the Electricity Grid**¹⁹

5

6 Technology and innovation are driving a more dynamic system that is transitioning away
7 from usual patterns of supply and demand towards more complex interactions and
8 inputs in electricity generated and consumed (Figure 8, above). The role of the utility
9 continues to evolve to support the new smart grid ecosystem, comprising renewable
10 and other distributed energy resources, microgrids, electric vehicles, and growing
11 interest in energy storage for power quality, off-peak storage, and grid resilience. See
12 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.

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

3



4 **Figure 9: Installation of Pole-Mounted Energy Storage Systems**

5

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

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

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

12

13 **5. PERFORMANCE AND CONTINUOUS IMPROVEMENT**

14 Toronto Hydro has created a customer-focused outcomes framework (the “Outcomes
15 Framework”) for the 2020-2024 period that facilitates continuous improvement and
16 measures the effectiveness of the utility’s plans through the implementation of 15
17 custom performance measures for a total of 44 unique measures to be reported to the
18 OEB annually (see discussion below). These outcomes are expressions of the utility’s
19 goals and objectives. As set out in Figure 10, the Outcomes Framework links customer
20 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>>.

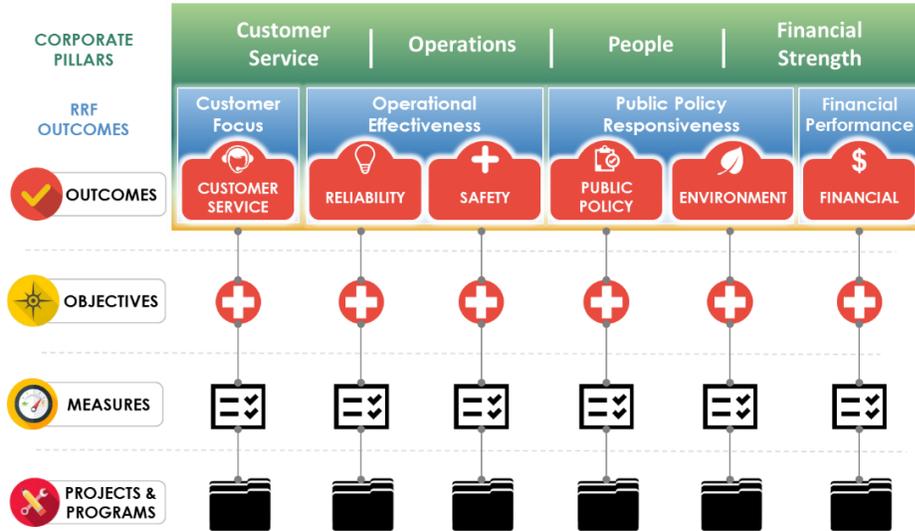


Figure 10: Outcomes Framework

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

7

8 **5.1 Performance-Based Plan**

9 To remain responsive to customer needs and preferences and demonstrate continuous
 10 improvement in performance setting and tracking, Toronto Hydro has proposed 15
 11 custom measures within its Outcomes Framework that are incremental to measures
 12 tracked and assessed by the OEB, for a total of 44 measures to be reported annually.

13 Table 2, below, shows the number of performance measures within each Outcomes
 14 categories. Toronto Hydro’s proposed custom measures reflect a thorough

15 understanding of customer priorities and provide assurance that value for money will be
 16 achieved through the utility’s capital and operational plans.

1 **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

2

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

7

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

12

13 **5.2 Performance Measurement and Management**

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

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

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

12
 13 **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%

14
 15 In addition, from 2013-2017, Toronto Hydro achieved or exceeded the OEB’s Electricity
 16 Service Quality Requirements (“ESQR”) standards 85 percent of the time. In 2017, for
 17 instance, the utility met or surpassed the OEB’s standards for 11 out of the 12 measures
 18 (92 percent). In respect of outages, Toronto Hydro's has slightly improved its number
 19 and frequency of customer interruptions in the last five years, and its performance has
 20 been equal to or better than the distributor target from 2013-2017. This achievement is
 21 attributable to the investments the utility has made in the system.

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

8

9 **5.3 Completing Major Capital Programs**

10 For several years, Toronto Hydro has focussed on delivering a significant and ongoing
11 capital plan to improve the safety and reliability of the distribution system and deliver
12 service levels aligned with the needs and preferences of its customers. By the end of
13 2019, a number of the utility’s initiatives are on-track to be substantially complete,
14 including:²⁴

- 15 • The Operating Cost Centre Consolidation Program (“OCCP”), which involved the
16 consolidation of Toronto Hydro’s operating centres to optimize the utility’s use
17 of space and decrease property costs, as well as return net gains on sales to
18 ratepayers.²⁵
- 19 • Paper-Insulated Lead-Covered (“PILC”) Cable Leakers and Piece-Outs Program,
20 which involved replacing and repairing aging and defective PILC cables, reducing
21 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.

- 1 • Overhead Infrastructure Relocation Program, which involved replacing feeders
2 that were in difficult to access locations or high-risk location (e.g. ravines and
3 overhead highway crossings), reducing system reliability and safety risks.²⁷
4 • Copeland Station, an underground transformer station (see Figure 11, below)
5 that will add capacity equivalent to 70 skyscrapers to the downtown core,
6 helping to ensure that Toronto continues to receive safe and reliable electricity
7 in the face of growth and pressures on system capacity.²⁸
8



9

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.

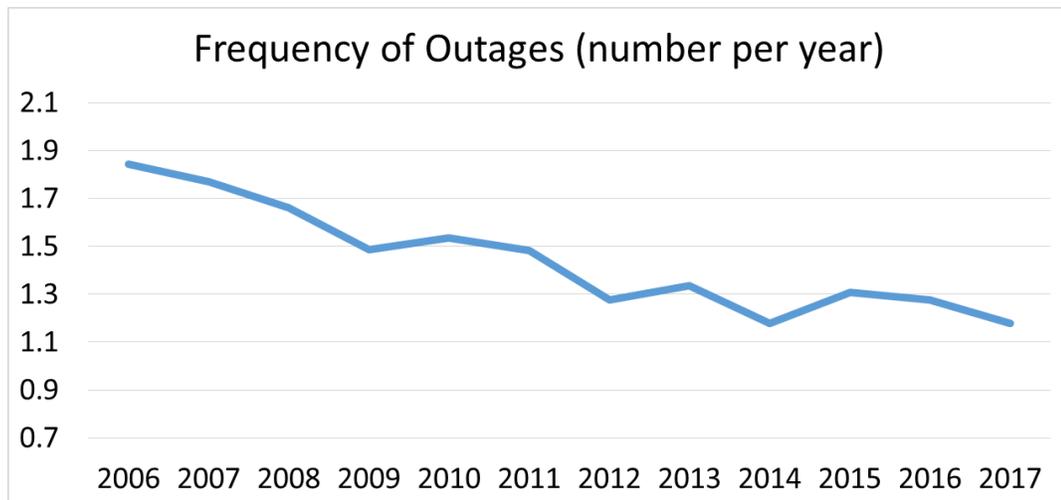
²⁸ EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 5, 2016), Exhibit 2B, Section E7.9.

1 **5.4 System Stewardship**

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

9
10 The decrease in APUL has also strengthened the reliability of the system, which is one of
11 the top three priorities of customers. Since the mid-2000s, reliability had been
12 deteriorating. However, through investments in these assets, reliability has stabilized.
13 As shown in Figures 12 and 13, below, the frequency and duration of outages have
14 essentially plateaued, with slight improvements in the last five years.

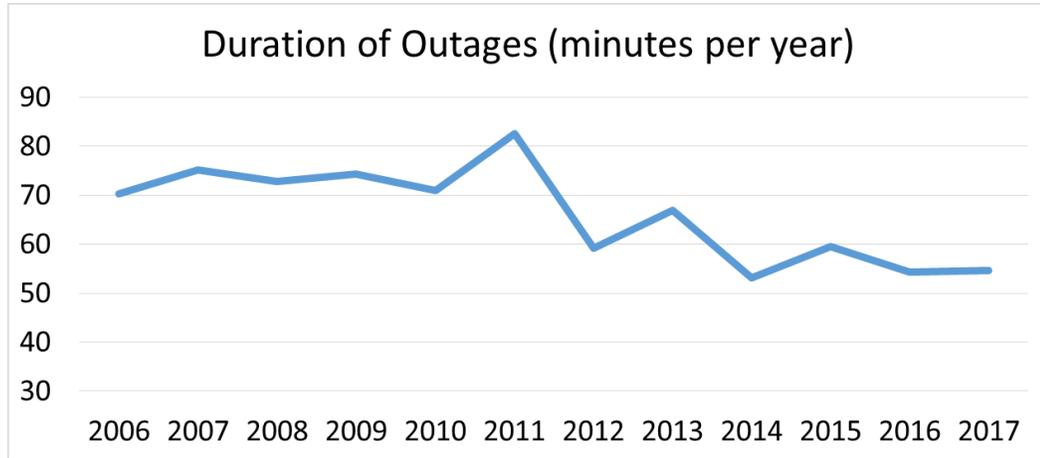
15



16

Figure 12: Historical SAIFI²⁹

²⁹ Excluding MEDs and Loss of Supply.



1 **Figure 13: Historical SAIDI³⁰**

2
3 There is still a large population of assets past their useful life. Continued investment is
4 required to ensure there is no deterioration in recently stabilized system performance.

5
6 **5.5 Analytic Tools**

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

13
14 **6. OVERVIEW OF THE 2020 TO 2024 CAPITAL AND OPERATIONAL PLANS**

15 The plans for Toronto Hydro's capital and operational programs included in this
16 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.

1 investments in distribution system infrastructure as well as other investments in
2 supporting facilities and equipment, such as system control centres, fleet vehicles (see
3 Figure 14, below), and data management software.³² Operational plans address day-to-
4 day activities, such as emergency response to outages, system infrastructure
5 inspections, and employee training.³³
6



7 **Figure 14: Example of Toronto Hydro’s Fleet Vehicles**

8
9 The 2020-2024 plan strikes a balance between these pressing needs and customer
10 preferences for: (i) keeping prices as low as possible; (ii) maintaining average reliability;
11 (iii) improving reliability for customers experiencing below-average service; and (iv)
12 balancing other priorities (e.g. customer service) with the need to contain rate
13 increases. The resulting five-year plan represents the minimum level of investment

³² See Exhibit 2B, Section E.

³³ See Exhibit 4A, Tab 2.

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

3

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

12

13 **6.1 Price Constrained Plans**

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

18

19 Accordingly, Toronto Hydro's plans do not include all the reasonable funding requests
20 that it would propose as appropriate given the needs of the system. For example,
21 Toronto Hydro has constrained its capital plan that underlies its proposed rate increase
22 to an annual average of \$562 million average per year, even though a higher level is
23 preferable from an asset management perspective to better manage certain elevated
24 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.

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

5

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

11

12 **6.2 Capital Plan**

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

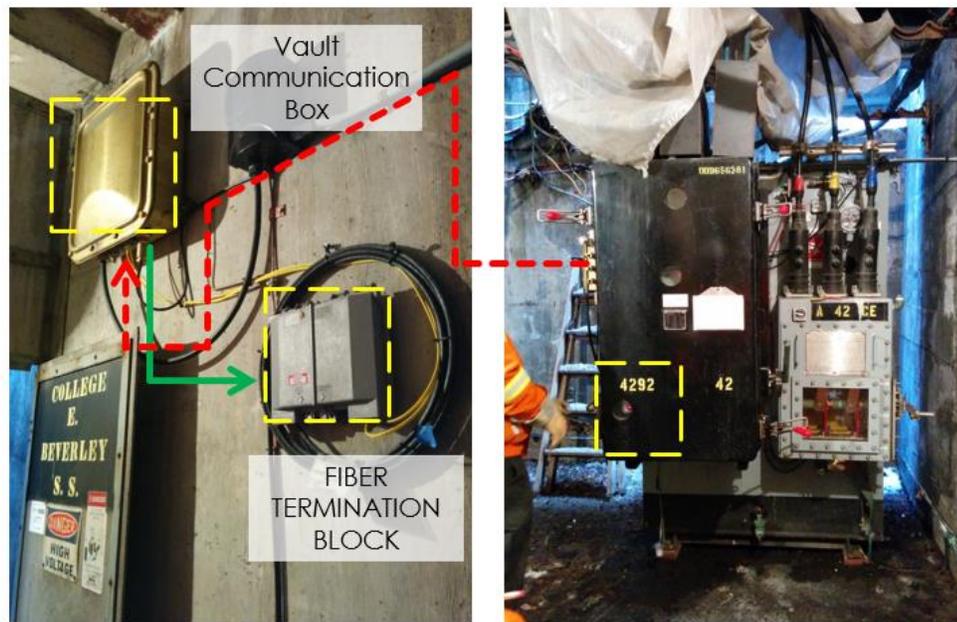
³⁵ See Exhibit 2B.

³⁶ See Exhibit 2B, Section E5.

³⁷ See Exhibit 2B, Section E6.

³⁸ See Exhibit 2B, Section E7.

1 These programs also address supportive distribution needs such as investments in fleet
2 vehicles, data management systems, and other assets that indirectly support the
3 distribution system (i.e. general plant).³⁹ All these programs are necessary to safely and
4 reliability power the City of Toronto and to be responsive to other customer needs,
5 preferences, and priorities.
6



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

9
10 The 2020-2024 capital plan continues the utility's effort to renew a significant backlog of
11 deteriorated and obsolete assets at risk of failure, adapt the system to handle a growing
12 and intensifying major city, and harden the system to make it more resilient when
13 extreme weather hits and expedite restoration capabilities when outages do occur. This
14 plan will enable the utility to keep pace with technological advancements, and enable

³⁹ See Exhibit 2B, Section E8.

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

5

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

14



15 **Figure 16: Examples of Reactive Work: Pole Fire Caused by Tracking (left), Exposed and**
16 **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.

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

5

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

11

12 **6.3 Operating, Maintenance & Administration (“OM&A” or “Operational”) Plan**

13 Toronto Hydro’s operational plan is organized into 21 programs, each of which advances
14 similar outcomes in similar ways. Some programs work directly with the distribution
15 system, such as preventative maintenance, emergency response, and the control
16 centre.⁴⁴ Other programs provide support to operations and customers, such as fleet,
17 facilities, and supply chain,⁴⁵ customer service and support,⁴⁶ human resources, finance,
18 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.

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

3

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

10

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

20

21 **6.4 Third Party Input and Review**

22 As part of its business plan, Toronto Hydro retained external experts to conduct
23 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).

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

4

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

1 **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 (wireline attachments)	per pole/year	44.15
	%	5.1

1 **OUTCOMES AND PERFORMANCE MANAGEMENT**

2
3 In developing its approach to outcomes and performance management, Toronto Hydro
4 considered the policy guidance from the OEB, including the *Renewed Regulatory*
5 *Framework for Electricity Distributors: A Performance Based Approach* (the “RRF”).¹ A
6 key theme of the OEB’s guidance is that emphasizing results rather than activities is
7 more responsive to customer preferences, enhanced distributor productivity, and
8 promoting innovation.²

9
10 Toronto Hydro has a long-standing productivity culture, which has evolved over time
11 while remaining responsive to the utility’s operating challenges and regulatory
12 landscape. Since amalgamation in 1998, the utility has been working on streamlining
13 and rationalizing legacy tools, eliminating unnecessary processes, and optimizing assets
14 and workforce. Toronto Hydro’s systems and processes are structured around this
15 culture of performance and outcomes, and include a suite of tools to sustain or improve
16 performance as required.

17
18 As detailed in the utility’s 2015-2019 Application, as the utility has matured, its
19 productivity efforts have resulted in significant savings for customers.³ This has involved
20 streamlining and rationalizing legacy tools, processes, assets and workforce, as well as
21 enhancing utility capabilities such as the asset management and resourcing practices
22 and tools to plan and deliver a significant and sustained capital plan. This has also
23 included the introduction of efficiency-driving tools such as its outage management

¹ Ontario Energy Board, *Renewed Regulatory Framework for Electricity Distributors: A Performance Based Approach* (October 18, 2012).

² *Ibid* at p. 2.

³ EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 6, 2015), Exhibit 1B, Tab 2, Schedule 5, Appendix A.

1 system, and distribution management system, adoption of reliability-centered
2 maintenance, job harmonization, and performance and attendance management
3 programs.

4

5 Toronto Hydro’s commitment to performance management is reflected throughout this
6 Application. For instance, the utility relies on performance governance tools to drive
7 performance and continuous improvement. Specifically, the Management Control and
8 Reporting System (“MCRS”) and the Plan-Do-Check-Act (“PDCA”) management control
9 cycle, consistent with ISO 14001 and OHSAS 18001 standards.⁴ Toronto Hydro uses
10 these tools to manage processes, provide timely data, and enable decision-making.

11

12 Similarly, Toronto Hydro utilizes another performance governance process, Lean (i.e.
13 Kaizen), an operational efficiency methodology that focuses on eliminating eight types
14 of waste,⁵ and streamlining business processes. Collaboration with front line staff, who
15 are most familiar with processes and wastes, results in optimizing how work is
16 completed – thereby saving resources (labour, time, materials, space). By targeting
17 waste reduction in areas such as inventory, waiting time, space, and staff utilization, a
18 direct impact to customer value can be realized as costs to operate are streamlined.

19

20 Toronto Hydro has also developed a customer-focused outcomes framework (the
21 “Outcomes Framework”) for the 2020-2024 plan period that facilitates continuous
22 improvement and measures the effectiveness of the utility’s plans. These outcomes are
23 expressions of the utility’s goals and objectives.

⁴ Toronto Hydro is registered with ISO 14001:2015 and OHSAS 18001:2007, both internationally recognized standards in environment, health, and safety. Together, they establish a framework that incorporates effective risk management, emphasizes continual improvement, and achieves operational efficiencies.

⁵ Defects, Overproduction, Waiting, Non-Utilized Talent, Transportation, Inventory, Motion, Extra-Processing.

1 Leveraging this foundation, the utility expects its custom measures, reported under the
2 Outcomes Framework, and the OEB reporting measures (Electricity Distributor
3 Scorecard and Electricity Service Quality Requirements) will provide the OEB,
4 stakeholders and most importantly, customers, quantitative assessment tools for the
5 utility’s planning and execution activities. This framework and associated measures also
6 provide quantitative insight into Toronto Hydro’s strong performance during the last
7 plan period (2015 through 2019), and enables performance measurement during the
8 period of this plan (2020 through 2024).

9
10 Lastly, as detailed in Toronto Hydro’s rate-setting framework, Exhibit 1B, Tab 4,
11 Schedule 1, the utility has included productivity gains as part of the rate adjustment
12 mechanism, constraining operational funding increases going forward at less than the
13 rate of inflation, and reconciling a price-cap formula with funding requirements to
14 address Toronto Hydro’s significant, multi-year investment needs over the 2020 to 2024
15 period. It has also included, throughout the Application, detailed descriptions of how
16 the utility is managing costs and improving outputs.⁶

17
18 This Exhibit is separated into two sections. A discussion of Toronto Hydro’s Outcomes
19 Framework, including its development, inputs, and proposed custom measures, is
20 followed by a comprehensive performance management overview incorporating its
21 productivity and cost efficiency initiatives including benchmarking results. Productivity
22 initiatives, such as those discussed in Section 2, are directed to achieve savings,
23 reductions, or efficiencies. Since productivity consists of inputs and outputs, changes to
24 inputs are influenced in an ongoing, continuous improvement cycle. Inputs include cost
25 management, but also more subtle contributors such as increased capacity and process

⁶ Please see Exhibit 2B, Section A and Exhibit 4A, Tab 2, Schedules 1-18, specifically the “Cost Control” sections.

1 improvement. Overall, this Exhibit provides a centralized discussion on how Toronto
2 Hydro ensures customer value by using results from cost trends and assessments,
3 benchmarking studies as well as customer engagement activities to shape its proposed
4 plans.

5

6 **1. TORONTO HYDRO'S OUTCOMES FRAMEWORK**

7 Toronto Hydro has organized its application around outcomes to ensure that value for
8 customers is achieved via a utility's selection of investments and pacing. This outcomes
9 or results-based focus is not new to Toronto Hydro. The utility has a long and
10 established corporate performance framework with a focus on continuous
11 improvement.

12

13 Toronto Hydro's 2020-2024 Outcomes Framework was derived from six customer
14 priorities identified through the utility's customer engagement activities, the utility's
15 corporate pillars as well as the OEB's RRF outcomes.

16

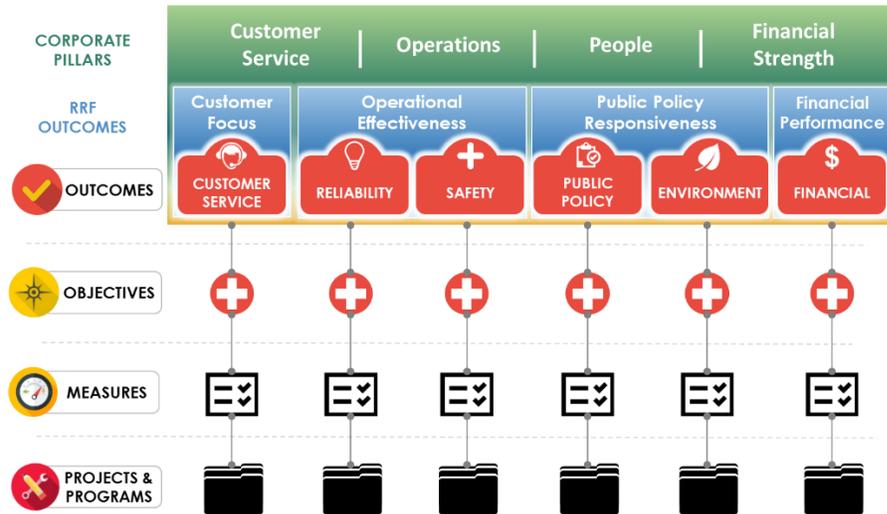
17 Toronto Hydro's customers identified six categories of priorities related to: Price,
18 Reliability, Safety, Customer Service, Public Policy, and Environment.⁷ The OEB RRF
19 outcomes are: Customer Focus, Operational Effectiveness, Public Policy
20 Responsiveness, and Financial Performance.⁸ Toronto Hydro's corporate pillars are:
21 Customer Service, Operations, People, and Financial Strength.

⁷ See Exhibit 1B, Tab 3, Schedule 1

⁸ EB-2010-0379, Ontario Energy Board Report of the Board: Performance Measurement for Electricity Distributors: A Scorecard Approach (March 5, 2014).

1 The resulting framework, depicted in Figure 1, is informed by the six priorities identified
 2 in the Phase I low-volume customer focus groups, in addition to Toronto Hydro’s
 3 corporate pillars and the OEB’s RRF outcomes. The Outcomes Framework is focused on
 4 six key outcomes: Customer Service, Reliability, Safety, Environment, Public Policy,⁹ and
 5 Financial.¹⁰ This Framework transitioned into the lens through which Toronto Hydro
 6 articulated and implemented its strategic vision throughout business planning. This
 7 vision is reflected in the investment decisions made by the utility.

8



9 **Figure 1: Toronto Hydro’s Customer-Focused Outcomes Framework¹¹**

10

11 Overall, Toronto Hydro intends to continue using its Outcomes Framework to assess and
 12 communicate the effectiveness of its plans in delivering value that aligns with evolving
 13 customer preferences over time. Please see Exhibit 2B, Section E2, for a discussion of

⁹ Which includes enabling the system to support in the reduction of greenhouse gases.

¹⁰ Which includes delivering reasonable electricity prices.

¹¹ The RRF Outcomes are aligned alongside Toronto Hydro’s Outcomes based on the definitions provided by the OEB in the Utility Rate Handbook. It should be noted that Toronto Hydro’s Financial outcome includes cost-related components that the OEB would classify within the Operational Effectiveness outcome.

1 how the utility has identified specific outcomes valued by its customers and how its
 2 plans and proposed expenditures deliver those outcomes.

3
 4 **1.1 Toronto Hydro’s 2020-2024 Custom Performance Measures**

5 To remain responsive to customer needs and preferences and demonstrate continuous
 6 improvement in performance setting and tracking, Toronto Hydro has proposed 15
 7 custom measures within its Outcomes Framework that are incremental to measures
 8 tracked and assessed by the OEB, for a total of 44 unique measures to be reported
 9 annually.¹² See Appendix A for a full list of measures to be reported annually to the
 10 OEB. For a comprehensive discussion of Toronto Hydro’s custom measures for the
 11 2020-2024 plan period, please refer to Exhibit 2B, Section C2. Toronto Hydro’s
 12 proposed custom measures reflect a thorough understanding of customer priorities and
 13 provide assurance that value for money will be achieved through the utility’s 2020-2024
 14 Distribution System Plan.

15
 16 **Table 1: 2020-2024 Custom Performance Scorecard Measures**

Toronto Hydro Outcome	OEB Reporting Category	Toronto Hydro’s Custom Measures	Target
Customer Service	Customer Satisfaction	Customers on eBills	Improve
Safety	Safety	Total Recorded Injury Frequency	Maintain
		Box Construction Conversion	Improve
		Network Units Modernization	Improve
Reliability	System Reliability	SAIDI - Defective Equipment	Maintain
		SAIFI - Defective Equipment	Maintain
		FESI 7 System	Improve
		FESI-6 Large Customers	Maintain
	Asset Management	System Capacity	Maintain
		System Health (Asset Condition) – Wood Poles	Monitor
		Direct Buried Cable Replacement	Improve

¹² These proposed measures will monitor distribution system planning process performance.

Toronto Hydro Outcome	OEB Reporting Category	Toronto Hydro's Custom Measures	Target
Financial	Cost Control	Average Wood Pole Replacement Cost	Monitor
		Vegetation Management Cost per km	Monitor
Environment	Environment	Oil Spills Containing PCBs	Improve
		Waste Diversion Rate	Monitor

1

2 Toronto Hydro's custom performance measures, and the targets related to all measures
 3 in general (including the Electricity Distributor Scorecard and the Electricity Service
 4 Quality Requirements), have been developed on the basis of the proposals, plans, and
 5 associated rates contained in this Application. To the extent that Toronto Hydro's
 6 approvals differ from those it seeks in this Application, then the utility would need to
 7 reforecast and re-assess its forecasted attainable performance for the period. Further,
 8 there are risks outside of Toronto Hydro's control which may also affect its ability to
 9 achieve performance targets.

10

11 **2. PERFORMANCE MANAGEMENT**

12 Toronto Hydro is an efficient organization that strives to promote its history of
 13 productivity and customer cost savings. Inherent in its focus on outputs and value is the
 14 emphasis on measuring and tracking performance, using internal and external
 15 benchmarking.

16

17 This section centralizes the utility's discussion of productivity and includes summaries of
 18 benchmarking studies relating to Toronto Hydro's performance relative to its peers. The
 19 activities captured within the following discussions are testament to the utility's
 20 commitment to ensure continuous improvement in the efficiency of key operational
 21 tasks that ultimately contribute to value-for-money for customers.

1 **2.1 Productivity**

2 Toronto Hydro’s framework of current and future productivity processes and initiatives
 3 emphasize increasingly sophisticated performance measurement tools, identification for
 4 new efficiency opportunities, and reducing manual, labour-intensive processes through
 5 streamlining and technological improvements. The discussion below provide examples
 6 of sources of productivity improvements.

7
 8 **2.1.1 Health and Safety**

9 Lost working time negatively affects productivity. Therefore, Toronto Hydro has applied
 10 extensive efforts in health and safety, which has decreased costs, reduced absenteeism
 11 and improved employee health and safety. In 2015 and 2016, the Canadian Electricity
 12 Association recognized Toronto Hydro as the best in its peer group for its superior
 13 performance in occupational health and safety. Table 2, below, compares Workplace
 14 Safety Insurance Board (“WSIB”) accident costs averaged over the 2014-2016 period.

15
 16 **Table 2: Average WSIB Accident Costs¹³**

	Toronto Hydro	Hydro One Networks	Alectra Utilities	Hydro Ottawa	London Hydro	Enwin Utilities
Average WSIB Accident Costs 2014 - 2016	\$21,922	\$1,361,519	\$69,694	\$200,719	\$60,158	\$28,128
Average WSIB Accident Costs per Employee 2014 -2016	\$13.70	\$247.54 ^a \$180.59 ^b	\$43.56	\$286.74	\$191.59	\$85.49

^a Based on 5,500 full time employees

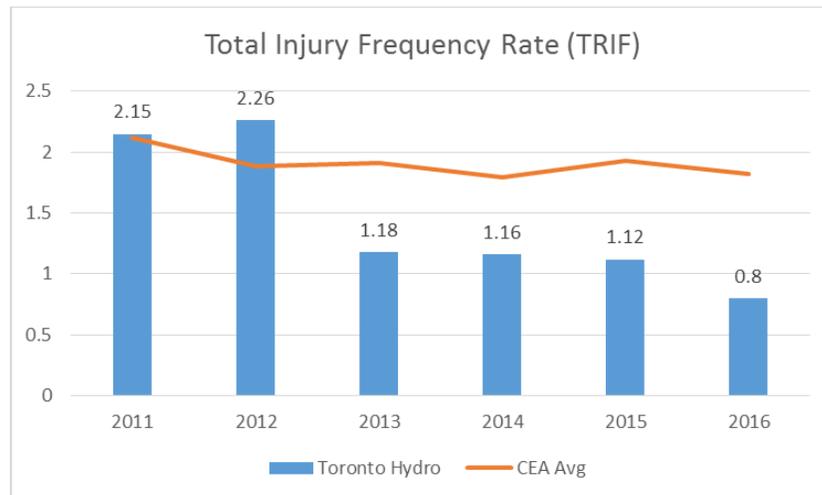
^b Based on 5,500 full time employees plus 2,045 part time employees

¹³ Workplace Safety Insurance Board Ontario, Compass, available at: <<https://compass.wsib.on.ca>>.

1 This recognition is based on Toronto Hydro’s significant and sustained improvement,
2 between 2011 and 2016, with notable improvements with respect to the following
3 safety indicators:

- 4 • A 68 percent decrease in total recordable injury frequency (“TRIF”) (Figure 2,
5 below);
- 6 • A 96 percent decrease in lost time injury severity;
- 7 • A 63 percent decrease in lost time injury frequency;
- 8 • A 87 percent decrease in restricted work days (Figure 2, below); and
- 9 • A 57 percent decrease (86 to 37) in the number of WSIB claims.

10



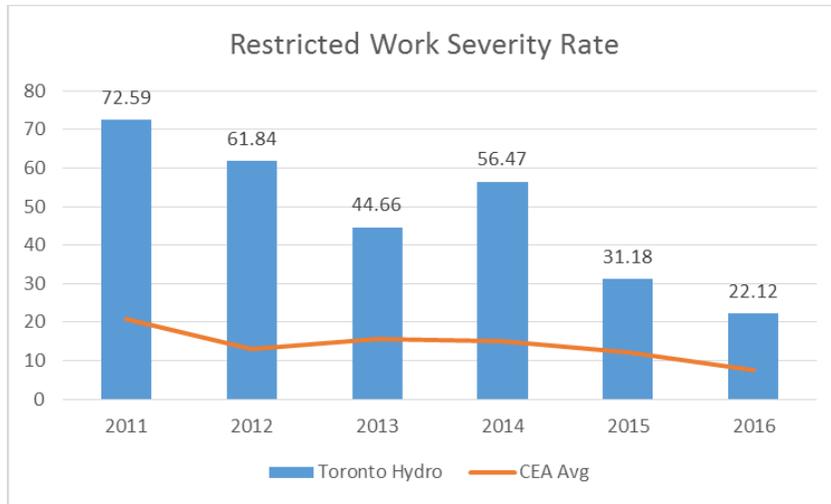
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Figure 2: Total Recordable Injury Frequency

12

13 Over the past ten years, Toronto Hydro improved its safety performance as measured
14 by Total Recordable Injury Frequency (“TRIF”) by 82.6 percent. More recently, Toronto
15 Hydro spent over 5 million hours without a lost-time injury from December 17, 2014 to
16 August 10, 2016. The total lifetime cost to an employer associated with a lost-time

1 injury may be over \$165,000.¹⁴ The avoidance of these costs creates savings for the
2 utility and its customers.
3



4 **Figure 3: Restricted Work Days**

5
6 As seen in Figure 3, above, from 2011 to 2016, Toronto Hydro also achieved and
7 sustained an 87 percent reduction in restricted work days. A restricted work day is the
8 number of calendar days to a maximum of 180 days during which an employee is
9 subject to restricted work, based on the recommendation of a physician or licensed
10 health care professional, for an individual case.¹⁵ Restricted work days impacts a
11 utility's performance by reducing the contribution an employee is physically able to
12 make often resulting in additional costs related to finding replacement or
13 supplementary labour.

¹⁴ Workplace Safety and Insurance Board (Ontario) Fact Sheet: High Impact Claims, available at:
<http://www.wsib.on.ca/cs/idcplg?IdcService=GET_FILE&dDocName=WSIB011540&RevisionSelectionMethod=Latest Released>

¹⁵ When an employee is medically determined to be unable to perform one or more routine functions or unable to work the normal time period of their pre-injury/illness work day, they are working in a "restricted" capacity. Routine functions are the work activities that the employee regularly performs at least once a week.

1 Further, between 2011 and 2017, Toronto Hydro’s employee attendance number
2 improved by 50 percent, with employees averaging 4.74 number of sick days per year.
3 Comparatively, the average number of sick days per employee (in all industries) in
4 Canada during this same period was 9.21, and for employees in the utility industry, the
5 average number of sick days was 9.06. From a productivity standpoint, this means that
6 Toronto Hydro employees had 4.5 fewer sick days than employees in other industries in
7 Canada during this time period, and 4.3 fewer days than employees in other utilities in
8 Canada. Currently, Toronto Hydro’s absentee rate of 3.54 days is well below that of the
9 national, provincial, and municipal average of 9.6 days, 8.6 days, and 7.2 days
10 respectively.¹⁶ This translates to more than \$2 million in cost savings relative to the
11 utility industry benchmark, on average, during this time period.¹⁷

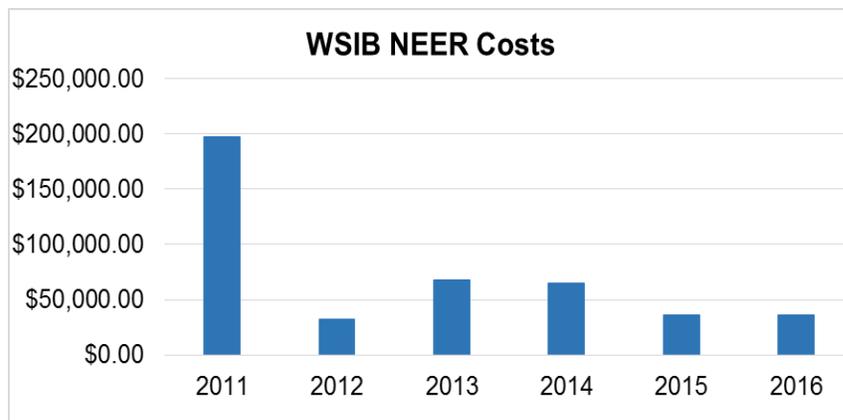
12
13 Toronto Hydro’s superior safety performance has resulted in significant cost savings
14 resulting from a reduction in WSIB annual premiums and an increase in WSIB rebates.
15 WSIB is funded solely through premium revenue.¹⁸ Premiums are based on a number of
16 factors, including: new claims, administration expenses, and past claim costs. In
17 addition, between 2011 and 2016, the utility lowered its WSIB New Experimental
18 Experience Rating (“NEER”) costs by approximately 82 percent, see Figure 4, while WSIB
19 performance index improved by 80 percent over the same time frame. NEER is a
20 mandatory program administered by the WSIB to track and anticipate costs for WSIB
21 claims. Each year, the WSIB establishes an expected annual cost based on industry
22 claim history and the size of organization, and compares the employers’ performance
23 against this expected cost (calculated as the performance index). If WSIB actual costs

¹⁶ Work absence of full-time employees, Statistics Canada, available at:
<<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410019001>>

¹⁷ These estimated cost savings are conservative values based on wages alone.

¹⁸ About Us, Workplace Safety Insurance Board, available at: <<http://www.wsib.on.ca>>.

1 are below the expected cost, the employer receives a rebate of the difference between
2 the actual and expected costs. On the other hand, if the WSIB actual costs exceed the
3 expected cost, the employer must pay a surcharge up to three times the expected cost.
4 Through its strong focus on safety, Toronto Hydro has received substantial WSIB
5 rebates.



7 **Figure 4: WSIB NEER Costs**



8 **Figure 5: WSIB Performance Index¹⁹**

9

¹⁹ The WSIB is in the process of transitioning to a new methodology in 2020 for calculating premiums that will eliminate the NEER program. For more info see: <http://www.wsib.on.ca>.

1 Toronto Hydro's strong safety performance is intrinsically linked to its comprehensive
2 and cost-effective internal training programs. The utility develops and provides key
3 internal training, leveraging internal resources and equipment to complete testing,
4 audits, completion of applications, and authoring of reports, saving the utility significant
5 external consultant and vendor costs. For instance, in 2007, the Government of Ontario
6 recognized Toronto Hydro's curriculum for the Certified Power Line Person ("CPLP") as
7 equivalent to the in-school requirements for Power Line Technician Trade. Given
8 Toronto Hydro's unique distribution system, in 2008, Toronto Hydro obtained Training
9 Delivery Agent Status from the Province for its Power Line Technician Program to train
10 its own apprentices. In 2017, the average delivery costs to provide the CPLP
11 accreditation internally was approximately \$16,000. By comparison, the average cost of
12 external CPLP accreditation is approximately \$25,000-\$31,000.

13

14 *2.1.2 Process Improvements*

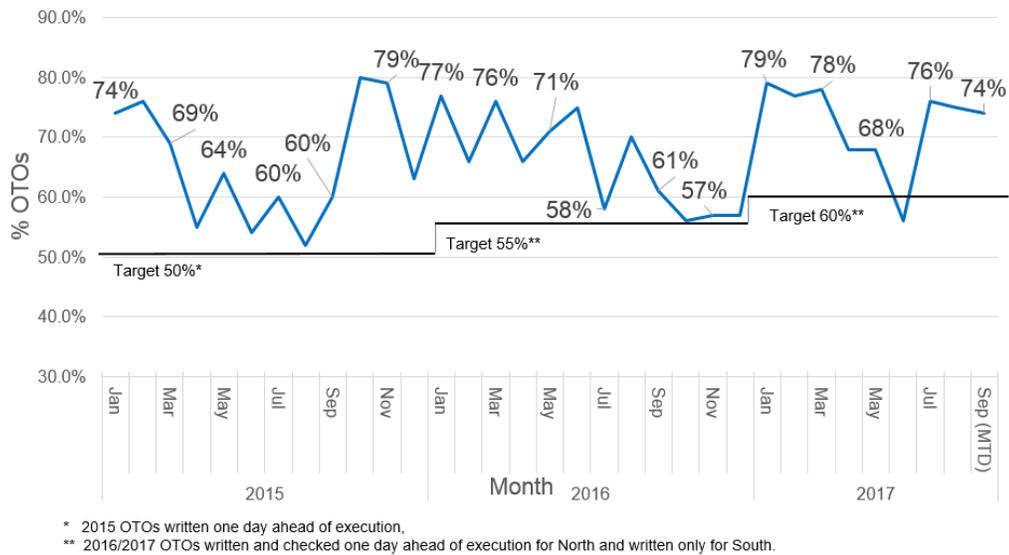
15 *Increasing Wrench Time for Crews*

16 Toronto Hydro's Control Centre is responsible for the safe and efficient operation of the
17 distribution system. This includes directly opening and closing remotely operable
18 switches to redirect the flow of electricity and directing/instructing field crews in the
19 execution of work. The Control Centre is responsible for switching steps (Orders to
20 Operate) and the issuance of "Hold Offs."

21

22 An Order to Operate is comprised of a list of switching instructions that enable
23 operations crews to safely transfer customer load and establish suitable work protection
24 over a specified range of system devices. Over the last few years, Toronto Hydro's
25 Control Centre has been working on steadily increasing the percentage of planned

- 1 Orders to Operate completed prior to work execution. This has contributed to a
- 2 reduction in last minute work volume and allows field work to commence without delay.



3 **Figure 6: Percentage of Orders to Operate Completed Ahead of Work Execution**

4

5 Toronto Hydro has also made improvements to Hold Off times experienced by its crews.

6 Hold Offs are special conditions that prevent certain automatic equipment operations

7 for the duration of time that a field crew is working in proximity to Toronto Hydro's

8 infrastructure. The application of Hold Offs for certain activities are a requirement of

9 Toronto Hydro's work procedures, and if not applied, can result in equipment damage

10 and create extended outages should an incident occur in the physical or electrical

11 proximity to the work site.

12

13 Since 2016, Toronto Hydro's Control Centre analyzed Hold Off volume data and used

14 this to spread the peak demand across a longer time frame by staggering call-in times.

15 As shown in Figure 7, this has directly contributed to a significant reduction in the

16 average time crews spent waiting for Hold Offs.

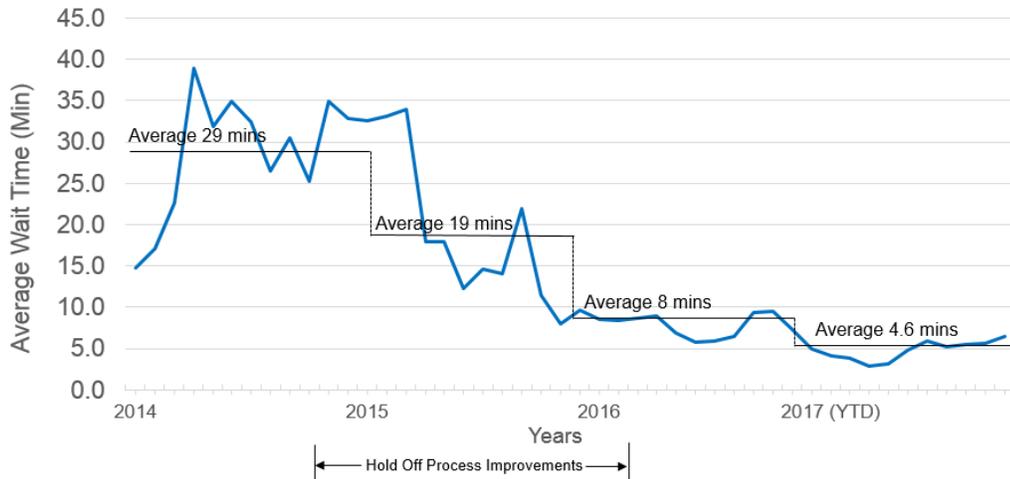


Figure 7: Average Crew Wait Times for Hold Offs

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For more information on the Control Centre’s process improvements driving productivity, please refer to Exhibit 4A, Tab 2, Schedule 7.

In addition, since 2015, to aid in the efficient execution of work, Toronto Hydro implemented processes to ensure feeder scheduling occurs in an optimized manner. Much of the work performed on Toronto Hydro’s system (e.g. maintenance, capital construction, urgent reactive or emergency work, customer maintenance, or new connections) requires feeders to be taken out of service in order to create a safe work zone. Every time a feeder is taken out of service in the downtown core, crews are required to visit the site and manually move the switch handles. Toronto Hydro has been working on maximizing the amount of work that is completed during each feeder outage. This is accomplished through strong coordination and planning, specifically, weekly switching and system restoration schedules.

1 For a complete list of benefits resulting from this process, please refer to the
2 Preventative and Predictive maintenance programs at Exhibit 4A, Tab 2, Schedules 1-3.

3
4 *Facilities Asset Management Improvements*

5 Toronto Hydro maintains a complex portfolio of facilities, including critical operational
6 sites (e.g. stations and control centres), in support of the reliable and efficient operation
7 of the utility's distribution system. The effective maintenance of these facilities is
8 required in order to ensure adequate protection for electrical grid equipment, secure
9 access for employees and security of designated areas, and appropriate work
10 conditions to support employee productivity. Since 2015, Toronto Hydro has created a
11 robust facilities management system that records assessments and maintenance plans
12 for all assets located in Toronto Hydro's work centres and stations. This repository
13 system identifies the condition of all facilities-related assets (e.g. poor, fair, good)
14 owned by Toronto Hydro, thereby ensuring that the utility efficiently performs the
15 necessary maintenance work where required.

16
17 These changes have facilitated the development of a robust Facilities Asset
18 Management Strategy, filed at Exhibit 2B, Section D4. The Strategy ensures that when
19 planning and executing projects, the utility makes strategic decisions based on a number
20 of factors, including detailed asset condition assessments, the criticality of the asset,
21 industry standards, and past experience. These process improvements facilitated the
22 results of a third-party assessment, which ranks these processes above average in
23 facilities asset management competence (see Asset Management Practices discussion,
24 below). For more information on Toronto Hydro's Facilities programs, please refer to
25 Exhibit 2B, Section E8.2 and Exhibit 4A, Tab 2, Schedule 12.

1 Reduction in Manual Processes

2 Toronto Hydro's Customer Care program invests in a number of automation processes
3 that eliminates the need for manual work. This leads to cost savings. For instance,
4 through various initiatives, the utility encourages the use of customer self-service
5 features on Toronto Hydro's website to provide easier customer access to information
6 and to reduce the need for customer contact. This decreases the volume of customer
7 contact for the call centres and allows optimization of the use of lower cost outsourced
8 labour. For instance, since call-centre business hours were expanded to 8:00 p.m.,
9 Toronto Hydro's third-party service provider has been used exclusively to provide lower
10 cost call handling resources and customer service.

11

12 In addition, the utility has also reduced its paper, printing, and postage costs by
13 increasing the adoption of customer electronic billing to 224,420, as at end of 2017,
14 which saves approximately \$9.52 per electronically billed customer a year. For a full list
15 of Customer Care process improvements, please refer to Exhibit 4A, Tab 2, Schedule 14.

16

17 Lastly, through investments in the Metering program, specifically in meters that have a
18 more effective transmitter that increases the range of the meter signal, the utility
19 decreases the number of manual reads required and retrieves faster customer level
20 outage information. Similarly, through the introduction of meters with remote
21 disconnection capabilities, Toronto Hydro is able to decrease the number of physical
22 visits to a customer's property. For a complete list of metering related improvements
23 driving customer service and efficiency gains, please refer to Exhibit 2B, Section E5.4.

1 *2.1.3 Program-Level Efficiencies*

2 As part of planning, Toronto Hydro employs a variety of tools, processes, and
3 approaches to facilitate a culture of continuous improvement and further efficiency and
4 productivity gains for the benefit of customers. The five examples below are provided
5 as a means of summarizing the type of initiatives and processes utilized by the utility to
6 improve execution efficiency and reduce costs.

7

- 8 • **Facilities Management** (Exhibit 4A, Tab 2, Schedule 12): Toronto Hydro’s real-
9 estate management approach has been driving cost savings for customers.
10 Specifically, as part of the Operating Centres Consolidation Program (“OCCP”),²⁰
11 the utility sold two of its facilities and returned the after-tax gains on the sale
12 and related tax savings to customers through a rate-rider. The termination of a
13 lease at two other facilities allowed for a reduction in maintenance costs, as
14 explained in Exhibit 4A, Tab 2, Schedule 12.²¹ In addition, in 2018, Toronto
15 Hydro sold an additional property (60 Eglinton), allowing for: (i) allocation of net
16 after-tax gains and related tax savings on the sale of this property; (ii) eliminating
17 otherwise ongoing property-related costs associated with the property; (iii)
18 increasing the utilization of remaining properties; and (iv) returning the gains to
19 ratepayers. For details on the cost savings achieved through Toronto Hydro’s
20 facilities management, please refer to Exhibit 4A, Tab 2, Schedule 12. For a
21 comprehensive variance analysis on the OCCP, please refer to Exhibit 2B, E4.
- 22 • **Disaster Preparedness Management** (Exhibit 4A, Tab 2, Schedule 6): Due to
23 significant efforts to build and retain internal disaster planning expertise, the
24 program continues to reduce reliance on external consultants for program

²⁰ EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 6, 2015), Exhibit 2B, Section E8.3.

²¹ For a comprehensive discussion of the results of OCCP, please refer to Exhibit 2B, Section E4.

1 guidance and development, leading to cost savings. In addition, the program
2 facilitates efficient use of internal resources with a view to controlling external
3 labour costs. In addition, in partnering with other utilities via Mutual Assistance
4 Agreements, Toronto Hydro has access to “at cost” crews, equipment, supplies
5 and expertise following a disaster event (weather related or otherwise).

- 6 • **Corrective Maintenance** (Exhibit 4A, Tab 2, Schedule 4): Toronto Hydro actively
7 works on correcting cable chamber nomenclature deficiencies as the need is
8 identified. This eliminates the need to create a separate work request and
9 additional travel time for repair, resulting in savings of approximately \$400,000
10 per year.
- 11 • **Fleet and Equipment Services** (Exhibit 2B, Section E8.3): Through extensive
12 efforts to rationalize the size of its vehicle fleet, Toronto Hydro has decreased its
13 number of fleet vehicles from 660 in 2013 to 588 in 2017, which reduces
14 maintenance, fuel, repair, licensing and administrative costs. The utility plans on
15 maintaining this reduced fleet size in the 2020-2024 plan period.
- 16 • **Area Conversions** (Exhibit 2B, Section E6.1): The Area Conversions program
17 funds the replacement of functionally obsolete 4.16 kV distribution system
18 designs with updated standard 13.8 kV and 27.6 kV lines, Improving the speed
19 and cost-efficiency of customer grid access (including generation and electric
20 vehicle access) in high-growth areas of downtown Toronto by converting
21 approximately 2,600 poles (containing approximately 100 kilometres of low
22 capacity and low clearance box construction feeders) to more efficient and
23 flexible higher voltage standards. This improves the efficiency with which we can
24 connect or upgrade customers with any associated savings directed back to the
25 connecting/upgrading customer.

1 For additional information on how Toronto Hydro’s work is facilitating efficiencies and a
2 reduction in operating and maintenance costs, please refer to Exhibit 2B, Section D and
3 Exhibit 4A, Tab 2, Schedules 1-18. Lastly, for a discussion on program-level cost-savings
4 expected to be carried forward to the 2020-2024 plan period, please refer to Exhibit 2B,
5 Section A.

6

7 **2.2 Scorecard Performance & Internal Benchmarking**

8 The OEB has established a set of performance metrics for electricity distributors through
9 its Performance Scorecard, the Electricity Distributor Scorecard (“EDS”), to assess utility
10 performance over time and to compare performance across utilities. For the last
11 several years, Toronto Hydro’s performance on the EDS has been strong, with
12 observable improvements in several key areas such as customer first contact resolution,
13 telephone calls answered on time, new residential and small business services
14 completed on time and billing accuracy. In addition, over the 2013-2017 period,
15 Toronto Hydro achieved or exceeded the Electricity Service Quality Requirements
16 (“ESQR”) standards 85 percent of the time. In 2017, for instance, the utility met or
17 surpassed the OEB’s standards for 11 out of the 12 measures (92 percent). In respect of
18 outages, Toronto Hydro's number and frequency of customer interruptions have been
19 equal to or better than the distributor target for the 2013-2017 period. This
20 achievement is attributable to the investments the utility has made in the system. For a
21 comprehensive review of the utility’s reliability improvements, please refer to Exhibit
22 2B, Section E2.

23

24 For further information on Toronto Hydro’s internal benchmarking including historical
25 performance on the EDS and 2015-2019 DSP measures, ESQR and reliability, please see

1 Exhibit 1B, Tab 2, Schedules 2, 3, 4, and 5.²² Please refer to Exhibit 2B, Section C for a
2 discussion on how the utility will continue to use internal benchmarking to set baseline
3 targets for the proposed custom performance measures, and Exhibit 2B, Section E2 for a
4 discussion on the utility's internal benchmarking results on reliability.

5

6 **2.3 External Benchmarking**

7 Since its 2015-2019 Application, Toronto Hydro has used a variety of benchmarking
8 studies to assess its proposed plans, including those set out in Table 3, below.

9

10 **Table 3: Benchmarking Reports Filed in this Application**

Benchmarking Review	Evidence Reference
Econometric Benchmarking of Historical and Projected Total Cost and Reliability Levels – Power System Engineering Inc.	Exhibit 1B, Tab 4, Schedule 2
Unit Costs Benchmarking Study – UMS Group	Exhibit 1B, Tab 2, Schedule 1, Appendix B
IT Budget Assessment- Gartner Consulting	Exhibit 2B, Section E8.4, Appendix A
Compensation Benchmarking – Mercer Canada	Exhibit 4A, Tab 4, Schedule 5
Dual Distribution Control Centre – London Economics Inc.	Exhibit 2B, Section E8.1, Appendix A

11

12 The results allow for the identification of continuous improvement opportunities. The
13 discussion below summarizes Toronto Hydro's benchmarking studies and provides the
14 conclusions reached by several third party assessors on the utility's performance and
15 costs in relation to its peers. Collectively, these results identify Toronto Hydro as a
16 strong performer in a variety of areas.

²² This includes a completed OEB Appendix 2-G (filed at Exhibit 1B, Tab 2, Schedule 5), documenting both the Service Quality and Service Reliability indicators, as per s. 2.2.2.8 of the Chapter 2 Filing Requirements. The utility confirms that the data is consistent with its scorecard.

1 2.3.1 *Econometric Total Costs*

2 In the course of preparing for its current Application, Toronto Hydro retained Power
3 System Engineering Inc. (“PSE”) to apply econometric modelling to benchmark the
4 utility’s historical and projected costs and reliability.²³ The purpose of this review was to
5 assess the reasonableness of Toronto Hydro’s revenue forecasts and inform the
6 appropriate stretch factor in the utility’s Application.²⁴

7
8 PSE compared Toronto Hydro’s historical and projected total costs against its
9 benchmark costs i.e. Toronto Hydro’s expected costs in any given year based on the
10 econometric model.²⁵ PSE’s results indicated that (i) the historical average total costs
11 for the utility, from 2015 to 2017, are 18.6 percent below benchmark expectations.²⁶
12 Specifically, Toronto Hydro’s total annual costs were approximately \$157 million below
13 benchmark values in 2017;²⁷ and (ii) the projected total cost levels during the 2020-2024
14 period are 6.0 percent below benchmark expectations.²⁸ Toronto Hydro’s total annual
15 costs are expected to be approximately \$32 million below benchmark values in 2024.²⁹

²³ Power System Engineering Inc., *Econometric Benchmarking of Historical and Projected Total Cost and Reliability* (July 18, 2018), filed at Exhibit 1B, Tab 4, Schedule 2. As discussed in Exhibit 1B, Tab 4, Schedule 1, Toronto Hydro’s plan is prepared based on a forecasting model, as envisioned in section 2.1.8 of the Filing Requirements. A custom element of this Application is using a PSE forecasting model in place of a PEG forecasting model.

²⁴ *Ibid* at p. 2.

²⁵ *Supra* note 23 at p. 4.

²⁶ *Supra* note 23 at p. 30.

²⁷ *Ibid*.

²⁸ *Ibid*.

²⁹ *Ibid*.

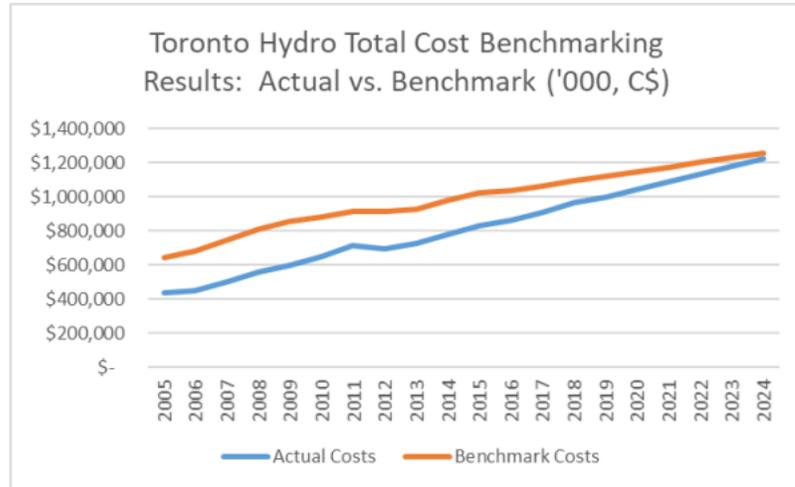


Figure 8: Toronto Hydro’s Cost Performance 2005-2024³⁰

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Based on their findings, PSE states that Toronto Hydro is not a poor total cost performer and recommends a stretch factor of 0.3 percent.³¹ For more information on this report, as well as details on Toronto Hydro’s ratemaking framework, please refer to Exhibit 1B, Tab 4, Schedule 1.

2.3.2 Unit Costs

To assess the actual efficiency with which Toronto Hydro executes its system investment and maintenance programs, the utility retained UMS Group (“UMS”) to perform a capital and maintenance unit cost benchmarking exercise.³² The utility provided UMS with actual, all-in capitalized unit costs for major asset classes for the 2014-2016 period. UMS assessed these asset classes to be reflective of the utility’s operating performance. UMS performed a normalized comparison of these results to those of peer utilities

³⁰ *Supra* note 23 at p. 7.
³¹ *Supra* note 23 at p. 49.
³² UMS Group, Toronto Hydro-Electric System Limited Unit Costs Benchmarking Study, filed at Appendix B to Exhibit 1B, Tab 2, Schedule 1.

1 across North America. These peer utilities were of comparable size and complexity. The
 2 results of this analysis are provided in Table 4 below.

3
 4 **Table 4: Results of UMS Group’s Unit Cost Benchmarking Study³³**

Category/Program	Quartile			
	Top	2 nd	3 rd	Bottom
<i>Wood Pole</i>		X		
<i>UG Cable (XLPE)</i>		X		
<i>OH Switches (Manual and Remote/Motor-Operated)</i>		X		
<i>Pole Top Transformer</i>			X	
<i>Padmount/UG Transformer</i>		X		
<i>Network Transformer/Protector</i>		X		
<i>Breaker (SF₆, Oil, and Vacuum)</i>		X		
<i>Vegetation Management</i>		X		
<i>Pole Test and Treat</i>		X		
<i>Overhead Line Patrol</i>		X		
<i>Vault Inspection</i>		X		

5
 6 As Table 4, above, illustrates, Toronto Hydro fared strongly in comparison with its peers
 7 for the majority of the asset categories. UMS reports that the methods currently in
 8 place to report and manage unit costs conform to industry standards.

9
 10 These results provide an indication that the utility has delivered its large capital program
 11 cost-effectively through rigorous project development, program management,
 12 assessment, and execution practices. UMS further reports that the utility’s attempts to
 13 improve the collection and maintenance of unit cost information is expected to further
 14 assist in managing costs and productivity.³⁴ For more information on the Unit Cost

³³ *Ibid* at p.7.

³⁴ *Supra* note 32 at p.8.

1 Benchmarking report, as well OEB Appendix 5-A (Unit Cost Metrics), please refer to
 2 Exhibit 1B, Tab 2, Schedule 1, Appendix B and Appendix C, respectively.

3
 4 **2.3.3 Information Technology (“IT”) Costs**

5 As part of its IT cost planning and assessment, Toronto Hydro retained Gartner
 6 Consulting (“Gartner”) to provide a peer benchmark review of its IT budget.³⁵ The
 7 review included a comprehensive comparison of IT metrics, spending and staff
 8 distributions to provide the utility with a view on how its IT spending aligns against its
 9 peers. Toronto Hydro was benchmarked against 15 peer utilities based on industry and
 10 revenue, all serving major urban locations.³⁶ Gartner concluded that for 2017, Toronto
 11 Hydro’s IT spending, expressed as a percentage of revenue and operational expense, is
 12 lower than the peer group.³⁷ Specifically, 2.2 percent versus 2.5 percent and 2.4
 13 percent versus 3.1 percent, respectively.³⁸ Further, infrastructure support costs are
 14 approximately \$4 million less than what other peer organizations would spend to
 15 support the same workload.³⁹ Gartner made similar findings in respect to the utility’s
 16 2020 forecast.⁴⁰ For more information on this review and Toronto Hydro’s IT program,
 17 please see Exhibit 2B, Schedule E8.4.

18
 19 **Table 5: IT Costs Benchmarking for 2017 (Actuals) and 2020 (Forecast)**

	Toronto Hydro 2017 Costs	Toronto Hydro 2020 Costs	Peer Average
Revenue (\$ Millions)	4,016.9	4,042.5	4,477.8
Operational Expense (\$ Millions)	3,572.7	3,447.5	3,659.8

³⁵ Gartner Consulting, IT Budget Assessment- Final Report (March 16, 2018), filed at Exhibit 2B, Schedule E8.4, Appendix A.

³⁶ *Ibid* at p. 8.

³⁷ *Supra* note 35 at pp. 10-11.

³⁸ *Supra* note 35 at p.12.

³⁹ *Supra* note 35 at p. 13.

⁴⁰ *Supra* note 35 at pp.23-32.

	Toronto Hydro 2017 Costs	Toronto Hydro 2020 Costs	Peer Average
Organizational Employees	1,390	1,467	4,730
Organizational Users	3,430	N/A	N/A
IT FTEs	214	200	305
IT Capital and Operating Expenses (\$ Millions)	87.1	92.9	110.4
Customers	758,193	784,095	1,233,000

1

2 **2.3.4 Compensation Costs**

3 In 2018, Toronto Hydro retained Mercer Canada Limited (“Mercer”) to undertake a
 4 market review of the utility’s compensation and benefits program competitiveness for
 5 its non-executive management, non-union professionals, and unionized employees.⁴¹

6 The peer group was selected amongst energy and general industry sectors the utility
 7 competes against for talent.⁴² Toronto Hydro worked with Mercer to identify a variety
 8 of positions to use as its benchmark, including positions that represent 56 percent of the
 9 employees at the utility.⁴³

10

11 Overall, Mercer concluded that total remuneration, including value of all cash
 12 compensation, benefit and pension plans are positioned within a market competitive
 13 range⁴⁴ relative to the 50th percentile of the energy market, and are below the general
 14 industry market.⁴⁵ For more information, please refer to the full review, filed as part of
 15 Toronto Hydro’s compensation evidence at Exhibit 4A, Tab 4, Schedules 4-5.

⁴¹ Mercer Canada Limited, Toronto Hydro-Electric System Limited Non-Executive Compensation and Benefits Review (January 2018), filed at Exhibit 4A, Tab 4, Schedule 5.

⁴² *Ibid* at p.2.

⁴³ *Ibid*.

⁴⁴ Mercer considers “competitive range” to include compensation levels that fall within 10 percent of the target market position on a position-by-position basis and 5 percent on an overall organization basis (where you have a larger sample size and smaller variability in observations) when compared to target positioning (e.g. the 50th percentile).

⁴⁵ *Supra* note 41 at p. 5.

1 2.3.5 *Asset Management Practices*

2 Toronto Hydro’s vast and complicated assets require the utilization of various asset
3 management (“AM”) processes to provide the architecture for its long-term, short-term,
4 and maintenance planning functions, found at Exhibit 4A, Tab 2, Schedules 1-5, and the
5 framework underpinning the development of its 2020-2024 Capital Expenditure Plan,
6 described in Section E of the DSP. Toronto Hydro’s AM process aims to realize
7 sustainable value from the utility’s assets for the benefit of its customers and
8 stakeholders.

9
10 In the course of preparing its 2020-2024 DSP, Toronto Hydro engaged UMS Group
11 (“UMS”) to perform a review and evaluation of the utility’s asset management
12 practices.⁴⁶ UMS is strongly qualified to assess utility asset management practices and
13 has adopted its assessment methodologies to align with emerging industry standards.⁴⁷
14 UMS assessed Toronto Hydro’s AM practices against the industry standard for asset
15 maturity (ISO 55001) using a variety of methods, including conducting interviews with
16 several Toronto Hydro key departments, reviewing relevant sections of the utility’s
17 2020-2024 DSP, and benchmarking against a peer utility group.

18
19 UMS concluded, among other findings, that the utility has a number of key AM
20 processes that substantiate the DSP as a means to “deliver value to stakeholders by
21 optimizing decisions from an asset lifecycle perspective and balancing risk with cost
22 performance.”⁴⁸ In addition, UMS found that Toronto Hydro’s use of lifecycle planning,
23 trade-offs analysis, risk assessments and use of failure forecasting all exceeded the

⁴⁶ UMS Group, Toronto Hydro-Electric System Limited Distribution System Plan Asset Management Review, filed at Exhibit 2B, Section D, Appendix A.

⁴⁷ *Ibid* at p.3.

⁴⁸ *Supra* note 46 at pp. 15-16.

1 typical utility asset management process.⁴⁹ Outside programs addressing assets strictly
2 serving the distribution system, Toronto Hydro's IT programs⁵⁰ use of risk analysis and
3 lifecycle assessments exceeds industry standard practice, while the Facilities
4 programs⁵¹ use of asset condition assessments rank it above the average utility in
5 facilities asset management competence.⁵² For more information on this review as well
6 as Toronto Hydro's AM practices, including how the utility plans, prioritizes, and
7 optimizes expenditures based on this information, please refer to Exhibit 2B, Section D.

8 9 *2.3.6 Dual Distribution Control Centre*

10 Toronto Hydro engaged London Economics International LLC ("LEI") to conduct a two-
11 part analysis to evaluate the reasonableness of the utility's proposal for a dual Control
12 Centre.⁵³ First, LEI was tasked with undertaking a review of comparator utilities with
13 one or more fully functional Control Centres. As part of this undertaking, LEI compared
14 Toronto Hydro's forecast dual Control Centre construction costs to those expended by
15 other utilities. Second, LEI assessed, from an economic perspective (using the concept
16 of Value of Lost Load), the utility's proposal for a dual Control Centre.⁵⁴

17
18 In respect to its review of comparator utilities, LEI assessed four other large U.S. and
19 Canadian utilities with more than one fully functional Control Centre. These utilities cite
20 a myriad of factors, similar to those outlined in Toronto Hydro's Control Operations
21 Reinforcement program, for utilizing more than one fully functional Control Centre,

⁴⁹ *Ibid.*

⁵⁰ See Exhibit 2B, Section E8.4 and Exhibit 4A, Tab 2, Schedule 17 for more information.

⁵¹ See Exhibit 2B, Section E8.2 and Exhibit 4A, Tab 2, Schedule 12 for more information.

⁵² *Supra* note 46 at pp. 16.

⁵³ London Economics International LLC, Jurisdictional Review and Economic Case for a Dual Distribution Control Centre in Toronto Hydro Territory (June 22, 2018), filed at Exhibit 2B, Section E8.1, Appendix A.

⁵⁴ *Ibid* at p.4.

1 including supporting resiliency, increasing reliability, assisting with the increase in
2 distributed generation resources, and ensuring quick recovery from natural disasters
3 and terrorist threats.⁵⁵ LEI concluded that there was a precedent for North American
4 utilities to build one or more fully functioning Control Centre.⁵⁶ Further, when assessed
5 against other utilities for Control Centre construction costs, in the last five years,
6 Toronto Hydro was in line (and slightly lower than) the identified utilities.⁵⁷

7
8 Second, LEI used an economic analysis based on the Value of Lost Load methodology to
9 conclude that outages of relatively short durations will cost as much as Toronto Hydro's
10 forecast construction costs for the dual Control Centre.⁵⁸ Therefore, if the utility's
11 proposed dual Control Centre could reduce the duration of potential outages or allow
12 for a fully functional alternative in the event that the primary Control Centre is non-
13 functional, the avoided outage costs would mean that the dual Control Centre would
14 pay for itself.⁵⁹

15
16 For more information on this review as well as Toronto Hydro's proposed dual Control
17 Centre in the Control Operations Reinforcement program, please refer to Exhibit 2B,
18 Section E8.1

⁵⁵ *Ibid* at pp. 5-14.

⁵⁶ *Supra* note 53 at p. 27.

⁵⁷ *Ibid*.

⁵⁸ *Ibid*.

⁵⁹ *Supra* note 53 at p. 26.

Appendix A: Annually Reported Measures

Outcomes	OEB Reporting Category	Electricity Distributor Scorecard Measures	Electricity Service Quality Requirement Measures	Custom Performance Measures ¹
Customer Service	Service Quality	<ul style="list-style-type: none"> New Residential/Small Business Services Connected on Time Scheduled Appointments Met on Time Tel. Calls Answered on Time 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> First Contact Resolution Billing Accuracy Customer Survey Satisfaction Results 	<ul style="list-style-type: none"> Billing Accuracy Written Responses to Enquiries 	<ul style="list-style-type: none"> Customers on eBills
Safety	Safety	<ul style="list-style-type: none"> Level of Public Awareness Compliance with Ontario Reg. 22/04 Number of General Public Incidents Rate per 10, 100, 1000 Km of Line 		<ul style="list-style-type: none"> Total Recorded Injury Frequency Box Construction Conversion Network Units Modernization

¹ See Exhibit 2B, Section C2 for a detailed discussion of Toronto Hydro’s Custom Performance Measures.

² Low Voltage (“LV”)

³ High Voltage (“HV”)

Outcomes	OEB Reporting Category	Electricity Distributor Scorecard Measures	Electricity Service Quality Requirement Measures	Custom Performance Measures ¹
Reliability	System Reliability	<ul style="list-style-type: none"> Average Number of Hours that Power to a Customer is Interrupted (SAIDI) Average Number of Times that Power to a Customer is Interrupted (SAIFI) 		<ul style="list-style-type: none"> SAIDI - Defective Equipment SAIFI - Defective Equipment FESI-7 FESI-6 - Large Customers
	Asset Management	<ul style="list-style-type: none"> DSP Implementation Progress 		<ul style="list-style-type: none"> System Capacity System Health (Asset Condition) – Wood Poles Direct Buried Cable Replacement
Financial	Cost Control	<ul style="list-style-type: none"> Efficiency Assessment Total Cost per Customer Total Cost per Km of Line 		<ul style="list-style-type: none"> Average Wood Pole Replacement Cost Vegetation Management Cost per Km
	Financial Ratios	<ul style="list-style-type: none"> Liquidity: Current Ratio Leverage: Total Debt to Equity Ratio Regulated ROE - Deemed vs. Achieved 		
Public Policy	Conservation & Demand Management	<ul style="list-style-type: none"> Net Cumulative Energy Savings 		
	Connection or Renewable Generation	<ul style="list-style-type: none"> Renewable Gen. Connection Impact Assessments Completed on Time Micro-embedded Gen. Fac. Connected on Time 	<ul style="list-style-type: none"> Micro Gen. Fac. Connected on Time 	
Environment	Environment			<ul style="list-style-type: none"> Oil Spills Containing PCBs Waste Diversion Rate

**TORONTO HYDRO-ELECTRIC SYSTEM LIMITED
("THESL")
UNIT COSTS BENCHMARKING STUDY**

SECTION I - INTRODUCTION

Torys LLP (“Torys”), acting on behalf of 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 and perform benchmarking comparisons of a pre-selected set of asset categories and maintenance programs; namely:

Asset Categories

- Wood Pole Replacement
- UG Cable (XLPE)
- OH Switches (Manual and Remote / Motor Operated)
- Pole Top Transformer Replacement
- Padmount / UG Transformer Replacement
- Network Transformer / Protector Replacement
- Breaker Replacement (SF6, Oil and Vacuum)

Maintenance Programs

- Vegetation Management
- Pole Test and Treat
- Overhead Line Patrol
- Vault Inspection

Establishing Context

In establishing context for the analyses and conclusions contained within this report, UMS Group:

- Reviewed relevant reports, procedures and system performance data provided by the Company, (**see Appendix A**);
- Was provided complete access to the Company’s technical and management staff in the form of conference calls and on-site workshops (e.g.; Design and Construction, Planning and Standards, Enterprise Project Management and Development, Engineering and Regulatory and Finance); and
- Formed a Peer Group Panel, comprised of 17 electric utilities with system and customer demographics like those of THESL, each dealing with the unique cost drivers that are prevalent in large 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:

- Regional costs,
- Practices in reporting costs,
- System demographics (i.e.; population density and underground utility congestion), and
- Other external factors (i.e.; mandates and constraints regarding performance of work, weather, and vegetation).

Thus, we developed normalization factors (**see Appendix C**), assuring the completeness and relevance of our benchmarks. In addition, 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

UMS Group, headquartered at 300 Interpace Parkway, Parsippany, NJ, 07054, was retained as an independent expert. With over 28 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 province 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 expert for this effort, Mr. Jeffrey W. Cummings, fully acknowledges his duties as an expert 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, he acknowledges that it is his 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 related 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.

He acknowledges that the duty referred to above prevails over any obligation, which he may owe either Torys or 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 to accomplish THESL’s stated objectives, 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

UMS Group was retained to conduct a review of THESL’s methodology for determining the unit costs underlying its distribution system capital and maintenance programs and 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.; Design and Construction, Planning and Standards, Enterprise Project Management and Development, Engineering, and Regulatory and Finance),
- Reviewed a myriad of requested reports, procedures and system performance data (see Appendix A).
- Established a Peer Group Panel of 17 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 full-scale normalization (i.e.; accounting for 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 four maintenance programs and a comparison of THESL’s unit cost methodology with that of 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. However, the reporting of unit costs for productivity measurement or benchmarking across electric utilities is complex:

- Asset Categories: 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 within the same year. Though seemingly straight forward, electric utilities need to account for the (1) carryover of costs from the previous fiscal year, (2) lagging costs applied to uninstalled assets, and (3) different reporting regimens for work performed in-house vs. by a third party.
- Maintenance Programs: The industry is 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 actually “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). Therefore, the fact that 50 percent of the utilities responding to the survey could not provide unit costs for three of the four maintenance programs was not a surprise.

In spite of the industry shortfalls described above, electric utilities have typically used unit costs to provide order-of-magnitude estimates, define staffing levels, create resource-loaded schedules, and/or support financial reporting requirements. Therefore, the above-described methodology has proven adequate. However, as the focus shifts to measuring and comparing performance, inconsistencies in the burdening of capital labor costs, challenges in disaggregating the components of unit costs to arrive at a direct labor unit cost, and lack of transparency into the number of units installed will:

- Preclude effective Performance Management (e.g.; use of fully-loaded unit costs potentially masks productivity improvement or degradation, the inability to unitize maintenance programs limits the monitoring of productivity to budget management, and inconsistencies in the burdening of capital labor costs results in the need for more rigorous “normalization” routines when comparing unit costs across electric utilities),
- Adversely affect management’s ability to assess the effectiveness of material procurement policies, and
- Limit insights regarding the trade-offs in using in-house vs. hiring outside contractor resources.

As we surveyed the industry, THESL was among a small percentage of electric utilities that are addressing these issues.

THESL – Specific Perspective Regarding Unit Cost Methodology

THESL has taken some initial steps to bridge the gap between unit cost and performance management by implementing a new “Asset Assembly Unit Structure” (“AAU”) for tracking unit costs for in-house capital projects as a complement to “Unit Pricing Contract Management System” (“UPCMS”) used for work performed by outside contractors. This change allows for the (1) 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.

With respect to the four Maintenance Programs that comprised the scope of this effort, THESL derived cost and unitized information from the vendor invoices, thus reflecting an accurate depiction of unit cost. For maintenance work performed by THESL in-house staff, THESL comports to the industry standard of not applying overheads to maintenance costs (only salary burdened by statutory costs and benefits).

Unit Cost Benchmarks

In reviewing the actual benchmarks, relative to a Peer Group Panel of 17 electric utilities spanning the North American continent ([see Section III and Appendix B](#)), fully “normalized” comparisons place THESL in the second quartile in all but one asset category. Even without “normalizing” for differences in regional costs, accounting practices, and a myriad of difficulty factors - [see Section III and Appendix C](#) - THESL’s position is still fairly strong: Two Asset Categories: Wood Pole and Breaker, and One Maintenance Program: Pole Test and Treat slip slightly into the 3rd quartile.

Table II-1: Fully Normalized Benchmark Comparisons

Category / Program	THESL Unit Cost 3-YR Weighted Average	Quartile			
		Top	2 nd	3 rd	Bottom
Wood Pole	\$7,434		X		
UG Cable (XLPE)	\$96		X		
OH Switches (Manual and Remote / Motor-Operated)	\$21,062		X		
Pole Top Transformer	\$11,761			X	
Padmount / UG Transformer	\$21,454		X		
Network Transformer / Protector	\$88,943		X		
Breaker (SF6, Oil, and Vacuum)	\$85,242		X		
Vegetation Management	\$2,111		X		
Pole Test and Treat	\$18		X		
Overhead Line Patrol	\$44		X		
Vault Inspection	\$253		X		

The seven asset categories represent approximately 60 percent of the maintenance capital budget over the 2014 through 2016 period, and THESL spends approximately 50 percent of all preventative and predictive maintenance costs on the four maintenance programs that comprised this study.

Summary

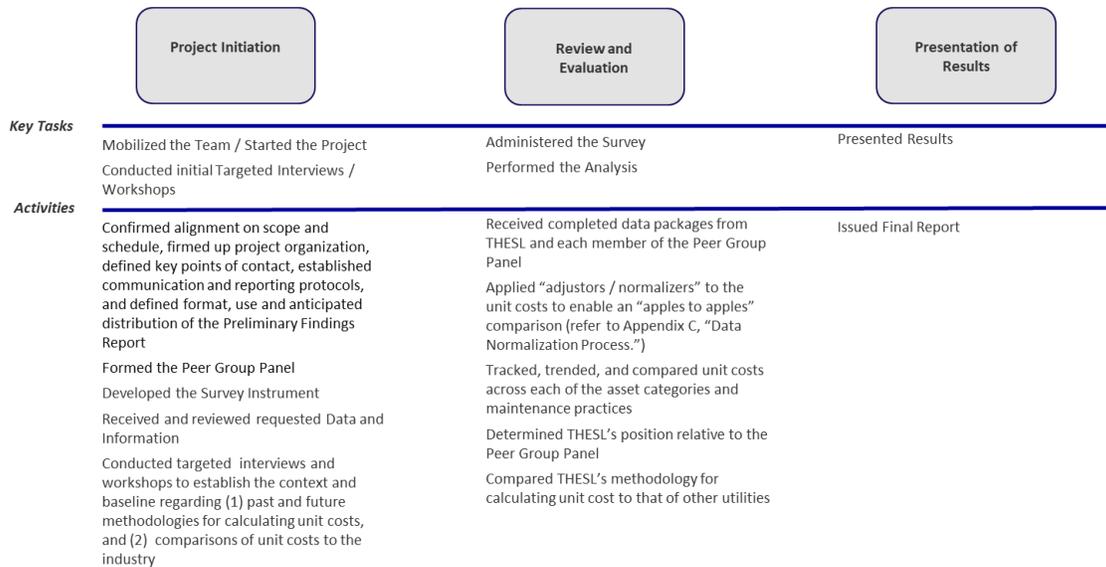
THESL is operating from a position of strength with respect to Unit Costs:

- Fully normalized benchmark comparisons place THESL in a strong position (2nd quartile in all but one of the asset categories / maintenance programs reviewed as part of this project),
- Recent changes in the structures used by THESL to collect and maintain capital unit cost information (i.e.; AAU) opens the door for improving the quality of estimates and the managing of productivity, and
- Methods currently in place to report and manage unit costs related to maintenance programs comport to industry standards.

SECTION III – PROJECT APPROACH

In order 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



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 level of objectivity and relevance committed to in our original proposal.

Peer Group Panel

The Peer Group Panel used for this study consisted of 17 electric utilities; namely:

- AES-IPL (Indianapolis, IN)
- AES-DPL (Dayton, OH)
- Ameren UE (St. Louis, MO)
- Baltimore Gas and Electric (Baltimore, MD)
- Detroit Edison (Detroit, MI)
- Dominion – VP (Richmond, VA)
- ENMAX (Edmonton, AB)
- FirstEnergy CEI (Cleveland, OH)
- Lansing Board of Water and Light (Lansing, MI)

- Pacific Gas and Electric (San Francisco, CA)
- Portland General Electric (Portland, OR)
- Philadelphia Electric Company (Philadelphia, PA)
- SMUD (Sacramento, CA)
- SaskPower (Regina, Saskatchewan)
- Seattle City Light (Seattle, WA)
- Southern California Edison (Southern California including Los Angeles suburbs)
- Xcel Energy – MN (Minneapolis, MN)

In selecting the utilities that comprise this group, our goal was to provide comparisons that would be relevant to an electric utility of THESL’s size and complexity (and where there were inconsistencies, apply industry-accepted normalization processes). Table III-1 illustrates THESL’s relative position across the myriad of factors considered in conducting like-for-like unit cost comparisons. Though no two electric distribution systems / organizations are identical, THESL is among the highest percentages within this Peer Group Panel in four of five factors that can influence comparisons of fully loaded unit costs.

Table III-1: Distribution of Peer Group Panel across Difficulty Factors (including THESL)

Vegetation		
Low	Medium	High
9	7	2
UG Utility Congestion		
Low	Medium	High
1	6	11
Population Density (Customers per Square KM)		
Low (<25)	Medium (25 to 100)	High (>100)
2	4	12
External Factors		
Low	Medium	High
2	7	9
Weather / Climate		
Mild	Moderate	Harsh
4	11	3

NOTES: The area shaded in red reflects the categorization of THESL in each category.

There are several instances where a utility has a large urban center and even larger rural areas (e.g.; Xcel Energy, Ameren UE, and SaskPower). In these cases, we were able to collect data on those districts that serve the larger population centers (i.e.; more closely approximating THESL’s demographics).

In considering other Province of Ontario electric distribution systems / organizations, notwithstanding the recently formed Alectra Utilities,¹ THESL stands unique. Toronto city ordinances, a higher cost of living, the amount of underground construction, greater volatility in customer movements, amount of electric distribution assets, and population density, taken in totality, suggested a more appropriate peer group for comparing unit costs, one that consists of electric utilities operating in other regulatory environments / under other jurisdictions.

See Appendix B for more detail regarding the categorization of utilities in Table III-1.

Asset Categories and Maintenance Programs

As stated in Section I – Introduction, the study addressed unit costs for replacing seven categories of assets and conducting four maintenance programs, based initially on a list prepared by THESL, and then modified based on the availability of relevant unit cost information from the Peer Group Panel:

Asset Categories

- Wood Pole Replacement
- UG Cable (XLPE)
- OH Switches (Manual and Remote / Motor Operated)
- Pole Top Transformer Replacement
- Padmount / UG Transformer Replacement
- Network Transformer / Protector Replacement
- Breaker Replacement (SF6, Oil and Vacuum)

Maintenance Programs

- Vegetation Management
- Pole Test and Treat
- Overhead Line Patrol
- Vault Inspection

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 two perspectives:

- *Contribution to Capital Expenditures and Maintenance Spending*: The seven asset categories represent approximately 60 percent of the maintenance capital budget over the 2014 through 2016 period; and THESL spends approximately 50 percent of all preventative and predictive maintenance costs in each year on the four maintenance programs that comprised this study.

¹ It may be appropriate to invite Alectra Utilities to join the Peer Group Panel in future benchmark studies, but only after the organizations around which this organization has formed fully integrate their business practices and accounting processes. Given that the merger was not complete until January 31st, 2017, the time frame for this study (2014-2016), and our view that a 3 to 5-year time frame to complete these types of transformations is reasonable, we felt it appropriate to hold off on including Alectra Utilities in this effort.

- 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 include vegetation management, equipment failures, underground facilities, and the overall conduct of inspection, test and maintenance programs, all of which the seven asset categories and four maintenance programs that comprised this study are covered.

It is therefore our view that any conclusions around performance resulting from benchmarking or trending the unit costs of these seven asset categories and four maintenance programs are reflective of THESL's operating performance.

Survey Instrument

UMS Group originally identified 20 electric utilities for inclusion in the Peer Group Panel, requiring 12 to assure a valid sample size on which to make meaningful comparisons. We were successful in soliciting the participation of 17, thus enhancing the veracity of the results. The Survey Instrument itself (see Appendix F) consisted of three tabs:

- Unit Costs for years 2014 through 2016, requesting the fully loaded installation, test, and inspection costs and number of assets installed / test and inspections conducted for each asset category and maintenance program. We averaged the responses were across the three-year period (weighted by number of replacements, inspections and / or tests each year) to “smooth out” the year-to-year fluctuations that are likely to occur in the course of executing an annual capital investment and the 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 work), (3) listings of costs included for contracted work, and (4) the bases for the accounting of these costs (i.e.; GAAP or IFRS). This information was then used to inform the “Pre-Analysis Adjustors” phase 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 “Full-Scale” phase of the normalization process briefly described below and further expanded upon in Appendix C.

THESL first reviewed and tested the survey instrument, after which 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 within THESL (e.g.; Design and Construction, Planning and Standards, Enterprise Project Management and Development, Engineering, and Regulatory and Finance) 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 Tab 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 our Global Learning Consortia (the focus of which includes benchmarking and the sharing of practices to improve performance and reduce costs), most notably the International Distribution Asset Management Study (IDAMS), International Transmission Operations and Maintenance Study (ITOMS), and International Distribution Benchmark Consortium (IDBC), and
- UMS Group knowledge gleaned from routinely working with over 40 to 50 electric utility organizations on an annual basis.

Benchmarking

UMS Group applied its methodology and a tailored work plan to meet THESL's specific objective to benchmark unit costs across seven asset categories and four 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, 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 the survey instrument, configured 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. 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; and thus, 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, thus increasing the overall credence of the results. As UMS Group detected instances of potential misinformation, omissions, or anomalies it contacted the respondent and resolved any underlying issues.

- Assure an “Apples-to-Apples” 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, Population Density, External Factors and Weather Climate). There was not a perfect fit for the 17 electric utilities across all five areas, though each member of the peer group panel was “compatible” with THESL in several of these areas (but, none in all of them). UMS Group developed data normalization routines to account for any remaining gaps, enabling valid comparisons of fully loaded unit costs (acknowledging that directional accuracy rather than precision is the acceptable standard in conducting such comparisons). Unique to this project was the use of a phased approach to data normalization. We started with raw comparisons (accounting for the conversion from imperial to metric units and US to Canadian dollars), then applied pre-analysis adjustors (accounting for regional cost factors and the different methods used by electric utilities in burdening unit costs with indirect and overhead costs), and ended with full scale normalization (adjusting for the difficulty factors presented in Table III-1). Addressed in more detail in **Appendix C**, this staged approach provides transparency to the process of data normalization, deemed appropriate given the wide range of factors that can affect these comparisons.
- Present the Results: UMS Group presented THESL’s position relative to the Peer Group Panel median at each of the three phases of normalization (refer to Table IV-1). 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 fully normalized scenario 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

As a precursor to assessing THESL's Unit Cost Methodology it is important to reemphasize that though a simple concept to grasp, there is enough evidence to suggest that the reporting of unit costs for benchmarking across electric utilities is complex:

- Past applications of unit costs have not necessarily been part of a performance management / improvement process; rather used to provide order-of-magnitude estimates (with no feedback loop to actual execution), and/or support some form of financial reporting (not necessarily linked to managing worker productivity or project / program execution). Further, current data collection processes for cost are heavily biased towards supporting basic finance and accounting functions, and are generally not conducive to providing the necessary granularity (from an operations perspective) to manage costs at the project or program level. The results of the Peer Group Panel Survey validated this point, as only half of the respondents were able to differentiate among the different types of UG cable and breakers, or separate UG network transformers from network protectors (some utilities even encountered challenges in integrating units installed with dollars spent).
- Practices regarding the burdening of capital labor costs are inconsistent across the industry (e.g.; the industry treats training, meetings, conferences, and A&G, and AFUDC / CWIP costs differently), rendering use of publicly available information to conduct such comparisons, marginally useful.
- Maintenance program costs are not always unitized or traceable back to actual installations. Rather, electric utilities often manage them as programs with budgets based on historical spending patterns with little, if any visibility on units inspected, tested or maintained.

Therefore, any industry comparisons of unit costs across electric utilities will require some degree of normalization. However, internal trending through application of a consistent methodology can be an integral part of any electric utility's internal performance management program by tracking changes in performance related to project / program execution.

In assessing THESL's approach to unit costing, it is our view that THESL is in line with the industry, noting the following as the bases for this statement:

- **Asset Categories:** THESL is transitioning from an approach that mirrors (in concept) that which is in effect across the industry to one that will provide even more granularity and transparency in measuring performance. In responding to the survey that drove this effort, THESL aggregated fully loaded unit costs for each asset class within a project (referred to as a "data point"). It then removed outliers (i.e.; those data points that fell within the lower decile and upper decile of the full range of data points), and calculated the average value of all remaining data points (reflecting a combination of in-house and outside contractor costs). This approach was necessary for the following reasons:
 - The structure used to track and maintain unit cost estimates (referred to as the "LU / MU" structure where "LU" signifies "Labor Units" and "MU" signifies "Material Units") lacks sufficient granularity to facilitate traceability of actual costs charged against specific types of assets and repetitive activities during project execution. THESL has since implemented a revised work breakdown structure complete with an "Asset Assembly Unit" structure ("AAU") to capture average costs incurred on repetitive activities. This effort will include specific type of assets that, for internally executed planned capital work, will (1) facilitate an improved feedback loop between budgeted and actual costs for estimated units, and (2) isolate the wrench time component in an activity to better analyze the controllable drivers of field productivity.
 - The "Unit Pricing Contractor Management System" ("UPCMS") used to estimate, track and invoice work performed by outside contractors does not facilitate a view of the actual direct labor costs for completed units of work. .
- **Maintenance Programs:** For work performed by external contractors, THESL extracted unit costs directly from the vendor invoices. Consistent with established industry practices, any in-house labor costs assigned to maintenance programs are not burdened by overheads (i.e.; only statutory costs and benefits are applied).

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 the pre-established checkpoints:

- Raw Comparisons ("Median" in Table IV-1), 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 (e.g.; combining Network Transformers with Network Protectors),
- Pre-Analysis Adjustors ("Median 1" in Table IV-1), adjusting for regional cost variances and accounting for the different methods used by electric utilities in applying indirect and overhead costs to unit costs, and

- Full-Scaled Normalization (“Median 2” in Table IV-1), incorporating commonly incurred “difficulty factors” (e.g.; Population Density, UG Utility Congestion, External Factors, Weather/Climate, and Vegetation) to further refine the benchmarking process.

Table IV-1 provides an encapsulated summary of THESL’s unit costs (reflecting a three-year average through 2016), as compared to the Peer Group median at each of these checkpoints. The red shading reflects the one asset category with unit costs significantly higher than the Peer Group Median, and the yellow shading highlights two asset classes (Wood Pole Replacement and Breaker Replacement) and one maintenance program (Pole Test and Treat) where THESL’s unit costs are marginally higher (within 10 percent) than that of the Peer Group Median. So, on balance, THESL compares favorably with the Peer Group Panel.

Table IV-1: THESL and Peer Group Panel Comparisons

	Units	THESL	Median	Median 1	Median 2
Asset Categories					
Wood Pole Replacement	Each	\$ 7,434	\$ 7,372	\$ 7,438	\$ 7,665
UG Cable Replacement-XLPE	per Meter	\$ 96	\$ 96	\$ 96	\$ 98
OH Switches Replacement	Each	\$ 21,062	\$ 21,590	\$ 22,269	\$ 23,451
Pole Top Transformer Replacement	Each	\$ 11,761	\$ 8,652	\$ 9,301	\$ 10,514
Padmount / UG Transformer Replacement	Each	\$ 21,454	\$ 21,491	\$ 21,645	\$ 23,479
Network Transformer / Protector Replacement	Each	\$ 88,943	\$ 89,254	\$ 87,991	\$ 95,369
Breaker Replacement	Each	\$ 85,242	\$ 85,228	\$ 85,128	\$ 92,938
Switchgear Replacement	Each	\$ 1,529,625	Note 1	Note 1	Note 1
Maintenance Practices					
Vegetation Management	per Line KM	\$ 2,111	\$ 3,739	\$ 3,792	\$ 3,965
Pole Test and Treat	Each	\$ 18	\$ 17	\$ 19	\$ 19
Overhead Line Patrol	per Line KM	\$ 44	\$ 44	\$ 47	\$ 47
Vault Inspection	Each	\$ 253	\$ 253	\$ 261	\$ 272

We provide a more detailed presentation of these results in [**Appendix G**](#).

Implications of the Study

In reviewing our assessment of THESL’s Unit Cost methodology, the subsequent benchmarking across seven asset categories and four maintenance programs, and taking stock of industry practices, additional assertions apply:

- The asset categories and maintenance programs selected by THESL represent a valid proxy for trending its performance.
- Within these asset categories and maintenance programs, continued refinement is called for in the reporting, collecting and synthesizing of cost and installation data, particularly as the industry drives to adopt unit costing as a means for trending and comparing performance.

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- The industry (particularly in North America and certainly in the US) has not matured to the point where (1) common methodologies exist in deriving unit rates, or (2) managing unit rates is a conscious part of any performance improvement programs.
- 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 such an effort difficult.

Appendix A – Supporting Material

UMS Group used the following THESL provided information and data to support the study:

- Unit Cost Survey – THESL September 5, 2017 (THESL Response to Unit Cost and Accounting Tabs on the Survey Form)
- 2-AMPCO-3 Table of Costs
- 2015-2019 Programs to Asset Category Mapping_V2_20170801 (Capital Program Tracker)
- Capital UC Methodology (Capital Unit Cost Methodology-Power Point Presentation)
- Interrogatory Response-AMPCO (1-AMPCO-3 filed May 27, 2016)
- Maintenance Practice
- SAIFI SAIDI 2012-2016 (2012-2016 SAIFI SAIDI by Cause Code with and without MED for Lines and Stations)
- SAP Asset Class Mapping Extract 08082017)Master Spreadsheet of Distribution Assets)
- THESL-Reply Argument (EB-2014-0116 pages 66 through 68 13398-2009 19208026.4)
- THESL LTR Affidavit of A. Rouse 20150116 (THESL Custom Incentive Rate Application (EB-2014-0116 dated January 16, 2015)
- THESL Response AMPCO Motion Settlement 20170121 (THESL Custom Incentive Rate Application (EB-2014-0116 dated January 21, 2015)
- THESL SUB AMPCO Affidavit of M. Walker dated January 13, 2015 (THESL Responses to motions filed by Energy Probe and AMPCO on December 22nd and 31st, 2014)
- UMS Info Request Response 2017-09-15 (Estimated Labor % per Unit by Asset Class – Capital / Regulated Safety Training, and Employee Fringes)
- Unit Cost Local Factors (THESL Response to Local Factors Tab on the Survey Form)
- Unit Costs for Benchmarking Study – Maintenance (VM, Pole Testing, OH Line Patrol and IR Screening, OH Switch Maintenance, and UG Vault Inspection 2014 through 2019)
- Whitepaper Adoption of IAS16 PPE Engineering and Admin Reclassification 2010-04-03 (“EAR” Version V5.7-Final dated July 30, 2010)

Appendix B – Peer Group

The Peer Group Panel used for this study consisted of 17 electric utilities; namely:

- AES-IPL (Indianapolis, IN)
- AES-DPL (Dayton, OH)
- Ameren UE (St. Louis, MO)
- Baltimore Gas and Electric (Baltimore, MD)
- Detroit Edison (Detroit, MI)
- Dominion – VP (Richmond, VA)
- ENMAX (Edmonton, AB)
- FirstEnergy CEI (Cleveland, OH)
- Lansing Board of Water and Light (Lansing, MI)
- Pacific Gas and Electric (San Francisco, CA)
- Portland General Electric (Portland, OR)
- Philadelphia Electric Company (Philadelphia, PA)
- SMUD (Sacramento, CA)
- SaskPower (Regina, Saskatchewan)
- Seattle City Light (Seattle, WA)
- Southern California Edison (Southern California including Los Angeles suburbs)
- Xcel Energy – MN (Minneapolis, MN)

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 (and where there are inconsistencies, apply industry-accepted normalization processes – see Appendix C). 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 for four of five factors that can influence comparisons to unit costs.

Table B-1: Distribution of Peer Group Panel across Difficulty Factors (including THESL)

Vegetation		
Low	Medium	High
9	7	2
UG Utility Congestion		
Low	Medium	High
1	6	11
Population Density (Customers per Square KM)		
Low (<25)	Medium (25 to 100)	High (>100)
2	4	12
External Factors		
Low	Medium	High
2	7	9
Weather / Climate		
Mild	Moderate	Harsh
4	11	3

NOTE: The area shaded in red reflects the categorization of THESL in each category.

The following extracts were used to categorize the Peer Group utilities in terms of **Vegetation**:

Figure B-1: US Vegetation Density

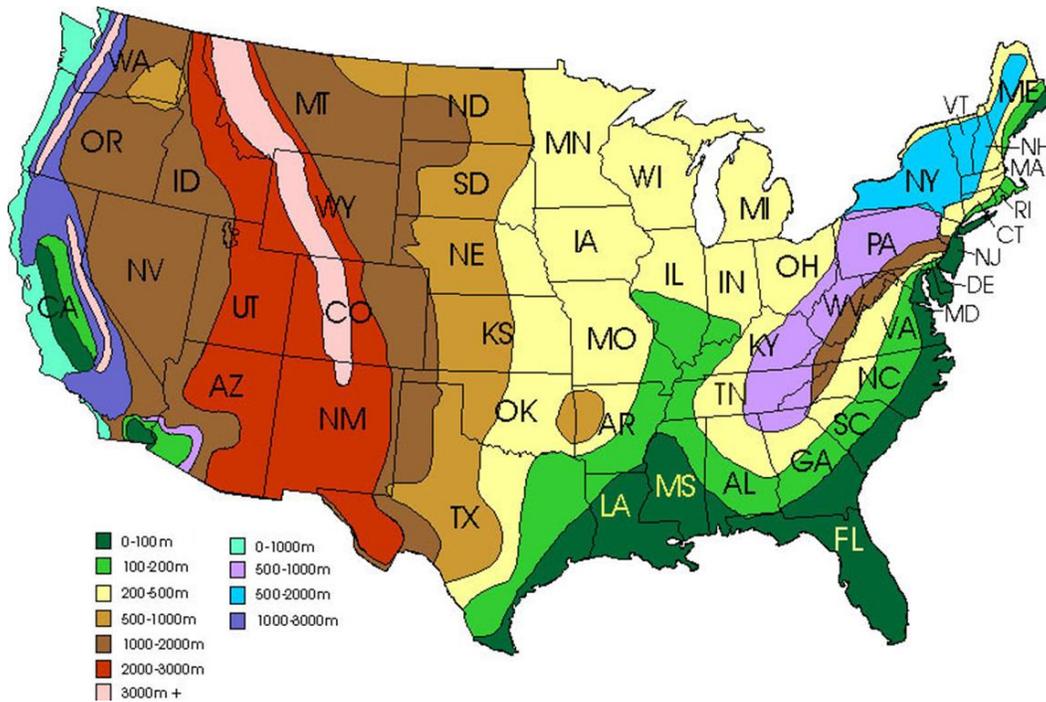
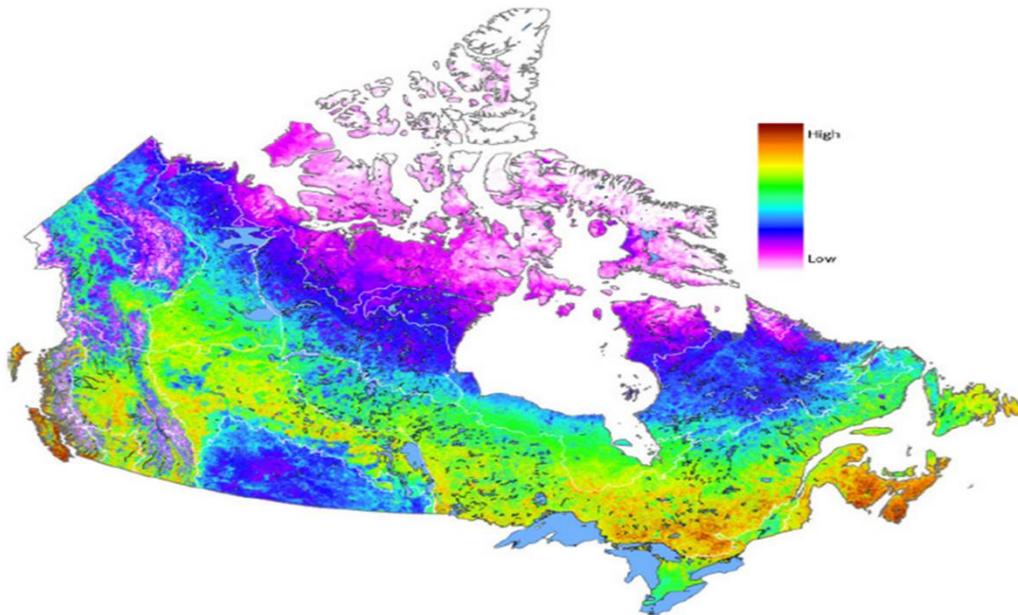
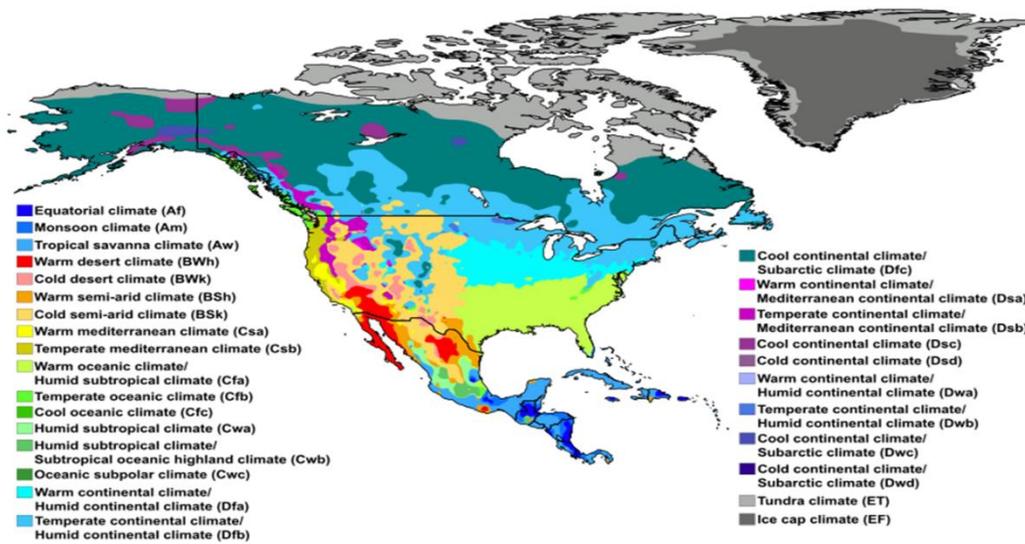


Figure B-2: Canadian Vegetation Density



In addition, with respect to **Weather / Climate**:

Figure B-3: North American Climate Map



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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	M	N	O	P	Q
Excessive Travel Time	X		X	X	X	X	X	X			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	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	X	X	X	X
Requirements to perform work off hours (i.e., night/weekend)	X		X	X	X	X	X	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	X	X				
Excessive switching requirements (i.e., to isolate on dual radial construction)	X	X	X	X				X	X	X			X		X			
Shoring requirements for UG work	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	X	X
Prior use of lead cables	X	X							X				X				X	
High fault currents (impacting equipment sourcing)	X	X								X	X	X	X	X	X	X	X	X
Paid duty for police presence on public roads	X	X	X	X	X	X	X			X		X	X	X	X	X	X	X
Extensive use of submersible transformers	X	X						X										X
Environmental regulations	X	X				X	X	X		X		X		X	X	X		X
Insufficient IT Enablement									X								X	
Union Work Rules										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	X	X	X	X	X
Level of Difficulty	High	High	Medium	Medium	Low	Medium	Medium	Medium	Low	High	Medium	High	Medium	High	High	High	High	High

NOTE: 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).

In addition, the following table substantiates the groupings (High, Medium and Low) of the Peer Group Panel based on **Population Density**.

Table B-3: Peer Group Panel Population Density

Peer Group Panel	Number of Customers	Service Territory (Sq. KM)	Population Density
AES-IPL	480,000	1,368	351.0
AES-DPL	520,000	6,000	86.7
Ameren UE	1,200,000	113,183	10.6
Baltimore Gas and Electric	1,250,000	5,957	209.8
Detroit Edison	2,200,000	20,000	110.0
Dominion VP	2,600,000	77,700	33.5
ENMAX	850,000	1,087	782.0
FirstEnergy CEI	700,000	4,403	159.0
Lansing Board of Water and Light	100,000	130	769.2
Pacific Gas and Electric	16,000,000	181,300	88.3
Portland General Electric	862,000	10,360	83.2
Philadelphia Electric Company	1,600,000	5,439	294.2
Sacramento Municipal Utility District	625,000	1,431	436.8
SaskPower	522,000	651,000	0.8
Seattle City Light	425,000	342	1,243.1
Southern California Edison	15000000	130000	115.4
Toronto Hydro	761,000	630	1,207.9
Xcel Energy	2,500,000	17,066	146.5

NOTE: Though the normalization process is designed to account for differences in key variables (of which Population Density is one), a review of Table B-3 identifies three utilities whose population density is excessively low (SaskPower, Ameren UE and Dominion VP) in comparison to the Peer Group Panel. Removing them from the sample does not change Toronto Hydro's position within the respective quartiles.

The categorization of **UG Utility Congestion** (High, Medium and Low) was based on each utility's response to a direct inquiry from UMS Group.

Other Utilities Serving the Province of Ontario

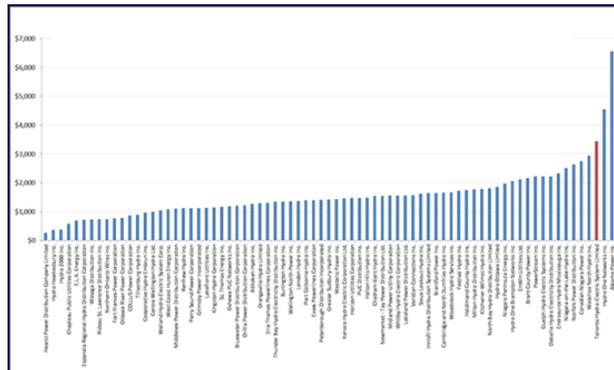
In establishing the Peer Group Panel, there is rationale for defining a peer group outside of the other utilities that serve the Province of Ontario (as the peer group determines the comparative position with respect to unit costs). First, from purely a demographic perspective, the City of Toronto ranks among the more urban in North America, and as with all predominantly urban electric utilities, they 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

Installed Distribution Assets

As THESL serves a significantly larger number of customers (10 times that of the Provincial average), they are among the top 3 in terms of fixed assets per customer (i.e.; more assets to maintain and ultimately replace on a per customer basis).

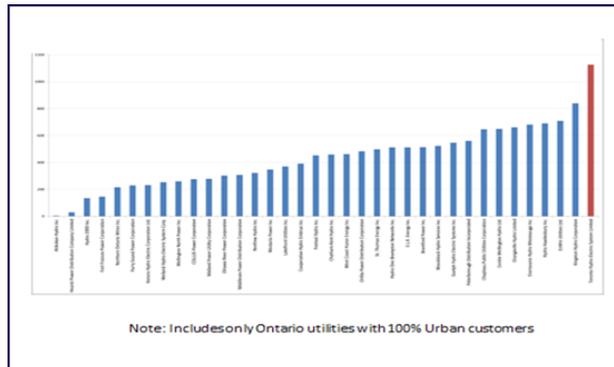
Figure B-5: Installed Distribution Assets (Comparison with Ontario LDCs)



Urban Population Density

Narrowing the view to Electric Distribution Companies serving only urban customers, THESL is at the far end of the scale; and is the second largest in total number of customers.

Figure B-6: Customers per Urban KM²



The uniqueness among LDCs is always an issue when conducting comparative analyses (i.e.; the need for normalizing the inputs). However, in this instance, the sheer magnitude and scope of the differences in customer density, system configuration, and number of installed assets, combined with the external factors that are typically intensified in large urban areas, presents THESL as an outlier relative to all the other Ontario LDCs. Therefore, we have established a peer group that presents a more compatible view of these differentiating factors, thus facilitating a more valid comparison of unit costs.

Appendix C – Unit Cost Benchmarking Normalization

Prior to conducting comparative analyses with the Panel Group Panel (see Appendix B), it was necessary to “normalize” the unit cost performance across all participating electric utilities. The selection of the panel accounted for key criteria to facilitate proper comparisons (e.g.; mix of urban and rural centers, cross-section of public and investor-owned utilities, with minor exceptions climate and number of customer served, existence of an underground network, and externally imposed mandates / constraints that affect productivity). Yet no two electric utilities or the specific factors that affect their costs are ever identical - thus, the need to “normalize.”

Defining the “Normalizing” Variables

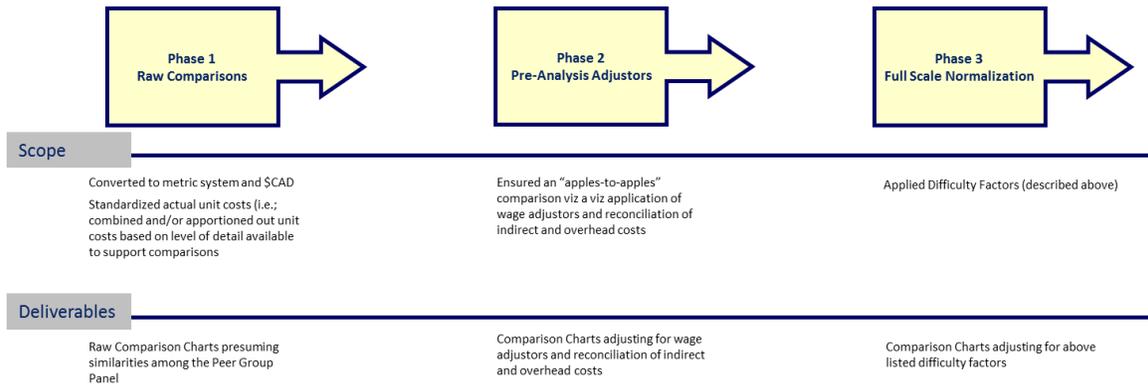
For this study, we established two categories of variables:

- Cost-Related Variables:
 - *Regional Cost Differences* (applying regional cost adjustors based on average wages in each of the major cities that comprise the Peer Group Panel)
 - *Accounting Practices* (relating to the handling of indirect costs and overhead allocations viz a viz unit costs for asset replacements and / or the conduct of maintenance practices.
- Difficulty Factors, acknowledging that system and city-specific demographics play a role in worker productivity:
 - *Population Density* (potentially impacts accessibility, increases awareness of public safety, and creates added distractions during the performance of work),
 - *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),
 - *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),
 - *Weather*, (accounts for the differences between harsh and temperate climates and their impact on productivity), and
 - *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).

Applying the “Normalizing” Variables

In applying these variables, we instituted a three-phased approach, thereby availing the reader total transparency to the comparisons at three major junctures of the process.

Figure C-1: Three-Phased Data Normalization Process



- **Raw Comparisons (Phase 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 (2014 through 2016), the conversion rate of \$US to \$CDN at the end of each year was applied (accounting for the ever-changing conversion rate over the three-year period).
- **Pre-Analysis Adjustors (Phase 2)** involved the application of regional cost adjustors and accounting for the different methods used by electric utilities to apply indirect and overhead costs to unit costs.

Table C-1 illustrates the derivation of regional cost adjustors, sources for which include the Board of US Labor Statistics and, for Canada, individual governmental provincial websites. Using “average wage” as a proxy, we decreased the unit costs at electric utilities with regional costs higher than THESL (i.e.; ENMAX, Pacific Gas and Electric and Southern California Edison) and increased all others (except Seattle City Light, which is on a par with THESL), these changes all proportionate to their variance from the average wage for Toronto.

Table C-1: Regional Cost Adjustors

Peer Group Panel	Average Wage	Factor	Adjustment
AES-IPL	\$ 58,082	0.74	1.35
AES-DPL	\$ 58,627	0.75	1.34
Ameren UE	\$ 59,818	0.76	1.31
Baltimore Gas and Electric	\$ 68,101	0.87	1.15
Detroit Edison	\$ 63,860	0.82	1.23
Dominion VP	\$ 60,896	0.78	1.29
ENMAX	\$ 104,410	1.33	0.75
FirstEnergy CEI	\$ 59,830	0.76	1.31
Lansing Board of Water and Light	\$ 58,962	0.75	1.33
Pacific Gas and Electric	\$ 94,438	1.21	0.83
Portland General Electric	\$ 66,910	0.85	1.17
Philadelphia Electric Company	\$ 66,452	0.85	1.18
Sacramento Municipal Utility District	\$ 67,816	0.87	1.15
SaskPower	\$ 89,431	1.14	0.88
Seattle City Light	\$ 78,492	1.00	1.00
Southern California Edison	\$ 102,400	1.31	0.76
Toronto Hydro	\$ 78,280	1.00	1.00
Xcel Energy	\$ 68,212	0.87	1.15
Average Adjustment			1.13

NOTE: We made adjustment indicated in Table C-1 to the labor component of Unit Cost, assuming the following split between labor and non-labor costs

Table C-2 Labor and Non-Labor Cost Split

Asset Category / Maintenance Program	Labor Costs	Non-Labor Costs
Wood Pole Replacement	60%	40%
UG Cable Replacement	50%	50%
OH Switches Replacement	40%	60%
Pole Top Transformer Replacement	50%	50%
Padmount / UG Transformer Replacement	50%	50%
Network Transformer / Protector Replacement	40%	60%
Breaker Replacement	40%	60%
Vegetation Management	70%	30%
Pole Test and Treat	70%	30%
Overhead Line Patrol	70%	30%
Vault Inspection	70%	30%

In further adjusting for the differences in Accounting Practices, we queried each of the electric utilities as to what non-direct labor and material were and were not included in the unit costs, distinguishing between utility and outside contractor-performed work. Table C-3 illustrates the differences across the Peer Group Panel.

**Table C-3: 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	M	N	O	P	Q
Design and Permitting Costs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Project Management / Supervisory Costs	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Other Project-Related Costs (e.g.; Fleet and Warehousing)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Other Labor-Related Costs (e.g.; Training, Meetings and Conferences)	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	
Employee-Related Costs (Benefits, Pensions and Bonuses)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Divisional Administrative and General Costs			X	X				X	X	X		X			X	X		X
AFUDC / CWIP	X		X	X	X			X	X	X			X	X	X	X		X
Adjustment Factor	1.0	1.02	0.95	0.95	1.0	1.02	1.02	0.95	0.95	0.95	1.02	1.0	1.02	1.0	0.95	0.95	1.02	1.0

The adjustment factors, ranging between 0.95 and 1.02, reflect comparisons with THESL (i.e.; those with more categories in their Unit Costs calculation than THESL were reduced by five percent; and those with fewer categories in their Unit Costs calculation than THESL were increased by two percent). There was no noted difference in applying loaders to work performed by outside contractors.

- **Full-Scale Normalization (Phase 3)** applied the above described difficulty factors in further normalizing unit costs across all 18 participating electric utilities. Table C-4 provides the bases for these adjustments.

Table C-4: Full Scale Normalization

Utility	Population Density	UG Utility Congestion	External Factors	Weather / Climate	Vegetation
Impact	High / Medium / Low	High / Moderate / Low	High / Medium / Low	Mild / Moderate / Harsh	High / Medium / Low
Source of Impact Assessment	Table B-3	Peer Group Survey	Table B-2	Figure B-3	Figures B-1 and B-2
AES-IPL	High	High	Medium	Moderate	Low
AES-DPL	Medium	Low	Medium	Moderate	Low
Ameren UE	Low	Moderate	Low	Moderate	Low
Baltimore Gas and Electric	High	High	High	Moderate	Medium
Detroit Edison	High	Moderate	Medium	Moderate	Low
Dominion-VP	Medium	Moderate	Medium	Mild	High
ENMAX	High	Moderate	Medium	Harsh	Low
FirstEnergy-CEI	High	High	High	Moderate	Medium
Lansing Board of Water and Light	High	Moderate	Low	Moderate	Low
Pacific Gas and Electric	High	High	High	Mild	Medium
Portland General Electric	Medium	High	High	Moderate	Medium
Philadelphia Electric Company	High	High	Medium	Moderate	High
Sacramento Municipal Utility District	High	High	High	Mild	Medium
SaskPower	Low	Moderate	Medium	Harsh	Low
Seattle City Light	High	High	High	Moderate	Medium
Southern California Edison	High	High	High	Mild	Low
Toronto Hydro	High	High	High	Moderate	Medium
Xcel Energy	High	High	High	Harsh	Low

In addition, Table C-5 outlines the framework used in applying these normalizing factors.

Table C-5: Difficulty Factor Scoring Criteria

Domain	Weighting	Metric	Source	Ordinal Ranking Assignment
Population Density	20%	Customers per KM ² translated to High / Medium Low	Table B-3	High: 6 Medium: 5 Low: 4
UG Utility Congestion	20%	High / Moderate / Low	Peer Group Survey	High: 6 Medium: 5 Low: 4
External Factors	20%	High / Medium /Low	Table B-2	High: 6 Medium: 5 Low: 4
Weather / Climate	20%	Harsh / Moderate / Mild	Figure B-3	High: 6 Medium: 5 Low: 4
Vegetation	20%	High / Medium / Low	Figures B-1 and B-2	High: 6 Medium: 5 Low: 4

In applying the domain rankings to specific Asset Categories and Maintenance Programs, it is important to note that depending on the operating environment for each category / program, not all the domains in Table C-5 applied. Tables C-6 and C-7 account for this further refinement to the normalization process.

Table C-6: Domain Applicability Matrix by Asset Category / Maintenance Program

Operating Environment	Asset Category / Maintenance Program	Domain				
		Population Density	UG Utility Congestion	External Factors	Weather / Climate	Vegetation
Overhead (OH)	Wood Pole OH Switch Pole Top Transformers Breaker Pole Test and Treat OH Line Patrol	X		X	X	X
Underground (UG)	UG Cable Padmount / UG Transformer Network Transformer / Protector Vault Inspection	X	X	X	X	
Vegetation Management	Vegetation Management			X	X	X

Table C-7: Full-Scale Normalization Factors (by Domain and Operating Environment)

Peer Group Panel	Population Density	UG Utility Congestion	External Factors	Weather / Climate	Vegetation	OH Adjustment		UG Adjustment		VM Adjustment	
						Score	Factor	Score	Factor	Score	Factor
AES-IPL	6	6	5	5	4	20	1.09	22	1.04	14	1.13
AES-DPL	5	5	5	5	4	19	1.14	20	1.13	14	1.13
Ameren UE	4	5	4	5	4	17	1.23	18	1.22	13	1.19
Baltimore Gas and Electric	6	6	6	5	5	22	1.00	23	1.00	16	1.00
Detroit Edison	6	5	5	5	4	20	1.09	21	1.09	14	1.13
Dominion VP	5	5	5	4	6	20	1.09	19	1.17	15	1.06
ENMAX	6	5	5	6	4	21	1.05	22	1.04	15	1.06
FirstEnergy CEI	6	6	6	5	5	22	1.00	23	1.00	16	1.00
Lansing Board of Water and Light	6	5	4	5	4	19	1.14	20	1.13	13	1.19
Pacific Gas and Electric	6	6	6	4	5	21	1.05	22	1.04	15	1.06
Portland General Electric	5	6	6	5	5	21	1.05	22	1.04	16	1.00
Philadelphia Electric Company	6	6	5	5	6	22	1.00	22	1.04	16	1.00
Sacramento Municipal Utility District	6	6	6	4	5	21	1.05	22	1.04	15	1.06
SaskPower	4	5	5	6	4	19	1.14	20	1.13	15	1.06
Seattle City Light	6	6	6	5	5	22	1.00	23	1.00	16	1.00
Southern California Edison	6	6	6	4	4	20	1.09	22	1.04	14	1.13
Toronto Hydro	6	6	6	5	5	22	1.00	23	1.00	16	1.00
Xcel Energy	6	6	6	6	4	22	1.00	24	0.96	16	1.00
Average Adjustment							1.07		1.07		1.07

Tables C-8 through C-10 present the outputs of the three-phased approach to normalization across the seven asset categories and four 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-8: Raw Comparisons – Phase 1 (Metric and Canadian Dollar Conversion)

Asset Category	Unit	THESI	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	Median
Wood Pole Replacement	Each	\$ 7,434	\$ 6,190	\$ 5,552	\$ 5,957	\$ 5,229	\$ 4,801	\$ 7,567	\$ 7,533	\$ 5,174	\$ 7,452	\$ 7,233	\$ 7,286	\$ 7,964	\$ 7,848	\$ 7,457	\$ 7,762	\$ 7,310	\$ 7,548	\$ 7,172
UG Cable Replacement (XLPE)	Meter	\$ 96	\$ 72	\$ 79	\$ 84	\$ 77	\$ 99	\$ 92	\$ 96	\$ 95	\$ 101	\$ 93	\$ 90	\$ 99	\$ 96	\$ 98	\$ 97	\$ 88	\$ 100	\$ 96
OH Switch Replacement	Each	\$ 21,062	\$ 27,456	\$ 21,086	\$ 19,095	\$ 18,282	\$ 21,574	\$ 21,786	\$ 23,278	\$ 21,605	\$ 16,813	\$ 17,762	\$ 20,755	\$ 23,795	\$ 26,310	\$ 22,300	\$ 22,433	\$ 18,929	\$ 24,154	\$ 21,590
Pole Top Transformer Replacement	Each	\$ 11,761	\$ 7,006	\$ 8,090	\$ 7,412	\$ 8,093	\$ 8,157	\$ 9,300	\$ 12,576	\$ 7,491	\$ 10,166	\$ 12,043	\$ 7,285	\$ 12,435	\$ 13,683	\$ 8,527	\$ 8,326	\$ 10,358	\$ 8,777	\$ 8,652
Padmount / UG Transformer Replacement	Each	\$ 21,454	\$ 19,684	\$ 18,239	\$ 18,938	\$ 18,612	\$ 19,475	\$ 19,309	\$ 22,375	\$ 18,689	\$ 21,691	\$ 21,855	\$ 21,738	\$ 23,025	\$ 24,610	\$ 21,670	\$ 17,452	\$ 21,529	\$ 21,910	\$ 21,491
Network Transformer / Protector Replacement	Each	\$ 86,943	\$ 81,811	\$ 80,099	\$ 79,766	\$ 72,128	\$ 81,871	\$ 73,024	\$ 92,465	\$ 72,905	\$ 91,423	\$ 86,034	\$ 89,565	\$ 90,700	\$ 94,052	\$ 94,811	\$ 92,043	\$ 91,030	\$ 90,472	\$ 89,254
Breaker Replacement	Each	\$ 85,242	\$ 74,373	\$ 78,582	\$ 74,057	\$ 71,214	\$ 81,570	\$ 79,773	\$ 89,565	\$ 78,571	\$ 88,328	\$ 85,214	\$ 86,356	\$ 87,765	\$ 88,240	\$ 88,316	\$ 82,809	\$ 88,139	\$ 87,093	\$ 85,228
Maintenance Practice																				
Vegetation Management	Line KM	\$ 2,111	\$ 4,071	\$ 2,403	\$ 2,697	\$ 3,786	\$ 3,713	\$ 3,683	\$ 3,436	\$ 4,369	\$ 3,312	\$ 4,264	\$ 4,030	\$ 3,765	\$ 3,600	\$ 4,134	\$ 4,564	\$ 3,115	\$ 4,534	\$ 3,739
Pole Test and Treat	Each	\$ 18	\$ 15	\$ 16	\$ 17	\$ 17	\$ 17	\$ 19	\$ 19	\$ 19	\$ 15	\$ 15	\$ 15	\$ 15	\$ 15	\$ 15	\$ 15	\$ 18	\$ 18	\$ 17
Overhead Line Patrol	Line KM	\$ 44	\$ 40	\$ 44	\$ 45	\$ 46	\$ 46	\$ 46	\$ 46	\$ 46	\$ 41	\$ 41	\$ 41	\$ 41	\$ 41	\$ 44	\$ 44	\$ 42	\$ 42	\$ 44
Vault Inspection	Each	\$ 253	\$ 214	\$ 221	\$ 215	\$ 229	\$ 229	\$ 275	\$ 275	\$ 275	\$ 257	\$ 257	\$ 257	\$ 257	\$ 257	\$ 283	\$ 283	\$ 256	\$ 256	\$ 253

Table C-9: Pre-Analysis Adjustors - Phase 2 (Regional Cost Adjustments and Accounting Practices)

Asset Category	Unit	THESI	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	Median
Wood Pole Replacement	Each	\$ 7,434	\$ 7,481	\$ 6,375	\$ 6,798	\$ 6,197	\$ 5,560	\$ 9,040	\$ 6,082	\$ 5,882	\$ 7,802	\$ 8,166	\$ 7,960	\$ 7,442	\$ 7,835	\$ 6,083	\$ 8,027	\$ 8,124	\$ 6,773	\$ 7,438
UG Cable Replacement (XLPE)	Meter	\$ 96	\$ 85	\$ 88	\$ 93	\$ 89	\$ 112	\$ 108	\$ 80	\$ 105	\$ 104	\$ 104	\$ 96	\$ 94	\$ 96	\$ 82	\$ 99	\$ 96	\$ 91	\$ 96
OH Switch Replacement	Each	\$ 21,062	\$ 31,460	\$ 22,818	\$ 20,573	\$ 20,539	\$ 23,993	\$ 24,759	\$ 19,900	\$ 23,214	\$ 17,058	\$ 19,407	\$ 22,036	\$ 22,834	\$ 26,281	\$ 19,189	\$ 22,570	\$ 20,461	\$ 22,501	\$ 22,269
Pole Top Transformer Replacement	Each	\$ 11,761	\$ 8,248	\$ 9,022	\$ 8,222	\$ 9,342	\$ 9,260	\$ 10,840	\$ 10,452	\$ 8,283	\$ 10,478	\$ 13,377	\$ 7,847	\$ 11,776	\$ 13,664	\$ 7,146	\$ 8,493	\$ 11,355	\$ 8,026	\$ 9,301
Padmount / UG Transformer Replacement	Each	\$ 21,454	\$ 23,173	\$ 20,340	\$ 21,007	\$ 21,485	\$ 22,108	\$ 22,506	\$ 18,596	\$ 20,663	\$ 22,358	\$ 24,276	\$ 23,415	\$ 21,805	\$ 24,576	\$ 18,162	\$ 17,803	\$ 23,600	\$ 20,035	\$ 21,445
Network Transformer / Protector Replacement	Each	\$ 86,943	\$ 93,741	\$ 86,679	\$ 85,938	\$ 81,032	\$ 91,052	\$ 82,989	\$ 79,048	\$ 78,336	\$ 92,755	\$ 94,003	\$ 95,093	\$ 87,038	\$ 93,951	\$ 81,584	\$ 92,603	\$ 98,403	\$ 84,280	\$ 87,991
Breaker Replacement	Each	\$ 85,242	\$ 85,218	\$ 85,037	\$ 79,788	\$ 80,006	\$ 90,717	\$ 90,660	\$ 76,569	\$ 84,425	\$ 89,615	\$ 93,107	\$ 91,686	\$ 84,222	\$ 88,145	\$ 75,995	\$ 83,312	\$ 95,277	\$ 81,133	\$ 85,128
Maintenance Practice																				
Vegetation Management	Line KM	\$ 2,111	\$ 5,049	\$ 2,838	\$ 3,164	\$ 4,604	\$ 4,386	\$ 4,507	\$ 2,692	\$ 5,102	\$ 3,521	\$ 4,891	\$ 4,465	\$ 3,471	\$ 3,593	\$ 3,280	\$ 4,784	\$ 3,510	\$ 3,991	\$ 3,792
Pole Test and Treat	Each	\$ 18	\$ 19	\$ 19	\$ 20	\$ 20	\$ 20	\$ 20	\$ 15	\$ 15	\$ 17	\$ 17	\$ 17	\$ 17	\$ 17	\$ 12	\$ 12	\$ 20	\$ 20	\$ 19
Overhead Line Patrol	Line KM	\$ 44	\$ 50	\$ 52	\$ 53	\$ 54	\$ 54	\$ 36	\$ 36	\$ 36	\$ 47	\$ 47	\$ 47	\$ 47	\$ 35	\$ 35	\$ 47	\$ 47	\$ 47	\$ 47
Vault Inspection	Each	\$ 253	\$ 266	\$ 261	\$ 252	\$ 270	\$ 270	\$ 215	\$ 215	\$ 215	\$ 295	\$ 295	\$ 295	\$ 295	\$ 295	\$ 224	\$ 224	\$ 289	\$ 289	\$ 253

**Table C-10 Full-Scale Normalization – Phase 3
(Difficulty Factors)**

Asset Category	Unit	THRESH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	Median?
Wood Pole Replacement	Each	\$ 7,494	\$ 7,481	\$ 6,955	\$ 7,724	\$ 7,605	\$ 6,066	\$ 9,862	\$ 6,358	\$ 6,684	\$ 8,156	\$ 8,166	\$ 8,322	\$ 8,457	\$ 7,835	\$ 6,636	\$ 8,027	\$ 8,124	\$ 7,081	\$ 7,665
UG Cable Replacement (XLPE)	Meter	\$ 96	\$ 85	\$ 92	\$ 105	\$ 108	\$ 122	\$ 126	\$ 83	\$ 119	\$ 109	\$ 108	\$ 101	\$ 106	\$ 96	\$ 86	\$ 95	\$ 96	\$ 95	\$ 98
OH Switch Replacement	Each	\$ 21,062	\$ 31,460	\$ 24,892	\$ 23,378	\$ 25,207	\$ 26,175	\$ 27,010	\$ 20,805	\$ 26,380	\$ 17,834	\$ 19,407	\$ 23,038	\$ 25,948	\$ 26,281	\$ 20,993	\$ 22,570	\$ 20,461	\$ 23,524	\$ 23,451
Pole Top Transformer Replacement	Each	\$ 11,761	\$ 8,248	\$ 9,843	\$ 9,343	\$ 11,466	\$ 10,101	\$ 11,825	\$ 10,927	\$ 9,412	\$ 10,954	\$ 13,377	\$ 8,203	\$ 13,382	\$ 13,664	\$ 7,796	\$ 8,493	\$ 11,355	\$ 8,391	\$ 10,514
Padmount / UG Transformer Replacement	Each	\$ 21,454	\$ 23,173	\$ 21,224	\$ 23,747	\$ 26,155	\$ 24,030	\$ 26,420	\$ 19,405	\$ 23,358	\$ 23,330	\$ 25,332	\$ 24,433	\$ 24,650	\$ 24,576	\$ 18,951	\$ 17,029	\$ 23,600	\$ 20,906	\$ 23,479
Network Transformer / Protector Replacement	Each	\$ 86,943	\$ 93,741	\$ 90,448	\$ 97,147	\$ 98,648	\$ 98,969	\$ 97,422	\$ 82,485	\$ 88,554	\$ 96,788	\$ 98,090	\$ 99,227	\$ 98,391	\$ 95,951	\$ 85,132	\$ 88,577	\$ 98,403	\$ 87,945	\$ 95,369
Breaker Replacement	Each	\$ 85,242	\$ 85,218	\$ 92,768	\$ 90,668	\$ 98,189	\$ 98,964	\$ 98,902	\$ 80,050	\$ 95,938	\$ 93,688	\$ 93,107	\$ 95,854	\$ 95,706	\$ 88,145	\$ 82,904	\$ 83,312	\$ 95,277	\$ 84,821	\$ 92,038
Maintenance Practice																				
Vegetation Management	Line KM	\$ 2,111	\$ 5,049	\$ 3,193	\$ 3,559	\$ 5,467	\$ 4,935	\$ 4,789	\$ 2,861	\$ 6,059	\$ 3,521	\$ 4,891	\$ 4,744	\$ 3,688	\$ 3,593	\$ 3,690	\$ 4,784	\$ 3,510	\$ 4,241	\$ 3,965
Pole Test and Treat	Each	\$ 19	\$ 19	\$ 21	\$ 23		\$ 22		\$ 16			\$ 17				\$ 13		\$ 20		\$ 19
Overhead Line Patrol	Line KM	\$ 44	\$ 50	\$ 56	\$ 60		\$ 59		\$ 38			\$ 47				\$ 38		\$ 47		\$ 47
Vault Inspection	Each	\$ 253	\$ 266	\$ 272	\$ 285		\$ 293		\$ 225			\$ 308				\$ 234		\$ 289		\$ 272

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 Morris Corporate Center 1, 300 Interpace Parkway, Suite C380, 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.

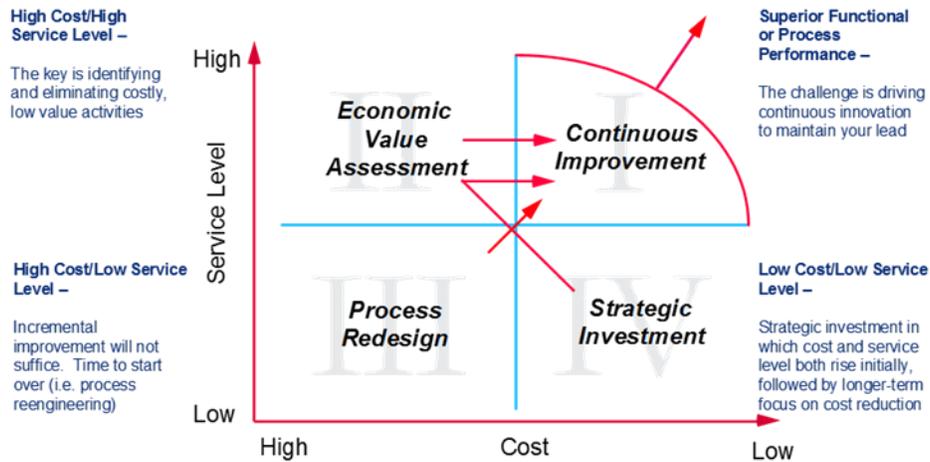
UMS Group Competencies and Skills

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 four consultants that contributed to this effort combine for over 120 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 the 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 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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)
Dayton Power and Light (AES) Generation and T&D Performance Diagnostics T&D System Refurbishment and Replacement Risk Assessment	<ul style="list-style-type: none"> • 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
FirstEnergy (JCP&L) Investment, O&M Spending and Performance Comparison Study	<ul style="list-style-type: none"> • Capital Investment Levels • O&M Spending Levels • Reliability Performance • Aging Infrastructure Analysis
Indianapolis Power and Light Company (AES) Generation and T&D Benchmarking	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • O&M Spending Comparison • Capital Investment Levels Comparison • Investment Renewal Comparison • Asset Recovery Comparison • Reliability and Availability Comparison • Practices Assessment • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Organization Redesign • Work Management • Asset Management • O&M Cost Reduction • Aging Workforce / Succession Planning

SaskPower Business Renewal Initiative: Capital Efficiency and O&M Spending Assessments (Generation, T&D and Customer Service)	<ul style="list-style-type: none"> • Capital Investment Levels • O&M Spending Levels • System Reliability Performance • Worker Productivity (Unit Costs) • Maintenance Performance • Aging Infrastructure Trends and Comparisons • Aging Workforce Comparisons
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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 their resumes.

Table D-2: UMS Group Core Team

Name	Project Role	Years of Experience	Relevant Areas of Expertise
Jeffrey Cummings	Project Manager and Expert Witness	37	<ul style="list-style-type: none"> • 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
Steven Morris	SME-Operational Analytics	29	<ul style="list-style-type: none"> • Cost and Service Level Comparative Assessments • O&M Program Spending • Staffing Level Analyses and Benchmarking • Capitalization Practices related to Major Maintenance • Substation Maintenance and Construction • Distribution Construction Unit Cost Benchmarking • Economic Modeling for Asset Replacement and Maintenance Decision Support
Thomas Myers	SME-Inspection, Test and Maintenance	32	<ul style="list-style-type: none"> • Technology Selection and Implementation • Enterprise Analytics • Asset Lifecycle Planning • Capital Investment and O&M Program Planning • Service Restoration • Inspection, Test and Maintenance Program Optimization • GIS Implementation and Operation • Work Planning and Execution
Brett Shaw	SME-Electric Distribution Operations	30	<ul style="list-style-type: none"> • Comparative Assessments (Benchmarking Diagnostics) • Energy Delivery • Industry Learning Consortia • Asset Management Transformations • Asset Risk and Performance Diagnostics • Work Planning and Execution • Work Productivity Assessments • Overtime Root Cause Analysis • Contract Administration

Jeffrey W. Cummings

SUMMARY AND BACKGROUND

Mr. Cummings is a Senior Vice President and Managing Director for the Americas of UMS Group. He has 37 years of professional consulting experience, with an extensive background in both engineering and strategic and operational planning for the large investor-owned utilities and municipalities in North America and Australia; most recently AES-Indianapolis Power and Light Company, FirstEnergy (Ohio, West Virginia, Maryland, New Jersey and Pennsylvania), Westar Energy, ATCO Electric, Lansing Board of Water and Light, Saskatchewan Power, BC Hydro, Ameren (Illinois and Missouri), Ergon Energy and Public Service Electric and Gas Company. He supports these clients in addressing key strategic and operational challenges, focusing on T&D network modernization, distribution reliability, energy efficiency, and fleet optimization, capital investment planning and prioritization, asset strategy and plan development, organizational transformation, and regulatory strategy; and when called upon, has offered expert testimony, most recently to one Canadian Provincial Utility Commission (PBR Rate Filing) and two U.S. State Regulators (Financial and Reliability Performance Assessments).

Prior to joining UMS Group, Mr. Cummings operated an independent consulting practice for nearly a decade where he supported utilities in the areas of strategic and operational planning, organizational development, technical and commercial management, and merger and acquisition assessment and implementation. 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 5 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. And, prior to his tenure with Vectra Technologies, Mr. Cummings was employed by Stone and Webster Engineering Corporation where he assumed increasing levels of responsibility in the management of large Lignite and Nuclear Power engineering and construction projects.

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

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-time frame. In both instances, written direct testimony was provided and Mr. Cummings was called upon to provide oral testimony during cross-examination.

Assisted a mid-western electric utility in developing a Grid Revitalization 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 an industry context around which to justify such a program.

Assisted a Canadian electric utility in offering an independent third-party assessment of a recent PBR filing performing high-level comparative analyses of proposed growth and infrastructure renewal capital investments 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 as much as \$50 million a year without any noted decrease in system performance. Conducted across Power Production, Transmission and Distribution and Customer Service, 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 adopting the relevant aspects of PAS55. Areas of focus included comparative cost and service level analyses, work planning and execution, performance dashboards, transmission and distribution reliability, capital portfolio optimization, and business value/risk tolerance frameworks.

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 electric system reliability as measured by SAIFI, CAIDI and SAIDI with a thorough review of historical results (as reported in their outage management systems) and supporting reliability programs. Specifically, these assessments analyzed 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. The fourth assessment involved a thorough review of the electric distribution infrastructure from both an asset health and condition and energy efficiency viewpoint, 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 and benefits 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, system reliability or safety). Areas of focus included electric transmission and distribution, customer operations, gas distribution and asset management. The outcome has been incorporated into a long-range plan to improve earnings despite an unfavorable outcome is a recent rate case filing.

Performed a capital and O&M spending 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 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 power generation. In reviewing their planned capital expenditures over a 10-year period, Mr. Cummings developed a plan to (1) reduce the current plan by 25 percent and (2) optimize the allocation of capital over the 10-year capital planning horizon.

Strategic advisor for a major transformation effort within a U.S. Midwest municipality, that included conducting performance diagnostics 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.

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 accurately predict failure patterns 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 recommendations were adopted and integrated with the municipality's five-year operating plan.
- Development of a preventive and corrective fleet (vehicle and attached equipment) maintenance program, adopting many 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

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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 program was embraced by both the municipality and city government officials.

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. The resulting plan was adopted by the Board of Directors, accepted by the City of Chicago, and supported by the commission staff and state regulator.

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

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. Many of the skills and competencies used by Mr. Cummings in his roles as management consultant (summarized above) were developed through hands-on experience in managing over 425 engineering professionals and overseeing the management of over 500 projects annually.

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, support to IPC in preparing and presenting rate cases to the Illinois Commerce Commission (ICC) for cost recovery, installing an information system 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.

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

- *“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”*, an article written in January 2009.
- *“Grid Modernization: A Roadmap to Tomorrow's Infrastructure...Don't Get Lost on the Way to AMI,”* a white paper written in April 2009.

Steven J. Morris

SUMMARY AND BACKGROUND

Mr. Morris is a Principal of UMS Group. He has 29 years of consulting and management experience with the last 20 years spent in the electric and gas utility industries. He has significant expertise in performance management, asset management, strategic planning, financial analysis, and benchmarking and has written/edited dozens of analytical reports on utility industry topics.

He is currently responsible for leading the firm's client-sponsored benchmarking and best practices study projects in which ad hoc groups of utilities are brought together to perform targeted, deep dive studies into issues of industry concern.

Prior to joining UMS, Mr. Morris worked for both Andersen Consulting and Navigant Consulting. He also founded Research Reports International, a business focused on providing data and information on key issues facing electric and gas industry executives. Mr. Morris holds a B.A. in Economics and an M.B.A. both from Cornell University.

HIGHLIGHTS OF EXPERIENCE

Developed and implemented a process and analytical tools to support decisions related to the health of a West Coast utility's station assets. Identified the customized functionality necessary for existing AHI tool to provide the decision support capabilities required. Developed algorithms for determining effective age and identified the sources of input data needed for the model. Defined failure modes and assessed impact of failure. Defined and map the processes needed to make optimum use of the tool.

Led the effort for a major West Coast combination utility to develop skills and competencies in Asset Management for Transmission and Distribution. Performed 2-day Asset Management Workshop for 30 client managers and engineers. Developed template and process for creating Asset Life-cycle Strategies and supported client Asset Strategists in creating the first two strategies, Distribution Wood Poles and Substation Transformers.

Performed an external assessment of a Northeastern Utility's Asset Management processes and underlying practices (UMS had performed similar assessment 4 years ago). The objective of this review was to evaluate the effectiveness of Asset Management in performing its responsibilities, as well as review cross-functional processes to identify opportunities for improvement.

Conducted several studies of utility accounting of plant investments to assist clients in optimizing their allocation of expenditures for major maintenance among capital and O&M accounts. Performed industry surveys of property accounting policies for coal-fired and hydro power generation, as well as for natural gas compression and storage. Identified the factors considered in determining if a cost is capitalized, the specific criteria used (e.g., length, % replacement, etc.), and the approach and strategies for managing the decision to capitalize spending. Identified opportunities for clients to revise their property accounting methodology based upon how others are addressing similar work.

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Assisted a large Northeastern electric utility in identifying opportunities to reduce its total O&M budget by 10-15% on an ongoing basis. Managed project team assessing all areas of the business (i.e., Power Markets, T&D, Customer Ops, and Corporate Services) to identify opportunities for achieving \$110 million in annual savings. Team performed benchmarking and analyses, conducted interviews and observations, and reviewed processes and practices to identify opportunities for reducing costs through change in maintenance frequencies, reduction in staff, appropriate allocation of costs between O&M and capital, process improvement, leveraging technology, and outsourcing.

Developed a business strategy for a Midwestern gas utility to expand its competitive meter services business. Evaluated the existing business to identify weaknesses and limitations; developed and evaluated alternatives for growing the business; and developed a plan to reposition the business and drive growth through acquisitions. Also evaluated acquisition and partnership candidates and recommended targets. Identified the capabilities required to succeed in implementing the new business strategy.

Evaluated the ability of a Midwestern gas utility to successfully manage and operate a newly purchased water utility. Evaluated personnel skill sets and technology/assets available to support the water business; identified key areas of management and operational concern; and developed recommendations on improving management and operations to alleviate concerns.

Performed several Staffing Analyses for generation companies. Benchmarked staffing levels across major functions, evaluated spans of control, and analyzed organizational designs. Developed innovative model to forecast appropriate staffing levels for maintenance, operations, engineering, and supervision based on plant technology, size, and function. Recommended staffing changes, contracting strategies, and organizational realignment to reduce headcount without impacting performance.

Conducted multiple projects for a major West Coast combination utility to optimize substation maintenance and inspection practices. Project included designing and executing a multi-company comparative study to identify inspection/maintenance tasks performed, the scope and frequency of these tasks, the resource mix, and the productivity/efficiency of maintenance. Based on Study results, organized and facilitated three conferences with utilities to share their practices in substation inspection maintenance.

Identified best practices in Customer Facilities Extension for a Canadian utility. Conducted survey with North American utilities to determine standard and best practice in estimating process, pricing strategy, deposit/payment policy, investment levels, rebates, and risk mitigation strategies. Assessed impact of regulatory environment on policy direction. Interviewed key account customers to understand their view on company's current policies and practices. Provided recommendations on modifying policies and practices to support client's desired objectives.

Restructured Western utility's resource planning and performance management organizations for its Transmission Line, Substation, and System Operations business units. Interviewed key personnel on both the service provider and internal customer sides to understand work performed, value received, and gaps in services. Analyzed staffing levels and resources per function. Identified opportunities for consolidating some functions, shifting some functions to other

organizations, and achieving efficiencies in existing functions. Recommended restructuring of groups resulting a 20% headcount reduction with no reduction in performance.

Performed a SWOT analysis of a Western Municipal Utility's Field Operations group. Assessed and benchmarked lines and stations maintenance and construction functions to identify strengths and weaknesses. Assessment included cross-functional processes and enabling technology. Developed 3, 5 and 10-year views of federal, state, and local opportunities and threats. Recommended strategic direction to leverage strengths and opportunities. Developed recommendations to close gaps around weaknesses.

Performed an assessment of a Midwestern electric utility's Distribution and Transmission practices, processes, and performance. Analyzed overtime, outages, asset age, OPEX/CAPEX, etc. to identify gaps against best practices. Developed recommendations for improving performance / reducing business risk and quantified impact, difficulty, and relative cost to implement.

Provided independent assessment of a Northeastern utility's outage restoration capabilities, staffing levels, and asset replacement in support of a rate case filing. Performed analyses to determine utility's performance in relation to regional peers and in support of filed testimony. Developed a framework for evaluating and comparing mobilization efforts and restoration time frames across several companies, region-wide and assessing their performance based on impact of storms and amount of damage.

Assisted a European State-owned Transmission System Operator in developing an innovation management process to ensure state-of-the-art technology adoption and operation in their grid. Performed benchmark of key transmission grid technologies to identify current and future market penetration. Surveyed and interviewed top performing utilities to identify best practices in technology monitoring, assessment, and selection, R&D outsourcing, technology commercialization, and innovation management. Developed recommendations on changes to culture, processes, systems, and business orientation required to implement a more innovation business structure.

Conducted a study to help a major U.S. combination utility understand industry best practices for improving its inventory control and accuracy tools and processes. Designed and implemented survey of utility industry practices regarding inventory segmentation and cycles, counting and reconciliation, training and technology, and controls and key performance indicators. Interviewed Study participants to identify common and best industry practices. Study included a dozen U.S. utilities and identified both common and best industry practices in these areas, as well as benchmarked KPIs.

Thomas Myers

SUMMARY AND BACKGROUND

Mr. Myers is a Principal at UMS Group with over 32 years of experience providing management consulting services to the utilities industry. He has extensive worldwide experience developing business plans, achieving improvements in business processes, and implementing technology to reduce costs and improve operating results. Tom's extensive worldwide experience and thought leadership has provided him with a unique understanding of the technical, operational, and business challenges related to grid modernization. His involvement on more than 60 consulting projects at over 40 utilities in seven countries has provided him with a track record of successful engagements. Tom is a frequent speaker and writer on industry issues and recognized thought leader in the industry.

Prior to joining UMS, Mr. Myers held leadership positions at IBM, KEMA, Scott Madden, Arthur Andersen and Andersen Consulting.

Mr. Myers is a Certified Public Accountant (CPA), Project Management Professional (PMP), and held a professional engineer's license in Arizona. He has a Bachelor's Degree in Engineering from the University of Illinois and a Master of Accountancy from Arizona State University.

HIGHLIGHTS OF EXPERIENCE

Conducted an after-action review of a Northwest energy company's performance during a significant weather event and compared against a previous assessment performed four years earlier.

Conducted a leading practice survey related to damage assessment for a Northwest energy company to improve storm response effectiveness and support improvements in training, organization, staffing and management of storm-related work activities.

Developed a facilities strategy for a Pacific utility to address current vulnerabilities and future requirements related to their operations in emergency situations, such as after a tsunami.

Assessed the emergency response function of a Northwest municipal utility to define needed improvements and establish parameters and facility requirements that could be used to develop a capital improvement project.

Managed a project for a large west coast energy company to develop an Enterprise Analytics Strategy and Roadmap that defined capabilities, technologies and initiatives to support a strategic direction for the use of analytics for asset management and operations. The Roadmap defined the functional and technical architectures to support these analytical capabilities.

Managed a project for an energy company in Brazil to identify and implement global leading practices that utilized emerging technology to support asset lifecycle optimization for construction and maintenance processes.

Managed a project for a Pacific energy company to launch their asset management function and develop strategies for major categories of transmission and distribution assets. The strategies

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were used to establish performance, capital investment and maintenance plans, and supported regulatory proceedings to gain cost recovery through the rate base.

Conducted a global research project for a Canadian regulatory agency into the use of asset management standards by regulators in the review and assessment of energy company investment plans.

Managed a project for a large east coast energy company to optimize asset performance and develop capital plans to address aging assets and projected performance issues.

Managed a project for a Midwest transmission company to improve asset performance and develop action plans for reducing the number and duration of interruptions.

Managed a project for a Midwest transmission company to build out asset management functions, processes and capabilities. He developed process flows and procedures for the new asset owner.

Managed a project for a global energy company to support a long-term asset performance improvement project to reduce costs and improve the operating performance of the company's overall portfolio of plants.

Managed an asset management and geographic information system implementation project for a U.K. water company to support their strategy to be a leader in the industry through the exploitation of technology for asset management decision-making.

Managed a project for a large Midwest energy company to develop the business model for asset management, including the organization structure, business processes, performance measures and technology architecture. This model was to become the template to be applied to each newly acquired company in support of the company's acquisition strategy.

Managed a project for a large west coast energy company to assess the capabilities of their geographic information system, and to develop an investment strategy to support future asset management strategies.

Managed a project for a large Southwest pipeline company to implement a geographic information system to support engineering and operating departments in their performance of asset management functions.

RELEVANT ARTICLES AND PRESENTATIONS

"Asset Management" – presented in March 2012 at the Power Systems Conference at Clemson University in South Carolina.

"Approach to Managing Critical Transformers" – presented in January 2012 at the DistribuTECH conference in San Antonio, Texas

"Optimizing Investments in Vegetation Management" – Presented in February 2011 at the DistribuTECH Conference in San Diego, California

Brett Shaw

SUMMARY AND BACKGROUND

Mr. Shaw is a Senior Associate of UMS Group. He has over 30 years of experience in and with the electric utility industry and is responsible for the delivery of the firm's asset and risk management assessments, diagnostic benchmarking, process improvement and performance measurement and management systems, with specific emphasis on the Electric Transmission, Distribution, and Customer Operations, and Demand Side Management business areas.

Prior to joining UMS Group, Mr. Shaw served in various senior management capacities at Southern Company (Gulf Power), and most recently as Vice President of Engineering and Operations at CHELCO, a large electric cooperative serving a large portion of Florida's Panhandle.

Mr. Shaw is a graduate of the University of West Florida, with a B.S. degree in Industrial Technology, and currently serves in a variety of executive roles in the Florida's business & civic community. Mr. Shaw is also a graduate of the National Rural Electric Cooperative Association (NRECA) MIP executive leadership program, as well as various Southern Company leadership training programs.

HIGHLIGHTS OF EXPERIENCE

Leads onsite member delivery of the ITOMS Consortium, a custom transmission operation and maintenance diagnostic program, and manages new member program orientation and training. This program is performed every other year and has participants from North and South America, Europe, Middle East, Africa, Asia, and Australia. All programs are comprehensive; they analyze existing policy effectiveness and unit cost per activity and assess the processes and practices in place. Assessments are performed by leveraging information gathered from senior staff interviews and diagnostics are performed by collecting performance data from the participant records. Performance gaps are identified, and improvement strategies and tactics explored.

Led several large-scale asset management transformation projects and PAS 55 assessments for many major electric utility companies around the globe. These efforts have involved detailed process assessments leading to redesign of activities in the Risks and Asset Management frameworks. Key focus areas have included Asset Strategy and Investment Planning, Design Construct & Refurbish, Operate Maintain & Restore, and Performance Management activities.

Led and played an integral role in conducting risks and diagnostic assessments for multiple global clients. These studies included extensive analysis of performance in functional areas like Transmission Lines, Substations, Distribution and Vegetation Management. In addition to analytical diagnostics, global best practices were also evaluated for applicability for each client.

Led and performed multiple performance assessments of US electric utility's Electric Transmission and Delivery organizations. Benchmarked cost and service level performance against peer utilities to identify potential areas of concern. Conducted practices interviews with representatives from all major functions and across the hierarchy to identify work and

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management practices that were contributing to performance issues. Developed recommendations for improving business performance that included changes in culture, management philosophy, work practices, and processes. Identified and recommended key performance indicators to monitor implementation of recommendations and track actual performance improvement

Performed assessments of multiple US and Canadian electric utility's Distribution and Transmission practices, processes, and performance. Analyzed overtime, outages, asset age, OPEX/CAPEX, etc. to identify gaps against best practices. Developed asset management recommendations for improving performance / reducing business risk and quantified impact, difficulty, and relative cost to implement.

Performed an assessment of a Midwestern electric utility's Distribution and Transmission practices, processes, and performance. Analyzed overtime, outages, asset age, OPEX/CAPEX, etc. to identify gaps against best practices. Developed recommendations for improving performance / reducing business risk and quantified impact, difficulty, and relative cost to implement.

Participated in a Grid Modernization study for a prominent Northeastern Investor-Owned Utility, Mr. Shaw conducted in depth reviews of existing infrastructure and the relevance of aging "legacy" material and construction standards on the client's ability and ease to implement modernization strategies.

Led the integration of UMS' Investment Optimization tool set in to the Asset Management process at a large Southwestern utility. The implementation involved working with the client's asset management and energy delivery management teams to develop and implement the Optimizer to effectively manage the client's large portfolio of both Capital and O&M expenditures.

Led integrated organizations consisting of customer service, engineering, construction/ operations/ maintenance of electric transmission & distribution infrastructure, and marketing across all major customer segments. As a member of the Executive staff, participated in and provided leadership at Board of Directors meetings for the cooperative. Led territorial negotiations with a neighboring utility.

Reengineered contract administration function, generating significant cost savings through review of existing contracts. Negotiated and successfully administered contracts with major municipalities, military installations, and service providers. Established strategic plans and goals at enterprise and functional levels within his organizations as well as in cooperation with partner organizations such as Alabama Electric Cooperative (now PowerSouth Energy Cooperative). Revamped transformer and equipment production/repair facility and moved facility to positive earnings and cash flow. Managed major National Account program including the leadership of company wide sales force.

Participated in a statewide risks assessment and comment process, through the Florida Electric Cooperative Association, of the "storm-hardening" rule for electric distribution proposed by the Florida Public Service Commission. Was actively involved in regulatory negotiations, achieving positive win-win outcomes while ensuring regulatory compliance.

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Corporate Senior Management experience included leading and empowering engineering and operations organizations to design, construct and maintain electric transmission and distribution systems. Provided key leadership in successful labor agreement negotiations. Also provided management leadership to other customer operation organizations including customer service and marketing.

Major project leadership includes providing leadership throughout a \$140 million restoration effort following a major hurricane event and serving as the corporate lead in formulating and managing a major Y2K transition plan.

Led Total Quality Management (TQM) teams in achievement of Florida's Sterling Award for Quality. Facilitated process improvements toward the achievement of 25% efficiency gains and directed downstream implementation activities.

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 OPCOs' 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 a number of opportunities to fine-tune / improve its practices that at the highest level, the FE PA OPCOs' 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 Snow Storm). 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&L's 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 staffs. 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

Unit Costs Tab

Category	Unit of Measurement	2014		2015		2016		Comments
		Number of Units (if known)	Unit Costs (2016)	Number of Units (if known)	Unit Costs (2015)	Number of Units (if known)	Unit Costs (2014)	
Wooden Pole Replacement	each							
UG XLPE Replacement	meter							
UG PILC Replacement	meter							
Vegetation Management - Tree Trimming	kilometer							
Vegetation Management - Herbicide	acre							
Pole Test and Treat	each							
Overhead Line Patrol	circuit							
Vault Inspection	each							
OH Manual Switches	each							
OH Remote/Motor Operated Switches	each							
Overhead (Poletop) Transformer Replacement	each							
Padmount Transformer Replacement	each							
Underground (submersible and vault) Transformer Replacement	each							
Network Transformer Replacement	each							
Network Protector Replacement	each							
Oil Breaker Replacement	each							
SF6 Breaker Replacement	each							
Vacuum Breaker Replacement	each							
Station Switchgear (Air) Replacement	each							
Station Switchgear (GIS) Replacement	each							

Accounting Tab

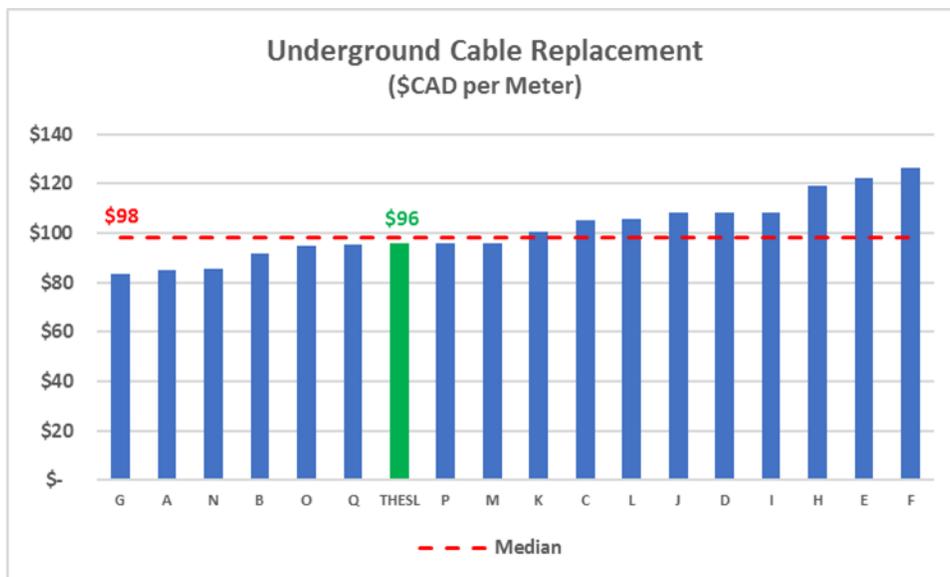
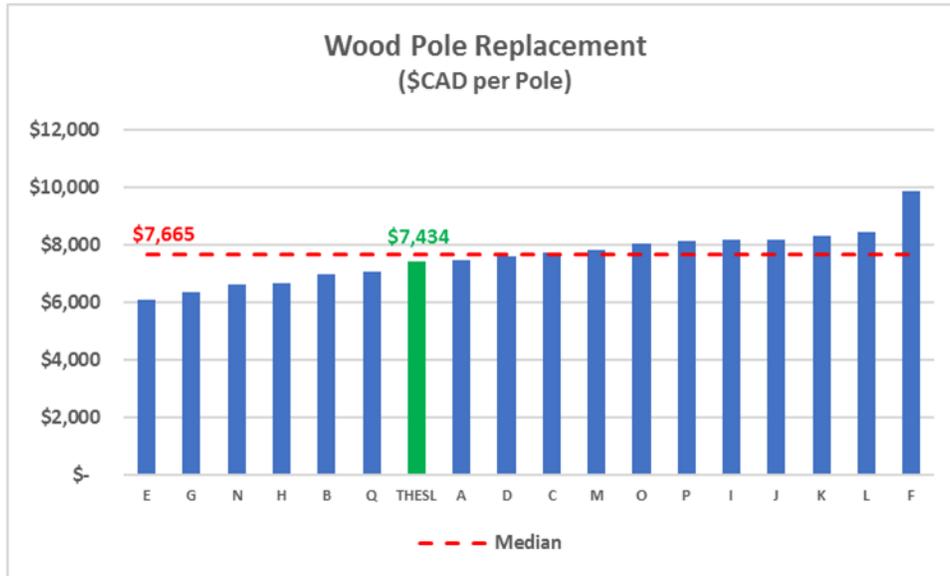
	Accounting Related Questions	Response	Comments
1	Which of the following methods do you use to determine unit rates for your distribution programs (e.g., pole replacement, UG cable replacement, veg mgmt, etc.)?		
	Divide total spent by number of units		
	Average individual costs of separate work orders		
	Other (please describe)		
2	In addition to Direct Labor and Material, which of the following costs are included in your unit costs for In-House work ?	Response (Please indicate "Y" or "N")	Comments
	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, insurances and pension)		
	Administrative and General costs		
	AFUDC / CWIP		
	Other (please describe)		
3	In addition to Contractor's cost, which of the following costs are included in your unit costs for Contracted work ?	Response (Please indicate "Y" or "N")	Comments
	Contractor Management/Supervision costs (please indicate in comments if these costs include overheads per question 2)		
	Permitting and Design Costs		
	Other (please describe)		
4	Do you "net out" customer contributions from your unit costs?		
5	Do you use GAAP or IFRS accounting? (please specify which in Comments)		

Local Factors Tab

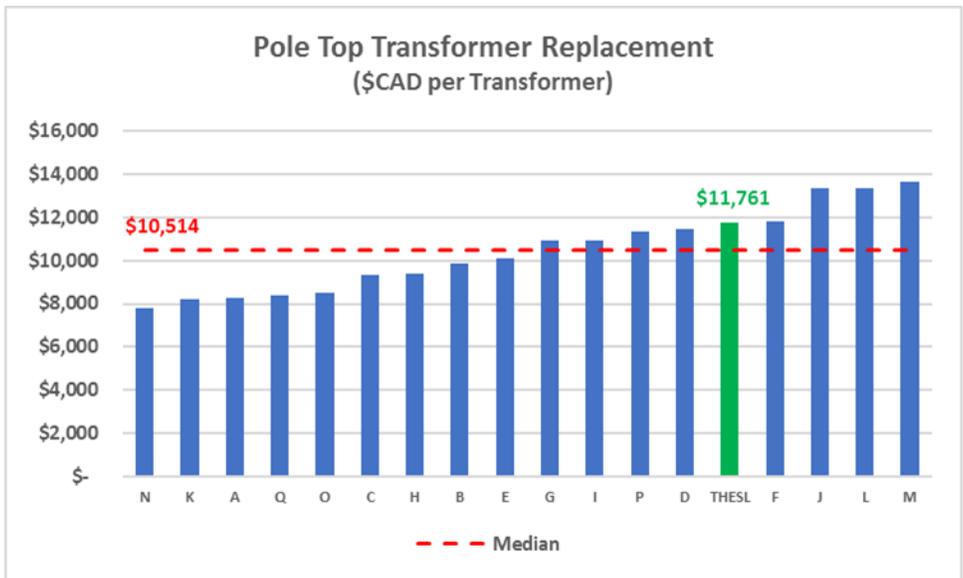
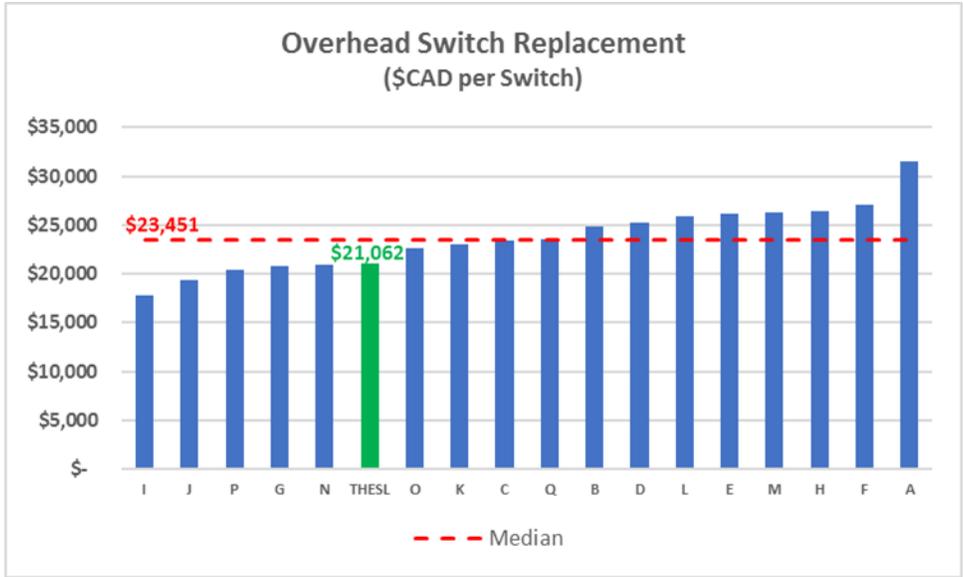
	Local Factors	"X" to those that apply	Comments
1	Which of the following factors impact the cost of you performing inspections and replacement work?		
	Excessive travel time (over 30 mins.)		
	Road restrictions which limit working hours		
	High water table		
	Working next to energized lines (requiring 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)		
	Box Construction		
	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		
	City consent requirements (i.e., customer notification, restoration, progressive clean-up, etc.)		
	Other (please specify in Comments)		

Appendix G – Detailed Benchmarking Results

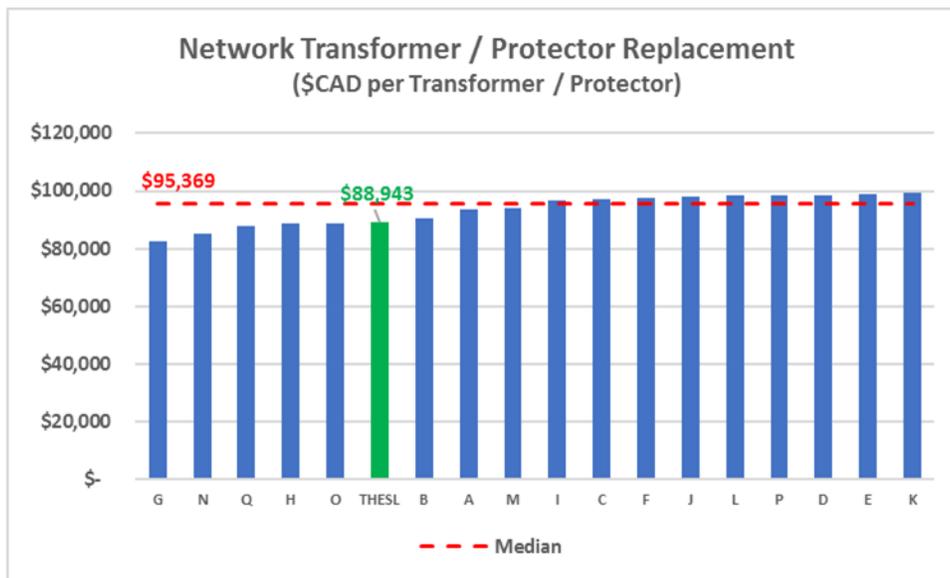
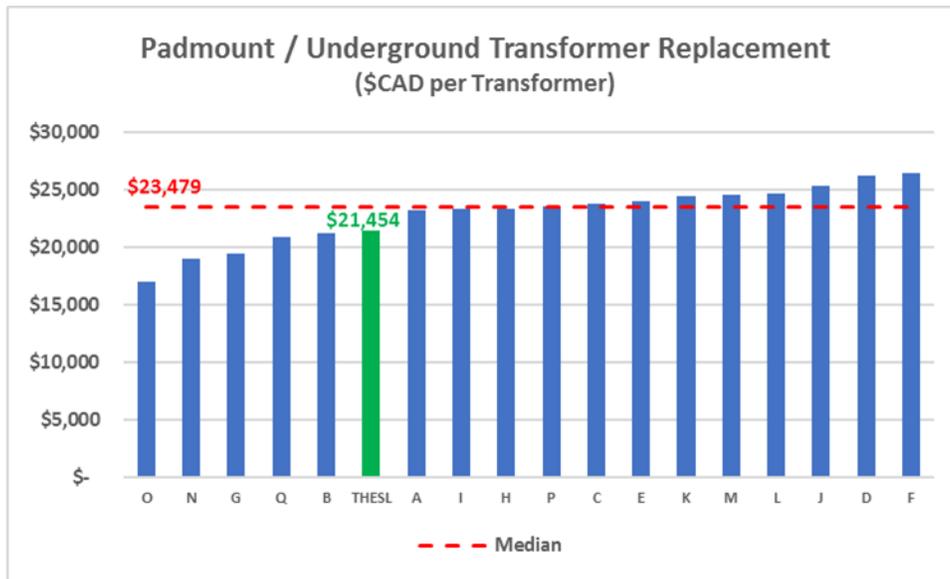
The following charts are provided, presenting the unit costs for each of the utilities (in ascending order), showing THESL’s (Green) position relative to each of the electric utilities and the Peer Group Panel full-scaled “normalized” median value (Red). Tables that detailed tables each step of the “normalization” process are presented in Appendix C (Tables C-8, C-9 and C-10).



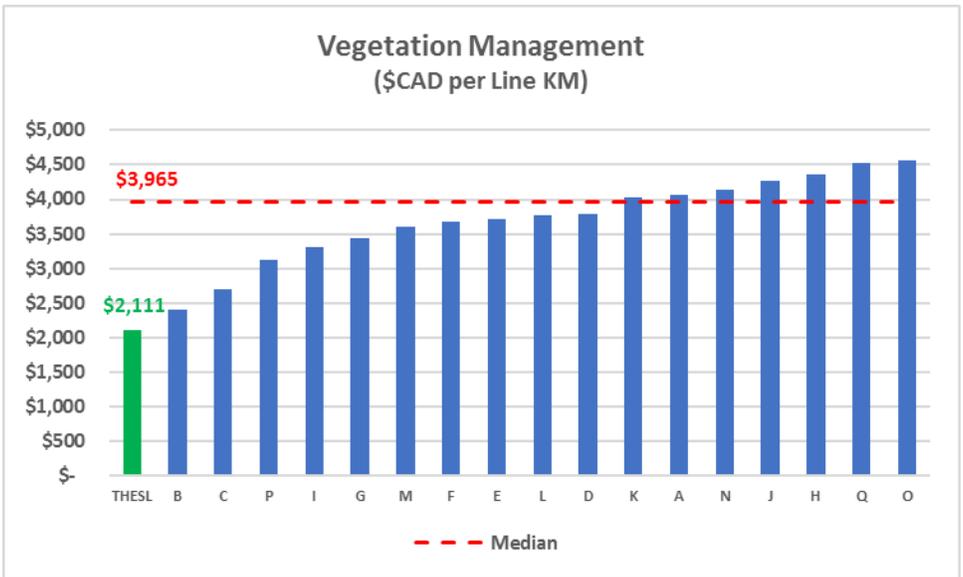
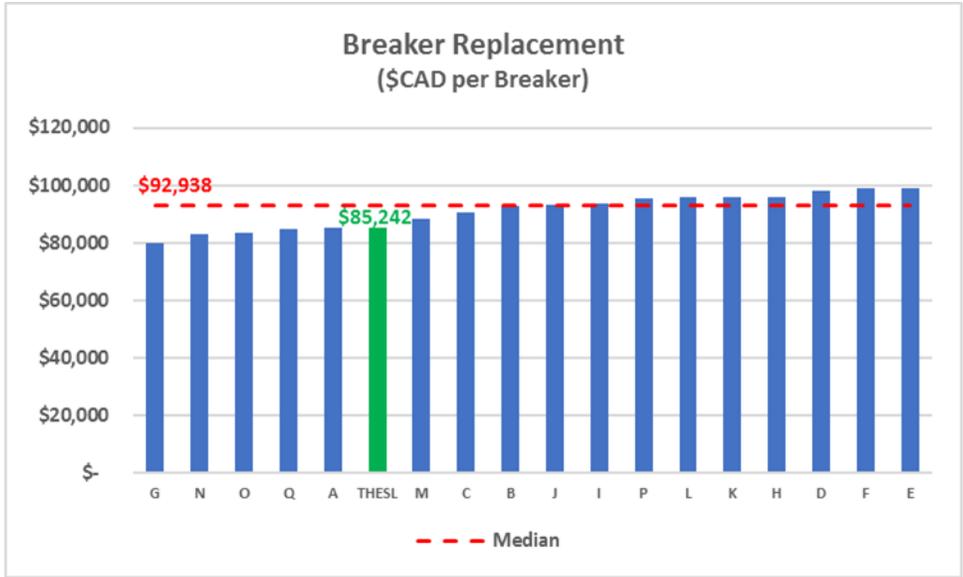
NOTE: The use of a letter designation for each member of the Peer Group Panel provides the confidentiality assured in soliciting participation for this study.



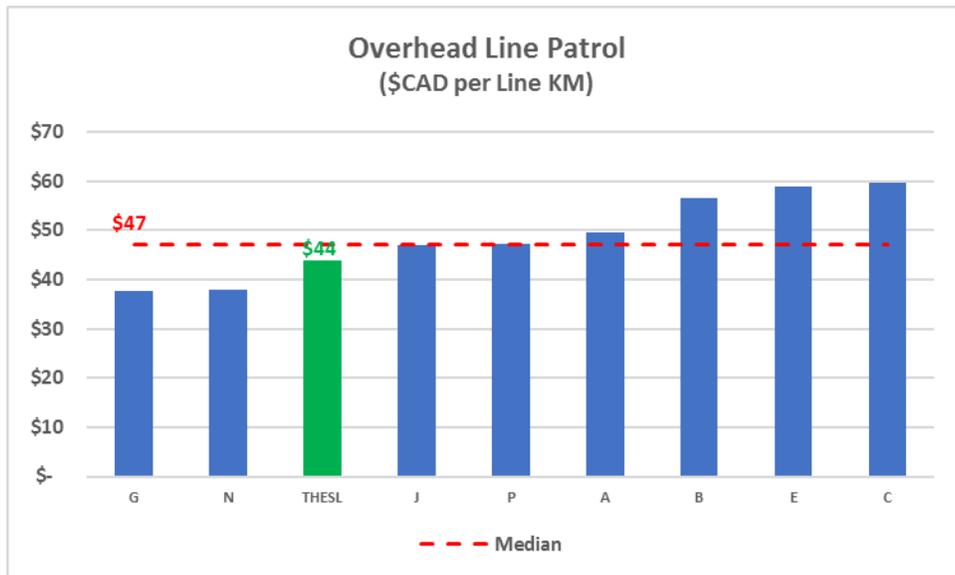
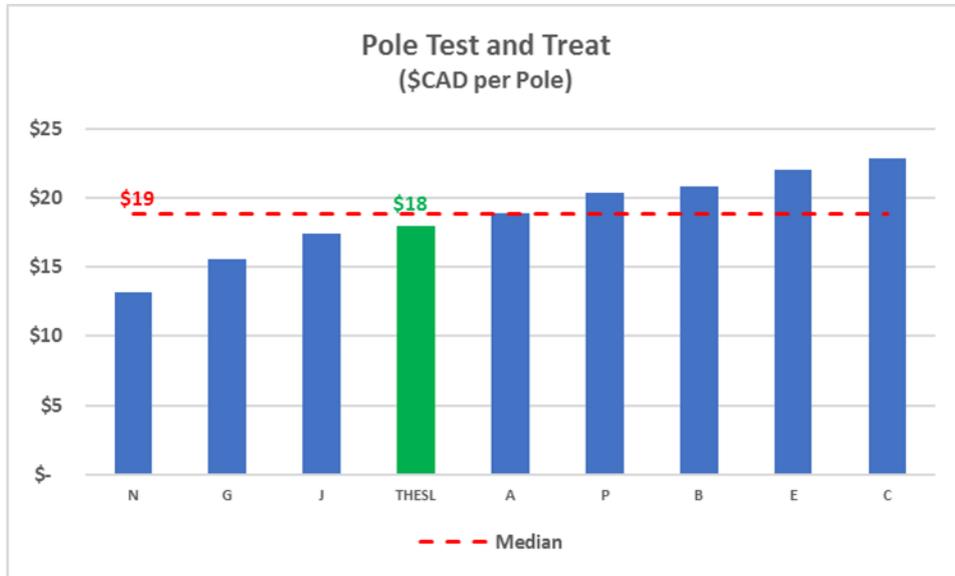
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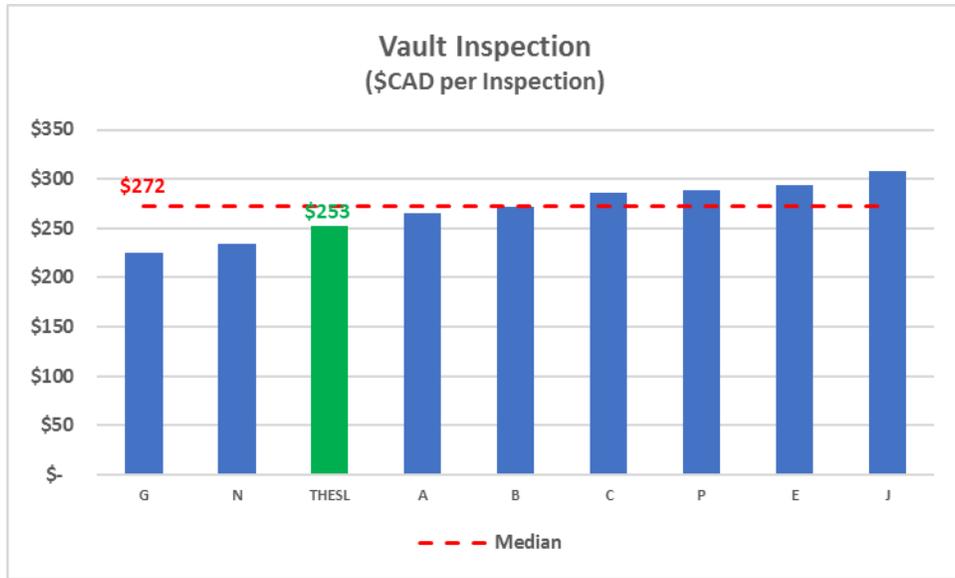
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**OEB Appendix 5-A
 Metrics**

Metric Category	Metric	Measures	
		2017 (1 Year)	2013-2017 (5 Year) Average
Cost	Total Cost per Customer ¹	870	815
	Total Cost per km of Line ²	23,234	42,438
	Total Cost per MW ³	157,364	137,824
CAPEX	Total CAPEX ⁴ per Customer	715	657
	Total CAPEX ⁴ per km of Line	19,086	33,837
O&M	Total O&M per Customer	155	158
	Total O&M per km of Line	4,148	8,602

Notes to the Table:

- 1 Total Cost per Customer is the sum of a distributor's capital and O&M expenditures divided by the total number of customers that the distributor serves. The expenditure and customer amounts are as presented in the Yearbooks.
- 2 Total Cost per km of Line is the sum of a distributor's capital and O&M expenditures divided by the total number of kilometres of line that the distributor operates to serve its customers. The expenditure and kilometre amounts are as presented in the Yearbooks.
- 3 The Total Cost per MW is the sum of the distributor's capital and O&M expenditures divided by the total peak MW that the distributor serves. The expenditure and peak demand amounts are as presented in the Yearbooks.
- 4 Annual CapEx amounts are as presented in Yearbooks.

Explanatory Notes on Adverse Deviations (complete only if applicable)
Metric Name: Total Cost per Customer The increase of \$55 is primarily due to increased investment in the distribution system as described in Exhibit 2B, Section E.
Metric Name: Total Cost per MW The increase of \$19,540 is primarily due to increased investment in the distribution system (see Exhibit 2B, Section E) and lower than average peak demand.
Metric Name: Capital Addition for the Year per Customer The increase of \$57 is primarily due to increased investment in the distribution system (see Exhibit 2B, Section E).

1 **ELECTRICITY DISTRIBUTOR SCORECARD AND 2015-2019 DISTRIBUTION**
2 **SYSTEM PLAN PERFORMANCE MEASURES**

3
4 In accordance with the OEB's *Renewed Regulatory Framework for Electricity Distributors*
5 (the "RRF"), Toronto Hydro reports annually on its progress against measures aligned
6 with the following core objectives: Customer Focus, Operational Effectiveness, Public
7 Policy Responsiveness, and Financial Performance.¹ These results are reported as part
8 of the OEB's Electricity Distributor Scorecard (the "EDS") and used to assess utility
9 performance over time and in comparison to other utilities.

10
11 The first section of this Schedule discusses Toronto Hydro's performance for each of the
12 EDS measures² for the last five years, i.e. 2013-2017, and is consistent with the
13 approach Toronto Hydro undertakes in its annual reporting.³ The second section of this
14 Schedule discusses historical performance relating to the 12 Distribution System Plan
15 ("DSP") measures introduced as part of the utility's 2015-2019 Rate Application.⁴

16
17 **1. EDS PERFORMANCE**

18 As illustrated in Table 1, Toronto Hydro's performance on the EDS has been strong over
19 the 2013-2017 period, including notable improvements in Customer First Contact
20 Resolution, Telephone Calls Answered on Time, New Residential and Small Business
21 Services Completed on Time and Billing Accuracy. The following sections provide

¹ Report of the Board, *Renewed Regulatory Framework for Electricity Distributors: A Performance Based Approach* (October 18, 2012).

² The definitions of each of these performance measures is available at:
<https://www.oeb.ca/sites/default/files/uploads/Scorecard_Performance_Measure_Descriptions.pdf>

³ Toronto Hydro's Electricity Distributor Scorecard for 2016 is available at:
<<https://www.torontohydro.com/sites/electricsystem/residential/customer-care/Documents/Scorecard%20-%20Toronto%20Hydro-Electric%20System%20Limited.pdf>>

⁴ EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 6, 2015), Exhibit 2B, Section C.

- 1 additional detail on Toronto Hydro's EDS historical performance and targets, for each
- 2 measure.

1 **Table 1: Toronto Hydro EDS Performance 2013-2017**

Performance Outcomes	Performance Categories	Measures	2013	2014	2015	2016	2017 ^{a,b}	Target		Average	
								Industry	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%		95.72%	
		Scheduled Appointments Met On Time	99.60%	99.80%	99.90%	99.50%	99.37%	90.00%		99.63%	
		Telephone Calls Answered On Time	82.00%	71.90%	76.80%	64.70%	77.92%	65.00%		74.66%	
	Customer Satisfaction	First Contact Resolution	77%	81%	84%	86%	88%			83%	
		Billing Accuracy		96.62%	97.54%	98.86%	99.24%	98.00%		98.07%	
		Customer Satisfaction Survey Results		91%	91%	83%	83%			N/A	
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%			70.33%	
		Level of Compliance with Ontario Regulation 22/04	C	C	C	C	C		C	N/A	
		Serious Electrical Incident Index	Number of General Public Incidents	2	3	0	0	1		2	1.2
	Rate per 10, 100, 1000 km of line		0.202	0.295	0	0	0.070		0.083	0.113	
	System Reliability	Average Number of Hours that Power to a Customer is Interrupted	1.11	0.89	0.99	0.91	0.91		1.11	0.96	
		Average Number of Times that Power to a Customer is Interrupted	1.34	1.18	1.31	1.28	1.18		1.36	1.26	
	Asset Management	Distribution System Plan Implementation Progress ^c	105%	147%	100%	101%	99%			N/A	
		Efficiency Assessment	5	5	5	5				5	
	Cost Control	Total Cost per Customer	\$924	\$967	\$1,000	\$1,044				\$984	
		Total Cost per Km of Line	\$66,793	\$70,688	\$73,309	\$27,819				\$59,652	
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			12.51%	34.58%	62.30%		1,576.05 GWh	N/A	
		Renewable Generation Connection Impact Assessments Completed On Time	100.00%	97.12%	100.00%	100.00%	81.08%			95.64%	
	Connection of Renewable Generation	New Micro-embedded Generation Facilities Connected On Time	100.00%	100.00%	100.00%	100.00%	92.41%	90.00%		98.48%	
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			0.68	
		Leverage: Total Debt (includes short-term and long-term debt) to Equity Ratio	1.34	1.65	1.57	1.45	1.34			1.47	
		Profitability: Regulatory Return on Equity	Deemed (included in rates)	9.58%	9.58%	9.30%	9.30%	9.30%			9.41%
			Achieved	7.10%	7.41%	10.71%	12.18%	9.08%			9.30%

a. Results to be finalized and submitted to the OEB via the annual Scorecard MD&A process

b. Certain results are issued by the OEB and were not available at the time of preparation.

c. The amount previously reported for 2016 has been adjusted from 113% to 101%

1 **1.1 Service Quality: New Residential/Small Business Services Connected on Time**

2 Toronto Hydro connected an average of 95.7 percent of new residential and small
3 business services (i.e. new connections less than 750 volts) on time over the 2013-2017
4 period, exceeding the industry target of 90 percent. In 2017, Toronto Hydro achieved its
5 best result to date, connecting 98.3 percent of the 2,621 new residential and small
6 business connections on time.

7

8 Serving one of the fastest growing cities in North America, Toronto Hydro receives high
9 volumes of connections and upgrades requests for residential and commercial
10 developments each year. To meet these challenges, the utility continues to look for
11 ways to improve the connection needs of its customers. For instance, in 2017, Toronto
12 Hydro consolidated its connection design teams to enable the allocation and
13 distribution of work across design team members in a more effective and efficient
14 manner. In addition, Toronto Hydro provided electronic means for customers to
15 complete their connections inquiries. These process improvements enable customer
16 inquiries to be handled efficiently and expeditiously.

17

18 For the 2020-2024 period, Toronto Hydro aims to meet or exceed the current OEB
19 standard for this measure. The utility's performance under this measure is enabled by a
20 number of programs including Customer Connections (Exhibit 2B, Section E5.1) and
21 Customer-Driven Work (Exhibit 4A, Tab 2, Schedule 8).

22

23 **1.2 Service Quality: Scheduled Appointments Met On Time**

24 Toronto Hydro met an average of 99.6 percent of all requested appointments on time
25 over the 2013-2017 period, exceeding the performance standard set by OEB of 90
26 percent.

1 Serving one of the fastest growing cities in North America, Toronto Hydro receives high
2 volumes of appointments requests every year. For the 2020-2024 period, Toronto
3 Hydro aims to meet or exceed the current OEB standard for this measure. The utility's
4 performance under this measure is enabled by a number of programs including
5 Customer Connections (Exhibit 2B, Section E5.1) and Customer-Driven Work (Exhibit 4A,
6 Tab 2, Schedule 8).

7

8 **1.3 Service Quality: Telephone Calls Answered On Time**

9 Toronto Hydro answered an average of 74.7 percent of telephone calls on time over the
10 2013-2017 period, exceeding the industry target of 65 percent.

11

12 Toronto Hydro met the standard each year from 2013-2017 with the exception of 2016,
13 where the performance was at 64.7 percent, just slightly below the OEB standard. The
14 was due to a number of factors including a 10 percent call volume increase, when
15 compared to 2015, due to an increase in calls resulting from rate changes.

16

17 In 2017, Toronto Hydro extended its Call Centre weekday business hours from 8:00 a.m.
18 to 4:30 p.m. to 8:00 a.m. to 8:00 p.m. The extended Call Centre hours has resulted in
19 more manageable call volumes, contributing to improving results. While some year-
20 over-year volatility is to be expected, for the 2020-2024 period, Toronto Hydro aims to
21 meet or exceed the current OEB standard for this measure. The utility's performance
22 under this measure is enabled primarily by the utility's Customer Care program (Exhibit
23 4A, Tab 2, Schedule 14).

24

25 **1.4 Customer Satisfaction: First Contact Resolution**

26 First Contact Resolution tracks the successful resolution of a customer's concern or
27 needs in the first instance they contact the utility. This measure reflects the proportion

1 of telephone enquiries related to a residential or commercial account where the issue
2 was resolved in the first call. Toronto Hydro has averaged 83.2 percent in this measure
3 over the 2013-2017 period. The utility continues to explore effective ways to promote
4 the consumer-utility interaction such as enabling self-service tools for specific issues.

5
6 Toronto Hydro's First Call Resolution performance has consistently improved from 77
7 percent in 2013 to 88 percent in 2017. In addition, the promotion of customer self-
8 service features on Toronto Hydro's website has contributed to a reduction in the
9 potential need for customers to contact the utility. Toronto Hydro remains committed
10 to performing well in this measure. The utility's performance under this measure is
11 enabled primarily by the utility's Customer Care program (Exhibit 4A, Tab 2, Schedule
12 14).

14 **1.5 Customer Satisfaction: Billing Accuracy**

15 Toronto Hydro issued an accurate bill 98.1 percent of the time on average over the
16 2014-2017 period, meeting the industry target of 98 percent.

17
18 Billing inaccuracies may be caused by a variety of factors including incomplete or
19 inaccurate meter data, incorrect account or move-in/move-out information, or
20 misapplication of rates.

21
22 Toronto Hydro's performance was slightly below the industry target in 2014 and 2015.
23 The steady improvements since 2014 resulted from focused attention by the utility on
24 process improvements and hardware enhancements. Since 2015, Toronto Hydro has
25 invested extensively on process improvements and hardware enhancements driving the
26 billing accuracy performance back to the OEB standard, and in fact slightly exceeding it
27 in 2016 and 2017.

1 Process improvements include streamlining the meter to cash process, implementation
2 of preventative measures to monitor and reduce billing errors and exceptions,
3 improvements to training and standard operating procedure documents, and the
4 proactive integration of relevant controls in new projects. Replacements of defective
5 meters, enhanced engagement with vendors, enhancements to field service and
6 metering data exception management processes, and investments in metering and
7 meter data collection technologies also contributed to reductions in billing inaccuracies.

8

9 Over the 2020-2024 period, Toronto Hydro intends to begin an upgrade of its residential
10 and small commercial meters (for more information please refer to the Metering
11 Program – Exhibit 2B, Section E5.4). These new meters allow for improved data
12 transmission to collectors, resulting in fewer errors and less manual meter reads. They
13 also contain larger storage capacity, resulting in lower data loss, and an enhanced meter
14 signal range, resulting in cost reduction from fewer personnel required to conduct
15 manual meter reads. These investments are expected to allow Toronto Hydro to
16 achieve superior Billing Accuracy results.

17

18 For the 2020-2024 period, Toronto Hydro intends to meet or exceed the OEB standard
19 for this measure. The utility's performance under the measure is enabled by a number
20 of programs including Toronto Hydro's Customer Care program (Exhibit 4A, Tab 2,
21 Schedule 14) and the Metering program (Exhibit 2B, Section E5.4).

22

23 **1.6 Customer Satisfaction: Customer Satisfaction Survey Results**

24 Toronto Hydro first reported this measure in 2014 and surveyed customer satisfaction in
25 the following key areas: (a) power quality and reliability; (b) price; (c) billing and
26 payment; (d) communications; and (e) the customer service experience.

1 In 2016, Toronto Hydro adopted a survey methodology used by Innovative Research
2 Group and the Electricity Distributors Association. Based on the survey activities
3 undertaken in December 2016, Toronto Hydro achieved an overall score of 83 percent,
4 which surpassed the provincial average of 79 percent. It is not possible to compare the
5 2016 and 2014 survey results because the two surveys are based on different
6 methodologies, including differences in scoring scales, structure of questions and overall
7 scoring index versus a single score.

8

9 Toronto Hydro intends to continue to engage with customers via a customer satisfaction
10 survey every two years, at a minimum, through the 2020-2024 period, and will aim to
11 maintain or improve customer satisfaction. The utility's performance under the
12 measure is enabled by a number of Toronto Hydro programs including Customer Care
13 (Exhibit 4A, Tab 2, Schedule 14) and Customer Connections (Exhibit 2B, Section E5.1).

14

15 **1.7 Safety: Level of Public Awareness of Electrical Safety**

16 This measure was introduced in 2015. The overall Public Safety Awareness Index across
17 various areas of the utility, as reported for 2015 and 2016, was 71 percent and the 2017
18 survey results were 69 percent. The results remain stable and are within the 4 percent
19 margin of error, given the sample size of 600 customers.

20

21 Toronto Hydro values safety and proactively ensures awareness and importance of
22 safety in the vicinity of its distribution equipment. These activities include proactive
23 contact voltage scans on street-level assets, taking prompt corrective action where
24 potential safety issues are identified, and fostering a robust corporate safety culture
25 including comprehensive internal safety course work.

1 Distributors are required to report the results of a standard safety awareness survey of
2 the general public residing within their service territory, who may or may not be direct
3 customers, at least once every two years. The survey, as designed by the Electrical
4 Safety Authority (“ESA”) and tests the respondents’ electrical safety awareness across
5 several topics, including power line clearance distances, emergency procedures related
6 to vehicular collisions with utility equipment and safety precautions related to
7 excavation work.

8
9 For the 2020-2024 period, Toronto Hydro intends to continue to monitor the level of
10 public safety awareness relating to the distribution system as well as continuing to meet
11 or exceed all current OEB EDS targets relating to public safety. The utility’s performance
12 under this measure is impacted by Toronto Hydro’s ongoing communications messaging
13 as part of the Customer Care program (Exhibit 4A, Tab 2, Schedule 14).

15 **1.8 Safety: Compliance with Ontario Regulation 22/04**

16 The ESA deemed Toronto Hydro to be compliant with the requirements of Ontario
17 *Regulation 22/04 – Electrical Distribution Safety* for 2013 through 2017. These results
18 were achieved through successful due diligence inspections, resolution of public safety
19 concerns, compliance investigations, and annual compliance audits conducted by the
20 ESA and a declaration of compliance.

21
22 *Ontario Regulation 22/04 – Electrical Distribution Safety* establishes the requirements
23 for electrical distribution safety related to the design, construction, and maintenance of
24 electrical distribution assets owned by the utility. This includes making sure appropriate
25 procedures are in place to prevent accidents or incidents, keeping the system in safe
26 working condition, etc. The utility must demonstrate how well it met the standards by
27 providing declarations, audit results, inspection reports, and other documentation.

1 Toronto Hydro intends to remain in compliance with *Ontario Regulation 22/04* through
2 the 2020-2024 period. The utility's performance under the measure is enabled through
3 a number of programs included in Exhibit 2B, Sections E5-E8, and Exhibit 4A, Tab 2.

4 5 **1.9 Safety: Serious Electrical Incident Index**

6 Toronto Hydro has surpassed the distributor targets, with only one reporting incident in
7 the three years, which results in a ratio of 0.035 incidents per 1,000 km of line for 2017. /C

8
9 For the 2020-2024 period, Toronto Hydro intends to meet or exceed the relevant
10 distributor target for this measure. The mitigation of public safety risk is enabled by a
11 number of programs included in Exhibit 2B, Section E5 and E6 and Exhibit 4A, Tab 2.

12 13 **1.10 System Reliability: SAIDI / SAIFI**

14 Toronto Hydro's average SAIDI performance for the 2013-2017 period was 0.96 while
15 the average SAIFI performance for the period was 1.26. The utility's annual SAIDI and
16 SAIFI results have met or exceeded the OEB's distributor target during this period.

17 Please see Exhibit 1B, Tab 2, Schedule 4 for a comprehensive discussion on the
18 underlying causes of system interruptions captured by SAIDI and SAIFI.

19
20 For the 2020-2024 period, Toronto Hydro intends to continue its strong performance
21 and maintain system reliability performance at the 2013-2017 average.⁵ The utility's
22 performance under the measure is enabled through a number of programs including
23 Area Conversions (Exhibit 2B, Section E6.1), Network System Renewal (Exhibit 2B,
24 Section E6.4), and the Underground and Overhead System Renewal programs (Exhibit
25 2B, Section E6.2, E6.3, and E6.5).

⁵ Toronto Hydro will be using performance results from 2013-2017, which is the most current five-year average, as opposed to the fixed five-year (2010-2014) average distributor specific target.

1 **1.11 Asset Management: Distribution System Plan (“DSP”) Implementation Progress**

2 For 2017, the DSP implementation progress was 99 percent. Toronto Hydro has
3 adjusted planned spending in 2018 and 2019 to closely adhere to the approved five-year
4 cumulative amount. See Exhibit 2B, Section E4 for details on the implementation of the
5 utility’s DSP.

6

7 The DSP Implementation Progress measure reflects the effectiveness of the utility in
8 implementing its DSP. This measure is intended to track the ratio of the actual
9 cumulative capital expenditures to the aggregate approved five-year capital expenditure
10 amount. Toronto Hydro has hundreds of individual capital projects each year, and the
11 selection and timing of those projects varies with dynamic customer and system needs,
12 as well as weather, field conditions, permitting, site access, third party co-ordination,
13 and other factors. A regular part of Toronto Hydro’s operation is rebalancing the mix
14 and timing of capital projects to adjust for these factors.

15

16 For the 2020-2024 period, Toronto Hydro will continue to report the progress of its DSP
17 implementation based on the approved amount.

18

19 **1.12 Efficiency Assessment**

20 Efficiency is determined using an econometric benchmarking model that compares each
21 actual total costs to average total costs predicted by the model, which benchmarks
22 against Ontario-based utilities. Utilities’ total costs are evaluated to produce a single
23 efficiency ranking. This is divided into five groups based on the magnitude of the
24 difference between each utility’s actual and predicted costs. For the period 2013-2016,
25 Toronto Hydro maintained its efficiency ranking of 5.⁶

⁶ The 2017 OEB Benchmarking results were not available at the time of filing.

1 While Toronto Hydro endorses the importance of a sophisticated quantitative
2 assessment of distributor efficiency, the methodology underlying the reported results
3 for this measure do not adequately assess the efficiency performance of a utility of
4 Toronto Hydro's size, density, and asset base.

5
6 Toronto Hydro's PSE Benchmarking Report– *Econometric Benchmarking of Historical
7 and Projected Total Cost and Reliability Levels* – is a better indicator of the utility's
8 performance and is included in Exhibit 1B, Tab 4, Schedule 2.

9
10 For the 2020-2024 period, Toronto Hydro will continue to report under this measure, as
11 defined by the OEB.

12

13 **1.13 Total Cost per Customer and Total Cost per km of Line**

14 For the 2013-2016 period, Toronto Hydro's average total cost per customer was \$984
15 and average cost per kilometre was \$59,652. This amount is then divided by the total
16 number of Toronto Hydro customers served and the total the number of kilometres of
17 line of distribution line operated by the utility.

18

19 In 2016, the utility adjusted its methodology for the Total Cost per km of Line measure
20 to align with the OEB's definition by accounting for the utility's significant secondary
21 (lower-voltage) distribution network. This is reflected in the significant (62 percent)
22 decrease in results from 2015 to 2016.

23

24 Toronto Hydro's Total Cost per Customer is increasing primarily due to increased capital
25 costs paired with modestly increasing OM&A costs. This increase is consistent with
26 Toronto Hydro's ongoing efforts to find operational efficiencies while undertaking

1 capital work to replace aging and deteriorating assets and meet the growing demand on
2 its distribution system.

3

4 For the 2020-2024 period, Toronto Hydro will continue to report under this measure, as
5 defined by the OEB.

6

7 **1.14 Net Cumulative Energy Savings**

8 In 2017, Toronto Hydro achieved 333 GWh of net incremental energy savings persisting
9 to 2020. At the halfway point of implementation, the utility has achieved 62 percent of
10 the 1,576 GWh target for net cumulative energy savings for the 2015 to 2020 period.

11

12 Under the Conservation First Framework, the IESO allocates energy savings to be
13 achieved by each utility in the province. Each LDC is then responsible for achieving its
14 allocated 2015-2020 CDM Plan Target. Toronto Hydro works closely with the IESO and
15 other LDCs to continually develop and improve provincial offerings, while at the same
16 time creating local programs that target specific opportunities unique to Toronto. In
17 2017, Toronto Hydro achieved the highest annual energy savings Toronto Hydro has
18 ever reported, driving new standards of performance across all customer segments.

19

20 Most of the utility's Conservation and Demand Management programs are not funded
21 via rates. However, Toronto Hydro's Stations Expansion program (Exhibit 2B, Section
22 E7.4) includes rates-funded demand response activities to defer distribution
23 infrastructure, which supports the Conservation First objectives.

24

25 Going forward, Toronto Hydro aims to fulfill the target within the time-frame allotted.

1 **1.15 Connection of Renewable Generation: Renewable and Micro-Embedded**
2 **Generation Connections**

3 The utility averaged 96.5 percent for Renewable Generation Connection Impact
4 Assessments (“CIAs”) Completed on Time and 98.5 percent for New Micro-embedded
5 Generation Facilities Connected on Time over the 2013-2017 period.

6
7 As of the end of 2017, Toronto Hydro had responded to over 8,000 inquiries from
8 customers and developers seeking to connect generation under various programs such
9 as the IESO programs,⁷ Net-Metering, Energy Storage, Combined Heat and Power
10 (“CHP”), Closed Transition, and Load Displacement. A wide range of proponents have
11 submitted project applications, including many schools, housing managers, large grocery
12 stores, condominium corporations, and department stores. As of the end of 2017,
13 Toronto Hydro had connected nearly 1,800 distributed generation projects of various
14 sizes totalling 225.7 MW in capacity.

15
16 In 2017, Toronto Hydro’s connection process changed such that the execution of the
17 Connection Agreement and collection of connection costs would occur prior to meter
18 installation. Due to uncertainty about some of the provincially-supported programs,
19 customers began to exhibit a reluctance in paying the connection costs after the project
20 was connected to the grid. As a result, more time and effort was required by Toronto
21 Hydro to deal with the increased volume of non-payment collections. The change in
22 process is expected to minimize this matter and contribute to increased efficiencies in
23 relation to the connection process.

⁷ Including Feed-in-Tariff (“FIT”), microFIT, Process and Systems Upgrade Initiative (“PSUI”), and Renewable Energy Standard Offer Program (“RESOP”).

1 Toronto Hydro intends to improve its performance of the CIA measure and to continue
2 to exceed or maintain the industry target for micro embedded through the 2020-2024
3 period. The utility's performance under this measure is enabled by the Customer
4 Connections (Exhibit 2B, Section E5.1), Generation Protection, Monitoring, and Control
5 (Exhibit 2B, Section E5.5), and Energy Storage Systems (Exhibit 2B, Section E7.2).

6
7 **1.16 Financial Ratios: Liquidity: Current Ratio (Current Assets/Current Liabilities)**

8 Toronto Hydro's "Current Assets" and "Current Liabilities" are determined in accordance
9 with the requirements of the OEB's Electricity Reporting and Record Keeping
10 Requirements for Electricity Distributors ("RRR") and the Accounting Procedures
11 Handbook ("APH"), and not by reference to IFRS. As a result, the "Liquidity Ratio"
12 expressed in the EDS may differ from similarly-termed financial ratios or information
13 presented in documents that the utility's parent company, Toronto Hydro Corporation,
14 is required to file under securities laws, and which are available on System Electronic
15 Document Analysis and Retrieval ("SEDAR").

16
17 For an analysis on the financial performance of Toronto Hydro Corporation and its
18 affiliates, including the utility, please refer to the financial reports available on Toronto
19 Hydro's website⁸ and SEDAR.⁹

20
21 **1.17 Financial Ratios: Leverage: Total Debt to Equity Ratio**

22 Toronto Hydro's "Total Debt" and "Equity" are determined in accordance with the
23 requirements of the OEB's RRR and APH, and not by reference to IFRS. As a result, the
24 "Leverage Ratio" expressed in the Scorecard and this Scorecard MD&A may differ from

⁸ Toronto Hydro Financial Reports

<<http://www.torontohydro.com/sites/corporate/InvestorRelations/FinancialReports/Pages/FinancialReports.aspx>>

⁹ <<https://www.sedar.com/>>

1 similarly-termed financial ratios or information presented in documents that Toronto
2 Hydro is required to file under securities laws and which are available on SEDAR.

3

4 For an analysis on the financial performance of Toronto Hydro Corporation and its
5 affiliates, including the utility, please refer to the financial reports available on Toronto
6 Hydro's website¹⁰ and SEDAR.¹¹

7

8 **1.18 Financial Ratios: Leverage: Profitability: Regulatory Return on Equity – Deemed**
9 **(included in rates) and Achieved**

10 The Regulatory Return on Equity ("ROE") is calculated on the same basis as the
11 methodology used to establish Toronto Hydro's base rates for a year, which is
12 prescribed by the OEB. The Regulatory ROE is not determined in accordance with IFRS.
13 As such, the Scorecard's "Profitability" performance measures ("Deemed" and
14 "Achieved" Regulatory ROE) may differ from similarly-termed expressions of profitability
15 and return on equity presented in documents that Toronto Hydro Corporation, the
16 utility's parent company, is required to file under securities laws and which are available
17 on SEDAR.

18

19 For analysis of the financial performance of Toronto Hydro Corporation and its affiliates,
20 including the utility, please refer to its Corporate MD&A available on Toronto Hydro's
21 website¹² and SEDAR.

¹⁰ Toronto Hydro Financial Reports

<<http://www.torontohydro.com/sites/corporate/InvestorRelations/FinancialReports/Pages/FinancialReports.aspx>>

¹¹ <<https://www.sedar.com/>>

¹² *Supra* note 10.

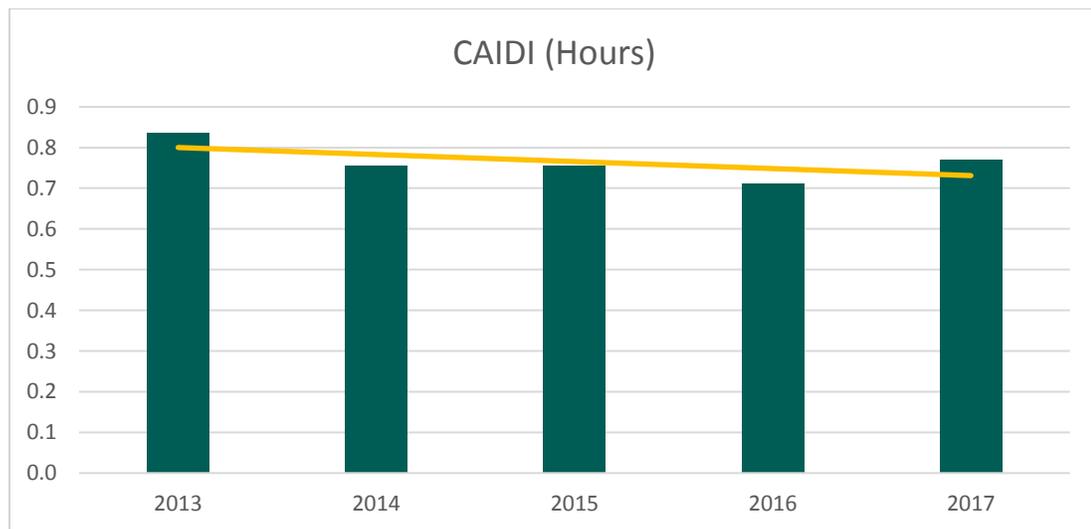
1 **2. 2015-2019 DSP PERFORMANCE MEASURES**

2 This section provides the results of Toronto Hydro’s historical performance on the 12
3 DSP measures proposed as part of its 2015-2019 Rate Application.¹³ In an effort to
4 reduce duplication, performance results for measures already discussed in the previous
5 section or in Exhibit 1B, Tab 2, Schedules 3 and 4 and Exhibit 2B, Section C are not
6 included here.

7
8 **3. CUSTOMER AVERAGE INTERRUPTION DURATION INDEX (“CAIDI”)**

9 CAIDI measures the outage duration experienced by an average Toronto Hydro customer.
10 The utility’s performance for CAIDI has been consistent with overall reliability
11 improvements exhibited in recent years. Figure 1, below, shows the utility’s
12 performance for this measure over the 2013-2017 period. Toronto Hydro’s reliability
13 improvements are attributable to the utility’s distribution system investments.

14



15

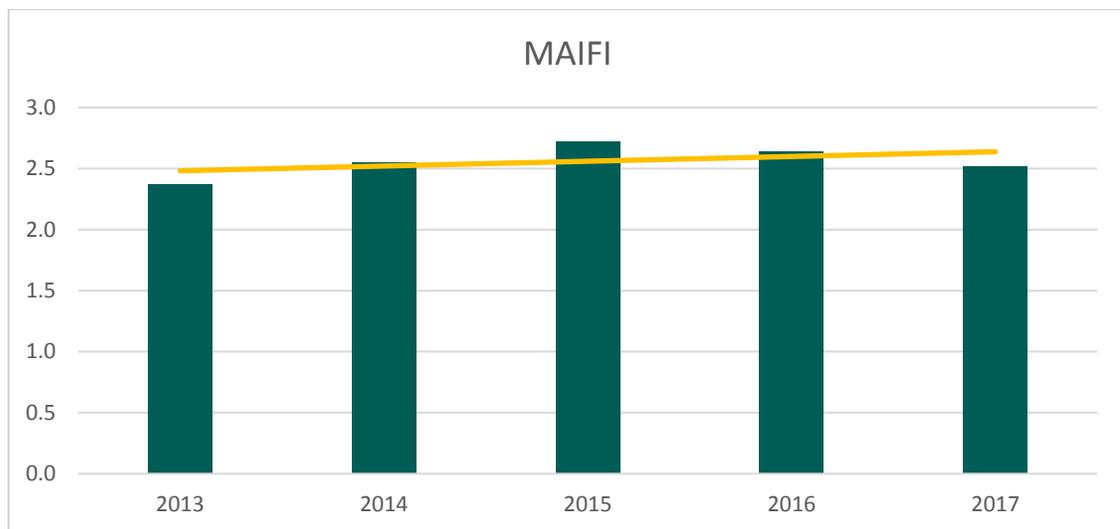
Figure 1: CAIDI Performance from 2013-2017

¹³ *Supra* note 4. Note that in place of some of these measures, Toronto Hydro has proposed 15 Custom Performance Measures for the 2020-2024 plan period in the current Application. Please see Exhibit 2B, Section C for more information.

1 **4. MOMENTARY AVERAGE INTERRUPTION FREQUENCY INDEX (“MAIFI”)**

2 MAIFI measures the average frequency of momentary interruptions (i.e. less than one
3 minute) that affect Toronto Hydro’s customers. Figure 2, below, shows the utility’s
4 performance for this measure over the 2013-2017 period. The five-year annual
5 frequency value for the period 2013 to 2017 is 2.56 compared to the corresponding
6 value of 2.74 reported in the utility’s last Rate Application (for the period 2009 to 2013).
7 For 2017, MAIFI was 2.52. This result represents a marginal improvement from the prior
8 year and is generally consistent with recent historical results.

9



10

Figure 2: MAIFI Performance from 2013-2017

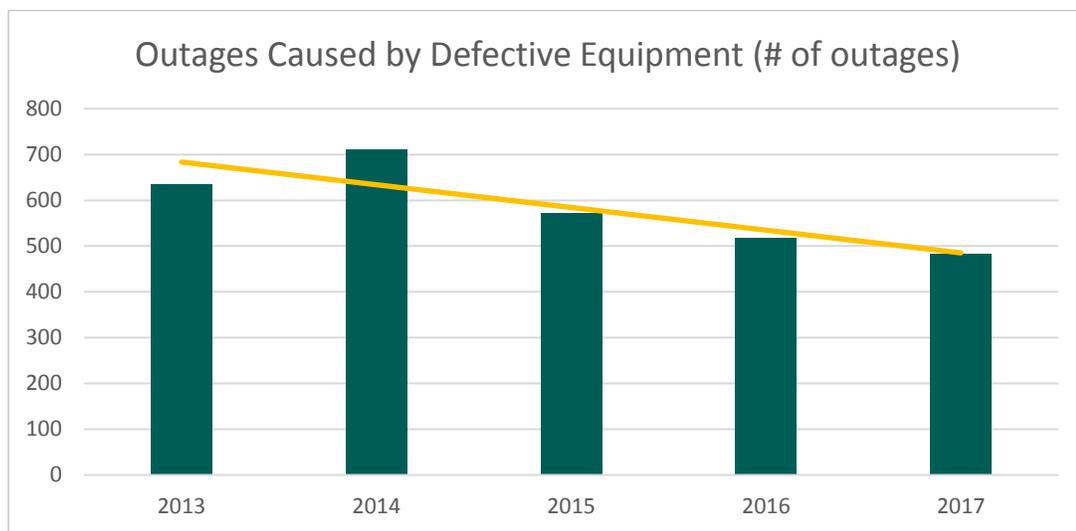
11

12 **5. OUTAGES CAUSED BY DEFECTIVE EQUIPMENT**

13 The Number of Outages Caused by Defective Equipment tracks the total number of
14 sustained customer interruptions attributable to defective equipment, which may result
15 from causes such as equipment failures due to deterioration from age or maintenance
16 deficiencies and indicates the health of the system.

1 Figure 3, below, shows the utility's performance in this measure over the 2013-2017
2 period. In 2017, Toronto Hydro recorded 484 outages caused by defective equipment,
3 the lowest number in recent history. The overall declining trend as shown in Figure 3,
4 below, aligns with Toronto Hydro's general expectations and is consistent with its
5 implementation of its capital renewal programs.

6



7 **Figure 3: Outages by Defective Equipment Performance from 2013-2017**

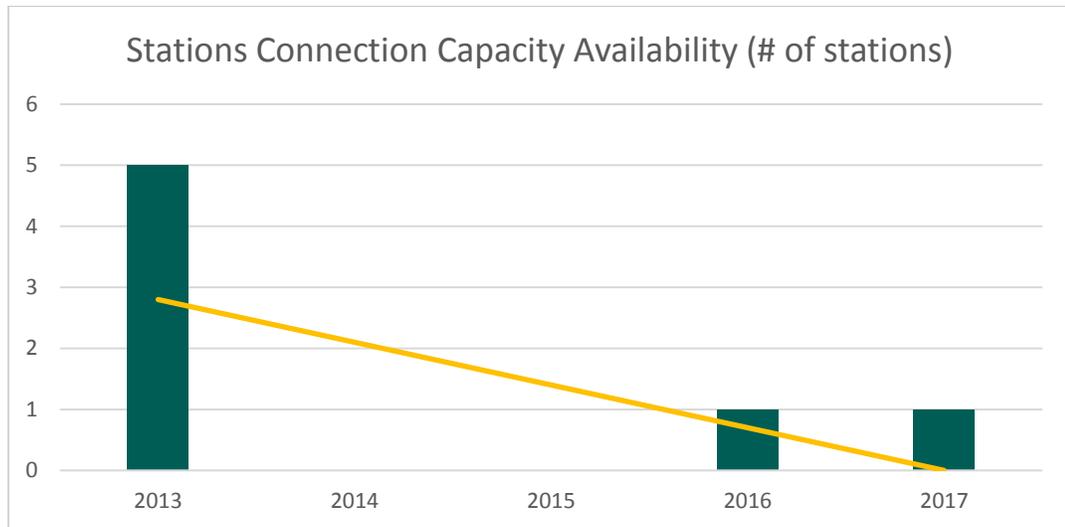
8

9 **6. STATIONS CAPACITY AVAILABILITY**

10 The Stations Capacity Availability tracks the number of Transformer Stations where
11 station demand is forecasted to exceed 90 percent of the station's firm capacity within
12 the next five years. Figure 4 shows the utility's performance in this measure over the
13 2013-2017 period. The number of stations with demand forecasted to exceed the 90
14 percent threshold within five years remained at one station in 2016 and 2017. The
15 measure has remained consistent, since system peak load in 2017 was similar to 2016.
16 Figure 4, below, also shows a declining trend for the past five-year period illustrating
17 that Toronto Hydro has managed stations capacity and load transferring successfully.

1 Distribution system load across the system decreased slightly from 2014 to 2017, driving
2 the measure down to zero. Two stations currently are forecasted to become loaded
3 beyond 90 percent in the coming years.

4

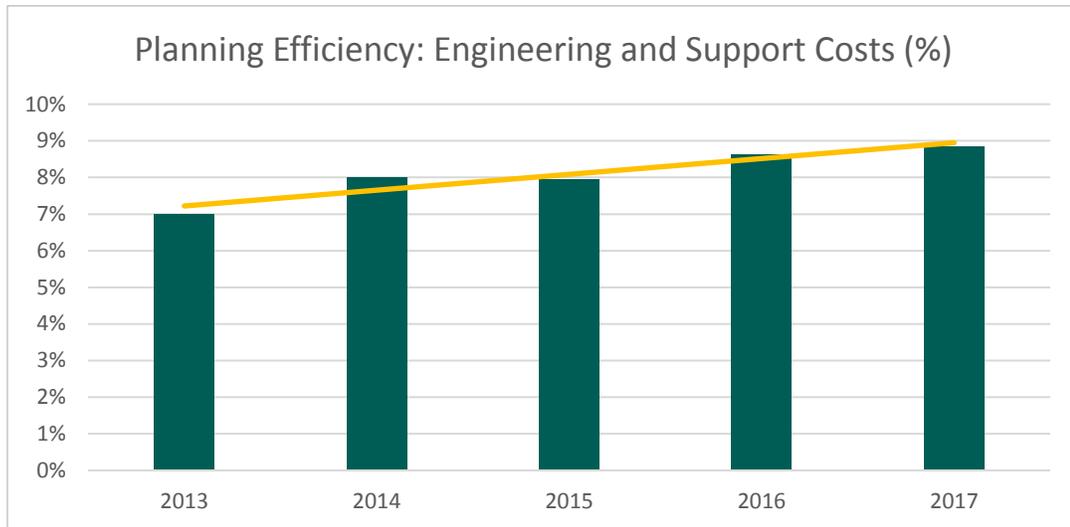


5 **Figure 4: Stations Capacity Available Progress Performance for 2013-2017**

6

7 **7. PLANNING EFFICIENCY - ENGINEERING AND SUPPORT COSTS**

8 This measure monitors the proportion of indirect labour costs being charged to capital
9 projects. Figure 5 shows the utility's performance in this measure over the 2013-2017
10 period. Factors that have impacted this measure include year-to-year variations in
11 overall capital spending, design requirements for future spending, and increases in
12 Control Centre activities to manage increasing demands for outage management on the
13 distribution system. Demands have also increased in the System Access category, which
14 requires increased Control Centre engagement. These demands include staffing
15 requirements which resulted in higher labour costs, and increased cost attributable to
16 this category.



1 **Figure 5: Engineering and Support Costs (%) Performance from 2013-2017**

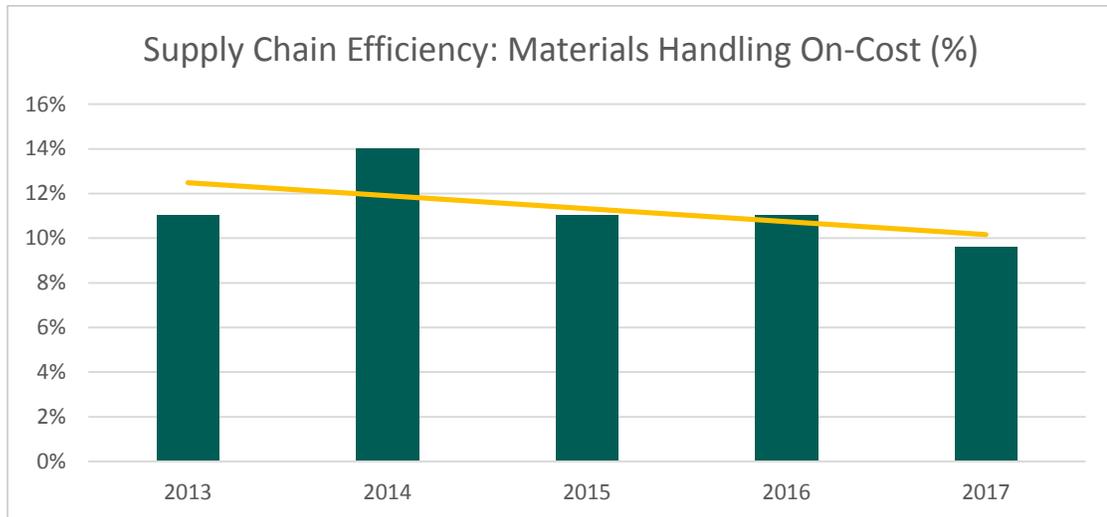
2

3 **8. SUPPLY CHAIN EFFICIENCY: MATERIALS HANDLING ON-COST**

4 In accordance with the applicable accounting framework, Toronto Hydro adds the
5 eligible portion of its supply chain and warehousing activities costs directly to the capital
6 projects and programs that these activities support. The supply chain and warehousing
7 costs are added to the total costs of capital projects through the service charge referred
8 to as “On-Cost”, which is applied as a percentage of the project’s total costs.

9

10 As shown in Figure 6, actual on-cost rate decreased between 2013 and 2017, with the
11 general stability over the five-year historical period.



1 **Figure 6: Materials Handling On-Cost Performance from 2013-2017**

2

3 **9. CONSTRUCTION EFFICIENCY: INTERNAL VS CONTRACTOR COST BENCHMARKING**

4 To track the costs of capital construction projects completed by the utility's internal
5 construction crews, Toronto Hydro compared the cost of select projects constructed
6 internally to the unit prices charged for similar work performed by external contractor
7 crews.

8

9 Internal project construction costs were on average [REDACTED] than the costs of
10 the same projects had they been constructed externally using up to seven design and
11 construction contractors over the 2013 to 2016 period.¹⁴ This value was calculated
12 using the weighted average of individual estimate variances equal to the portion of
13 contractor work performed by each of the six or seven contractors in a reference year.
14 Year-over-year results were affected by the selected sample project which comprised of
15 different units of work.

¹⁴ The results for 2017 are not available at this time.

1 **10. CONSTRUCTION EFFICIENCY: STANDARD ASSET ASSEMBLY LABOUR INPUT**

2 The Standard Asset Assembly Labour Input is related to the development of a
3 comprehensive framework for tracking the total number of labour hours required to
4 stage, install, and energize a fully assembled unit corresponding to each major asset
5 class of the utility’s electricity distribution plant (e.g. transformers, switchgear etc.).
6

7 In 2016, Toronto Hydro successfully implemented Asset Assembly Units for estimating
8 internal construction activities and leveraged this new approach to develop a
9 construction scheduling and dashboard tool to manage construction projects during
10 their lifecycle. The asset assembly project was launched in 2017, and Toronto Hydro is
11 in the very early stages of data collection. Given the amount of electrical planned
12 capital project work that is executed by internal Toronto Hydro staff, obtaining a
13 statistically significant data set is expected to take at least 12-24 months.
14

15 The envisioned end-state scope includes about 25 discrete estimates of total labour and
16 “non-wrench” hours (e.g. driving, set-up/take-down, breaks) required to fully complete
17 a single installation of a major asset class unit. The estimates of total hours will be
18 developed based on system averages derived through analysis of past results, pilot time
19 studies, and other activities determined as necessary during the project stages. Toronto
20 Hydro continues work on developing and assessing the feasibility of this measure.

1 **SERVICE QUALITY PERFORMANCE**

2

3 **1. OVERVIEW**

4 Toronto Hydro monitors and reports its performance results for the Electricity Service
5 Quality Requirements (“ESQRs”) in accordance with the OEB’s Reporting and Record-
6 keeping Requirements (“RRR”).¹ This section provides the reported Service Quality
7 Requirements for the last five years (2013-2017). A completed Appendix 2-G,
8 documenting both Service Quality and Service Reliability Indicators, is provided in
9 Exhibit 1B, Tab 2, Schedule 5. Toronto Hydro confirms that the data included in this
10 evidence is consistent with the scorecard.²

11

12 As illustrated in Table 1, Toronto Hydro’s Service Quality performance has been steady
13 in most areas over the last five years, meeting or exceeding the ESQR standards 85
14 percent of the time, with noteworthy improvements in Emergency Response and
15 Connections of New Services (Low Voltage) measures. A detailed explanation as well as
16 a remediation plan for those measures below the OEB standard are provided below.

¹ See OEB Distribution System Code, Chapter 7 Service Quality Requirements, and RRR section 2.1.4.

² This section is filed in accordance with section 2.2.2.8 [Service Quality] of the Chapter 2 Cost of Service Filing Requirements.

1 **Table 1: Summary of Toronto Hydro’s ESQR Performance**

ESQR	OEB Standard	Hist. 5 Year Avg.	2013	2014	2015	2016	2017
Connection of New Services-Low Voltage (“LV”)	90	95.7	94.2	91.5	96.9	97.7	98.3
Connection of New Service-High Voltage (“HV”)	90	99.7	100.0	100.0	100.0	100.0	98.4
Micro Embedded Generation Facilities	90	98.5	100.0	100.0	100.0	100.0	92.4
Appointment Scheduling	90	87.7	96.6	96.2	89.0	72.0	81.8
Appointment Met	90	99.6	99.6	99.8	99.9	99.5	99.4
Rescheduling a Missed Appointment	100	98.6	98.4	94.6	100.0	100.0	100.0
Telephone Accessibility	65	74.7	82.0	71.9	76.8	64.7	77.9
Telephone Call Abandon Rate	10	1.9	1.2	1.7	1.6	3.1	1.9
Written Response to Enquires	80	94.9	98.9	85.8	97.5	93.1	99.0
Billing Accuracy	98	98.1	NA	96.6	97.5	98.9	99.2
Emergency Response (Urban)	80	87.8	74.4	92.0	87.2	91.8	93.6
Reconnection Performance Standard	85	99.8	100.0	100.0	100.0	99.7	99.4

2

3 **2. CONNECTION OF NEW SERVICES – LOW VOLTAGE**

4 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
 5 for this measure. Specifically, Toronto Hydro connected an average of 95.7 percent of
 6 new low voltage connections (i.e. new connections below 750 volts) on time over the
 7 2013-2017 period, exceeding the OEB standard of 90 percent. Further details on the
 8 utility’s performance in this measure can be found under “New Residential/Small
 9 Business Services Connected on Time”³ in Exhibit 1B, Tab 2, Schedule 2.

³ OEB EDS Measure Descriptions are available at:
 <https://www.oeb.ca/sites/default/files/uploads/Scorecard_Performance_Measure_Descriptions.pdf>

1 **3. CONNECTION OF NEW SERVICES – HIGH VOLTAGE**

2 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
3 for this measure. Specifically, Toronto Hydro connected an average of 99.7 percent of
4 new high voltage connections (i.e. new connections greater than 750 volts) on time over
5 the 2013-2017 period, exceeding the OEB standard of 90 percent.

6
7 Toronto Hydro’s services one of the fastest growing cities in North America, requiring
8 the utility to respond to high volumes of connections and upgrades requests for
9 residential and commercial developments each year. To meet these challenges, the
10 utility continues to look for ways to improve how it responds to the connection needs of
11 its customers. For instance, in 2017, Toronto Hydro consolidated its connection design
12 teams to enable the allocation and distribution of work across design team members in
13 a more effective and efficient manner. In addition, Toronto Hydro introduced an online
14 method of allowing customers to complete their connections inquiries. This has
15 enabled customer inquiries to be dealt with efficiently and expeditiously.

16
17 For the 2020-2024 period, Toronto Hydro intends to continue to meet or exceed the
18 current OEB standard for this measure. Toronto Hydro’s performance under this
19 measure is enabled by programs including the low voltage connections work discussed
20 in Toronto Hydro’s Customer Connections program (Exhibit 2B, Section E5.1).

21
22 **4. MICRO-EMBEDDED GENERATION FACILITIES**

23 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
24 for this measure. Specifically, Toronto Hydro connected an average of 98.5 percent of
25 micro-embedded generation facilities over the 2013-2017 period, exceeding the OEB
26 standard of 90 percent. Further details on the utility’s performance in this measure can

1 be found under “New Micro-Embedded Generation Facilities Connected on Time” in
2 Exhibit 1B, Tab 2, Schedule 2.

3

4 **5. APPOINTMENTS SCHEDULING**

5 Over the 2013-2017 period, on average, Toronto Hydro has performed below the OEB
6 standard for this measure. Specifically, on average, Toronto Hydro scheduled 87.7
7 percent of appointments within five business days over the 2013-2017 period, falling
8 slightly below the OEB standard of 90 percent.

9

10 Toronto Hydro has made several process improvements in an effort to increase
11 performance in this measure. Some of these improvement initiatives include:

- 12 • Optimizing the number and use of contractors to address appointments for cable
13 locates;
- 14 • Establishing self-locating agreements that enable qualified excavators to perform
15 locates safely, without engaging Toronto Hydro;
- 16 • Establishing alternate locate agreements allowing excavations to be performed
17 under pre-established conditions without a field locate;
- 18 • Increased training of locate service providers enabling them to complete pre-
19 screening; and
- 20 • Expanding the use of remote pre-screening to identify locations where no
21 underground infrastructure exists, thus eliminating the need for a site visit (and
22 an appointment).⁴

⁴ Self-locating agreements enable excavators to provide their own locates on Toronto Hydro’s behalf and alternate locate agreements allow excavations under set conditions without a field locate.

1 These efforts have led to a 10 percent increase in the reported performance from 2016
2 to 2017. Specifically, in 2017, Toronto Hydro scheduled 81.8 percent of all
3 appointments within five business days, improving on its 2016 performance of 72.0
4 percent. Going forward, the utility will continue to work on its performance. The
5 utility's performance under this measure is enabled by such programs as Customer-
6 Driven Work (Exhibit 4A, Tab 2, Schedule 8).

7

8 **6. APPOINTMENTS MET**

9 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
10 for this measure. Specifically, Toronto Hydro has arrived on time for an appointment
11 99.6 percent of the time over the 2013-2017 period, exceeding the OEB standard of 90
12 percent. Toronto Hydro's performance under this measure is discussed in Exhibit 1B,
13 Tab 2, Schedule 2 under "Scheduled Appointments Met n Time."

14

15 **7. RESCHEDULING A MISSED APPOINTMENT**

16 Over the 2013-2017 period, on average, Toronto Hydro has performed below the OEB
17 standard for this measure. Specifically, on average, Toronto Hydro rescheduled a
18 missed appointment 98.6 percent of the time over the 2013-2017 period, falling slightly
19 below the OEB standard of 100 percent. However, performance under this measure has
20 been at the OEB standard of 100 percent for the last three years (i.e. 2015, 2016, and
21 2017).

22

23 Toronto Hydro strives to meet all its appointments, with very few missed on an annual
24 basis. When one of these few missed appointments is subsequently not rescheduled in
25 accordance with the OEB's standard, it results in a relatively significant impact in
26 percentage terms. For instance, in 2014, out of a total of number of 16,727 customer

1 appointments only 37 were missed, of which only two were rescheduled in accordance
2 with the OEB's standard.

3

4 For the 2020-2024 period, Toronto Hydro intends to perform at the current OEB
5 standard of 100 percent. The utility's performance under this measure is enabled by
6 such programs as Customer-Driven Work (Exhibit 4A, Tab 2, Schedule 8).

7

8 **8. TELEPHONE ACCESSIBILITY**

9 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
10 for this measure. Specifically, Toronto Hydro responded within a 30-second time period
11 74.7 percent of the time over the 2013-2017 period, exceeding the OEB standard of 65
12 percent. Toronto Hydro's performance under this measure is discussed in Exhibit 1B,
13 Tab 2, Schedule 2 under "Telephone Calls Answered on Time." The utility's performance
14 under this measure is enabled by such programs as Customer Care (Exhibit 4A, Tab 2,
15 Schedule 14).

16

17 **9. TELEPHONE CALL ABANDON RATE**

18 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
19 for this measure. Specifically, Toronto Hydro has a call abandonment rate of 1.9
20 percent, on average, compared to the OEB standard of 10 percent.

21

22 The Toronto Hydro's Contact Centre receives and responds to approximately 93,000
23 written inquiries and 527,000 telephone calls per year. Customers engage with the
24 Contact Centre to inquire about Toronto Hydro's business practices, including, but not
25 limited to, payment options, electricity consumption, and collections.

1 In 2017, Toronto Hydro extended its Call Centre weekday business hours from 8:00 a.m.
2 to 4:30 p.m. to 8:00 am to 8:00 p.m. These extended hours have resulted in more
3 manageable call volumes.

4

5 For the 2020-2024 period, Toronto Hydro intends to meet or exceed the OEB standard
6 for this measure. The utility's performance under this measure is enabled by such
7 programs as Customer Care (Exhibit 4A, Tab 2, Schedule 14).

8

9 **10. WRITTEN RESPONSE TO ENQUIRIES**

10 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
11 for this measure. Specifically, Toronto Hydro has responded to written enquiries within
12 ten business days 94.9 percent of the time over the 2013-2017 period, exceeding the
13 OEB standard of 80 percent.

14

15 For the 2020-2024 period, Toronto Hydro intends to meet or exceed the OEB standard
16 for this measure. The utility's performance under this measure is enabled by such
17 programs as Customer Care (Exhibit 4A, Tab 2, Schedule 14).

18

19 **11. BILLING ACCURACY**

20 Over the 2013-2017 period, on average, Toronto Hydro has met the OEB standard for
21 this measure. Specifically, Toronto Hydro has issued an accurate bill 98.1 percent of the
22 time, on average, over the 2013-2017 period, meeting the OEB standard of 98 percent.

23 Toronto Hydro's performance under this measure is discussed in Exhibit 1B, Tab 2,
24 Schedule 2 under "Billing Accuracy." The utility's performance under this measure is
25 enabled by such programs as Metering (Exhibit 2B, Section E5.4) and Customer Care
26 (Exhibit 4A, Tab 2, Schedule 14).

1 **12. EMERGENCY RESPONSE**

2 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
3 for this measure. Specifically, Toronto Hydro responded to emergency calls within 60
4 minutes 87.8 percent of the time over the 2013-2017 period, exceeding the OEB
5 standard of 80 percent for urban areas.

6

7 The utility's performance below the OEB standard in 2013 was explained in Toronto
8 Hydro's 2015-2019 Application as resulting from the timing and severity of Major Event
9 Days ("MEDs") – typically storms – which may not allow for a timely response to all
10 (often simultaneous) emergency calls. Since then, Toronto Hydro's 2014 to 2017
11 performance has substantially improved and has resulted in an overall five-year average
12 of 87.8 percent – exceeding the OEB standard of 80 percent.

13

14 In 2017, Toronto Hydro successfully responded to 93.6 percent of emergency calls
15 within 60 minutes. Toronto Hydro continues to assess and optimize the number of
16 crews on shift to maximize resources and prioritize events to increase the number of
17 events responded to per crew shift.

18

19 For the 2020-2024 period, Toronto Hydro intends to meet or exceed the current OEB
20 standard for this measure. The utility's performance under this measure is enabled by
21 such programs as Emergency Response (Exhibit 4A, Tab 2, Schedule 5).

22

23 **13. RECONNECTION PERFORMANCE STANDARD**

24 Over the 2013-2017 period, on average, Toronto Hydro has exceeded the OEB standard
25 for this measure. Specifically, Toronto Hydro reconnected an average of 99.8 percent of
26 customers on time for the 2013-2017 period, exceeding the OEB standard of 85 percent.

1 Toronto Hydro has made investments to its metering system to allow remote
2 reconnection for certain customers. This was part of a pilot project started in 2017 to
3 improve the efficiency and timeliness of the reconnection process. Toronto Hydro is
4 gradually upgrading its meters to have remote-control capabilities and as of the end of
5 2017 had over 48,000 meters with such capabilities in service. These new meters can be
6 remotely disconnected, reconnected, or operated intermittently to interrupt load on a
7 pre-set schedule, without the need for a site visit.

8

9 As these meters become more commonplace, performance under this measure is
10 expected to further improve, as the utility will increase its capability to remotely
11 reconnect customers nearly instantaneously after a customer makes payment or enters
12 into an arrears payment plan.

13

14 For the 2020-2024 period, Toronto Hydro intends to meet or exceed the current OEB
15 standard for this measure. Toronto Hydro's performance under this measure is enabled
16 by work including that in the Metering (Exhibit 2B, Section E5.4) and Customer Care
17 program (Exhibit 4A, Tab 2, Schedule 14).

1 **RELIABILITY PERFORMANCE**

2

3 Toronto Hydro tracks reliability performance indicators System Average Interruption
4 Frequency Index (“SAIFI”) and System Average Interruption Duration Index (“SAIDI”) in
5 several ways:¹

- 6 1) All events;
- 7 2) Excluding events relating to Loss of Supply (“LoS”);
- 8 3) Excluding events relating to Major Event Days (“MEDs”);
- 9 4) Excluding MEDs and LoS; and
- 10 5) Excluding MEDs, LoS, and scheduled outages.

11

12 Scenarios 1, 2, and 3 provide SAIFI and SAIDI in the manner required by the OEB’s
13 prescribed Appendix 2-G, filed at Exhibit 1B, Tab 2, Schedule 5. Scenarios 4 and 5
14 provide SAIFI and SAIDI excluding: (i) outages related to MEDs and LoS (consistent with
15 the OEB Electricity Distributor Scorecard and MD&A) discussed in Exhibit 1B, Tab 2,
16 Schedule 2; and (ii) MEDs, LoS and scheduled outages, respectively, as a more
17 normalized reflection of total system reliability performance. Each scenario provides
18 valuable information as to the causes, duration, and frequency of outages within
19 Toronto Hydro’s distribution system.

20

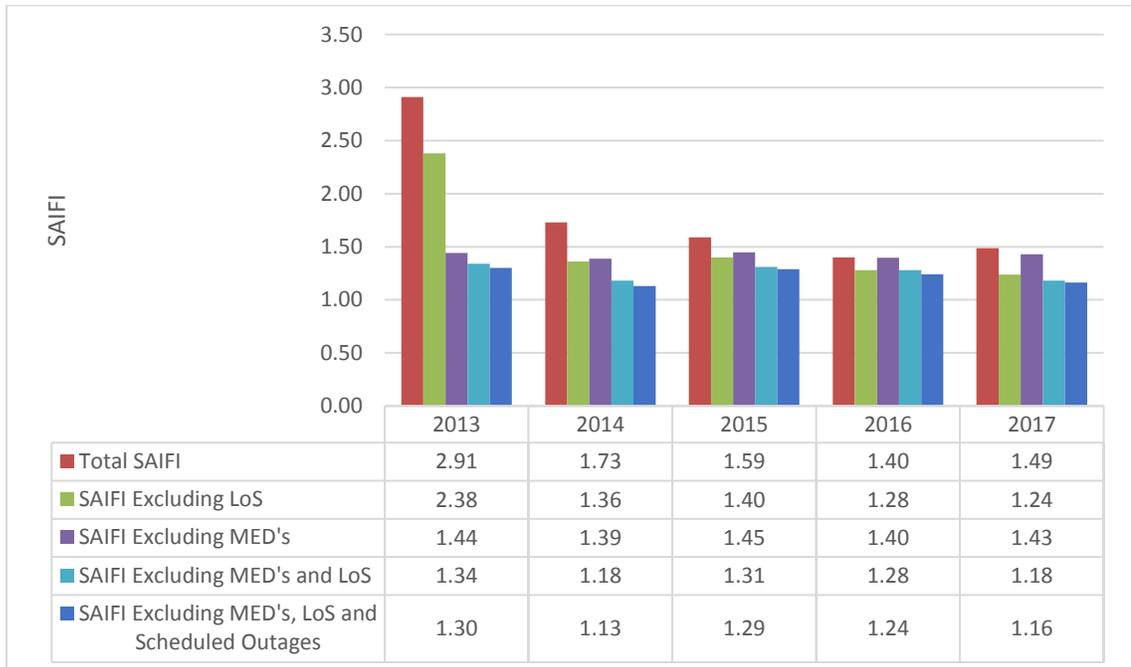
21 **1. SYSTEM OVERVIEW**

22 Figures 1 and 2 below show the system’s total SAIFI and SAIDI between 2013 and 2017,
23 respectively, under each of the five scenarios. The notably higher SAIFI and SAIDI in
24 2013 under Scenarios 1 and 2 can be attributed to the flooding of Manby TS in July and

¹ During the 2020-2024 plan period, Toronto Hydro will be tracking performance under FESI-7 (System) and FESI-6 (Large Customers) as part of its custom performance measures, please see Exhibit 2B, Section C for more information.

1 the ice storm in December of that year. Both of these occurrences were outside the
 2 utility’s control and met the definition of MEDs as set out in the OEB’s Electricity
 3 Reporting and Record Keeping Requirements (“RRR”).² These MEDs caused the year-
 4 over-year fluctuations to be more drastic. In contrast, Scenarios 3 (excluding MEDs),
 5 Scenario 4 (excluding MEDs and LoS), and Scenario 5 (excluding MEDs, LoS, and
 6 scheduled outages) illustrate more normalized SAIFI and SAIDI values with less
 7 fluctuations. Toronto Hydro considers these latter scenarios to offer greater insight into
 8 system reliability as they provide a better indication of the performance trend of the
 9 system and the impact of recent investments, and are the more commonly used
 10 indicators across the industry for benchmarking against distribution system
 11 performance.

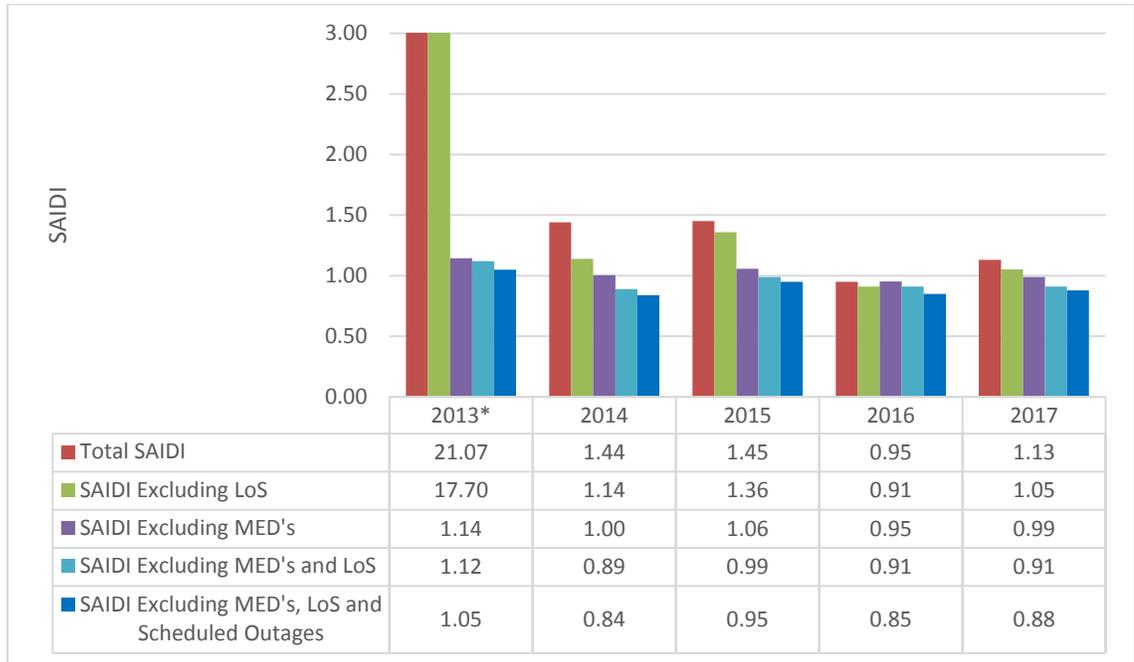
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Figure 1: System Level SAIFI

² OEB, Electricity Reporting and Record Keeping Requirements (“RRR”), Section 2.1.4.2(7).



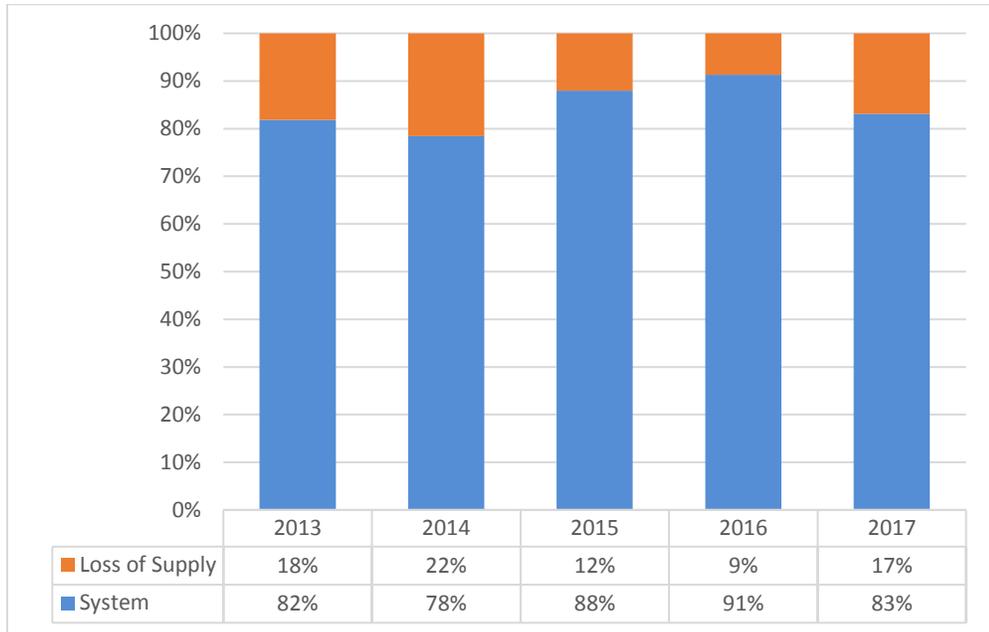
*2013 Values cut off above the chart due to the high SAIFI and SAIDI values prior to excluding MEDs.

Figure 2: System Level SAIDI

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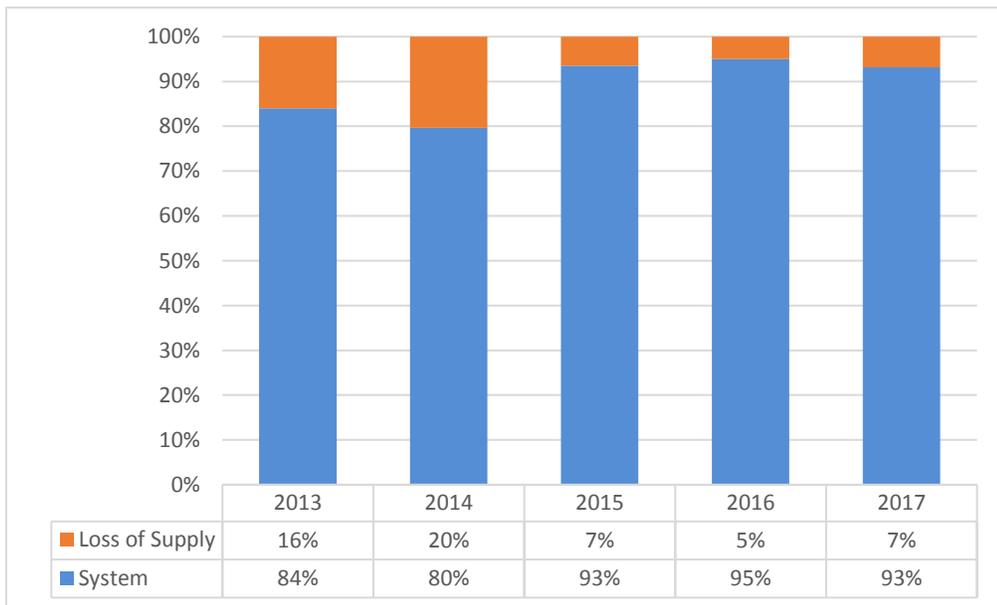
2. LOSS OF SUPPLY

Loss of Supply (“LoS”) events have a significant impact on the overall reliability of Toronto Hydro’s distribution system, and being external to Toronto Hydro’s operations and control, are generally excluded from a system reliability analysis. On a system level, LoS events can contribute up to 22 percent of SAIFI and 20 percent of SAIDI (based on system reliability analysis beginning in 2013), although significant variations can occur year to year. There are also significant variations between individual LoS events, which makes it difficult to perform trend analyses and forecast future reliability performance. For instance, 23 LoS events occurred in 2015, whereas 20 LoS events occurred in 2017. Nevertheless, the fewer events in 2017 affected SAIFI and SAIDI to a greater extent due to the higher impacts of individual events in that year. Figures 3 and 4 below show the SAIFI and SAIDI system impact due to LoS.



1
2

Figure 3: Loss of Supply Impact on Total SAIFI



3

Figure 4: Loss of Supply Impact on Total SAIDI

3. MAJOR EVENT DAYS

Major Event Days (“MEDs”) are defined by the Institute of Electrical and Electronics Engineers (“IEEE”) as “events that are beyond the design and/or operational limits of a utility.”³ Major Events are similarly defined by the OEB’s RRR as “an event that is beyond the control of the distributor and is: unforeseeable, unpredictable, unpreventable, or unavoidable.”⁴ Similar to LoS events, MEDs are external to routine utility operation, and in addition, are highly volatile from year to year. The exclusion of MEDs and LoS events allows a utility to normalize its reliability data, making it possible to establish meaningful reliability performance trends and associated targets. MEDs experienced by Toronto Hydro since 2003 are shown in Table 1, below.

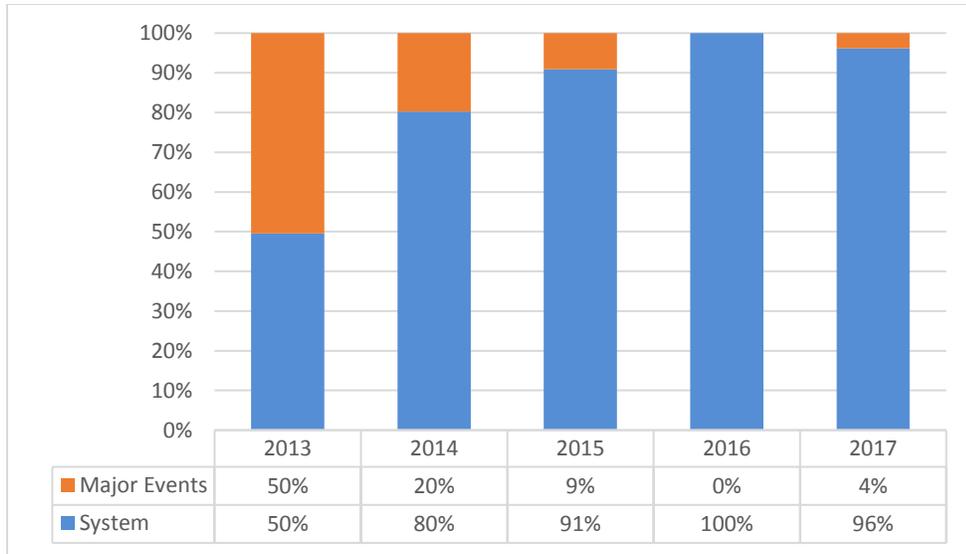
Table 1: Major Event Days

Dates	Description	Number of Outages	Total Customers Interrupted	Total Customer Hours Interrupted
July 8, 2013	Major Storm (Thunderstorm)	56	324,672	2,377,913
July 9, 2013	Major Storm (Thunderstorm)	44	41,502	91,646
December 21, 2013	Freezing Rain Ice Storm	42	175,928	3,204,481
December 22, 2013	Freezing Rain Ice Storm	208	441,547	8,295,093
December 23, 2013	Freezing Rain Ice Storm	25	29,530	196,633
December 24, 2013	Freezing Rain Ice Storm	23	13,983	149,337
December 25, 2013	Freezing Rain Ice Storm	18	20,225	92,924
December 26, 2013	Freezing Rain Ice Storm	20	19,147	91,458
April 15, 2014	Loss of Supply to Manby TS	27	113,035	129,479
June 17, 2014	Major Thunderstorm	38	55,442	88,496
November 24, 2014	Wind Storm	46	82,053	99,027
March 3, 2015	Freezing Rain	49	107,242	291,672
October 15, 2017	Wind Storm	31	43,175	107,846

³ IEEE 1366-2012 – IEEE Guide for Electric Power Distribution Reliability Indices.

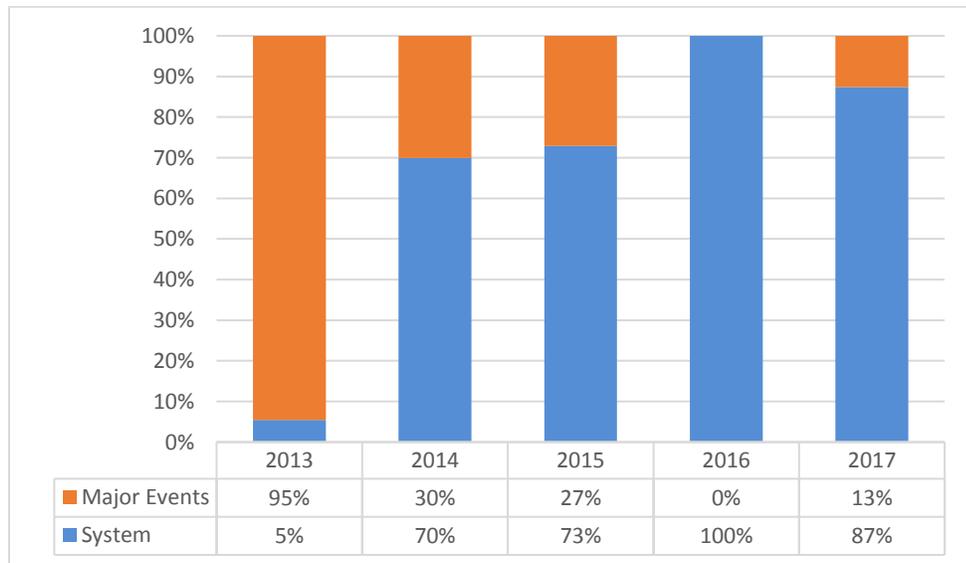
⁴ Ontario Energy Board, Electricity Reporting & Record Keeping Requirements (March 15, 2018) at p. 10.

1 Figures 5 and 6, below, demonstrate the SAIFI and SAIDI system impacts resulting from
 2 MEDs.
 3



4 **Figure 5: Major Event Days Impact on Total SAIFI**

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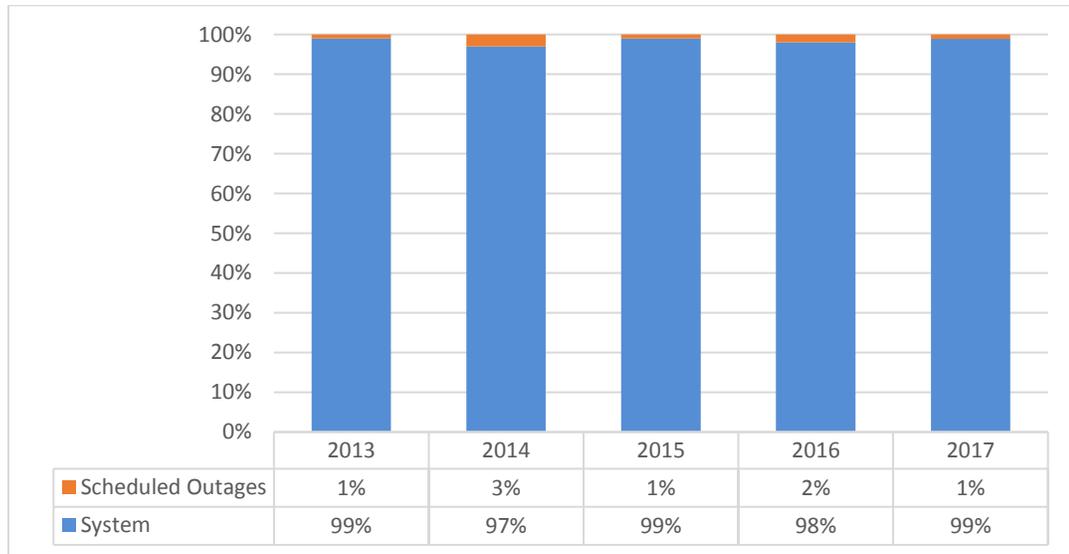


6 **Figure 6: Major Event Days Impact on Total SAIDI**

1 **4. SCHEDULED OUTAGES**

2 Scheduled outages are associated with construction and preventative maintenance
 3 activities. Assets that are at risk of failing in the near future may be taken out of service
 4 to be repaired or replaced. While this can lead to lengthy outages, the duration of the
 5 outage would generally be much shorter than those caused by the asset failing while in-
 6 service. These planned replacements are also often required to mitigate safety risks to
 7 Toronto Hydro’s employees. Toronto Hydro provides customers advanced notification
 8 of any impending work prior to engaging the project, which gives them the opportunity
 9 to plan their activities around the repair work. As planned outages do not reflect the
 10 inherent reliability performance of the distribution system, they are typically excluded
 11 from reliability analyses.

12



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Figure 7: Scheduled Outages Impact on Total SAIFI

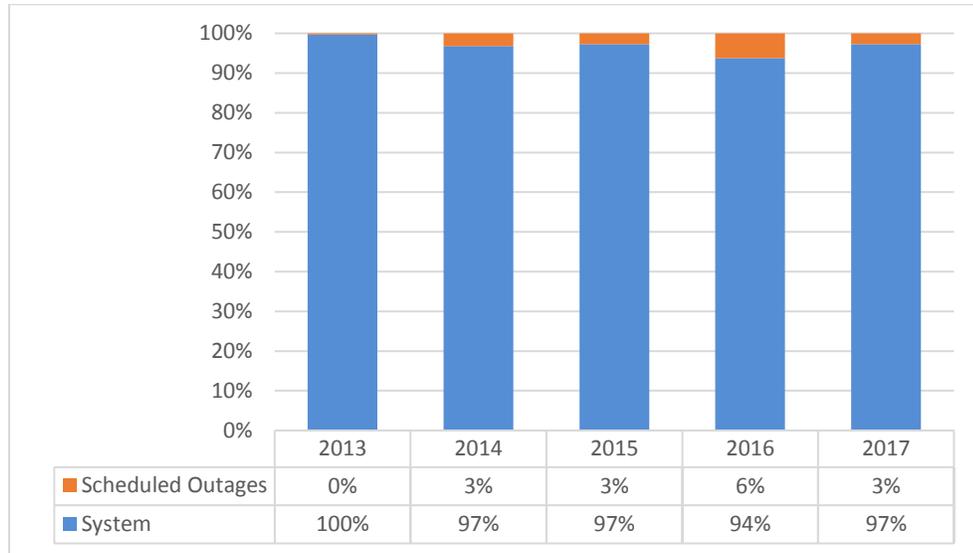


Figure 8: Scheduled Outages Impact on Total SAIDI

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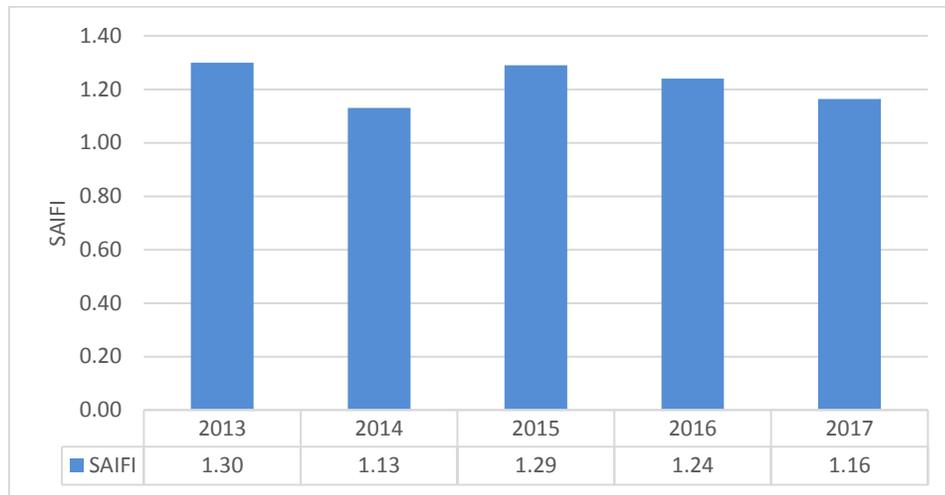
5. SYSTEM RELIABILITY EXCLUDING LOSS OF SUPPLY, MAJOR EVENT DAYS AND SCHEDULED OUTAGES

As noted above, MEDs and LoSs are outside the utility’s control. As a result, these factors are typically excluded from analysis of the overall system performance. In addition, scheduled outages are required to allow certain work to be completed on the distribution system such as replacing assets that are at their end of life or in deteriorated condition to prevent a future outage. The inclusion of scheduled outages in reliability analysis would not provide a true reflection of distribution system performance. Figures 9 and 10, below, show the adjusted SAIFI and SAIDI (excluding LoS, MEDs, and scheduled outages).

The year-over-year adjusted values show that SAIFI and SAIDI have been generally stable, with a slight downward trend. A breakdown of system interruption causes is shown by the cause codes in Figures 11 and 12. The cumulative weather reliability impacts on the system are highlighted in Figures 13 and 14. SAIDI shows a steady

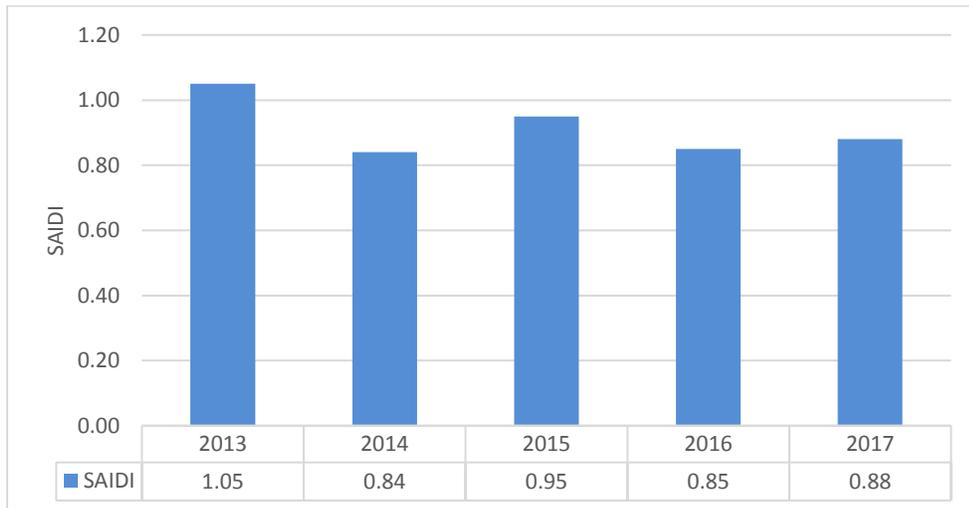
1 improvement over the 2013-2017 period. This is in part a reflection of the utility's
 2 continued work to improve restoration times through the installation of remotely
 3 operated switches, which allow faster restoration of customers as well as
 4 reconfigurations to reduce assets in rear lot locations that typically have longer outage
 5 durations.

6



7 **Figure 9: System SAIFI Excluding MEDs, Loss of Supply and Scheduled Outages**

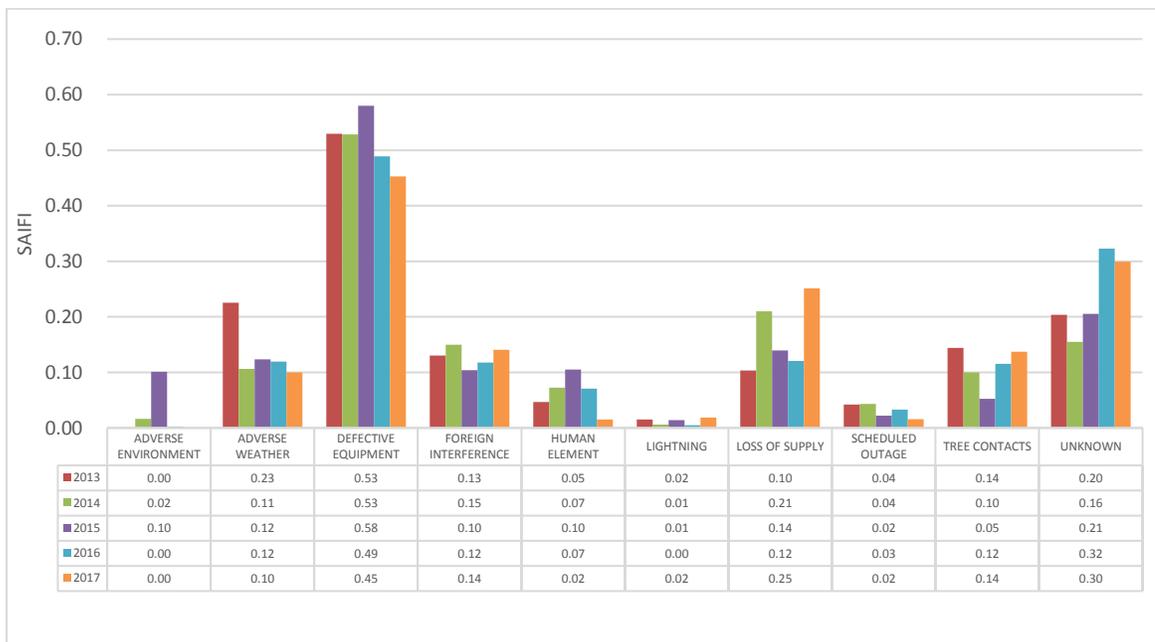
8



9 **Figure 10: System SAIDI Excluding MEDs, Loss of Supply and Scheduled Outages**

1 **6. CAUSE CODE ANALYSIS**

2 Toronto Hydro tracks causes of service interruptions using the ten primary cause codes
 3 as specified in the OEB’s RRR.⁵ Figures 11 and 12, below, show the utility’s 2013-2017
 4 SAIFI and SAIDI performance by cause code. Table 2, below, shows the percentage
 5 contribution of each cause code to overall system SAIFI and SAIDI.
 6



7 **Figure 11: SAIFI Cause Code Breakdown (Excluding MEDs)**

⁵ RRR, Section 2.1.4.2.5 - Reporting Cause Codes.

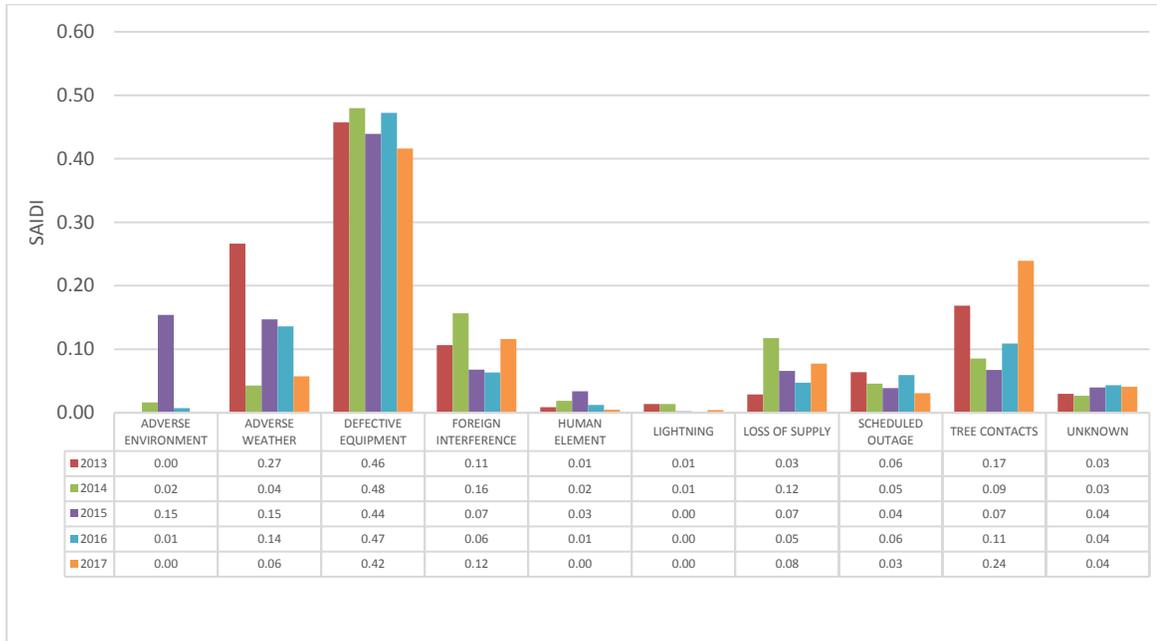


Figure 12: SAIDI Cause Code Breakdown (Excluding MEDs)

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Table 2: Five-Year Average SAIFI and SAIDI Contribution by Cause Code

Cause Code	Contribution % to SAIFI	Contribution % to SAIDI
Defective Equipment	36.3	44.0
Unknown	16.7	3.5
Loss of Supply*	11.6	6.5
Foreign Interference	9.0	9.9
Adverse Weather	9.5	12.6
Tree Contacts	7.7	13.0
Human Element	4.4	1.5
Scheduled Outage*	2.2	4.6
Adverse Environment	1.7	3.5
Lightning	0.8	0.7

* Excluded from typical system analysis when evaluating Toronto Hydro's system reliability performance

4
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6

Between 2013 and 2017, defective equipment was the main contributor to SAIFI and SAIDI, at 36.3 percent and 44.0 percent respectively. As shown in Figures 11 and 12,

1 above, the majority of improvement in 2017 SAIFI and SAIDI results relative to prior
2 years was in respect to Defective Equipment and Adverse Weather. Toronto Hydro
3 views the Defective Equipment cause code as a primary indicator of the condition of its
4 distribution system and tracks the cost code as a measure of continuous improvement
5 in the execution of its capital expenditure and maintenance plans. To this end, Toronto
6 Hydro has proposed two custom performance measures, SAIDI – Defective Equipment
7 and SAIFI – Defective Equipment for the 2020-2024 plan period. Please refer to Exhibit
8 2B, Section C for more information. Additional analysis of certain cause codes is
9 provided below.

10

11 **7. WEATHER IMPACTS**

12 The following three cause codes can generally be combined to provide a more accurate
13 reflection of weather impacts on the system:

- 14 1) Adverse Weather,
- 15 2) Lightning, and
- 16 3) Tree Contacts.

17

18 Figures 13 and 14, below, illustrate the cumulative weather reliability impacts on the
19 system.

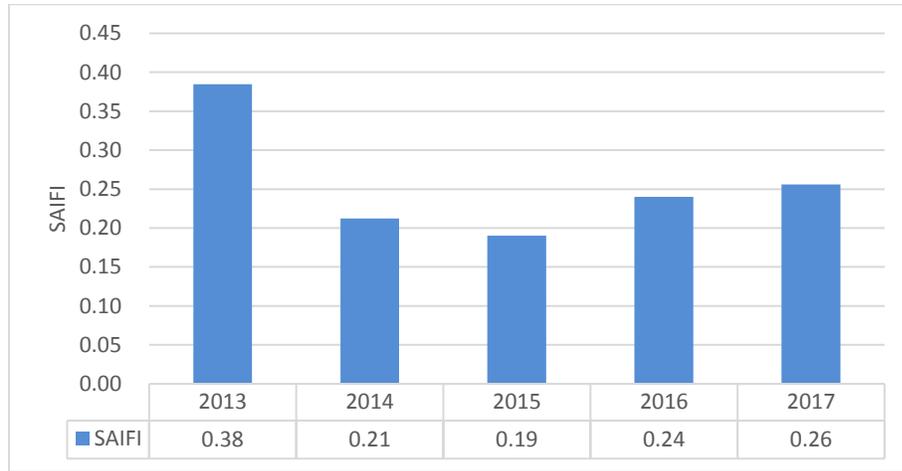


Figure 13: Weather Impacts to SAIFI

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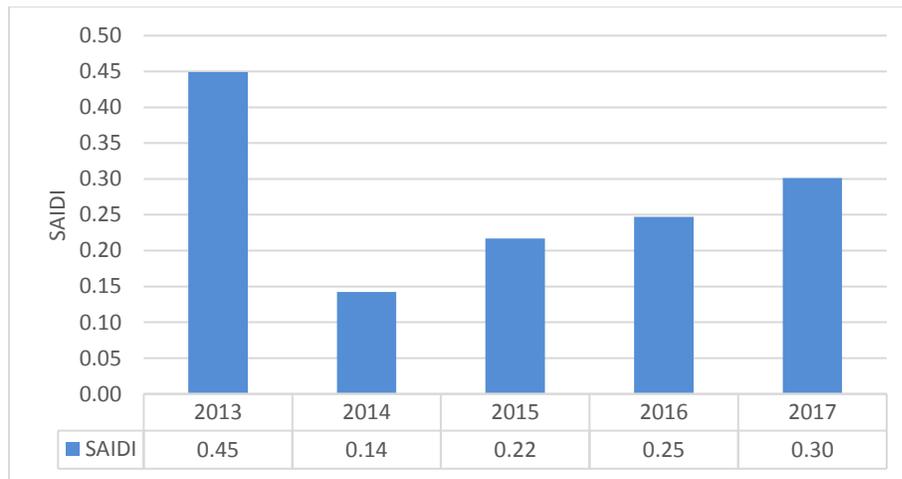


Figure 14: Weather Impacts to SAIDI

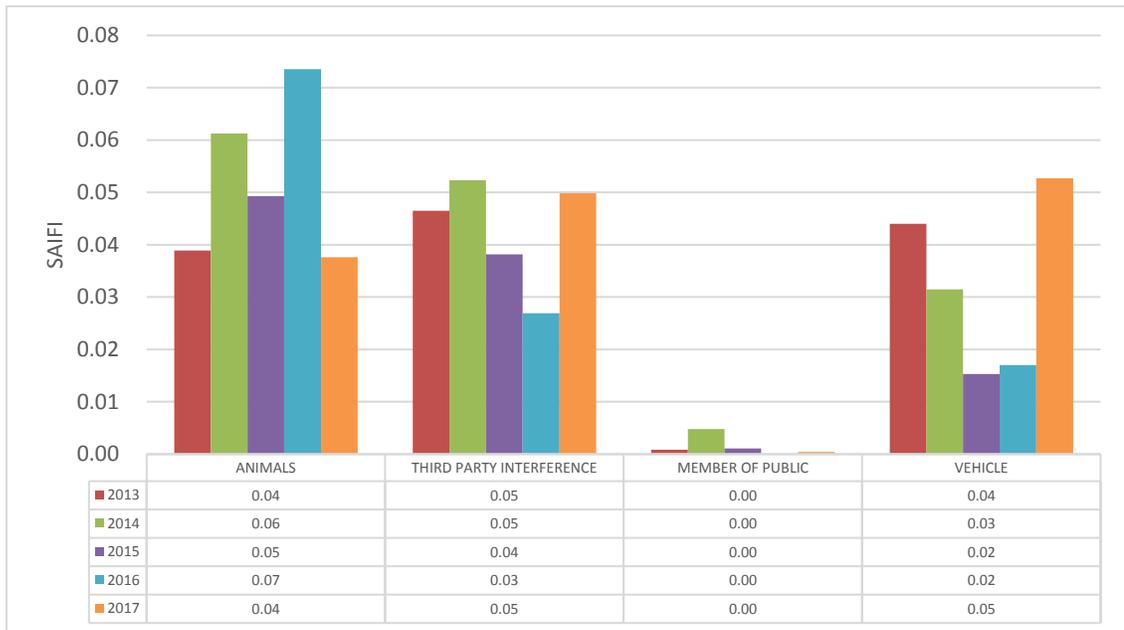
3
4

5 Weather impacts on the distribution system account for a significant portion of total
 6 system SAIFI and SAIDI. In 2017, weather related causes contributed 18 percent of the
 7 annual SAIFI and 30 percent of the annual SAIDI results. Figures 13 and 14, above,
 8 demonstrate that a large portion of the SAIFI and SAIDI improvements in 2014 can be
 9 attributed to relatively favorable weather conditions that year.

1 **8. FOREIGN INTERFERENCE IMPACTS**

2 Foreign interference consists of outages caused by animal contact, dig-ins, vehicles, and
 3 other foreign objects. Though there are different ways to mitigate foreign interference,
 4 such as installing animal guards or moving assets to more secure locations, yearly
 5 performance is generally volatile and largely attributable to single isolated events.
 6 Figures 15 and 16, below, show the impacts of foreign interference on Toronto Hydro’s
 7 distribution system.

8



9

Figure 15: Foreign Interference – Root Cause SAIFI

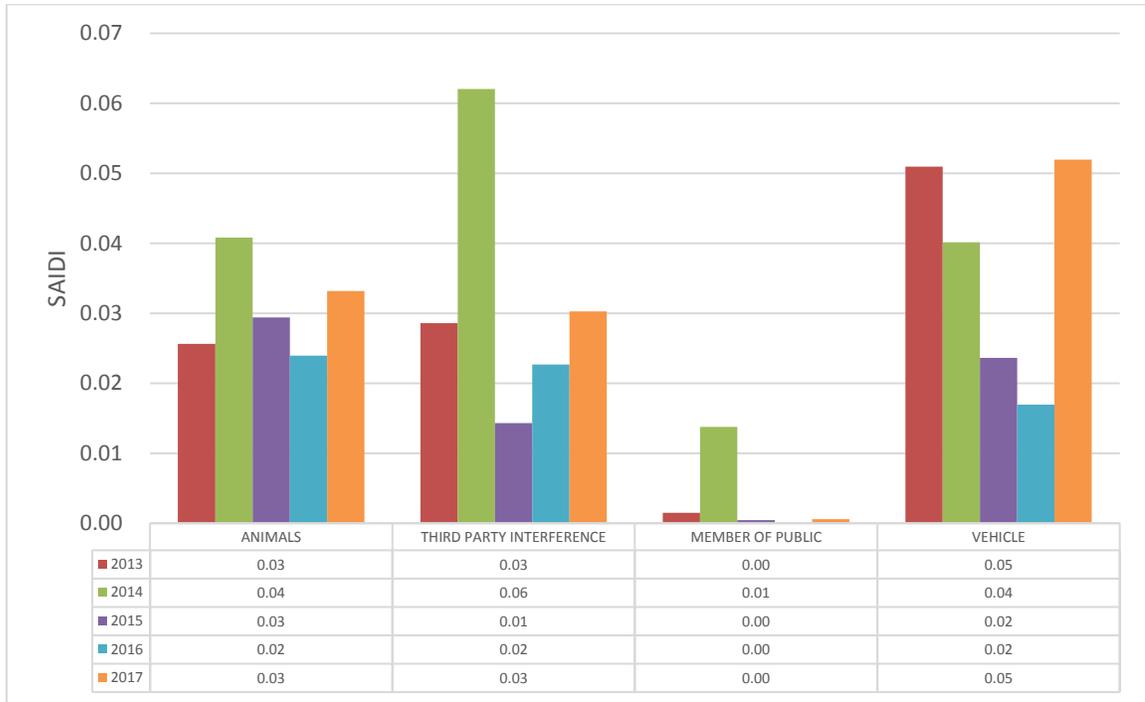


Figure 16: Foreign Interference – Root Cause SAIDI

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3 Of the four sub-categories of foreign interference shown in Figures 15 and 16, above,
 4 animal contact is one of the more “controllable” factors, in that Toronto Hydro is able to
 5 install reasonable measures to effectively mitigate this risk. More specifically, Toronto
 6 Hydro’s capital programs include installing new standard animal guards as part of
 7 overhead renewal programs (see the Overhead System Renewal program, Exhibit 2B,
 8 Section E6.5), and spot mitigation activity as part of the Worst Performing Feeder
 9 program (see the Reactive and Corrective Capital program Exhibit 2B, Section E6.7).
 10 These new standard animal guards eliminate a physical point of contact with live
 11 equipment and insulate all critical components.

12

13 The Third Party Interference category and dig-ins (where third parties such as other
 14 utilities have dug into the ground and interfered with Toronto Hydro’s equipment,

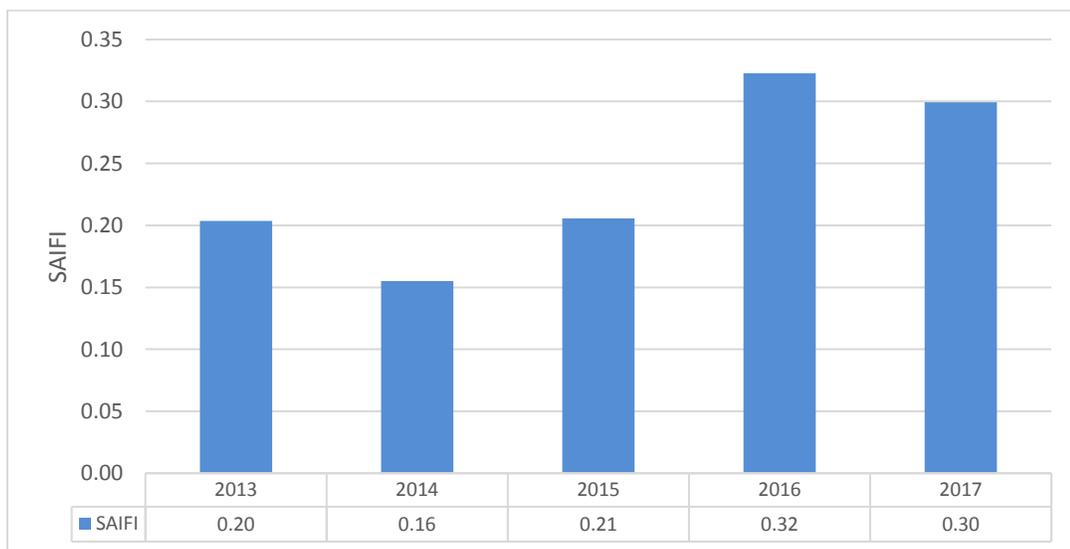
1 causing a fault) have continued to decline due to the removal of direct buried cables
 2 from the system. However, this improvement was offset in 2017 by increased foreign
 3 interference from contractors and other utilities. In general, the above-noted Foreign
 4 Interference categories are volatile and generally beyond Toronto Hydro’s control. For
 5 instance, 3 percent of SAIFI and 10 percent of SAIDI in 2017 were due to a single vehicle
 6 incident on April 3, 2017.

7

8 **9. UNKNOWN IMPACTS**

9 Unknown Impacts consist of outages that have no apparent cause, where power is
 10 restored by simply closing the breaker or replacing a fuse. As shown by Figures 17 and
 11 18, below, Unknown Impacts show some similarities to the trend of Weather Impacts
 12 over the past few years. However, as this category can encompass many different
 13 possible causes, there are unexplained variations as well. Although Toronto Hydro
 14 makes best efforts to investigate these events, it is not always possible to pinpoint the
 15 exact cause.

16



17

Figure 17: Unknown Impacts to SAIFI

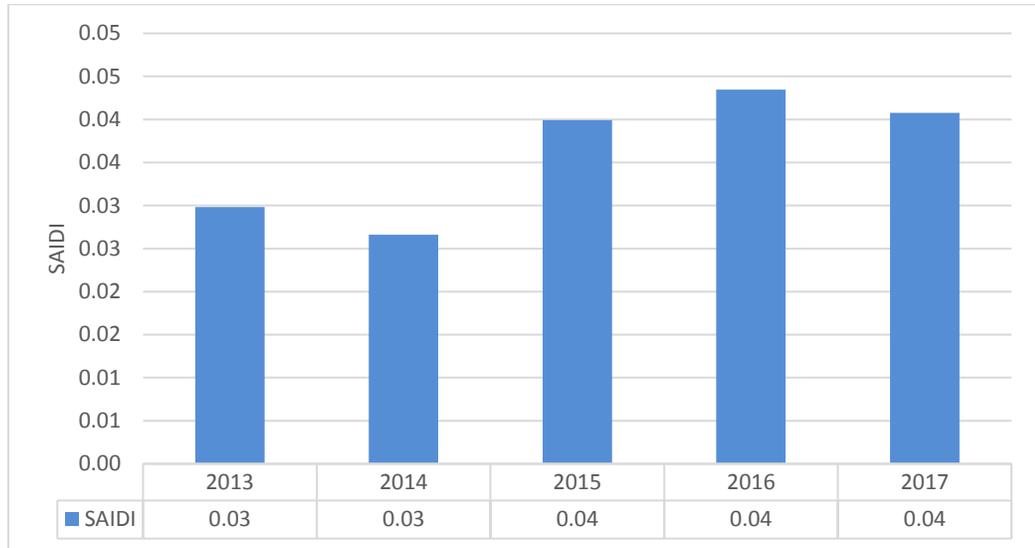


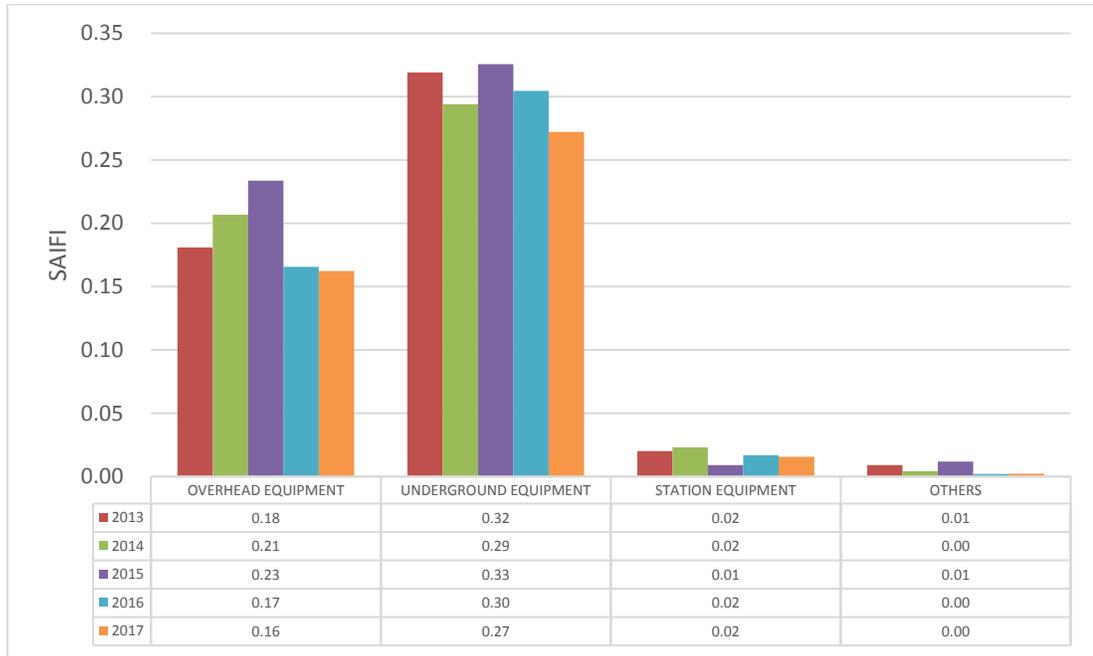
Figure 18: Unknown Impacts to SAIDI

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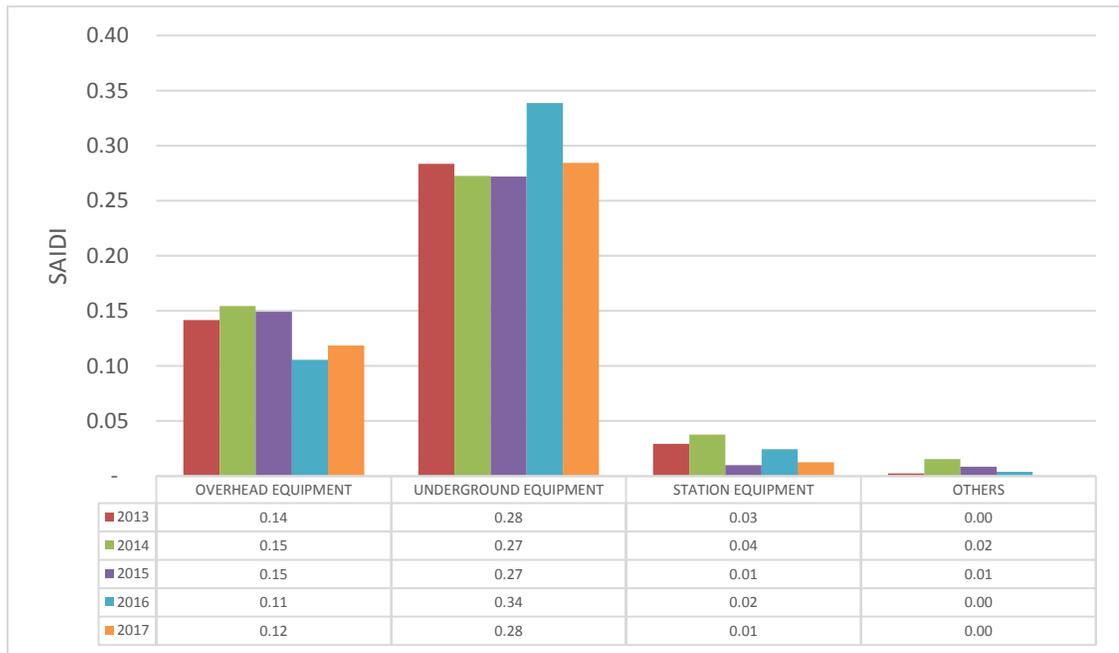
3 **9.1 Defective Equipment Impacts**

4 As shown in Figures 19 and 20, below, since 2013, the contribution of defective
5 equipment to Toronto Hydro's SAIFI and SAIDI has shown a slight improvement overall
6 in all categories.



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Figure 19: Defective Equipment SAIFI



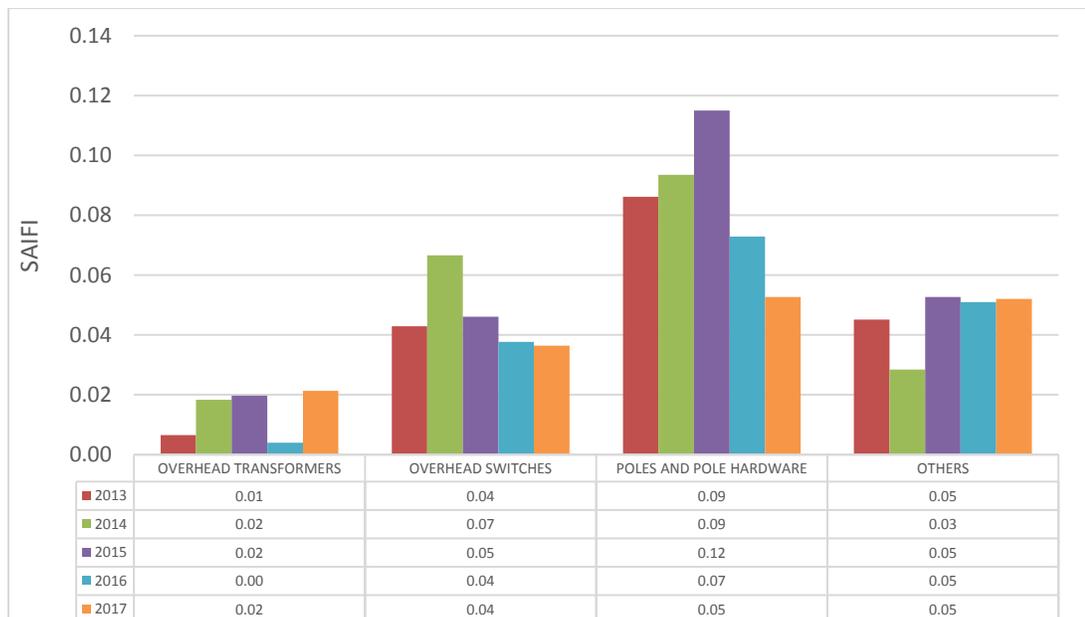
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Figure 20: Defective Equipment SAIDI

1 **9.2 Overhead Defective Equipment**

2 As shown by the Overhead Defective Equipment cause codes in Figures 21 and 22,
 3 below, the most significant SAIDI and SAIFI impacts since 2013 are attributable to pole
 4 and pole hardware failures as well as overhead switches. This is mainly due to the
 5 magnitude of these types of failures, which often disable large numbers of feeders.
 6

7 Overall, Toronto Hydro has experienced a stable or improving trend across most sub-
 8 categories under Overhead Defective Equipment. This is attributable to the investment
 9 work Toronto Hydro has undertaken in respect to overhead rebuilds and porcelain
 10 insulator replacements. Other programs such as Area Conversions (see Exhibit 2B,
 11 Section E6.1), which also renews and relocates overhead assets, have also contributed
 12 to the improvement of reliability performance on the overhead system. To sustain this
 13 trend, Toronto Hydro plans to continue this replacement program through the 2020-
 14 2024 plan period.
 15



16 **Figure 21: Defective Equipment SAIFI – Overhead**

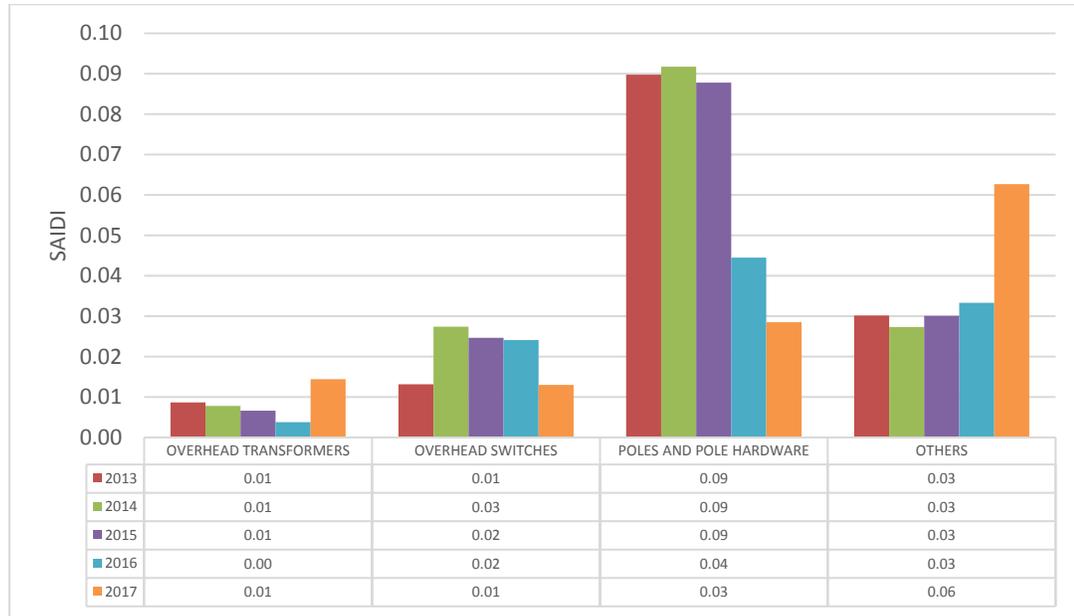
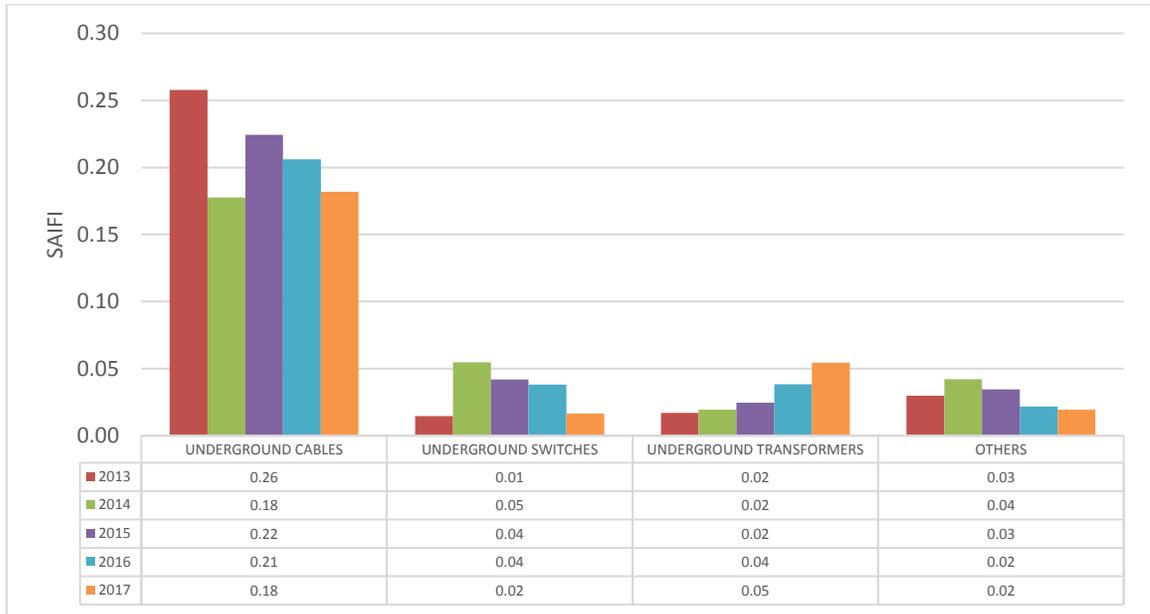


Figure 22: Defective Equipment SAIDI – Overhead

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10. UNDERGROUND DEFECTIVE EQUIPMENT

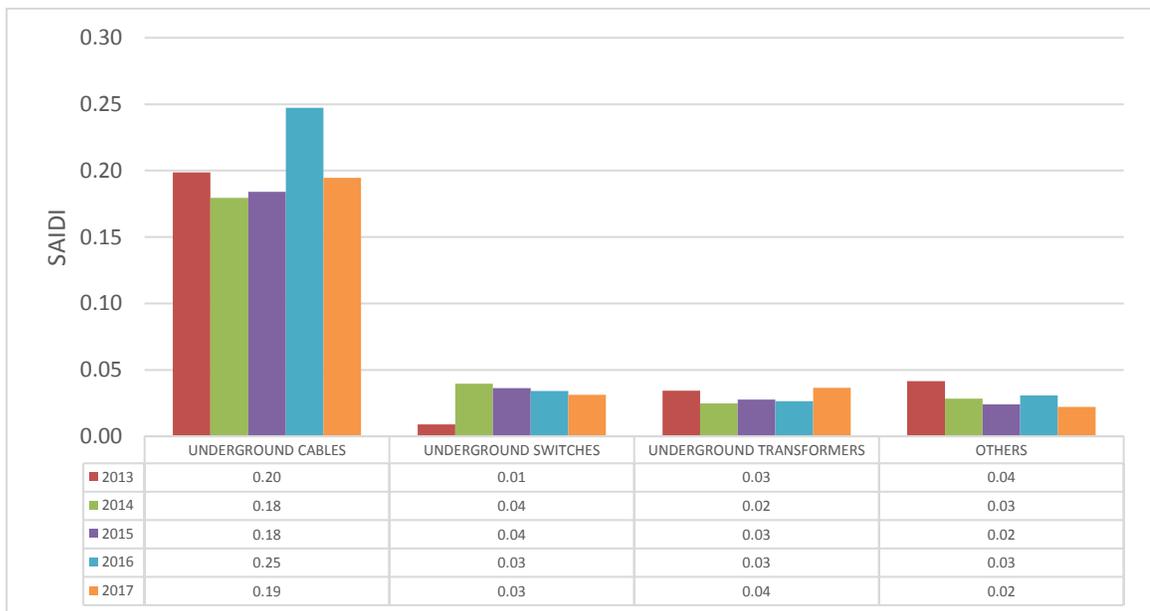
As shown by the Underground Defective Equipment cause codes in Figures 23 and 24, below, underground cable faults dominate both the SAIFI and SAIDI indices and are the biggest equipment-related causes of interruptions in Toronto Hydro’s system. The majority of these failures have been due to direct buried cables. Given the emphasis on replacing direct buried cables over the past few years, there has been a reduction in failures caused by these cables. Nevertheless, despite these efforts, the continued aging of the remaining direct buried cables and of other types of cables that are reaching end of life are offsetting improvements and resulting in a marginal improvement to overall underground cable failures and an overall stable trend to underground defective equipment. This supports the need to continue investment in replacing cables that are past useful life, as detailed in Underground System Renewal – Horseshoe program Exhibit 2B, Section E6.2.



1

Figure 23: Defective Equipment SAIFI – Underground

2



3

Figure 24: Defective Equipment SAIDI – Underground

**OEB Appendix 2-G
Service Reliability Indicators
2013 - 2017**

Index	SAIDI					SAIFI				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
Including all events	21.07	1.44	1.45	0.95	1.13	2.91	1.73	1.59	1.40	1.49
Excl. LoS	17.70	1.14	1.36	0.91	1.05	2.38	1.36	1.40	1.28	1.24
Excl. MED's	1.14	1.00	1.06	0.95	0.99	1.44	1.39	1.45	1.40	1.43
Excl. LoS and MED's	1.12	0.89	0.99	0.91	0.91	1.34	1.18	1.31	1.28	1.18
Excl. LoS, MED's & Sch. Outages	1.05	0.84	0.95	0.85	0.88	1.30	1.13	1.29	1.24	1.16

5 Year Historical Average SAIDI

5 Year Historical Average SAIFI

Including all events (1)	5.21	1.82
Excl. LoS (2)	4.43	1.53
Excl. MED's (3)	1.03	1.42
Excl. LoS and MED's (4)	0.96	1.26
Excl. LoS, MED's & Sch. Outages (5)	0.91	1.22

SAIDI = System Average Interruption Duration Index

SAIFI = System Average Interruption Frequency Index

(1) including all events

(2) excluding events related to Loss of Supply ("LoS")

(3) excluding events related to Major Event Days (MEDs)

(4) excluding Major Event Days ("MEDs") and LoS

(5) excluding MEDs, Loss of Supply, and Scheduled Outages

Indicator	OEB Minimum Standard	2013	2014	2015	2016	2017
Low Voltage Connections	90%	94.2	91.5	96.9	97.7	98.3
High Voltage Connections	90%	100.0	100.0	100.0	100.0	98.4
Micro-Embedded Generation Facilities	90%	100.0	100.0	100.0	100.0	92.4
Appointment Scheduling	90%	96.6	96.2	89.0	72.0	81.8
Appointments Met	90%	99.6	99.8	99.9	99.5	99.4
Rescheduling a Missed Appointment	100%	98.4	94.6	100.0	100.0	100.0
Telephone Accessibility	65%	82.0	71.9	76.8	64.7	77.9
Telephone Call Abandon Rate	10%	1.2	1.7	1.6	3.1	1.9
Written Response to Enquires	80%	98.9	85.8	97.5	93.1	99.0
Billing Accuracy	98%	n/a	96.6	97.5	98.9	99.2
Emergency Urban Response	80%	74.4	92.0	87.2	91.8	93.6
Emergency Rural Response	80%	n/a	n/a	n/a	n/a	n/a
Reconnection Performance Standard	85%	100.0	100.0	100.0	99.7	99.4

1 **CUSTOMER ENGAGEMENT**

2

3 **1. OVERVIEW**

4 Toronto Hydro undertook extensive Customer Engagement in connection with and as
5 part of the development of this CIR Application. Following the OEB's policy guidance,

6 Toronto Hydro developed a genuine understanding of its customers' needs and
7 preferences and analyzed and used the results of Engagement to inform its plans.

8 Toronto Hydro relies on both "Planning-specific" and "Ongoing" Customer Engagement
9 activities, as detailed in this Schedule.

10

11 **2. CUSTOMER ENGAGEMENT: POLICY GUIDANCE**

12 In conducting Customer Engagement, Toronto Hydro considered the Renewed
13 Regulatory Framework for Electricity Distributors ("RRF"), Chapter 5 of the Filing
14 Requirements for Electricity Distribution Rate Applications ("Filing Requirements"), the
15 Handbook for Utility Rate Applications, the EB-2014-0116 decision in respect of Toronto
16 Hydro's 2015-2019 rate application, and OEB decisions in other utilities' rate
17 applications.¹ A key theme of the OEB's guidance is that a utility's business plan be
18 informed by and responsive to customer needs and preferences. This requires an
19 expectation that the utility develop a genuine understanding of its customers' needs
20 and preferences, and is able to demonstrate how the development of its business plan
21 was informed by the results of Customer Engagement.

22

23 **3. PLANNING-SPECIFIC CUSTOMER ENGAGEMENT**

24 Toronto Hydro's Planning-specific Customer Engagement process was a multi-phased,
25 iterative process that equipped the utility with a genuine understanding of its

¹ For example, EB-2017-0024, Decision and Order.

1 customers' needs, preferences, and priorities so as to inform the utility's business plan.
2 The process spanned over 18 months, between late 2016 and mid-2018, and involved
3 over 10,000 Toronto Hydro customers of all sizes.

4

5 Toronto Hydro engaged Innovative Research Group ("Innovative"), a national consulting
6 firm with expertise in public opinion research (and experience in energy policy in
7 particular), to execute the utility's Planning-specific Customer Engagement. The
8 resulting final report (the "Innovative Report") can be found in Appendix A to this
9 Schedule.

10

11 Innovative executed the Planning-specific Customer Engagement in two phases. Phase
12 1 provided input into the development of the business plan, including the penultimate
13 Distribution System Plan ("DSP"). Phase 2 helped to refine the business plan, including
14 the final DSP.

15

16 **3.1 Phase 1**

17 Phase 1 of the Planning-specific Customer Engagement focused on assessing customer
18 needs and preferences in relation to outcomes relevant to Toronto Hydro's programs
19 and services. Phase 1 was conducted to generate a comprehensive view of customers'
20 priorities as a front-end input into Toronto Hydro's business plan.

21

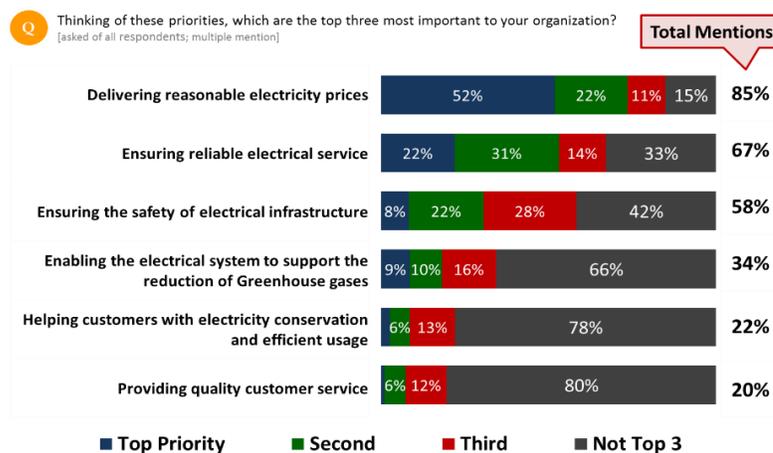
22 Innovative used a range of techniques to assess customers' needs and preferences.
23 Quantitative methods provided statistically valid results (e.g. surveys directed at
24 residential and small business customers). Qualitative methods provided constructive
25 context to supplement the statistical results (e.g. focus groups directed at residential,
26 small business and mid-market customers).

1 The Innovative Report discusses in detail the Phase 1 process and results. For example,
 2 initial focus group engagement identified six key customer priorities:

- 3 1) Delivering reasonable electricity prices;
- 4 2) Ensuring reliable electrical service;
- 5 3) Ensuring the safety of electrical infrastructure;
- 6 4) Providing quality customer service;
- 7 5) Helping customers with electricity conservation and efficient usage;
- 8 6) Enabling the electrical system to support the reduction of greenhouse gases.

9
 10 In the follow-up telephone survey, a majority of customers replied that each of these six
 11 priorities were either “important” or “extremely important.” When asked to rank them,
 12 low-volume customers prioritized “delivering reasonable electricity prices” first,
 13 followed by “ensuring reliable electrical service.” By comparison, large customers with
 14 average peak loads over 1 MW (“Key Accounts”) prioritized “ensuring electrical service”,
 15 ahead of “delivering reasonable electricity prices”.²

16



17

Figure 1: Low-volume Customer Priority Rankings, Phase 1.

² Innovative Report, Exhibit 1B, Tab 3, Schedule 1, Appendix A, Executive Summary pg. 11.

1 Considering the entirety of the Phase 1 results, Innovative concluded that “customer
2 and stakeholder feedback from Phase 1 can be summarized by the following key points:

- 3 1) Keeping distribution price increases as low as possible;
- 4 2) Maintaining long-term performance for customers experiencing average or
5 better service;
- 6 3) Improve service levels for customers experiencing below average service or who
7 have special reliability needs (e.g. hospitals); and
- 8 4) Balancing other customer priorities (e.g. customer service) with the need to
9 contain rate increases.”³

10

11 The timing of Phase 1 allowed Toronto Hydro to leverage the results in a number of
12 ways. It informed the development of the Outcomes Framework (see Exhibit 1B, Tab 2,
13 Schedule 1), which became the lens through which the utility assessed the value to
14 customers of its program expenditure proposals. It informed the strategic parameters
15 established for the business plan, which included an upper limit of 3.5 percent as a cap
16 on the average annual increase to base distribution rates (see Exhibit 1B, Tab 1,
17 Schedule 1). Consequently, Phase 1 results informed the development of the
18 penultimate business plan that was taken back to customers during Phase 2 (see Exhibit
19 1B, Tab 1, Schedule 1; Exhibit 2B, Section E2).

20

21 Innovative developed a high-level, two-page “Placemat” summary of the findings of its
22 work in support of Toronto Hydro’s Phase 1 Customer Engagement activities. The
23 Customer Engagement Placemat provided an easily accessible version of the key results
24 of Phase 1 Customer Engagement.

³ Ibid., pg. 5

1 **3.2 Phase 2**

2 Phase 2 provided additional insight about customers' needs and preferences prior to the
3 completion of the business plan. The purpose of Phase 2 was threefold:

- 4 • To confirm customer needs, preferences, and priorities identified in Phase 1;
- 5 • To solicit customer feedback on the content of Toronto Hydro's proposed plans
6 and the subsequent rate impact including customer preferences toward
7 particular capital programs where trade-offs on pacing existed; and
- 8 • To solicit customer feedback on Toronto Hydro's planning development process,
9 including the customer engagement process.

10

11 The Phase 2 approach involved two different methods: a workbook and surveys.

12 Innovative developed an online workbook to gather input from any interested
13 residential, small business, or mid-market customer. Toronto Hydro took a number of
14 steps to increase the visibility of the workbook, including: emailing over 200,000
15 residential and small business customers notifying them about the workbook;
16 advertising the workbook in the utility's electronic newsletter delivered to nearly
17 200,000 customers; and promoting the workbook through social media posts, which
18 made over 40,000 impressions (Twitter and Facebook).

19

20 Innovative developed surveys based on the feedback from the online workbook. A
21 randomly recruited telephone survey was executed for residential, small business and
22 mid-market customers, and an online survey was done to gather input from Key
23 Account customers. All Key Account customers were notified by email about the survey
24 and reminder emails were sent to encourage its completion. Details about both surveys
25 are provided in the Innovative Report.

1 Based on the results, Innovative concluded that customers' needs and preferences
2 identified in Phase 1 were consistent with customer feedback received in Phase 2.
3 Customers were also strongly supportive of the customer engagement process used to
4 collect and use customer needs and preferences.

5

6 Innovative further concluded that customers generally supported Toronto Hydro's
7 proposed plan, and that "majorities of residential, small business, mid-mark and key
8 account customers say [the utility] should stick with its proposed plan or do more."⁴
9 Innovative also found a range of customer support for the various investment pacing
10 trade-offs presented to customers. For example, a majority of customers favoured a
11 more limited involvement by Toronto Hydro in support of microgrids, in contrast to
12 strong support for increasing the pace of investments in monitoring and control
13 equipment and network units.

14

15 In response to the conclusion that customers generally supported the plan, Toronto
16 Hydro made only modest refinements to its plan. Given the particularly strong support
17 across customer classes for programs that address the risk of network vault floods and
18 fires (i.e. Network Unit Renewal and Network Condition Monitoring & Control), Toronto
19 made minor adjustments to the pace of these programs to address these issues at an
20 accelerated pace over the 2020-2024 period. Exhibit 2B, Section E2.3 discusses in detail
21 how Customer Engagement results are reflected in the 2020-2024 Capital Expenditure
22 Plan, including the final adjustments made in response to Phase 2 results.

⁴ Ibid. pg. 3.

1 3.2.1 *Continuous Improvement*

2 The Planning-specific Customer Engagement described in this evidence represents an
3 evolution in the process used in connection with Toronto Hydro's 2015 CIR Application
4 in a number of important ways. Phase 1 was introduced as an entirely new process and
5 purposefully sequenced to inform the development of the business plan.

6
7 The Phase 2 process was changed in a number of ways. Customers were provided
8 specific information about Toronto Hydro's planning process, how it solicited feedback
9 from customers, and information about Toronto Hydro's cost benchmarking
10 performance. The results of the Phase 1 engagement were summarized and customers
11 were again asked to rank priorities to evaluate if the needs and preferences that
12 informed the business plan had changed. Program-specific information, including
13 activities, outcomes, and bill impacts were shared in respect of trade-offs where
14 customer input was sought. And customers participating in the online workbook were
15 shown the estimated net bill impact of their trade-off choices and allowed to change
16 their responses if desired.

17

18 3.2.2 *Ongoing Customer Engagement*

19 Ongoing Customer Engagement occurs and informs decision-making at Toronto Hydro
20 through the range of interactions that are primarily intended to deliver valued customer
21 services.

22

23 Toronto Hydro's customer services, outlined in the Customer Care program (Exhibit 4A,
24 Tab 2, Schedule 14), respond to the needs of the utility's wide array of customers. The
25 utility serves a large and diverse base of approximately 768,000 customers, ranging from
26 individual residential consumers to large industrial and commercial businesses. Toronto

1 is home to Canada’s largest banks, stock exchange, major manufacturers, and other
2 large organizations sensitive to service interruptions. There are dozens of hospital,
3 healthcare and long-term care facilities and hundreds of schools, colleges, and
4 universities. Toronto Hydro also delivers electricity to the Provincial Legislature, City
5 Hall and a range of government offices and work centres. It also serves thousands of
6 high-rise multi-residential condominium and apartment buildings, which serve many
7 more customers behind a Toronto Hydro “bulk meter.”

8
9 Over time, interactions with all customers through various channels inform the utility’s
10 plans in a number of ways including the continuous improvement of its customer
11 services, as well as the development of its capital programs and execution of capital
12 work.

13

14 *3.2.3 Customer Services*

15 Toronto Hydro’s customer services continue to evolve with customer expectations, as
16 detailed in the following examples.

17

18 As noted in the Customer Care Program (see Exhibit 4A, Tab 2, Schedule 14), an
19 increasingly popular method of engagement continues to be Toronto Hydro’s
20 customized self-service portal (known as “MyTorontoHydro”). It offers automated
21 move-in/move-out capability, eBill and pre-authorized payment enrolment, and the
22 ability to view bill and payment histories. In addition, through the Independent
23 Electricity System Operator’s (“IESO”) residential conservation program, Toronto Hydro
24 expanded the functionality of its PowerLens portal to include a variety of electricity
25 management tools and educational information such as usage breakdowns, kWh
26 reduction goal setting, consumption and cost alerts, disaggregation charts, home

1 assessments, and customized tips and recommendations to reduce consumption. The
2 portal is available online or via mobile devices, further enhancing customer experience.
3 Additional offerings will continue to be incorporated based on customer research and
4 feedback to identify opportunities to bolster usage of the self-service portal. This
5 includes offering MyTorontoHydro account management services to commercial
6 customers, as well as expanding capabilities on PowerLens for electric vehicle usage.

7

8 Toronto Hydro's Contact Centre handles about 93,000 written inquiries and 527,000
9 telephone calls per year pertaining to inquiries about payment options, electricity
10 consumptions, collections, and a range of other topics. The Contact Centre is
11 responsible for many activities whose performance is tracked by the OEB in the Service
12 Quality Requirements (see Exhibit 1B, Tab 2, Schedule 3).

13

14 Toronto Hydro's Customer Experience function manages research and work that provide
15 insights to customers' views on current services, processes and communications, and
16 opportunities for continuous improvement.

17

18 Escalations and Special Investigations resolves customer concerns that require more
19 complex or lengthy analysis, and is closely connected to the Contact Centre, which
20 initiates over 320 requests. Over 300 other requests are commenced through the Office
21 of the President and the OEB. In 2017, Escalations and Special Investigations
22 successfully resolved 98 percent of escalated customer inquiries within ten business
23 days.

24

25 Communications and Public Relations is responsible for direct-to-customer and digital
26 communications, such as bill inserts, website and social media, and corporate

1 communications, such as news releases and reporting. Media are important conduits
2 between Toronto Hydro and its customers that purvey accurate and timely information
3 about power outages, electrical safety, consumer issues, and local investments. Media
4 relations play a particularly critical role during emergency outage situations when
5 customers are most likely to be looking for this information.

6

7 *3.2.4 Individual Capital Projects*

8 Feedback from customers received through Toronto Hydro's customer services can also
9 influence individual capital projects within a given DSP program, as detailed in the
10 following examples.

11

12 Through Community Relations and Customer Operations Communications ("COC"),
13 Toronto Hydro maintains a comprehensive approach for communicating information to
14 customers concerning planned capital work and planned outages, in order to provide a
15 better understanding around the capital project and prepare customers for work at or
16 near their properties. This engagement commonly takes the form of one-on-one
17 contact with customers, community town hall meetings, special information sessions,
18 and a variety of online content. A customer inquiry line and escalation process is
19 available to customers and, when needed, staff are dispatched on-site to liaise directly
20 with customers.

21

22 Engagement with Toronto Hydro customers is also a regular occurrence when work has
23 the potential to disrupt local neighbourhoods and property. Typically, there are three
24 rounds of notifications:⁵

⁵ Toronto Hydro's Key Accounts function works directly with Key Account customers to minimize disruptions to large businesses and institutional customers.

- 1 • General notification of construction work is given to all residents in an affected
- 2 area;
- 3 • Letters are provided to all customers that will have equipment, such as poles or
- 4 transformers, located on or adjacent to their property; and
- 5 • A pre-construction letter is issued approximately one week prior to work
- 6 commencing.

7

8 COC is responsible for providing these notifications and for addressing or escalating
9 customer concerns. For example, if customers are not satisfied with the scope or nature
10 of planned work, COC may investigate new design options or engage customers in-
11 person or at Toronto Hydro-initiated community meetings.

12

13 More intensive and incremental engagement is used in relation to rear-lot projects,
14 which can require significant work on Toronto Hydro's part to relocate electrical
15 infrastructure and remove legacy assets from private property. Before work begins,
16 Toronto Hydro proactively initiates an Open House in the community where work is
17 expected to take place. At that forum, Toronto Hydro provides an overview of the
18 scope and timelines of the work, an explanation of why the work is taking place and
19 contact information for customers who wish to follow up for more information. The
20 three-round notification process is then implemented. For more information about
21 Toronto Hydro's rear-lot investments, see the Area Conversions program in the DSP
22 (Exhibit 2B, Section E6.1).

23

24 In addition to COC, the Key Accounts function works proactively with large business and
25 institutional customers on matters such as planned outage notification and
26 coordination, Global Adjustment settlement notification, load profile and rates analysis

1 and power quality and energy management. It also responds to issues raised by Key
2 Account customers and acts as a liaison to expedite workable solutions.
3 Municipal Government Relations and the Office of the President handle over 1,500
4 issues per year in response to City councillor requests on citizens inquiries, most
5 commonly regarding street lighting, capital projects and power outage-related issues,
6 and routinely meet with City councillors and staff on ongoing and emerging issues.

7

8 *3.2.5 Capital Programs*

9 Ongoing customer engagement can also influence Toronto Hydro's capital investment
10 plans. Toronto Hydro's Worst Performing Feeder investment is an example of capital
11 work that emerged from a customer-centric analysis of the utility's reliability
12 performance that provided a better understanding of the customer experience as it
13 relates to reliability.⁶ This work is proposed to continue in 2020 to 2024 as part of the
14 Reactive and Corrective Capital Program. More information on Worst Performing
15 Feeders can be found in the DSP (Exhibit 2B, Sections D3, and E6.7).

16

17 Toronto Hydro's participation in Regional Planning is another channel of ongoing
18 engagement that informs the development of the capital plan. The Regional Planning
19 Process includes the Local Advisory Committee ("LAC"), led by the IESO. The IESO
20 invited the City of Toronto, First Nations, and Metis communities, stakeholders,
21 community groups, and the general public to provide input on the development of the
22 Regional Plan. In all, the Toronto LAC has 18 members. For more information about the
23 Regional Planning Process, see Section B of the DSP (Exhibit 2B). For more information
24 about how Regional Planning considerations influence Toronto Hydro's plans, see
25 Section E2.2.3.3 of the DSP.

⁶ EB-2011-0144. Exhibit D1, Tab 10, Schedule 3. p. 1.

1 Finally, Toronto Hydro's plans are responsive to the priorities of local government. An
2 example is *TransformTO*, which identifies how the City of Toronto plans to reduce
3 greenhouse gas emission and improve health, grow the economy and improve social
4 equity. Toronto Hydro plans to partner with the Toronto Transit Commission ("TTC") to
5 make improvements and additions to nearby distribution plant to support the
6 conversion of the TTC's bus fleet from diesel hybrid to electric. For more information on
7 Toronto Hydro's engagements with the City of Toronto, see Section D2.1 of the DSP.



CUSTOMER ENGAGEMENT

2020 CIR Application

June 15, 2018

Prepared for:

Toronto Hydro
14 Carlton Street
Toronto, Ontario M5B 1K5



Customer Engagement

2020 CIR Application

June 15, 2018

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.

Innovative Research Group Inc.

56 The Esplanade, Suite 310
Toronto, Ontario M5E 1A7
Tel: 416.642.6340
Fax: 416.640.5988
www.innovativeresearch.ca



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1. Introduction

Innovative Research Group Inc. (INNOVATIVE) was engaged by Toronto Hydro Electric-System Ltd. (Toronto Hydro or THESL) to help it design, execute and document the results of THESL's customer engagement process as part of the development of its Financial and Business Planning process and its 2020 to 2024 Custom Incentive Rate (CIR) Application, including its Distribution System Plan.

The Ontario Energy Board's (OEB) "consumer-centric" approach to rate applications contained in the *Renewed Regulatory Framework for Electricity (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 and actionable intelligence 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 THESL'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.

New customer engagement elements in this consultation included:

- Collecting customer input prior to Toronto Hydro's planning process for the CIR Application as well as in the final decision-making stage.
- Allowing customers participating in the online workbook to review the bill impact of their responses and to change those responses if desired.
- A more extensive effort to increase participation in the online exercise resulting in over 10,000 completed workbooks.
- Using examples of specific projects to identify customer preferences between bill impacts and customer-facing outcomes in a transparent fashion.
- The use of incentives in the phone survey to allow for a longer survey that might otherwise have been possible.

Other efforts to respond to comments regarding previous engagements are addressed later in this report.

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 (October 13, 2016)

Based on a review of the OEB handbook and previous decisions, the engagement focused on two types of questions: **needs** and **preferences**.

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.

As noted on the previous page, customer feedback related to THESL's proposed rate application was collected in two phases.

- **Phase I (2016-2017)** set out to identify customer needs and preferences as they relate to the outcomes that the utility should focus on and prioritize. While THESL has ongoing feedback on customer needs from its customer satisfaction work and had extensive input from customers on general trade-offs from both its IRRP and previous rate application consultations, it did not have any specific customer feedback on preferences related to outcomes. Given the priority placed on identifying customer preferences in the Handbook, the key priority for the first round was to develop a list of customer outcomes and to identify customer priorities among those outcomes for the THESL planning process. Customer feedback obtained in this phase helped inform Toronto Hydro's business planning, including the penultimate DSP.
- **Phase II (2017-18)** re-engaged with customers to confirm customer needs and preferences as they relate to outcomes in Phase I. With THESL planning now well advanced, this round of engagement was able to solicit customer feedback on THESL's proposed plans, and explore trade-offs in relation to specific programs and the associated bill impacts, as well as the pacing and prioritization of investments. Customers were able to look at the cumulative bill impact of their choices and adjust them as needed.

This report summarizes the findings from THESL's iterative CIR customer engagement program conducted over a two year period, between 2016 and 2018.

2. Executive Summary

The customer engagement as part of this Application took a two phased approach to identify customer needs and preferences. The first phase focused on identifying the outcomes THESL customer value and priorities among those outcomes. The second phase focused on generating feedback on Toronto Hydro's proposed plans.

While customer engagement continues to be an ongoing process, the engagement as part of this Application found the following:

Toronto Hydro is generally seen to be meeting the needs of most customers effectively.

THESL customers are generally satisfied with the services they receive. When customers are asked how THESL can improve its service, most customers either have no suggestions or are looking for lower rates.

Price and reliability dominate as customers' top outcome priorities.

Customers consistently, across rate classes value price and reliability above other priorities, with price constantly at the top priority for non-large use customers.

Customers generally support THESL's propose plan.

After reviewing the key choices in THESL's plan, majorities of residential, small business, mid-market and key account customers say THESL should stick with its proposed plan or do more. Even the most economically vulnerable customers support the plan.

While customers began reviewing Toronto Hydro's plan skeptically, they were strongly supportive of programs aimed to improve parts of the system experiencing below average performance or where spending more now can avoid greater disruption and higher costs in the future.

Customers are less supportive of innovation. They support investments in control equipment that would improve performance but do not support paying more for increased storage and microgrids.

2.1 Phase I Customer Engagement

The first phase of THESL's customer engagement dedicated to this application took place at the beginning of the planning process. The goal of this phase was to provide THESL with input on customer needs and preferences at the start of the planning process.

At that time, the OEB had just released the *Handbook for Utility Rate Applications* with a clear focus on outcomes. THESL's existing work had explored needs and a wide variety of trade-offs but had not explicitly addressed outcomes. Phase I focused on filling that gap by developing a list of outcomes important to customers and then establishing customer priorities among those outcomes. As part of that exercise, information on customer needs was also updated.

2.1.1 Understanding Customer Needs and Preferred Outcomes

To identify customer needs and preferences, INNOVATIVE conducted a series of customer engagements, designed to help uncover priorities for the utility that customers' value and their relative importance against each other.

Before engaging directly with THESL customers, INNOVATIVE and THESL discussed existing research related to customer needs, preferences and outcomes to understand the potential issues THESL customer care about and what they want and need from their utility.

Building on previous research, INNOVATIVE conducted exploratory focus groups to better understand and identify the outcomes that THESL customers' value, and the criteria they use to measure successful delivery of these outcomes. The focus groups included mapping the customer journey, expectations of THESL today and in the future as a way of uncovering outcomes and measurement criteria.

Based on customer feedback from the focus groups, a series of outcomes were developed and evaluated through a representative low-volume customer survey. The survey was designed to assess the importance of identified outcomes and rank them by relative importance.

In addition to a low-volume customer survey, INNOVATIVE also surveyed Key Account customers to better understand how THESL could deliver valued services and set outcomes among competing priorities.

This section of the report details the iterative research process of identifying and ultimately quantifying the THESL outcomes as valued and prioritized by its customers.

Phase I Customer Engagement Summary

	Methodology	Dates	Quantity	
Qualitative Research				
Residential	Focus Groups	Dec. 5 & 6, 2016	2 groups	
Small Business (GS < 50 kW)	Focus Groups	Dec. 5 & 6, 2016	2 groups	
Mid-Market (GS > 50 kW)	Focus Groups	Feb. 28 – Mar. 1, 2017	4 groups	
Stakeholders (NGOs, Industry Associations)	In-depth Interviews	June 12-30, 2017	10 interviews	
	Methodology	Field Dates	Targeted Sample Size	Final Completes
Low-Volume Telephone Survey				
Residential	Telephone	Dec. 7-14, 2016	n=400	n=416
Small Business (GS < 50 kW)			n=200	n=211
Total Low-Volume Customer Completes			n=600	n=627
Key Accounts				
Large Use Customers (2MW+)	Online	Feb. 23 – Mar. 24, 2017	N/A	n=63

Summary of Customer Priorities

Priorities	Residential*	GS < 50 kW*	GS > 50 kW**	Key Accounts ^β
1st	Prices	Prices	Price	Reliability
2nd	Reliability	Reliability	Reliability	Price
3rd	Safety	Safety	ETOR / Communications	Environmental Risk Mitigation (Reliability)

* Feedback from **residential** and **GS < 50 kW** customers obtained through both focus groups and telephone surveys.

** Feedback from **GS > 50 kW** customers obtained through focus groups.

^β Feedback from **Key Account** customers obtained through an online survey.

Customer and stakeholder feedback from Phase I can be summarized by the following key points:

1. Keeping distribution price increases as low as possible;
2. Maintaining long-term performance for customers experiencing average or better service;
3. Improve service levels for customers experiencing below average service or who have special reliability needs (e.g. hospitals); and,
4. Balancing other customer priorities (e.g. customer service) with the need to contain rate increases.

Phase I customer feedback informed THESL's business planning, including the penultimate DSP. THESL's plans were later refined based on feedback from the Phase II customer engagement.

An overview of customer priorities can be found below in the ***Phase I: Toronto Hydro Customer Priorities*** table. At the conclusion of Phase I, INNOVATIVE provided a two-page summary with the overview table and the key results of the low volume and Key Accounts surveys for reference

Phase I: Toronto Hydro Customer Priorities

PRIORITIES	Residential & GS <50 KW	GS >50 KW	Key Accounts (Large Users)	Stakeholder Groups (Key Issues)
Price	HIGH (1st Priority) <ul style="list-style-type: none"> Containing price increases is the top priority for most residential and small business customers. Increasing rates must be justified (i.e. there is a clear need and ratepayers dollars will be spent efficiently). 	HIGH (1st Priority) <ul style="list-style-type: none"> Containing price and providing short-term rate predictability is the top priority. 	HIGH (2nd Priority) <ul style="list-style-type: none"> Prioritizing reliability over price is of high importance (i.e. cost of power interruptions outweighs the cost of rate increases). 	Housing & Social Services <ul style="list-style-type: none"> Reliability outweighs cost Quality and consistency of power is a key need Incentive programs need to be more accessible and may not be targeted at greatest returns Conservation efforts constrained by bulk meter buildings Building renewal and retrofitting are priorities
Reliability	HIGH (2nd Priority) <ul style="list-style-type: none"> Maintaining current “good” level of reliability is a key priority. 	HIGH (2nd Priority) <ul style="list-style-type: none"> Maintaining current level of reliability is a key priority for this group of customers. Providing outage communications and responsive service is valued more highly among this rate class (than others). 	HIGH (1st and 3rd Priority) <ul style="list-style-type: none"> #1 Maintaining reliability (including power quality) is the top priority. #3 Implementing strategies to mitigate outages caused by extreme weather is a top 3 priority. 	Large Commercial <ul style="list-style-type: none"> Reliability is needed 24/7 Reliability is a competitive advantage System resilience is a concern Cybersecurity is a priority Behind the meter innovation is a need Cost is <u>not</u> a significant factor
Safety	HIGH (3rd Priority) <ul style="list-style-type: none"> Setting public safety as a top priority is assumed and expected. 	<ul style="list-style-type: none"> Setting public safety as a top priority is assumed and expected. 	<ul style="list-style-type: none"> Setting public safety as a top priority is expected. 	Small Commercial <ul style="list-style-type: none"> Reliability is needed 24/7 Customer service is the key need – lampposts, local development, outages Cost is primarily a concern among local, micro businesses
Customer Service	<ul style="list-style-type: none"> Provide accurate ETOR, proactive information on CDM programs and energy management. Provide tools to make billing, account management, and usage information easily accessible. 	HIGH (3rd Priority) <ul style="list-style-type: none"> Providing accurate ETOR and proactive communications is a key priority. Enhance customer service to match emerging technological capabilities and needs (e.g. allow customers to get bills by emails, create master accounts to manage multiple bills). 	<ul style="list-style-type: none"> Maintaining current “very good” levels is expected. Helping customers take advantage of CDM programs is seen as a valued priority. 	Small / Mid-sized Manufacturing <ul style="list-style-type: none"> Cost is a significant factor Reliability seen as less of a concern ICI program ineligible Global adjustment is a friction point, impairs budgeting
Public Policy Response	<ul style="list-style-type: none"> Incentivize adoption of innovative technologies that enable conservation and consumption management. 	<ul style="list-style-type: none"> Pursue value-for-money investments where long-term cost savings can be realized (e.g. spend now to save later). Avoid premature investments in unproven or untested technologies that impact customer rates. 	<ul style="list-style-type: none"> Investing in technology that helps customers save money is valued. 	
Environmental	<ul style="list-style-type: none"> Make programs combatting climate change known to customers. Show customers how such programs impact their bills. 	<ul style="list-style-type: none"> Maintain equipment and infrastructure in adverse weather. 	<ul style="list-style-type: none"> Actualize other priorities, before focusing on environmental concerns. 	
Methodology ▶▶	Quantitative and Qualitative	Qualitative	Quantitative	Qualitative

Source: Innovative Research Group (Customer Research - December 2016, March 2017, June 2017)

2.1.2 Customer Outcomes Priorities by Rate Class

Low-Volume Customer Priorities

Through the focus groups with residential and GS < 50kW customers conducted on December 5 and 6, 2016, a list of six key customer outcomes were identified:

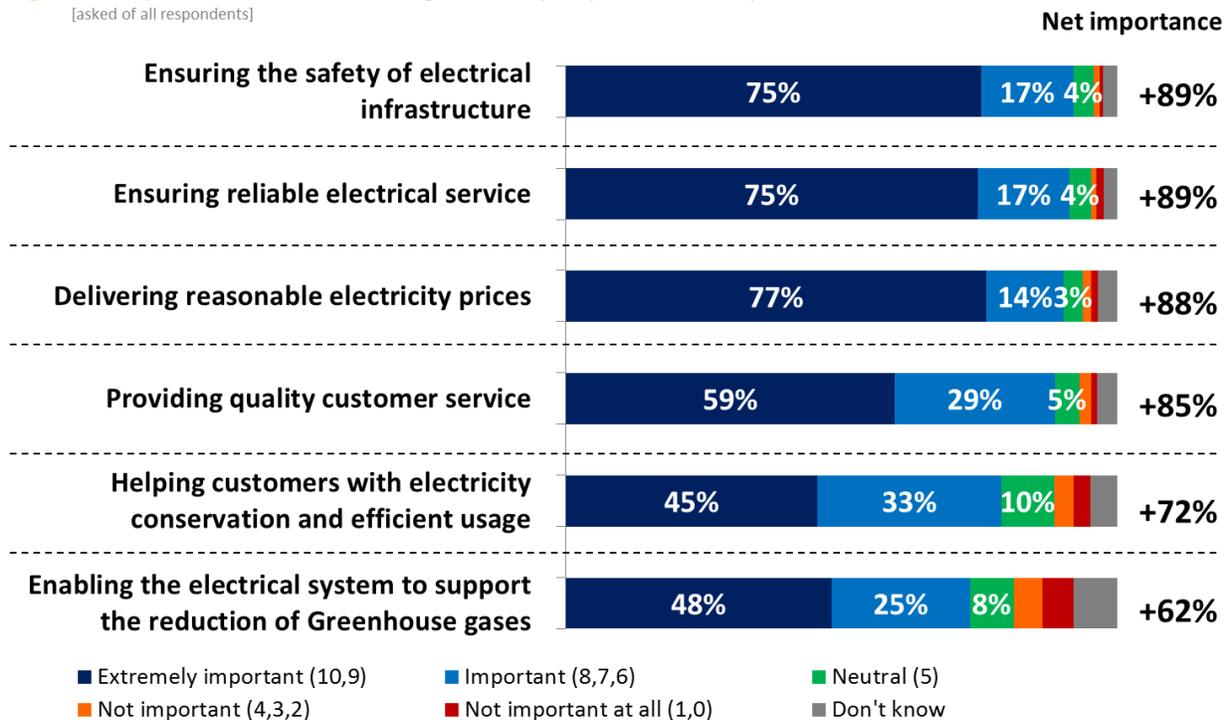
1. Delivering reasonable electricity prices
2. Ensuring reliable electrical service
3. Ensuring the safety of electrical infrastructure
4. Providing quality customer service
5. Helping customers with electricity conservation and efficient usage
6. Enabling the electrical system to support the reduction of Greenhouse gases

In a follow-up telephone survey of n=627 low-volume THESL customers (conducted December 7-14, 2016), respondents were asked to assess the importance of each priority.

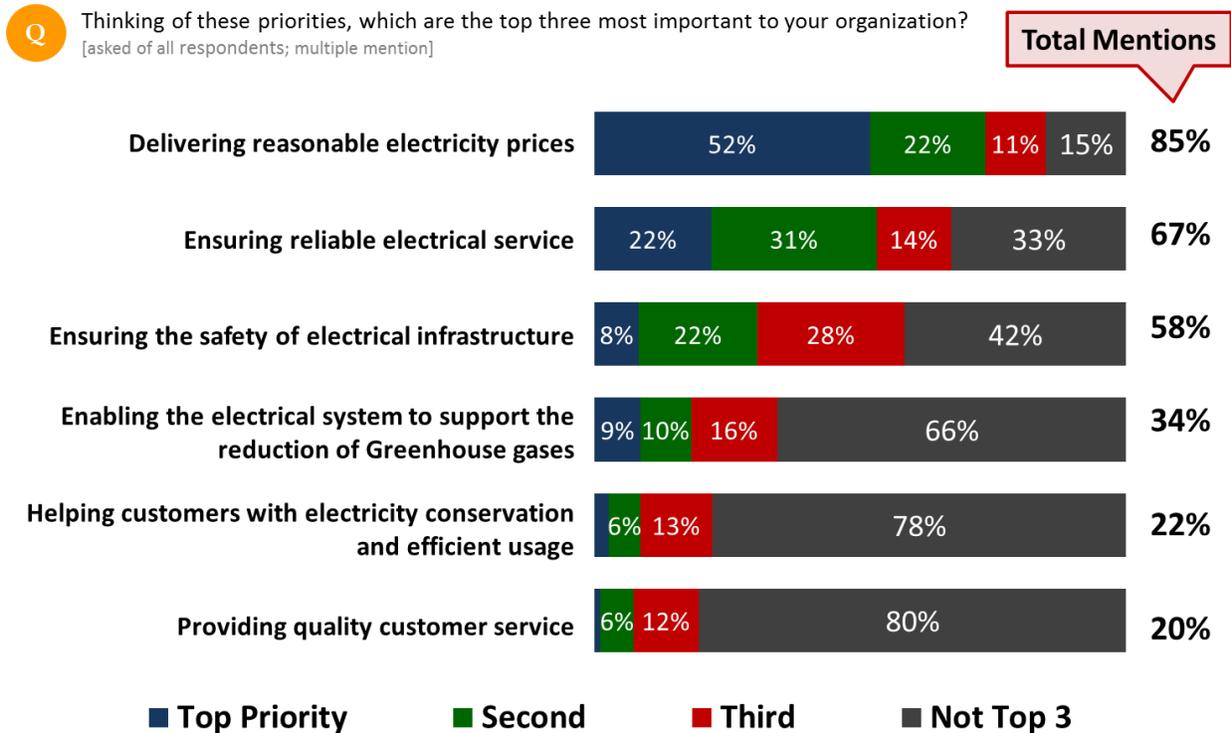
Similar to what was observed in the previous focus group research, *safety, reliability, and price* are seen as equally important to low-volume customers.



Using a scale from 0 to 10, where 0 means not important at all and 10 means extremely important, please tell me how important each of the following Toronto Hydro priorities are to you as a customer?
[asked of all respondents]



Customers were then asked to rank outcomes in order to help THESL understand which of the most important outcomes to give priority to when those outcomes conflict. *Delivering reasonable electricity price* clearly emerges as the top priority valued by low-volume customers, followed by *reliability*, and then *safety*.



Mid-Market Customer Outcome Priorities

INNOVATIVE conducted a total of four focus groups over two nights, among GS > 50 kW customers on February 28 and March 1, 2017. All focus groups were held in North York. Respondents were randomly recruited from a THESL provided list of approximately 6,000 GS > 50 kW customers.

From the focus groups, the following common priorities were identified:

1. **Customer Service:** Overall, customer service is seen as excellent with the exception to specific incidents where base observations are noted. Generally, maintaining the current level of customer services was seen as a priority for THESL.
2. **Reliability and Outage Communications:** Power reliability is seen as good, but more importantly Toronto Hydro's responsiveness and communications were seen as key business needs. Maintaining the current level of reliability appears to be a priority among this rate class.
3. **Bill Impact:** Cost was an overarching concern, but not specifically directed at Toronto Hydro. The more participants learned about Toronto Hydro, its plans and its place in the electricity system, the less concern participants appeared to be regarding Toronto Hydro's impact on their bill.
4. **Future Rates:** While learning more about Toronto Hydro reduced concern about price, participants still give high priority to cost containment and short-term rate predictability. Even

with that concern about bill impacts, this rate class appears to be willing to accept “reasonable” rate increases based on a value proposition that included the following definitions:

- a) Maintaining current reliability (not necessarily enhancing reliability);
- b) Investing prudently, where long-term cost savings are realized (spend more now to save even more later);
- c) No premature investing in unproven or untested technologies;
- d) Enhanced customer service to match emerging technological capabilities and needs (e.g. allow customers to get bills by emails, create master accounts to manage multiple bills, live assistance chat features); and
- e) Investing in education and promotion of CDM as a means for individual cost savings and also as a route to mitigating future demand and reliability challenges.

Key Account Customer Outcome Priorities

These are the findings from an INNOVATIVE online survey conducted among Key Account customers between February 23 and March 24, 2017.

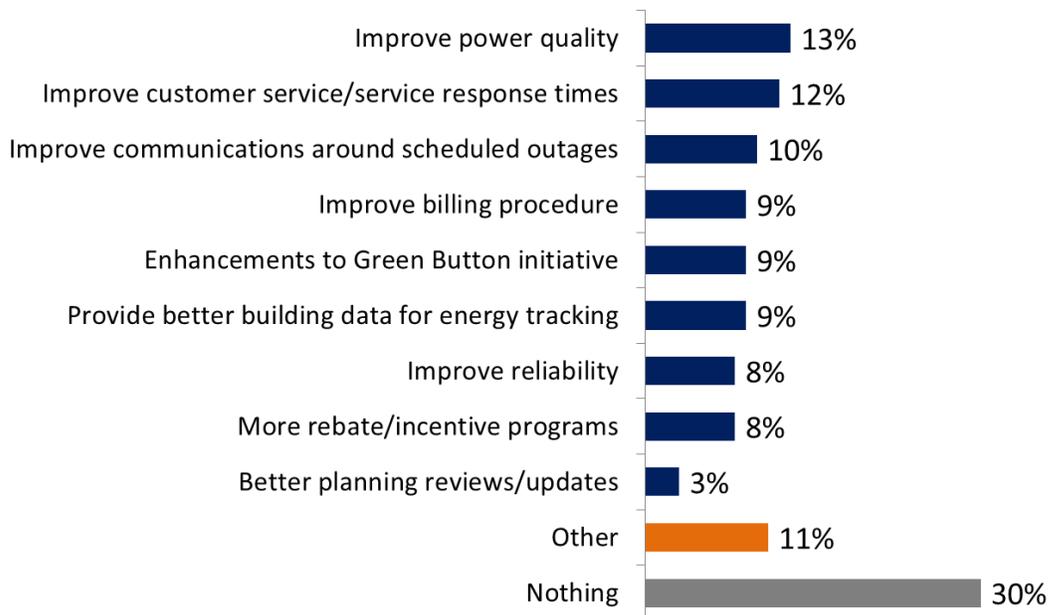
Toronto Hydro provided INNOVATIVE with an email contact list consisting of the prime contact for each of its 275 Key Account customers. INNOVATIVE provided each Key Account contact with a unique URL via an email invitation so that only customers identified by Toronto Hydro were able to complete the survey and complete the survey only once.

The analysis of this survey is based on 63 eligible responses from Toronto Hydro’s Key Account customers.

When asked what THESL could do to improve service, a plurality (30%) suggested nothing; followed by power quality and improved service response times.



Is there anything in particular that **Toronto Hydro** can do to improve its services to your organization?
[OPEN-ENDED; multiple mention, asked of all respondents; n=63]



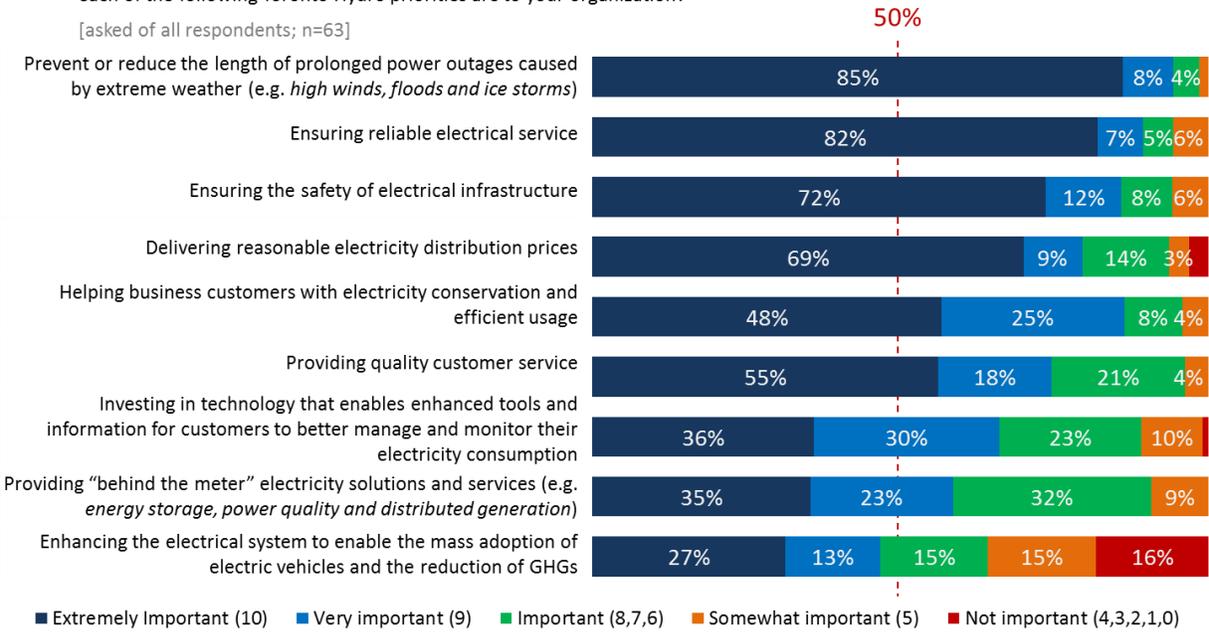
As with lower volume customers, Key Accounts were asked to rate and rank a list of outcomes. Several categories were added to the Key Account list based on an initial review of previous Key Account engagements with THESL staff.

Similar to other rate classes, *safety*, *reliability*, and *price* are most important to customers. System hardening, an additional category unique to this survey, is the topped ranked priorities among Key Accounts (this priority did not come up in qualitative discussions with other rate classes).

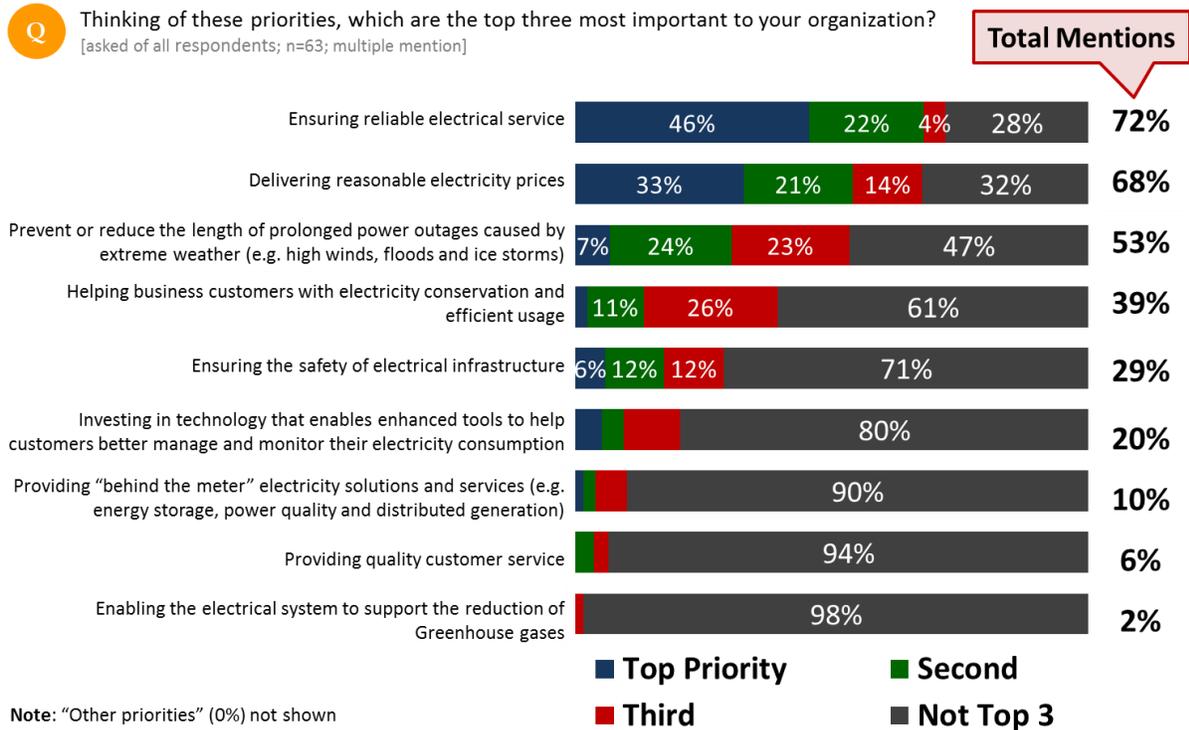


Toronto Hydro regularly holds discussions with its customers to better understand how it should set spending priorities with ratepayer dollars. In recent conversations with customers, a number of company goals were identified as priorities for Toronto Hydro. Using a scale from 0 to 10, where 0 means not important at all and 10 means extremely important, please indicate how important each of the following Toronto Hydro priorities are to your organization?

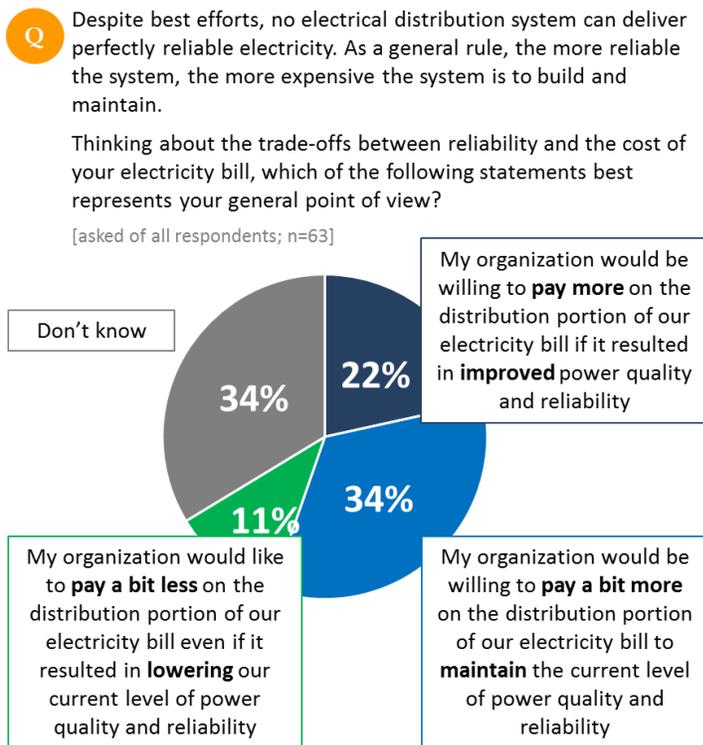
[asked of all respondents; n=63]



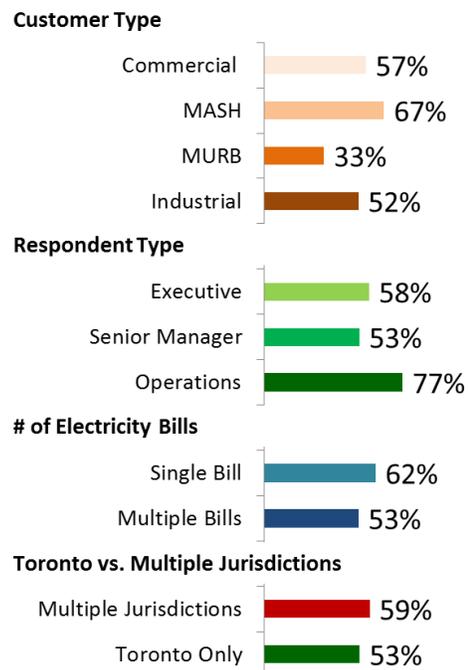
Looking at the top priority (first mention), *reliability* appears to be more important than *price* to this rate class (although price is a close second in priority rankings).



A majority of Key Account customers (56%) say they are willing to pay more to maintain or improve system reliability.



Segmentation ▶▶
"Pay More" to either *improve* or *maintain*:



Stakeholder Outcomes Preferences

INNOVATIVE conducted nine in-depth interviews with industry and social stakeholders between June 12 and 30, 2017. Interviews and dyads were semi-structured based around key themes. Specific and topical probes were employed throughout. All interviews and dyads were held at participant organization offices across Toronto.

The in-depth stakeholder interviews revealed a number of common themes.

- 1) **Reliability:** Industry associations held reliability, by far, their overreaching top priority.
- 2) **Social Outcomes:** Social organizations also held reliability as top priority, but also held social outcomes as a key priority (e.g. community renewal, sustainable living).
- 3) **Price:** Mid-sized manufacturing association held price above all else, far above reliability. Specifically, this stakeholder was seeking a price reductions as opposed to price stabilization.
- 4) **Price Predictability:** Most industry and social organizations favour price stabilization and predictability over absolute reductions (e.g. reasonable price increase are accepted by this group of stakeholders). The biggest concern with the price of electricity is not distribution rates, but rather the global adjustment that has been unpredictable over the past decade.
- 5) **Risk Mitigation:** Resilience of infrastructure – defined as an ability of withstand adverse events which may be physical or virtual – appears to be a key priority for almost all stakeholder groups.
- 6) **Socio-economic Outcomes:** Every group, in varying ways, cited socio-economic outcomes as an increasing priority (e.g. impact poverty, employment, cost of living, quality of life, economic competitiveness, etc.).
- 7) **Incentive Programs:** Better target incentives where there is the greatest long-term benefits. Make it easier to access incentives.
- 8) **Other:** Specific one-off instances of interaction points of service friction with Toronto Hydro (e.g. vaults, sub-metering, inconsistent power quality, collaboration and communications on development projects, lampposts).

2.2 Phase II Customer Engagement

In 2017, THESL planners used customer and stakeholder feedback, collected throughout the Phase I customer engagement program, to help align the 2020 CIR DSP and operational programs with customer expectations.

Phase II of the engagement took place in the spring of 2018 and focused on three goals:

- confirming the customer needs, preferences and priorities identified in Phase I;
- soliciting customer feedback on the content of its proposed plans and subsequent rate impact including customer preferences towards particular capital projects where trade-offs on pricing exist,
- soliciting customer feedback on THESL’s planning development process, including the customer engagement process.

INNOVATIVE worked with THESL staff to translate the penultimate business plan and DSP into consultation materials that a typical customer could understand. Consultation materials were designed to provide meaningful feedback.

The following section summarizes customer feedback from an online feedback portal among low-volume customers, telephone surveys among low-volume and mid-market customers, and an online survey among Key Account customers.

Phase II Customer Engagement Summary

	Methodology	Field Dates	Targeted Sample Size	Final Completes
Online Feedback Portal				
Residential	Online	April 26 – May 28, 2018	N/A	n=10,165
Small Business (GS < 50 kW)			N/A	n=181
Total Online Feedback Portal Completes			N/A	n=10,346
Surveys				
Residential	Telephone	May 1 – 10, 2018	n=600	n=600
Small Business (GS < 50 kW)	Telephone	May 2 – 14, 2018	n=200	n=215
Mid-Market (GS > 50 kW)	Telephone	May 3 – 11, 2018	n=200	n=202
Key Accounts	Online	June 7 – 15, 2018	N/A	n=XX

2.2.1 Customer Needs

A strong majority of Toronto Hydro customers are both familiar with the utility and satisfied with the services they receive. When asked if there is anything in particular that Toronto Hydro could do to improve services, customers respond with either “nothing” or “reduce the price” – this is consistent with all rate classes.

Customer Needs	Telephone Surveys		
	Residential	Small Business	Mid-Market
Familiarity with Toronto Hydro			
Familiar	84%	81%	87%
Not familiar	11%	13%	10%
Satisfaction with Services			
Satisfied	74%	79%	78%
Dissatisfied	12%	8%	7%
Suggestions for Improved Services			
None	34%	41%	28%
"Reduce the price"	32%	31%	30%

A key part of the engagement is to ensure all participants have a basic understanding of key facts about Toronto Hydro and its role in Ontario's electricity system. Following that background information, INNOVATIVE asked customers about familiarity with both the amount of their bill that is remitted to Toronto Hydro, as well as the OEB. Familiarity with both measures is quite low, and it is observed that a majority of customers have no level of awareness regarding the OEB.

Familiarity with Electricity System	Telephone Surveys		
	Residential	Small Business	Mid-Market
Familiarity with Amount of Bill Retained by Toronto Hydro			
Familiar	35%	26%	30%
Not familiar	62%	64%	63%
Familiarity with Ontario Energy Board			
Familiar	45%	33%	43%
Not familiar	54%	62%	54%

2.2.2 Re-confirming Customer Outcome Priorities

Using the customer priorities identified in Phase 1 of the consultation, in Phase 2, customers were again asked to rank which priority was most important to them personally, or their organization. Consistent with Phase 1, it was found that customers prioritize price and reliability above all else. Ensuring the safety of electricity infrastructure was also consistently seen as an important priority that Toronto Hydro should focus on.

Customer Priorities	Residential		Small Business		Mid-Market	
	Phase 1 (July 2017)	Phase 2 (May 2018)	Phase 1 (July 2017)	Phase 2 (May 2018)	Phase 1 (July 2017) [†]	Phase 2 (May 2018)
1st	Prices	Prices*	Prices	Prices*	Prices	Prices*
2nd	Reliability	Reliability**	Reliability	Reliability**	Reliability	Reliability**
3rd	Safety	Safety***	Safety	Safety***	ETOR / Communications	Safety***

* Delivering reasonable electricity prices

** Ensuring reliable electricity service

*** Ensuring the safety of electricity infrastructure

[†] In Phase 1, Mid-Market customer views were gathered through qualitative focus group research.

Beyond the six customer priority outcomes identified in Phase 1 and further probed in Phase 2, a strong majority of customers did not identify any missing outcomes that Toronto Hydro should be focusing on. Furthermore, when asked if Toronto Hydro’s Customer Engagement process seemed like a good way or poor way of bringing customer needs and preferences into the Plan, a clear majority feel that it is the *right way*.

Feedback on Customer Engagement Process	Telephone Surveys		
	Residential	Small Business	Mid-Market
Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into Toronto Hydro’s plan?			
Good way	73%	74%	85%
Poor way	20%	15%	11%
Don’t know	6%	12%	4%

2.2.3 Planning Principles and Rate Impacts

Before exploring individual programs and their potential customer benefits and outcomes, customers were asked to respond to Toronto Hydro’s general approach.

In the telephone surveys, customers received the preamble below, which had customized rate impacts based on rate class. The following reflects the residential rate class preamble.

“Based, in part, on the initial customer input, Toronto Hydro has drafted a plan totaling approximately \$4.3B over five years.

Toronto Hydro’s proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

This proposed plan translates into an average 3.4% increase in your distribution rates each year from 2020 to 2024. The distribution charges on the monthly bill would increase to \$49 by 2024 for a typical residential customer.”

Rate Class	Proposed Annual Rate Increase (2020 to 2024)
Residential	3.4%
Small Business	4.4%
Mid-Market	3.9%

Proposed 2020 – 2024 Rate Impacts (%)

In the absence of a discussion of specific benefits for customers, a plurality of participants felt this general approach to be the *wrong approach*.

Approach to Planning for the Next Five Years	Telephone Surveys		
	Residential	Small Business	Mid-Market
Do you feel that this is definitely the right approach, probably the right approach, probably the wrong approach or definitely the wrong approach to Toronto Hydro’s planning for the next five years or would you say you don’t know?			
Right Approach	37%	28%	31%
Wrong Approach	44%	46%	37%
Don’t know	19%	26%	32%

While this is the only trade-off question where respondents appear to place price concerns above the maintenance of reliability and targeted improvements, it highlights the general concern about delivering reasonable electricity prices seen in the outcome section. As customers became more engaged in discussing more detailed trade-offs, their responses favoured the other outcomes over bill impacts.

2.2.4 Addressing Safety and Reliability

Customers were asked to provide feedback on the pacing and prioritization of six specific programs that are being proposed as part of the investment bucket “Addressing Safety and Reliability”. A majority of customers in each rate class support either the current proposed pace of investments or an accelerated approach and associated outcomes for all six programs, including *rear-lot*, *direct buried cable* and *PILC cable* replacement.

	Online Feedback Portal		Telephone Surveys		
	Residential	Small Business	Residential	Small Business	Mid-Market
Addressing Safety and Reliability Rear-Lot Replacement Program					
Stick with the proposed pace of investment	23% 	24% 	33% 	43% 	40% 
Pay more to remove rear-lot sooner	44%	32%	38%	22%	31%
Slow down this program	21%	29%	26%	29%	28%
Don't know	11%	15%	4%	6%	1%
Addressing Safety and Reliability Direct Buried Cable Replacement Program					
Stick with the proposed pace of investment	28% 	29% 	39% 	36% 	56% 
Pay more to remove high risk direct buried cable sooner	39%	27%	31%	27%	16%
Slow down this program	21%	30%	27%	27%	27%
Don't know	12%	14%	3%	9%	1%
Addressing Safety and Reliability Paper Insulated Lead Covered (PILC) Cable Replacement Program					
Stick with the proposed pace of investment	25% 	24% 	28% 	20% 	44% 
Pay more to accelerate PILC replacement	42%	30%	45%	36%	31%
Slow down this program	20%	26%	24%	36%	24%
Don't know	13%	19%	4%	8%	1%
	Online Feedback Portal		Telephone Surveys		
	Residential	Small Business	Residential	Small Business	Mid-Market
Addressing Safety and Reliability Network Unit Replacement Program					
Stick with the proposed pace of investment	27% 	24% 	33% 	32% 	40% 
Pay more to replace transformers sooner	40%	29%	39%	30%	35%
Slow down this program	19%	28%	25%	33%	23%
Don't know	13%	19%	3%	6%	2%
Addressing Safety and Reliability Cable Chamber Renewal Program					
Stick with the proposed pace of investment	25% 	24% 	32% 	26% 	43% 
Pay more to replace deteriorating cable chambers faster	43%	33%	39%	29%	26%
Reconstruct reactively, lowering rates now	18%	25%	25%	36%	30%
Don't know	14%	18%	4%	9%	1%
Addressing Safety and Reliability System Restoration Improvements					
Spend more to improve restoration times during outages	44%	29%	49%	41%	37%
Stick with what's already planned	48%	58%	49%	55%	63%
Don't know	8%	13%	2%	4%	1%

2.2.5 Innovation and Planning for the Future

With regards to investments in “*Innovation and Planning for the Future*”, customers were asked to provide feedback on three types of programs, including *energy storage*, *monitoring and control equipment* and *microgrids*. Customers are largely supportive in investments in monitoring and control equipment – in fact more customers believe that Toronto Hydro should be spending more on these investments, rather than reducing the current pace.

Knowing that energy storage investments are not required to maintain current levels of reliability, a majority of customers in all rate classes do not want to pay more for Toronto Hydro to do more energy storage projects. Likewise, a majority of customers only feel that Toronto Hydro should support *microgrids* only when those in the grid pay the full costs – again, knowing that these investments are not necessary to maintain reliability.

	Online Feedback Portal		Telephone Surveys		
	Residential	Small Business	Residential	Small Business	Mid-Market
Innovation and Planning for the Future Investments in Energy Storage Projects					
Spend more to partner on storage projects	40%	29%	37%	37%	26%
Don't spend more on storage projects	49%	58%	60%	55%	74%
Don't know	10%	13%	5%	8%	1%
Innovation and Planning for the Future Investments in Monitoring and Control Equipment					
Spend more on monitoring and control equipment	27%	18%	31%	26%	47%
Maintain current pace of investment	40%	34%	48%	40%	39%
Reduce spending on monitoring and control equipment	20%	29%	19%	26%	12%
Don't know	13%	18%	2%	8%	2%
Innovation and Planning for the Future Investments in Microgrids					
Spend more on supporting development of microgrids	35%	20%	36%	31%	37%
Support microgrids, if benefiting customers pay	46%	55%	56%	54%	59%
Don't know	19%	25%	8%	14%	4%

2.2.6 Opinion of Toronto Hydro's Proposed Plan

Overall, Toronto Hydro customers are supportive of the utility's current proposed plan, or a plan that improves services, including investments that focus on improving reliability and safety or innovation and planning for the future.

	Online Feedback Portal		Telephone Surveys		
	Residential	Small Business	Residential	Small Business	Mid-Market
Improve Service <i>Toronto Hydro should improve service, as discussed on the previous pages, even if that means an annual increase that exceeds [Residential: 3.4%; Small Business: 4.4%; Mid-Market: 3.9%]</i>	26%	22%	23%	18%	18%
Stick with Proposed Plan <i>Toronto Hydro should stick with a [Residential: 3.4%; Small Business: 4.4%; Mid-Market: 3.9%] annual increase to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs.</i>	37%	30%	48%	37%	55%
Scale Back Proposed Plan <i>Toronto Hydro should keep increases below [Residential: 3.4%; Small Business: 4.4%; Mid-Market: 3.9%] annually, even if that could mean reductions in service.</i>	21%	27%	24%	34%	23%
Other	6%	6%	2%	3%	2%
Don't know	10%	15%	3%	7%	2%

When highlighting more vulnerable customers, the table below illustrates that a majority (50%) of customers who say their electricity bill has a major impact on their finances support Toronto Hydro's current plan or an increase that exceeds the current proposal to improve services.

Opinion of Toronto Hydro's Proposed Plan Residential Customers	The cost of my electricity bill has a major impact on my finances and requires I do without some other important priorities.			Total
	Sig. Impact [n=139]	Impact [n=143]	No Impact [n=303]	
Improve services, increase above 3.4%	10%	14%	31%	23%
Stick with current plan at 3.4%	40%	56%	50%	48%
Keep increases below 3.4%	42%	24%	15%	24%

Small business customers whose electricity bill has a significant impact on their organization's bottom line are less likely to support Toronto Hydro's proposed plan.

Opinion of Toronto Hydro's Proposed Plan Small Business Customers	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 delayed.			Total
	Sig. Impact [n=61]	Impact [n=59]	No Impact [n=64]	
Improve services, increase above 4.4%	13%	20%	23%	18%
Stick with current plan at 4.4%	27%	47%	40%	37%
Keep increases below 4.4%	47%	31%	27%	34%

A majority of Mid-Market customers whose bill has a significant impact on their bottom line are supportive of Toronto Hydro's current proposed plan or, again, one that improves services beyond a 3.9% annual increase.

Opinion of Toronto Hydro's Proposed Plan Mid-Market Business Customers	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 delayed.			Total
	Sig. Impact [n=84]	Impact [n=71]	No Impact [n=38]	
Improve services, increase above 3.9%	12%	18%	33%	18%
Stick with current plan at 3.9%	49%	61%	56%	55%
Keep increases below 3.9%	32%	19%	11%	23%

2.2.7 Key Account Online Survey

As part of Phase II of this customer engagement, an online survey was conducted among 37 Toronto Hydro Key Accounts between June 7 and 18, 2018. The purpose of this survey was to build on the findings from Phase I; gathering general feedback on needs and priorities, THESL's engagement process, the utility's planning principles, as well as the rate impacts of the proposed plan.

General Satisfaction and Customer Needs

- 29 of 37 Key Account customers interviewed are satisfied with the services they receive from Toronto Hydro, with five neither satisfied nor dissatisfied and the remaining three somewhat dissatisfied.
- Areas for service improvements include; improved communications, quicker service response times, improved reliability and support with understanding or reducing impacts of Global Adjustment charges.

Toronto Hydro's Customer Engagement Process

- 32 of 37 Key Account customers interviews feel that Toronto Hydro's customer engagement process seems like a good way to bring customer needs and preferences into the utility's plan.

Re-Affirming Key Account Customer Priorities

- Confirming the findings from Phase I of the customer engagement, 33 of 37 Key Account customers feel that the following priorities are aligned with what they expect the utility to focus on:
 - Ensuring reliable electrical service;
 - Delivering reasonable electricity prices, and;
 - Preventing or reducing the length of prolonged power outages caused by extreme weather (e.g. high winds, floods and ice storms).

Power Quality Trade-Offs

- 24 of 37 Key Account customers interviewed express that their organization would be willing to pay more on the distribution portion of their bill in order to improve (10 of 37) or maintain (14 of 37) the current level of power quality.

Planning Principles

- 35 of 37 Key Account customers interviewed feel that Toronto Hydro’s proposed plan that is responsive to the principles outlined below seems like the *right approach* to planning.



1. Legal requirements by continuing to meet its obligations, including safety;



2. Customer feedback by:
 - a) Keeping distribution price increases as low as possible;
 - b) Maintaining long-term performance for customers experiencing average or better service;
 - c) Improve service levels for customers experiencing below average service or who have special reliability needs (e.g. hospitals); and,
 - d) Balancing other customer priorities (e.g. customer service) with the need to contain rate increases.



3. Business input by relying on expert analysis and professional judgment to develop construction and operations programs that address technical and operational requirements.

Opinion of Toronto Hydro’s Proposed Plan

- 29 of 37 Key Account customers interviewed feel that Toronto Hydro should either exceed the current plan to improve services beyond what is being proposed (4 of 37) or stick with the current plan and its expressed outcomes (25 of 37). Two customers feel that increases should be below what it currently proposed, and the remaining six either provided an alternative response or don’t know.

3. About this Consultation

3.1 Ontario Electricity in Context

THESL's initial round of engagement occurred before the introduction of the Fair Hydro Plan and the second round occurred in the lead up to the 2018 Provincial Election campaign. Both of these periods saw considerable public discussion of electricity, particularly surrounding price.

While this environment was challenging and participants certainly expressed views that were consistent with the political environment, they were still able to provide meaningful input into the planning issues facing Toronto Hydro.

3.2 Approach to Meaningful Consultation

Engaging customers in meaningful consultation on electricity can be a challenge.

Often customers feel they do not know enough to contribute to a consultation because of their limited familiarity with the distribution system; including how it is funded, regulated and the nature of its challenges. Others fear the combative nature of some public processes or prefer not to risk offending friends and neighbours by taking positions on issues that are sometimes controversial. Moreover, many customers simply do not pay attention and remain unaware of particular consultations that they would participate in had they been aware.

Considering both the challenge of engaging a representative group of customers and the challenge of lack of knowledge, INNOVATIVE developed a process built on five key principles:

1. Create open voluntary processes that allow anyone who wants to be heard an opportunity to express themselves.
2. Use random-sampling research elements to ensure a representative sample of customers are engaged.
3. Provide customers with the context they require to make informed decisions in a transparent manner that are articulated in real terms.
4. Create an opportunity for customers to learn the basics of the distribution system so they can provide a more informed point of view.
5. Focus on fundamental value choices. Look for questions that ask people to choose between key outcomes rather than focus on the technical questions of how to reach those outcomes.
6. Give THESL customers an opportunity to “colour outside the lines” through qualitative feedback.

As part of this engagement, more than 10,000 customers completed THESL's online feedback portal, compared to 209 as part of the utility's 2013 engagement. This increase in participation demonstrates clear progress in ensuring that customers who wish to express their views have the opportunity to do so.

One of the foundations of this customer engagement process was to provide customers the opportunity to “colour outside the lines” and raise issues that were not covered by the survey questions. The open-ended elements of the workbook and the discussion groups allowed customers this opportunity.

Finally, a specific effort was made to collect participant comments on the process itself to provide an opportunity for future improvements.

3.3 Responding to OEB Direction

In Toronto Hydro’s 2015 CIR Decision, the OEB found that “Toronto Hydro’s customer engagement efforts undertaken as part of the Application are reasonable as the first such effort in the context of the RRFE” but made several suggestions for improvement in the future.

It was noted that the utility had not provided sufficient context, including “*its existing benchmarking ranking and its relative levels of productivity and efficiency.*” (Toronto Hydro, Decision and Order, December 29, 2015, p. 7.) In response, additional information was provided to customers in both the online feedback portal and telephone surveys. An excerpt from Toronto Hydro’s *Customer Feedback Portal* is as follows:

Toronto Hydro’s total spending is benchmarked by the OEB against other utilities in Ontario. In the last year of publicly available data collected by the OEB, Toronto Hydro’s total cost per customer of \$1,044 is higher than the average Ontario utility cost of \$798. Those total costs are a combination of Toronto Hydro’s operating and capital costs.

Toronto Hydro’s operating costs of \$305 per customer are close to the Ontario average of \$304 dollars per customer. The choices in the operating budget are primarily driven by technical analysis and expert assessments of best practices.

In the same 2015 CIR Decision, the OEB commented on the timing of the utility’s engagement, noting “...the results were too late to have any meaningful influence on the capital and operating plans.” (Toronto Hydro, Decision and Order, December 29, 2015, p. 8.) As such, Toronto Hydro conducted this engagement in two rounds. The first round was used to provide input to THESL planners at the beginning of the planning process. This phase focused on identifying needs and outcomes and establishing preferences among those outcomes.

The initial phase began in **December 2016**, roughly two months after the OEB released the Handbook for Utility Rate Applications. This timing allowed for the consultation to reflect both the 2015 CIR Decision as well as the 2016 Handbook.

This most recent engagement, which spanned approximately 18 months, is, in part, a response to the Handbook which notes, “*Planning is an ongoing utility activity, not just something that is done in preparation for a rate application. Likewise, customer engagement to inform utility planning must also be an ongoing activity*” (Handbook to Utility Rate Applications, p. 12.)

Additionally, in its 2015 CIR Decision, the OEB noted of Toronto Hydro’s engagement that “...customers had not been provided with enough information to understand the impact of proposed levels of work on their rates...” (Toronto Hydro, Decision and Order, December 29, 2015, p. 7.) In the customer engagement as part of this Application, additional effort was made to provide relevant

background information regarding investment trade-offs, including utility benchmarking, system performance and program-specific investment decisions.

Finally, Toronto Hydro implemented a new approach in the *Customer Feedback Portal* which allowed customers to not only view their customized bill impact based on their responses, but also featured a dynamic tool that allowed them to re-calculated their potential bill impact until they reached the best balance for them. This allowed for more customer control and was intended to provide additional context on the impact of proposed investments on rates.

3.4 Enhanced Customer Engagement

3.4.1 Policy Evolution

In 2012, the OEB released its “**consumer-centric**” *Renewed Regulatory Framework* (RRFE), which began a fundamental shift in the way utilities operate; moving from a focus on **utility cost** to **value to customers**.

Since THESL’s 2015 CIR application filing the OEB issued its *Handbook for Utility Rate Applications*, which provides additional guidance to utilities on OEB expectations the role customer engagement should play in rate application development.

A key component of the rate application process includes documenting the **active engagement** between utilities and their customers.

- Utilities should engage customers in the development of their business plans in a way that addresses identified **outcomes that are valued by customers**.
- Utilities should then engage customers on the investment plan proposed to deliver on the business plan by identifying **preferences** and **needs**.
- Utilities must demonstrate services are provided in a manner that responds to identified customer **preferences** and **needs**.

3.4.2 Gathering and Responding to Customer Feedback

To address OEB requirements set out in the *RRFE* and *Handbook* – and direction set by OEB rate decisions – THESL and INNOVATIVE developed an iterative, multi-year approach to gathering and responding to customer feedback.

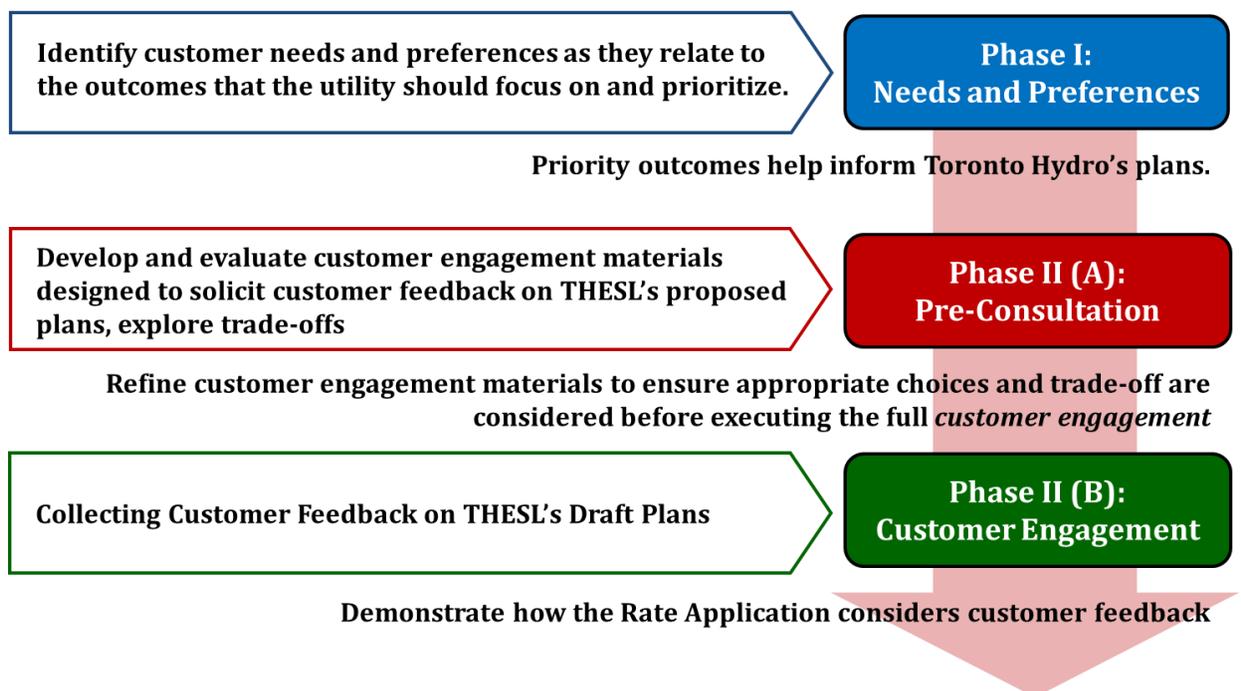
1. **Identifying Customer Priorities:** In 2016 and 2017, INNOVATIVE executed **Phase I** of THESL’s customer engagement, where customers from all rate classes were consulted to develop a detailed understanding of their preferences as they relate to the outcomes that the utility should focus on and prioritize.
2. **Using Customer Feedback to Guide the Development of Plans:** In 2017, THESL used the **Phase I** customer engagement feedback to help inform Toronto Hydro’s business planning, including the penultimate DSP.
3. **Collecting Customer Feedback on THESL’s Penultimate Plans:** In 2017 and 2018, INNOVATIVE executed **Phase II** of THESL’s customer engagement program, where it re-engaged with customers to confirm customer needs and preferences as they relate to outcomes in **Phase I**. This round of engagement was able to solicit customer feedback on

THESL’s proposed plans, and explore trade-offs in relation to specific programs and the associated bill impacts, as well as the pacing and prioritization of investments.

4. **Re-Examining the Business Plan and DSP:** In 2018, THESL revised the utility’s business plan and DSP in response to **Phase II** customer engagement feedback as part of their OEB requirement to demonstrate how customer feedback has been considered in the development of their **2020 CIR Application** before filing with the OEB.

3.4.3 Consultation Process Overview

The diagram below provides an overview of INNOVATIVE’s multi-phased customer engagement process, designed to support the consultation requirements of THESL’s 2020 CIR application. This customer engagement program was designed as an iterative process where each subsequent phase of the consultation built on learnings from previous phases and the components within.



1. **Phase I (2016-2017)** set out to identify customer needs and preferences as they relate to the outcomes that the utility should focus on and prioritize. This was executed using a combination of both qualitative and quantitative research methodologies. In addition to engaging low-volume, mid-market and large use customers, INNOVATIVE also conducted a series of in-depth interviews with stakeholders who represent a cross-section of views from various customer groups.

This first phase of the customer engagement provided THESL’s information to help inform Toronto Hydro’s business planning, including the penultimate DSP.

2. **Phase II (A) – Consultation Materials Design and Evaluation.** The next phase of this process was to develop and evaluate customer engagement materials designed to solicit customer feedback on THESL’s proposed plans, and explore trade-offs in relation to specific programs and the associated bill impacts, as well as the pacing and prioritization of investments.

Following the development of THESL’s penultimate DSP, INNOVATIVE began the process of translating detailed financial and technical documents into customer-facing consultation materials. The developed customer consultation materials took the form of an online customer feedback portal.

Customer testing focus groups were conducted before the launch of the online customer feedback portal. These focus groups were intended to ensure the portal used language that was accessible to customers and that it provided an appropriate amount and substance of information, in order for customers to provide an informed opinions on THESL’s proposed plan.

3. **Phase II (B) - Customer Engagement.** The next phase of the customer engagement integrated research-based consultation tools, with traditional voluntary-based tools. The online customer feedback portal provided an opportunity for customers who wished to participate in the consultation to have their say. This process also provided a clear understanding of needs and preferences across the broader customer base. This final phase of the customer engagement was divided into two components:

- **Qualitative Component:** An online workbook allowed us to determine the range of views held by THESL customers regarding the plan and trade-offs.
- **Quantitative Component:** Randomly recruited telephone surveys of residential, small commercial (GS < 50 kW), and mid-market (GS > 50 kW) customers and an online survey of large use (Key Account) customers was the final step in the consultation process. Randomly recruited surveys allow for generalizable conclusions that can be applied to the broader population of THESL customers. The surveys were developed based on the feedback from the online customer feedback portal. Incentives were used to allow for a longer survey which allowed more topics to be covered.

APPENDIX 1.1

Low-Volume Customer Focus Groups

March 17, 2017

Prepared for:

Toronto Hydro

14 Carlton Street

Toronto, Ontario M5B 1K5



Low-Volume Customer Focus Groups

Following our iterative research process, the low-volume focus groups were designed based on feedback collected from internal staff interviews and the literature review of previous customer satisfaction research.

Objective: Using an exploratory research methodology, our objective was first to understand the customer journey, from initial contact (typically account initiation or transfer) through to the various other touchpoints customers typically encounter.

Our second objective was to obtain insights into what customers expect of Toronto Hydro, particularly in terms of what represents value to customers and what customer priorities for Toronto Hydro are, both in context of valued outcomes and choices impacting customers.

1.1 Methodology

Four focus groups were conducted on December 5 and 6, 2016, in Downtown Toronto at Consumer Vision (5th) and at the Westin Hotel North York (6th), recruited by Innovative Research Group. Respondents received a cash incentive for participation. On both nights, the first group was of low volume business customers and the second of residential customers. In the business groups, a mix of ages, genders and business types was obtained. In the residential groups, an even mix of ages and incomes, as well as an even split between house and condo dwellers, was obtained. In general, for the Downtown groups respondents were recruited from south of Eglinton, and for North York groups respondents were recruited from north of Eglinton and east of Yonge, extending north of the 401 and east into Scarborough.

We deployed a detailed *Discussion Guide*, used to moderate all four focus groups. In group 2, a verbal primer was employed early in the session to give basic contextual information on Toronto Hydro and the electrical system overall. In groups 3 and 4 a printed primer was employed to give more formal and consistent contextual information.

The show rate was high, averaging 6 to 8 respondents in each group.

This memo summarizes key findings, and offers observations and potential strategic avenues based on these groups and past research. We are pleased to discuss these findings in greater detail, if desired. *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. Where a respondent comment is specific to an ethnicity or gender, it is so noted. Overall, there were few differences between respondents or groups, so we have chosen not to identify verbatim by group, customer type or gender, so that interpretation is not unduly biased.

Please Note: Qualitative research does not hold the statistical reliability or representativeness of quantitative research. It is an exploratory research technique that should be used for strategic direction only.

A note on interpreting focus groups findings: In focus group research, the value of the findings lies in the *depth* and *range* of information provided by the participants, rather than in the *number* of individuals holding each view. References in this report such as “most” or “some” participants

cannot be projected to the full population. Only a large sample, quantitative survey would be accurately projectable to the full population.

1.2 Customer Journey

1.2.1 Initial Point of Contact

For both business and residential customers, the initial point of contact on the customer journey was at the connection point to initiate an account. In almost every case, this was to transfer an existing account or change billing name on an account being taken over. In general, this happened by telephone, although for many, the contact was not direct as a landlord or lawyer may have handled the account transfer, so the true initial point of contact was receiving the first bill.

Other points of contact cited by respondents included:

- Information inserted in the billing
- Representative entering residence or business to read meter
- Service technician on site for electrical system upgrade
- Safety issue – phone contact or field contact
- Security issue – billing scam, phishing scam
- Usage/conservation inquiry
- Closing account
- Subcontractor issue - inspection
- Payment issue – billing anomaly or disconnect issue
- Online contact – for information, or account activity

Verbatim customer quotes included:

“When I joined the company it was already connected.”

“It was 22 years ago, so I would have started by opening an account in person.”

“They reached out to me about a tenant default,”

“About a power outage.”

“Disconnect and reconnect in a system upgrade.”

“Somebody contacted me about unpaid bills, it was a scam, so I contacted (Toronto Hydro) and they confirmed it was a scam.”

“They contacted a few years ago to come in and install high efficiency bulbs.”

“A call to hydro to set up the account.”

“I live in an apartment building, so my landlord set it up.”

“I called them to set up account details, it was uneventful.”

“I haven’t had any contact other than the bills.”

“I came back from vacation and forgot to pay my bill, so they had disconnected me.”

“They gave me some information on using my cooker at night to save money.”

1.2.2 Customer Expectations

Frequently cited expectations of customers fall into the following broad descriptors:

- Human contact
- Acknowledgement
- Friendly customer contact
- Information
- Swift service, reasonable service standard (timely response)
- Ease of access, alternatives for access
- Proactive information, information actionable to the customer
- Reliable, organized, clean onsite service

In general, for most, Toronto Hydro met their service expectations at every point of contact. Toronto Hydro was felt to be very professional in customer service. Customer verbatim included:

"They pretty much met my expectations"

"They broke down the bill and rates quite well, they explained it well and gave me good advice"

"I have no problems; their service has been fine."

"I think they are pretty good."

"My contact has been very professional."

Where there were perceptions of expectations not being met, two factors emerged: first, that the misalignment of expectations and service outcome was situational and circumstantial, and second, that the perception may have been fueled by anger over electricity bills that was not necessarily focused on Toronto Hydro, but the electrical system overall, and was largely due to a desire, rather than an expectation, for which no outcome at that point of contact was possible. Further, lack of understanding had significant impact on those perceptions.

"My expectations depend on the circumstances."

1.2.3 Outages

Outages were the top point of discussion. There was significant distinction made between outages which are broader and event related, such as the '2012 ice storm', and those which are what respondents considered 'system' related – outages due to infrastructure failures or random, yet commonly occurring events – such as a tree falling down. Respondents considered ice storm level events 'Acts of God' and had more communications expectations than restoration expectations, or were inclined to be more forgiving with these events.

However, respondents frequently noted that not all weather related events fall into this category, with many falling under 'day to day, common' event categories – where the expectation is that Toronto Hydro should be well prepared for such events, or even that infrastructure should be robust enough that such outages rarely occur.

Overall, outages were seen as a very significant issue to business owners, citing the impact on their revenues and costs. The expectation, however, was less on reduction of outages than it was on giving businesses more ability to take appropriate actions when an outage occurs. The base expectation is that Toronto Hydro is aware of the outage and is taking action. Business owners were looking for a reliable *estimated time of response* (ETOR), so that they can make decisions on their

own resources - sending staff home, closing for the day, avoiding spoilage, or taking any other possible actions. None had an expectation of absolute certainty or a very specific time or length – they simply wanted information at a level where they could make business decisions. To an extent this was also true of residential respondents, a number of whom work from home. Outages for residential customers also had impact on child care and care of elderly residents.

Respondents often brought up a distinction between what they felt were ‘planned outages’ and unplanned, ‘event driven’ outages. The former they saw as outages that were scheduled by Toronto Hydro for maintenance, upgrades or other reasons – and were known in advance, and likely had known durations. In these cases, respondents felt that advance notice is an expectation and a firm ETOR as well.

“In my business, I am looking to know they are acting on it (power outage)”.

“I need to know a time frame in a power outage, a range, so I can make decisions right away.”

“Looking to know local, at a granular level.”

“I expect that customers will be compensated for any outage.”

“If there is a default based on the system rather than a weather event it should be compensated.”

“I want acknowledgement and an expected time frame, so we don’t keep employees around for nothing.”

“I expect that they know about it and are fast.”

A few respondents in each group brought up an expectation of compensation for outages. Others dismissed that notion as impractical, but regardless, the notion expressed was primarily based on an expectation of acknowledgement and empathy more than tangible consideration.

Whether the outage is local, defined typically as their home or workplace and adjoining buildings; or their street, or broader based significantly affected expectations on information. If it is very local, respondents tended to have expectations that were also very local – based on their own interests, but when the outage is broader or extends out of the local area, respondents tended to have less personal expectations and looked at the outage in broader social terms.

“I just want to know (in an outage) what to do next – will it be 5 minutes, 5 hours or 5 days?”

“Just want a window.”

“Because I work at home, an outage can be very disruptive. I need to manage my day.”

There was some mention of contacting Toronto Hydro during an outage. For most, there was an understanding that such situation often overload customer service. But for some, what was missing was a human element. Most, however, were simply looking for enhanced tools – mostly online – to allow them to manage their own expectations and take any necessary actions.

“Anytime I had contact about an outage I got a busy service, there was no human contact.”

“Want to be able to go online for outages by postal code.”

“Can we get an email or text message about an outage, especially when I am out of town.”

In the North York groups, both business and residential respondents cited more frequent, short term outages than did downtown respondents. In both downtown and North York groups, some respondents, based on personal experiences either first or second hand, felt that some areas of the

City received favorable treatment in terms of priority in a widespread outage. At the same time, many respondents identified that restoring power as quickly as possible to the greatest number of customers should be the priority.

"In my area (Don Mills) we have regular power outages. They should figure out why we have so many outages."

"With outages, it is just managing expectations."

1.2.4 Billing

Respondents had clear expectations on billings and the account process. They desired a reasonable service standard in terms of phone response time, which they generally felt was met; easy to understand billings, which they felt was not met (but not entirely a fault of Toronto Hydro); and many were starting to look to migrating account activities online, where their expectation was of a very simple process that respected their time and provided information on what the next steps were for a customer in terms of payment and confirmation.

Most desired more information on the items being billed. Few, if any, respondents understood their bills are many focused on the delivery charge as a main element where understanding was lacking.

Overall, what respondents wanted in terms of information on billing could be described as twofold – information that could be used to identify the root causes of perceived high electricity bills, and proactive information tools that allowed them to – or gave a feeling of – being able to act on their electricity costs. One frequently mentioned suggestion was to break out electricity bills by component company.

In terms of customer contact with Toronto Hydro, most felt the phone contact was friendly and professional. Many felt that, in their contact with Toronto Hydro, they received useful and relevant advice. The few who cited negative experiences or perceptions largely formed these from situations of non-payment or a billing conflict. Their expectation in these cases could be best described as looking for more empathy or understanding of their situation.

"I can get my personal bill by email but not my business bill." (A misconception but a perception held by several business customers)

"The bills are not in layman's terms, I don't understand them. The bills are not approachable."

"I have to learn about this by word of mouth"

"When I was away, I came back expecting the bill to be zero, but it had spiked on one day, and they couldn't explain it to me. They kept trying to convince me someone must have been in my house. They wouldn't take me at my word, but I understand that is a big ask."

"A small gesture would have created a lot of good will,"

"A breakdown of that delivery charge would be appreciated. I know there is Hydro One in there and other people getting a piece."

"These rate increases might not even be Toronto Hydro, it could be these other people."

"It would be better to get information from Toronto Hydro on where money goes than from the newspapers."

"Even billing, spreading out over 12 months would be helpful, like Enbridge."

"I want information on what the process is, what my next step is in terms of paying, and what the business responsibilities are."

"I should be able to do all the setup and information entry online, and there should be a confirmation process in return."

"The website has to be very easy to follow. Small businesses don't have time to sit in front of a computer."

"I want to be able to call in, and get someone quickly. If there are one or two steps, fine, but more, it is too much."

"I want to be able to call and they have the business history quickly available."

"They should rename the delivery charge." "I don't understand the delivery fees."

1.2.5 Information/Conservation

Across all groups, there was a frequently expressed desire for more 'tools', primarily seen as online or mobile, to enable customers to better manage their consumption and costs. Behind what was commonly expressed was a desire for Toronto Hydro to enable and empower customers with actionable information, at a day and time usage level.

Customers generally felt that they had no options on electricity provider, or in many cases – particularly businesses – on usage. Providing proactive information that empowers customers could mitigate this significantly.

Items that are proactive – daily usage tools, alerts for anomalous usage or spikes – were often mentioned across groups.

"I need more tools to manage my costs"

"I don't have time to look into conservation. The business doesn't have any options (on usage) as it is all peak time."

"I would be really interested in finding out daily usage. I didn't know you could get it online; that would make me sign up online."

"Having unusual usage alerts would be good."

"I would want more tips, but not just for homeowners, for renters too."

1.2.6 Service/Field Interactions

Expectations on service calls and field interactions were primarily functional in terms of being clean, timely and accountable for their work. While there were few respondents who had service technician or other field interaction, most were noted as being positive. The expectations were where the customer felt that their problem was not resolved and Toronto Hydro was seen as not taking responsibility for resolution.

Some business customers noted instances where Toronto Hydro attended their workplace to install energy saving fixtures or upgrades. These were viewed positively, as Toronto Hydro being proactive.

"I expect them to show up on time, be organized, clean up after themselves, and do the job quickly. I can't say they didn't meet my expectations."

"I expect them to take accountability for their mistakes and not blame the customer for any problems."

"But I do appreciate them coming in and showing me ways to save money. Guidance."

"Warnings on old systems and upgrades, improving service from internal systems to reduce downtime."

1.2.7 Customer Choices

In every group, there was mention of Toronto Hydro being a monopoly and the customer having no choices in supplier. This came up as a perception that affected many respondents' attitudes on customer service, as those inclined to have weaker service perceptions also tended to express emotions related to lack of choice. There were no specific incidents or encounters that formed this perception, however, indicating that the true need expressed was again to obtain some empathy and acknowledgement on what they saw as burdensome electricity costs. Customers who held this view were voicing a sense of not having an outlet for their feelings, rather than a concrete desire for any structural change to the electricity market.

"There are no choices, so they don't have to be more customer friendly."

"They are just like the TTC, you don't have any options so they just don't care."

"Maybe they should have an ombudsman to take care of any concerns."

"I just want to be treated as a person."

1.3 Emerging Issues and Priorities

Frequently identified issues and associated priorities were consistent across all groups, and can be described as:

- Price increases
- Infrastructure – upgrading, preplanning
- Demand – population growth, lifestyle changes, technology, electrification of transit
- Climate change
- Capacity
- Disruption due to technology – storage
- Alternative power – solar, wind
- Social shifts – lifestyles, employment, business
- Economic impacts of pricing and investments

Over-arching and coloring attitudes and perceptions of future issues and expectations in electricity, and perceived value and priorities, was concern about future costs. Overall, across all groups, respondents placed choices through a lens of what would impact future prices, and in relation to other issues and shifts they saw on the horizon – in how they live; and socially and technologically.

Some were immediate impacts such as an imminent carbon tax. Other were demand based on the horizon – electrification of transit, increased household demand through increased adoption of technology, and population growth demands.

Electrification of transit was seen as threatened by electricity rates. Technology adoption was seen as a source of higher electricity use, and higher bills purely from usage. Growth was seen as both a source of higher costs, as more infrastructure and replacement of older infrastructure would add to rates, but also a reliability issue and an issue of innovation.

"How can they ensure with carbon tax coming in that people can even afford hydro?"

"With a coming jobs crisis what are they doing to get rates down?"

"Electric cars will be a big new demand but the price is (making them) unaffordable."

"With electric cars coming in, we are really going to be in trouble."

"We can't have electricity so high that we have people who can't afford electricity."

"There has to be a break point in what they invest in where rates don't go up higher."

Although perceived high rates and fear of future rate increase was predominant across all groups, when individual written 'intervention' exercises were introduced, the consideration set expanded considerably and price was not necessarily the top consideration. Most were open to accepting some level of cost increase, with conditions. The prime consideration was broadly cost effectiveness, seen as ensuring – or providing some level of validation – that Toronto Hydro is, itself, operating to be cost effective operationally, and that cost increases go towards the areas that customers are most concerned with.

"I am willing to accept higher rates for investments if they result in lower rates in a few years."

"I understand rates will keep going up. It is a question of whether those increases are going to investments, in reliability, renewables and so on, or not."

1.3.1 Reliability

Reliability – reducing outages, which to some was eliminating outages altogether – was seen to be a required core value. However, on probing, most identified this as an infrastructure issue primarily driven by perceptions of aging equipment and growth in demand. To most, reliability overall trumped cost, electricity being seen as a necessity of life and business. However, there was low value placed on achieving higher reliability for most – as in general, with the exception of some North York customers, reliability was seen as quite high, and the infrequent minor inconvenience was not seen as less important than keeping costs low. At the same time, respondents distinguished between those minor, infrequent outages and outages from infrastructure deficiencies, which they felt needed to be addressed as they were seen as having broader ramifications.

"The infrastructure is weak, resiliency of the network is weak."

"Electricity is something we can't do without. We have to minimize downtime."

"Minimize downtime, but don't raise my bill."

"The priority is to spend more of the part that goes to Toronto Hydro on infrastructure and reliability and not raise costs."

"Concerns about the durability of the grid."

"High reliability at minimum cost to customers – reliable and affordable."

"It doesn't matter if we provide a cheap source of electricity if it isn't reliable."

"You can have a very low price but it doesn't matter if there is no reliability."

"Elimination is ideal, but reduce it so it doesn't happen from old equipment but from specific events."

"Investing in reducing outages should result in savings that trickle down to me."

"I don't have a problem with outages so that doesn't create value for me."

"They have been doing the infrastructure, but look at internal costs like salaries."

"There are only two points to this. One is better, bigger, faster, The other is costs, costs, costs."

1.3.2 Value for Money and Balancing Trade-Offs

Overall, across all groups, "value" was seen as achieving balance between investments that might have short term rate impact but would yield longer term cost containment. Customers, both business and residential, often felt that growth in demand came primarily from the pace of condo development, and were inclined to believe that this demand was being forced on them as ratepayers, without the developers paying what was perceived as their 'fair share'.

Respondents also felt they did not have sufficient information on the sources of rate pressures. This was typically seen partly as being able to assign 'blame', but also as fulfilling or alleviating an unformed perception on internal spending.

Yet respondents generally took a long term view of value, feeling that making reasonable investments over the short term may raise costs to ratepayers, but may bring longer term benefits that include either reducing rates or mitigating future increases.

However, it was also seen that Toronto Hydro had limitations on its ability to be more efficient.

"Value for money has also to do with the balance between paying high wages and spending on infrastructure. All our concerns have to do with infrastructure and distribution, but value also has to do with how they spend money internally."

"The priorities should be the ones that have the most direct impact on costs."

"I need to know where the source of the cost increases is coming from, like OPG not Toronto Hydro, so I can put that where it deserves."

"The reason we pay so much isn't Toronto Hydro, it's OPG and Hydro One."

"Find ways to make condo developers pay more for infrastructure."

"How much do these condos pay to fund capital investment?"

"The customer bears a lot of costs, as does Toronto Hydro, for someone else or someone forcing it on them."

"I don't think industrial or condo developers are paying for the system upgrades they cause."

"Toronto Hydro openly admit they can't fill the new demand from all these new downtown condos. But the condo developers should pay, not regular customers."

"Long term, modernizing infrastructure will pay for itself."

"I would like to see them look within the company on how they can save money."

"We pay a lot of money. Yes, we have to invest. But we just can't keep increasing the rates."

"We don't know if costs are too much because don't know where the money goes. "

"Presumable if infrastructure expands that should bring the costs down eventually."

"The 10 year goal should be to invest in ways that reduce bills."

"Being Toronto only, there is no ability to gain economies of scale that would benefit the customer."

Balancing reliability and cost was consistent across groups. Reliability was viewed as an asset management issue – balancing new investment to meet future demand and replacement of aging equipment to increase reliability. While 100% reliability was seen as an ideal, most felt that the cost of achieving that was not a priority.

"Reliability is an asset management problem – the balance between investing for new demand and increasing reliability on existing lines."

"Sometimes in business there is nothing you can do to manage usage, so reliability is most important."

"You can do all these things if you throw a lot of money at them, but you can't make the costs so high that nobody can afford them. So, value for money might not be the latest technology."

"Meeting demand that is coming up is most important to me, with less power outages."

"Reliability is good right now. Whatever happens on other fronts, reliability can't go down. It is low on the priority list, particularly in terms of costs."

"I think the current level of redundancy is fine and I wouldn't expect them to spend to increase it."

"A 2% increase in reliability isn't worth any cost increase."

"If we are at, say, 95% reliability now, it is a question of how much it would cost to get to 99%."

1.3.3 Demand and Growth

Respondents uniformly saw increased demand placing pressures on the electrical system from three primary sources:

- (1) lifestyle, from increased use of technology,
- (2) climate change, from increased need for air conditioning as well as increasing climate related events, and
- (3) population growth.

Respondents did not place personal value on these challenges, other than expecting Toronto Hydro to have a plan in place and appropriate support systems to ensure this demand is met.

"In our ecosystem, climate change is causing increased demands."

"There are more devices using electricity so the demand is always going up."

"Is there a system in place to support all the new development?"

"Need to support future growth."

"There should be a framework in place for major events to be ready."

1.3.4 Environmental

'Clean energy' and environmental concerns did not come up unaided from respondents, itself indicative of lower concern. In part this was because respondents did not view this as an area completely under Toronto Hydro's control or mandate. However, when prompted, respondents identified green energy and clean energy sources as an emerging issue, albeit without clear needs from Toronto Hydro.

"Environmental – ratio of clean to dirty power."

"I put environmental last on my list as I felt it is more an OPG issue than Toronto Hydro, so I felt other issues are more important."

"Focus more on green energy alternatives."

1.3.5 Innovation

Respondents identified the emergence of alternative energy sources as both an opportunity and threat. The threat identified was in perceived future ability of businesses and residential customers, through solar power, to generate their own electricity – and by doing so, disrupt the current electrical system by having less 'system generated' electricity to spread infrastructure and utility costs over. The opportunity was seen as alternative energy sources giving customers the ability to control their costs.

Many respondents also cited the need for innovation to match how the nature of employment and business is changing. Many business respondents saw the notion of peak usage becoming outmoded, as employment patterns shift from traditional models to more flexible, remote or other models.

"Decentralization of power sources will be disruptive to their business model."

"What's going to happen when more people go to solar – and demand decreases? Will rates go up even more?"

"Peak use changing as the way businesses operate change."

1.4 Identified Outcomes

Across all groups, respondents identified a similar set of desired outcomes from Toronto Hydro. Their ranking of those outcomes in terms of importance was also very consistent, and in order of importance can be described as:

- Reducing prices
- Enhancing reliability
- Ensuring safety – for both employees and the public
- Responsiveness to customer concerns, ease of access
- Tools to enable consumption management
- Community partner

1.4.1 Inter-related, programmatic

Overall, respondents across all groups had similar priorities for Toronto Hydro. Overall, safety was the top priority, seen as an over-arching value that took precedence over any other factors. Safety was largely seen as table stakes in this context, which respondents assumed was always a core outcome.

Price was a secondary, over-arching priority. Respondents across all groups felt that price impact must be top of mind in every activity Toronto Hydro proposes or undertakes. However, price concerns did not restrict the consideration set – respondents had priorities that ranked ahead of price, but with the condition that price impacts must be minimized or justified adequately.

So the priorities were all seen as inter-related and forming part of an overall program that had safety and price as over-riding considerations or table stakes that had to be satisfied, but were otherwise strongly related to one another.

“All these points you listed are inter-related.”

“I don’t think we should have to choose. They are accountable for all this.”

“We should invest in green energy, but we can’t do that without proper infrastructure in place.”

“If we say that catastrophes are more important than day to day outages, we will see a decrease in service on day to day.”

“The consumer simply can’t pay a single penny more.”

“Increasing costs to businesses hurts the consumers more because I just pass that on by raising product prices.”

“First priority is reliability and second is price.”

“First is reliability, second price, third environmentally sensitive.”

“Cleaner and more reliable are the priorities.”

Power quality was not seen as an issue or priority among low-volume customers.

“I would be surprised if anyone notices any [power] quality differences. It’s not an issue anymore.”

1.4.2 Safety

Respondents placed high value on safety, seen as safety of Toronto Hydro employees and safety of customers, both within their homes and workplaces and externally, on the streets or in public.

“Safety is the top priority. Not just about me, more broad, socially.”

“Safety is expected as a bare minimum. If they can’t manage their equipment safely, they have no business running the system.”

“If you are reliable then you should already be safe.”

Safety was seen by all groups as the top, over-arching priority. It was viewed as both a core value and a pre-condition – safety was something seen as an attribute that permeates every other aspect. Respondents were unanimous across groups in expressing that safety comes before everything else, even price.

1.4.3 Innovation

Respondents identified investment in innovative technologies as a high priority. This was seen as having short term rate impacts that were justified by longer term benefits to customers, both in terms of enabling them to obtain lower cost energy, and in terms of conservation and environmental benefits.

The integration of renewables with traditional sources was identified across groups as a high priority. Investing in storage technology was seen as having significant long term benefits and as having the potential to meet increased demand while both lowering costs and possibly alleviating part of the infrastructure challenges.

Respondents believed that Toronto Hydro had a role in incentivizing adoption of innovative technologies that enable conservation and better customer usage management.

"It would be interesting if they were looking at storage with solar and wind."

"Something some companies are doing is getting into stored power. Toronto Hydro should look at innovations to meet demand peaks."

"Invest in innovative infrastructure."

"Incentives for conservation innovations, like solar shingles."

"Integration of off grid sources & renewables."

1.4.4 Customer empowerment

Empowerment adds value and significantly abates rate founded emotions. Enabling usage management was identified as a priority that created significant value for both business and residential customers. This was seen as providing tools, online and mobile, that enabled real time, granular level usage information – even longer term, usage at an individual appliance or source level. Many residential customers suggested pro-active tools – mobile alerts for usage anomalies and outages, for example.

All saw value in creating tools that empowered customers to manage their own usage, and saw these as cost savers with a benefit in excess of any added costs to implement.

"Look at more online ways to help me monitor my usage and costs."

"I can do my banking on my phone, I should have something like that for electricity on my phone."

"They could have proactive tools like alerts that tell me when I am doing something costly or inefficient."

"Continual education reminds me to do things that save money."

"Tools for conservation, like online tools, are needed."

"There should be more detailed, day and time information."

"They provide more information on usage to household than businesses."

"There should be an incentive like programs to save."

A few residential customers were aware of tools online in their customer account that provide daily usage information. Business users were not aware of such tools, and felt that there was more focus

on information to residential than to business customers. Some residential customers suggested creating programs that provide some incentive to reduce consumption.

In terms of the billing and account process, respondents also saw these as communications and empowerment issues – they valued ease of access, particularly through online tools, that gave them easy and quick access to their accounts, to setup an account or make changes, and to obtain responses from Toronto Hydro on outages, billing concerns and conservation tips.

1.4.5 Communication is key

Enhancing communications, particularly with ETOR but also pro-actively with usage and monitoring tools, was seen across all groups as a priority and creating value. Communications was seen as a key and over-arching service element. It touched on every aspect of the customer experience, and in fact formed perceptions on reliability and largely mitigated potential sources of dissatisfaction.

Respondents expected Toronto Hydro to operate through the customer lens, and this was seen throughout as a matter of having empathy for the customer and looking at service, as well as investment priorities, in terms of the pressures and changes customers are experiencing in their lives and businesses.

“Service is parts of everything – reliability, communications, improving infrastructure is dependability, but also the price.”

“People will pay more...slightly more...for improved service, communications.”

“Communications is ahead of reliability.”

“It comes back to what the mission of Toronto Hydro is.”

“Maybe they have a CEO mindset but they need to look at priorities through the customer mindset.”

Respondents across groups saw customer service as communications. Overall, as there were few gaps identified in customer service other than specific, isolated instances, what respondents prioritized in customer service along with ‘empowerment’ tools was responsiveness and having a sense that customer service is at the forefront. For example, most respondents saw being more responsive to communicating with customers on outages as a higher priority than reducing them. Similarly, most saw enhancing communications on conservation and usages as a higher priority than simply reducing costs or maintaining current rates.

“Being a community partner means being responsive to customer concerns.”

“Being responsive to customer concerns is actually a reliability issue.”

“It is a customer service industry so customer service comes first. Proactive response not reactive.”

1.5 Measuring Outcome Success

While customers have strong opinions on how they want Toronto Hydro to focus its efforts in terms of customer outcomes, few have concrete suggestions on how Toronto Hydro should measure successful delivery of such outcome.

Overall, measuring success was seen by customers to be reflected on their bills – keeping cost increases at a minimum.

More broadly, respondents saw a strong measure of social responsibility in Toronto Hydro's mandate and an opportunity to lead. Social responsibility was typically defined as both how Toronto Hydro treats customers with difficulty paying their bills, for which there was more of a need for empathy than for abatement, and at a higher level, in Toronto Hydro being seen as having a significant city building mandate.

"The measure of reliability is avoiding stories about major outages in the media."

"Measure of success is on the bills."

"Faster and more coherent response to outages, better communication, showing what that 25% is doing."

"Successful is in how the public feels about Toronto Hydro, whether people feel they are being listened to."

"It shouldn't be about a business, it should be about improving our city."

"There is a social responsibility embedded in Toronto Hydro, they should be a model for other companies."

1.6 Preferred Customer Engagement

Overall, both business and residential customers identified a need for simple information that enabled them to have a better understanding of how the electrical system works and on where money is spent to make a meaningful contribution to a consultation.

More specifically, respondents wanted cost breakdowns, and information on the costing and cost impacts of the elements of Toronto Hydro's plans.

While many stated that the preferred vehicle for a consultation is online, probing revealed that, in fact, customers preferred a format where they could be given information, perhaps in a video format, and survey type questions they could respond to once they have suitable information.

No one preferred public meetings.

Some residential customers were cynical about the consultation process, feeling that it would have no impact. This was not, however, a majority view. In fact, many respondents wanted to ensure that a broad cross section of views were collected, including low income customers.

"Do a survey."

"I need to know how many low-income customers they have, we need to look at whether they are consulted."

"Public meetings are a terrible way to get feedback."

"I like a workshop online, with information and questions."

"Need financial information, like budgets and cost breakdowns."

"Need to know why this and not something else, why they need this plan and not some other plan."

"I don't think anything would change their plans."

"What are my options?"

"Need to know the whole chain of how they operate, every aspect and the costs."

"I need to know how they propose to address alternate energy, increased demand, price increases and so on."

"I would like a video on how Toronto Hydro operates."

"Give some information like this in the bills, and then I could go online for more information on each topic."

"I need to know what the options are on each priority and the impacts on costs and longer term impacts."

1.7 Focus Group Appendix

The following two-page background primer was used in the second night of THESL's residential customer focus group in North York. A similar version of the primer was used with GS customer in North York as well.

Toronto Hydro's Role in Ontario's Electricity System

Ontario's electricity system is owned and operated by public, private and municipal corporations across the province. It is made up of three components: **generation**, **transmission** and **distribution**.

	<h4>GENERATION</h4> <p>Generating facilities convert various forms of energy into electric power.</p>	<h4>EXAMPLES</h4> <p>Ontario Power Generation TransCanada Energy Ltd Bruce Power Samsung Renewable</p>
	<h4>TRANSMISSION</h4> <p>Transmission lines (high voltage lines) connect the power produced at generating facilities to transformer stations.</p>	<h4>EXAMPLE</h4> <p>Hydro One</p>
	<h4>DISTRIBUTION</h4> <p>Distribution lines (at medium voltages) carry electricity to homes and businesses.</p>	<h4>EXAMPLES</h4> <ul style="list-style-type: none">• PowerStream• Horizon Utilities• Enersource 
	<h4>RATEPAYERS</h4> <p>Electricity is consumed by local customers including homes and businesses. Customers of electricity distribution companies are often referred to as ratepayers.</p>	<p>Customers</p>

Where does electricity come from?

In Ontario, approximately 70% of electricity is generated by **Ontario Power Generation (OPG)**. This provincially-owned crown corporation has **generation** stations across the province that produce electricity from hydroelectric dams, nuclear reactors, and natural gas burning power plants.

Once electricity is generated, it must be delivered to the communities across Ontario in need of power. This happens by way of high voltage **transmission stations** and interconnected lines that serve as highways for electricity. The province has more than 30,000 kilometres of transmission lines*, owned mostly by **Hydro One**.

Toronto Hydro's Roles in Ontario's Electricity System

Toronto Hydro is responsible for the last step of the journey: distributing electricity to customers in the City of Toronto through its **distribution system**.

The City of Toronto

Toronto Hydro is 100% owned by the City of Toronto.

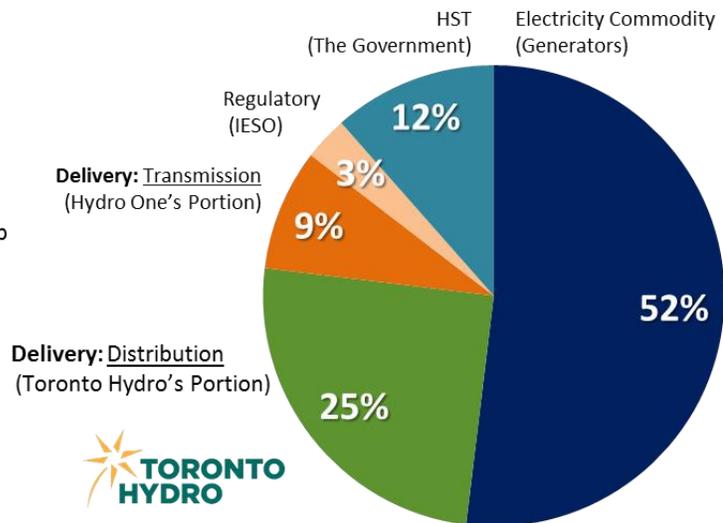
*Source: IESO. The Power System, www.ieso.ca

Electricity Bills: Understanding where your money goes

Your Electricity Bill: Every item and charge on your bill is mandated by the provincial government or regulated by the OEB. There are two distinct cost areas that make up the "Delivery" charge on your bill: **distribution** and **transmission**. While Toronto Hydro collects both, the transmission charge is remitted to Hydro One. The distribution charges include the portion of your bill that Toronto Hydro keeps, as well as some other "pass through" charges, most of which are remitted to the IESO. The distribution charges which Toronto Hydro keeps make up about 25% of the typical residential customer's (750 kWh per month) total electricity bill.

Toronto Hydro's distribution rates are subject to the review and approval of the OEB. The distribution fees collected from customers cover Toronto Hydro's capital investments and operating expenses.

About 25% of the average residential electricity bill goes to Toronto Hydro. The rest of the bill goes to power generation companies, transmission companies, the government, and regulatory agencies.



SAMPLE RESIDENTIAL MONTHLY BILL Toronto Hydro-Electric System Ltd.	
Account Number: 000 000 000 000 0000	
Meter Number: 00000000	
Your Electricity Charges	
Electricity	
Off-Peak @ 8.700 C/kWh	42.41
Mid-Peak @ 13.200 C/kWh	16.83
On-Peak @ 18.000 C/kWh	24.30
Delivery (Toronto Hydro \$40.23)	53.94
Regulatory Charges	4.92
Debt Retirement Charge	0.00
Debt Retirement Charge exemption saved you \$X.XX	
Total Electricity Charges	\$142.40
HST	\$18.51
Total Amount	\$160.91

How are electricity rates determined in Ontario?

The electricity industry in Ontario is regulated by the Ontario Energy Board (OEB). One of the OEB's roles is to review the distribution plans of all electricity distributors and set the rates that they can charge customers.

Toronto Hydro is funded by the distribution rates paid by its customers. Periodically, Toronto Hydro is required to file an application with the OEB to determine the funding available to operate and maintain the distribution system. Toronto Hydro must submit evidence to justify the amount of funding it needs to safely and reliably distribute electricity to its customers.

APPENDIX 1.2

Mid-Market Customer Focus Groups

March 17, 2017

Prepared for:

Toronto Hydro

14 Carlton Street

Toronto, Ontario M5B 1K5



Mid-Market Focus Groups

Following our iterative research process, the mid-market (GS > 50 kW) focus groups were designed based on feedback collected from internal staff interviews and the literature review of previous customer satisfaction research.

Objective: Using an exploratory research methodology, our objective was to obtain insights into what customers expect of Toronto Hydro, particularly in terms of what represents value to customers and what customer priorities for Toronto Hydro are, both in context of valued outcomes and choices impacting customers.

1.1 Methodology

Four mid-market focus groups were conducted on February 28 and March 1, 2017, in North York at Head Research.

February 28, 2017:

- Industrial Customers (6 participants)
- Mash & Other Customer Types (6 participants)

March 1, 2017:

- Commercial Customers (6 participants)
- Commercial Customers (6 participants)

Participants received a \$150 cash incentive as compensation for their time. Participants were recruited from across Toronto and qualified if they either paid their organization's electricity bill or had oversight on electricity management decisions.

We deployed a detailed *Discussion Guide*, used to moderate all four focus groups. In all four focus groups a printed primer was shared with participants in the early part of the session to provide consistent contextual information on Toronto Hydro and the role it plays within Ontario's electricity system, and bill impact.

This report summarizes key findings, and offers observations and potential strategic avenues based on these groups and past research. *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.

Please Note: Qualitative research does not hold the statistical reliability or representativeness of quantitative research. It is an exploratory research technique that should be used for strategic direction only.

A note on interpreting focus groups findings: In focus group research, the value of the findings lies in the *depth* and *range* of information provided by the participants, rather than in the *number* of individuals holding each view. References in this report such as "most" or "some" participants cannot be projected to the full population. Only a large sample, quantitative survey would be accurately projectable to the full population.

1.2 General Overview

1.2.1 Knowledge and Familiarity:

Across all four groups, respondents were asked first a series of introductory questions to establish baseline context and direct the discussion to Toronto Hydro's role as the local distributor. Virtually all respondents identify Toronto Hydro as their supplier of electricity, and, unaided, a strong majority identify Toronto Hydro as the distributor in some form. When provided a description in a handout, most are surprised to learn that Toronto Hydro only represents 10% of their bill. Ownership of Toronto Hydro was less clear. Although some identify it as city owned, many are not clear.

1.2.2 Touchpoints

For all respondents, there was no 'customer journey' initially. Virtually all grandfathered in some way (e.g. THESL account predated participant involvement with their organization). Common customer service touchpoints included:

- Billing inquiries
- Internal service work
- Metering inquiries online
- Outages
- Service of Toronto Hydro equipment
- Online app – service interruptions
- Scheduled maintenance – internal
- CDM program participation

Overall **electricity rates** came up early and unaided.

1.2.3 Mid-Market Customer Priorities

1. **Customer Service:** Overall, customer service is seen as excellent with the exception to specific incidents where base observation are noted.
2. **Reliability and ETOR:** Power reliability is seen as good, but more importantly Toronto Hydro's responsiveness and communications were seen as meeting business needs.
 - Maintaining the current level of reliability appears to be a priority among this rate class.
3. **Bill Impact:** Cost was an overarching concern, but not specifically directed at Toronto Hydro. Becoming aware of Toronto Hydro's place in the electricity system significantly abated "rate rage" directed toward Toronto Hydro.

- Increasing transparency and education about THESL’s role and future plans further abated concerns on rates and significantly expanded consideration of Toronto Hydro’s priorities and challenges (e.g. to know Toronto Hydro, is to like Toronto Hydro).
4. **Future Rates:** While knowing more about Toronto Hydro decreases “rate rage”, there was an observed desire for cost containment and short-term rate predictability. That said, for the most part, this rate class appears to be willing to accept “reasonable” rate increases based on a value proposition that included the following definitions:
- a) maintaining current reliability (not necessarily enhancing or decline);
 - b) investing prudently, where long-term cost saving are realized (spend more now to save more later);
 - c) no premature investing in unproven or untested technologies;
 - d) enhanced customer service to match emerging technological capabilities and needs (e.g. allow customers to get bills by emails, create master accounts to manage multiple bills, live assistance chat features); and
 - e) investing in education and promotion of CDM as a means for individual cost savings and also as a route to mitigating future demand and reliability challenges.

1.3 Industrial

Group 1 consisted of manufacturers.

“Dealing with Hydro I have had no issues.”

Overall, respondents were happy with Toronto Hydro’s service, although there were two ‘outliers’ who had long standing issues with their electrical service – one who operated a business with apparently antiquated equipment that was sensitive to power fluctuations, and another who operated a small manufacturing business which had a unique electrical issue.

“We are in a strange area where we having a floating ground, so there can be extreme voltage swings, like 134 volts down to 20. “

These respondents had two areas of focus that dominated their views – **reliability and costs**. To those with older manufacturing equipment, outages were a concern, although with one exception that was likely not strictly a reliability issue all had general satisfaction with reliability.

In terms of reliability, which for these participants’ experience is defined as infrequent, spontaneous outages, the expectation is similar to other groups – ability to make a reasonably informed business decisions, without expressly holding Toronto Hydro to a precise time frame. Many make their own estimation based on available facts; others were active in connecting online. One noted that Twitter information is more precise than Toronto Hydro’s website. In general, respondents felt that Toronto Hydro met their expectations in communicating what they need to know in an outage.

“Look to see if a wider area is out, or what the issue is, which tells me how long it might be and I can act accordingly.”

“I don’t always get the answer I need on an outage as quickly as I want, but I understand the issue at their end.”

"I just want to know they are aware of it, and about how long they think it will take."

"Their website has gotten better on service interruptions. Updating is much better."

"I just want to know if I should get people to sweep the floors or send them home."

"My expectations were met."

"They handed out flyers about a planned interruption two days in advance, they finished two hours early, can't ask for more than that."

"There was a broad power outage in Scarborough recently. I looked on the website, saw the scope of the outage, made the decision to send everyone home based on that, it came back on 90 minutes later and we lost a half day of production. If there were tools that gave a bit more information about the nature of the fault we might have been able to make a better decision."

"It would be nice to have a fixed estimate. Nobody is going to hold them to it."

"They do that on their twitter feed but not on their website."

The nature of this respondent group was such that conservation did not come up as an issue, expectation or something they had actively looked in to. Their businesses were such that they were likely operating on older equipment or older buildings operating on low capital budgets. Hence, their focus was on costs, not cost savings through active means. To the manufacturers, this was a competitive issue.

"Electricity is a main ingredient in our business. I can change all the lightbulbs in the world and it won't make a blip in our costs."

"We need electricity to produce, but we can't be competitive, even with Quebec."

"My business can't survive."

"They increase prices 16% a year. No business I know of increases prices that much every year. My infrastructure is aging too. I can't pass on those costs to customers."

"Now we are trading with the rest of the world, so our competitiveness is at risk, particularly with what we are headed towards."

Respondents could not find a satisfactory explanation of why rates continue to rise, and while some had made superficial inquiries, they had little knowledge of the components of their electrical bills or the system overall.

"When I make inquiries about increases the answer is usually that the OEB allows it."

"The terminology on the bills like global adjustment is not well explained. It would be good to see that on the bill."

"As far as I know Toronto Hydro is not making any profit off the commodity. The problem reaches beyond Hydro."

"They can't really tell you why rates keep going up. They only give a stock answer."

"I expect [Toronto Hydro] to behave like every other business, to not just pass along every cost increase because the OEB approves it."

This last comment was a typical sentiment – a misalignment with the market and economy their businesses operate in.

In terms of issues facing Toronto Hydro and the electricity system overall, respondents identified a limited, but consistent range of challenges: increased demand from new technologies, such as transit electrification, population growth, climate change and aging infrastructure. None cited environmental concerns more broadly than the impact of climate change on reliability as it affects their businesses.

Conservation was not explicitly mentioned, although several had investigated the possibility of solar energy for their business.

"Today solar panels just aren't efficient enough yet."

Although none saw solar energy as a short term solution for their business, many saw "democratization of the grid" with what they saw as the eventual adoption of solar energy and local storage as a long term eventuality.

"In 150 years we don't need Toronto Hydro, we will have solar heating and storage batteries."

In the near term, respondents saw reliability as the top priority, defined as maintaining the current reliability level at the lowest cost, while new technologies mature and become cost-effective.

"They have to focus on the core of the business – reliability."

"Making the infrastructure reliable, at least at today's level, would be the top priority."

"They should allocate funds towards maintaining the reliability levels we have now."

"There are many technologies coming on line, but with the cost problem, they can't be investing while they are cutting corners to save on rates. They should only invest where there is a positive rate impact."

"Don't expect too much unless the bill goes up."

"We don't face too many overages. If the costs of hydro go up much more, we don't have to worry about infrastructure or long term issues, we will be out of business."

"I don't see any industry that operates at 100% efficiency, what we are just trying to get better repair time. We are not suggesting increasing reliability is where to invest more money."

Respondents felt that the current reliability is reasonable, and although one who had a specific voltage swing issue cited quality as a priority, this was seen as a result of his own individual issue rather than a systemic issue affecting more customers.

"The quality of the commodity needs to be looked at, as a reliability issue."

There was no feeling that enhancing reliability at higher cost created value for their businesses. However, many felt that a longer term view towards investing with pay-back over a longer period, by investing in technologies that may reduce costs and/or dependency later, is valuable, even at a short term cost.

"Investing in renewable energy sources will pay off by getting us off the high cost contracts."

"Transitioning to renewables is the priority, even if it raises rates during the transition."

In Group 1, none really felt they had a fully formed solution. All recognized that the challenges they identified were tangible and had cost impacts. Their overall view was that Toronto Hydro needs to take cost-effective measures to maintain the infrastructure in place now, but not be purely reactive

to events. This was seen as a need for a 'plan' to minimize event-driven disruptions while investing effectively in the future.

"There is no magic solution here. You need to increase reliability or maintain it with these challenges coming that have cost implications. I don't have the answer."

"Patchwork infrastructure replacement is not very cost effective. They need an efficient plan that minimizes reactions to one-time events."

Many respondents recognized technologies being developed that may bring cost savings, but expressed a caution in investing too quickly in unproven technologies or what they saw as 'interim' technologies. The sentiment expressed was that early adoption may bring early obsolescence.

"Don't spend too much money on technology."

"In terms of technology I would rather wait. We cannot imagine today what might emerge, so anything we invest in today is probably obsolete right away. We are already way behind Asia and Europe. If we spend to catch up, we will still be behind."

To some, their view of Toronto Hydro investing in emerging technologies was clouded by their view on Smart Meters.

"I'm not sure they are using the best technology. The Smart Meters is how I judge that."

"Toronto Hydro must be squirrelling away money from these increases to put towards investments."

"I prefer the status quo."

"Reliability has to be the top. When the power goes out in our business bad things happen. Consistency is the standard."

Overall, the consensus was to invest, with acceptance of the rate implications, with a view to lowering longer term rates and enhancing business profitability.

"If manufacturers get a break in their cost they can produce more and bring back economic benefits."

1.4 MASH & Other Customers

Group 2 consisted of a range of business customers: landlords, property developers, an event company, the electricity manager for a major school board, and the Vice-President in charge of electricity at Toronto Community Housing. This dynamic, with two highly engaged and knowledgeable respondents and some smaller, but still highly engaged but less knowledgeable participants, was very effective in elevating the range of consideration for all.

Overall, respondents were very happy with Toronto Hydro service. Most had experienced power outages of a minor nature, or of a longer period attributed to weather related issue or other unpredictable event. All felt that Toronto Hydro's performance in outages is excellent.

"I find them very helpful and accommodating."

"In power outages, they are great."

"24/7 in power outages."

"They are operating within a highly regulated framework, but with us they really do step up to tailor programs to help our tenants."

"Power interruptions are so few and far between it really is very impressive."

"I am downtown, that system is really old."

"It never takes more than an hour to get the power back on."

"I come from Mexico, if there is a slight wind the power goes out, here it is just great."

Overall, expectations surrounding power outages were purely communications related. Most felt that Toronto Hydro does a good job at this, whether a planned service interruption or a spontaneous outage. Some, whose businesses were highly dependent on absence of even minor outages, felt they had some personal responsibility to provide 100% continuity, and that it was not entirely reasonable to expect Toronto Hydro to achieve complete elimination of any outages.

Communications was defined by all as simply the information they need to make a business decision, which is an estimated length of outage. Some felt that when they know the area or extent of the outage, and factor in the weather conditions, they can make an estimate themselves.

"I just expect that they communicate about the length they expect."

"We just need 24 hours' notice of any planned work in the area, which they usually do."

"I just need an idea of when it is coming back on, so I can tell my tenants."

"The last thing I need to hear is 'I don't know'."

"If you need power to be absolutely running 100% of the time without exception, you have to get a backup generator."

All respondents felt strongly that Toronto Hydro understands their business concerns with regards to reliability.

However, most had only made superficial inquiries or research into available incentives or conservation programs that would help reduce their costs. Conservation as a means to enable cost savings was a major focus and expectation of all respondents.

Respondents identified that they had primary responsibility in conservation. However, they felt that Toronto Hydro could assist them by making access to conservation information more easily accessible. Some felt that Toronto Hydro programs were tailored, or at least more accessible, to customers larger than they are. Many felt that the application process for programs was very labor intensive and complex.

“The large customers probably have the knowledge but the smaller ones don’t.”

Some noted that Toronto Hydro works well with other utilities and felt that they could collaborate for incentive and conservation programs more. Other suggested ‘bundling’ programs together to make them more accessible and less daunting.

Accessibility was primarily defined as website access in as few clicks as possible. It was also defined as promoting available programs more heavily to prompt customers such as them to inquire.

Accessibility to conservation information and programs, which respondents expected Toronto Hydro to provide, had some impact on overall rate viewpoints. Being pro-active in promoting and simplifying programs and incentives was highly valued, as respondents, faced with continued rate increases, recognized that their most direct route to mitigating rate increases is conservation.

“I haven’t spent enough time looking into incentives and resources to reduce my consumption.”

“They are very vague with conservation programs.”

“They are not territorial; they work with other energy suppliers to help us.”

“When we replaced lighting with LEDs they had an incentive.”

“I think they need a more user friendly website. The phone process is too slow.”

“Toronto Hydro should bundle incentives together based on volume to help smaller customers.”

“Customers need to have a pretty sophisticated team on the ground to be able to access things. The processes (applications) need to be streamlined.”

“As rates keep going up ultimately we have to make program decisions and customer decisions. Either we cut our programs or raise prices.”

“They have to find a way to cut the rates. They have 11% projected annual increases. I understand where they come from, but they have to find a way.”

Although respondents recognized that Toronto Hydro is only a relatively small part of their overall electricity bill, they felt that Toronto Hydro ‘owned’ some responsibility for being the first touchpoint in helping mitigate rate increases – as Toronto Hydro sends the bill for all related components; respondents felt they had primary responsibility for helping reduce impact for all components.

“When I get a bill, it says Toronto Hydro on it ... that is where their image problem is. I assume it is all going to them.”

Respondents were primarily concerned with the rising costs impeding their profitability, or being passed on to customers where possible and competitively feasible. Even more than the quantum of rates, predictability of rate changes was very important to business planning. In this sense, consistency and predictability were valued above the absolute amount of the rates.

“Electricity is an essential service. When the amount we can save through conservation is exceeded by the rates increases, that just gets passed on to customers or shareholders.”

“We need budget predictability over several years.”

Respondents identified consistent range of challenges facing Toronto Hydro, and the electrical distribution system, on the horizon.

“Increased demand will bring reliability issues.”

“Environmental challenges – producing electricity that produces environmental challenges, such as carbon footprint.”

“Power shortages through over-usage will increase, that goes with climate change.”

“Climate change, global warming, we need electricity but the costs of green energy are unsustainable.”

“Toronto Hydro has infrastructure issues that will only get worse with sharing of the grid.”

“A lot of Toronto Hydro’s distribution is above the ground and that will be a huge issue with increasingly extreme weather.”

In this group only, due to the unique mix of respondents, we were able to probe on whether an internal plan and specific actions were undertaken:

“We have a plan to deal with these things. The first step is in occupant behaviour.”

Landlords, as well as the school board, recognized that changing the behavior of occupants/individual locations was part of the solution. Others agreed with this, and felt that aside from rate concerns, behavioral change was simply good corporate citizenship. The larger respondents were aware that Toronto Hydro has plans to address these issues, others were not. Being aware that there is a plan caused some attitudinal change in the unaware. Their view turned to transparency as being made aware, particularly in terms of impact on rates, as being aware of the identified challenges and the existence of plans to address them (none identified a need to be made deeply aware of the actual plans) significantly abated any entrenched opposition to any rate increase. This also helped mid-level respondents obtain buy-in on rate increases from upper management.

“We have discussed it at our green committee, but no real plan.”

Smaller businesses are aware but may have no plan. The two larger organizations represented did.

“We have a five year plan that has a target of 4% reduction every year.”

“We looked at what the carbon footprint is of all our buildings and looked at what a realistic reduction target could be. We have identified the capital cost of achieving a 34% reduction by 2024, but we need funding to support that plan.”

“Our plan is simply to reduce costs. So far that is changing to LED lighting.”

“Cost is the driver but it is also part of being a good global citizen.”

“Resiliency is part of the plan – bringing in resources to deal with systemic challenges. Toronto Hydro is working with us on a pilot project bringing in new technology.”

"My employer is always interested in the costs, so that is the point where Toronto Hydro can help me get buy-in on any programs they have. Increasing awareness is important to that."

Respondents uniformly consider Toronto Hydro's main responsibility is to keep the power on. Overall, respondents all felt Toronto Hydro does a good job of it. Respondents were very aware that a key issue is aging infrastructure, which, combined with population growth and demand increases from new uses, are going to intersect in the near future.

Respondents were willing to accept short term increases that maintain current reliability. At the same time, there was a consistent view that Toronto Hydro's priority should be threefold:

1. Adopting new technologies that will reduce dependency and costs in the future
2. Enhancing incentives for conservation and increasing awareness of conservation programs
3. Be future oriented – maintain reliability at current levels and invest for long term gains

"Toronto Hydro's main responsibility is to provide electricity to my buildings."

"If you build awareness of programs and provide incentives that will help with the aging infrastructure. Every dollar spent on conservation yield many more dollars saved on infrastructure."

"Lessening dependency on the grid is key to keeping rates down."

"Establishing local generation through co-gen should be ramped up."

"Make local generation easier. Take a nodal approach."

"Short term costs increases for longer term payoffs is a good investment."

"There is no sense in paying money for more reliability, that only means paying for more crews on the road, which is short term at best and doesn't pay down the line with the demands accelerating. The investments need to be very future oriented to reduce dependency."

"Right now rates are just increasing without any long term sustainable solutions."

"If you educate you will have less usage and that will bring less outages and strain on the grid."

Respondents felt that there is a highly politicized environment around electricity now, and this is an impediment to their understanding, and to a conversation about longer term, sustainable solutions. Increased transparency was seen as the solution, as many of the issues and possible routes to resolution were not seen as likely to be highly visible as Toronto Hydro's plans are implemented.

"Political issues. Politicization of electricity."

"More transparency will help de-politicize."

"Our concern is about transparency, we don't know why they are increasing the rates so much. There is no difference in the service."

"It needs to be clear where they are investing so it doesn't become a political football."

"Toronto Hydro has to obtain public concurrence in addressing the problem. They have to be very transparent in obtaining that concurrence. The first step is making sure that everyone understands why rates keep going up."

"They need to show they are shaping a path for future generations. They need to shift the conversation away from justifying increases to the bigger picture."

As to how to increase understanding and awareness, respondents felt that the traditional 'insert in the bills' is not effective, and Toronto Hydro has to take a more active approach.

"It can't just be in an insert in the bills. We don't see those."

"Nowhere on the bills does it say 'for more information on rates call this number'."

"Their website is not user friendly in getting this information."

"Toronto Hydro should show the consumer where they are going with electricity quality, wholesale price, and technology solutions..."

"I get a lot of pamphlets in the bill that I don't read. It needs to be more interactive, inserts are very old school."

"I didn't even know I could see my metering information online until I called them."

Many respondents, particularly in condo or property management, were very low-tech.

"Toronto Hydro needs to go global and go big in their thinking."

Respondents, particularly the two representatives of larger organizations, came away from the discussion encouraged and enthusiastic.

"I've been writing down things tonight that are great ideas I never knew before."

"I am very heartened by this conversation tonight. Everyone around this table wants to know more and be part of the solution. Toronto Hydro has the right instincts in doing this."

1.5 Commercial Customers (Senior Managers)

Group 3 was a mix of commercial and residential property managers as well as a church pastor. These respondents were knowledgeable about Toronto Hydro being a local distributor, but had low knowledge of the electrical system overall and limited knowledge and understanding of their bills. There was some confusion at the outset about debt retirement and global adjustment, as well as ownership of Toronto Hydro.

"The debt retirement charge is gone now, it's the global adjustment."

"The facts I didn't know, like 30,000 km, and I thought Toronto Hydro got a bigger part of the pie."

"I didn't know the City of Toronto owned it. So the City should manage it, not the provincial government."

Overall, with one exception due to a billing issue, respondents were highly satisfied with Toronto Hydro's customer service. Touchpoints with Toronto Hydro were the same as in other groups, with some in Group 3 having had contact for retrofits and energy audits.

"I am in the Save On Energy program, I have a representative at Toronto Hydro who helps me a lot."

"Customer service is good, they are very accommodating and forthcoming."

"Same thing, they came out and went through the building very thoroughly and gave me good advice."

The respondent with a specific experience was not representative of others, and his negative view was formed by an expectation that Toronto Hydro, who as he saw it was in possession of knowledge he was not, should have been pro-active when his meter, which he feels is Toronto Hydro's responsibility, was out of service.

"Had a poor experience. A meter was offline for 6 months. It was a smart meter, so they would know immediately it was out. They were estimating my usage. They would not adjust the bill."

Now, he does not say that the estimate was different than actual might have been. He was simply angry that no one told him that the meter was offline.

"I only found out when I called to ask why my bill had gone up, it was way higher than I expected."

It is possible that this customer felt he had an opportunity to achieve an unexpected windfall and was denied.

Another suggested returning to early payment discounts, but other respondents were not in favor, believing that the discounts either come from other customers or are in effect not a discount but an increase to those who cannot pay in a relatively short period.

"I would like then to consider a discount again on early payments."

There were no other specific service related comments. Respondents overall felt that Toronto Hydro provided a high level of service and was responsive.

There was less discussion of outages and reliability than in other groups.

Group 3 identified a range of issues consistent with other groups:

- externally caused demand increase impacting reliability – population growth, technology
- climate change impacting reliability
- price increases of a systemic nature, outside Toronto Hydro's control
- aging infrastructure
- safety – due to infrastructure aging, climate change
- alternative energy sources becoming a larger supply source, concerns about reliability and ability to meet demand
- need for behavioral change among electricity users, both residential and business

"Everything runs on electricity today, more and more. This will increase demand a lot, going to EVs, other electrification."

"Climate change will start knocking down lines more often."

"Increasing population will bring a lot of people who can't afford power."

"The infrastructure has to be rebuilt and that is going to cost a lot. Even in nuclear safety."

"I have no confidence in alternative energy resources over the near term."

"In terms of conservation there has to be a mentality change."

Although there was great consistency with other groups in expectations of Toronto Hydro in meeting these challenges, Group 3 had an expanded consideration set and different priorities.

Group 3 was asked to perform an individual, written exercise intended to prompt respondents to expand their consideration set and think more broadly of trade-offs between cost and addressing the issues identified, by specifically identifying what creates value for their businesses. Groups 1 and 2 were given similar written exercises as well, but Group 3 was asked in terms of creating value, which Groups 1 and 2 were not. As a result, respondents were prompted to think less of their individual business concerns but to broader social and economic value.

Group 3 had a top focus on rates. However, they saw rates not purely in terms of their own bills, but more broadly – in terms of efficiency and more broadly than simply cutting costs. Their expectation was that Toronto Hydro makes smart, efficient choices when impacting rates. They identified that “*economic impacts*” be the key parameter involved in those choices, rather than simply ‘costs’.

However, having established economic impact as the over-arching expectation, Group 3 went on to identify 3 key expectations that related to rate impact which create value:

1. improving access to conservation programs and incentives, as a quality of service priority, streamlining program supplication processes
2. improving client education – information and incentives, but also by providing penalties for usages that do not conform to some normative conservation behavior
3. maintaining, but not enhancing, current reliability levels, upgrading and replacing on an “*incremental basis*” in a way that increases efficiency of distribution longer term

“They should do more to promote conservation with the public.”

“Focus on client education. As a landlord, we are the ones to suffer from the behaviour of the tenants.”

“The problem is in Canada we have had the freedom to use as much energy as we want for so long, so changing the attitude is hard.”

“Toronto Hydro’s job is getting it to us reliably.”

“Before the roof falls down you need to maintain it.”

“The focus has to be on maintaining infrastructure. If your roof is leaking, you have no choice. You can’t just patch it, which just puts it off and makes it worse.”

“Incremental increases are reasonable increases.”

“Maintain what you have.”

Respondents advised caution on adopting new, unproven technologies.

“I expect what I have now. I expect they should not be spending money on new and untried things. McGuinty did that and look what happened.”

“I’m happy with service right now. “

“On the subject of tradeoffs – quality of service vs. incremental increases. I am willing to pay more for a quality service. All aspects of service.”

The overall trade-off between cost increases and service was uniformly seen as “*Dependability over cost*”.

Respondents in Group 3 saw electricity as an essential service that must be reliable, at the current levels. They saw investing in 'soft' aspects of service, particularly those that promoted conservation and behavioral change, as having high value both short and longer term, easing some of the pressures facing the distribution system as new technologies and sources become proven, reliable and cost effective.

"Canada is a cold country. We need reliable electricity, it is not a luxury. This is not the Caribbean."

"You can't get cheap and high end reliability at the same time. I favor dependability over cost."

"There are no tradeoffs. Electricity is an essential service."

In terms of how to communicate with customers to promote conservation, respondents were vague but cited advertising and educational campaigns. They were specific, though, in stating that flyers inserted in bills may have limited reach.

"The information on flyers only gets to the bill payers, not the tenants."

1.6 Commercial Customers (Finance and Accounting Staff)

Group 4 was composed largely of mid to junior level respondents, primarily in residential landlord companies, who might be best characterized as accounts payable staff. As a result, they had little knowledge of electricity or Toronto Hydro beyond their narrow role in processing monthly invoices, or in some cases making basic inquiries on any billing anomaly or missing bill.

We chose to probe more deeply on functional aspects of their billing interactions, particularly the issues or concerns related to billing. In the later phase of the group, we elected to create a spontaneous paired dyad exercise to push respondents to collaborate on broader future issues beyond their limited job scope.

Overall, contact points with Toronto Hydro were more limited than in other groups – primarily occasional billing inquiries, which generally were about a missing bill or a perceived anomaly on the billing. The consideration set towards Toronto Hydro in this group was very limited, centering on aspects of processing bills.

"Just about the billing."

"I get the bills and I pay them."

"Calling about a missing bill."

Few had other contact points with Toronto Hydro, but *some* noted vaguely that they had inquired about conservation programs, usually promoted by receiving a higher than expected billing. There had also been contact about tenants moving, where the landlord paid hydro directly. One had contacted Toronto Hydro about an electricity reseller who solicited at his office.

"They have some conservation programs I have asked about."

"Calling about tenant move in and move out."

"I have called them about people coming to the door offering discount rates. I tell my department to call Toronto Hydro to ask if they are legit."

"We have had no issues with Ontario Hydro calling in."

In general, respondents were satisfied with Toronto Hydro's service, which to this group, was generally driven by phone contact. One respondent had a specific issue causing him to have a negative view.

"We had our plaza shut off because of an unpaid missing bill."

Probing this issue showed that the respondent likely had an internal issue where notices of the overdue bill apparently were not followed up on. Upon reduction through probing, the sole issue was that the respondent felt that Toronto Hydro should have recognized his business as a long-standing customer and contacted directly by phone before disconnecting. However, he was uncertain as to whether there had, in fact, been any phone notification.

Another specific issue was raised by a respondent who was an accountant who worked previously in bankruptcy, who felt that as a trustee Toronto Hydro did not consistently apply Bankruptcy Act rules around reconnection, and that when contacting Toronto Hydro, he would receive different responses from different representatives. However, his time acting as a trustee may not be very recent.

"I have found (in trustee situations) that they don't know or apply the rules consistently."

Focusing on aspects of billing interactions with those whose jobs involved clerical processing of invoices, most comments involved modernization of billing practices, particularly online access to billings, and flexibility in setting umbrella or 'master' accounts for landlords with multiple properties.

"They won't send me a missing bill by email, and they charge \$15 every time."

"We need the bills in paper."

"We tried to get e-bills, they could only do it by individual property, which is not how our company is set up."

"Other utilities make it way easier to set up e-billing."

In situations where there has been an omission or oversight on the customer's part and disconnection has been threatened, respondents noted that, as corporations, Toronto Hydro's requirements on payment do not fit with many corporation's practices. This was of particular concern to landlords holding multiple properties and/or units, and was related to the identified issue of ability to set up 'master' accounts.

"Corporations can't pay by credit card."

"One issue we have is paying a hydro deposit for each property we own, instead of a global corporate deposit. That money could better be used towards retrofits and other things."

In terms of phone contact, respondents at this level simply wanted reduced hold time. It was noted that many of the 'accounts payable' type respondents were relatively 'low-tech' in their jobs, which may be common among smaller industrial and property management customers.

"I hesitate to call them because I'm afraid I will be on hold for 15 minutes."

"They have actually gotten better at that."

"They could utilize email better, modernize how they send bills."

"Answer my questions in a timely manner."

"The more efficient in their responses they are, the more efficient we can be in our jobs."

"I get the bills from Toronto Hydro so that's who I ask about anything."

In common with other groups, Group 4 perceived Toronto Hydro as their point of contact for everything electricity related. They had a broad expectation of Toronto Hydro as an arbiter and focal point for advising them on how to mitigate rising costs on the overall bill, regardless of where responsibility lies.

In that perceived role, respondents expected Toronto Hydro to show empathy and flexibility – the latter defined as being able to react to their unique operating circumstances.

"Business advisory – help with mitigating the rising costs."

"Consistency, compassion, efficiency, compatibility."

"Flexibility."

The industrial respondents cited competitive concerns with rising costs, and some noted that Quebec competitors are taking advantage of the disparity in electricity costs.

"We have a hard time explaining to customers in Quebec why electricity for machinery is so much higher here, we are losing market share."

Respondents in this range felt that they were not of sufficient scale to invest in energy saving retrofits, and that available rebate programs are not sufficient. Some noted that the application process is too cumbersome for businesses of their size.

"The bottom line is that the costs to retrofit are too high. We have units on baseboard heaters and we have proposed a small rebate on our own."

"The rebate programs are not enough of an inducement."

Group 3 had a limited range of future issues they could identify, and struggled to identify and issues beyond expected increases in demand. None had any concrete view on reliability and none had experienced any significant outages, and for many, who simply processed invoices, outages were not in their consideration set. For those who had limited experience of outages, there was a view that increasing demand was a driving factor, and an expectation that communications to provide the ability to make business decisions, rather than reducing occasional outages, was the priority.

"I wonder if hydro can continue to meet the demand."

"I expect 100% answer, not necessarily 100% no outages."

Respondents had limited knowledge or experience with conservation programs, and expected Toronto Hydro to be more pro-active in getting this information to them.

"They aren't getting any information to me on what (conservation programs) are available. For businesses just putting an insert in an envelope isn't good enough."

"They should offer rebates for people who want to get into solar power."

Paired Dyad Exercise – Priorities:

For the last phase of the group, given the limited field of view towards electricity the respondents demonstrated and relatively limited business view stemming from many respondents being in 'invoice processing' positions, we elected to create an exercise where respondents were split into

pairs, and asked to work together in those pairs to identify key issues that the electrical system is facing and where Toronto Hydro should invest as priorities. The pairs were asked to identify investment priorities based on where value is created for their businesses. By pairing respondents in dyads, the goal was for the interaction to elevate the consideration set and prompt broader consideration.

From this exercise, respondents identified a range of issues similar to other groups:

- Demand increases due to population growth and technology
- Reliability pressures due to aging infrastructure and increased demand
- Climate change impacting reliability
- Economic changes, in the nature of work and economic mix shifting demand patterns
- Customer service needs changing due to shifts in work patterns and technology

In all these issues, respondent pairs saw cost as an over-arching concern, and saw investing in conservation programs – particularly promoting conservation, and making access to information easier – as creating value that had impact on reliability and demand challenges.

From their vantage point, investing in customer service – modernizing tools and increasing efficiency of contact resolution – as being of high value.

“Reliability so they can meet demand, but don’t raise the cost beyond what it needs to be – maintain stability and reliability while keeping cost increases as low as possible.”

“Managing demand is part of reliability – push the programs to reduce consumption, which in turn helps keep the need for infrastructure upgrades to a minimum.”

“Upgrade their email and online customer service to make navigating easier for customers. Something like a chat feature on their website. They need to step up their ball-game.”

“Implement a ‘chat’ feature on their website to speed up service.”

“Reduce demand keeps reliability high.”

“We would accept extra costs for easier access to customer service.”

“We are looking for out of the box solutions that enable more efficient use of electricity and better reliability, and would pay more if they could demonstrate the value proposition.”

“We are not looking for Cadillac service or reliability, to us value is better and quicker service and communications.”

Overall, respondents through this exercise arrived at a similar position to other groups – maintain reliability at current levels, invest in solutions that maintain that reliability accepting that, in the short term, rates will go up, but with a payback longer term. In the short term, create value by streamlining customer service, adding online tools that make their jobs easier and more efficient.

1.7 Focus Group Appendix

The following two-page background primer was used in all four mid-market focus groups.

Toronto Hydro's Role in Ontario's Electricity System

Ontario's electricity system is owned and operated by public, private and municipal corporations across the province. It is made up of three components: **generation**, **transmission** and **distribution**.

Component	Description	Examples
GENERATION	Generating facilities convert various forms of energy into electric power.	Ontario Power Generation TransCanada Energy Ltd Bruce Power Samsung Renewable
TRANSMISSION	Transmission lines (high voltage lines) connect the power produced at generating facilities to transformer stations.	Hydro One
DISTRIBUTION	Distribution lines (at medium voltages) carry electricity to homes and businesses.	 Alectra Utilities Oakville Hydro Veridian Connections
RATEPAYERS	Electricity is consumed by local customers including homes and businesses. Customers of electricity distribution companies are often referred to as ratepayers.	

Where does electricity come from?

In Ontario, approximately 70% of electricity is generated by **Ontario Power Generation (OPG)**. This provincially-owned crown corporation has **generation** stations across the province that produce electricity from hydroelectric dams, nuclear reactors, and natural gas burning power plants.

Once electricity is generated, it must be delivered to the communities across Ontario in need of power. This happens by way of high voltage **transmission stations** and interconnected lines that serve as highways for electricity. The province has more than 30,000 kilometres of transmission lines*, owned mostly by **Hydro One**.

Toronto Hydro's Roles in Ontario's Electricity System

Toronto Hydro is responsible for the last step of the journey: distributing electricity to customers in the City of Toronto through its **distribution system**.

The City of Toronto

Toronto Hydro is 100% owned by the City of Toronto.

*Source: IESO. The Power System, www.ieso.ca

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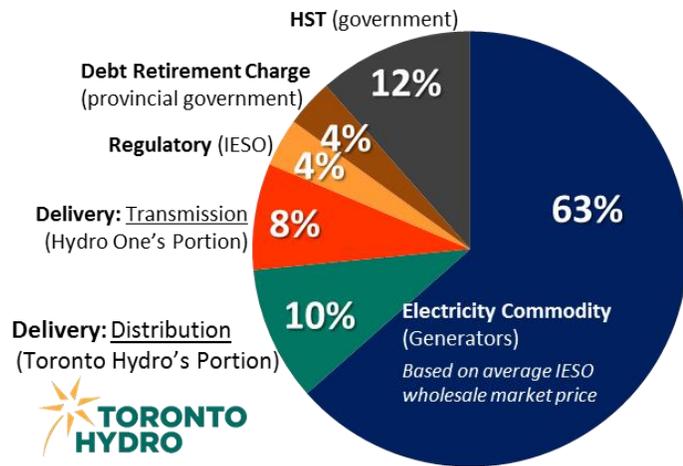
Electricity Bills: Understanding where your money goes

Your Electricity Bill: Every item and charge on your bill is mandated by the provincial government or regulated by the OEB. There are two distinct cost areas that make up the "Delivery" charge on your bill: **distribution** and **transmission**. While Toronto Hydro collects both, the transmission charge is remitted to Hydro One. The distribution charges include the portion of your bill that Toronto Hydro keeps, as well as some other "pass through" charges, most of which are remitted to the IESO.

The distribution charges which Toronto Hydro keeps make up about 10% of the typical electricity bill for general service customers with a monthly demand of 170 kW. The amount your organization pays varies depending on your peak demand.

The distribution fees collected from customers cover Toronto Hydro's capital investments and operating expenses.

About 10% of the average mid-sized business' electricity bill goes to Toronto Hydro. The rest of the bill goes to power generation companies, transmission companies, the government, and regulatory agencies.



SAMPLE GENERAL SERVICE > 50 KW MONTHLY BILL Toronto Hydro-Electric System Ltd.	
Account Number: 000 000 000 000 0000	
Meter Number: 00000000	
Your Electricity Charges	
Electricity Commodity*	\$9,402.72
*Commodity based on average IESO wholesale market price	
Delivery (Toronto Hydro's portion: \$1,479.09)	\$2,651.31
Regulatory Charges (IESO)	\$529.43
Debt Retirement Charge	\$525.00
Total Electricity Charges	\$13,108.46
HST	\$1,704.10
Total Amount	\$14,812.56

How are electricity rates determined in Ontario?

The electricity industry in Ontario is regulated by the **Ontario Energy Board (OEB)**. One of the OEB's roles is to review the distribution plans of all electricity distributors and set the rates that they can charge customers.

Toronto Hydro is funded by the distribution rates paid by its customers. Periodically, Toronto Hydro is required to file an application with the OEB to determine the funding available to operate and maintain the distribution system. Toronto Hydro must submit evidence to justify the amount of funding it needs to safely and reliably distribute electricity to its customers.

APPENDIX 1.3

Low-Volume Customer Needs & Preferences Survey

March 17, 2017

Prepared for:

Toronto Hydro

14 Carlton Street

Toronto, Ontario M5B 1K5



Low-Volume Customer Needs & Preferences

Building on the findings from the previous research phases, INNOVATIVE developed a survey instrument to determine THESL customer priorities and trade-offs between outcomes.

1.1 Methodology

INNOVATIVE conducted two customer surveys by telephone for THESL. In total, 627 low-volume THESL customers were surveyed between December 7th and 14th, 2016.

- A residential customer survey was conducted among 416 respondents.
- A general service customer survey was conducted among 211 respondents.

1.1.1 Sample Design

Survey respondents were randomly selected from customer lists provided by Toronto Hydro.

Respondents were only able to complete the survey if they were either responsible for managing or overseeing their organizations electricity bill or are primarily or have shared responsibility for paying their household electricity bill.

The sample was weighted down to n=400 to represent the actual distribution of Toronto Hydro customers by rate class, region and consumption levels.

Since the online survey was not a random probability based sample, a margin of error cannot be calculated. The Marketing Research and Intelligence Association prohibits statements about margins of sampling error or population estimates with regard to most online panels. However, a random probability based sample of n=627 would have an estimated margin of error of $\pm 3.9\%$, 19 times out of 20. The estimated margin of error would be larger within each sub-grouping of the sample.

Unweighted Sample

Region	Rate Class	Low	Medium-Low	Medium-High	High	Total
Toronto/ East York	GS	27	27	26	27	107
	Residential	38	37	39	37	151
Etobicoke/ York	GS	9	9	9	10	37
	Residential	21	22	22	21	86
North York	GS	10	10	11	10	41
	Residential	22	22	23	22	89
Scarborough	GS	6	6	6	8	26
	Residential	23	22	22	23	90
Total	GS	52	52	52	55	211
	Residential	104	103	106	103	416
Total		156	155	158	158	627

Weighted Sample

Region	Rate Class	Low	Medium-Low	Medium-High	High	Total
Toronto/ East York	GS	8	8	8	8	32
	Residential	31	31	31	31	124
Etobicoke/ York	GS	3	3	3	3	12
	Residential	17	17	17	17	68
North York	GS	3	3	3	3	12
	Residential	18	18	18	18	72
Scarborough	GS	2	2	2	2	8
	Residential	18	18	18	18	72
Total	GS	16	16	16	16	64
	Residential	84	84	84	84	336
Total		100	100	100	100	400

1.1.2 Survey Design

The survey questions asked of low-volume THESL customers were designed based on input from the previous phases of research. The questions were designed to assess importance of identified outcomes and then rank their relative importance.

The question wording was as follows:

Toronto Hydro regularly holds discussions with its customers to better understand how it should set spending priorities with ratepayer dollars.

In recent conversations with customers, a number of company goals were identified as priorities for Toronto Hydro.

Using a scale from 0 to 10, where 0 means not important at all and 10 means extremely important, please tell me how important each of the following Toronto Hydro priorities are to you as a customer?

Code	Response
00	Not important at all
01	
02	
03	
04	
05	Somewhat important
06	
07	
08	
09	
10	Extremely important
98	Don't know (DNR)
99	Refused (DNR)

Randomize

1. *Delivering reasonable electricity prices*
2. *Ensuring reliable electrical service*
3. *Ensuring the safety of electrical infrastructure*
4. *Providing quality customer service*
5. *Helping customers with electricity conservation and efficient usage*
6. *Enabling the electrical system to support the reduction of Greenhouse gases*

End Battery

Thinking of the priorities we just discussed, which is most important to you as a Toronto Hydro customer?

[Read list in same order as previous battery of questions]

Code	Response	
01	Delivering reasonable electricity prices	
02	Ensuring reliable electrical service	
03	Ensuring the safety of electrical infrastructure	
04	Providing quality customer service	
05	Helping customers with electricity conservation and efficient usage	
06	Enabling the electrical system to support the reduction of Greenhouse gases	
98	Don't know (DNR)	
99	Refused (DNR)	

7. *What is your top priority for Toronto Hydro?*
8. *What is the next most important priority?*
[remove answer from previous question, if asked to read again]
9. *And what do you consider the third most important priority?*
[remove answer from previous two questions, if asked to read again]

1.2 Outcome Importance and Rankings

In terms of relative importance, *safety*, *reliability*, and *price* seen as the most important priorities valued by THESL customers.

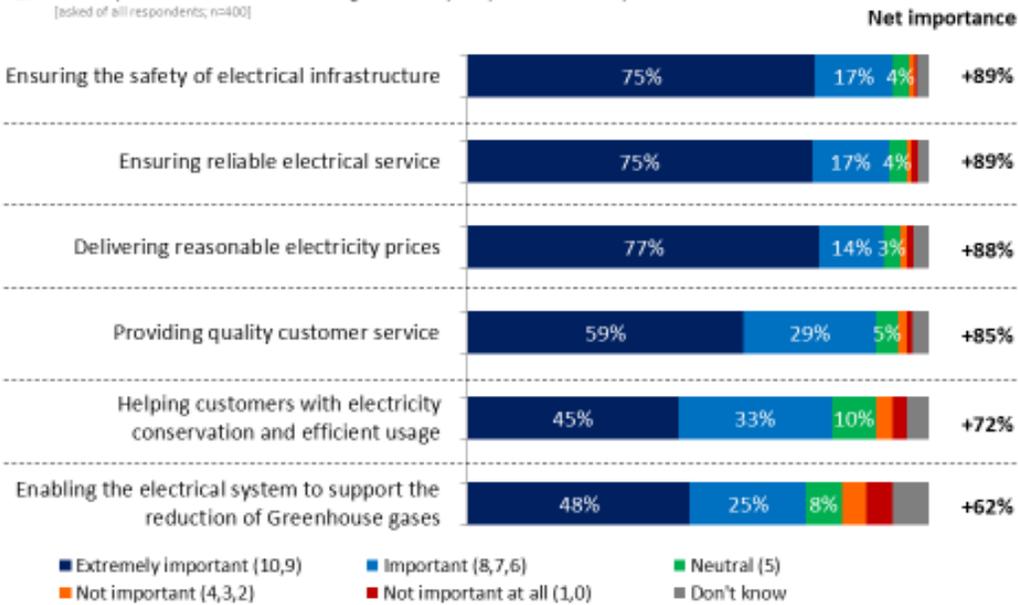
However, when asked to rank the top priority, among a provided list of outcomes, that Toronto Hydro should focus its efforts, "*delivering reasonable electricity prices*" is the clear priority for customers. In terms of rankings, *reliability* ranks second and *safety* ranks third, among a list of six priorities.

Relative Importance: Safety, reliability, and price seen as the most important priorities valued by THESL customers



Using a scale from 0 to 10, where 0 means not important at all and 10 means extremely important, please tell me how important each of the following Toronto Hydro priorities are to you as a customer?

[asked of all respondents; n=400]



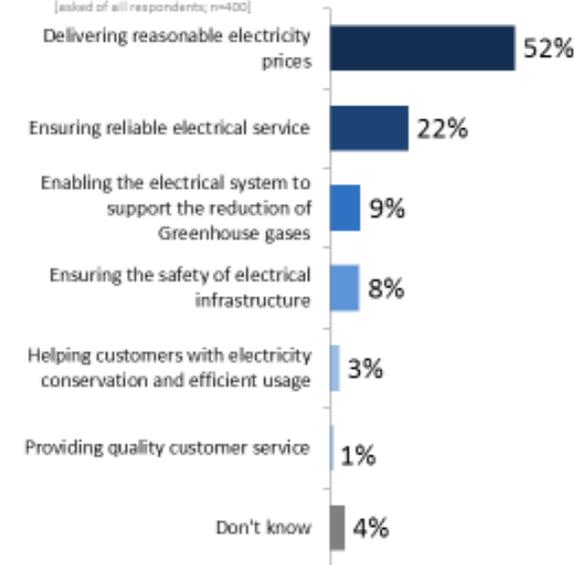
Ranking Outcomes: Over half (52%) identified *price* as their top priority, among multiple THESL outcomes



Thinking of the priorities we just discussed, which is most important to you as a Toronto Hydro customer?

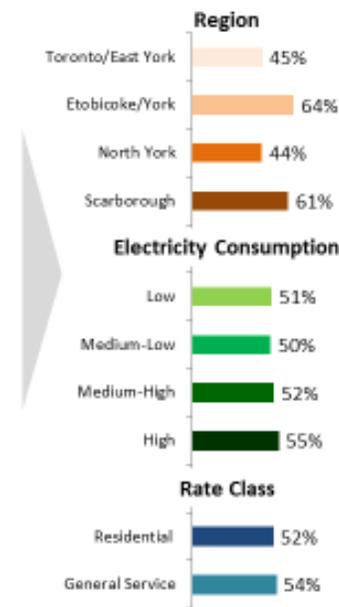
What is your top priority for Toronto Hydro?

[asked of all respondents; n=400]



Segmentation ▶▶

Respondents who say "Reasonable Electricity Prices":

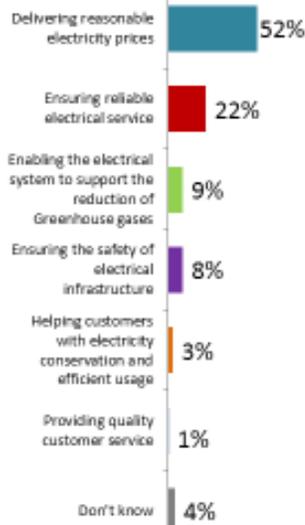


Ranking Outcomes: When asked to rank top three priorities; 1st price, 2nd reliability, and 3rd safety

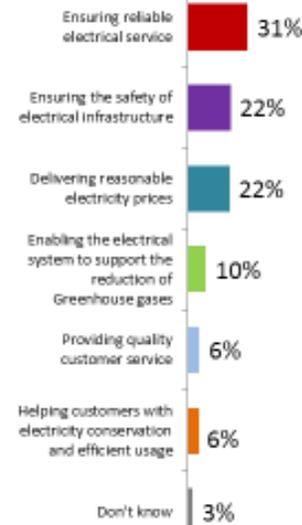
Q Thinking of the priorities we just discussed, which is most important to you as a Toronto Hydro customer? What is your top priority for Toronto Hydro? Next most important? Third most important?

[asked of all respondents; n=400]

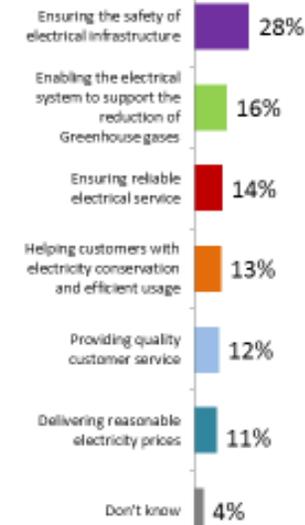
First Priority



Second Priority



Third Priority

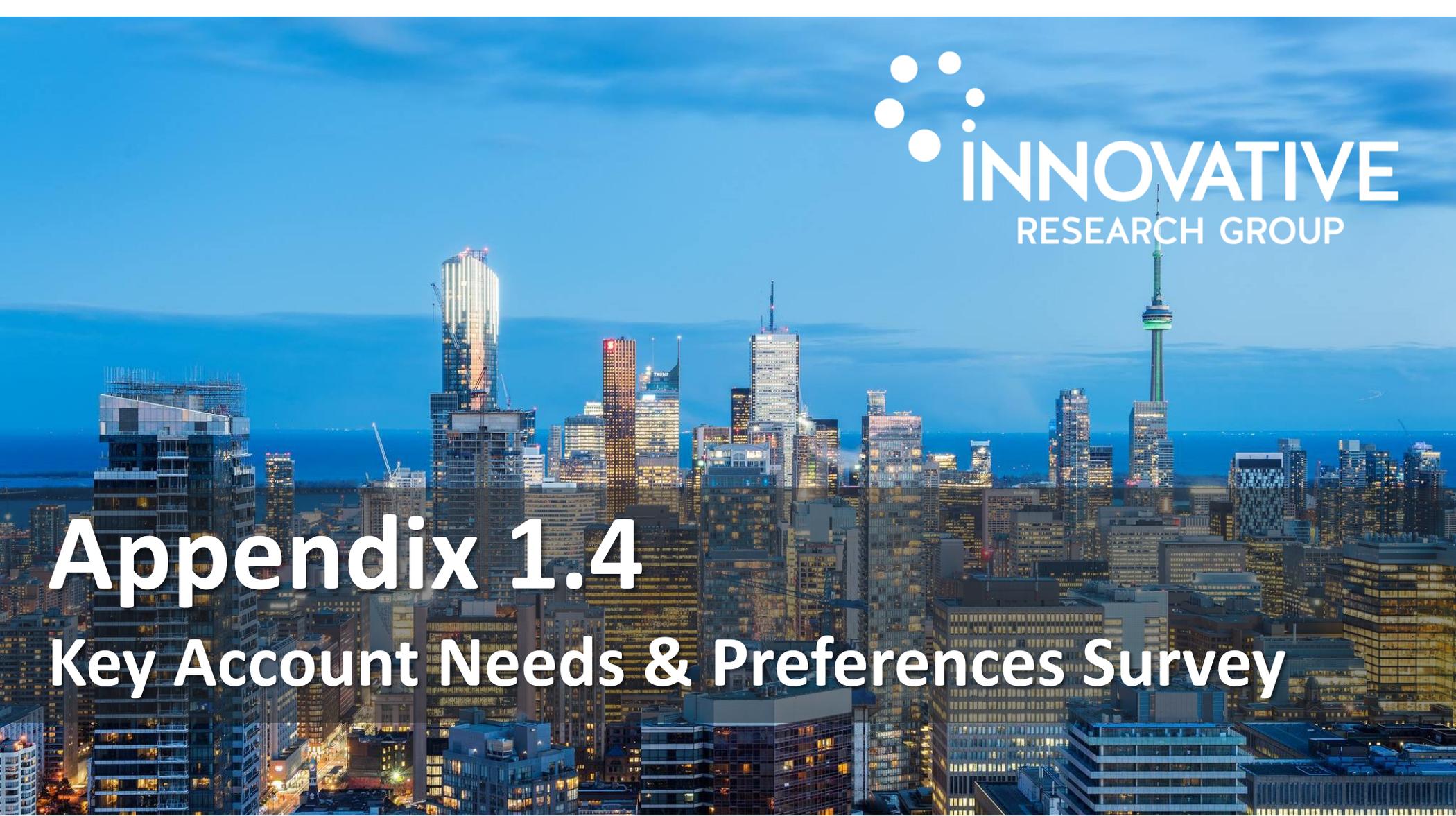


Multiple Mentions: Price, Reliability, and Safety top three identified priorities for Toronto Hydro customer outcomes

Q Thinking of the priorities we just discussed, which is most important to you as a Toronto Hydro customer? What is your top priority for Toronto Hydro? Next most important? Third most important?

[asked of all respondents; top three outcomes, columns will not equal 100%]

Total Mentions	Regional Breakdown				Rate Class		
	Total	Toronto/ East York	Etobicoke/ York	Scarborough	North York	General Service	Residential
Delivering reasonable electricity prices	83%	81%	85%	86%	81%	85%	82%
Ensuring reliable electrical service	64%	62%	69%	64%	65%	67%	64%
Ensuring the safety of electrical infrastructure	55%	56%	54%	49%	59%	50%	56%
Enabling the electrical system to support the reduction of Greenhouse gases	32%	38%	26%	26%	35%	27%	34%
Helping customers with electricity conservation and efficient usage	21%	19%	21%	27%	16%	18%	21%
Providing quality customer service	18%	20%	20%	17%	14%	23%	17%
Don't know	11%	10%	11%	11%	12%	12%	11%



Appendix 1.4

Key Account Needs & Preferences Survey

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 Services Ltd.



Key Findings

General Satisfaction

In line with Key Accounts' high level of familiarity with Ontario's electricity system, satisfaction with the service their organizations receive is high.

- Familiarity with the various parts of Ontario's electricity system is high among Key Accounts. Nine-in-ten (92%) report being familiar; 22% of those are *very familiar and can explain the details to others*. MURB Key Accounts (40%) are approximately twice as likely than other customer types to report being *very familiar*.
- Four-in-five (82%) report being satisfied with the service their organization receives, with the plurality (42%) *very satisfied*. Satisfaction levels vary according to customer type – Commercial: 78%; MASH: 95%; MURB: 100%; Industrial: 73%.
- Regarding Toronto Hydro's efforts to engage with management, the majority of Executive Management (67%) and Senior Managers (62%) feel they should maintain the current level of engagement, while 51% of Operations and Engineering feel Toronto Hydro should be doing more.

Corporate Attributes

Evaluations of all of Toronto Hydro's corporate attributes are net positive with more than half scoring a net agreement of more than +50%.

- Toronto Hydro's strongest attribute is providing its Key Accounts with quality advice and guidance (+75%). Areas to improve are providing good value for money (+43%) and being more than a just electricity distributor, but a business partner (+37%).

Priorities and Outcomes

Priorities regarding reliability and power quality are most important among Key Accounts.

- Rated *extremely* or *very important*, the top mentioned priorities are ensuring reliable service (93%), preventing or reducing length of outages caused by weather (89%), and ensuring safety of infrastructure (84%).
- Nine-in-ten (88%) have no additional priorities to suggest.
- The top ranked priorities are ensuring reliability, delivering reasonable prices, and system hardening.

Key Findings [2]

Power Quality and Reliability

Given the attributed importance of these capacities, Toronto Hydro is doing a good job managing power quality and reliability, however there remains room for improvement.

- The majority of Key Accounts are satisfied with the quality of power delivered to their organization (71%), and the reliability of their service (67%). A smaller majority is satisfied with the amount of time it takes to restore power (50%).

Price and Bill Impact

While a majority of Key Accounts find the portion of their bill allotted to Toronto Hydro to be reasonable, the impact of the total bill on their bottom line is significant for many.

- Three-in-five (60%) report familiarity with the breakdown of their bill, with MURB and MASH customers reporting the highest level of familiarity.
- Further, just over half (53%) find this breakdown to be reasonable, while only 10% find it unreasonable. The remaining 38% don't know enough to say.
- 78% agree that their bill has a major impact on the bottom line of their organization and results in some important spending priorities and investments being put off.

Regulated and Unregulated Services

Few Key Accounts suggest going beyond the status quo when it comes to extra and existing services, but there are common themes among those who do.

- Only 14% of Key Accounts say there are additional services they want from Toronto Hydro to which they're will to pay for. These services, management seminars, training and coaching regarding energy management and assistance with filing application.
- Modifications to existing services involve better access to meter interval data was most common among the 19% who had suggestions.

Key Findings [3]

Conservation and Demand Management

While the majority of Key Accounts feel Toronto Hydro does a good job of promoting CDM programs, alternative means of communication were suggested.

- CDM program participation varies among customer type. While more than half of Commercial (61%), MASH (74%), and Industrial (73%) Key Accounts have participated, this is the case for only 20% of MURB Key Accounts.
- That said, three-quarters (76%) say that Toronto Hydro does a good job of promoting CDM programs, including 80% of MURB Key Accounts.
- Providing concise and regular communications regarding energy management in the form of emails or newsletters is a common suggestion when asked how Toronto Hydro can better share information. Some also suggested webinars and joint forums with other utilities (e.g. gas and water).

Trade-off Between Reliability and Price

Throughout, power quality and reliability has proven to be a key priority among Key Accounts. However, there is a definite division in where they stand on the trade-off between reliability and price. This division appears to be anchored in customer type.

- 34% would be willing to **pay a bit more** to **maintain** the current level of power quality and reliability, while 22% would **pay more** to **improve**.
 - Separated by customer type, 57% Commercial, 67% MASH, 33% MURB, and 52% Industrial Key Accounts would pay more to either maintain or improve service.
- Only 11% prioritize **paying less** if this **resulted in lower** power quality and reliability.
- Finally, 34% of Key Accounts don't know enough to say.

Information Needs and Sources

Toronto Hydro provides valued management services, and has proven to be the number one source of information on electricity issues.

- Overall, the majority (67%) of Key Accounts are satisfied with Toronto Hydro's management services; the others (21%) are neither satisfied nor dissatisfied, or don't know enough to say (11%).
- All value statements pertaining to information needs and sources reflect positive outcomes. Most agree that they would like more information on how to manage costs (net +72%), and that better management of electricity costs will make their organization more competitive (net +70%).
- Toronto Hydro (75%) itself is the most common source of advice and information on electricity issues. The IESO (41%), BOMA (29%) and the Ministry of Energy (26%) are also top mentions.

Methodology

These are the findings of an **Innovative Research Group** (INNOVATIVE) online survey conducted among key account customers between February 23 and March 13, 2017.

Toronto Hydro provided INNOVATIVE with an email contact list consisting of the prime contact for each of its **275 key account customers**. INNOVATIVE provided each key account contact with a unique URL via an email invitation so that only customers identified by Toronto Hydro were able to complete the survey and complete the survey only once.

Customers were sent three reminder emails to encourage survey participation. In addition, Toronto Hydro staff followed up with customers by telephone to encourage survey participation.

The analysis of this survey is based on **63** eligible responses from Toronto Hydro's key account customers. The response rate of **22.9%** falls within the expected range for a survey of this nature.

Individual key account responses were anonymous and no identifiable respondent information was shared with Toronto Hydro. Responses were combined to protect the confidentiality of individual key account customers.

Category	Distribution		Survey Sample		Diff.	Weighted Sample	
	#	%	#	%		#	%
Commercial	102	37%	23	37%	--	23	37%
MASH	49	18%	19	30%	+12%	11	18%
MURB	27	10%	5	8%	-2%	6	10%
Industrial	94	34%	15	24%	-10%	22	34%
Other	3	1%	1	2%	--	1	1%
Total	275	100%	63	100%	--	63	100%

As illustrated in the adjacent table, the survey over-samples MASH customers and under-samples industrial customers. To correct for this skew in the data and better represent the views of the boarder rate-class, the sample has been weighted by the actual distribution of business categories.

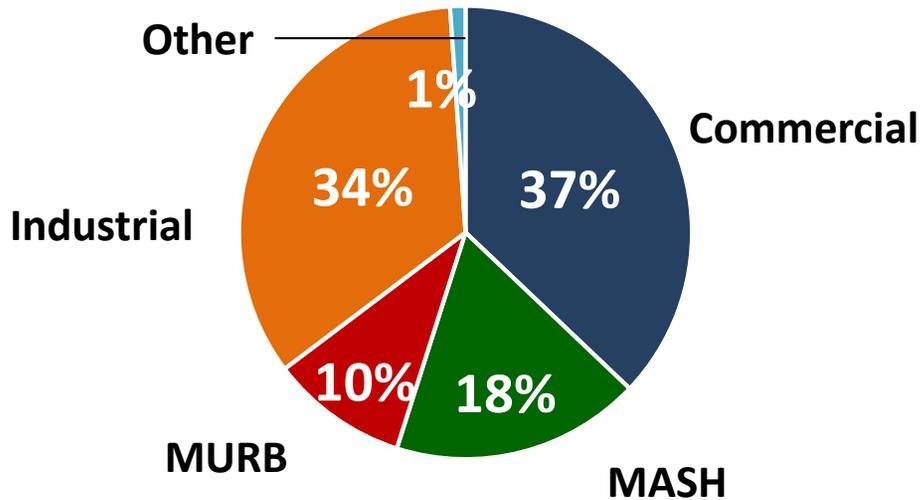
The estimated *Margin of Error* for a finite sample of this size is **±10.9%**, 19 times out of 20. The margin of error would be larger within each sub-grouping of the sample.

NOTES: References throughout this report such as “most” or “some” respondents cannot be projected to the full population of Toronto Hydro key account customers. Only a large sample, quantitative survey would be accurately projectable to the full population. In most cases, the findings from this small sample quantitative study should be interpreted as directional only.

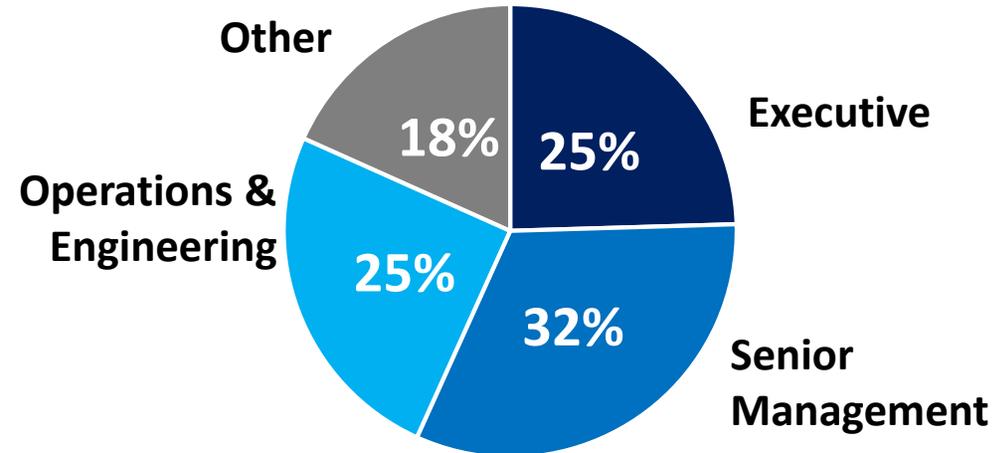
Graphs may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers.

Respondent Firmographic Profile

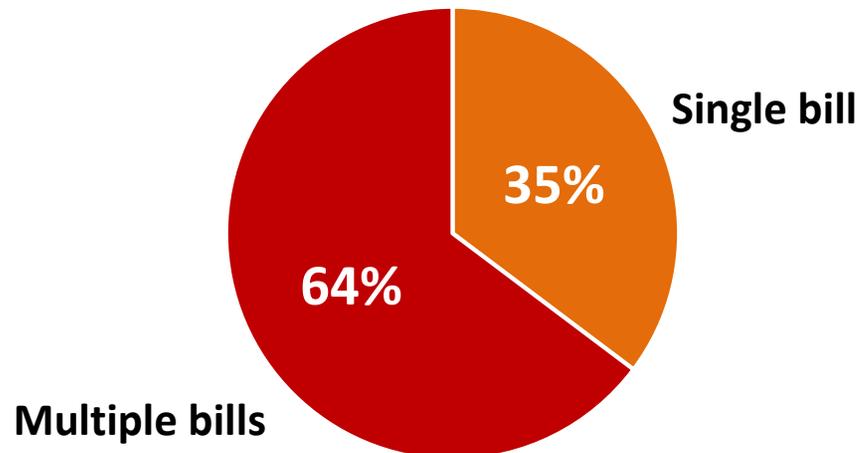
Customer Type



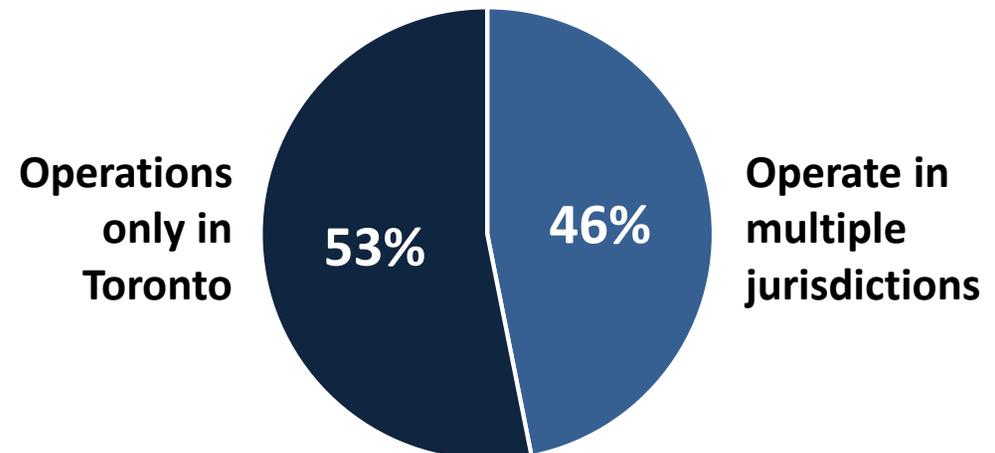
Respondent Occupation



of Electricity Bills from THESL



Jurisdictional Operations

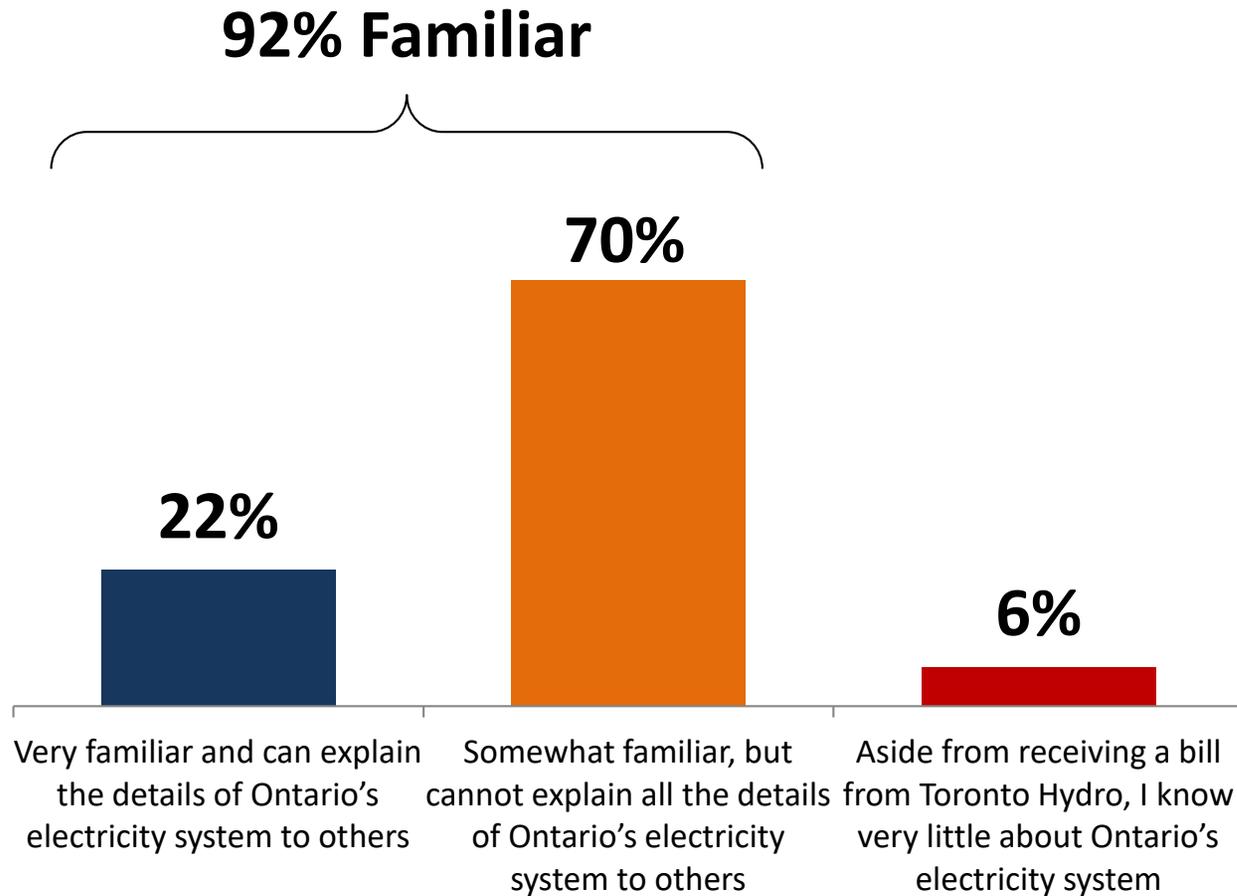


Note: "Don't know" (1%) not shown

Note: "Don't know" (1%) not shown

Familiarity: Nine-in-10 (92%) are familiar with Ontario's electricity system; 22% are *very familiar*

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?
 [asked of all respondents; n=63]

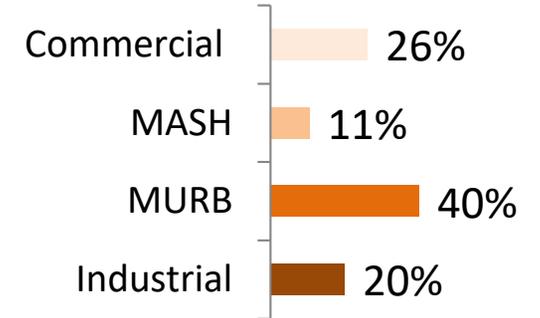


Note: "Don't know" (2%) not shown

Segmentation ▶▶

Respondents who say "Very Familiar":

Customer Type



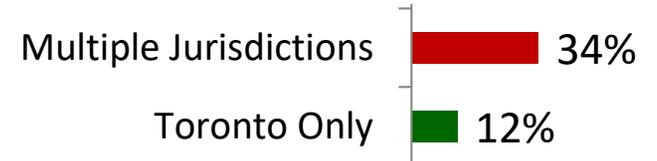
Respondent Type



of Electricity Bills



Toronto vs. Multiple Jurisdictions

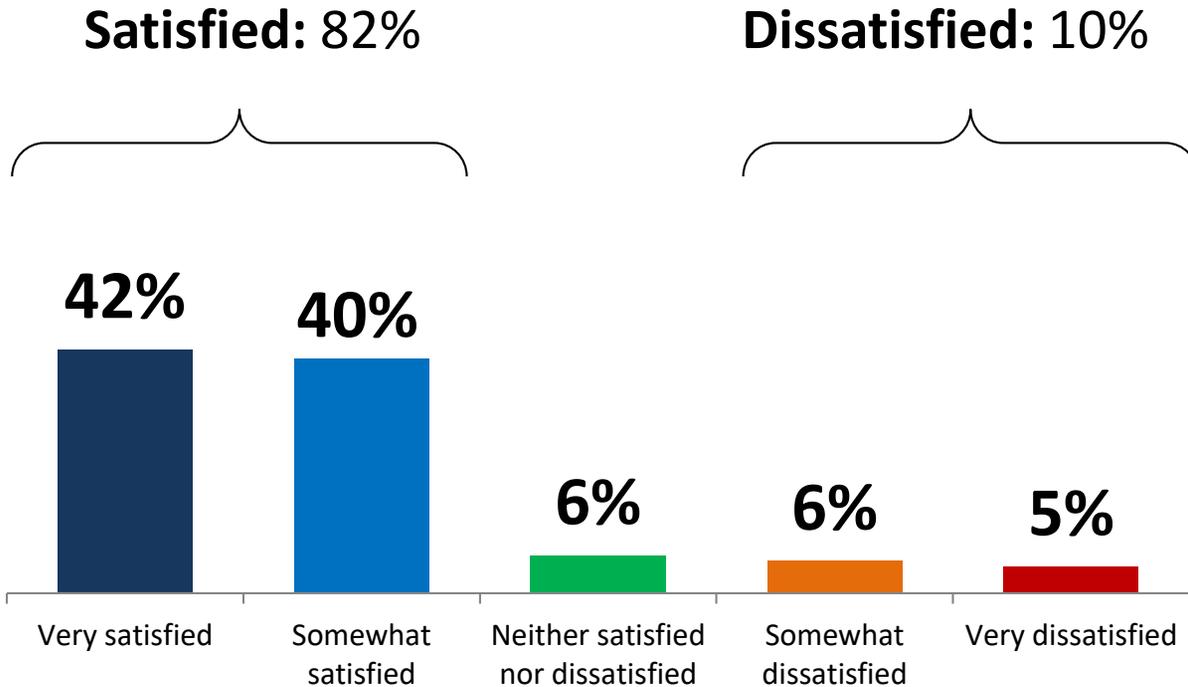


Overall Satisfaction: 82% satisfied with service; plurality (42%) somewhat satisfied

Q 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.

Generally, how satisfied are you with the service your organization receives from **Toronto Hydro**?

[asked of all respondents; n=63]

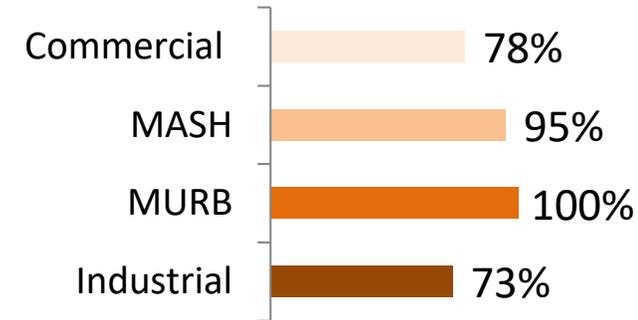


Note: "Don't know" (2%) not shown

Segmentation ▶▶

Respondents who are "Satisfied":

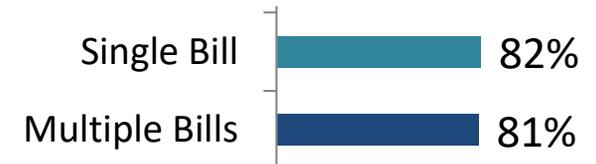
Customer Type



Respondent Type



of Electricity Bills



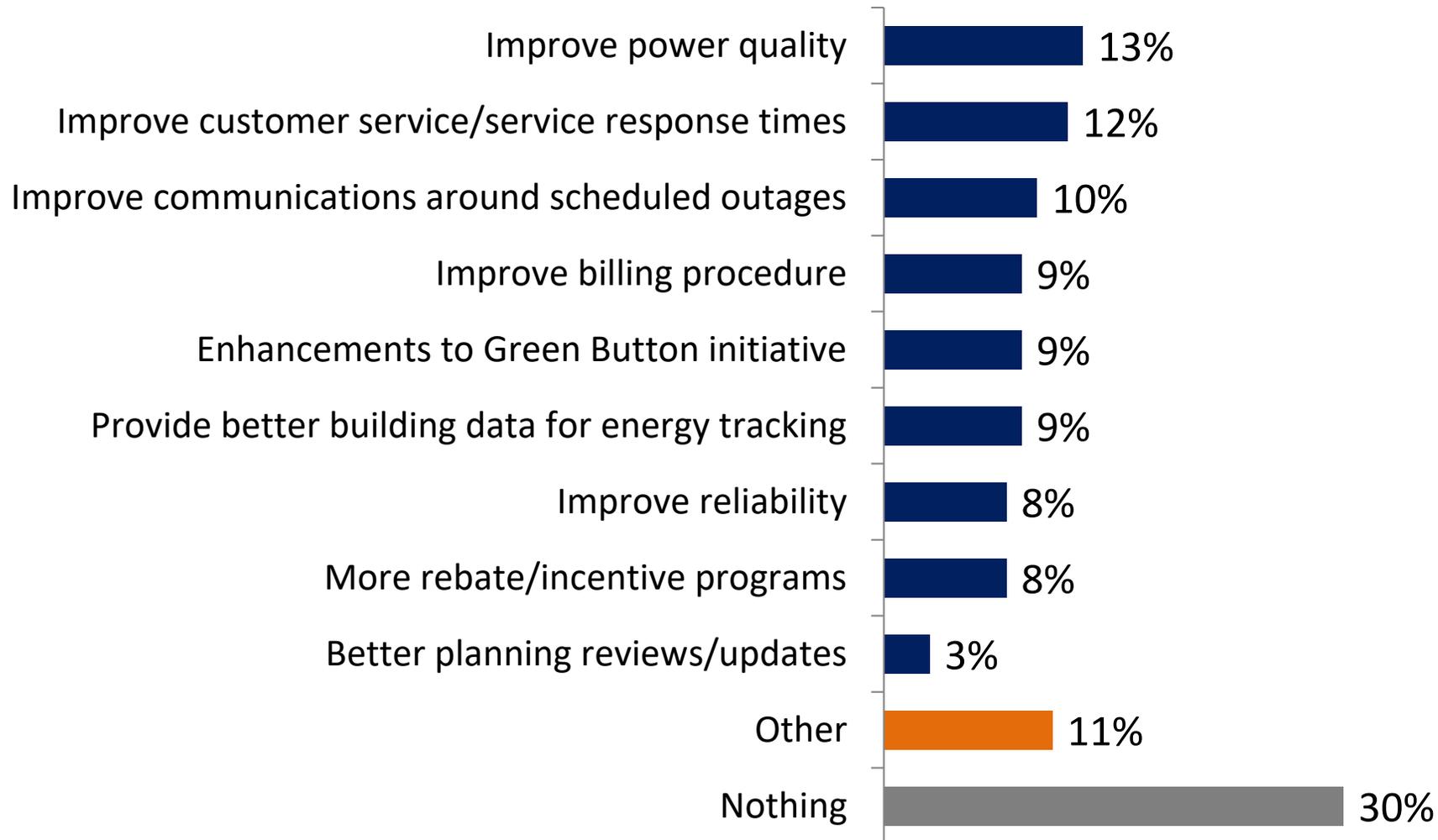
Toronto vs. Multiple Jurisdictions



Improvement: Plurality (30%) suggest nothing; power quality and response time next most commonly mentioned

Q

Is there anything in particular that **Toronto Hydro** can do to improve its services to your organization?
[OPEN-ENDED; multiple mention, asked of all respondents; n=63]

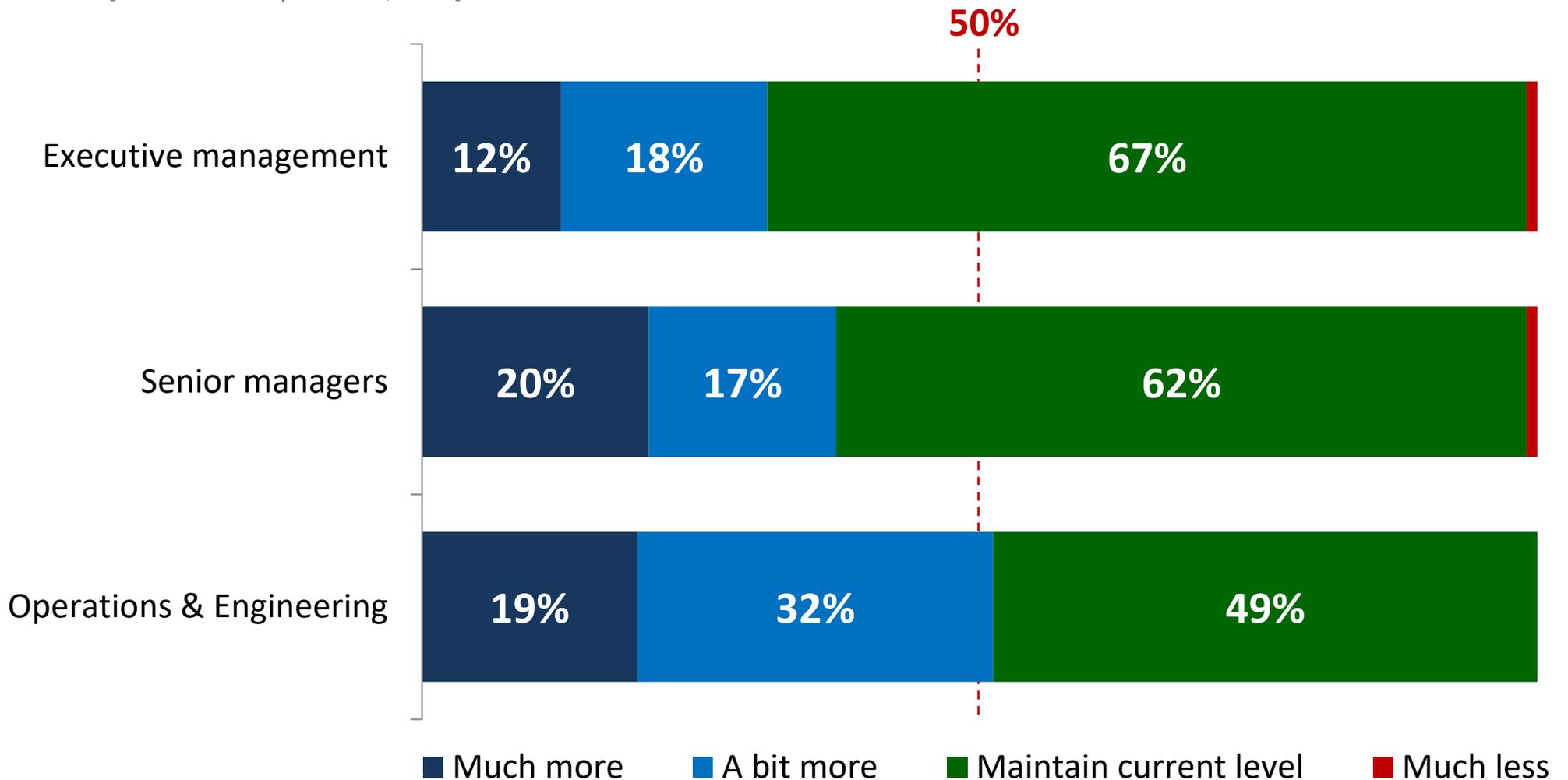


Engagement: for the most part, *maintain current level of staff engagement*; but greater effort required with O&E

Q

Do you think **Toronto Hydro** should be making more or less efforts to engage with the following levels of management at your organization?

[asked of all respondents; n=63]

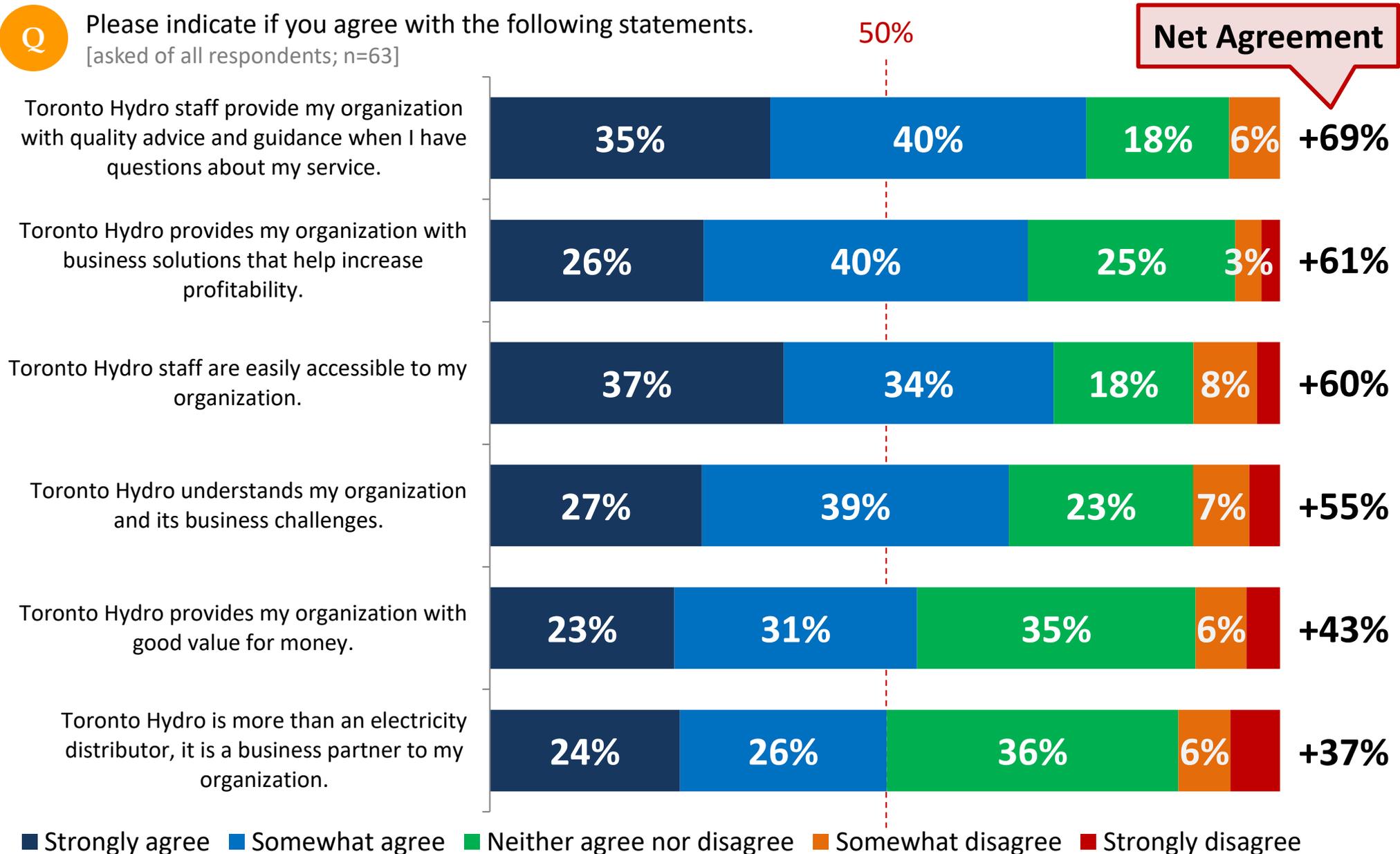


Note: Don't know (1% Executive management; 0% other levels of management) not shown

Corporate Attributes: Strong agreement on all tested attributes – particularly with advice, solutions, and access

Q Please indicate if you agree with the following statements.

[asked of all respondents; n=63]



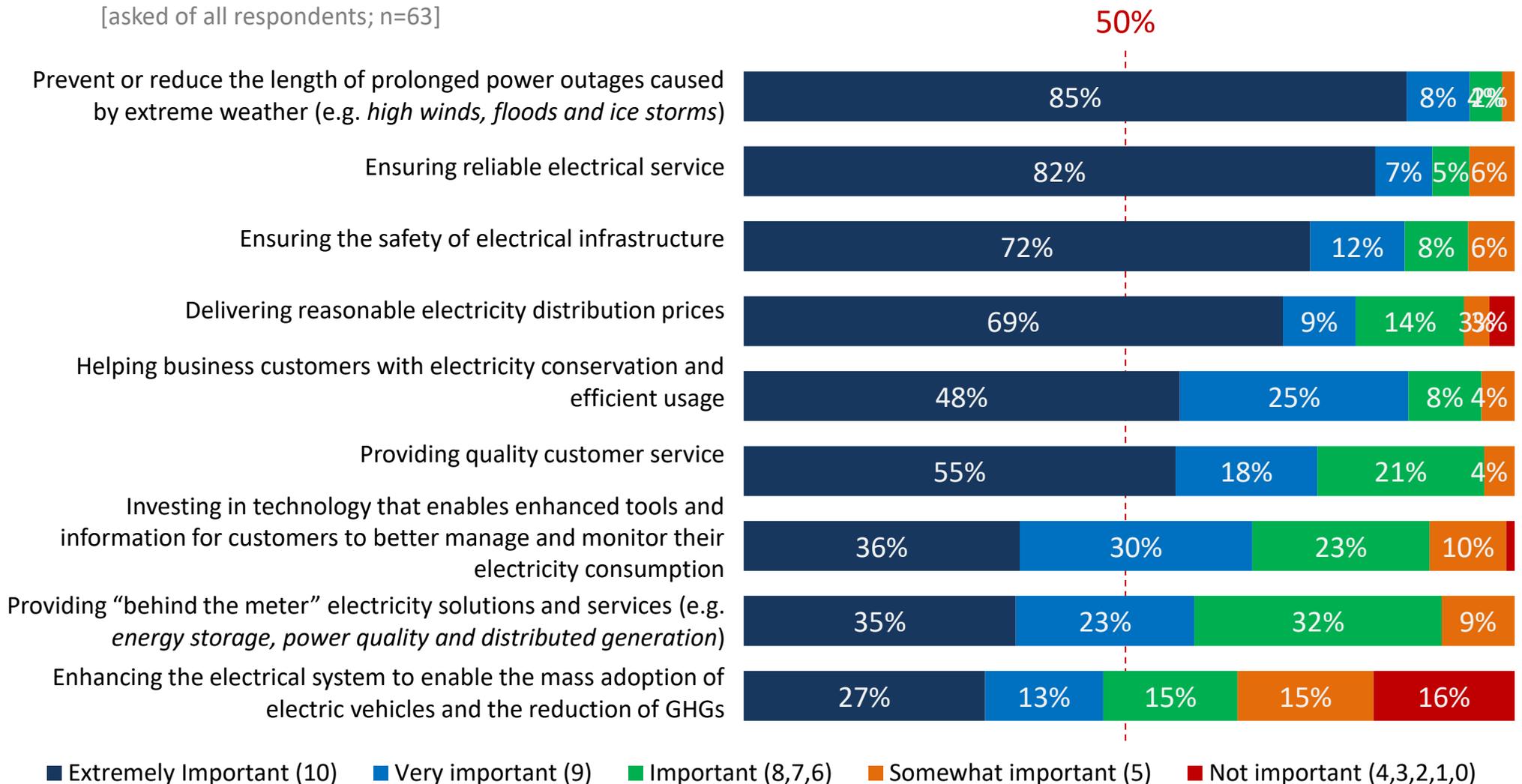
Note: "Don't know" not shown.

Priority Importance: Resuming service following an outage, reliability and safety are most important priorities ¹²



Toronto Hydro regularly holds discussions with its customers to better understand how it should set spending priorities with ratepayer dollars. In recent conversations with customers, a number of company goals were identified as priorities for Toronto Hydro. Using a scale from 0 to 10, where 0 means not important at all and 10 means extremely important, please indicate how important each of the following Toronto Hydro priorities are to your organization?

[asked of all respondents; n=63]



Additional Priorities: Majority (88%) suggest no additional priorities for Toronto Hydro

Q

Are there any other important priorities that **Toronto Hydro** should be focusing on, not mentioned above.
[OPEN-ENDED; asked of all respondents; n=63]

No

88%

Green
Button
Initiative

6%

Other

8%

- TH should be forcefully engaging with City planning to prevent as much kW/m² increase in buildings in the core. Buildings downtown should be watt density neutral or MORE efficient than the buildings they are replacing.
- Enabling our electrical contractor to reset tripped main breakers - only when Toronto Hydro staff/contractors are not available.
- Ensuring the Toronto Hydro's network is fully protected against cyber attacks.
- Find a solution how to monitor and control the subcontractor like Enercare

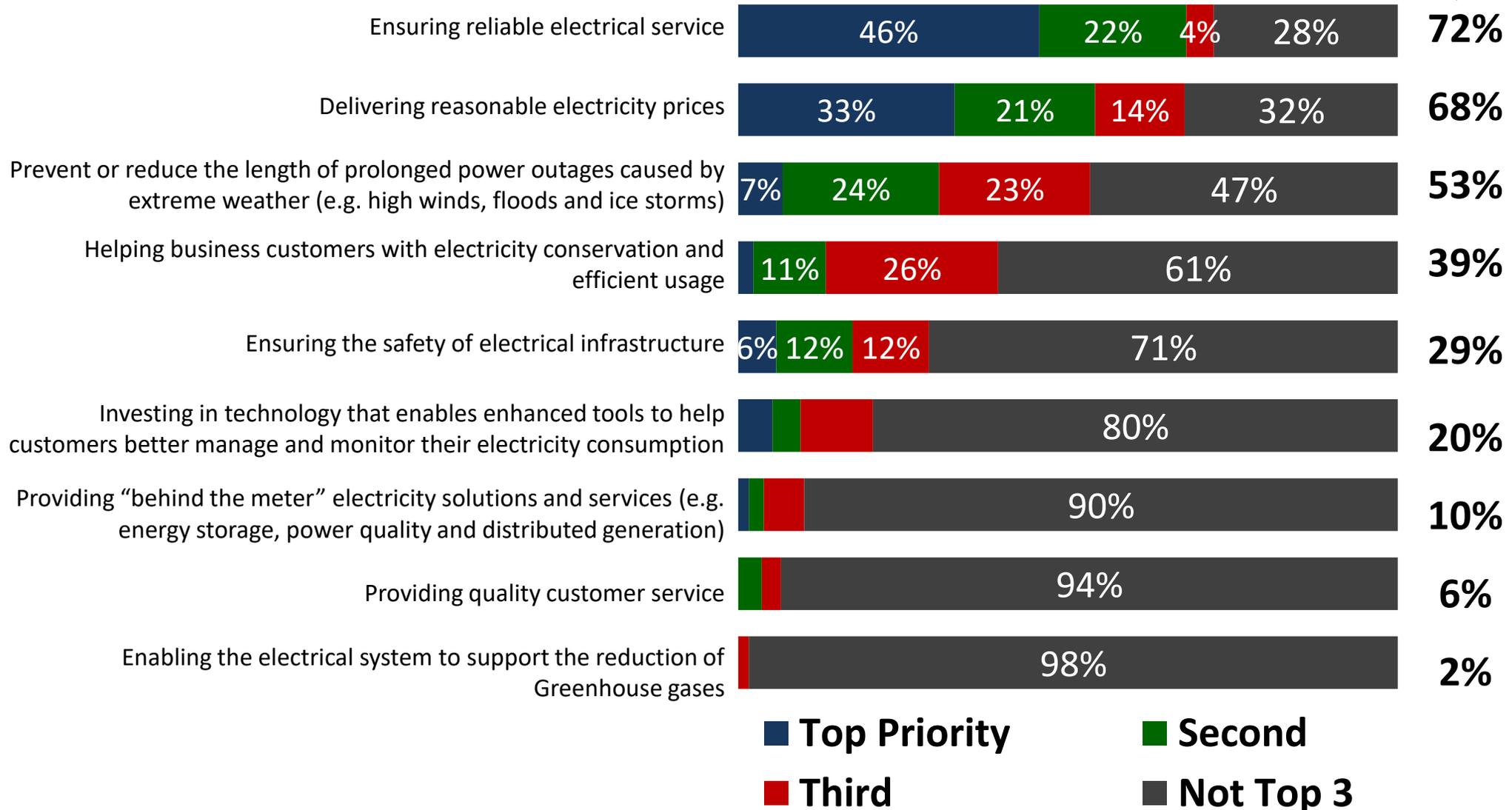
Priority Rankings: Top priorities include reliability, price, and system hardening

Q

Thinking of these priorities, which are the top three most important to your organization?

[asked of all respondents; n=63; multiple mention]

Total Mentions



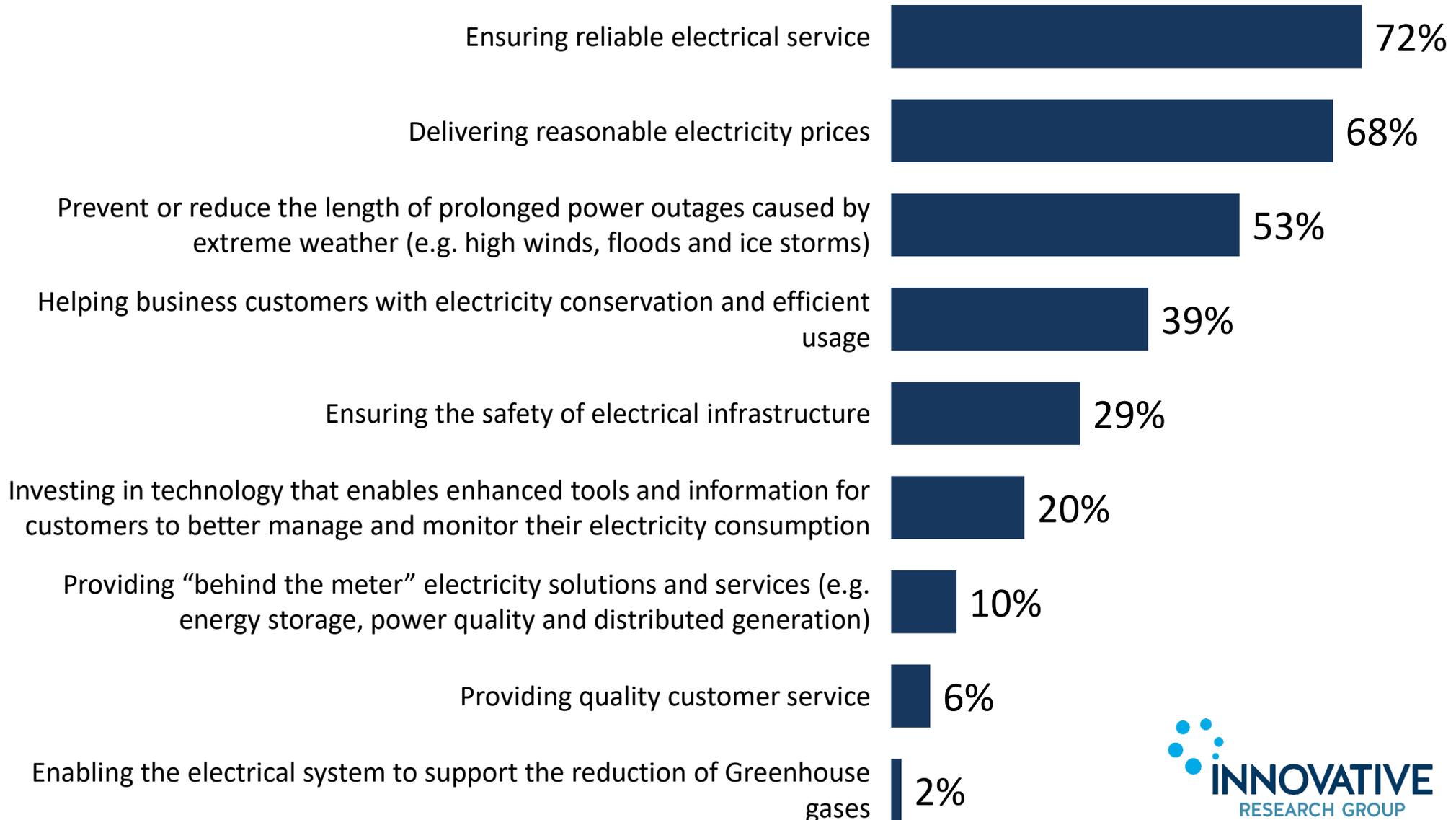
Note: "Other priorities" (0%) not shown

Top 3 Priority Rankings: Majority ranked reliability, price, and system hardening as top priorities

Q

Thinking of these priorities, which are the top three most important to your organization?

[asked of all respondents; n=63; multiple mention]



Power Quality and Reliability: 57% net satisfaction for power quality, 49% for reliability, 36% for restoration time

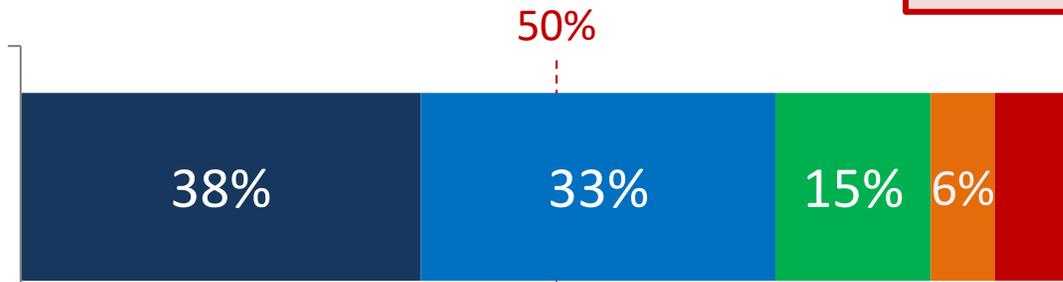


The following statements are about the electrical service that your organization receives from Toronto Hydro. For each statement, please indicate your level of satisfaction or dissatisfaction.

[asked of all respondents; n=63]

Net Satisfaction

The quality of the power delivered to your organization (as judged by the absence of voltage fluctuations that may affect your equipment).



The reliability of your electricity service (as judged by the number of power outages you experience).



The amount of time it takes to restore power when power outages occur.



- Very satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Very dissatisfied

Note: "Don't know" not shown

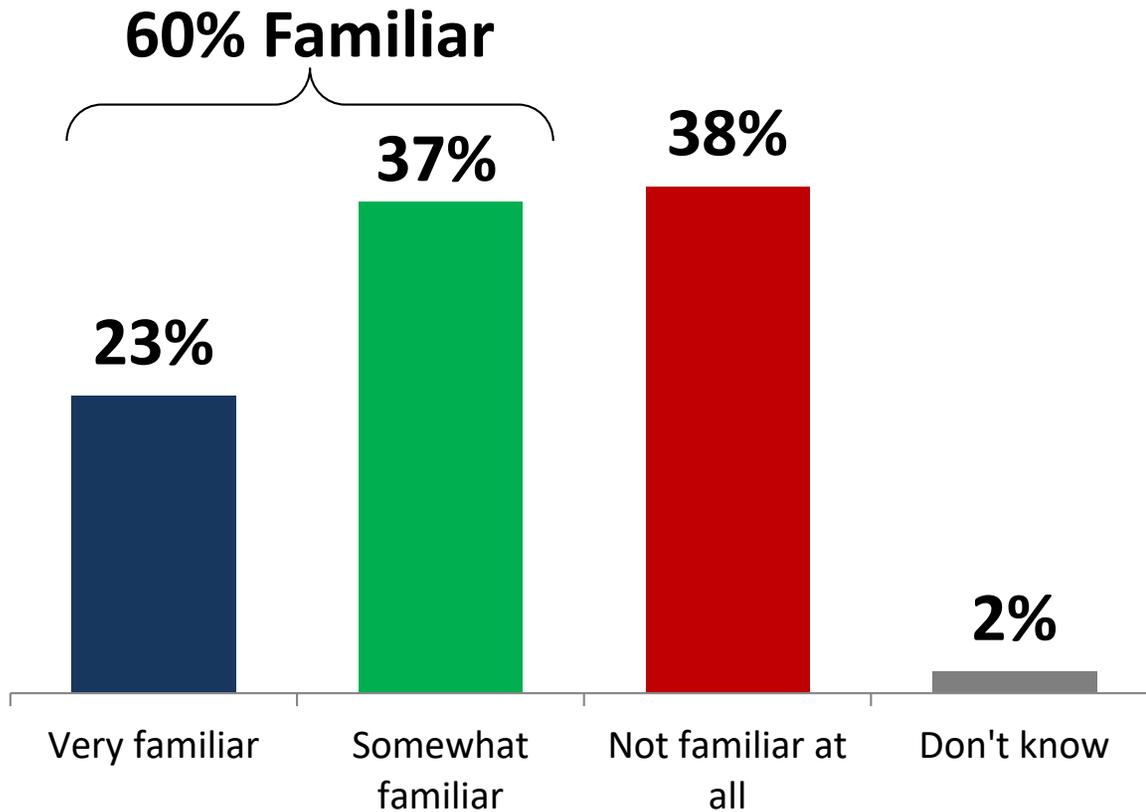


Familiarity with Portion of Bill: 60% are familiar with 23% very familiar; MASH (68%) and MURB (80%) most familiar

Q While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, they retain only **about 8%** of the average key account'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 percentage of your organization's electricity bill that went to Toronto Hydro?

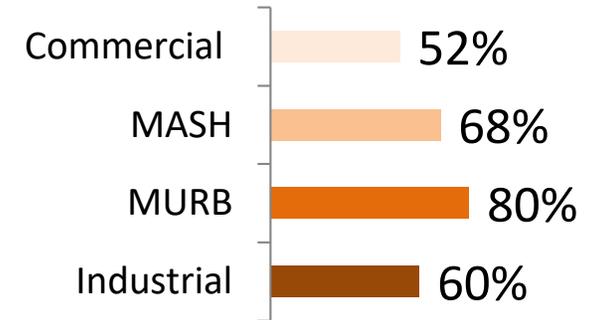
[asked of all respondents; n=63]



Segmentation ▶▶

Respondents who say "Familiar":

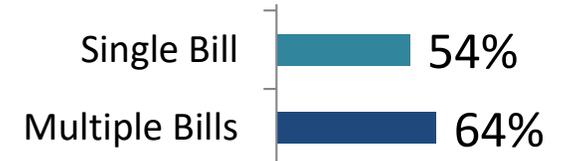
Customer Type



Respondent Type



of Electricity Bills



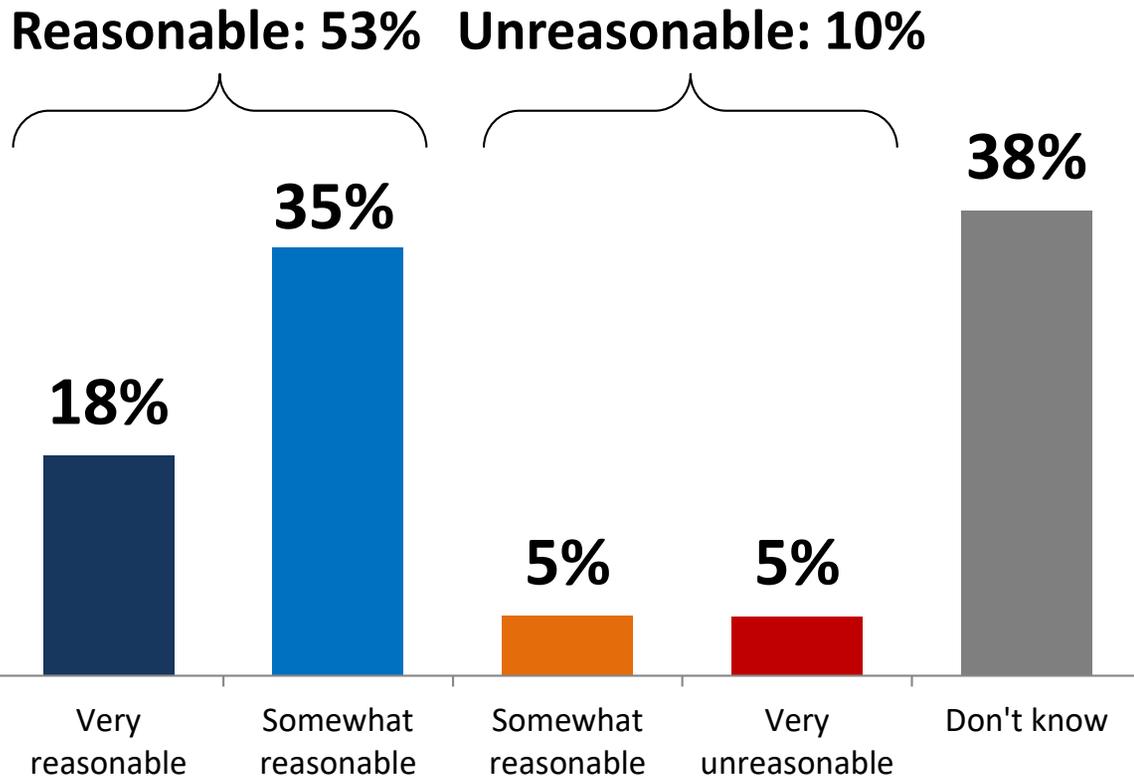
Toronto vs. Multiple Jurisdictions



Reasonability of Bill: Majority (53%) feel bill is reasonable; plurality (38%) don't know enough to say

Q Do you feel that the **8% of your organization's total electricity bill** that you pay to **Toronto Hydro** for the services they provide is reasonable, unreasonable or would you say you don't know enough to say?

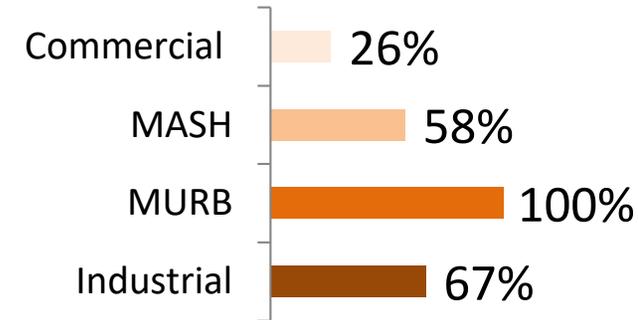
[asked of all respondents; n=63]



Segmentation ▶▶

Respondents who say "Reasonable":

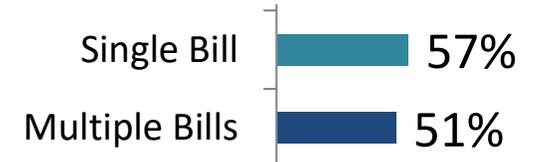
Customer Type



Respondent Type



of Electricity Bills



Toronto vs. Multiple Jurisdictions

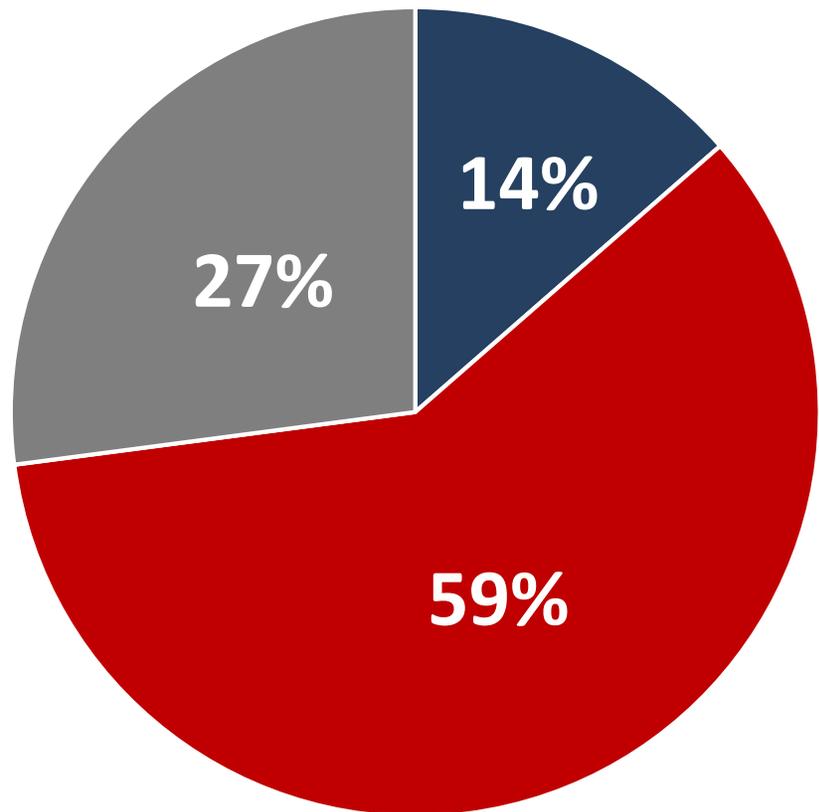


Additional Services: Majority (59%) say there are no additional services they would be willing to pay for

Q

Are there any additional services that you would look to **Toronto Hydro** to provide and would be willing to pay for?

[asked of all respondents; n=63]



■ Yes ■ No ■ Don't know

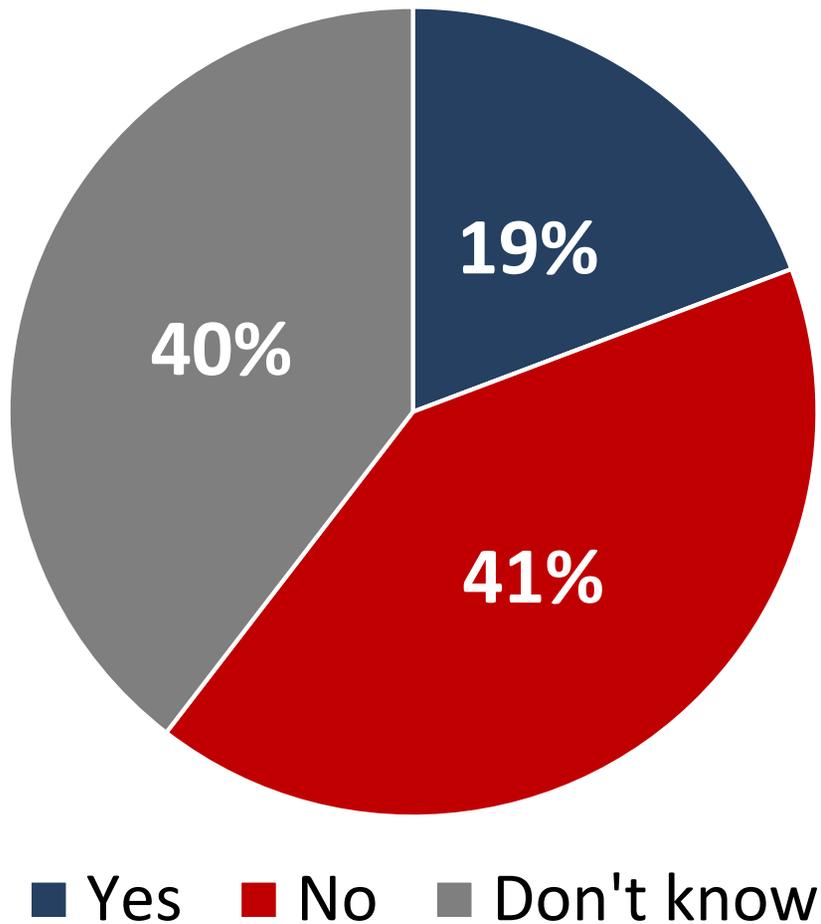
Additional Services Verbatim

- Additional seminar/training sessions for managers, executives and operations staff. Additional administrative assistance for filing applications, etc.
- Annual audits of energy usage on a per equipment/system basis.
- Electronic billing.
- Energy efficiency projects/solar.
- Energy management coaching. Energy storage implementation. Onsite distributed generation.
- Ensure system installed by Enercare is providing accurate data.
- Residential and commercial sub-metering.
- Seminar/updates on future and current projects, trends, etc.

Modified Services: One-in-five (19%) suggest modification to existing services; plurality (41%) *don't know*

Q Are there services that are currently offered by **Toronto Hydro** that could be done differently to better fit your needs?

[asked of all respondents; n=63]



Modified Services Verbatim

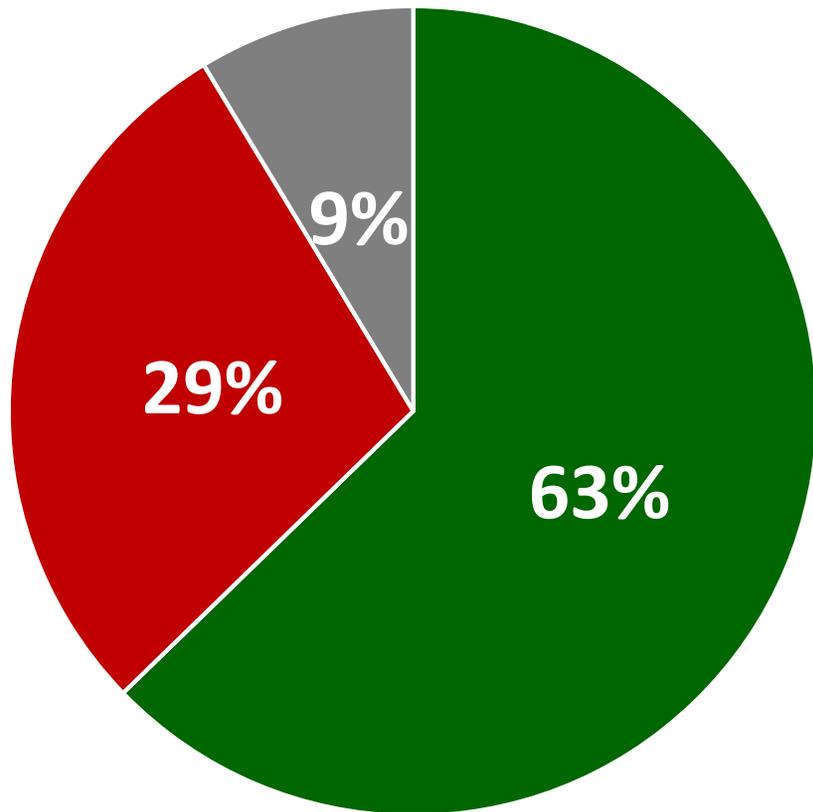
- Better incentive explanation/support.
- Dedicated crews available for maintenance lock out.
- Demand side management program is very complicated and hard to use.
- Easy access for owner-managers to main meter interval data in a green button format via website or open API.
- Educate on trends in Global Adjustment and how to reduce it.
- Increased visibility into system studies so that we are able to expedite request that flow through that unit.
- Provide easier to read hourly and daily consumption in an electronic format that can be imported into our energy management software.
- Provide more access to ION interval meter capability to help diagnose power quality issues.
- Reviewing and approving drawings for hydro services takes too long.
- The incentive program can be difficult at times to modify the application, but thanks to T.H. representative the difficulties are dealt with in a timely manner.

Conservation Demand Management: Majority (63%) have participated in a CDM program



Has your organization ever participated in a **Toronto Hydro** conservation demand management (CDM) program?

[asked of all respondents; n=63]

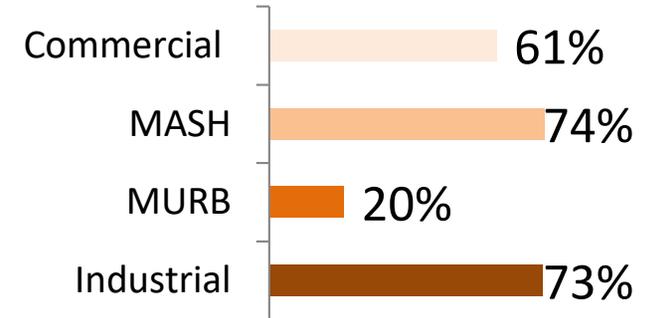


■ Yes ■ No ■ Don't know

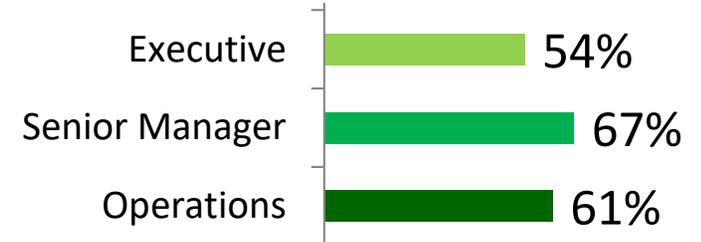
Segmentation ▶▶

Participated in a THESL CDM program:

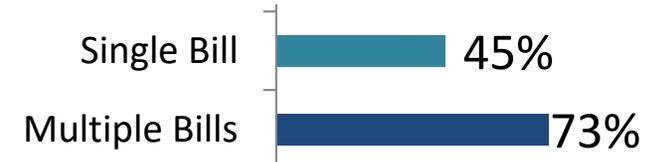
Customer Type



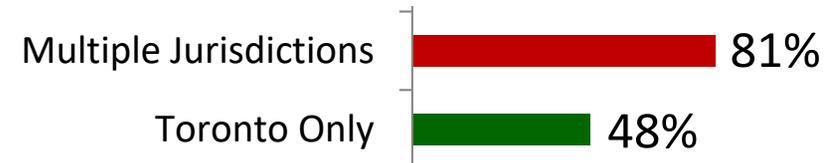
Respondent Type



of Electricity Bills



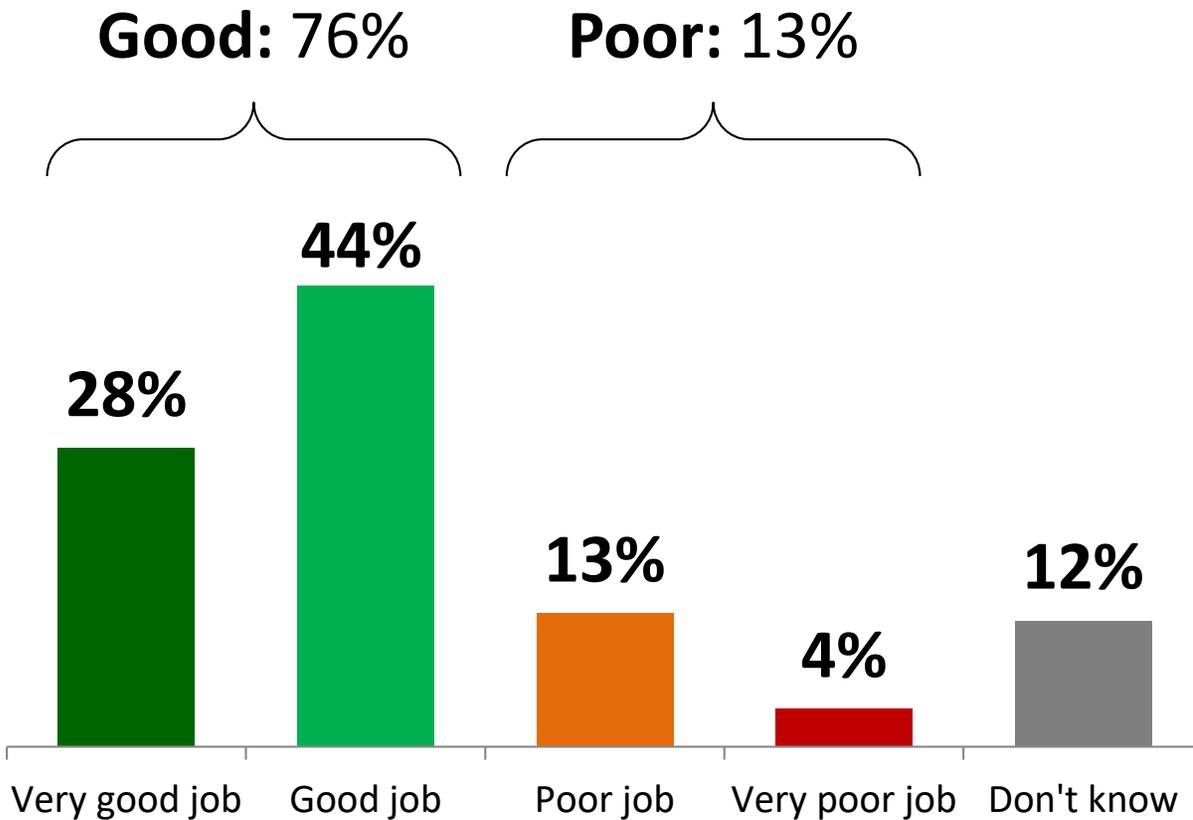
Toronto vs. Multiple Jurisdictions



Promoting CDM: 7-in-10 (72%) say Toronto Hydro does a good job of promoting CDM

Q How good or poor a job does **Toronto Hydro** do at providing your organization with information on available CDM tools and programs that can help you manage your organization's electricity bill?

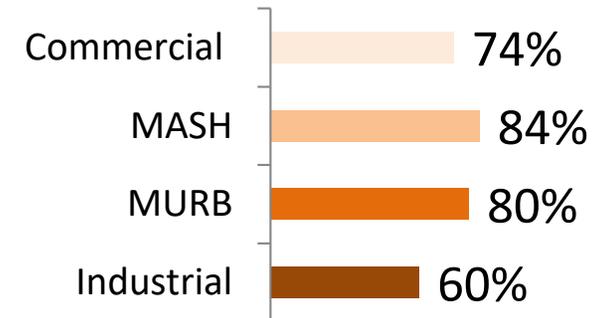
[asked of all respondents; n=63]



Segmentation ▶▶

Respondents who say "Good Job":

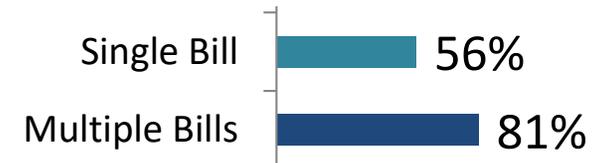
Customer Type



Respondent Type



of Electricity Bills



Toronto vs. Multiple Jurisdictions



Improving the Promotion of CDM: More communication and opportunity for interaction a common theme



Is there anything that **Toronto Hydro** can do to improve how it shares information on available saving tools and programs with your organization?

[OPEN-ENDED; asked of all respondents; n=63]

Promoting CDM Verbatim

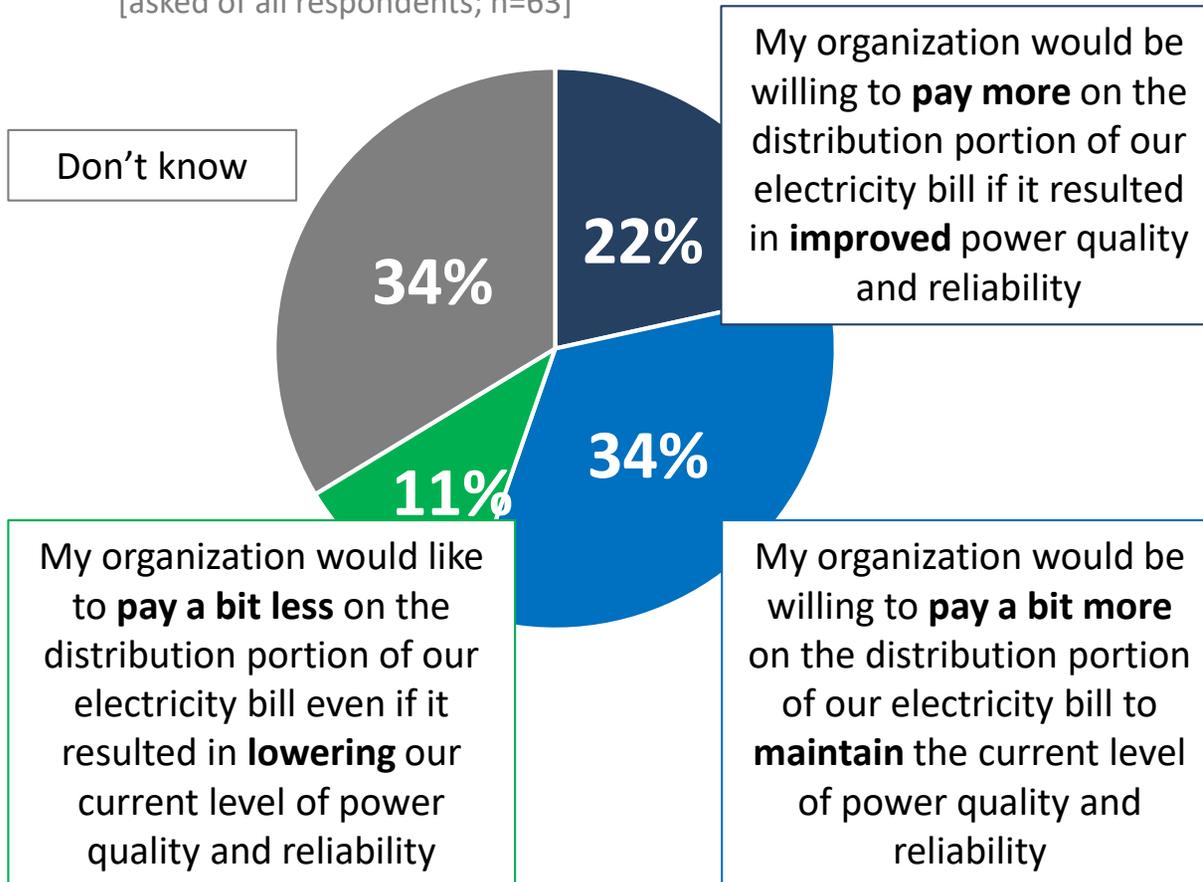
- A regular newsletter.
- Communication of available tools is important, there is always ways to improve.
- Energy into Action type forums should be run more often AND with other Utility stakeholders such as Enbridge gas distribution and TO Water. As each utility can offer COMPLEMENTARY energy management opportunities that when displayed in a vacuum don't make as viable an economic case.
- Find ways to help reduce consumption.
- Having easy-to-read one-pagers available that can be circulated to property management teams that outline all available IESO incentives (and steps to access them). Provide an annual meeting/webinar with all property managers to present/review Toronto Hydro services on offer, incentive application process, etc.
- I don't know what is available even though we have regular meetings with the Toronto Hydro representative.
- I will be attending my first Toronto Hydro meeting next week to discuss Global Adjustment. More of these opportunities should be scheduled.
- Improve the SaveOn Energy website and keep it current. It is not as user friendly as it can be and the applications are not being updated as they change. There are still several dated applications on the website that do not apply anymore.
- More email notifications.
- More information.
- Please provide us with the rate changes information, so we can budget our expenses.
- Provide more seminars for the commercial and industrial buildings.
- Providing data on a regular and shareable basis. I must point out however, that the Hydro staff have been extremely helpful in trying to bridge this gap and they should be commended for their great efforts - very much appreciated.
- Support on incentive applications - Intelligent incentives which Provide value
- Unsure. Sometimes receive the information, but most of the time other staff receive it before management.
- Updating by email to customers.
- We have a great relationship with Toronto Hydro, a roving Energy Mgr, and good personal contacts to ask questions of. No problems in this area.
- Workshops, webinars, emails.

Reliability and Price Trade-Off: Majority (56%) willing to pay more for improved or maintained reliability

Q Despite best efforts, no electrical distribution system can deliver perfectly reliable electricity. As a general rule, the more reliable the system, the more expensive the system is to build and maintain.

Thinking about the trade-offs between reliability and the cost of your electricity bill, which of the following statements best represents your general point of view?

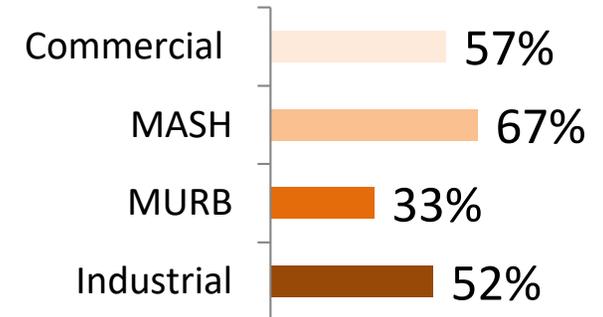
[asked of all respondents; n=63]



Segmentation ▶▶

"Pay More" to either improve or maintain:

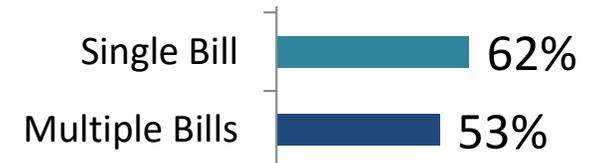
Customer Type



Respondent Type



of Electricity Bills



Toronto vs. Multiple Jurisdictions

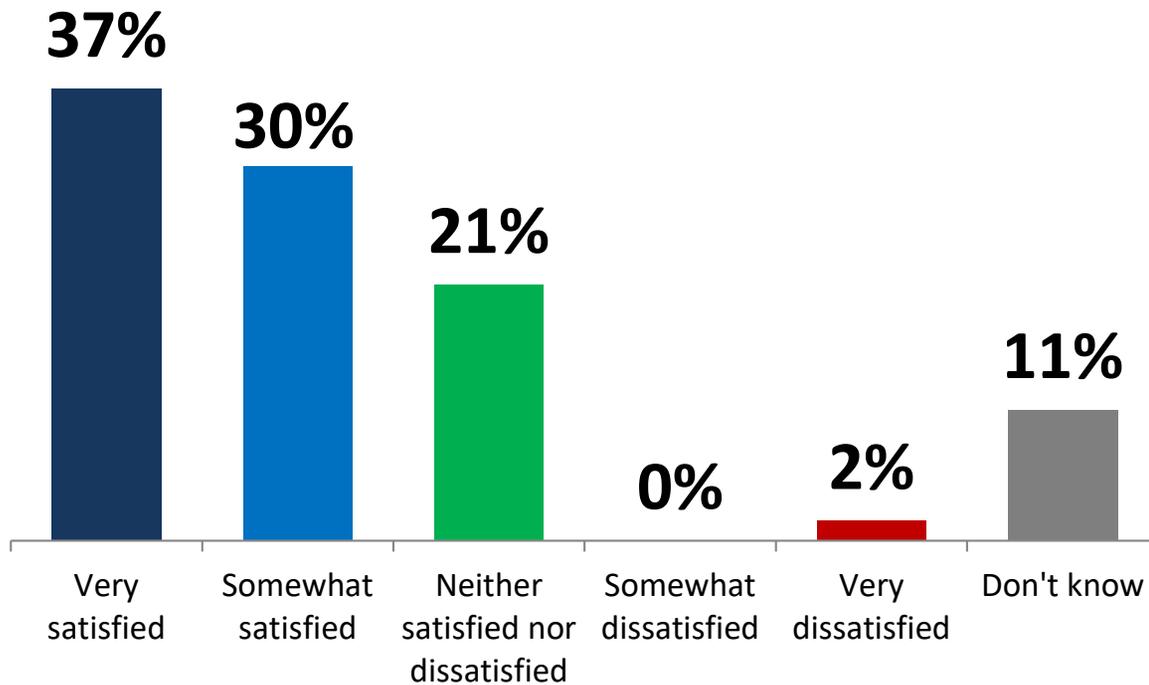


Satisfaction w/ KA service: Two-thirds (67%) satisfied with key account management; only 2% dissatisfied

Q How satisfied are you with Toronto Hydro's key account management services including after-hours information service and call number?
[asked of all respondents; n=63]

Satisfied: 67%

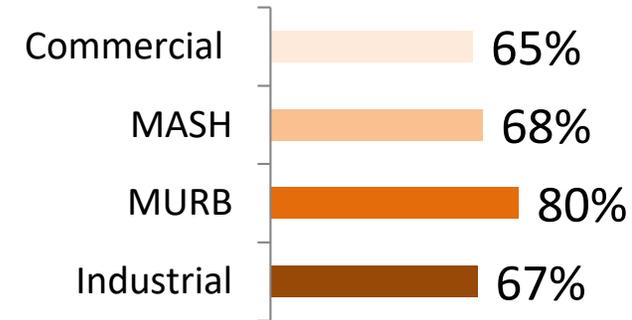
Dissatisfied: 2%



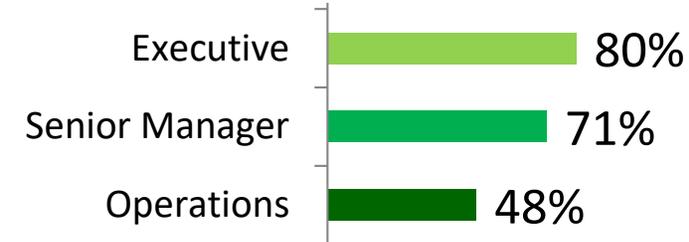
Segmentation ▶▶

Respondents who say "Satisfied":

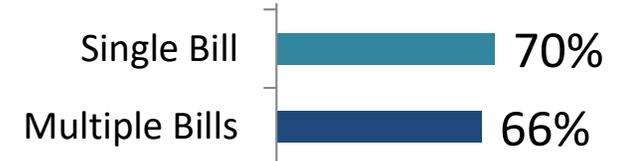
Customer Type



Respondent Type



of Electricity Bills



Toronto vs. Multiple Jurisdictions



Information Needs and Sources:

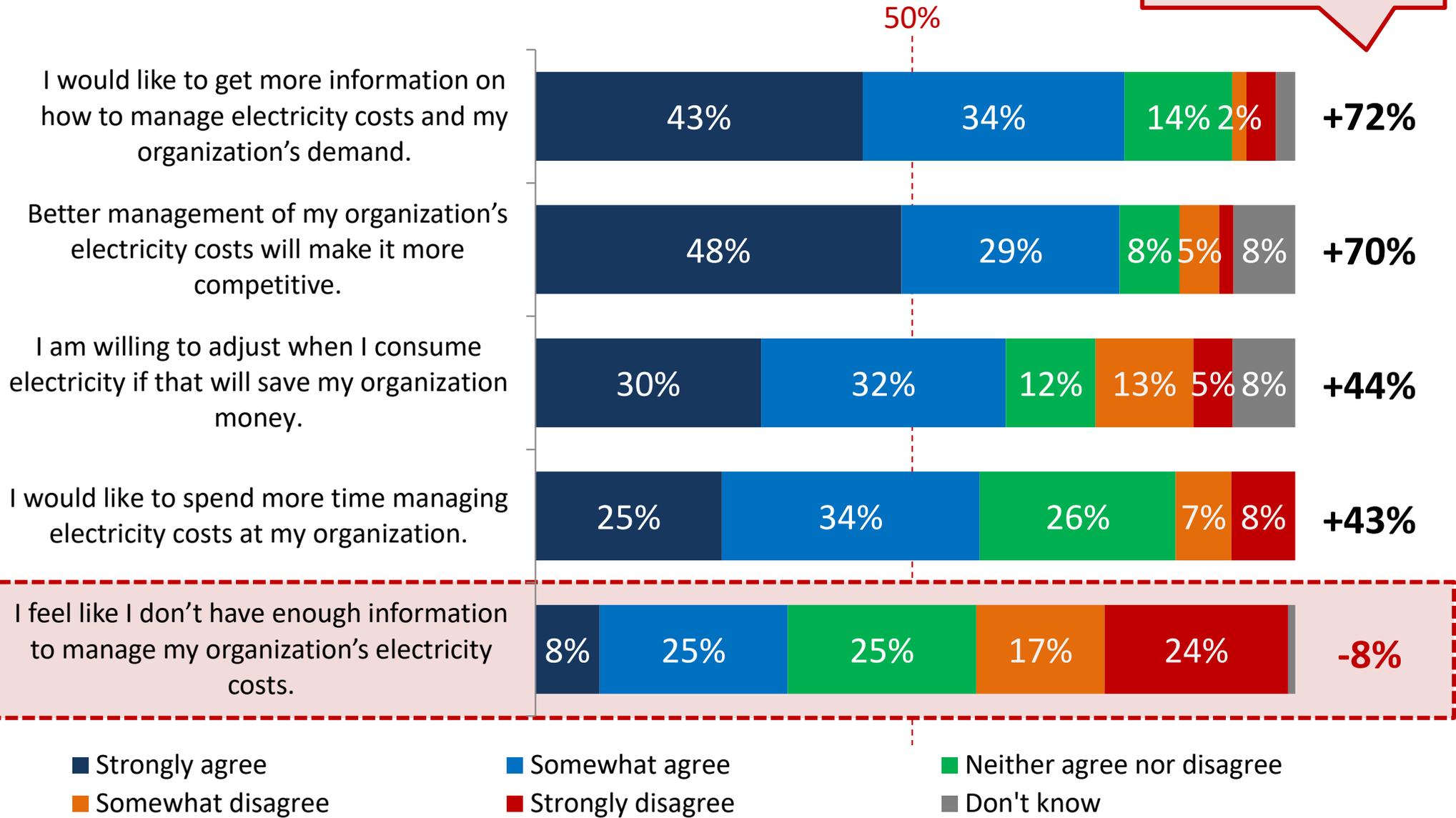
All measures reflect positive outcomes



Please indicate if you agree with the following statements.

[asked of all respondents; n=63]

Net Agreement



- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
- Don't know

Electricity Info Sources: Toronto Hydro (73%) top mention, followed by IESO (38%) and BOMA (33%)

Q

Do you seek advice and information on electricity issues from any of the following organizations or sources? If so, which ones?

[SELECT ALL THAT APPLY; asked of all respondents; n=63]



Organizations as Resources

Q

Respondents were asked to further specify organizations or choices from the previous question.

[OPEN-ENDED; asked of all respondents; n=63]

Print Magazines and Newspapers

- Toronto Star
- Globe and Mail
- National Post
- Facility Manager Magazine
- Sales brochures and newsletters
- Plant Magazine

Television Reporting

- CBC
- City TV
- Global
- All networks

Websites, Social Media and Blogs

- US Energy Star

Other Organizations

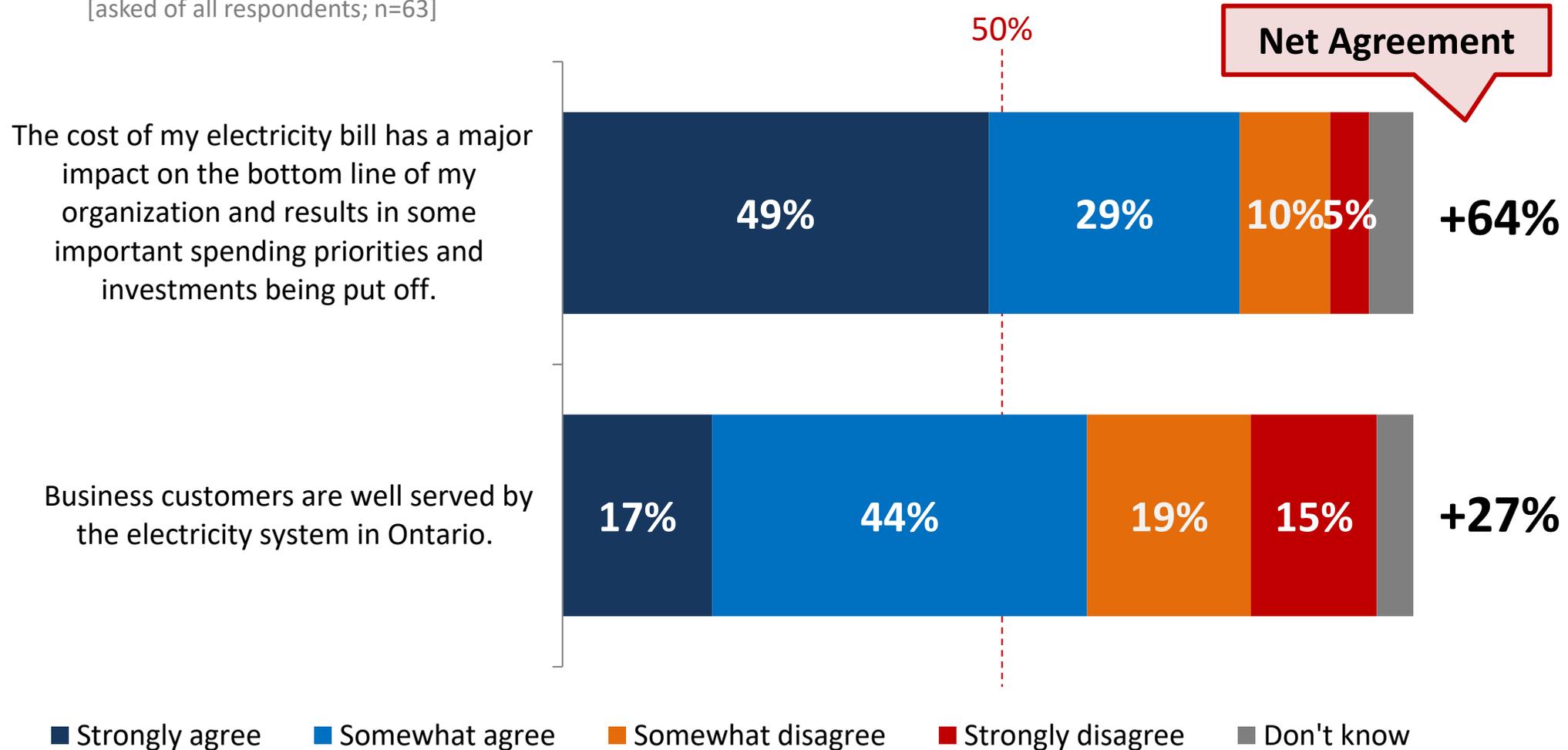
- Bruce Power
- CaGBC
- Canadian Hospital Engineering Society
- Energy Profiles Ltd.
- Greening Healthcare and FM service provider
- Green Team
- HEADS UP Energy Efficiency
- Other LDCs across Ontario and nationally
- REALPAC
- Vendors

Environmental Controls: 79% agree that their bill has a major impact; 61% agree that customers are well served

Q

For each statement, indicate to what extent you agree or disagree. If you don't know enough to say or don't have an opinion, please indicate below.

[asked of all respondents; n=63]



Final Comments

Q Do you have any additional comments or feedback?

[OPEN-ENDED; asked of all respondents; n=63]

Final Comments Verbatim

- Global A opt-in is a disaster about to unfold. Between battery systems, gas gen sets and other GA busting being a Global B participant will be an ongoing disincentive to invest CapEx in the province.
- I have found working directly with some of your staff in helping us with energy saving incentives and initiatives to be highly motivated and extremely approachable professional who have provided very useful information to help us find the right solutions to save energy.
- Compliments to our Toronto Hydro Account Executive. He provides us with a one-stop shopping approach to energy savings and incentives support.
- I just received a letter in the mail this week from the Buffalo NY Bus development group soliciting our business transfer there to save money on taxes, incentives to move, lower electricity, labour training incentives... Clearly some business have already moved. We must get Hydro pricing in line to remain competitive and get me off the list with my Accounting people at my USA head offices who compare my Toronto plant with Kansas, Iowa, Ohio, and Kentucky.
- I know Toronto Hydro has nothing to with the Global Adjustment however, I believe money should be invested to find different sources of power. The GA has done nothing to help organizations like us.
- Improving Toronto Hydro's website to provide more customer related info. e.g planned outages, incentive programs, would be helpful. Improving MVWeb is essential.
- Rates are an issue.
- Reliable power and power quality is very important to our business. Outages, brownouts, sags and surges impact equipment reliability and ongoing business operations.
- Toronto Hydro needs a stronger voice on development in Toronto. Existing customers cannot have their power supplies diminished in quality in order to provide new services for new development. Costs should be the burden of the developers and no approvals given until it is determined by an independent third party that existing supplies can handle more intensity. If the service needs to be upgraded, the developer pays.
- Victor and Team are excellent.
- Waste less, and charge us less.



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For more information, please contact:

Jason Lockhart

Vice President

416-642-7177

jlockhart@innovativeresearch.ca

Innovative Research Group Inc.

56 The Esplanade, Suite 310

Toronto ON | M5E 1A7

www.innovativeresearch.ca

APPENDIX 1.5

Stakeholder In-depth Interviews

June 30, 2017

Prepared for:

Toronto Hydro

14 Carlton Street

Toronto, Ontario M5B 1K5



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1. Stakeholder In-depth Interviews

Following our iterative research process, the key influencer/stakeholder in-depth interviews were designed based on feedback collected from prior qualitative research steps.

1.1 Methodology

Objective

Using an exploratory research methodology, our objective was to obtain insights into what customers expect of Toronto Hydro, particularly in terms of what represents value to customers and what customer priorities for Toronto Hydro are, from key influencers – associations, charities and municipal agencies whose members have significant interaction with, impacts from activities of and social and/or commercial stakes in the outcomes of Toronto Hydro.

These stakeholder groups represent the views of specific cohorts or categories, and while some of those cohorts or categories have been participants in other research feedback as individual members, the objective in this phase was to obtain a higher level, industry or cohort view, that represents the consensus views of each group.

Approach

Nine on-site in depth interviews were conducted between June 12 and June 30, 2017, all at the respondent organization's offices.

Participants were selected and initially contacted by Toronto Hydro, from their list of key impacted or influencer groups. In particular, participants were selected to represent those who may not have direct contact with Toronto Hydro's Key Account team, or who were determined to have views and input of relevance that may not be otherwise collected or considered.

We deployed a detailed *Discussion Guide*, used to moderate all sessions. No materials were shared with participants before or during the sessions, although those who asked were provided with an outline of topics to be covered in advance.

The sessions were moderated by INNOVATIVE Vice-President Robert Hutton. Toronto Hydro representatives accompanied to every session. Their role was twofold – to assist the facilitator should technical questions or matters came up beyond his limited technical expertise, and to listen as observers.

This report summarizes key findings, and offers observations and potential strategic avenues based on these groups and past research. *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 notes taken during the sessions and summaries from observers, and representative verbatim comments, offering interpretation and comment where necessary.

Please Note: Qualitative research does not hold the statistical reliability or representativeness of quantitative research. It is an exploratory research technique that should be used for strategic direction only.

A note on interpreting focus groups findings: In focus group research, the value of the findings lies in the *depth* and *range* of information provided by the participants, rather than in the *number* of individuals holding each view. References in this report such as “most” or “some” participants cannot be projected to the full population. Only a large sample, quantitative survey would be accurately projectable to the full population.

Interview Structure

The interviews were semi-structured based around five themes:

1. Where Toronto Hydro fits with the organization’s mandate?
2. What are the key expectations of Toronto Hydro among stakeholders?
3. What are the issues or challenges in electricity distribution seen emerging over the next decade?
4. What are the expectations of Toronto Hydro in response to these challenges?
5. What is the balance between costs and investment to meet those challenges?

Specific probes were deployed throughout on safety, reliability, demand/capacity, quality and customer service.

Topical probes deployed were on price, efficiency, technology, social impacts and environmental impacts. Not all probes applied to each stakeholder, so probes were adapted to suit each context.

1.2 Key Findings

1.2.1 *Toronto Hydro’s fit with organizational mandates*

- Distribution fit with all mandates
- Key aspects in common: reliability, cost, infrastructure renewal
- All have differing, but significant, interruption costs and impacts
- All see Toronto Hydro as a key collaborator and as a natural integrator with other system elements
- All had elements of social outcomes that fit with Toronto Hydro’s mandate

1.2.2 *Expectations of Toronto Hydro*

- Reliability is the primary expectation and is ‘table stakes’
- Cost is an expectation, but less reduction than containment, and does not trump reliability or higher level and longer term social outcomes
- Resilience of infrastructure, not only physical, but virtual
- Collaboration is a common expectation – increased engagement, coordination
- Easier access to incentives, particularly retrofits, is a need
- Focus incentives on better returns and consumption/waste reduction
- Systems approach – be an integrator and information hub
- Increase focus on, and visibility in, social outcomes

1.2.3 *Future electricity challenges*

- Maintain reliability
- Building renewal
- Behaviour modification is limited by lack of unit metering and other government policy
- Grid renewal, community renewal
- Development growth
- Cybersecurity

1.2.4 *How should Toronto meet perceived challenges*

- Electricity literacy is low, misinformation is common – increase outreach and communication, at street level
- More strongly advocate with provincial government

1.2.5 *What the balance between costs and meeting challenges*

- Reliability far outweighs cost considerations
- Cost increases must be tempered with cost containment
- Target investment to greatest long term returns
- Include social outcomes in evaluation criteria

1.3 Participant Profile

Federation of Rental Housing Providers/Greater Toronto Apartment Association

- **Mandate:** Advocacy, government relations
- **Constituents:** Property managers and building owners
- **Key Issues:** Sub metering, building renewal, energy retrofit incentives, vaults, energy costs

Association of Condominium Managers

- **Mandate:** Advocacy, government relations
- **Constituents:** Condominium managers and corporations
- **Key Issues:** Energy costs, time of use, unit metering, inconsistent power, energy retrofit and conservation programs

Housing Services Corporation/Toronto Community Housing

- **Mandate:** Advocacy, government relations
- **Constituents:** Low income and not for profit housing providers
- **Key Issues:** Energy affordability, housing stock retrofits, sustainable occupancy, targeted incentives

United Way

- **Mandate:** Poverty reduction
- **Constituents:** Member agencies, vulnerable populations

- **Key Issues:** Energy costs, tower renewal, access to incentives, energy retrofit and conservation programs

Bloor-Yorkville BIA

- **Mandate:** Advocacy, government relations
- **Constituents:** Local businesses
- **Key Issues:** Lampposts, local development, customer service

Metropolitan Toronto and Region Conservation Authority

- **Mandate:** Greenhouse gas reduction
- **Constituents:** Commercial building owners
- **Key Issues:** Energy waste, incentive programs, retro-commissioning, grid planning

Toronto Financial Services Alliance

- **Mandate:** Advocacy, promotion
- **Constituents:** Financial services sector
- **Key Issues:** Reliability, continuity, stability, cybersecurity

Coalition of Concerned Manufacturers

- **Mandate:** Advocacy
- **Constituents:** Small to mid-sized manufacturers
- **Key Issues:** Energy costs, ICI, global adjustment, combined heat/hydro solutions

Leslieville BIA

- **Mandate:** Advocacy, government relations
- **Constituents:** Local independent businesses
- **Key Issues:** Energy costs, reliability, sponsorship, customer service, local development

1.4 Stakeholder Priorities

Reliability: Industry associations held reliability as by far, their overreaching top priority.

Social Outcomes: social organizations also held reliability as top priority, but also held social outcomes as a key priority (e.g. community renewal, sustainable living).

Price: Manufacturing association held price above all else, far above reliability. Specifically, this stakeholder was seeking a price reductions as opposed to price stabilization.

Price Predictability: Both industry and social organizations favour price stabilization and predictability over absolute reductions (e.g. reasonable price increase are accepted by this group of stakeholders).

Biggest concern with the price of electricity is not distribution rates, but rather the global adjustment that has been unpredictable over the past decade.

Risk Mitigation: Resilience of infrastructure – defined as an ability of withstand adverse events which may be physical or virtual – appears to be a key priority for almost all stakeholder groups.

Socio-economic Outcomes: Every group, in varying ways, cited socio-economic outcomes as an increasing priority (e.g. impact poverty, employment, cost of living, quality of life, economic competitiveness, etc.).

Incentive Programs: Better target incentives where there is the greatest long-term benefits. Make it easier to access incentives.

Other: Specific points of service friction with Toronto Hydro (e.g. vaults, sub-metering, inconsistent power quality, collaboration and communications on development projects, lampposts).

Summary of Priorities by Stakeholder Group

Housing & Social Services	Large Commercial
<ul style="list-style-type: none"> • Reliability far outweighs cost • Sub-metering is a key constraint • Conservation efforts constrained by lack of sub metering and time of use • Building renewal and retrofitting are priorities • Quality and consistency of power is a key need • Incentive programs need to be more accessible and may not be targeted at greatest returns • Social outcomes need to be considered 	<ul style="list-style-type: none"> • 24/7 reliability is table stakes • Cybersecurity is a priority • System resilience is a concern • Behind the meter innovation is a need • Cost is not a significant factor • Reliability is a competitive advantage
Small Commercial	Small / Mid-sized Manufacturing
<ul style="list-style-type: none"> • Reliability is 24/7 • Customer service is the key need – lampposts, local development, outages • Cost is primarily a concern among local, micro businesses 	<ul style="list-style-type: none"> • Cost is a significant survivability factor • Reliability not a concern • ICI fairness is a need • Global adjustment is a friction point, impairs budgeting

1.5 Detailed Findings

Across all participant groups, respondents were asked first a series of introductory questions to establish baseline context and direct the discussion to Toronto Hydro’s role as the local distributor. A key opening topic was to establish the cohort or constituency the participant was representing, to establish whose views were being represented.

Participants were asked if they wished for their input to be provided in confidence, with the usual confidentiality disclaimers of qualitative research, or, recognizing many have a mandate to provide advocacy and input on topics affecting their members or representative cohort, they wished to respond ‘on the record’ ‘on behalf of their organization, with identity attribution.

With one exception, and in that case only because the participants did not have authority, confidentiality was waived and attribution requested.

1.5.1 FRPO/GTAA

Group 1 was a dyad, with the Greater Toronto Apartment Association (GTAA) and the Federation of Rental Housing Providers of Ontario (FRPO).

FRPO members tend to be larger property owners and managers *“as the industry has become a lot more professional”*. These include OMERS, many REIT’s, insurance companies as well as some members who supply the industry. FRPO’s focus is on advocacy and government relations. A key area of advocacy is in improvements in rental housing stock, where energy efficiency is a key focus. FRPO represents over 50,000 rental housing units across the province. It offers a certification program and a designation for buildings incorporating over 50 standards including green energy.

GTAA membership overlaps significantly with FRPO, but only within Toronto. Its members represent over 150,000 rental units across the GTA, all-purpose built housing, representing about 60% of the total rental housing stock. All its members are landlords in the primary rental market.

Neither FRPO nor GTAA may be fully representative of smaller landlords.

Sub-metering was seen as a key conservation strategy, but blocked by provincial regulation for electrical heat. This defeats attempts to modify resident behavior and effectively blocks the main route to developing a conservation consciousness among tenants.

“Sub-metering is a big issue – it is highly regulated. 10 to 15% of old buildings are heated with electricity. It is illegal to sub-meter electrical heat, then there is a socio-economic issue.”

“Changing people’s habits is the biggest impediment to conservation. As there is no sub-metering, residents don’t change habits as a result of billing.”

“There tends to be more people living in a unit than before.”

“It would be helpful if Toronto Hydro came out advocating for sub-metering. Push government to (allow) sub-metering.”

Provincial rent control regulations were seen to block landlord ability to invest in energy conservation, as well as being in conflict with policy goals to maintain current stock and build new affordable rental supply. Both felt that the \$400mm provincial green investment fund is focused on emerging technologies, rather than practical solutions their members could take advantage of – an example was retrofitting windows, a main source of energy loss.

“The province has a \$400mm program for conversion which is not very helpful.”

“The 50% bumpup will not have much uptake as few are sub-metered.”

“The province has embarked on energy benchmarking. A lot is done in a vacuum – to create incentives that work needs to be done in collaboration.”

“No longer being allowed to apply for above guideline increases for utilities.”

Landlords have difficulty navigating the available incentives and it would be useful to aggregate into an easily accessed form. Also, the application process was seen as deterring uptake of incentive programs.

There should be something on the (Toronto Hydro) website that is a one-stop shop for programs that are available.”

Citing overall widely varying and overall minimal energy literacy among property owners and managers, may struggle with assessing energy consultants who approach them and in selecting technical solutions or equipment.

“Pre-qualify consultants who approach buildings offering energy conservation solutions or equipment.”

Vaults were identified as a friction point. Prioritizing upgrades of vaults in older buildings is a priority, and moving them outside buildings where they can be more easily accessed and less of a risk is also seen as important. As electrical vehicles become more of an issue with landlords, vault location will become more of a critical factor, in being able to install charging stations often underground, under one or more floors of concrete. Disclosure of vault inspection findings was also seen as helpful.

“Toronto Hydro vaults in buildings is a sore spot. When something happens, the landlord takes the blame. Toronto Hydro doesn’t share info or history on vault inspections. Most are in older buildings and) need an upgrade program or have them moved out of buildings.

“Prioritize infrastructure upgrades on older buildings and areas.”

There was confusion over the implementation of the Fair Hydro Plan. The Fair Hydro Plan was seen as acting together with new rent control legislation to create a significant risk to landlords if, after the plan expires, rates skyrocket.

“Different utilities are dealing with the 17% reduction in different ways.”

“Fair Hydro Plan – what will happen after the next election?”

“Do we start to create a reserve fund for 10 years down the line when costs jump up massively?”

“There is a big inequity in terms of applying the reduction in debt retirement charge, those with sub-metering companies have a big advantage.”

Overall both saw reliability as very good, but note that when an interruption occurs, the impacts on tenants can be severe, particularly in winter months

“There are increasing failures of hardware – Toronto is working to make backup generation mandatory.”

“For reliability (interruptions) the tenants and the media blame the landlord.”

FRPO in particular was interested in collaborating with Toronto Hydro to act as a central hub for landlords to access resources such as incentive programs, rate plan information and conservation information.

Both felt that more regular stakeholder engagement would be beneficial, and asked that Toronto Hydro step up advocacy particularly when political decisions have broader ramifications on landlords, and tenants.

“Have annual meetings like this, maybe (together) with other LDCs”

“Speak up when politicians do something not in the interests of citizens.”

1.5.2 Association of Condominium Managers of Ontario

Group 2 was an in-depth interview with the Association of Condominium Managers of Ontario (ACMO).

ACMO represents over 1,000 condominium managers and 6 to 7,000 condominium corporations. In turn, these members represent over 700,000 condominium homeowners across Ontario, out of the 1.1mm people living in condos in the province. The bulk of those condominiums are in the GTA.

A major issue the industry faces is that “*there are not enough condo managers to go around*” and as a result energy literacy and technical ability vary widely. However, the new Condominium Act will bring rapid ‘professionalization’ to the industry, which will be an opportunity for Toronto Hydro to step up CDM collaboration and education.

With respect to Toronto Hydro, this impacts ability to manage rising costs and implement cost saving technologies, but also has more practical implications in being unable to budget hydro costs reasonably.

“The major issue is dealing with the costs that are ever escalating.” “Helping our stakeholders keep costs in check is a constant battle.”

“The uncertainty – trying to get budgets done without really knowing where rates are going.”

“We fight time of use constantly – we can’t do much with individual unit owners, but we still have to pass on those costs.”

“Individually metered units vs. bulk metered units is a challenge.”

A major issue is inconsistent power – providing a consistent 60Hz cycle. Power surges are damaging variable frequency drives and other sensitive equipment, as well as resident equipment. Toronto Hydro could assist by providing a conduit that property managers could coordinate with in logging and identifying sources of spikes.

“The other problem is inconsistent power – particularly buildings with centralized systems – there are a tremendous number of spikes.”

“We need Toronto Hydro to provide a cleaner feed.”

“Variable frequency drives are being installed – VFD’s do not like spikes – members lost 9 VFD’s in 6 months. We can’t get a consistent cycle rate.”

“Toronto Hydro can help document that – ACMO can get a notice out to members to start tracking & logging spikes – we need a conduit through Toronto Hydro.”

ACMO is generally supportive of incentive programs, particularly energy retrofit incentives, but questions whether the amount of the incentives is proportionally fair with respect to the benefit Toronto Hydro is seen as receiving.

“We need retrofit programs and better conservation programs.”

“With the amount of the rebate, we are helping Toronto Hydro more than they are helping our members.”

The practice of estimating bills creates problems for the industry:

“Estimated bills is another problem – considering the technology available, there is no reason still to do this, it creates havoc with our budgetary process.”

“Accuracy of the metering is not a problem.”

The issue of rates rising faster than inflation was brought up, in context of perceptions that Ontario is selling off excess energy at lower rates while infrastructure has been deterioration. This was seen as a lack of information and knowledge creating a vacuum in which negative perceptions can be formed, and ACOMO noted that media reports on perceived excessive executive compensation tend to paint all LDC's with the same brush. Education on the global adjustment, distribution vs. transmission and understanding bill components could assist in this regard.

“For smaller buildings, the distribution cost seems out of proportion in relation to the commodity cost. (Toronto Hydro) needs to explain distribution costs better.”

In terms of future issues, the major challenge was seen to be infrastructure supporting vehicle electrification. The industry faces significant barriers, both in the requirement under the Condominium Act for Board approval for substantial changes and in absorbing costs. The industry is looking to Toronto Hydro to ensure capacity is sufficient to enable EV charging and to provide financial incentives to help defray costs.

Overall, ACOMO was looking for Toronto Hydro to engage the development community earlier and more often on energy upgrades to buildings.

“Reach out to developers to intervene (earlier) as part of the conversion process when upgrading buildings.”

1.5.3 Housing Services Corporation/Toronto Community Housing Corporation

Group 3 was a dyad with Housing Services Corporation (HSC) and Toronto Community Housing Corporation (TCHC).

HSC is a not for profit under the Ontario Social Housing Act, serving the housing sector since 2002, including municipally owned, not for profit and co-op housing, all of which are subsidized to varying degrees. TCHC is the largest landlord in Canada, so can be considered a major subset of the sector HSC serves.

Both have a “*vested interest in energy utilities*”. HSC is part of an Energy Stakeholder Advisory Group, of which TCHC is a major stakeholder. Energy utilities are not subsidized to TCHC in any way, so they have a strong mandate to reduce energy costs.

HSC advocates for continuation of energy incentives, program flexibility and a holistic approach to gas & electricity programming.

Affordability is a major focus for HSC – particularly for tenants on individual meters, but also for landlords in the low income housing sector. However, in public housing as well as private low income housing suite metering is not common. Loss of federal subsidies and rising costs are impacting both, requiring support for tenants who fall into arrears.

Reliability is seen as very good, with some ‘pockets’ within the city experiencing more frequent outages which contain significant low-income populations, and significant outages impact the low income tenant severely as they have no options to relocate temporarily. TCHC faces these same challenges, as it has no options to evacuate and needs to enable residents to stay in place during an outage. TCHC is concerned about the end of incentives for CHP. TCHC operates on a “sustained occupancy model” through behind the meter generation. TCHC would like to see incentives for AC

upgrades as they have over 20,000 units requiring replacement, noting that all are old, highly inefficient units, typically poorly and unsafely installed.

HSC's benchmarking data indicates that newer buildings with more efficient systems and central cooling have higher energy demand. Larger family sizes in some buildings also drives up demand. Individual suite metering is a lower priority in capital backlogs.

Two key challenges in achieving both mandates are tenant behaviours and building operator knowledge and ability.

"Hard to get tenants to understand their impact."

"It is a challenge to educate building operations – site staff – as they have varying levels of knowledge and are mostly focused on building maintenance."

"The problem is having one person leaving a building to obtain training – we need an intensive training program."

"Building operators are resisting technology & upgrades because they don't have the knowledge. Some even disconnect upgrade technology."

HSC cites *"incentive fatigue"* caused by frustration in accessing and understanding IESO's web site. Involvement of the IESO in CDM programs was seen as adding unnecessary complexity. Both feel that *"strong incentive programs"* are needed. With respect to OECB, *"the onus was on the customer to apply"* which was seen as ineffective due to low level of knowledge and understanding. Both felt Toronto Hydro could be more pro-active in this respect. SHARP (Social Housing Apartment Retrofit Program) is seen as a small start but not necessarily well conceived or directed. Both felt that Toronto Hydro could add significant value by being pro-active with government at the point of program inception.

"Utility companies were nowhere to be seen when these programs were developed."

"Be more actively engaged with Ministries when these funding programs are created."

An IESO funded 'Energy Manager' for the sector was seen as being very beneficial.

HSC noted that Toronto Hydro's public facing materials make no mention of how social housing fits into Toronto Hydro's plans. Information aimed at the sector on bill components, Fair Hydro Plan, RPP vs. Non-RPP and targeted conservation information was seen as being of great value. Both respondents felt that the sector as a whole is a unique cohort that Toronto Hydro can collaborate with, offering a unique opportunity to be a test bed for pilot programs or collaborative initiatives in *"sustainable occupancy"*.

"Social housing providers are inherently marginalized. Look at social housing as a unique cohort, take advantage of the sector for pilot programs and cooperative programs."

Both respondents were organizationally concerned about price increases after the Fair Hydro Plan expires, noting the next 4 years as a *"temporary pause"* before price increases hit. Their expectation was that Toronto Hydro use this period as an opportunity to assist the sector in *"getting ahead of the price increases"* before they impact.

1.5.4 United Way of Toronto and York Region

Group 4 was composed of representatives of the United Way of Toronto and York Region (United Way). The United Way's mandate is to alleviate or prevent poverty generally and with a focus on priority neighborhoods. They are an 'anchor agency' to provide funding to a wide range of subsidiary agencies, but also to residents, to enable them to make changes, particularly vulnerable youth and employment.

Agencies funded by United Way deal with pocketbook issues as a major concern among their clients.

Those agencies, receiving a small part of their funding from United Way, are also facing challenges – since government grants no longer fund operating expenses, their funding has reduced, leaving less to support their clients.

"In Toronto, 80% of low income housing is private, 20% public – TCHC"

"The cost of delivering service is always increasing, funding is reducing, keeping the lights on is a challenge."

"There are people the agencies serve who are finding it increasingly difficult to make ends meet."

Electricity cost is a greater issue where quality of housing is poor. Quality of life is a key advocacy point for United Way.

"Most low income stock are highly inefficient buildings built in the 50's and 60's – there needs to be a tower renewal program. The challenge is to find a program that incentivizes private owners to upgrade their stock, making buildings more energy efficient and as a result more livable."

Tower renewal is a major concern, which United Way looks to Toronto Hydro to take a role in. Many privately owned low income housing units are highly energy-inefficient, and it is a challenge to attract investment. As a result, United Way feels that access to incentives is the main route to achieving energy upgrades to existing stock, with ancillary benefits to quality of life and overall in maintaining current stock.

United Way cite a need for a systemic approach to incentives, even involving other utilities; increasing ability to access incentives given the often low literacy and technical capability of potential applicants and flexibility for LDC's to deliver incentives directed to where they do the most good.

"Problem is how to get people access to incentives and programs."

"We need a systems response to this."

"Landlords get incentives for upgrades but don't pass them (the cost savings) on to tenants. The problem is that it is public money (they are receiving)."

"Incentives around Hydro can be very effective individually but less so in a system sense in tower renewal. Incentives need to leverage each other to provide stronger overall incentives – a better business case results – including social outcomes."

United Way suggest that a "systems view" needs to be adopted, not only in the sense of integration of programs offered by multiple utilities and governments – which they feel Toronto Hydro is the

best poised to be the natural integrator – but a view that takes in social outcomes, housing policy outcomes as well as renewal.

“Non-english people don’t understand their bills.”

United Way cite a higher incidence of non-english speakers in low income housing, creating a further barrier to understanding bills and obtaining information to enable greater control of their energy costs, and suggest bills and information be made available in a range of languages to meet this need.

Overall, United Way has not been hearing quality or reliability complaints from member agencies, but perceives that Toronto Hydro is not differentiated from other aspects of infrastructure.

In terms of investment – the next dollar spent – United Way feels that upgrading existing stock is inherently and quantitatively more valuable than building out new supply. Investment in transforming existing stock is therefore seen as the investment priority.

“United Way focuses on the public good – the expectation/priority for Toronto Hydro is to consider the broader public good in the investment plan.”

“Toronto Hydro needs to get the story out about how important they are to the social fabric of the City.”

“Toronto Hydro should have a customer advisory panel of low to medium income customers.”

United Way would like future meetings on a regular basis with Toronto Hydro and suggested high value in creating an advisory panel of low to mid income residents for consultation and advocacy on an ongoing basis.

1.5.5 Bloor-Yorkville Business Improvement Area

Group 5 was with the Bloor Yorkville Business Improvement Area (BIA).

The BIA represents the business community in the Bloor–Yorkville area, from Avenue Road north to Scollard and south to Charles, east to St.Paul Square. – over 1,400 businesses: store owners, property owners, office tenants and other businesses, funded by a 2% levy on property taxes businesses pay.

Of particular relevance to Toronto Hydro are the 240 lampposts the BIA own and pay monthly fees to Toronto Hydro to service. These are functional, as well as decorative lamppost intended to convey the unique positioning of the area.

“Our biggest issue has to do with lampposts. Related to development, when a lamppost is turned off or stored during construction. The area will continue to have major construction for the next 10 years.”

“At Yonge & Hayden, we moved a lamppost that Toronto Hydro said was not working to Yorkville, where it worked beautifully. Our frustration with Toronto Hydro is that nobody there knows what to do.”

The respondent mentioned that they had for many years been dealing with a Toronto Hydro representative who provided excellent, knowledgeable service but has since retired. Subsequent to his departure, the level of service and knowledge seems to have declined.

“We are not getting to the people in the vaults who know what they are doing.”

Many of the representative businesses, particularly low rise buildings and small, owner operated stores, are struggling financially, not solely due to rising hydro costs:

“Hydro has become too expensive, on top of recent property tax assessments.”

Many smaller businesses in the area were recently reassessed due to ‘best and highest use assessment’ practices. In the retail stores, hydro use is a critical component of the marketing mix – lighting is necessary to display and sell, and to create a retail experience. For many storefronts, lighting is 24/7. Hydro increases are coming on top of much steeper increases in property taxes.

“Moving from bi-monthly to monthly billing has added costs to small business owners because they have to pay a bookkeeper, particularly onerous on property owners.”

As responsible for the 240 lampposts, the BIA cites inefficiencies that add to their costs unnecessarily:

“There is duplication in cost in marking out Toronto Hydro owned conduits.”

“The list of lampposts on each vault is out of date – some are billed to the City, some to the BIA, some are shared conduits.”

Probing on reliability, safety, outage response and quality, overall, the BIA felt the businesses they represent are well served, noting that most infrastructure in the area is underground.

“Not aware of outright power reliability issues. Not aware of brownouts or blackouts affecting the area – most infrastructure is underground.”

“Being able to turn on the lights and operate equipment is critical. Not aware of any issues.”

“Hopefully we are building much smarter than ever before, particularly in new buildings, where they are using better modern technologies”

“There has been a disconnect between Hydro and the City on Bloor St. redevelopment ... the BIA has been caught in the middle.”

This last comment refers to an issue on the Bloor redevelopment 10 years ago, where there was a delay in issuing a purchase order from the city that delayed the project over a year, but this was noted as not being the fault of Toronto Hydro.

1.5.6 Metropolitan Toronto and Region Conservation Authority

Group 6 was with the Metropolitan Toronto and Region Conservation Authority (MTRCA). The MTRCA is a unique stakeholder in that it is both an advocate as well as a major customer. As one of 36 regional conservation authorities established by provincial legislation in Ontario, it is a major land owner, owning 16 facilities across the GTA – office buildings, 2 campgrounds, a museum, conservation areas and education centres, with over 50,000 acres of land. The MTRCA Board is composed of politicians from Peel, York, Dufferin and Toronto.

MTRCA is also unique in that this advocacy work has extended into paid ‘product’ – it has *“partnered with a private firm to create a benchmarking program which audits and sets up comparative energy targets for buildings”*. MTRCA *“pulls together funding and makes partnerships”* to promote that program.

Intertwined with the energy benchmarking program is a point of view towards energy conservation that MTRCA advocates – *“a huge shift – trying to change how people look at their energy costs, shifting*

from capital equipment expenditures with an energy reduction payback to operational savings through reducing energy waste”.

At another level, Toronto Hydro is a sponsor of MTRCA in the Mayor’s Megawatt program, and interacts with Toronto Hydro on permit applications for events and activities.

MTRCA characterizes itself as an environmental agency. Their principal point of advocacy is in reducing greenhouse emissions. Energy is seen as key element of that mandate, but more as an entry point for advocacy:

“We push for greenhouse reductions.”

“The audience for greenhouse gas reductions is maybe 25%, to get more of an audience for environmental concerns, the way is not through behavioral change, it is through cost savings.”

In this context, price is not in of itself a primary concern.

“Price is almost academic. Everyone should be reducing their costs.”

MTRCA’s singular view, in a sense their unique selling proposition, is that emphasis on reducing cost through most equipment replacement is “*wrong*”, that is a point of view pushed by those who benefit financially, but that the most effective way to reduce costs is to benchmark against comparators and establish a target to bring energy consumption in line with the top quadrant of the comparator set. This, in the view of MTRCA, is best accomplished by identifying the greatest sources of energy waste, not by taking incremental steps through costly equipment upgrades that bring increments of energy efficiency.

Taken in this context, MTRCA has singular views on the effectiveness of many incentive programs, informed by their investiture in their benchmarking program.

“CDM is investing dollars in incentives that reduce demand, to generate savings.”

The implication made is that this is primarily directed to either behavioral change or equipment upgrades – not identifying and correcting the greatest sources of waste.

“SNAP – Sustainable Neighborhoods – is an engagement program that is successful, but it doesn’t fit with the typical funding programs.”

“Toronto Hydro’s Upsaver program is cutting edge.”

“MOECC is not interested in what we are doing, they don’t see the value.”

“ECDM programs and the data (benchmarking, sources of energy waste) don’t align – most of the incentives are going to where there are no savings.”

Hence TRCA’s position on incentives is that they do not align with their programs:

“When we identify savings, they look to Toronto Hydro for incentives (which are typically attached to equipment expenditures, not reductions in consumption.)”

Relations with Toronto Hydro were seen as good.

“The only point of frictions is permitting – for example, at BlackCreek Village there is deteriorating underground wiring – Toronto Hydro has been slow to respond, citing a backlog – we are using backup generators that use oil – very expensive and environmentally damaging.”

Another program the TRCA is involved in is 'Greening Healthcare' – *“half of hospitals in the GTA and part of the program.”*

“Many have gone to hardware smoothing solutions as quality of power is variable in the city, predominantly outside the core– Scarborough is a problem.”

TRCA also interacts with Toronto Hydro as it manages all flood remediation, modelling flows along rivers, where Toronto Hydro equipment might be at risk.

As TRCA advocates less on behalf of any cohort or stakeholder group than for conceptual positions – *“we don't advocate on an individual level, we don't care about homeowners”* – their views on issues emerging in the future takes a more over-arching, conceptual form.

“The future is not on the larger grid, it is at the community level. IESO thinks big grid infrastructure, but this is not the future.”

“Focus on retro-commissioning – achieving operational savings by pointing to waste.”

“Work under the auspices of energy savings to bring in climate change, demand shifts, population growth to create sustainable eco-zones. Historical data doesn't work any more on any parameter.”

“Need to devolve grid planning to the municipal LDC level.”

“Invest where there are synergies, that help the greatest number of companies. Each building is an ecosystem that can help each other (energy transference). Take a bigger role in community planning. Ask what other roles Toronto Hydro can play with their assets.”

1.5.7 Toronto Financial Services Alliance

Group 7 was an in-depth interview with representatives of the Toronto Financial Services Alliance (TFSA). The TFSA is a public-private partnership whose mandate is to act as a facilitator and catalyst of opportunities within the financial services sector to attract new investment, assist in growth and market Toronto's value proposition as a global financial center. The TFSA's role is advocacy, but not in the sense of a typical industry trade association, as TFSA *“rarely takes public positions”* and *“tends to work behind the scenes”*, lobbying *“less for members than for the region overall”*.

The TFSA has 3 pillars of advocacy – growth, reputation and competitiveness. Increasingly, the financial sector members are global players, who happen to be located in Toronto but operate often more outside the country.

“Toronto Hydro fits with competitiveness and infrastructure in a big way.”

The sector relies on uninterrupted, reliable power 24/7, noting that today financial firms are highly systems dependent, conducting high level transaction feeds across multiple time zones simultaneously, and operate continually. TFSA also noted that the financial sector in Toronto is constantly competing globally for investment, talent and transactions – and electricity supply and reliability are part of the competitive framework of the region.

“Not so much a price issue – for most members, it's a rounding error.”

TFSA notes that this, in context, is simply a matter of reliability and consistency trumping price by a wide margin, even though the sector incurs substantial electricity costs.

“Continuity, quality, stability.”

TFSA notes that these are the 3 over-arching expectations of the sector. These are summed by TFSA as:

“Anything that interferes with their (the sector) ability to operate their systems is a major issue.”

Of note is the reference to “systems”, not to ‘keeping the lights on’ or enabling employees to work uninterrupted – the focus is on the systems that the financial system depends on almost exclusively to generate revenues.

“Stability and reliability is part of the value proposition of the financial sector.”

“Stability means – don’t have to worry about it when they are doing their technology or security plans.”

“The value proposition (of the sector) is in the back office, not the retail side.”

“Half of new investors are in fin-tech.”

Cybersecurity with respect to the electrical distribution system was a major concern, and expectation of Toronto Hydro.

“We worry about the resilience of the system to cyberattacks.”

In this sense, resilience was not only a physical expectation and priority, resilience to a cyberattack was even more of a priority.

Overall, TFSA saw reliability as high – *“We don’t hear anything about brownouts or outages from members.”*

Compared to other major financial cities the TFSA competes with, the electrical reliability in Toronto is considered a competitive advantage. There is a trend to locating data centers outside Toronto, but this is primarily to build redundancy and due to office space and talent access considerations.

However, continued reliability is a priority. There is concern that there are only two points of supply into the city, and loss of one would put the sector at risk.

“The interruption cost is huge.”

“The price vs. reliability equation is heavily weighted towards reliability.”

“Things like the vault fire are scary.”

“The east and west trunks are over 40 years old.”

“In reliability, predictability is important, firms don’t want to have small event contingency plans. For larger occurrences, most have contingency plans in place.”

TFSA’s priority for Toronto Hydro is preventative investment to ensure continued reliability and build resiliency and security. They would be supportive of greater flexibility in utility investment ‘behind the meter’ particularly in alternatives to conventional grid solutions which address power quality and reliability issues.

“Go to major clients to see if there are new technologies that Toronto Hydro could take advantage of.”

TFSA offered to provide letters of support for investments, particularly behind the meter, as well as to facilitate further engagement through round tables. TFSA suggested meeting with Toronto Global as a next step in the consultation process.

1.5.8 Coalition of Concerned Manufacturers

Group 8 is a recently formed group of 5 manufacturing related associations and a number of small to mid-sized manufacturers called the Coalition of Concerned Manufacturers (COCM). This coalition was created in November 2016 by Automatic Coating, a mid-sized manufacturer, solely in response to energy rates. COCM has since adopted advocacy positions on cap & trade and recently announced changes to employment standards. Automatic Coating (ACL) leads this coalition, and is the primary spokesperson. As a result, the views of COCM are formed by, and indistinguishable from those of ACL, and the COCM spokesperson moved freely between expressing views that represent the coalition and those that represent ACL. In effect the interview should be considered to represent ACL as a customer primarily.

The Coalition's overall goal is to *"ensure Ontario has the right policies to help & grow small to medium manufacturing businesses."* The Coalition sees energy prices as central to this and more recently, the implementation of cap & trade as a key obstacle to manufacturer survival and growth.

The Coalition feels that *"cap & trade has been set up to help large businesses but harm small to mid-sized ones"* by *"not giving us any credits but making us pay."*

The Coalition claims that many small to mid-sized business have taken steps to minimize their carbon footprints – *"we (ACL) have invested in technologies to reduce greenhouse emissions but do not receive credits, while paying extra for cap & trade on energy."*

The Coalition states that *"we only really started to pay attention to our energy bills two years ago"* and claim that cap & trade has been the key driver of their increased concern with energy costs.

A further point of concern was the global adjustment, which was characterized as *"outrageous – it makes it impossible to budget"* due to unpredictability.

"The more people get off the grid, the higher the global adjustment will be."

Another issue was that many manufacturers – those with 50 employees or less – don't qualify for ICI, and *"for many who do qualify, ICI raises their rates."*

"We need an industrial rate, like in most states (in the U.S.)"

Comparisons to the United States on the 3 main advocacy points – energy costs, minimum wages and cap & trade – were frequently brought up.

"Companies who are not relocating (to the United States) are relocating their growth, others are selling out to international conglomerates who will then relocate."

However, the discussion was short on concrete solutions – *"just lower the damn rates"* and some misinformation was seen – *"stop giving excess power away at a loss to subsidize our competitors in the U.S., excess energy should be sent to (Ontario) manufacturers."*

When probed, the representative acknowledged that their primary source of information is media reports, noting they have a significant Facebook following.

All these factors formed an overall position that rates, seen as being driven by government policy, were squeezing small manufacturers to a point where they are being forced to make decisions to re-acquire competitiveness with other jurisdictions:

“Manufacturers have 4 potential options now:

- 1. Many have and will close and go bankrupt*
- 2. Some will close and go to the U.S.*
- 3. Some will stay, but will establish their growth (expansion) in the U.S.*
- 4. Some will sell to an international conglomerate, who will then move the business to a more favorable jurisdiction.”*

The primary outcome of any of these options was *“loss of all those jobs”, “loss of that economic activity”* and *“Toronto Hydro is losing customers.”*

Again largely formed by media reporting, there were perceptions raised about *“people at Hydro getting paid 5 times what everyone else gets paid”* and *“CEO’s getting paid outrageous salaries”* that fed the overall position:

“Don’t ask manufacturers for a single penny more until you get your costs in order.”

In terms of reliability, the representative noted that *“most small manufacturers have backup generators”*, however this may be based on ACL having a backup generator. The participant noted that generally reliability and quality are good.

“I hear more about reliability issues outside of Toronto than inside.”

While not noting any specific problems, the representative noted that small manufacturers have *“a high threshold for quality.”*

The only specific issue identified was that *“planned outages are a problem”*, identifying a need for more advance notice and coordination.

In terms of conservation and investment in technologies:

“Manufacturers don’t know a lot about combined heat/hydro solutions – Toronto Hydro could do more by giving some advice on this. We get realtors selling CHP units on the side and desperate manufacturers may make bad decisions.”

1.5.9 Leslieville Business Improvement Area

The Leslieville B.I.A. represents around 225 independent businesses along Queen St. East between Vancouver Avenue and Empire Avenue. The businesses represented are largely independent and locally owned, ranging from galleries, restaurants, retail, arts & culture to *“next level services”* – digital and marketing agencies. Stakeholders are residents and visitors, but primarily businesses who pay the B.I.A. levy.

The BIA itself has several points of interaction with Toronto Hydro:

- “sponsorship of a community event”, “banners on hydro poles”*
- “engaged Hydro over the Jones & Queen mural to cover wires”*
- “generally looking for cooperation and support”*

- *“some members may contact the BIA first about a Toronto Hydro issue”*

In general the BIA *“has never heard anything about Hydro”* from members.

The only point of friction noted was an issue arising from a Toronto Hydro contractor a member experienced stemming from an incentivized lighting conversion, which was satisfactorily resolved, and the BIA ascribes to *“miscommunication.”*

However, that issue was significant to the BIA as the member business took to Facebook to be critical of Toronto Hydro, rather than contacting them first to ask for assistance, noting that *“social media can be an opportunity (for members) to spread the good and the bad”*.

The BIA characterizes electricity, to its members as *“an essential service, and Toronto Hydro is the only game in town.”*

“Businesses struggle to balance costs.”

“There is a perception that businesses pay too much – not just hydro, in property taxes and other costs.”

The importance of electricity, to businesses, was ranked *“on a scale of 1 to 10, probably a 10.”*

Consequently, the key expectations are on reliability of service and billing accuracy:

“Reliability has to be 24/7.”

“No wastage – don’t charge when you don’t have to.”

“An alarm system that is out for 20 minutes can be a serious issue.”

Reliability is seen as good, and a key expectation is on communication.”

“Hydro on Twitter has been highly responsive, even late at night.”

The BIA would like to have more engagement with Toronto Hydro, on several fronts:

“Would like to be able to alter businesses in advance (to planned outages)”

“Available programs, incentives, proactive issues.”

Two particular areas of collaboration were identified: Given *“lots of development in Leslieville”* bringing *“sudden construction that can take away parking”*, with immediate impact on local retail businesses, not only is *“getting notice in advance”* of assistance, but having a contact the BIA can coordinate with onsite – *“the Site Manager’s number”* – would allow the BIA to act as a central point of coordination with Toronto Hydro.

An imminent issue is street-scaping along Queen East:

“At some point Toronto Hydro will come into play – we will probably need Toronto Hydro to come in and give clear guidelines and hope that Hydro has fed into the City on this.”

The need identified is to better coordinate with the City, seen by the BIA as more difficult to interact with than Toronto Hydro:

“Leslie Barn is an example of a project where all the components worked together – better coordination.”

“Coordinate better with contractors”

An upcoming issue might be vehicle electrification – street charging stations.

“We would want to work with Toronto Hydro on vehicle electrification.”

Conservation was not seen as a priority for members due to “focus on making the day’s sales” – businesses would like more information, but were not seen as actively seeking out conservation information as it is not part of their immediate focus. The BIA felt they could be a point of collaboration on this:

“Could work through the BIA to reach members – Toronto Hydro being part of our new member introduction would be a small dunk – for existing members at the AGM or a stand-alone event.”

In terms of investment priorities, the BIA recognizes that costs are a continuing challenge for members, yet reliability is also a priority –

“Members would accept incurring a cost now but there would have to be a longer term benefit, not just economically but socially as well.”

Appendix 1.6 - Toronto Hydro Customer Priorities (Phase I)

PRIORITIES	Residential & GS <50 KW	GS >50 KW	Key Accounts (Large Users)	Stakeholder Groups (Key Issues)
Price	HIGH (1st Priority) <ul style="list-style-type: none"> Containing price increases is the top priority for most residential and small business customers. Increasing rates must be justified (i.e. there is a clear need and ratepayers dollars will be spent efficiently). 	HIGH (1st Priority) <ul style="list-style-type: none"> Containing price and providing short-term rate predictability is the top priority. 	HIGH (2nd Priority) <ul style="list-style-type: none"> Prioritizing reliability over price is of high importance (i.e. cost of power interruptions outweighs the cost of rate increases). 	Housing & Social Services <ul style="list-style-type: none"> Reliability outweighs cost Quality and consistency of power is a key need Incentive programs need to be more accessible and may not be targeted at greatest returns Conservation efforts constrained by bulk meter buildings Building renewal and retrofitting are priorities
Reliability	HIGH (2nd Priority) <ul style="list-style-type: none"> Maintaining current “good” level of reliability is a key priority. 	HIGH (2nd Priority) <ul style="list-style-type: none"> Maintaining current level of reliability is a key priority for this group of customers. Providing outage communications and responsive service is valued more highly among this rate class (than others). 	HIGH (1st and 3rd Priority) <ul style="list-style-type: none"> #1 Maintaining reliability (including power quality) is the top priority. #3 Implementing strategies to mitigate outages caused by extreme weather is a top 3 priority. 	Large Commercial <ul style="list-style-type: none"> Reliability is needed 24/7 Reliability is a competitive advantage System resilience is a concern Cybersecurity is a priority Behind the meter innovation is a need Cost is <u>not</u> a significant factor
Safety	HIGH (3rd Priority) <ul style="list-style-type: none"> Setting public safety as a top priority is assumed and expected. 	<ul style="list-style-type: none"> Setting public safety as a top priority is assumed and expected. 	<ul style="list-style-type: none"> Setting public safety as a top priority is expected. 	Small Commercial <ul style="list-style-type: none"> Reliability is needed 24/7 Customer service is the key need – lampposts, local development, outages Cost is primarily a concern among local, micro businesses
Customer Service	<ul style="list-style-type: none"> Provide accurate ETOR, proactive information on CDM programs and energy management. Provide tools to make billing, account management, and usage information easily accessible. 	HIGH (3rd Priority) <ul style="list-style-type: none"> Providing accurate ETOR and proactive communications is a key priority. Enhance customer service to match emerging technological capabilities and needs (e.g. allow customers to get bills by emails, create master accounts to manage multiple bills). 	<ul style="list-style-type: none"> Maintaining current “very good” levels is expected. Helping customers take advantage of CDM programs is seen as a valued priority. 	Small / Mid-sized Manufacturing <ul style="list-style-type: none"> Cost is a significant factor Reliability seen as less of a concern ICI program ineligible Global adjustment is a friction point, impairs budgeting
Public Policy Response	<ul style="list-style-type: none"> Incentivize adoption of innovative technologies that enable conservation and consumption management. 	<ul style="list-style-type: none"> Pursue value-for-money investments where long-term cost savings can be realized (e.g. spend now to save later). Avoid premature investments in unproven or untested technologies that impact customer rates. 	<ul style="list-style-type: none"> Investing in technology that helps customers save money is valued. 	
Environmental	<ul style="list-style-type: none"> Make programs combatting climate change known to customers. Show customers how such programs impact their bills. 	<ul style="list-style-type: none"> Maintain equipment and infrastructure in adverse weather. 	<ul style="list-style-type: none"> Actualize other priorities, before focusing on environmental concerns. 	

Methodology ▶▶

Quantitative and Qualitative

Qualitative

Quantitative

Qualitative

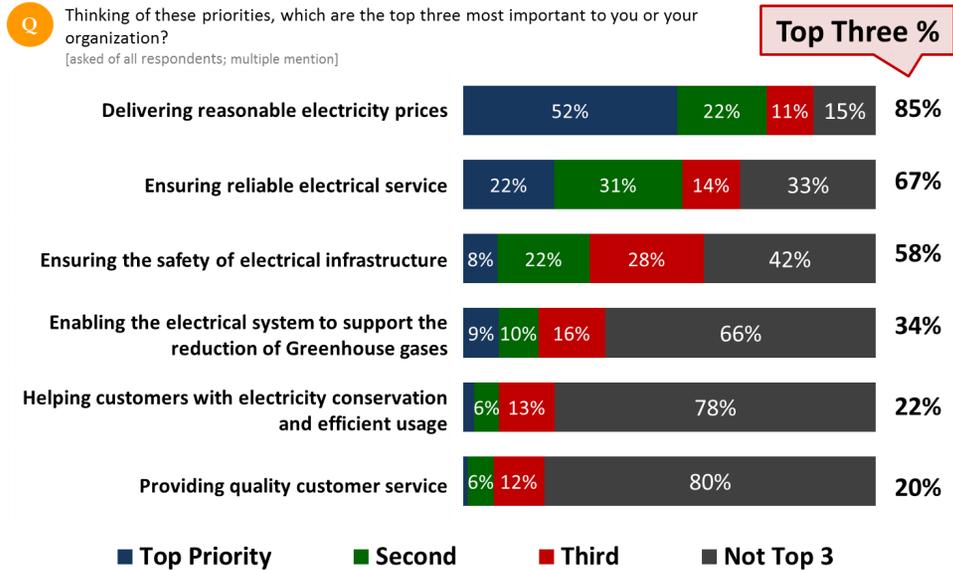
Toronto Hydro Customer Priorities

Low-Volume Customers (Residential and GS < 50 kW)

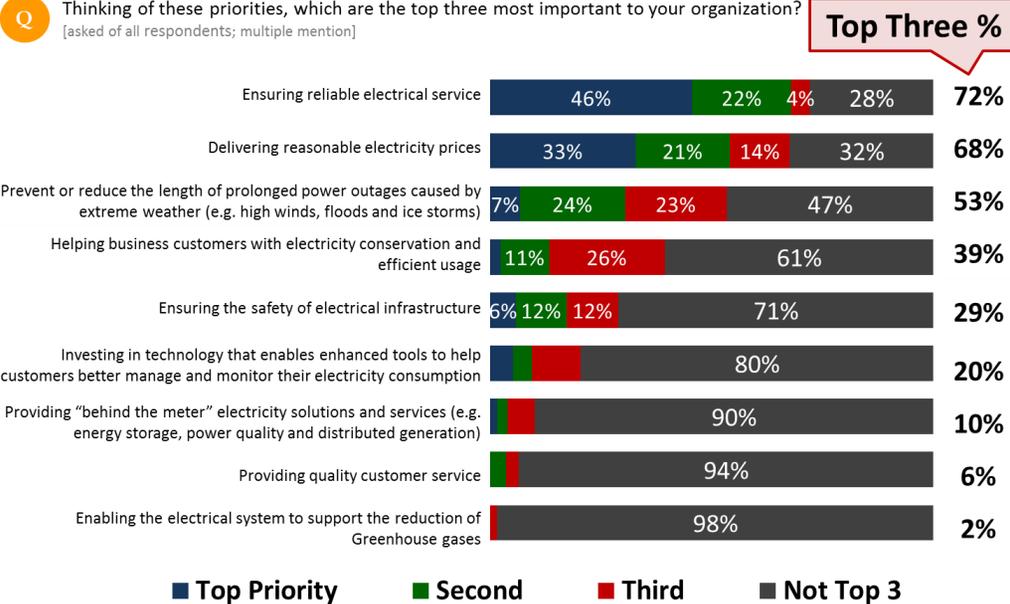
Key Account Customers (Large Users)

A series of questions were developed to identify Toronto Hydro customer priorities. The questions below were designed to rank their relative importance.

Ranking Priorities: When asked to rank top three priorities; 1st price, 2nd reliability, and 3rd safety.



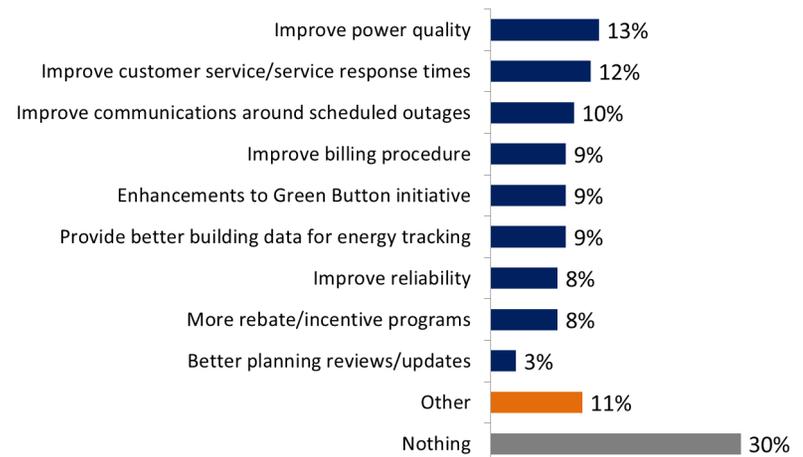
Ranking Priorities: Top priorities include reliability, price, and environmental risk mitigation.



The following open-ended question was asked of key account customers to identify where Toronto Hydro can improve services to their businesses.

Areas for Improvements: Plurality (30%) suggest nothing; power quality and response time next most commonly mentioned.

Q Is there anything in particular that Toronto Hydro can do to improve its services to your organization?
[OPEN-ENDED; multiple mention, asked of all respondents]



For more information on using this document or customer engagement results, please contact:

Kaleb Ruch: Regulatory
T: 416.542.3365
E: kruch@torontohydro.com

Joe Bilé: CDM Program Delivery and Business Development
T: 416.542.3351
E: jbile@torontohydro.com

Jason Lockhart: Innovative Research Group
T: 416.642.7177
E: jlockhart@innovativeresearch.ca

Toronto Hydro 2018 Customer Engagement
Customer Feedback Portal
Report



Survey Methodologies



Toronto Hydro commissioned INNOVATIVE to develop an online customer feedback portal to provide all customers an opportunity to learn more about Toronto Hydro and provide an opportunity to tell the utility how best they can serve them moving forward.

Field Dates

The Online Portal was accessible to Toronto Hydro customers from April 26th to May 28th, 2018.

Promoting the Online Portal

Promoting the online customer feedback portal included a combination of digital approaches:

- Toronto Hydro corporate web site promotions;
- Social media promotion (Twitter and Facebook); and
- E-blast promotions.

Publishing the Portal Online

INNOVATIVE hosted the online portal at the following URL:
TorontoHydroFeedback.com

The website prevented customers from completing questions repeatedly and saved their progress as they answered each question. Upon completion, the site was no longer accessible at the web address given.

Validating Consumer Responses

Customers who filled out the online portal were tagged with an identification number based on their postal code and their response as a residential or business consumer of Toronto Hydro. Postal codes were checked against lists provided by Toronto Hydro for validity and those deemed invalid were removed from the final sample.

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.*

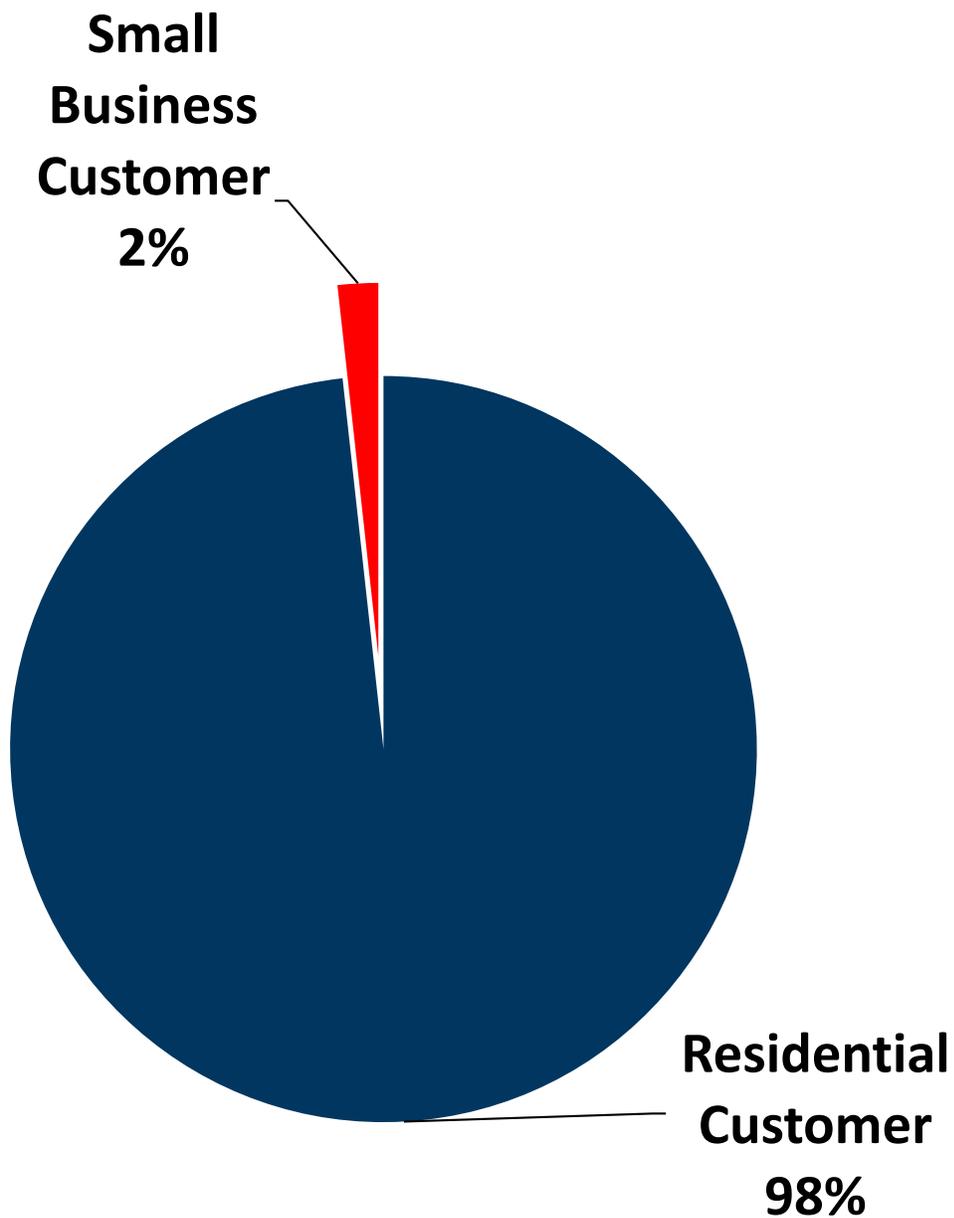
Segmentation and Demographics

Demographics

Respondents were shown different values in the survey based on whether they were residential or small business customers.

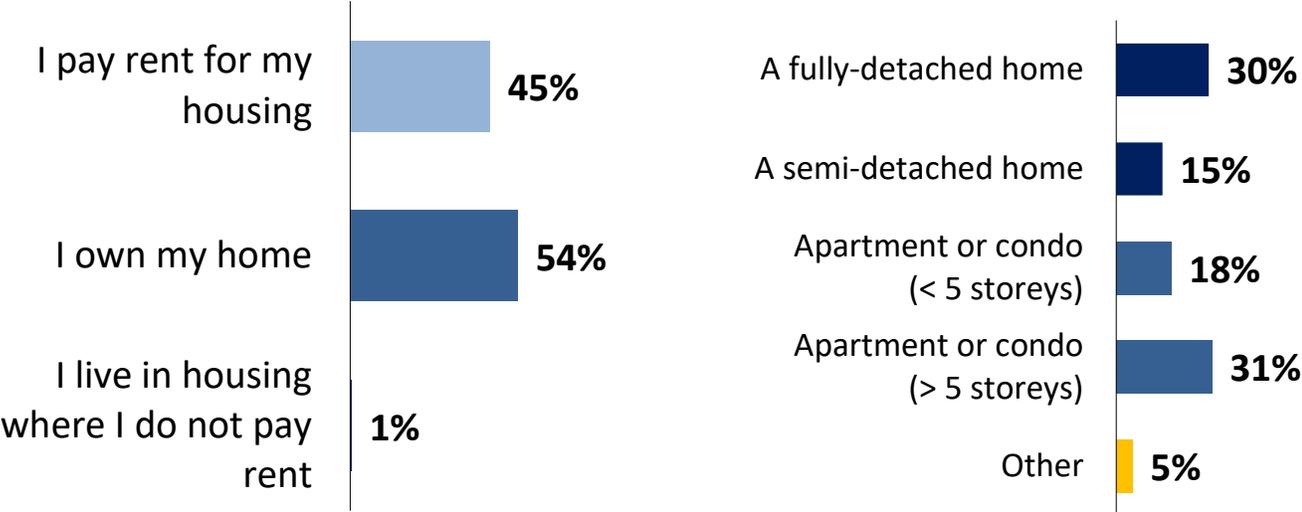
Residential n=10,165

Small business n=181

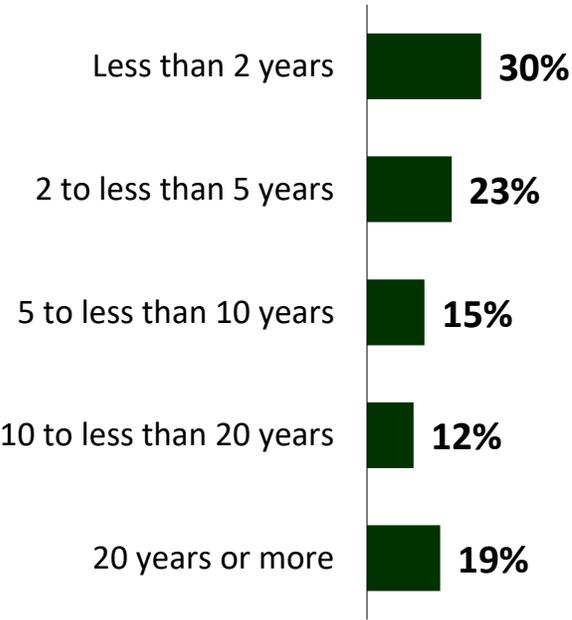


Demographics – Residential

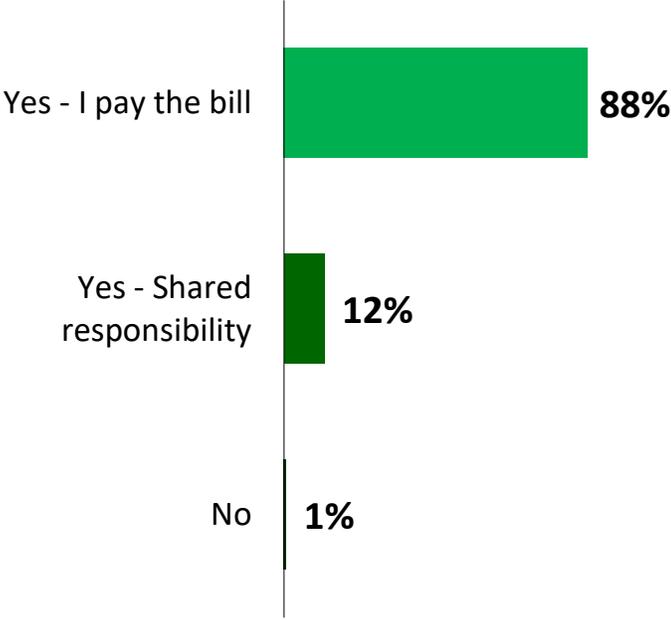
Primary Residence



Length as a Toronto Hydro Customer

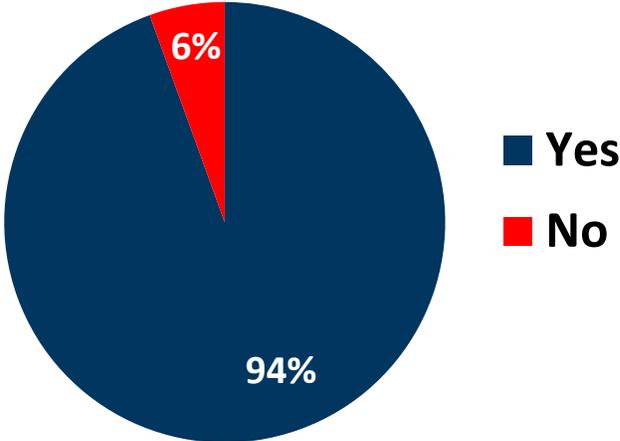


Bill Payment

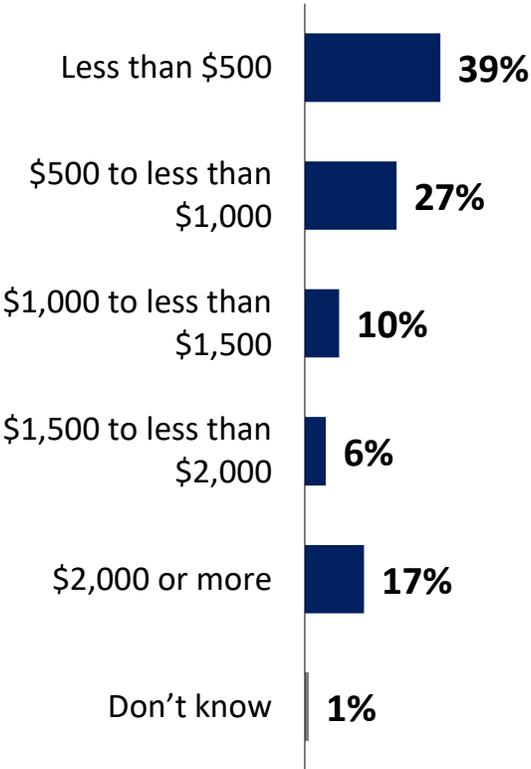


Demographics – *Small Business*

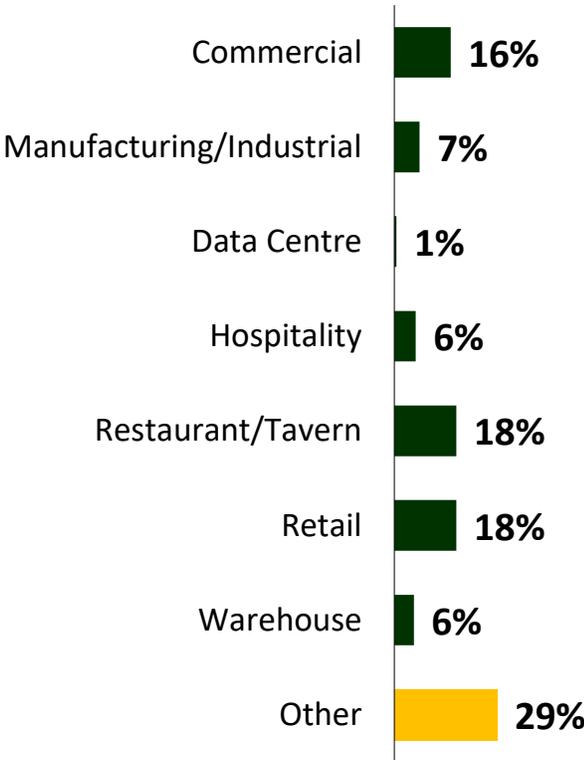
Q As part of your job, do you make decisions or influence decisions about electricity management?



Estimated Monthly Hydro Expenses

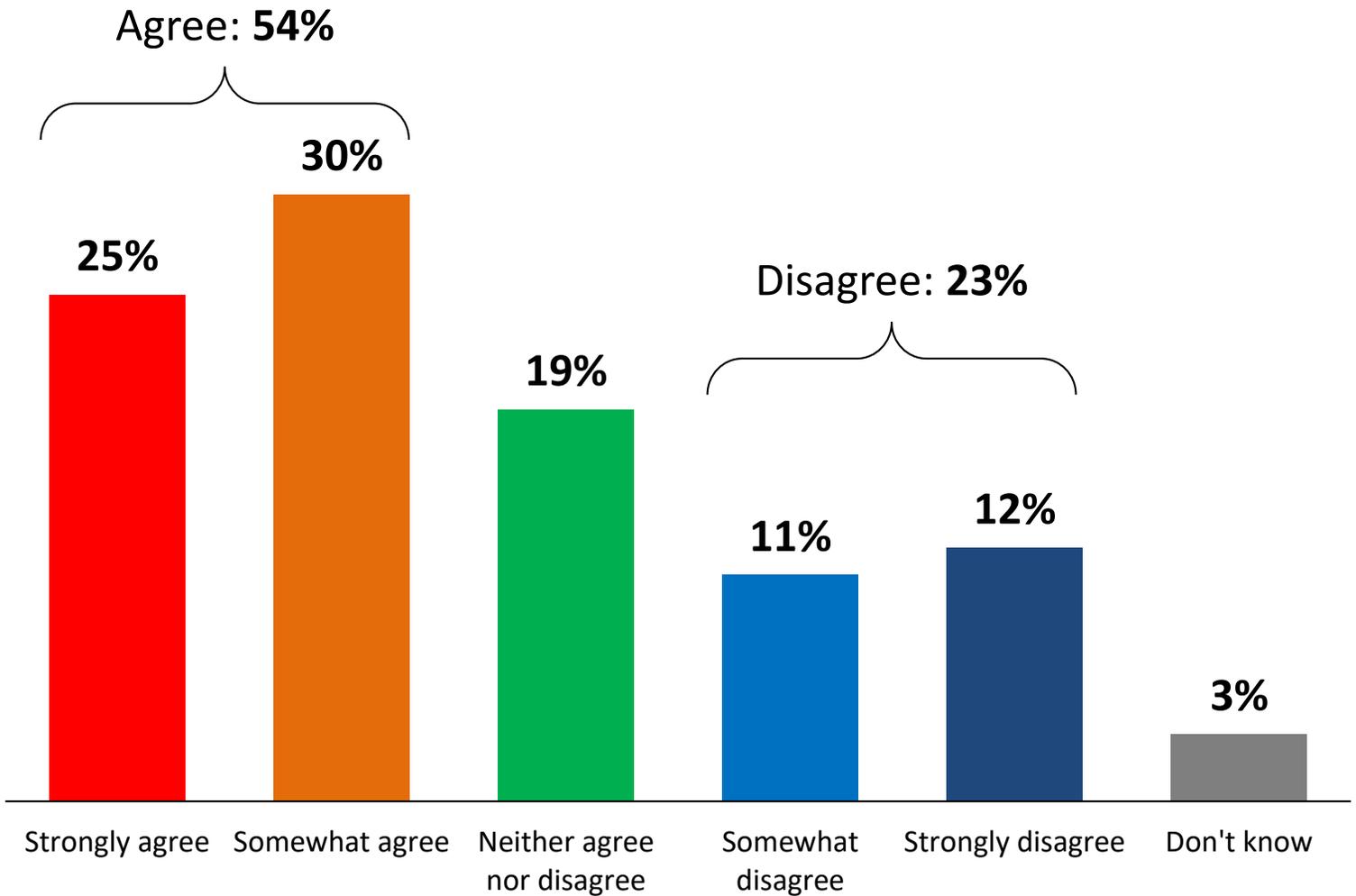


Sector



Segmentation & Demographics

Q Please indicate the extent to which you agree or disagree with the following statement: The cost of my electricity bill has a major impact on my household finances and requires I do without some other important priorities.
[asked all respondents, n=10,346]



Where does Toronto Hydro fit within the electricity system?

There are three main parts to Ontario's electricity system:

1) Generation

Where electricity comes from.

The electricity you use is generated from a mix of nuclear generation stations, water power installations, natural gas generating plants, wind turbines, and solar panels. A number of companies own these plants but Ontario Power Generation, a provincial crown corporation, generates most of the power used in Ontario.

2) Transmission

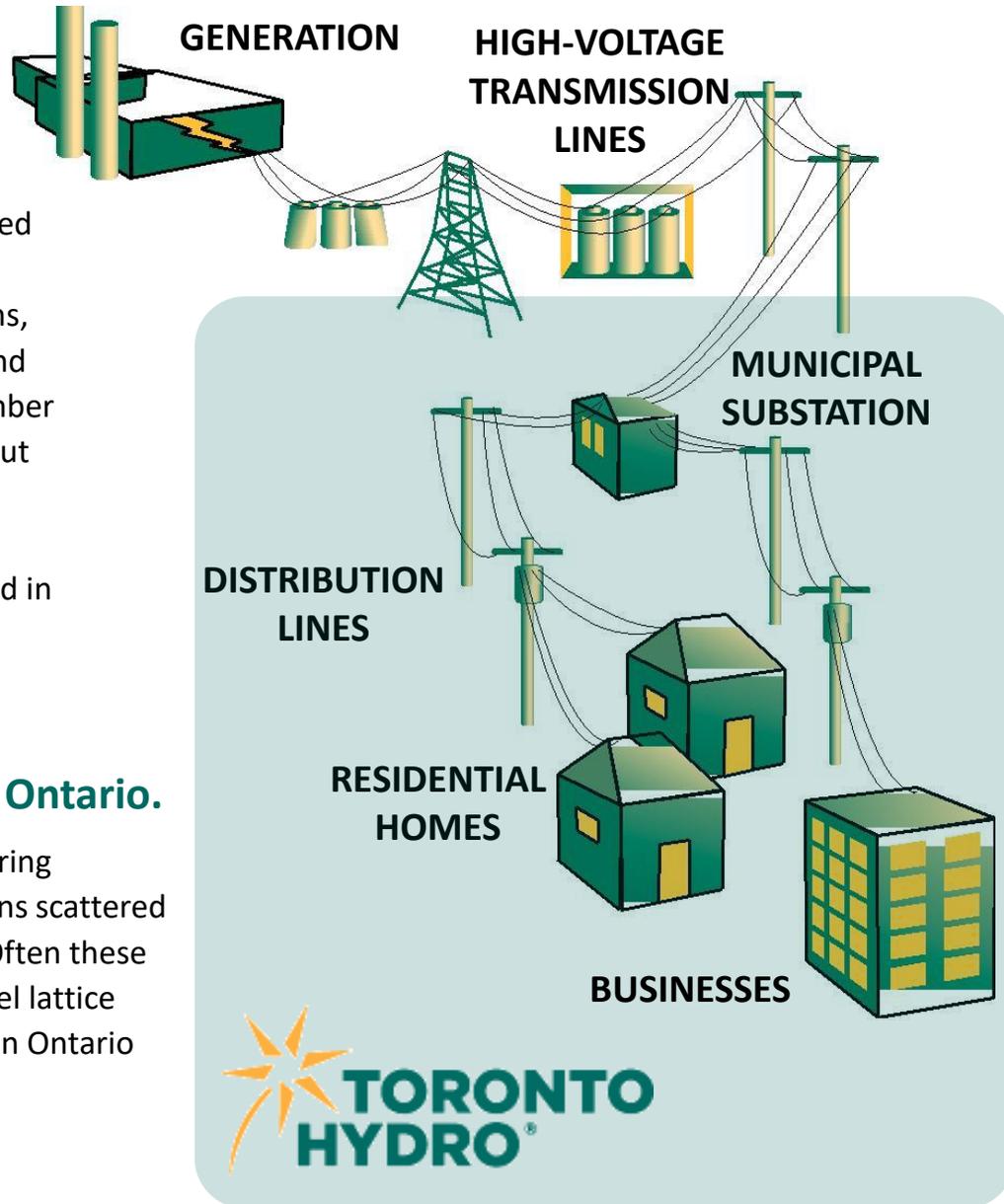
Electricity travels across Ontario.

High voltage transmission lines bring electricity from generating stations scattered across the province to Toronto. Often these lines are suspended on large, steel lattice towers. Almost all of these lines in Ontario are owned by Hydro One.

3) Local Distribution

Delivering power to homes and businesses in your community.

Toronto Hydro runs the part of the electricity system that directly serves you. Distribution stations receive and convert electricity to safer voltages. Distribution poles, wires, and underground cables deliver it to your home or business. Toronto Hydro builds and operates this distribution system, reads meters, calculates and collects bills for all parts of the electricity system, answers customer calls, and delivers conservation programs. Toronto Hydro is owned by the City of Toronto. Its activities are funded by rates set by the OEB, not by government tax dollars.

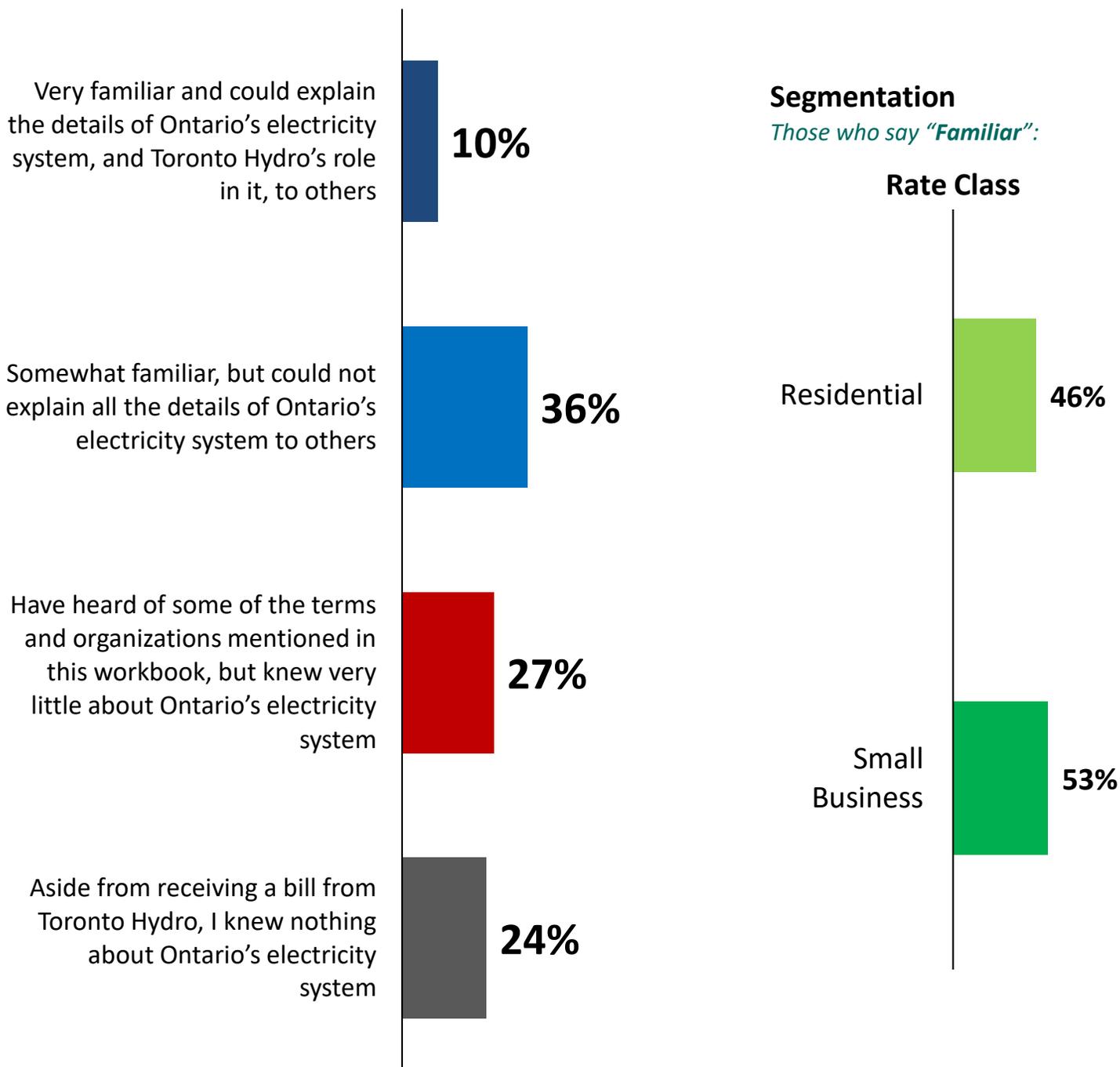


Familiarity with Toronto Hydro



Before this consultation, how familiar were you with the various parts of the electricity system, how they work together, and for which services Toronto Hydro is responsible?

[asked all respondents, n=10,346]



Note: "Don't know" (2%) not shown.

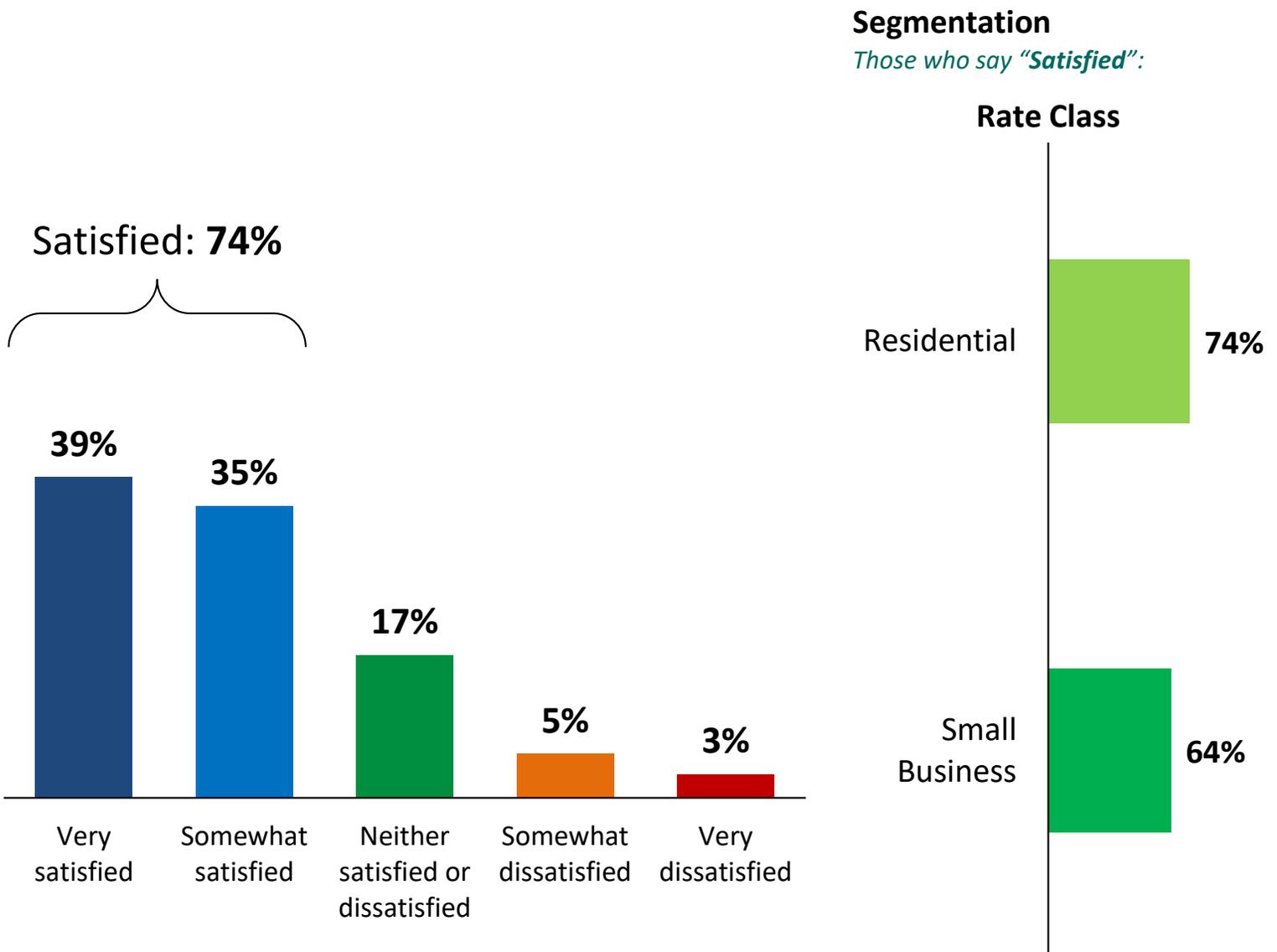
Satisfaction with Services



Toronto Hydro operates and maintains the local electricity distribution system, delivers electricity throughout the community, reads meters, calculates and collects customer electricity bills, answers customer calls, responds during outages, clears trees and brush from power lines, and delivers conservation and demand programs.

Generally, how satisfied or dissatisfied are you with the services you receive from Toronto Hydro?

[asked all respondents, n=10,346]



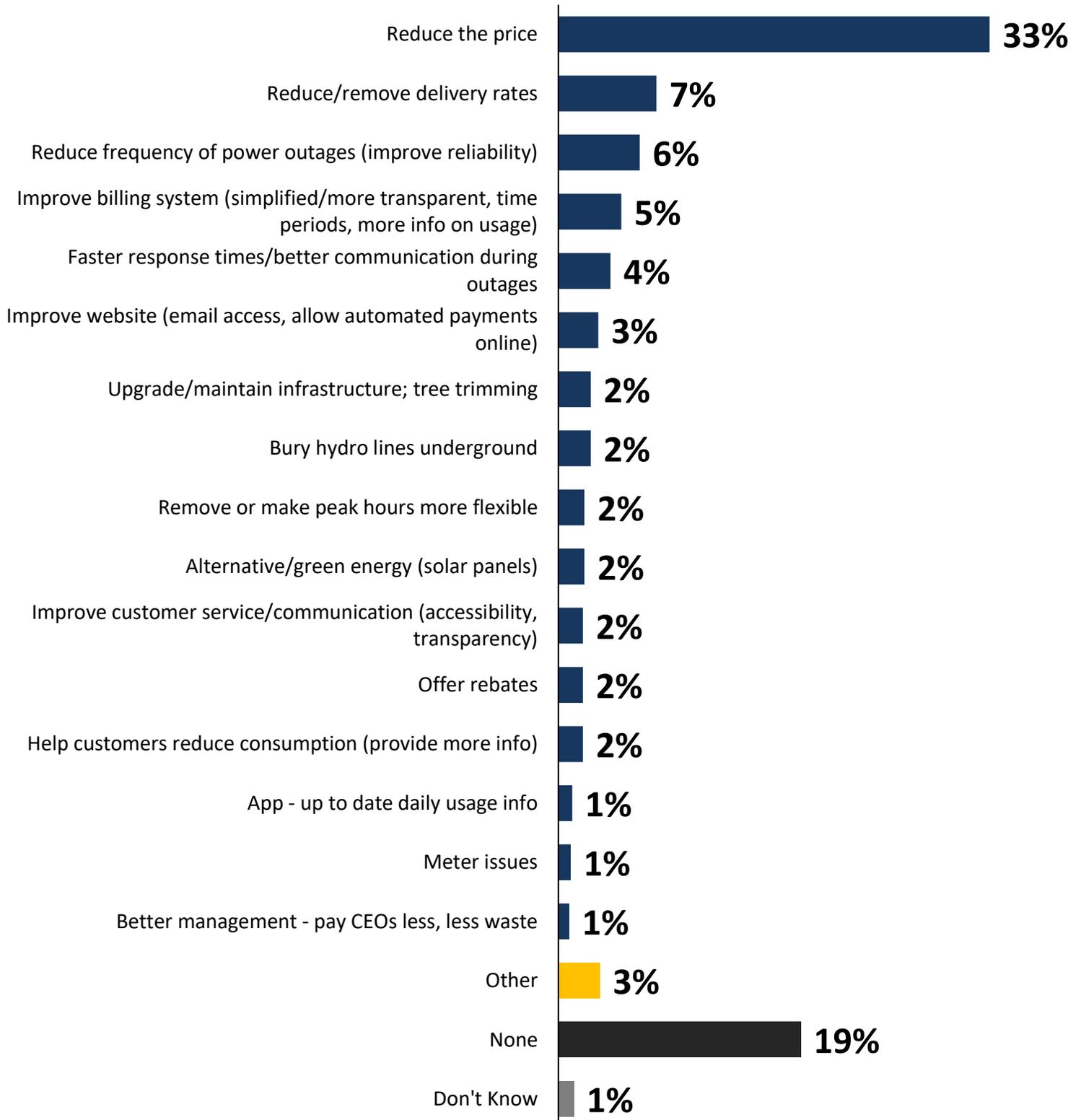
Note: "Don't know" (1%) not shown.

Suggestions for Improved Services



Is there anything in particular that **Toronto Hydro** can do to improve its services to you?

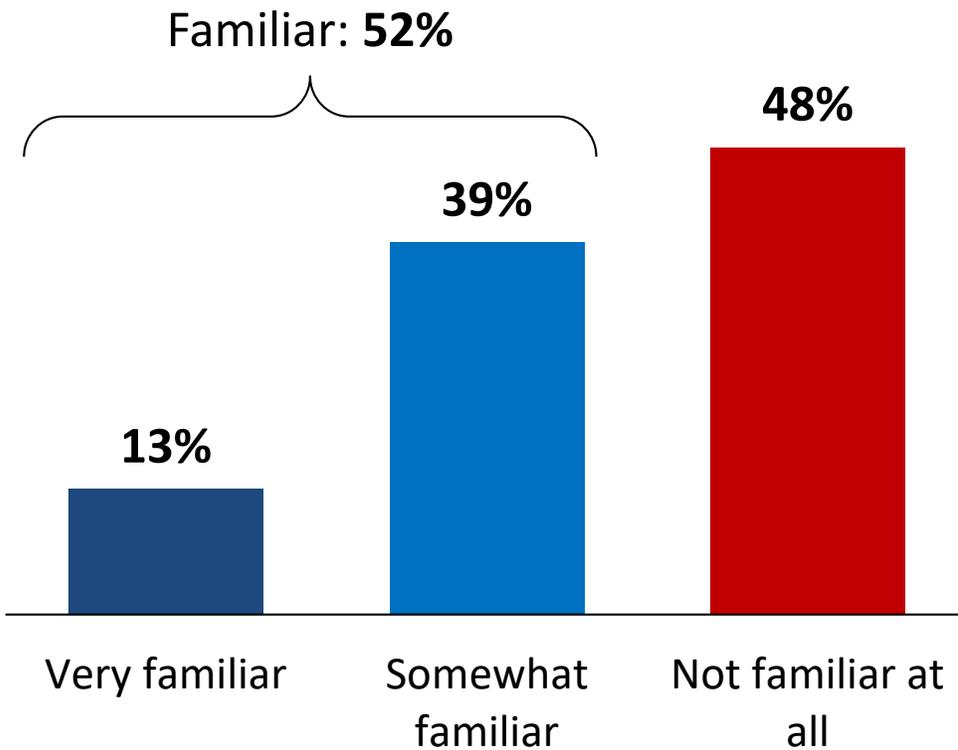
[asked all respondents, n=854]



Note: "Refused" (1%) not shown.

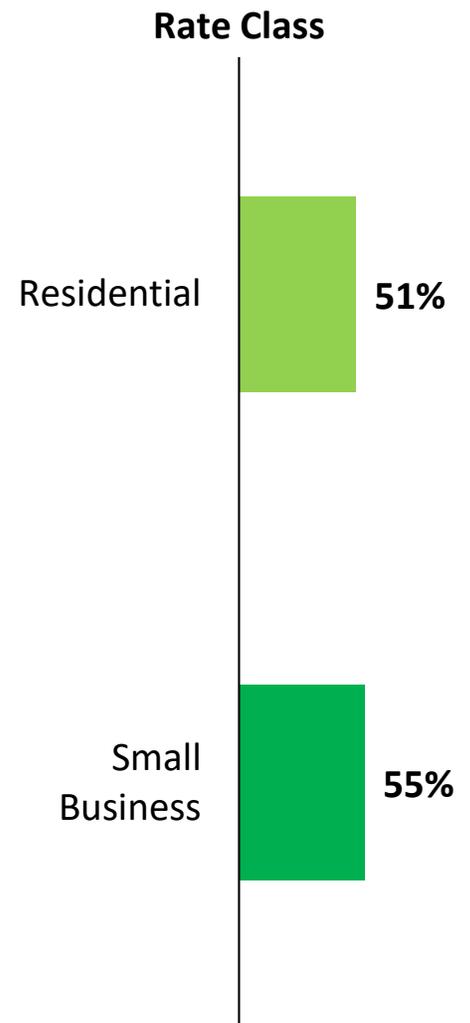
Amount of Bill Retained by Toronto Hydro

Q Before this engagement, how familiar were you with the percentage of your electricity bill that is retained by Toronto Hydro?
[asked all respondents, n=10,346]



Segmentation

Those who say "Familiar":

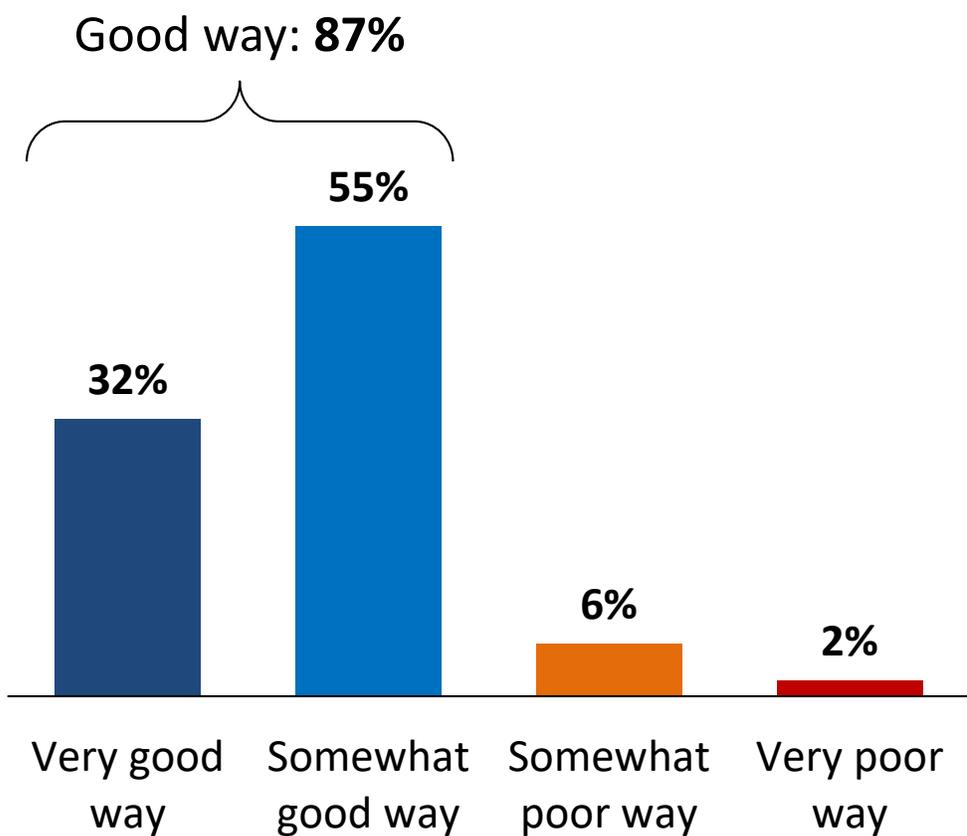


Feedback on Customer Engagement Process



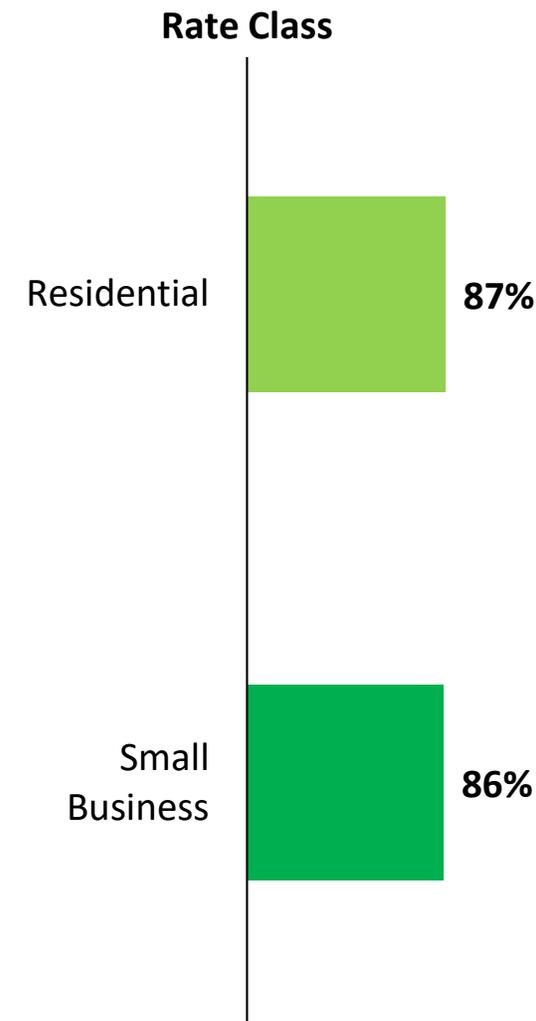
Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into **Toronto Hydro's** plan?

[asked all respondents, n=10,346]



Segmentation

Those who say "Good Way":



Note: "Don't Know" (5%) not shown.

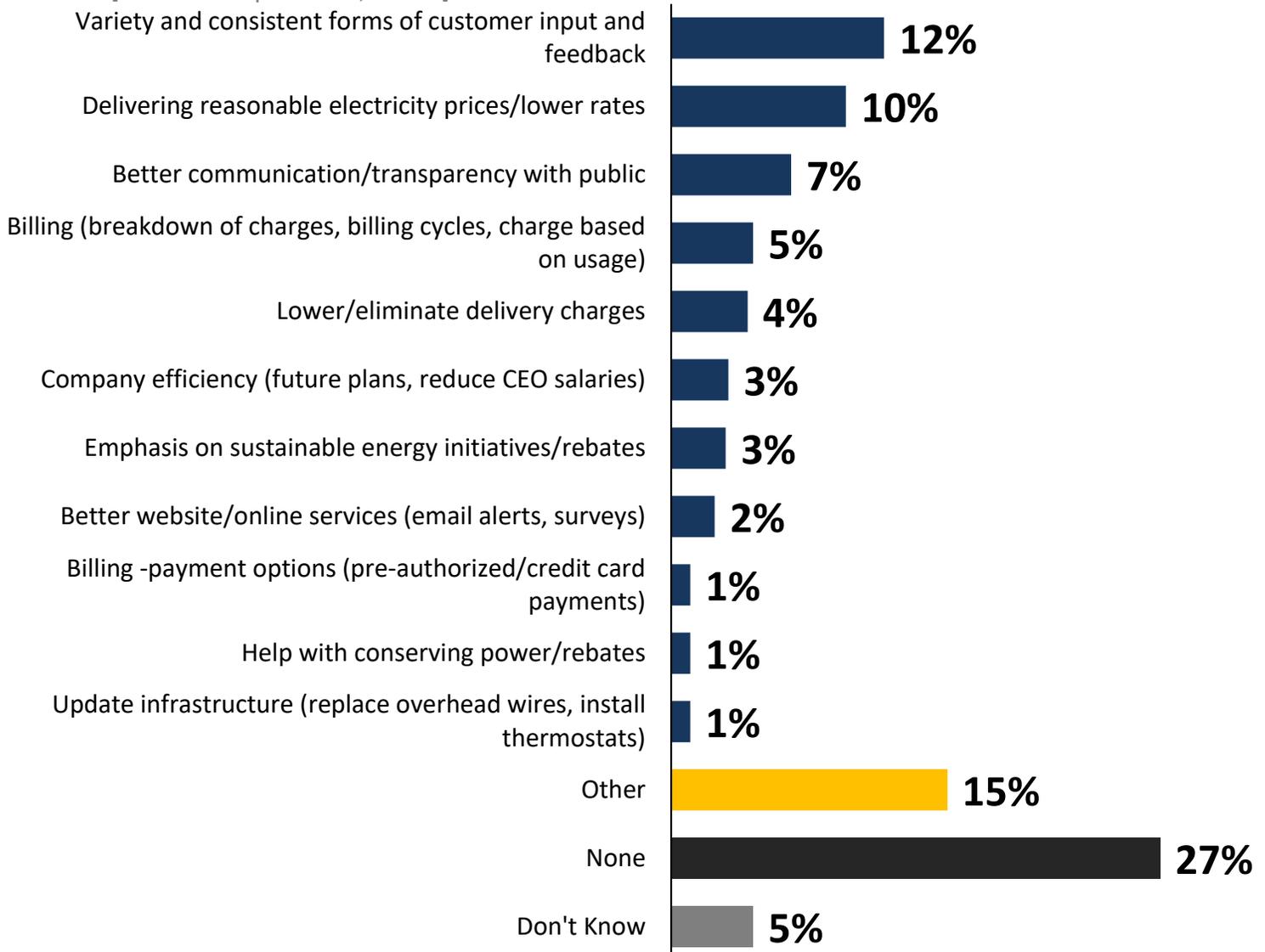
Customer Priorities That Don't Belong

Q In the initial customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for Toronto Hydro. They are:

- *Delivering reasonable electricity prices*
- *Ensuring reliable electricity service*
- *Ensuring the safety of electricity infrastructure*
- *Enabling the electricity system to support the reduction of greenhouse gases*
- *Helping customers with conservation and efficiency*
- *Providing quality customer service*

Are there any priorities on the list above that you feel don't belong? If so, please specify.

[asked all respondents, n=656]



Note: "Refused" (4%) not shown.

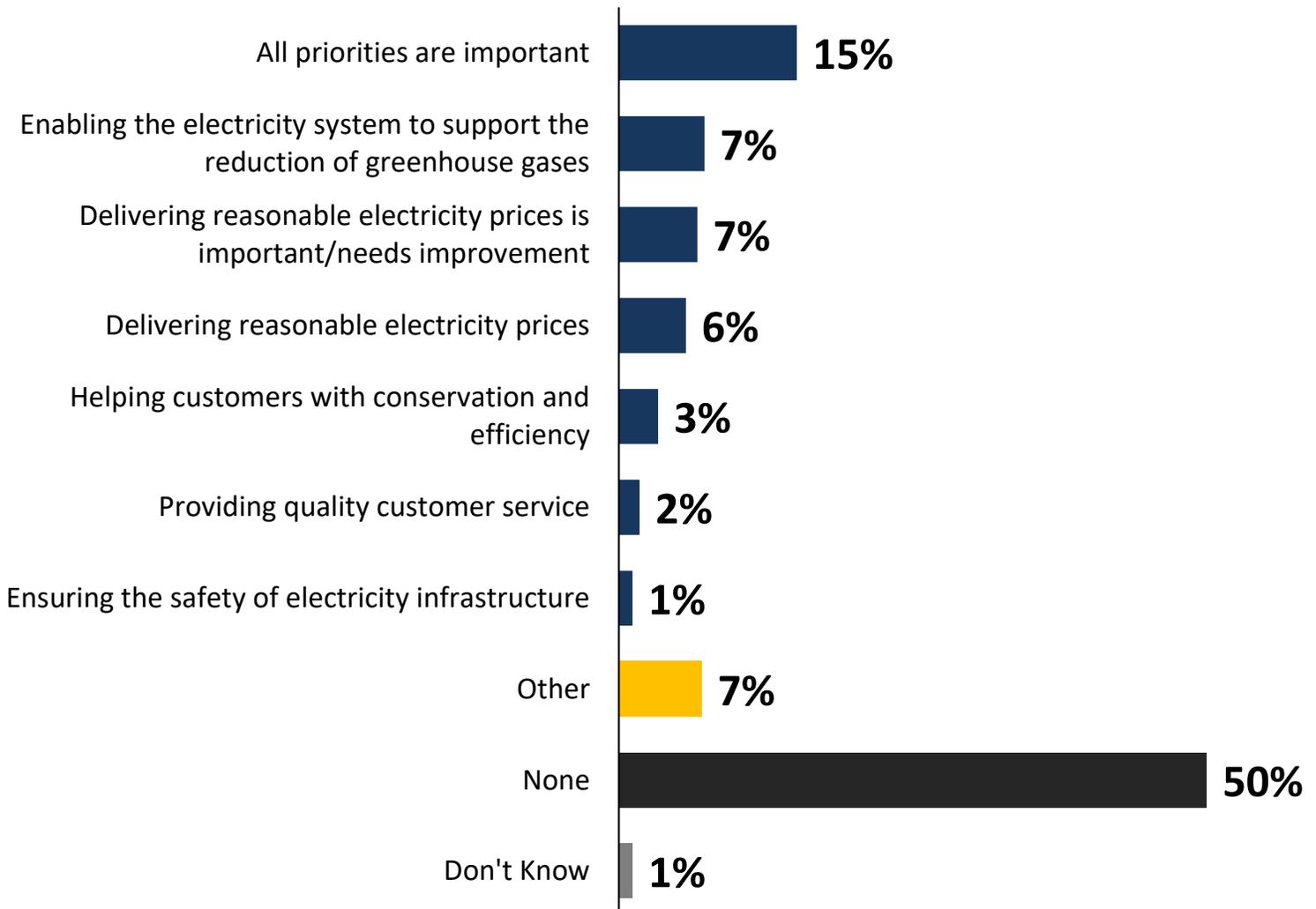
Additional Customer Priorities

Q In the initial customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for Toronto Hydro. They are:

- *Delivering reasonable electricity prices*
- *Ensuring reliable electricity service*
- *Ensuring the safety of electricity infrastructure*
- *Enabling the electricity system to support the reduction of greenhouse gases*
- *Helping customers with conservation and efficiency*
- *Providing quality customer service*

Are there any priorities that you would add to the list above? If so, please specify which priorities you would add.

[asked all respondents, n=511]



Note: "Refused" (1%) not shown.

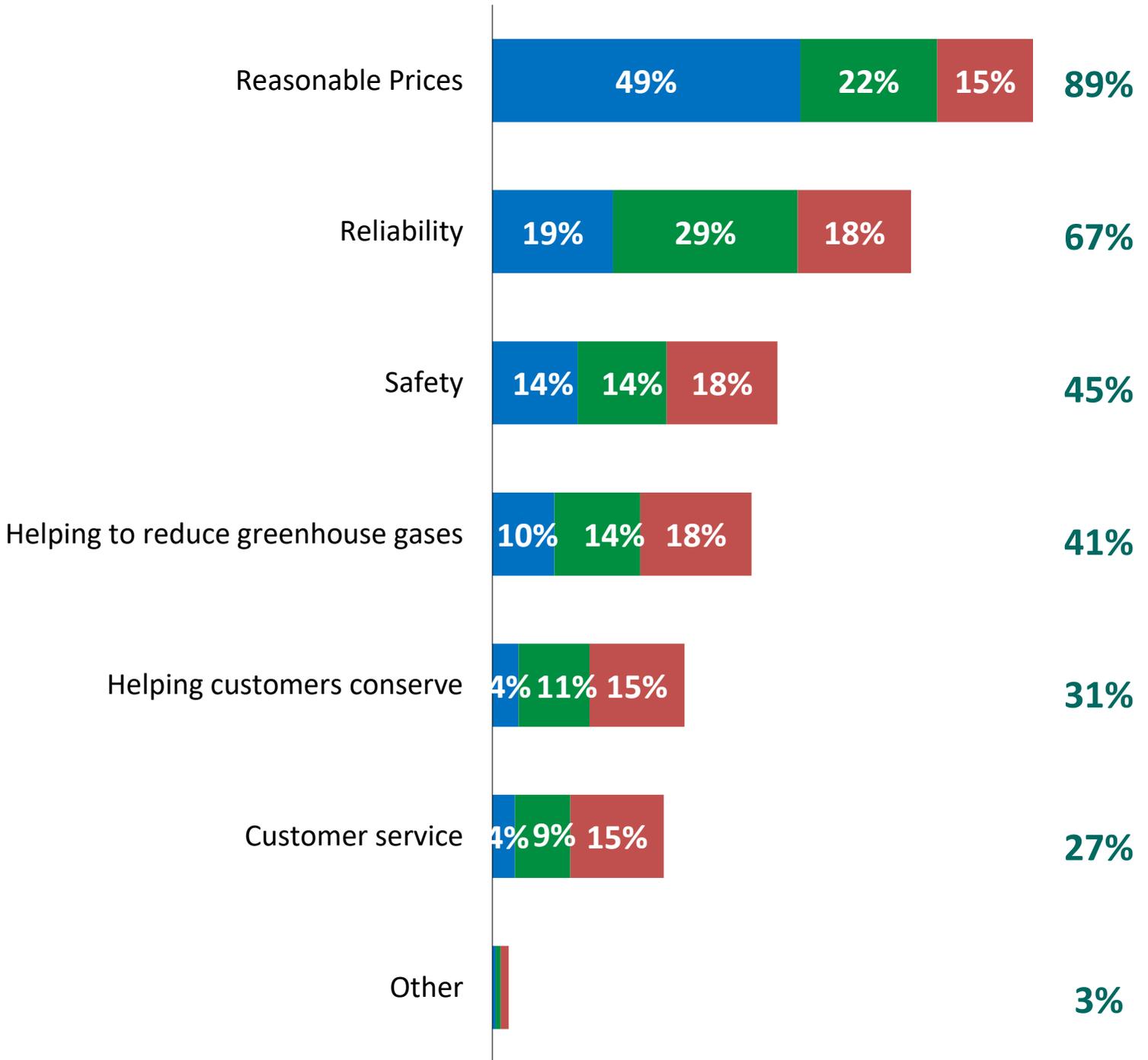
Customer Priorities



Please rank your Top 3 priorities from the list below.

[asked all respondents, n=10,346]

Top 3 Priority



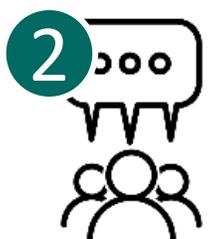
■ Most important ■ Second most important ■ Third most important

Building Toronto Hydro's Plan

With this customer feedback in mind, Toronto Hydro is proposing a Plan that is responsive to:



1. Legal requirements by continuing to meet its obligations, including safety;



2. Customer feedback by:
 - a) Keeping distribution price increases as low as possible;
 - b) Maintaining long-term performance for customers experiencing average or better service;
 - c) Improve service levels for customers experiencing below average service or who have special reliability needs (e.g. hospitals); and,
 - d) Balancing other customer priorities (e.g. customer service) with the need to contain rate increases.



3. Business input by relying on expert analysis and professional judgment to develop construction and operations programs that address technical and operational requirements.

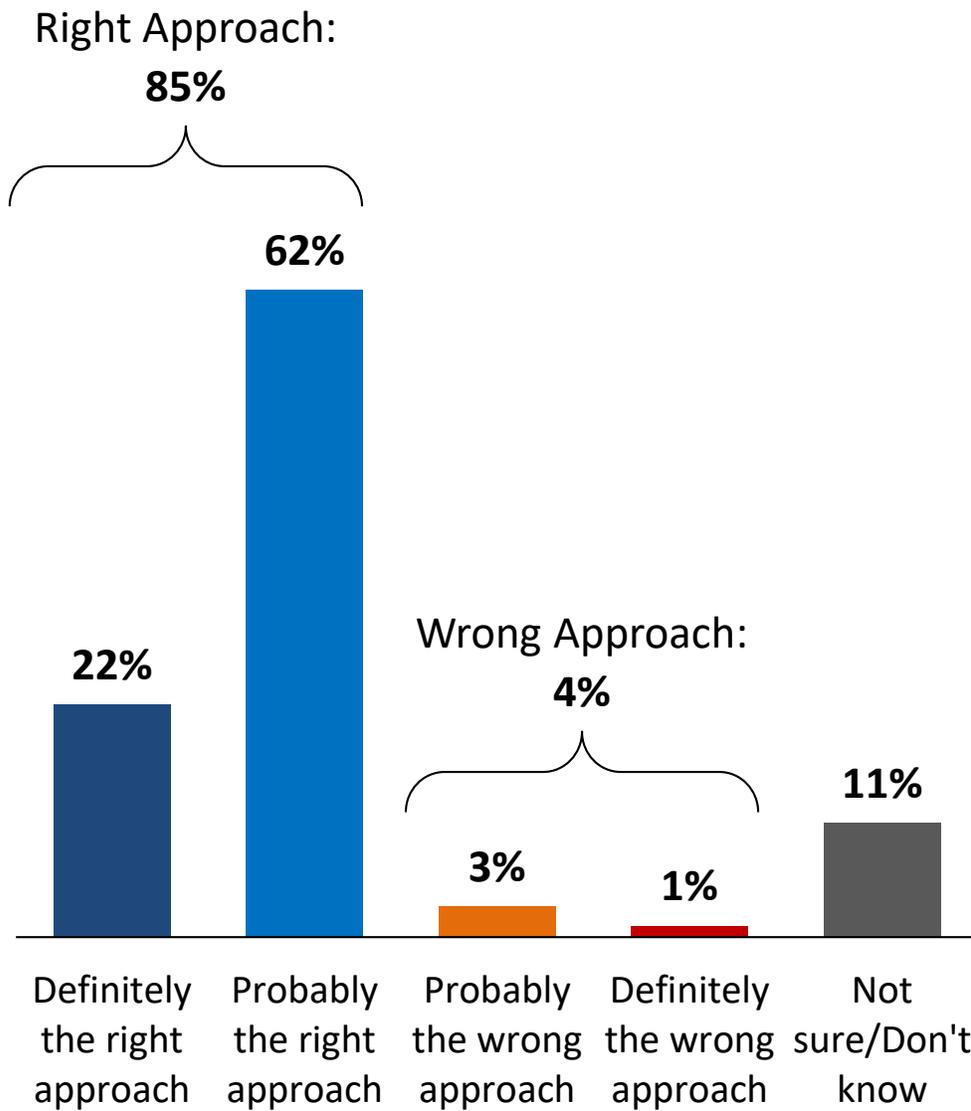
More information on Toronto Hydro's planning process [here](#).

Approach to Planning for the Next Five Years



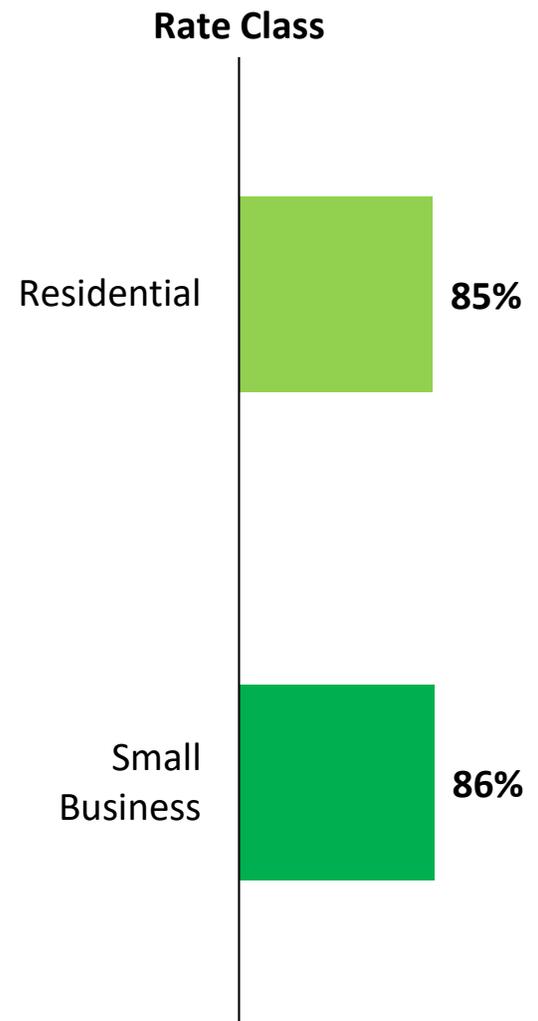
Does this seem like the right approach or the wrong approach?

[asked all respondents, n=10,346]



Segmentation

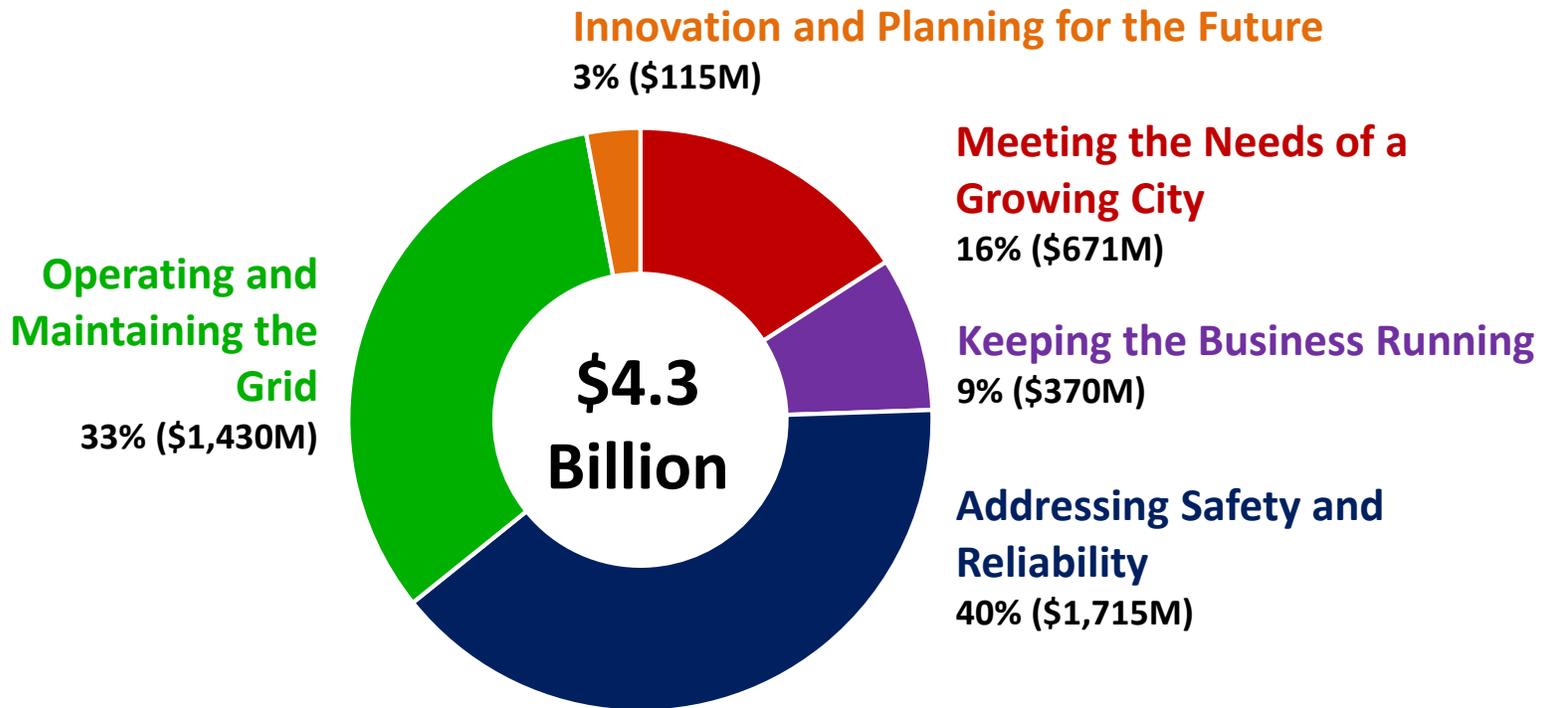
Those who say "Right Approach":



The Current Plan and Your Rates

Based on the initial customer input and the approach outlined on the previous page, Toronto Hydro has developed a plan totalling approximately \$4.3B over five years. **There are five key budget categories.**

To learn more about each category, simply hover over the title.



That translates into an average 3.4% (4.4%) increase in your (organization's) distribution rates in each of the five years of the plan. This compares to an average increase of 5.8% (6.8%) per year in Toronto Hydro's current plan for 2015 to 2019,



- In dollars and cents, that means an **average increase to the monthly bill of \$1.51 (\$4.86) each year** for the typical residential (small business) customer.
- Over the course of the proposed 5-year plan, the typical residential (small business) customer will see the distribution portion of their electricity bill **increase by \$7.57 (\$24.32).**
- As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$41.60 (\$101.98) in 2019 to \$49.17 (\$126.30) by 2024.**

The next section of this workbook will explore some of the choices Toronto Hydro needs to make to finalize this plan. However, before that discussion, we would like to get your initial feedback on the cost of the current version of the plan.

Initial Feedback on Proposed Plan

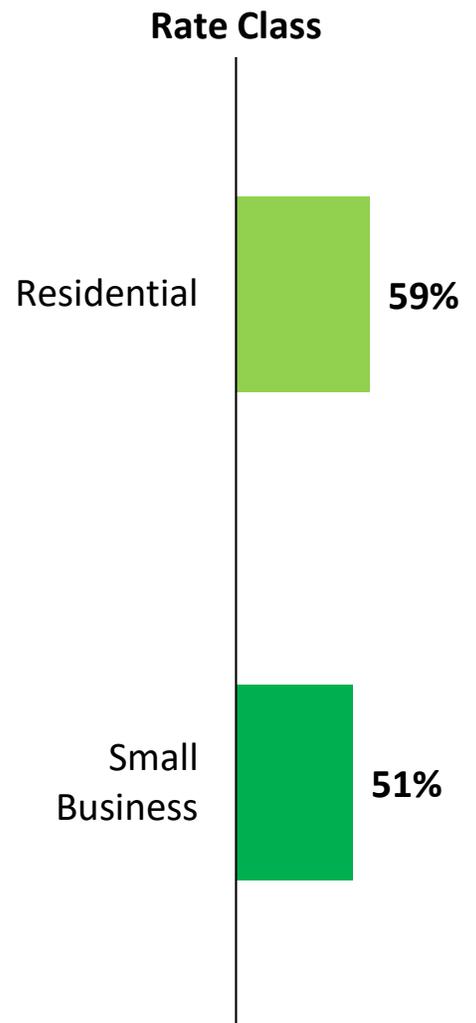
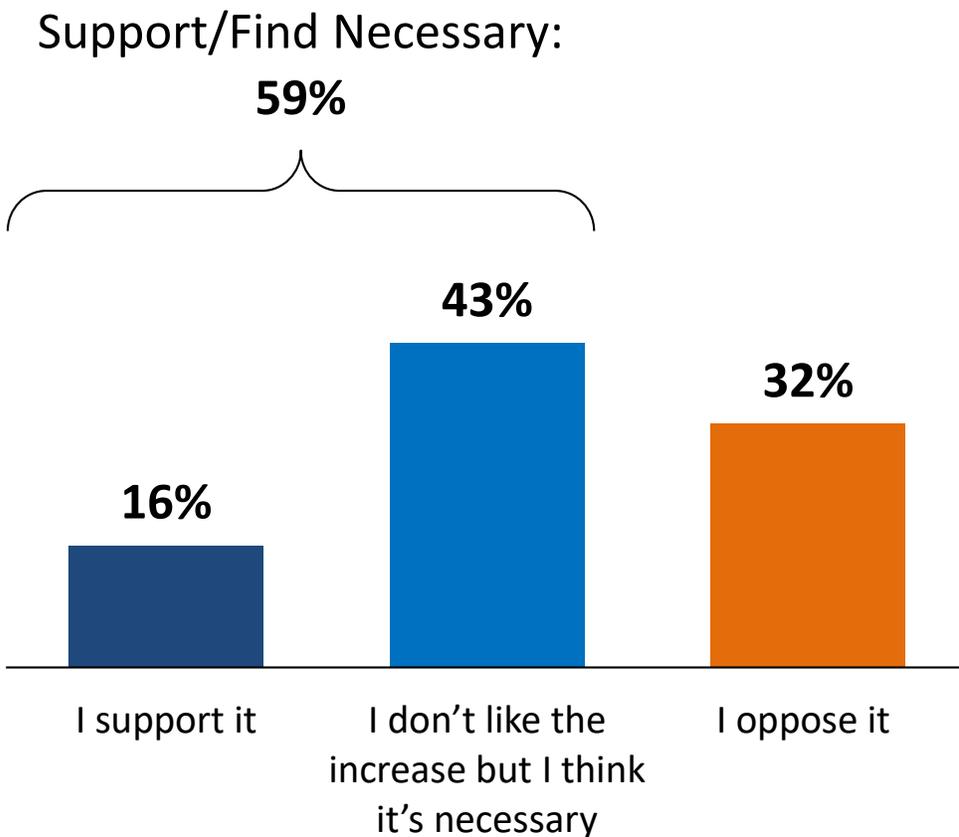


Which of the following statements best represents your view about a 3.4% (4.4%) annual increase to deliver current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs?

[asked all respondents, n=10,346]

Segmentation

Those who say "Support/Find Necessary":



Note: "Don't Know" (9%) not shown.

Initial Feedback on Proposed Plan

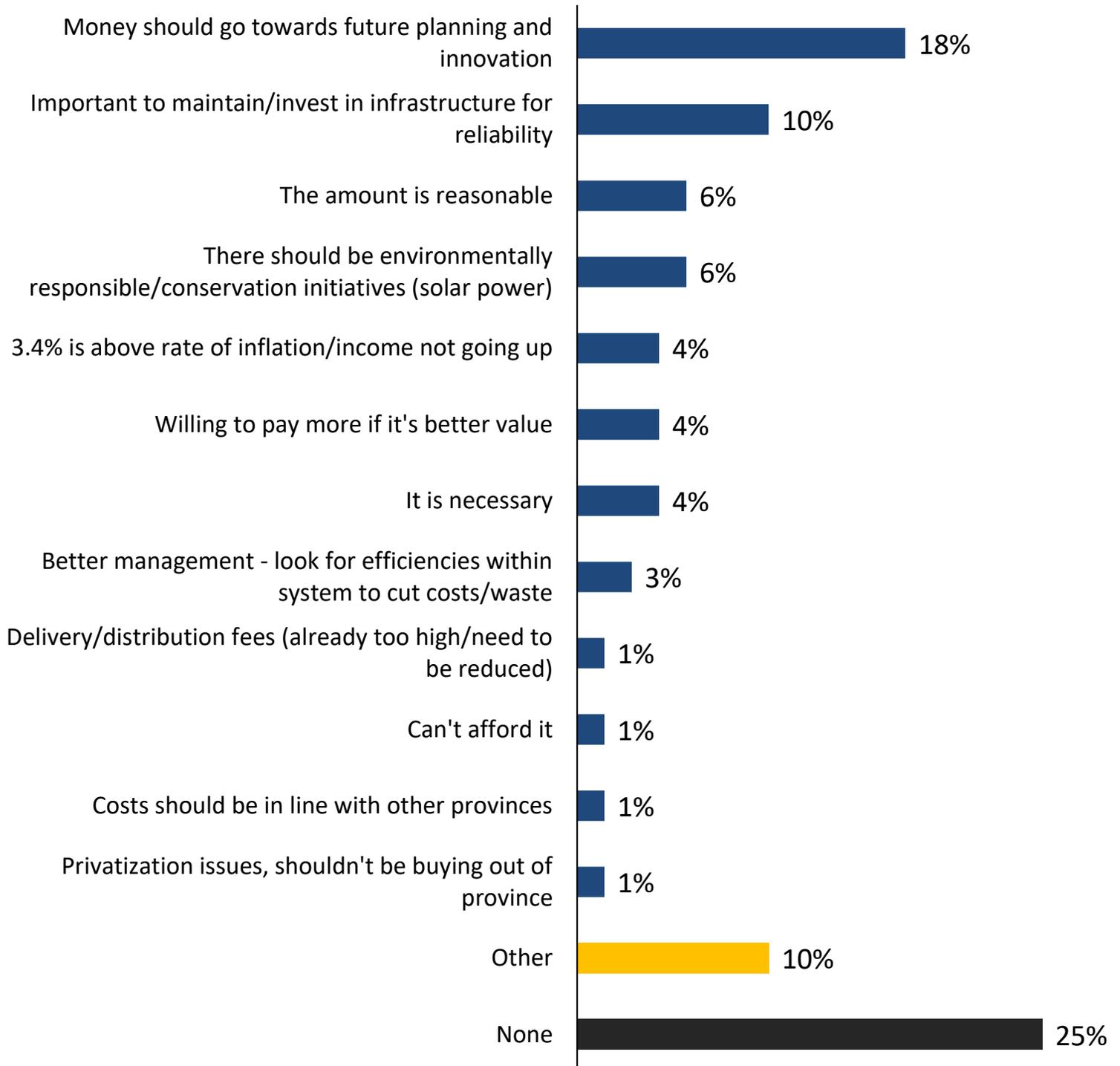
Additional Comments



Do you have any comments you wish to add?

[asked all respondents, n=67]

Those who say “I support it”:



Note: “Refused” (1%) not shown.

Initial Feedback on Proposed Plan

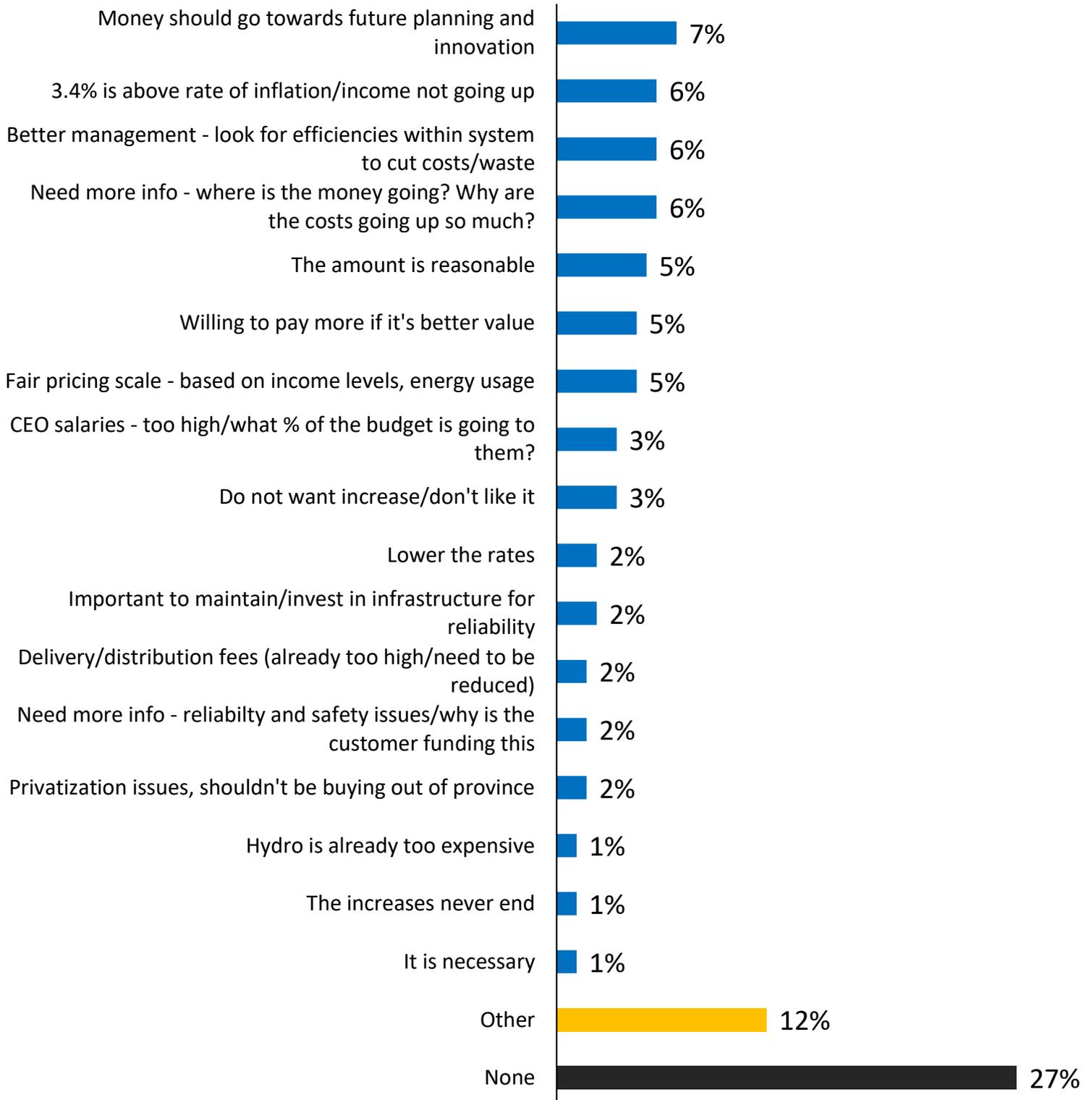
Additional Comments



Do you have any comments you wish to add?

[asked all respondents, n=173]

Those who say “I don’t like the increase by I think it’s necessary”:



Note: “Refused” (2%) not shown.

Initial Feedback on Proposed Plan

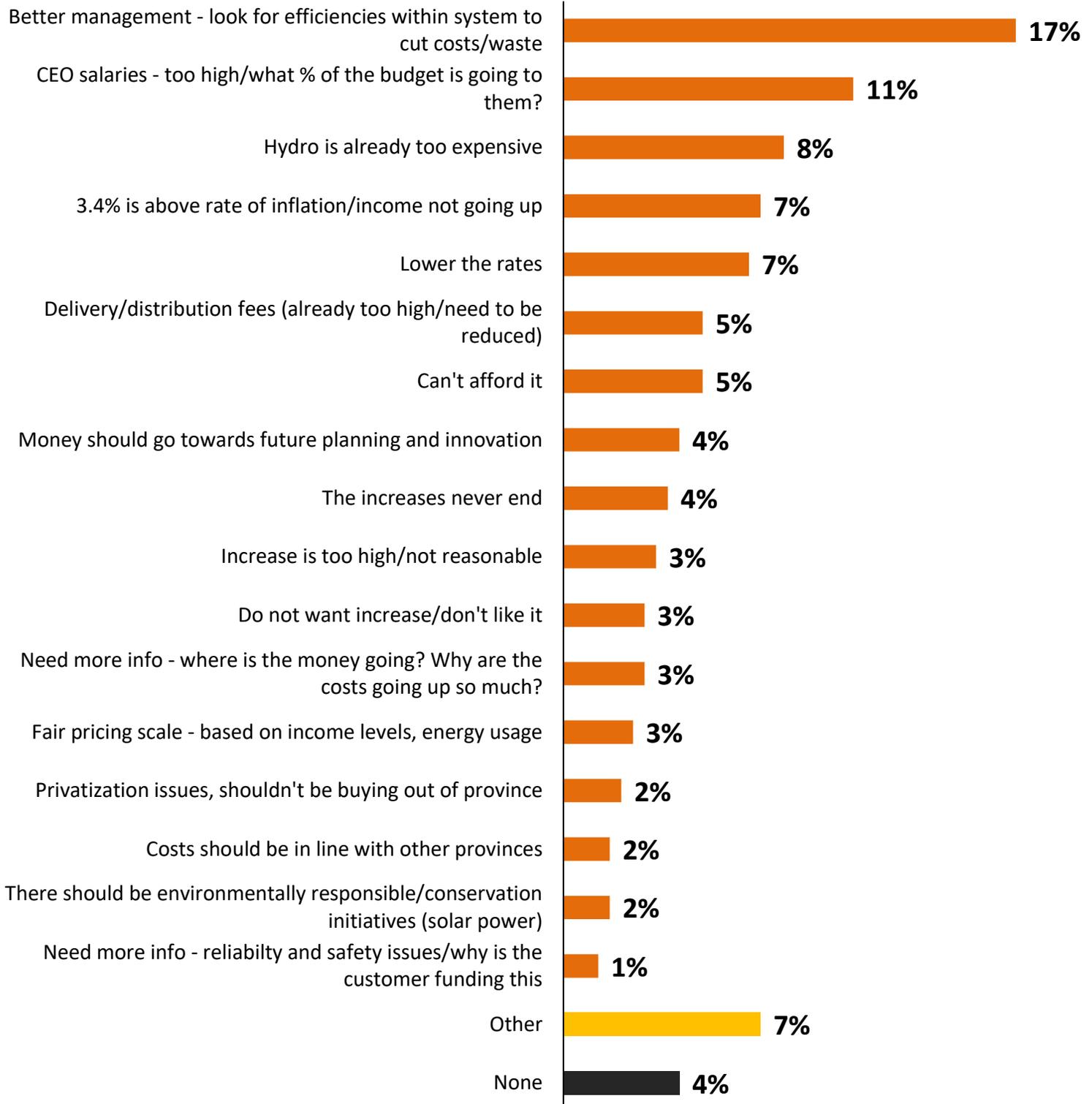
Additional Comments



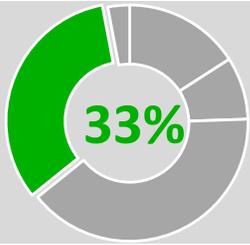
Do you have any comments you wish to add?

[asked all respondents, n=233]

Those who say "I oppose it":



Note: "Refused" (1%) not shown.



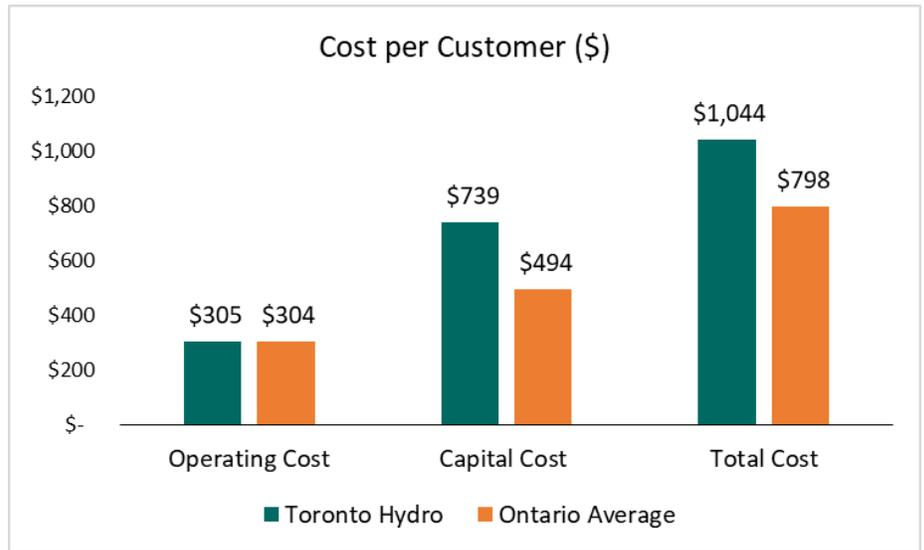
Making Choices

The following sections will ask about some key choices that could impact your rates.

Toronto Hydro’s total spending is benchmarked by the OEB against other utilities in Ontario. In the last year of publicly available data collected by the OEB, Toronto Hydro’s total cost per customer of \$1,044 is higher than the average Ontario utility cost of \$798. Those total costs are a combination of Toronto Hydro’s operating and capital costs.

Toronto Hydro’s **operating costs** of \$305 per customer are close to the Ontario average of \$304 dollars per customer. The choices in the operating budget are primarily driven by technical analysis and expert assessments of best practices.

As promised earlier, this customer feedback portal does not ask questions that expect you to be an electricity expert.



The OEB runs an open and transparent review process where experts from the OEB and intervenor groups review and challenge the Toronto Hydro’s analyses and assessments. You are welcome to participate in the OEB process if you are interested in those issues. Details can be found [here](#).

This consultation is focused on capital investments. Toronto Hydro’s capital costs are \$739 per customer compared to an Ontario average of \$494 per customer. Some of this spending is required by the standards that apply to all electricity distributors, or technical analysis of requirements. In other cases, the final amount Toronto Hydro spends is based on choices on the appropriate balance between cost and other outcomes that matter to customers. Since you as a customer are the best judge of which outcomes are most important to you, the remaining questions in this workbook ask for your feedback on those choices.

Again, the following sections will ask about some key choices that could impact your rates.

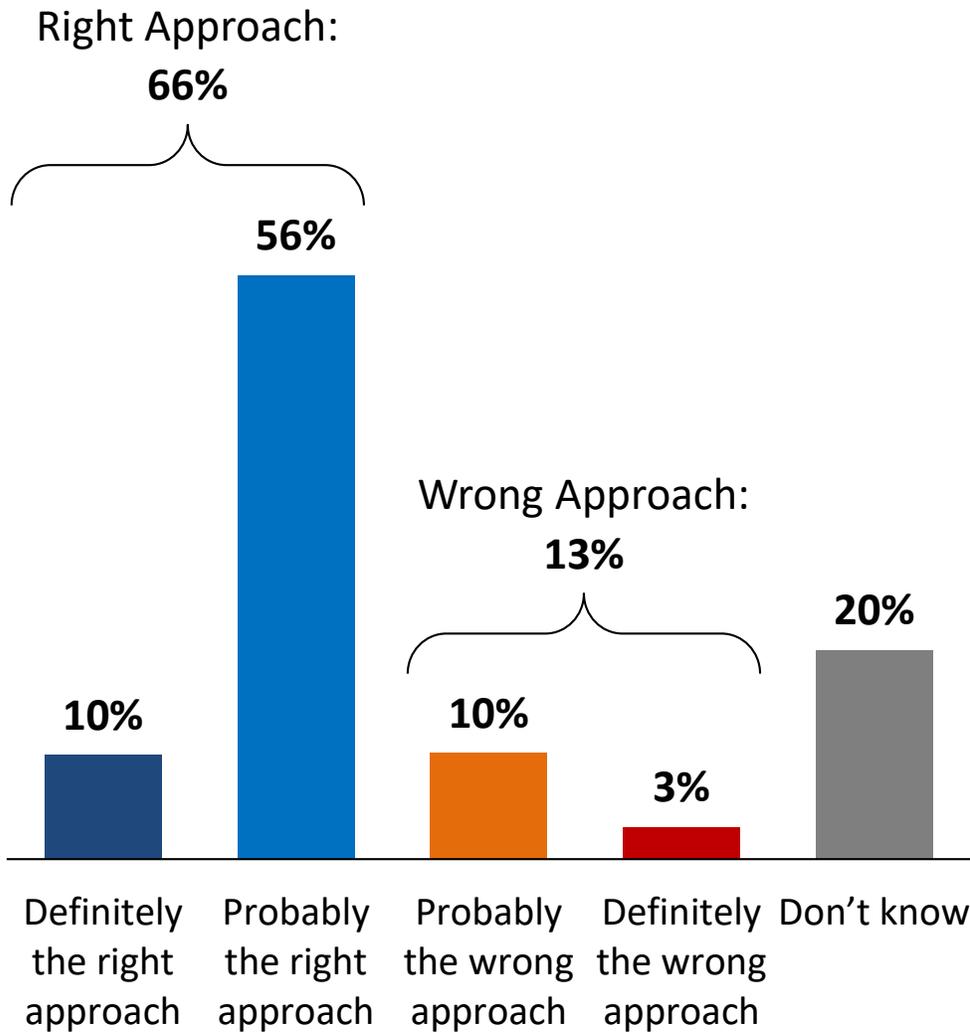
At the end of the portal, you will have an opportunity to review your responses and their impact on your bill. You will then be able to adjust your choices to provide what you feel is the best balance.

Making Choices



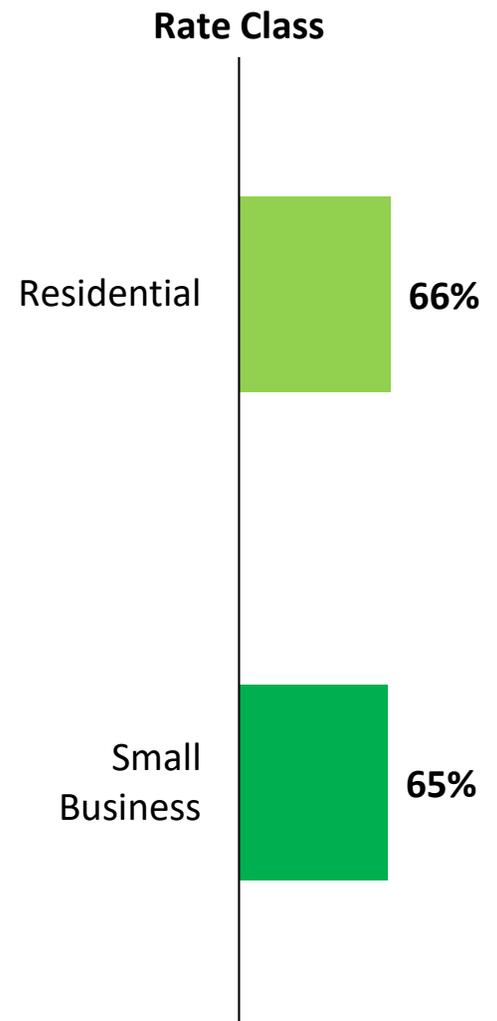
This workbook leaves detailed discussion of Toronto Hydro’s operating budget to experts from the OEB and intervenors in the formal OEB review; the workbook focuses on collecting your view on competing trade-offs in infrastructure investments. Does this seem like the right approach or the wrong approach to you?

[asked all respondents, n=10,346]



Segmentation

Those who say "Right Approach":



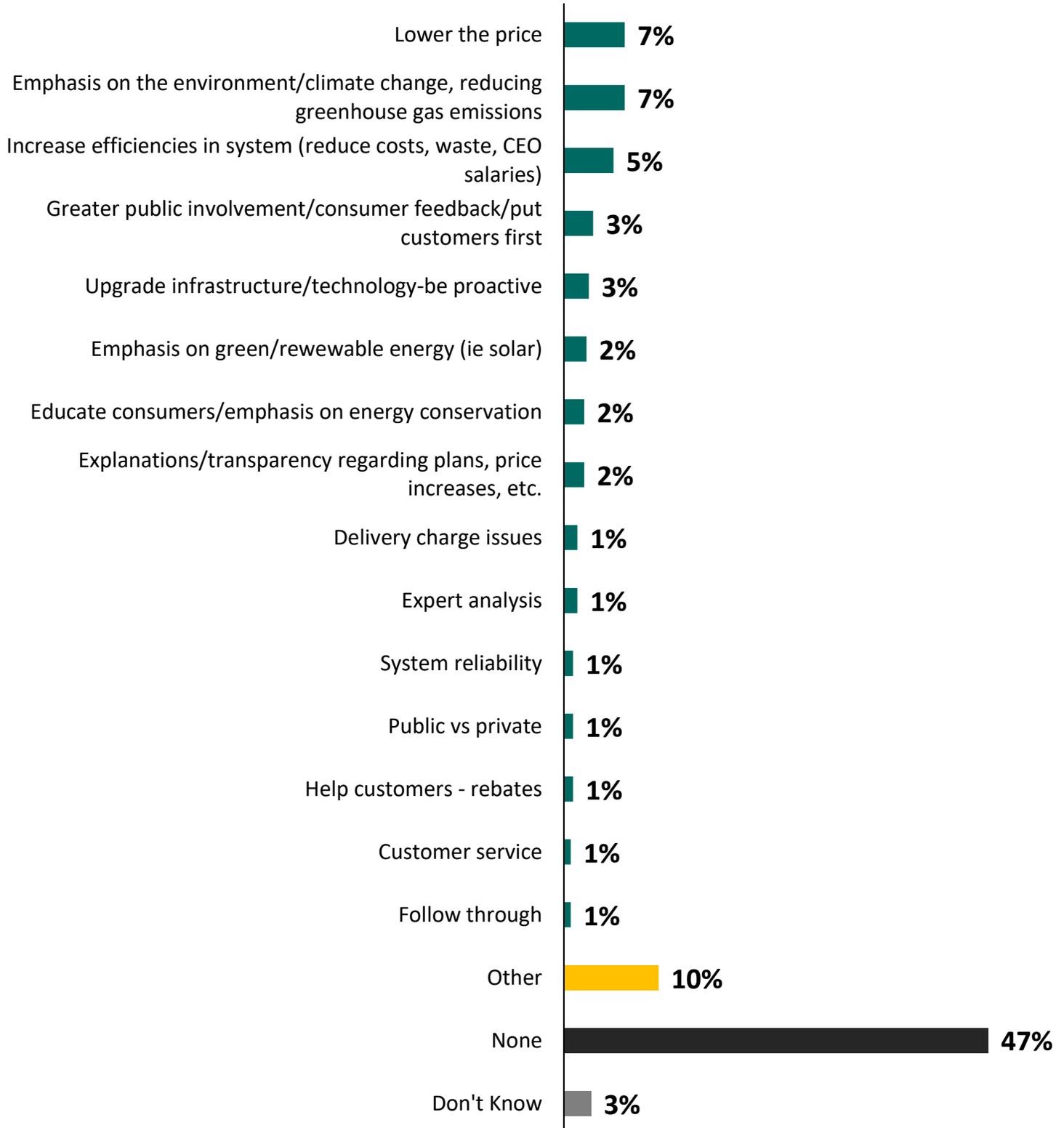
Making Choices

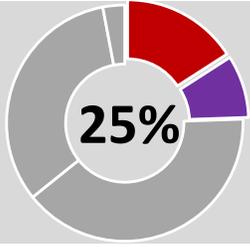
Additional Comments



Is there is anything in particular you would change about this approach or any other comments you would like to make?

[asked all respondents, n=401]





Investing in the Basics

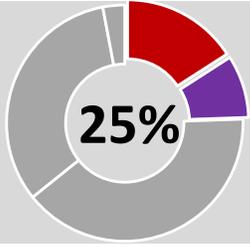
Meeting the Needs of a Growing City

Toronto is Growing. Toronto Hydro has an obligation to serve it.

You just have to drive around Toronto to see how quickly this community of over 2.9 million people is growing. New condos, office buildings, and transit projects are creating increasing demands on the electricity grid. Toronto Hydro is required to connect new customers to the grid and move infrastructure at the request of government, including for transit projects or road widening.



Beyond this, Toronto Hydro's efforts to meet the needs of a growing city include making investments that meet new demands on the grid in ways that at least maintain current reliability.



Investing in the Basics

Keeping the Business Running

In addition to maintaining the distribution grid, Toronto Hydro has to ensure that it invests in tools required to keep up with the needs of customers and the grid. The types of tools in this category are:

- **Information Technology:** systems required to securely operate the distribution system, manage customer information and privacy, and keep personnel working effectively and efficiently
- **Vehicles:** bucket trucks and other vehicles used to move personnel and supplies around the city to support the safe and reliable operation of the grid
- **Facilities:** offices and operations centers that house the people, vehicles, and equipment needed to serve customers



When deciding whether to continue to maintain existing tools or replace them, Toronto Hydro considers whether the risks and costs of continuing to use them outweighs the benefits of waiting longer to replace them. For example, Toronto Hydro intends to replace its system used for customer service and billing: the old version has reached the end of its useful life, no longer has full vendor support, and efforts to keep it going are becoming expensive and increasing the risks that Toronto Hydro cannot get accurate bills to customers on time.

Investing in the Basics



As a company, Toronto Hydro needs vehicles and tools to service the power lines and IT systems to manage the system and customer information. Which of the following statements best represents your point of view?

[asked all respondents, n=10,346]

Toronto Hydro should make the investments necessary to ensure its staff have the equipment and IT systems they need to manage the system efficiently and reliably

70%

Toronto Hydro should find ways to make do with the equipment and IT systems it already has

19%

Don't know

11%

Segmentation

Those who say "make the investments necessary":

Rate Class

Residential

70%

Small Business

61%

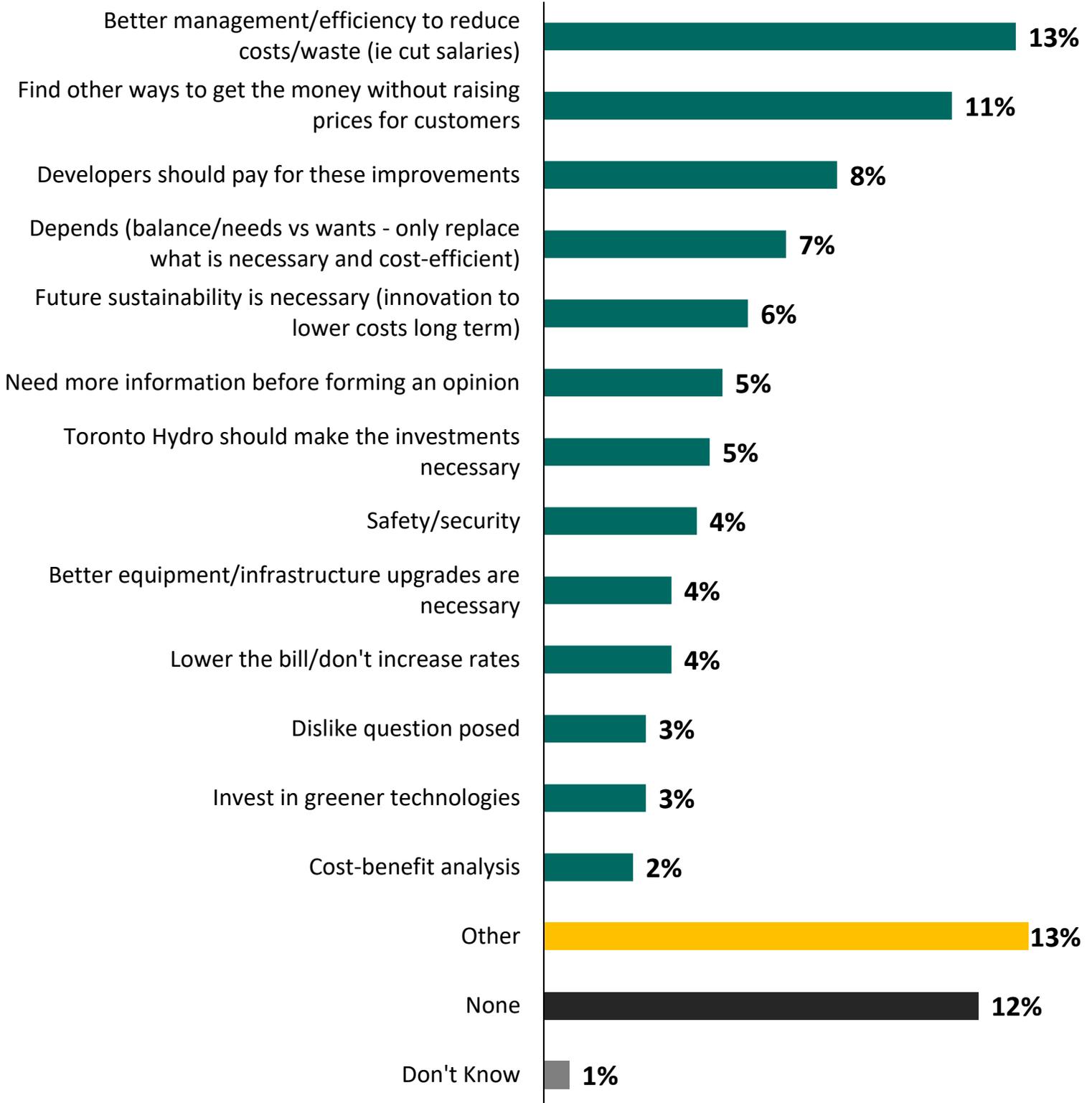
Investing in the Basics

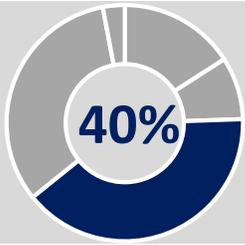
Additional Feedback



Additional Feedback

[asked all respondents, n=284]





Addressing Safety and Reliability

What's in this category?

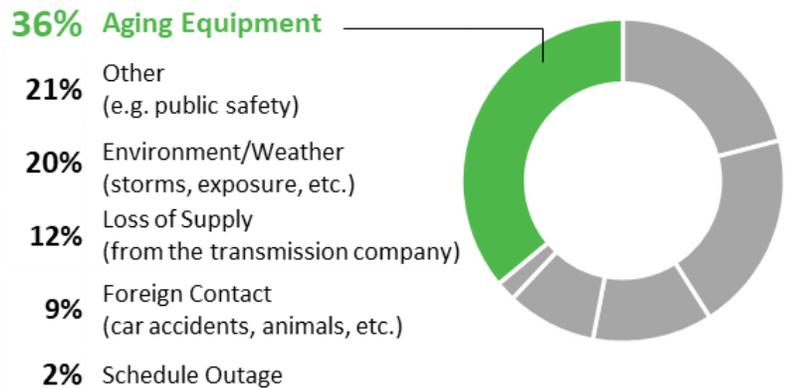
40% of Toronto Hydro's proposed budget will go towards ensuring safety and reliability is maintained and service improvements are made for customers experiencing below average reliability or who have special reliability needs (e.g. hospitals).

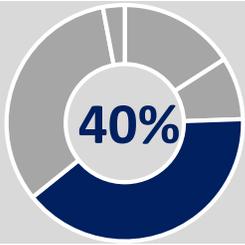
There are many reasons for poorer reliability (e.g. outages). In any given year, reliability can increase or decrease in response to unusual weather events. In fact, roughly 20% of all outages are caused by ice storms, severe winds, extreme rainfall, and other environmental events. However, the largest number of outages, roughly 36% of them, can be attributed to aging equipment.

Toronto Hydro measures both how many interruptions customers experience and how long those outages last. Over the past five years, excluding major events like ice storms, the average customer has experienced:

- Average of **1.4** outages per year.
- Between **60** and **70** minutes without power per year.

Aging equipment is responsible for approximately 36% of Outages



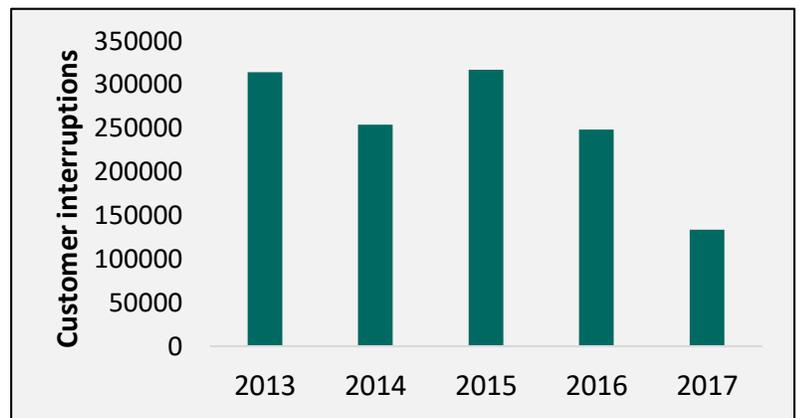


Addressing Safety and Reliability

Approximately one-third of Toronto Hydro's distribution assets are beyond their expected useful lives or will reach their expected end of useful life within the next five years. Toronto Hydro takes a stewardship approach to that challenge: investing in infrastructure that benefits today's customers and future generations of customers.

Toronto Hydro's current five year plan (2015-2019) ramped up investment in replacing old equipment **and the average number and length of outages has been declining**. The chart below illustrates this improvement for people who were having the worst experiences.

In the new plan, Toronto Hydro's general approach is to spend just enough on the grid so that most customers can expect a similar level of reliability over the next five years as they are experiencing today, and to provide improved service for those customers whose reliability is poorer or who have special reliability needs (e.g. hospitals).



of Customer Interruptions on Poor Performing Circuits

Addressing Safety and Reliability



Which of the following is closest to your point of view regarding Toronto Hydro's stewardship approach to addressing reliability?

[asked all respondents, n=10,346]

Toronto Hydro should stick with the proposed approach of maintaining the current level of day-to-day reliability that the average customer experiences respectively as part of the proposed rate increase of 3.4% [Small Business: 4.4%] per year.

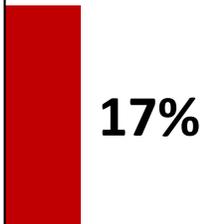


I am prepared to pay more so Toronto Hydro can reduce the number and length of outages that the average customer experiences.



Total: 68%

I am prepared to live with an increase in the number and length of outages so the proposed rate increase can be reduced.

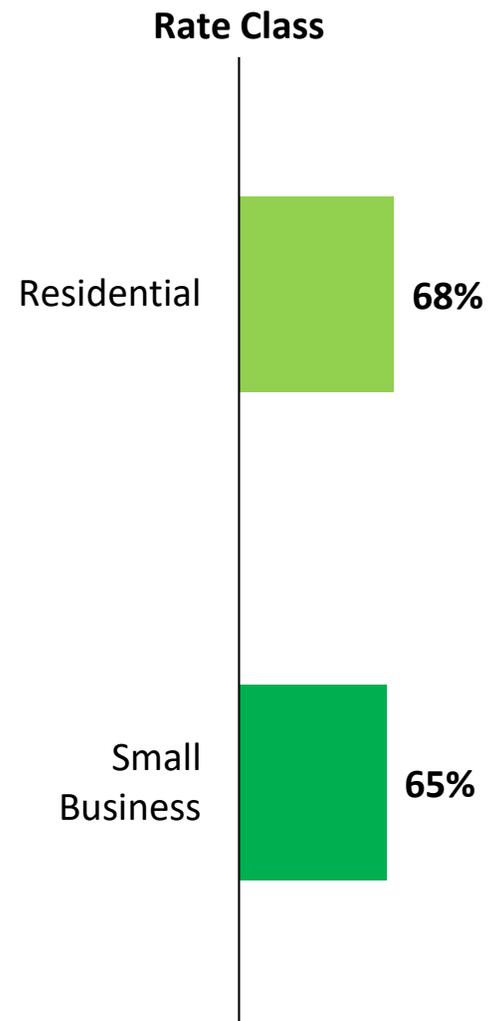


Don't know 15%



Segmentation

Those who say "prepared to pay more" or "stick with the proposed approach":



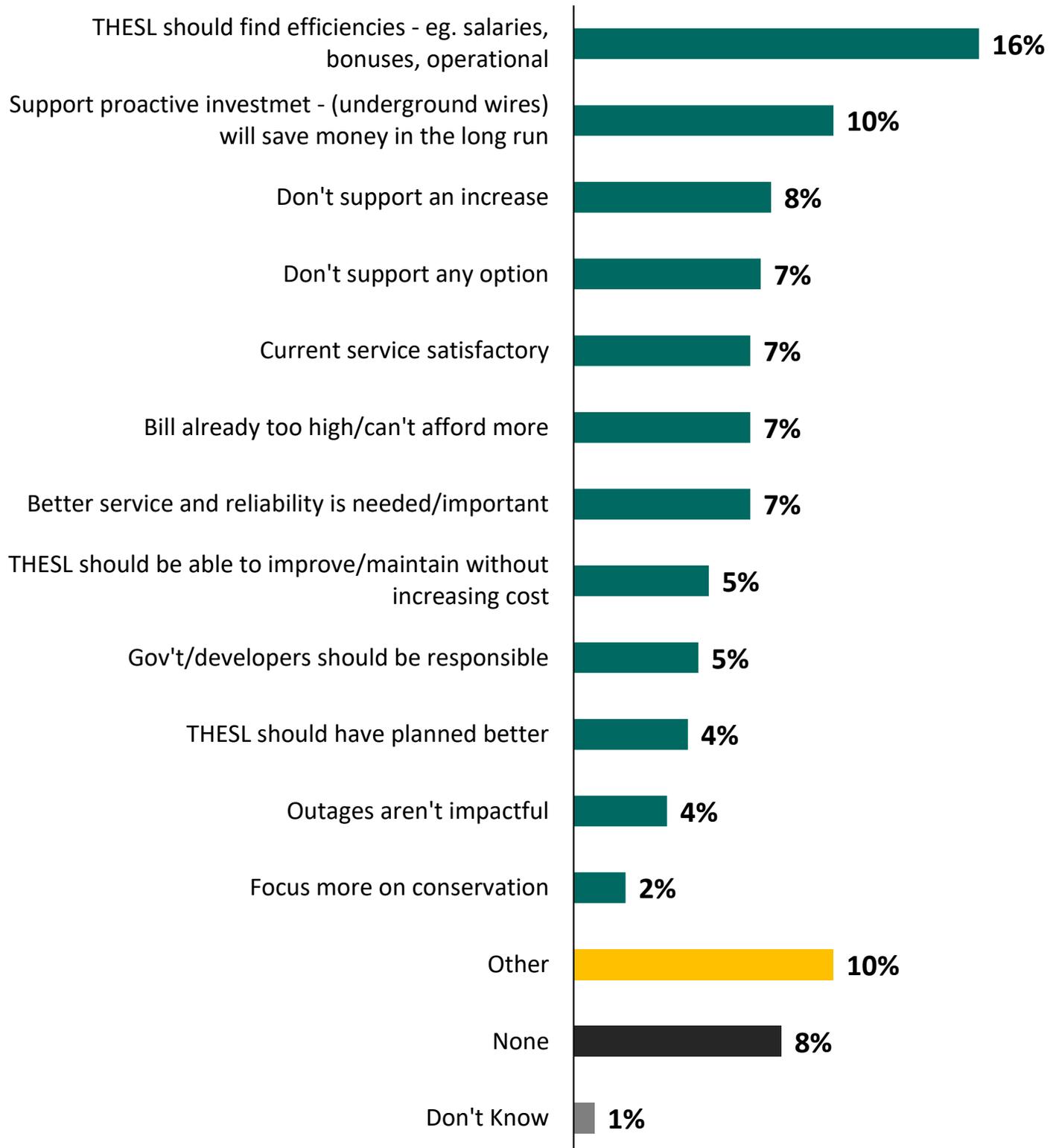
Addressing Safety and Reliability

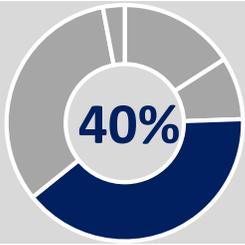
Additional Feedback



Additional Feedback

[asked all respondents, n=249]

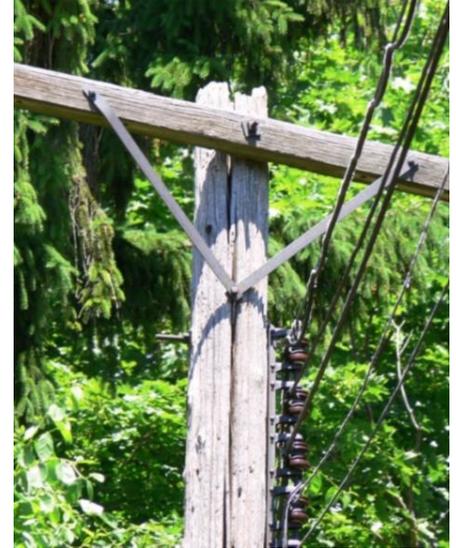




Dealing with types of lines that fail more often with more problems

Should we spend more to replace lines that cause more complicated problems more often?

While this is a general question, there are two particular types of neighbourhood power lines where there is a pressing issue - Rear-Lot Feeders and Direct Buried Cable. These are old technologies that have been in use for more than 50 years. While initially they served Toronto Hydro customers well, they now pose reliability and safety concerns. Customers served by these lines are more likely to experience power outages, and when they do those outages are more likely to last longer and be more expensive to fix.



- **Rear-Lot** refers to a type of overhead construction installed in residential backyards during the 1950s and 1960s. Because rear-lot lines are in customers' backyards, they are often difficult for crews to reach and have more exposure to risks such as falling trees and branches. Working on these lines often causes additional disruption and inconvenience to customers. Outages on rear-lot lines are about 1.3 hours longer on average as compared to outages on other power lines.
- **Direct Buried Cable** refers to a legacy type of underground construction where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system. Once these cables start to fail, they tend to experience a rash of failures. On average 800 customers are affected by each buried cable failure and the outages last longer than average (between 4 and 24 hours).

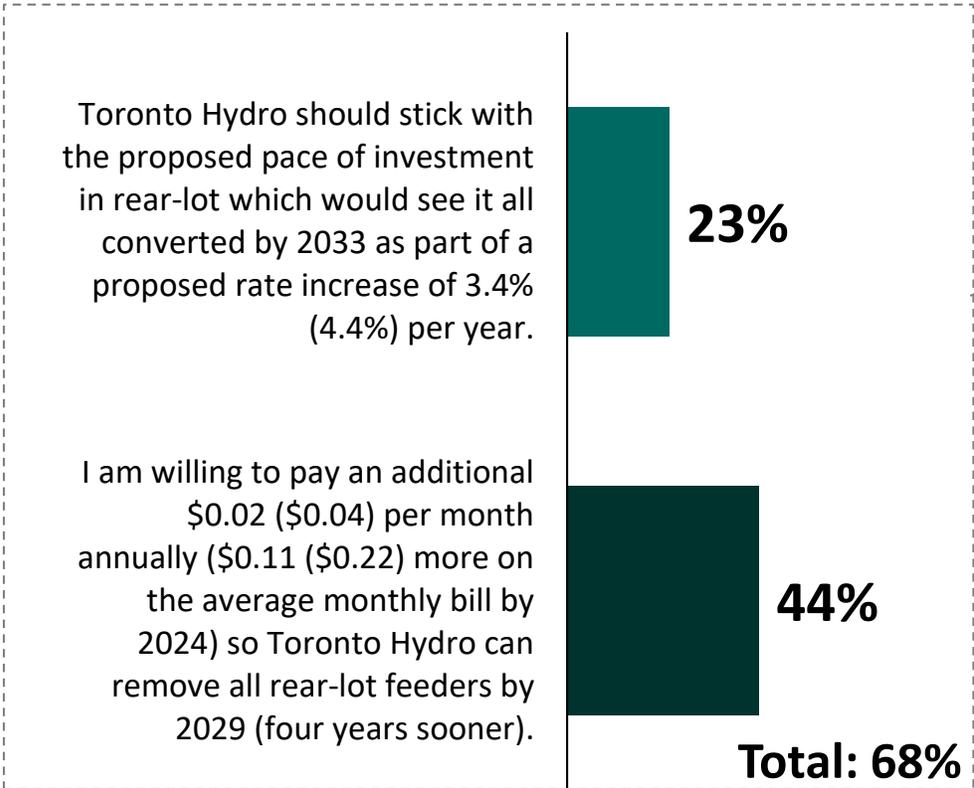
Toronto Hydro's initial plan will phase out rear-lot feeders by 2033 and a quarter of the highest risk direct buried cable by 2024. Converting these lines faster will improve reliability for customers served by this type of equipment.

Rear-lot Replacement Programs



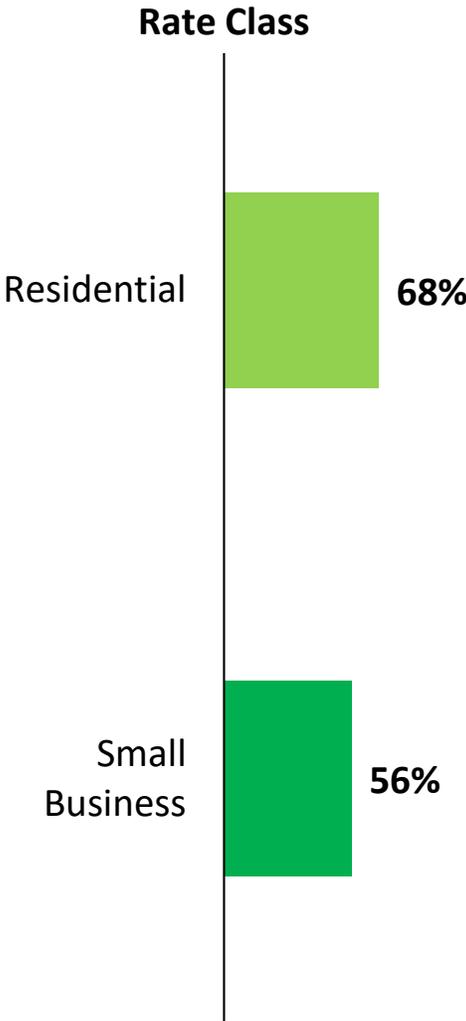
Which of the following is closest to your point of view regarding Toronto Hydro’s rear-lot replacement programs?

[asked all respondents, n=10,346]



Segmentation

Those who say “willing to pay an additional fee” or “stick with the proposed pace”:



I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.

21%

Don't know

11%

Direct Buried Cable Replacement Program



Which of the following is closest to your point of view regarding Toronto Hydro's direct buried cable replacement programs?

[asked all respondents, n=10,346]

Toronto Hydro should stick with the proposed pace of investment in direct buried cable replacement which would see a quarter of the highest risk cable replaced by 2024 as part of a proposed rate increase of 3.4% (4.4%) per year.

28%

I am willing to pay an additional \$0.19 (\$0.45) per month annually (\$0.94 (\$2.23) more on the average monthly bill by 2024) so Toronto Hydro can replace all of the highest risk direct buried cable by 2024.

39%

Total: 67%

I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.

21%

Don't know

12%

Segmentation

Those who say "willing to pay an additional fee" or "stick with the proposed pace":

Rate Class

Residential

67%

Small Business

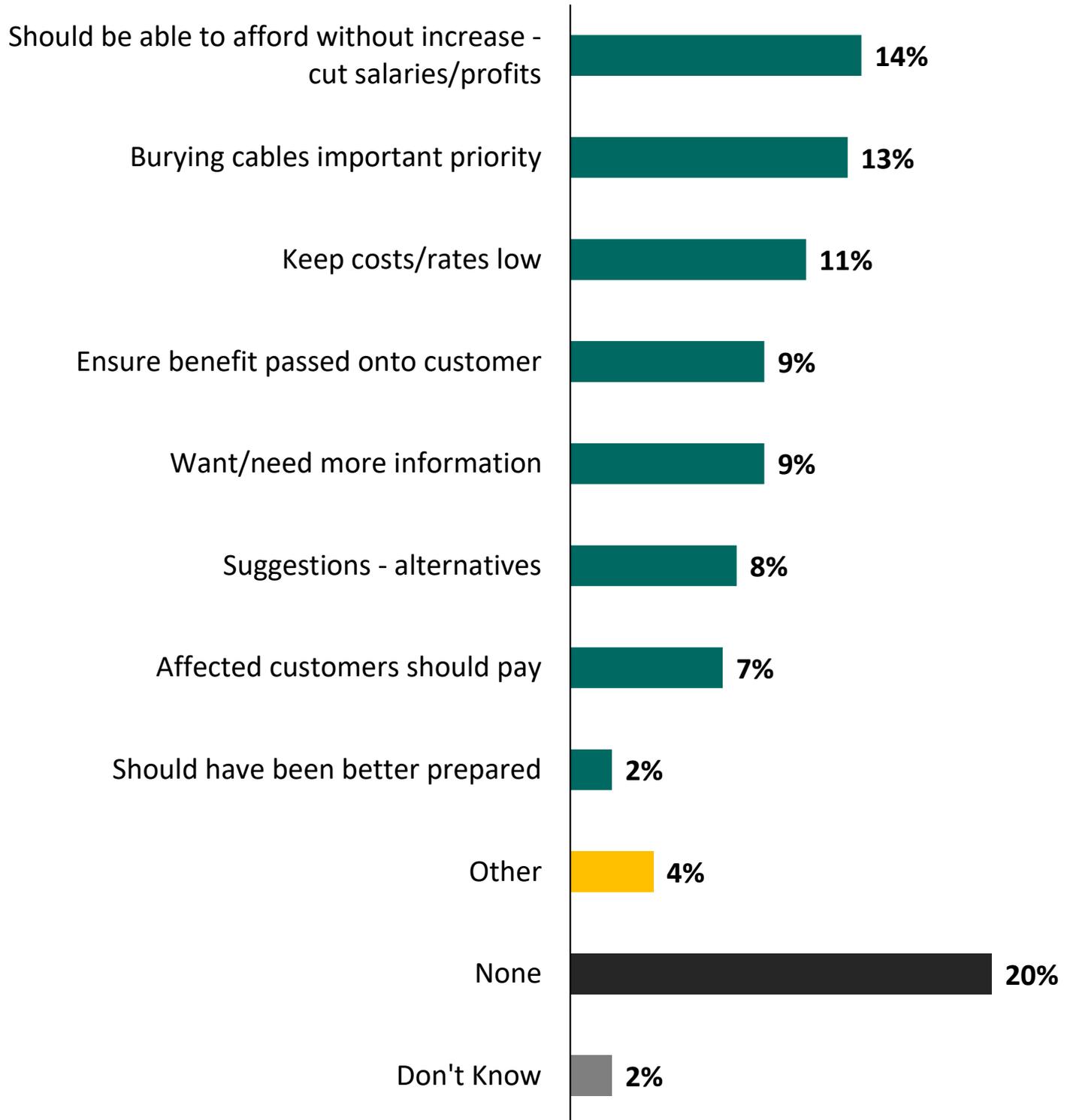
56%

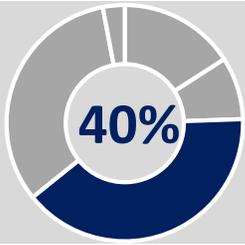
Dealing with types of lines that fail more often with more problems



Additional Feedback

[asked all respondents, n=152]





Dealing with complicated projects in built up areas

Should we spend more now to avoid increased cost and disruption later?

In order to keep rate increases down, Toronto Hydro has focused its spending on dealing with more urgent and immediate needs. However, with the current pace of growth in Toronto, there are a number of locations where Toronto Hydro knows that it will need to conduct work within a few years and where planned and current development will make those projects more expensive and more disruptive if Toronto Hydro waits.

Paper Insulated Lead Covered (PILC) Cable

One major example of this is PILC cable. PILC cable was the first type of underground cable installed as part of Toronto Hydro's grid and a lot of it is still providing electricity to the downtown core.

While this is a resilient type of equipment, all of these cables were installed more than 20 years ago. As these cables begin to age, the outer lead covers can begin to crack and leak oil.

Environmental regulations have changed, making it more costly and difficult to remove and replace these cables. As workers who first installed these types of cables continue to retire, fewer trades people have the expertise to deal with this equipment.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049 while still meeting legal, safety, and regulatory obligations. However, as the downtown core becomes more densely populated, it becomes increasingly more difficult, complex, and expensive to complete this type of work.

Toronto Hydro has identified an opportunity to replace all of this cable by 2039 by replacing these assets proactively, instead of relying solely on maintenance, refurbishment, and reactive replacement. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.

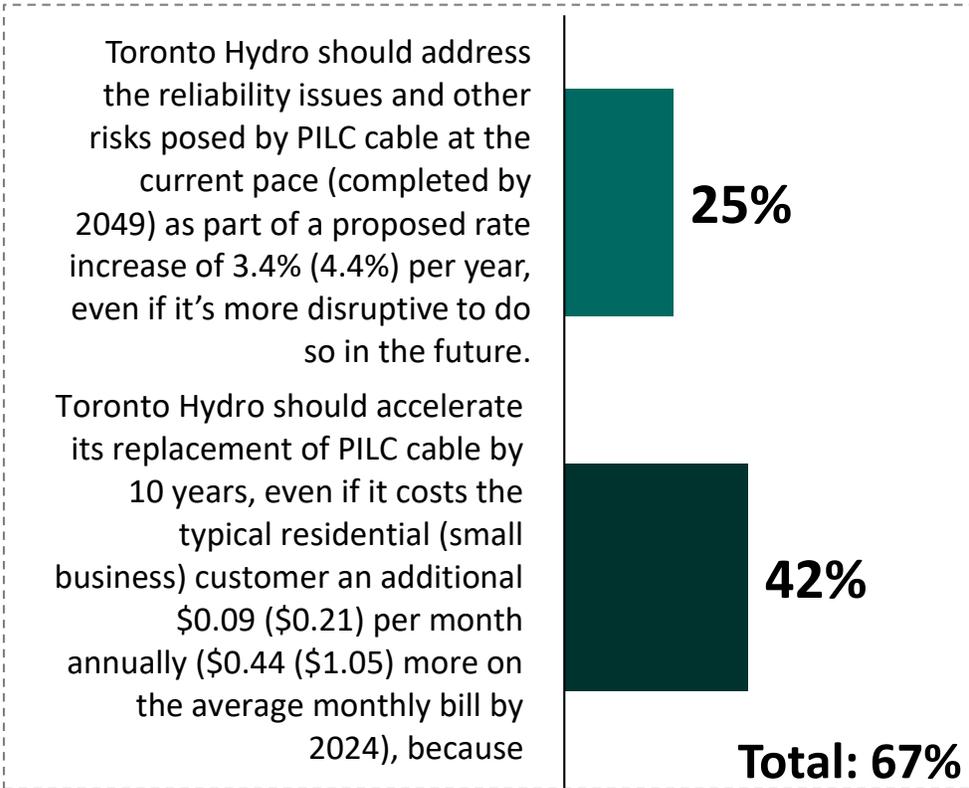


PILC Cable Replacement Program



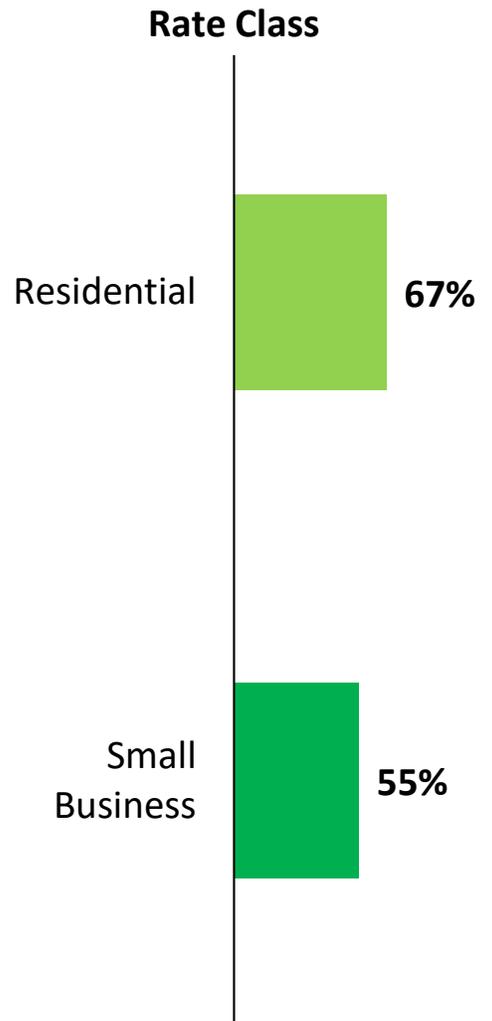
Which of the following is closest to your point of view regarding Toronto Hydro's PILC Cable replacement program?

[asked all respondents, n=10,346]



Segmentation

Those who say "address reliability at the current pace" or "accelerate its replacement":



I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced. **20%**

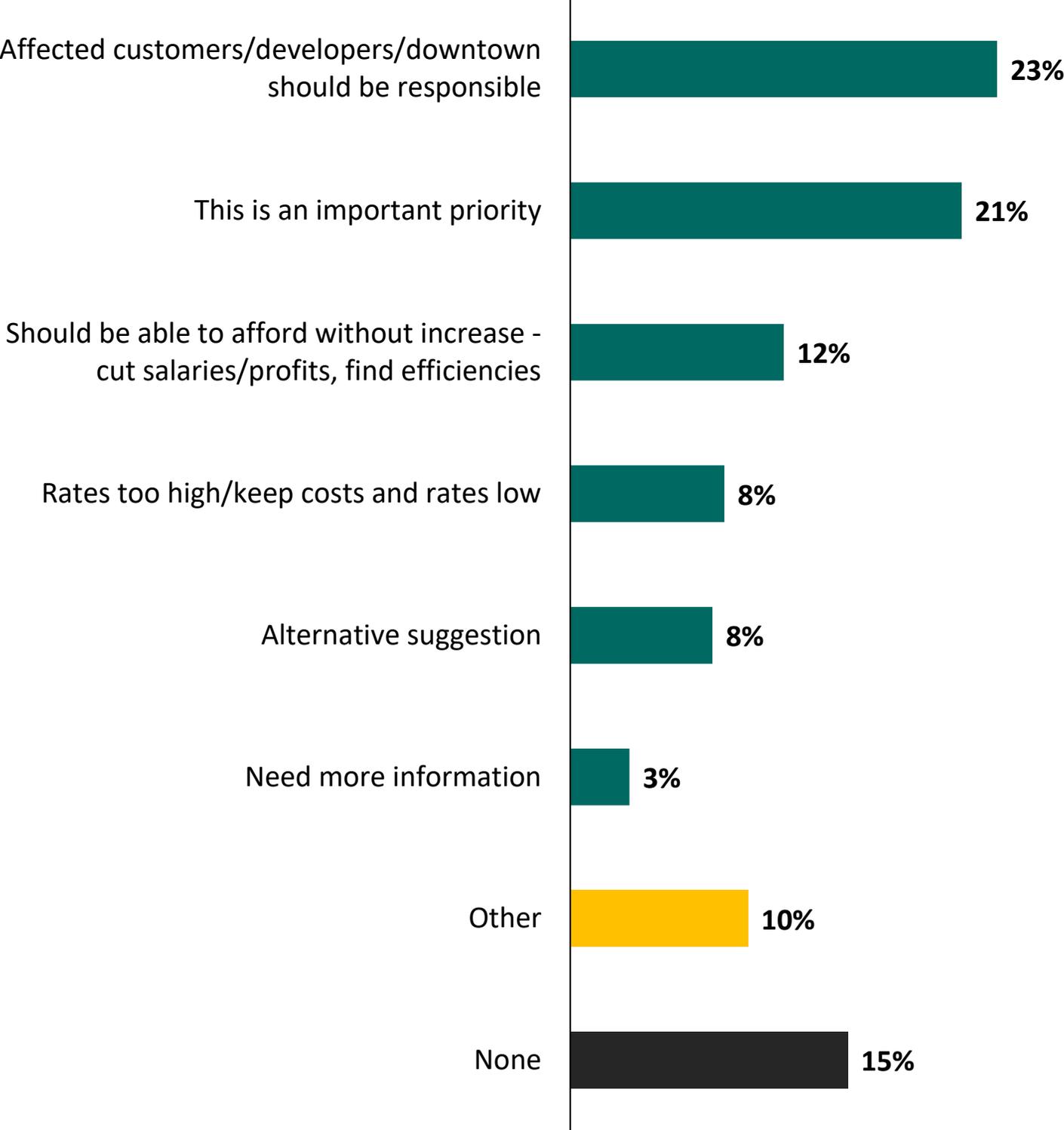
Don't know **14%**

PILC Cable Replacement Program



Additional Feedback

[asked all respondents, n=156]



Underground Network Transformers

Underground Network Transformers

Other underground infrastructure in the downtown core also faces some of the same challenges as PILC cable. Underground network transformers, units whose old design makes them prone to flooding, are located in areas that have been growing in terms of density and congestion. It is more difficult to do this work as time goes on.

Toronto Hydro's current plan (2015-2019) is dealing with the most pressing of these units that pose safety and reliability concerns. In the plan for 2020 to 2024, the focus is to replace just enough of these units so that outages, due to equipment failure, don't get any worse.

However the new units are significantly superior to the existing infrastructure. Much of the old infrastructure is not designed for the flooding that has become increasingly common and which can cause equipment failure and public safety hazards. The new network units are submersible and equipped with sensors to monitor transformer, protector, and vault conditions, resulting in the cost-effective reduction of reliability, environmental, and safety risks.

While the proposed plan would replace all the unit by 2031, the process could be advanced by three years to replace all these units by 2028.

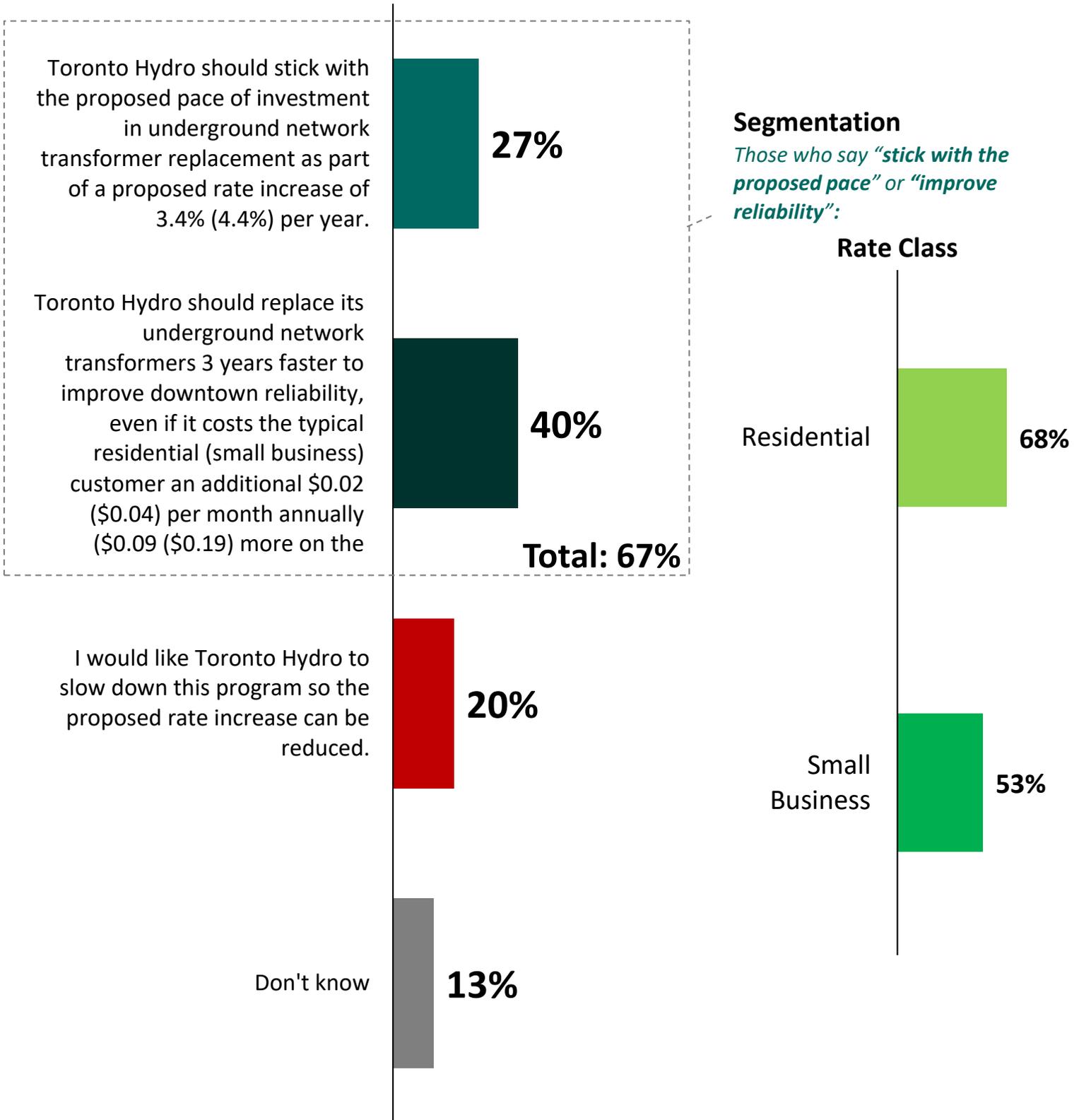


Underground Network Transformers



Which of the following is closest to your point of view regarding Toronto Hydro's Network Unit replacement program?

[asked all respondents, n=10,346]

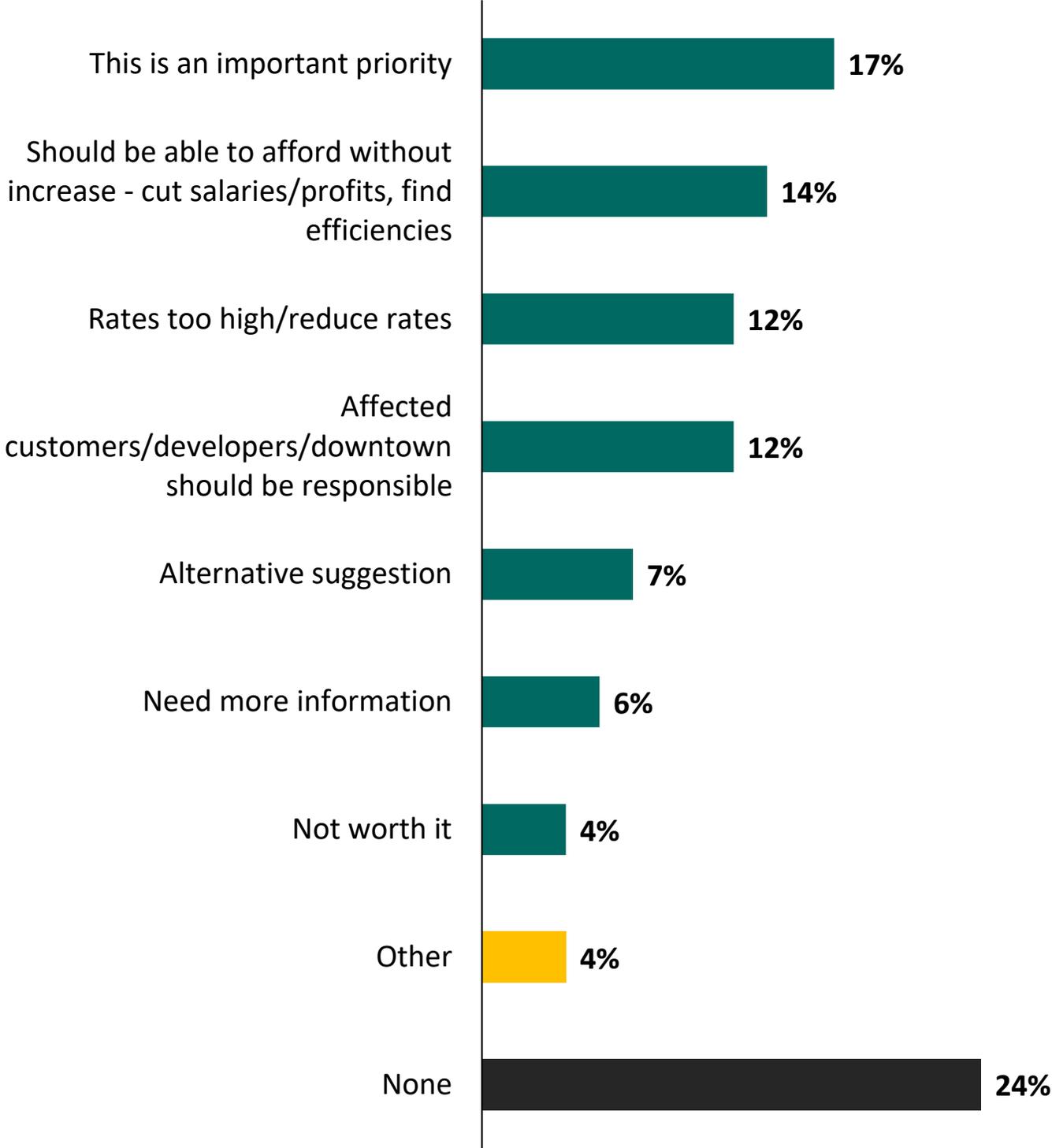


Underground Network Transformers



Additional Feedback

[asked all respondents, n=124]



Cable Chambers

Cable Chambers

Cable chambers are a third example of equipment that will become more costly and disruptive to fix over time. Cable chambers house, protect, and provide access to underground electrical equipment across the city. There are over 10,000 in Toronto, but many of them – including the majority of the roughly 500 that are in the most urgent need of attention – are downtown where they are subject to increased foot traffic. When they deteriorate or break, they can pose anything from a tripping hazard to something much more serious in the case of a collapsed chamber. Such instances can also cause long outages, either by damaging equipment or requiring the power to be turned off to the cables in the chamber so repairs can be made.

As part of its plan, Toronto Hydro is now taking a proactive approach to rebuilding hundreds of cable chambers at risk of failing. At the current pace, it would take approximately 30 years to address the chambers in the worst condition. Accelerating the work could halve that period, at an additional cost now.

Cable Chambers



Which of the following is closest to your point of view regarding Toronto Hydro's Cable Chamber renewal program?

[asked all respondents, n=10,346]

Toronto Hydro should stick with the proposed pace of investment in cable chamber renewal as part of a proposed rate increase of 3.4% (4.4%) per year.

25%

Toronto Hydro should address the safety and reliability risk posed by deteriorating cable chambers faster, even if it costs the typical residential (small business) customer an additional \$0.02 (\$0.05) per month (\$0.10 (\$0.23) more on the average monthly

43%

Total: 68%

Toronto Hydro should go back to reconstructing cable chambers reactively in order to keep my rates lower now.

18%

Don't know

14%

Segmentation

Those who say "stick with the proposed pace" or "address the reliability risk faster":

Rate Class

Residential

68%

Small Business

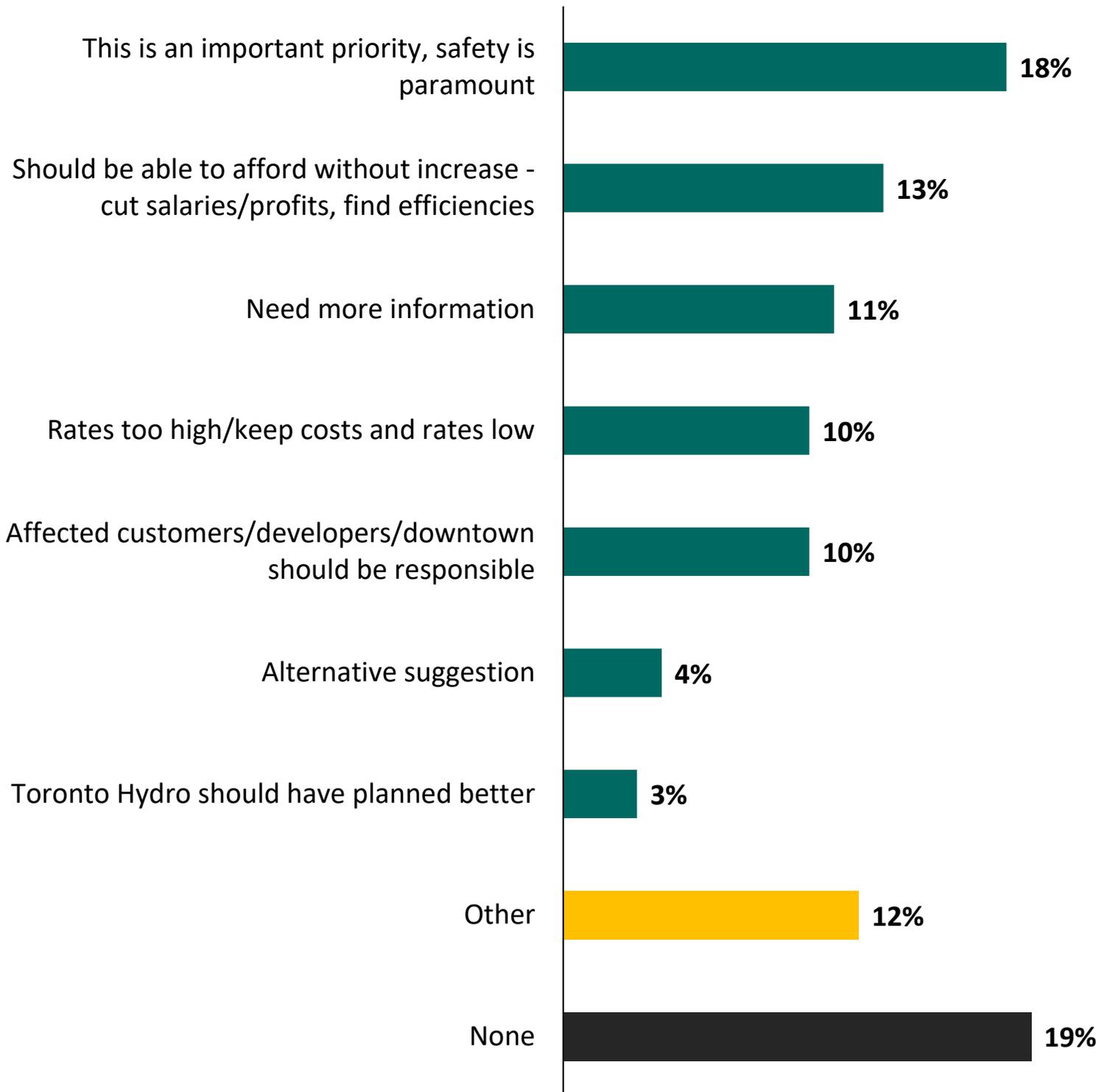
57%

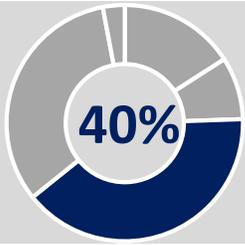
Cable Chambers



Additional Feedback

[asked all respondents, n=100]





Dealing with more frequent extreme weather events

Should we spend more to make the distribution system more resilient to the effects of major storms?

Toronto Hydro's distribution system is exposed to the elements: strong winds, freezing rain, and severe flooding have all caused at least one widespread outage in Toronto in recent years. While it may be impossible or impractical to completely guard against extreme weather, steps can be taken to "harden" the distribution system. Toronto Hydro is proposing a variety of enhancements to continue to build resiliency. Toronto Hydro is looking for your opinion on whether it should do more in one area in particular: the overhead system outside of the downtown core.



System Restoration Improvements

This type of work makes it easier for Toronto Hydro to restore power customers outside of the downtown following an outage. By adding remotely-operated technology, more back-up links within the grid, and other improvements, Toronto Hydro can better isolate the problem and get more customers' power back on faster.

Given customer desires to keep rate increases down, Toronto Hydro is currently proposing to reduce spending in this category. Improvements have already been made to some parts of the City and the reliability of this part of the overhead system has shown improvement in recent years. It is possible for Toronto Hydro to address more areas during 2020 to 2024 not yet benefiting from these improvements.

Dealing with more frequent extreme weather events



Should Toronto Hydro spend more now to speed up the pace of reducing outage times by up to 50% in neighbourhoods outside of downtown?

[asked all respondents, n=10,346]

Yes, I would be willing to accept an increase to my (organization's) monthly bill of \$0.02 (\$0.04) in each of the five years of the plan (\$0.09 (\$0.21) more by 2024) so more customers can get their power back on quicker during outages caused by storms and

44%

Segmentation

Those who say "Willing to accept an increase":

Rate Class

Residential

44%

Small Business

29%

No, I'm comfortable knowing that some of this work is already planned and would prefer to keep my bill lower.

49%

Don't know

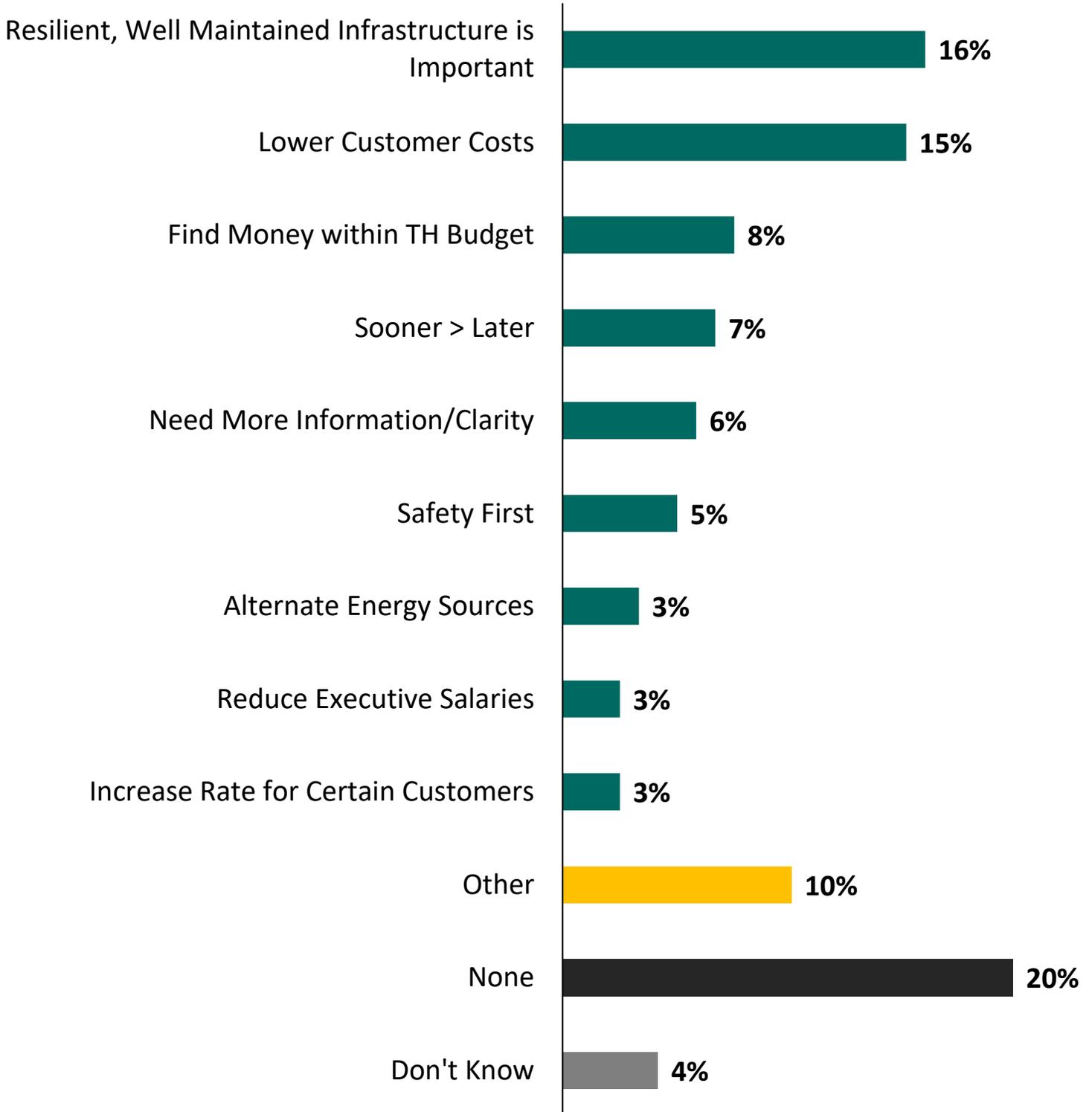
8%

Dealing with more frequent extreme weather events



Additional Feedback

[asked all respondents, n=118]





Innovation and Planning for the Future

Bring New Technology into the Toronto Hydro System

Technology is changing how people use electricity and the demands on the grid. Customers are not just taking power from the grid, they are also using technology like solar panels to produce their own power and send any extra back to the grid. Toronto Hydro is currently implementing new technologies in a limited manner and could increase the pace of that investment.

Energy Storage

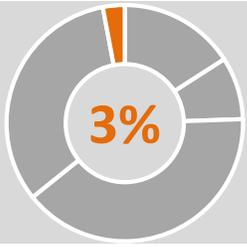
Toronto Hydro has already begun to integrate large-scale electricity storage into the system. Storage provides a number of benefits to customers:

- It supports reliability by providing electricity when the connection to generators is interrupted
- It can allow low cost electricity generated in off-peak hours to be available during peak demands.
- It helps intermittent renewable sources such as wind and solar integrate into the system, thereby increasing the availability of clean energy and reducing greenhouse gases (GHGs).
- It helps to enable the integration of electric vehicles into the system without requiring major increases in more traditional wires and transformers to deal with electric vehicle charging needs.



Crosstown Battery Storage (3D rendering of Phase 1)

Storage also provides a number of benefits that are invisible to customers but critical to the stability of the grid including power quality, load following, and frequency regulation.



Innovation and Planning for the Future

Right now Toronto Hydro is primarily using energy storage where there is an immediate benefit to the system. For example, at one of Toronto Hydro's most congested downtown stations (Cecil TS), battery storage and conservation solutions are being used to delay a necessary upgrade for approximately five to six years. This approach is expected to reduce the total overall cost to ratepayers by approximately \$6 million.



Poletop Energy Storage Unit

Toronto Hydro has identified a number of additional energy storage-related projects with critical large-scale public and private sector customers with a defined project need. These batteries would be located at host sites and provide benefits locally and to the distribution system. The host would pay most of the costs. Customers like you would pay for the portion that relates to the benefit they receive (e.g. area reliability).

These projects would improve reliability and help reduce GHGs but are not required to maintain current reliability. Pursuing these projects would increase the average annual bill impact of the plan by up to \$0.11 per month or a total of \$0.53 by 2024.

Innovation and Planning for the Future



Which of the following is closest to your point of view?

[asked all respondents, n=10,346]

I would be willing to pay up to \$0.53 (\$1.25) more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.

40%

No, I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.

49%

Don't know

10%

Segmentation

Those who say "willing to pay more":

Rate Class

Residential

40%

Small Business

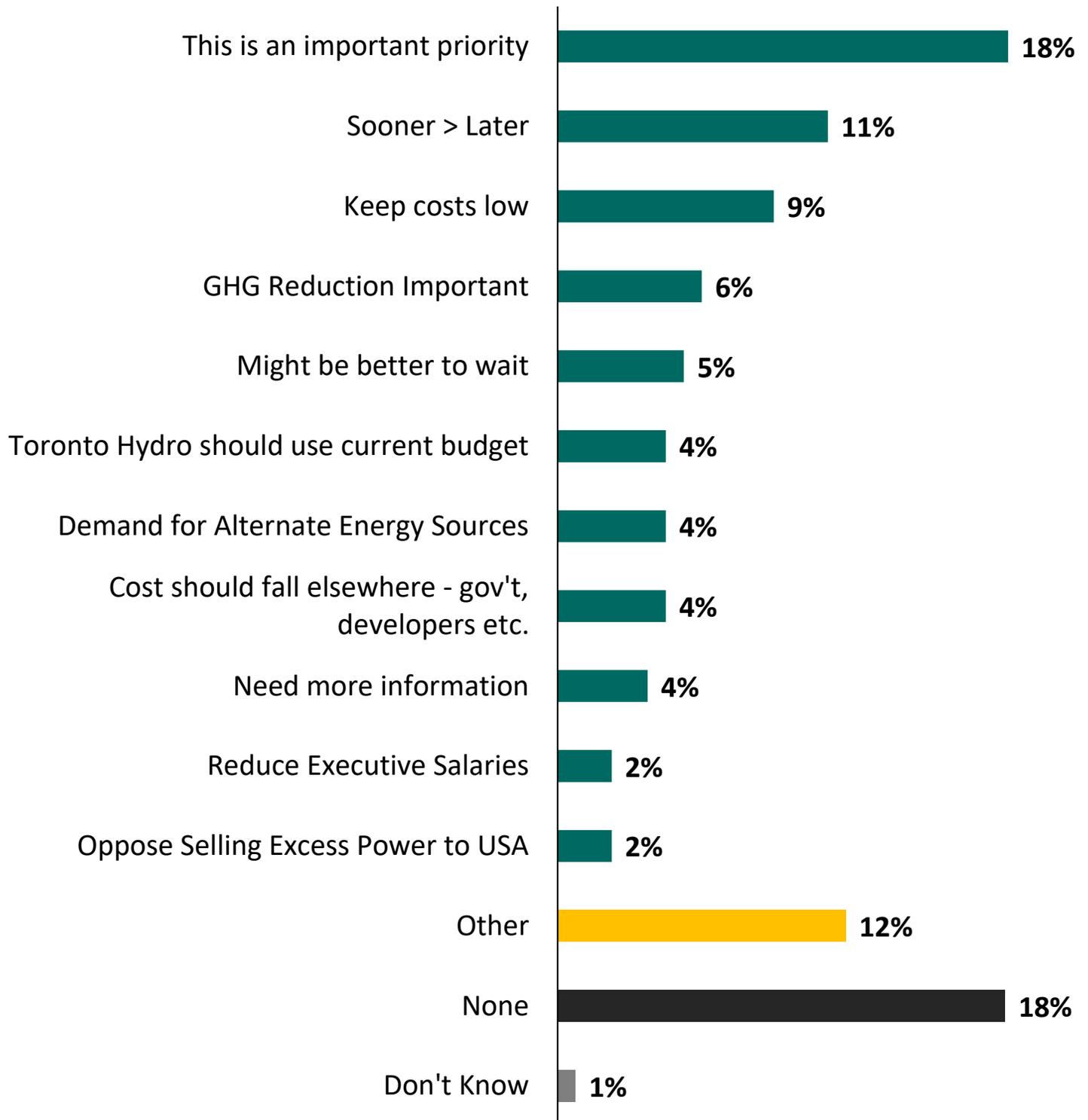
29%

Innovation and Planning for the Future

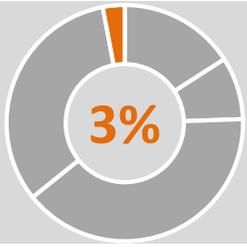


Additional Feedback

[asked all respondents, n=138]



Note: "Refused" (6%) not shown.



Innovation and Planning for the Future

Monitoring and Control Equipment

New communication technology has revolutionised the way the grid can be managed. New remote switches allow a Toronto Hydro system manager to restore power to many customers by flicking a switch in a control room before the line crew even leaves to repair the break. Remote monitors allow system managers to pinpoint where the break occurred instead of sending crews out in trucks visually inspecting the line. Environmental monitors at critical equipment facilities such as major transformers can identify changing conditions that threaten equipment before the equipment fails so preventative action can be taken to avoid an outage in the first place.

Within the base budget covered by the 3.4% (4.4%) annual increase, Toronto Hydro's new construction takes advantage of these new technologies wherever clear benefits can be established.

However, Toronto Hydro can improve the reliability of its grid by adding these devices to lines and transformers. In particular, installing devices in the downtown underground network that detect fire, floods or other risks can be completed more quickly.



Toronto Hydro Control Room

Innovation and Planning for the Future



Which of the following is closest to your point of view?

[asked all respondents, n=10,346]

I would be willing to pay \$0.07 (\$0.16) more per bill by 2024 for Toronto Hydro to be able to better predict fire, floods and other risks in the downtown network that cause outages or damage.

27%

Toronto Hydro should maintain the pace of installing monitoring and control equipment on the downtown network as planned within its existing proposed rate increase of 3.4% (4.4%) per year, but not go any further.

40%

Total: 67%

Toronto Hydro should reduce its planned increase by eliminating the improved monitoring and control equipment planned for the downtown network.

21%

Don't know

13%

Segmentation

Those who say "willing to pay more" or "maintain the pace":

Rate Class

Residential

67%

Small Business

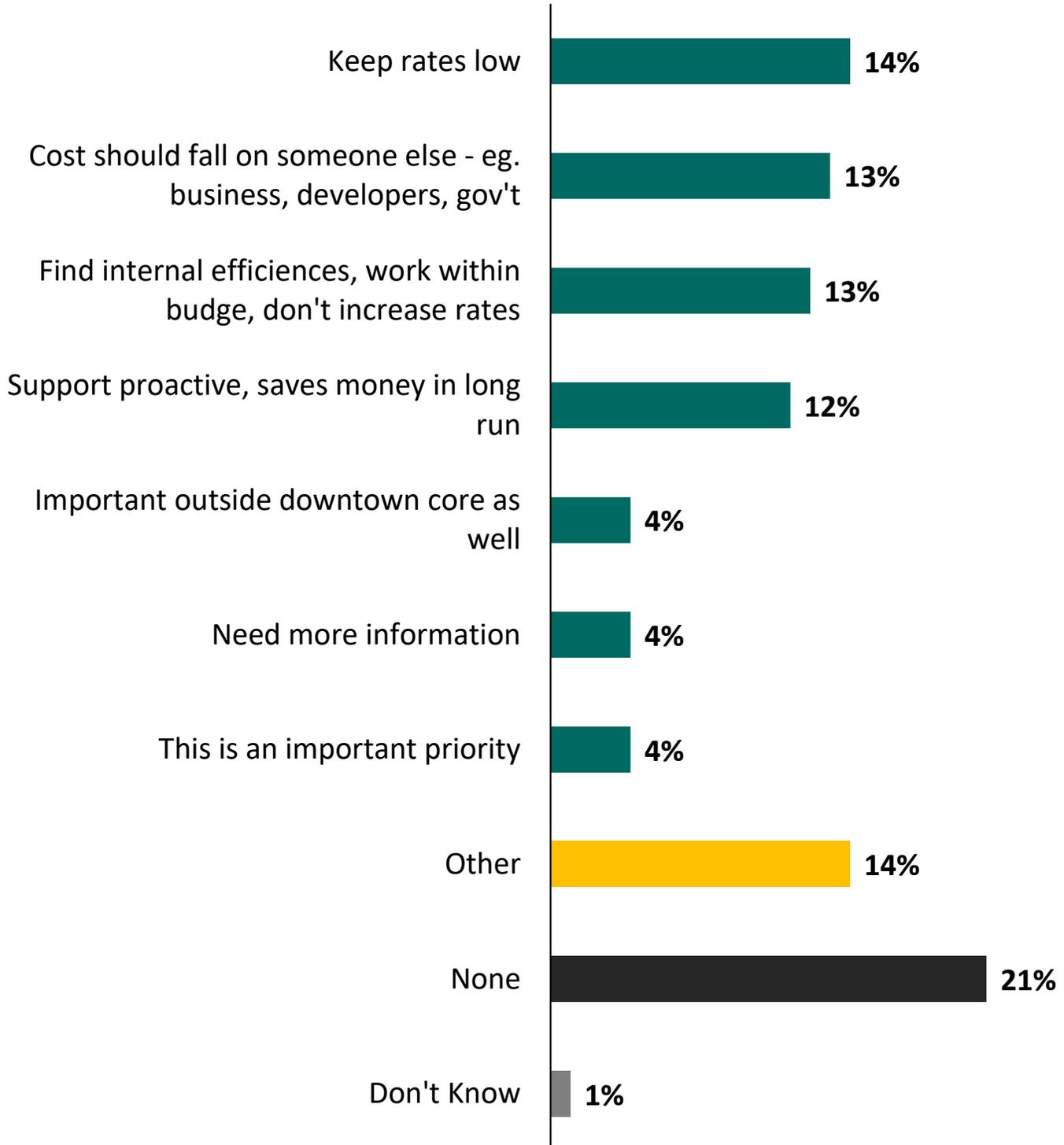
52%

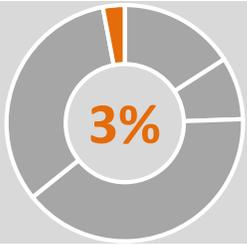
Innovation and Planning for the Future



Additional Feedback

[asked all respondents, n=104]





Innovation and Planning for the Future

Microgrids

New types of generation (often renewable), storage, and supporting systems are making it possible for communities, institutions or other large customers to develop “microgrids”. These are a local electricity network linking smaller sources of electricity with nearby uses such as homes, businesses and institutions. In the event of a failure of the larger network, a microgrid can seal itself off and continue to provide power locally. These offer customers increased choice for power supply, cost management, and improved resilience.



Microgrids would give customers more choices, while creating a more resilient and reliable grid. While spending on microgrids does benefit customers who are not on microgrids, those benefits are not required to maintain current reliability.

Innovation and Planning for the Future



Which of the following is closest to your point of view?

[asked all respondents, n=10,346]

I would be willing to pay \$0.09 (\$0.19) more per bill by 2024 for Toronto Hydro to support the development of microgrids in order to give customers more choice and create a more resilient and reliable grid.

35%

Toronto Hydro should support microgrids, but only if those customers pay for the full costs, as they are not required to maintain current reliability.

46%

Don't know

19%

Segmentation

Those who say "willing to pay more":

Rate Class

Residential

35%

Small Business

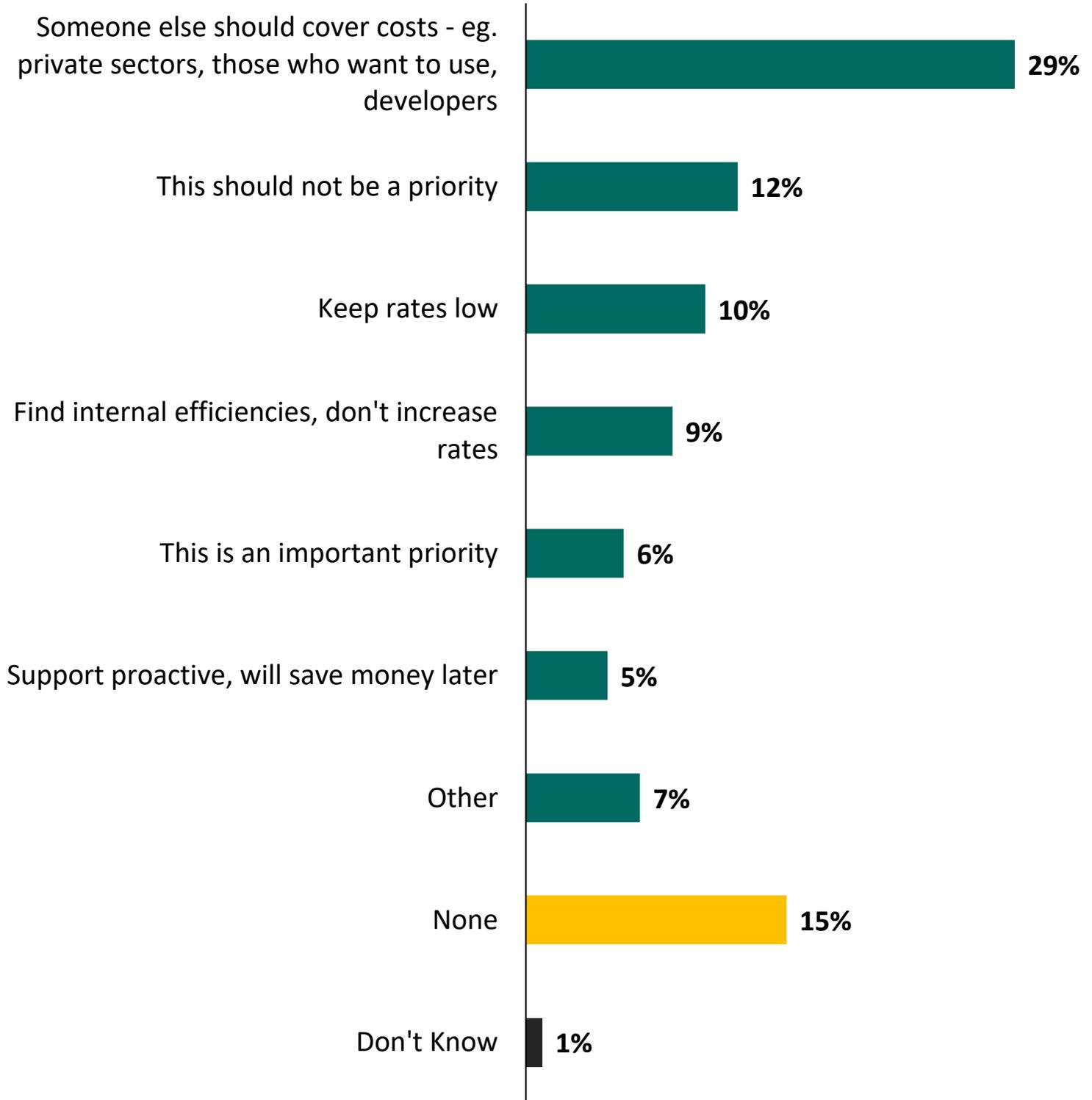
20%

Innovation and Planning for the Future



Additional Feedback

[asked all respondents, n=104]



Note: "Refused" (7%) not shown.

Investment Alternatives Summary

Throughout this portal, you have been asked about some key choices that could impact your rates.

First a quick reminder:

- Toronto Hydro's current proposed plan would result in a monthly **bill increase of \$1.51 each year** for the typical residential customer.
- Over the course of the proposed 5-year plan, the typical residential customer will see the distribution portion of their electricity bill **increase by \$7.57**.
- As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$41.60 in 2019 to \$49.17 by 2024**.

Below are your answers to questions that could impact your rates. At the bottom of this page you will find the total bill impact of all the answers you gave that would result in a bill increase.

Having seen the total bill impact, please review your answers and change your responses if you desire. Your potential rate impact will be re-calculated and you will have the opportunity to adjust your answers again until you feel you've reached the best balance for you.

Addressing Safety & Reliability: Rear-lot replacement program

- Toronto Hydro should stick with the proposed pace of investment in rear-lot which would see it all converted by 2033 as part of a proposed rate increase of 3.4% per year.
- I am willing to pay an additional \$0.02 per month annually (\$0.11 more on the average monthly bill by 2024) so Toronto Hydro can remove all rear-lot feeders by 2029 (four years sooner).
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
- Don't know

Addressing Safety & Reliability : Direct buried cable replacement program

- Toronto Hydro should stick with the proposed pace of investment in direct buried cable replacement which would see a quarter of the highest risk cable replaced by 2024 as part of a proposed rate increase of 3.4% per year.
- I am willing to pay an additional \$0.19 per month annually (\$0.94 more on the average monthly bill by 2024) so Toronto Hydro can replace all of the highest risk direct buried cable by 2024.
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
- Don't know

Investment Alternatives Summary

Addressing Safety & Reliability : Paper Insulated Lead Covered (PILC) cable replacement program

- Toronto Hydro should address the reliability issues and other risks posed by PILC cable at the current pace (completed by 2049) as part of a proposed rate increase of 3.4% per year, even if it's more disruptive to do so in the future.
- Toronto Hydro should accelerate its replacement of PILC cable by 10 years, even if it costs the typical residential customer an additional \$0.09 per month annually (\$0.44 more on the average monthly bill by 2024), because it's less disruptive to do it now than in the future.
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced
- Don't know

Addressing Safety & Reliability : Network Unit replacement program

- Toronto Hydro should stick with the proposed pace of investment in underground network transformer replacement as part of a proposed rate increase of 3.4% per year.
- Toronto Hydro should replace its underground network transformers 3 years faster to improve downtown reliability, even if it costs the typical residential customer an additional \$0.02 per month annually (\$0.09 more on the average monthly bill by 2024).
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced
- Don't know

Addressing Safety & Reliability : Cable chamber renewal program

- Toronto Hydro should stick with the proposed pace of investment in cable chamber renewal as part of a proposed rate increase of 3.4% per year.
- Toronto Hydro should address the safety and reliability risk posed by deteriorating cable chambers faster, even if it costs the typical residential customer an additional \$0.02 per month (\$0.10 more on the average monthly bill by 2024).
- Toronto Hydro should go back to reconstructing cable chambers reactively in order to keep my rates lower now.
- Don't know

Addressing Safety & Reliability : System Restoration Improvements

- Yes, I would be willing to accept an increase to my monthly bill of \$0.02 in each of the five years of the plan (\$0.09 more by 2024) so more customers can get their power back on quicker during outages caused by storms and other events.
- No, I'm comfortable knowing that some of this work is already planned and would prefer to keep my bill lower.
- Don't know

Investment Alternatives Summary

Innovation & Planning for the Future: Investments in energy storage projects

- I would be willing to pay up to \$0.53 more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.
- No, I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.
- Don't know

Innovation & Planning for the Future: Investments in monitoring and control equipment

- I would be willing to pay \$0.07 more per bill by 2024 for Toronto Hydro to be able to better predict fire, floods and other risks in the downtown network that cause outages or damage.
- Toronto Hydro should maintain the pace of installing monitoring and control equipment on the downtown network as planned within its existing proposed rate increase of 3.4% per year, but not go any further.
- Toronto Hydro should reduce its planned increase by eliminating the improved monitoring and control equipment planned for the downtown network.
- Don't know

Innovation & Planning for the Future: Investments in microgrids

- I would be willing to pay \$0.09 more per bill by 2024 for Toronto Hydro to support the development of microgrids in order to give customers more choice and create a more resilient and reliable grid.
- Toronto Hydro should support microgrids, but only if those customers pay for the full costs, as they are not required to maintain current reliability.
- Don't know

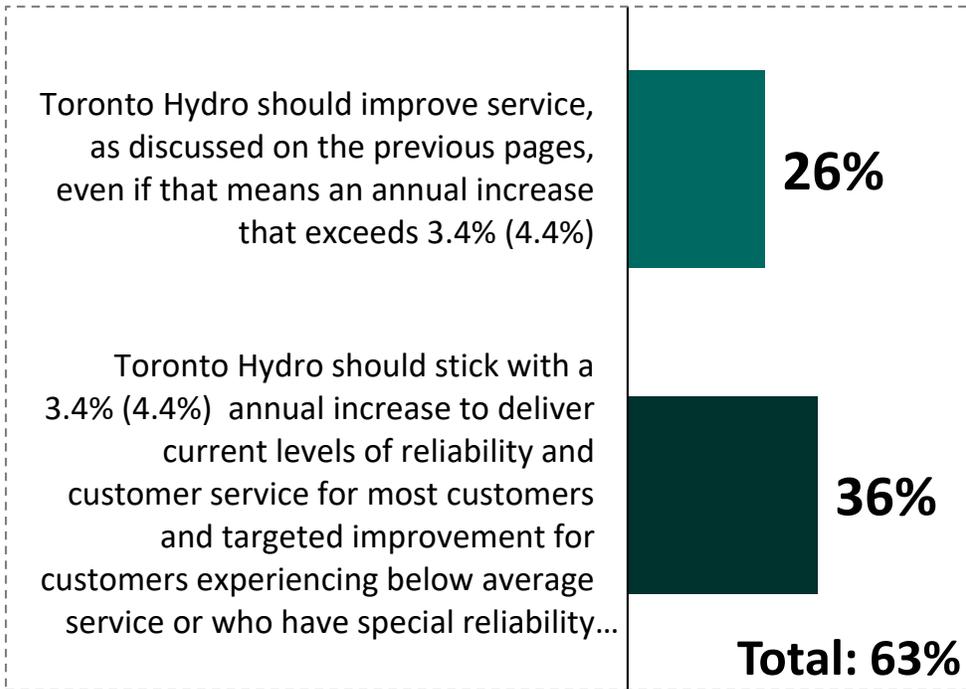
Based on your responses above, by 2024, the incremental bill impact of your choices would result in:

+\$X.XX per month

in addition to the estimated \$49.17 in distribution charges on the average residential customer's electricity bill.

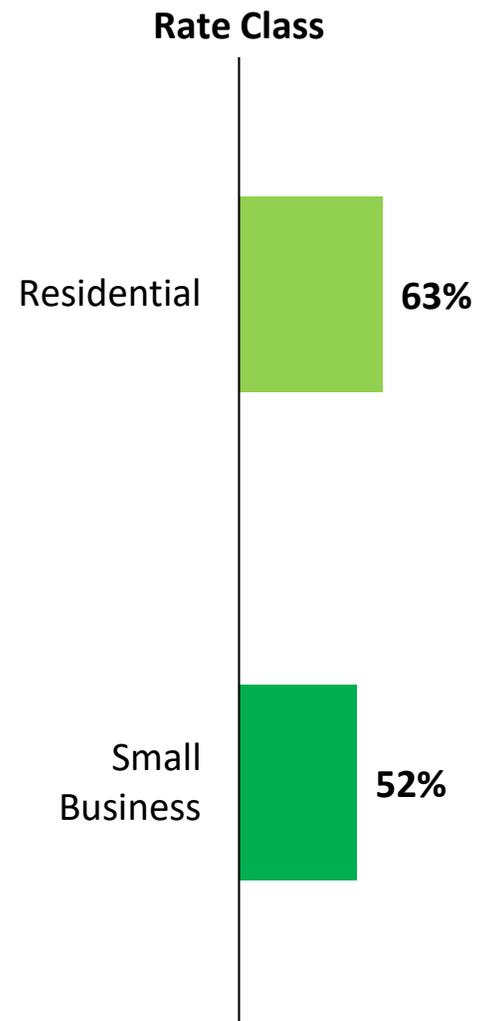
Customer Feedback: Investment Alternatives

Q With regards to Toronto Hydro's proposed plan, which of the following statements best represents your view?
[asked all respondents, n=10,346]



Segmentation

Those who say "Stick with current pace of investment or increase to improve services":

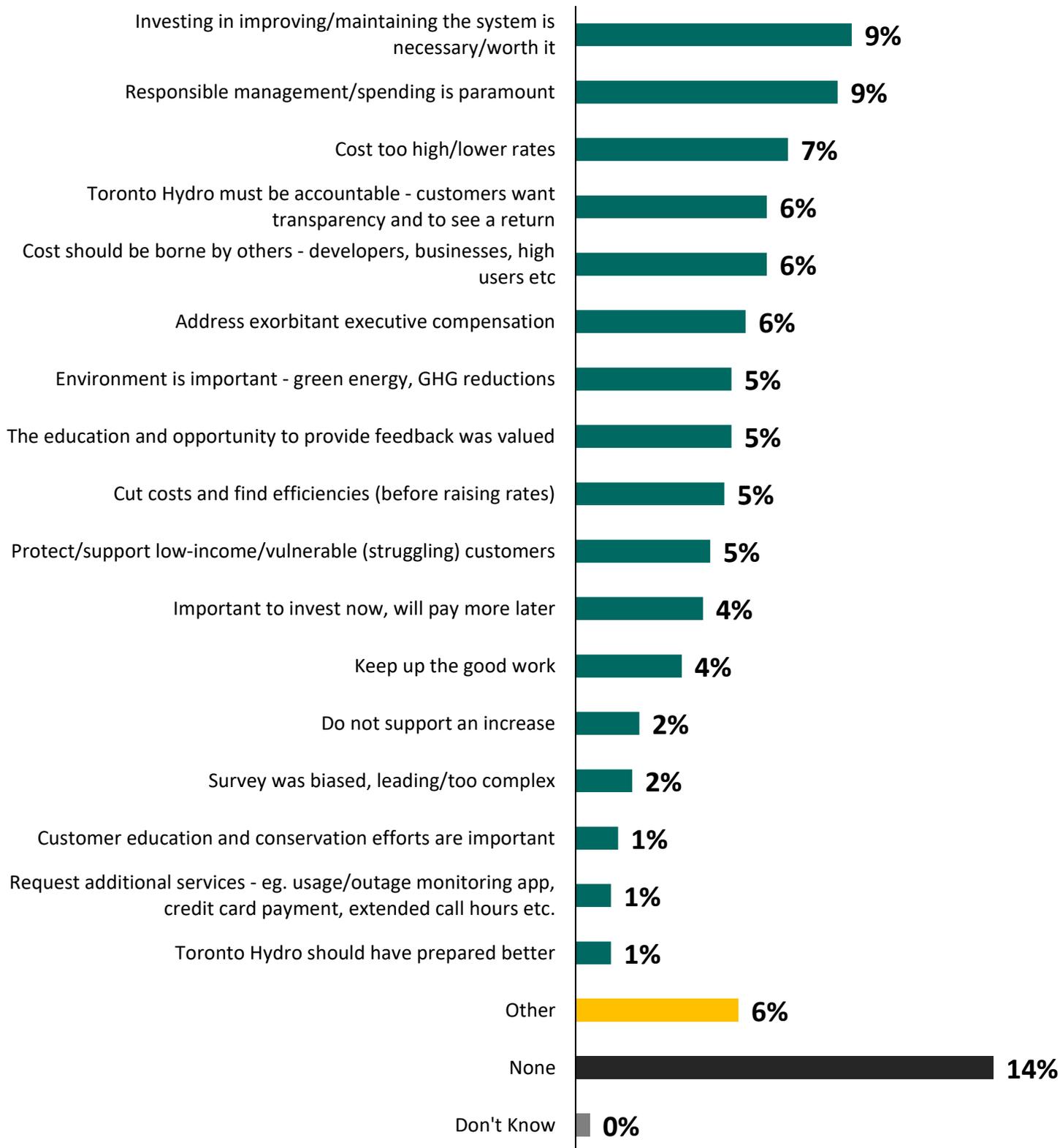


Final Comments



Now that you have considered the various choices Toronto has to make and the cost implications of those choices, do you have any final comments for Toronto Hydro?

[asked all respondents, n=418]

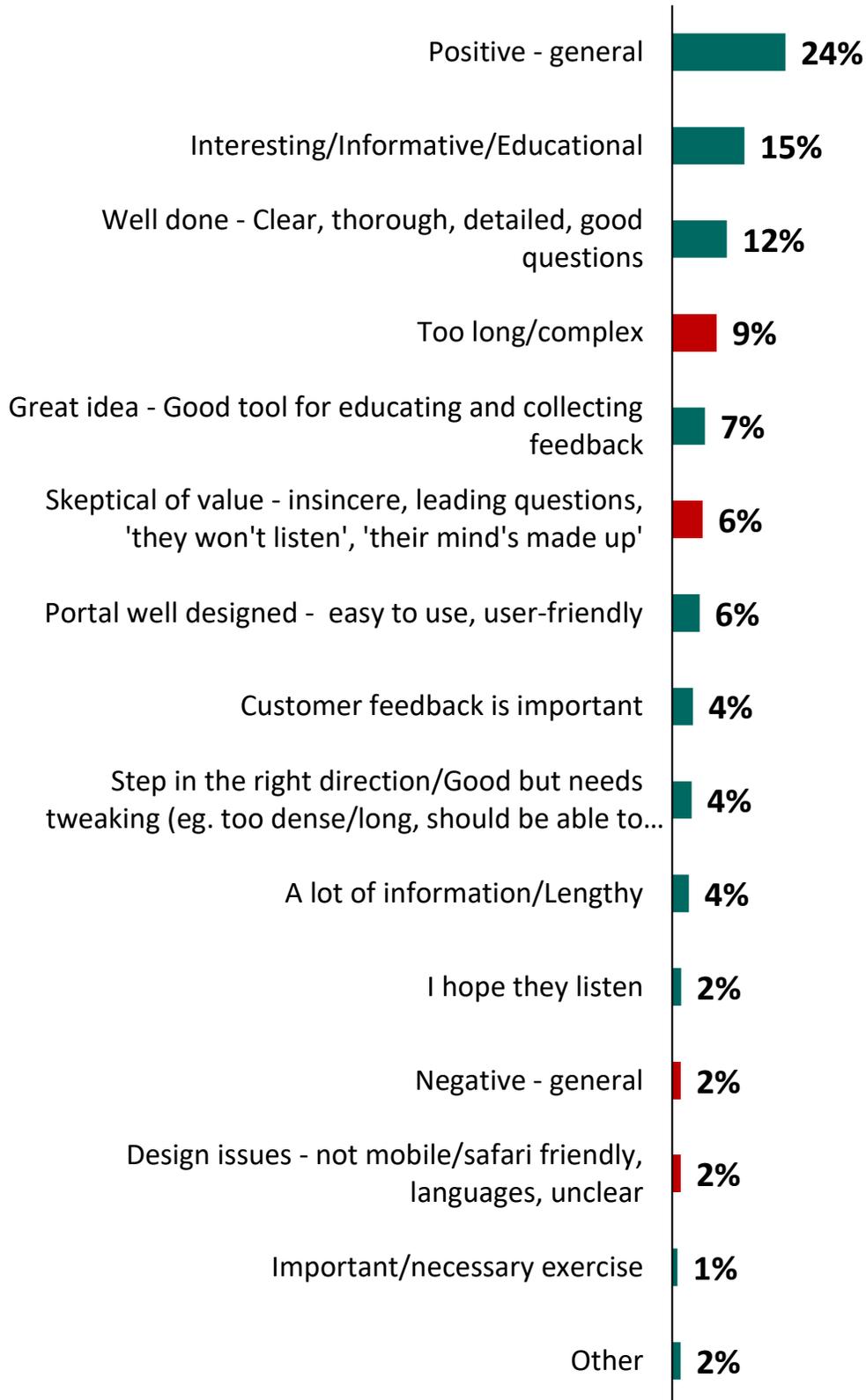


Overall Impression



What did you think about the customer feedback portal?

[asked all respondents, n=1,078]

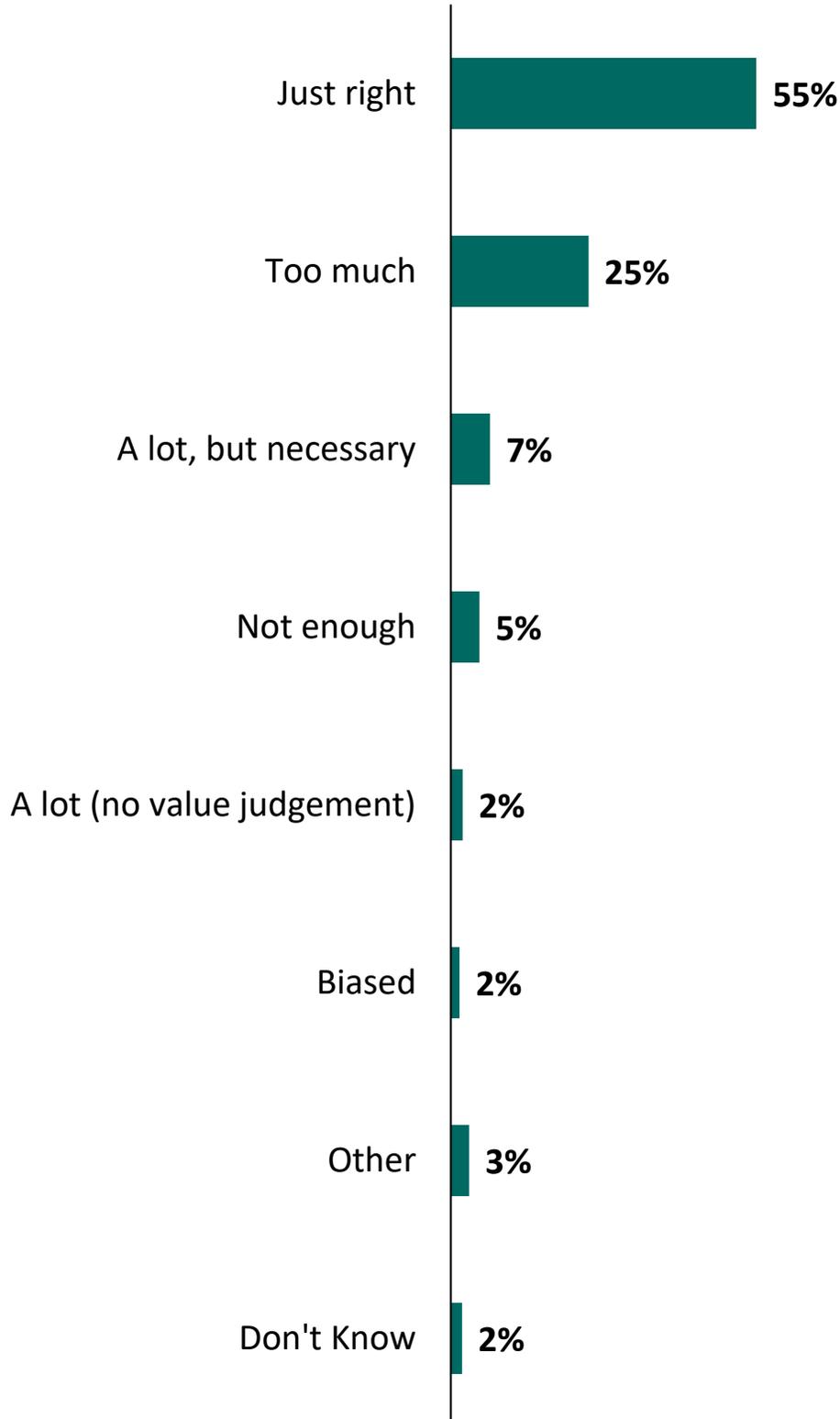


Volume of Information



Did Toronto Hydro provide too much information, not enough, or just the right amount?

[asked all respondents, n=1,104]

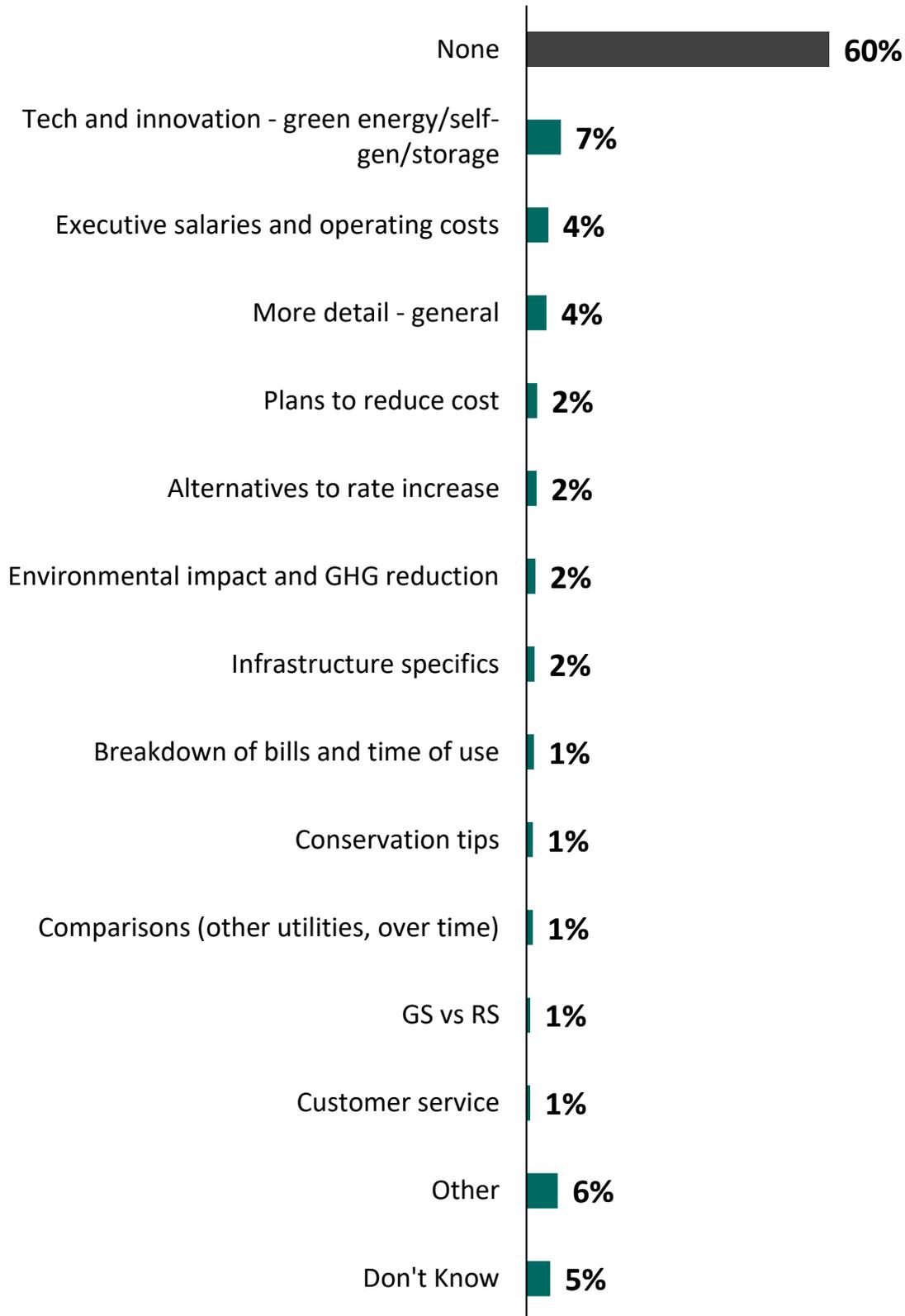


Content Covered



Was there any content missing that you would have liked to have seen included?

[asked all respondents, n=807]

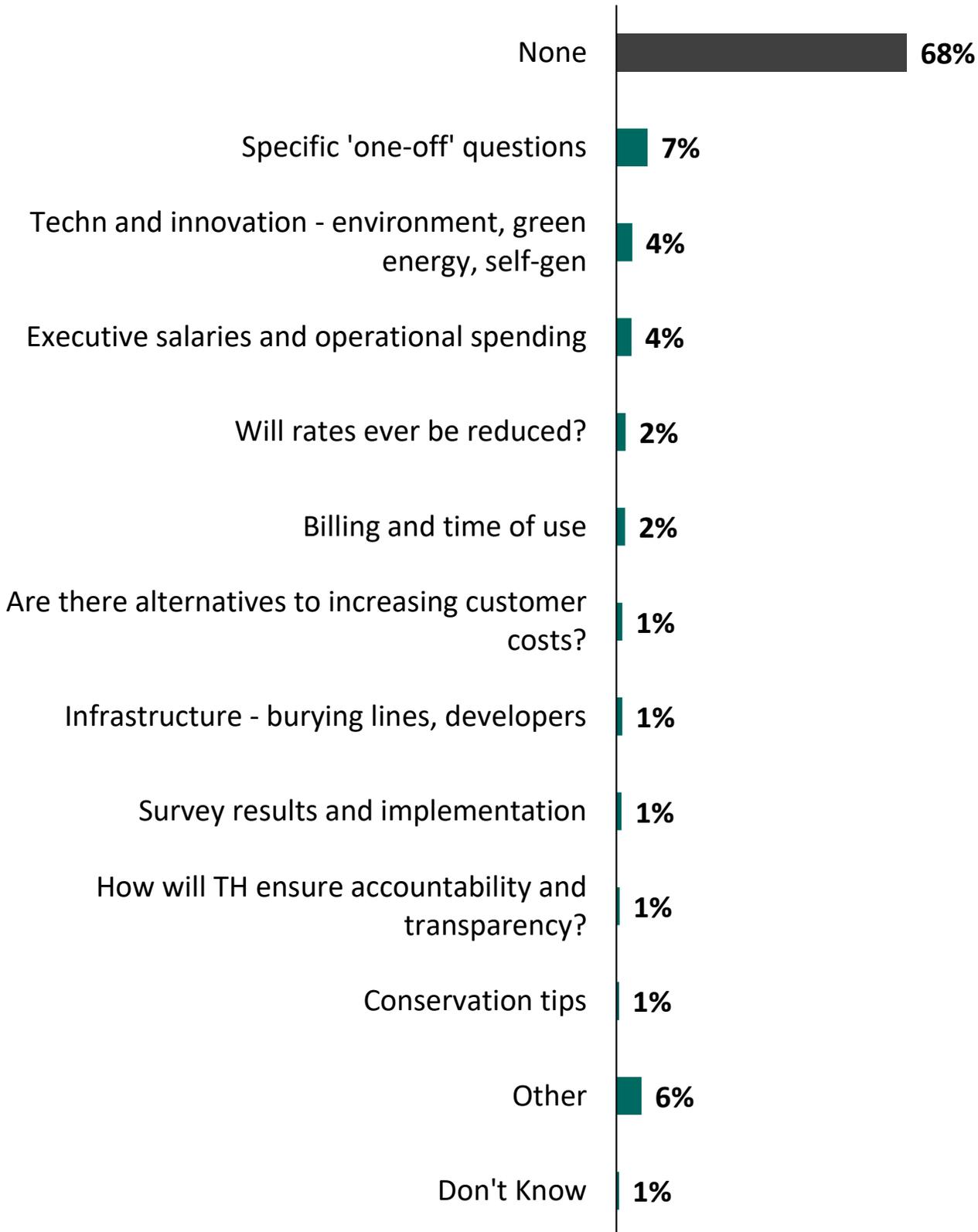


Outstanding Questions



Is there anything that you would still like answered?

[asked all respondents, n=642]

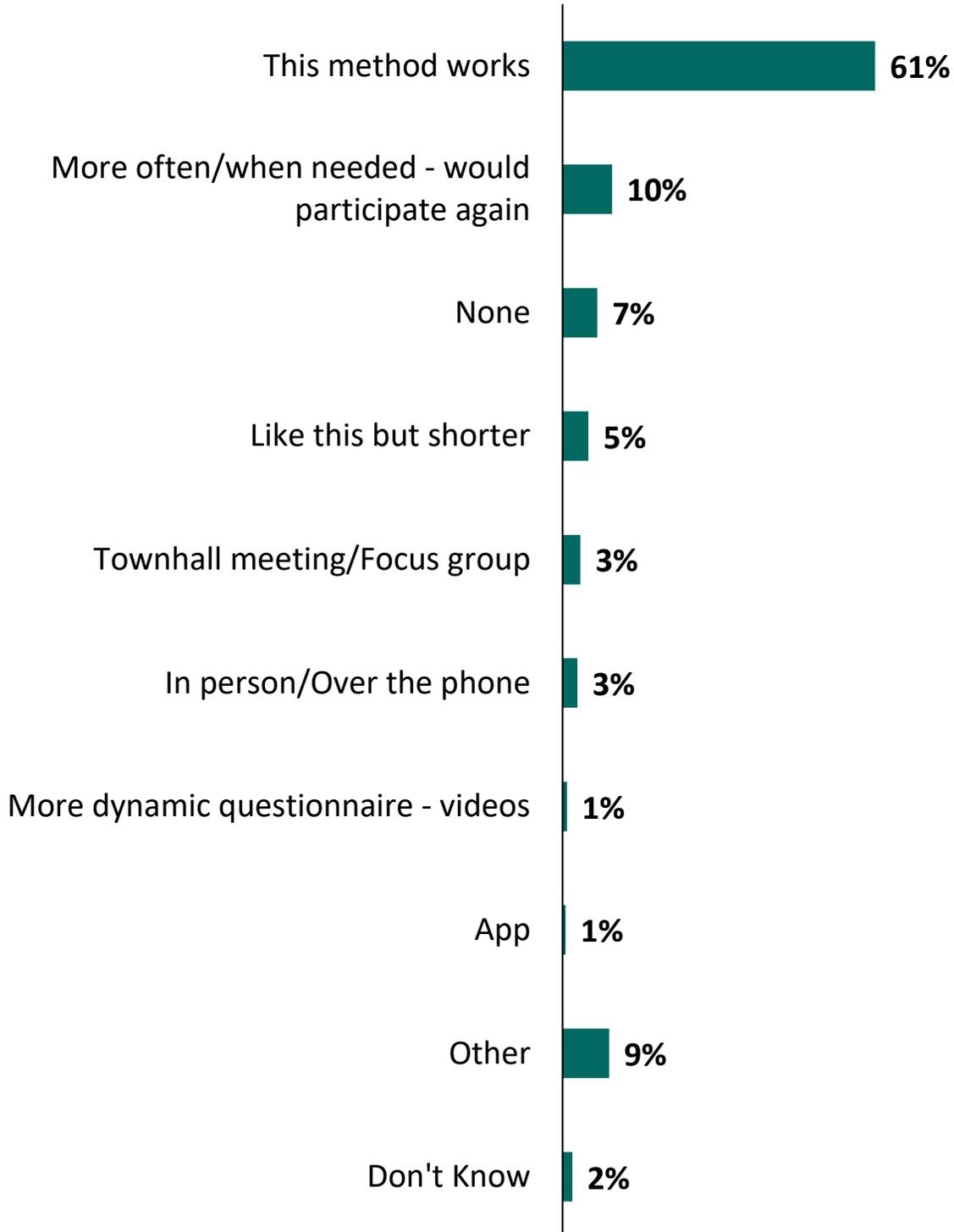


Suggestions for Future Consultations



How would you prefer to participate in these consultations?

[asked all respondents, n=701]





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For more information, please contact:

Jason Lockhart

Vice President

(t) 416-642-7177

(e) jlockhart@innovativeresearch.ca

Julian Garas

Senior Consultant

(t) 416-640-4133

(e) jgaras@innovativeresearch.ca

Toronto Hydro 2018 Customer Engagement

Residential Telephone Survey Report



Survey Methodologies



Field and Design

These are the findings of an Innovative Research Group (INNOVATIVE) telephone survey conducted among **n=600** Toronto Hydro **residential customers** between **May 1 and 10, 2018**.

The margin of error for a sample of $n=600$ is approximately $\pm 4.0\%$. 19 times out of 20.

Quotas were set by electricity consumption levels and geographic considerations from within the Toronto Hydro service territory in order to obtain a representative customer sample.

Residential customers were divided into quartiles based on annual electricity usage to ensure the sample had a proportionate mix of customers from low, medium-low, medium-high, and high electricity usage households.

For the purposes of executing the customer surveys, Toronto Hydro provided INNOVATIVE with a confidential list of customers' contact information.

The contact list included only customers with telephone contact information on file and who had been a customer of Toronto Hydro for at least one year. The information contained in the contact list included customer name, telephone number(s), postal code and total annual electricity consumption.

Only one customer per household was eligible to complete the survey. Respondents were screened to certify that only customers responsible for paying or overseeing their electricity bill were interviewed. This step was taken to ensure that survey respondents represented the most qualified person within a household to answer questions.

Customers were offered a \$10 Amazon Gift Card in appreciation for completing the survey.

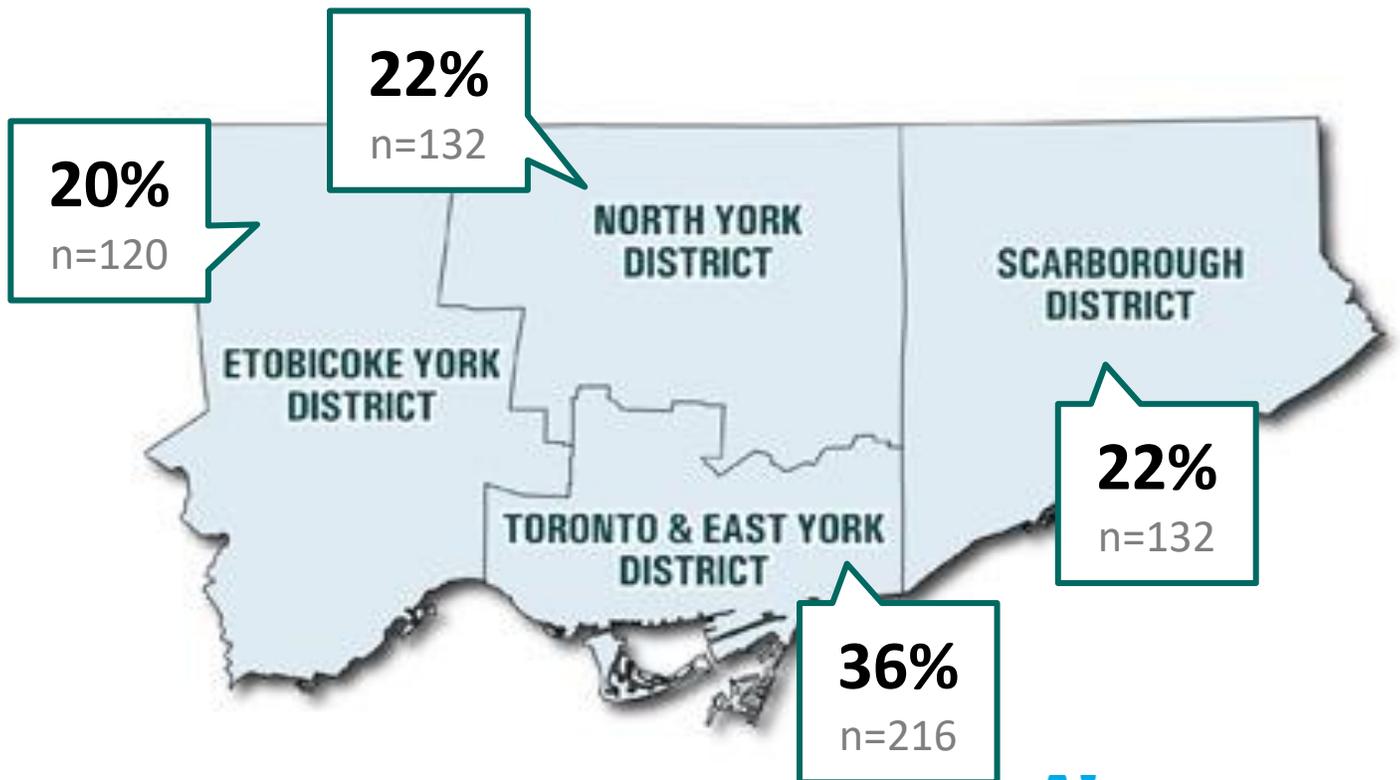
Note: *Graphs and tables may not always total 100% due to rounding values rather than any error in data. Sums are added before rounding numbers. Caution interpreting results with small n-sizes.*

Consumption Quartiles

The tables below illustrate the strata divisions for each rate class, based on consumption quartiles.

Dividing customer sample into quartiles based on known characteristics, including region and annual consumption, was used to develop accurate quotas to ensure the sample was representative of Toronto Hydro’s customer base.

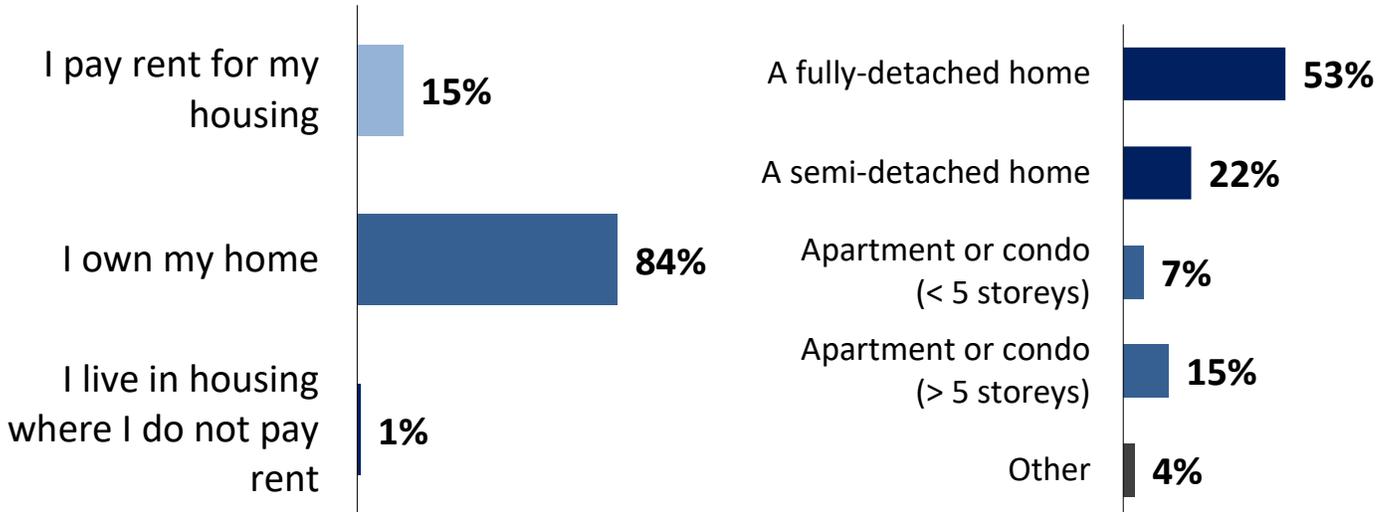
	Consumption Quartiles				Total
	Low	Medium-Low	Medium-High	High	
Toronto & East York	54	54	54	54	216
Etobicoke & York	30	30	30	30	120
North York	33	33	33	33	132
Scarborough	33	33	33	33	132
Total	150	150	150	150	600



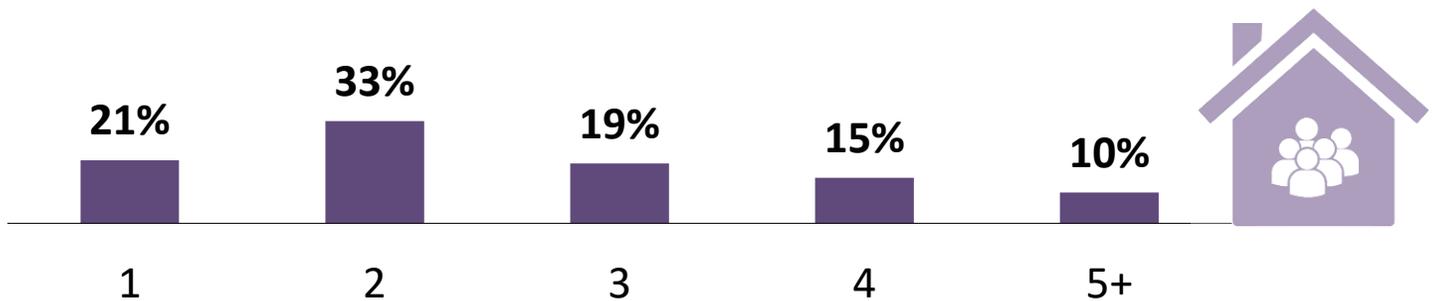
Segmentation and Demographics

Segmentation & Demographics

Primary Residence

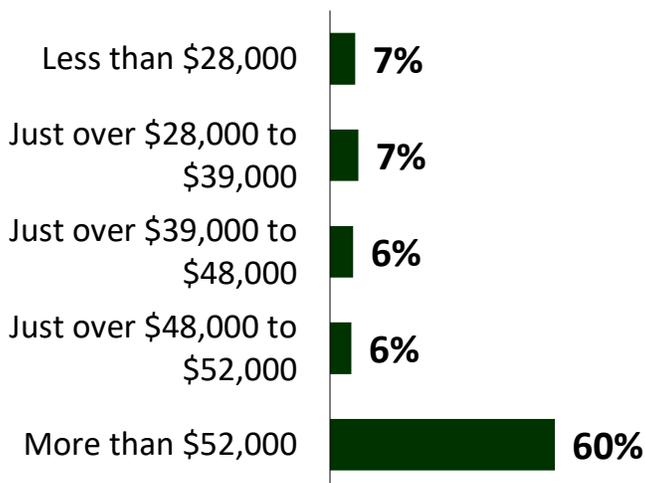


Household Size



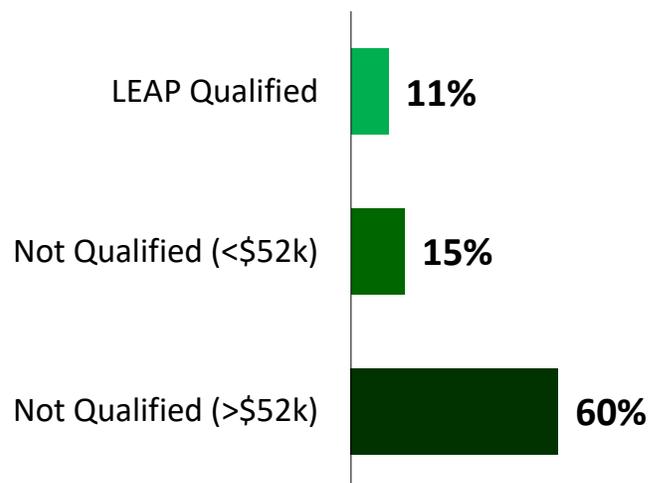
Note: 'Don't know' (2%) not shown.

Household Income After Tax



Note: 'Refused' (12%), 'Not sure' (2%) not shown.

LEAP Qualification



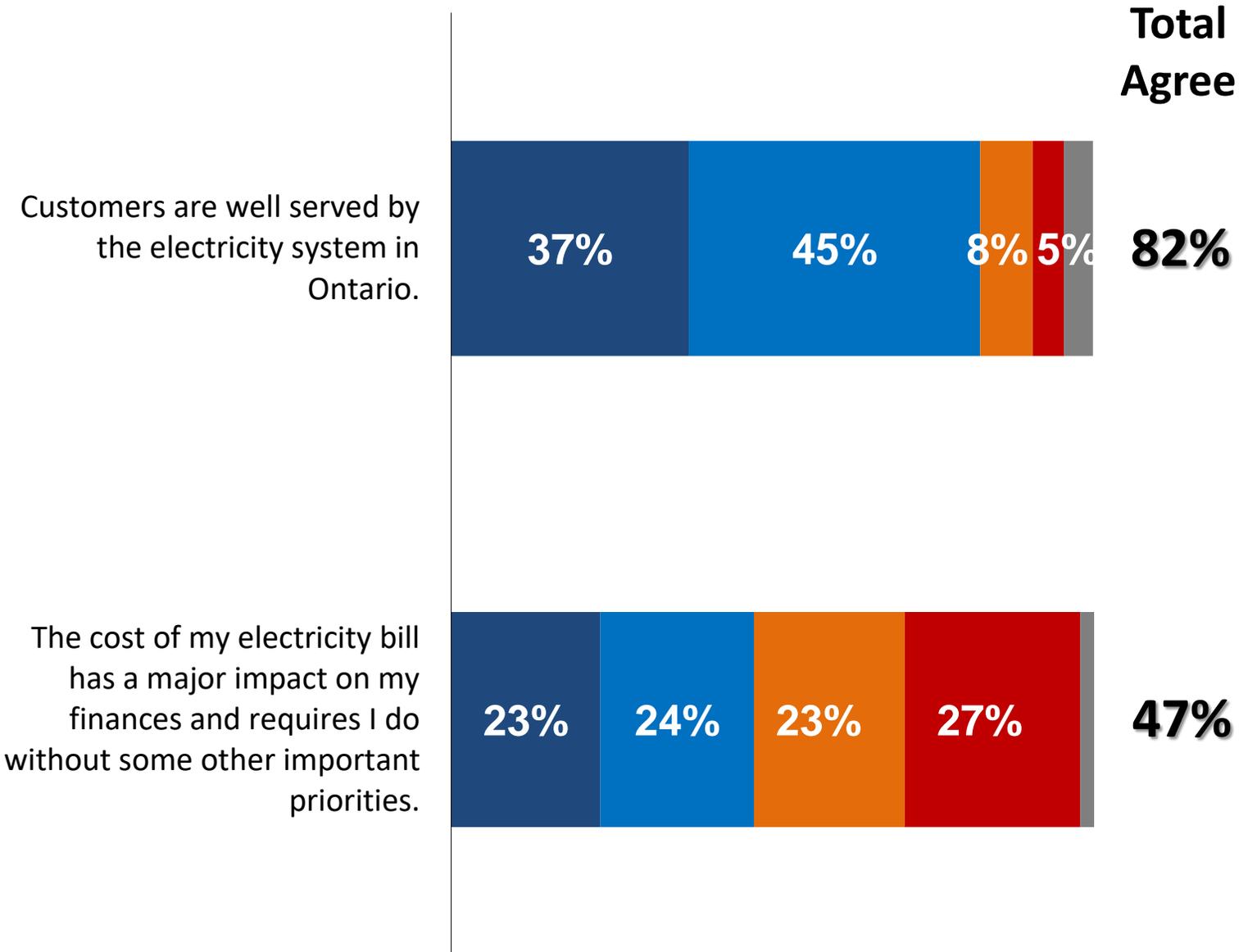
Note: 'Refused' (22%), 'Not sure' (2%) not shown.

Segmentation & Demographics



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.

[asked all respondents, n=600]



■ Strongly agree

■ Somewhat agree

■ Somewhat disagree

■ Strongly disagree

■ Don't know/No opinion

Familiarity Preamble



To start, I'd like to ask you a few questions about the electricity system ...

*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; and*
- ***Distribution lines** carry electricity to the homes and businesses in our communities.*

*Today we're going to talk about your **local distribution system** which is maintained and operated by Toronto Hydro.*

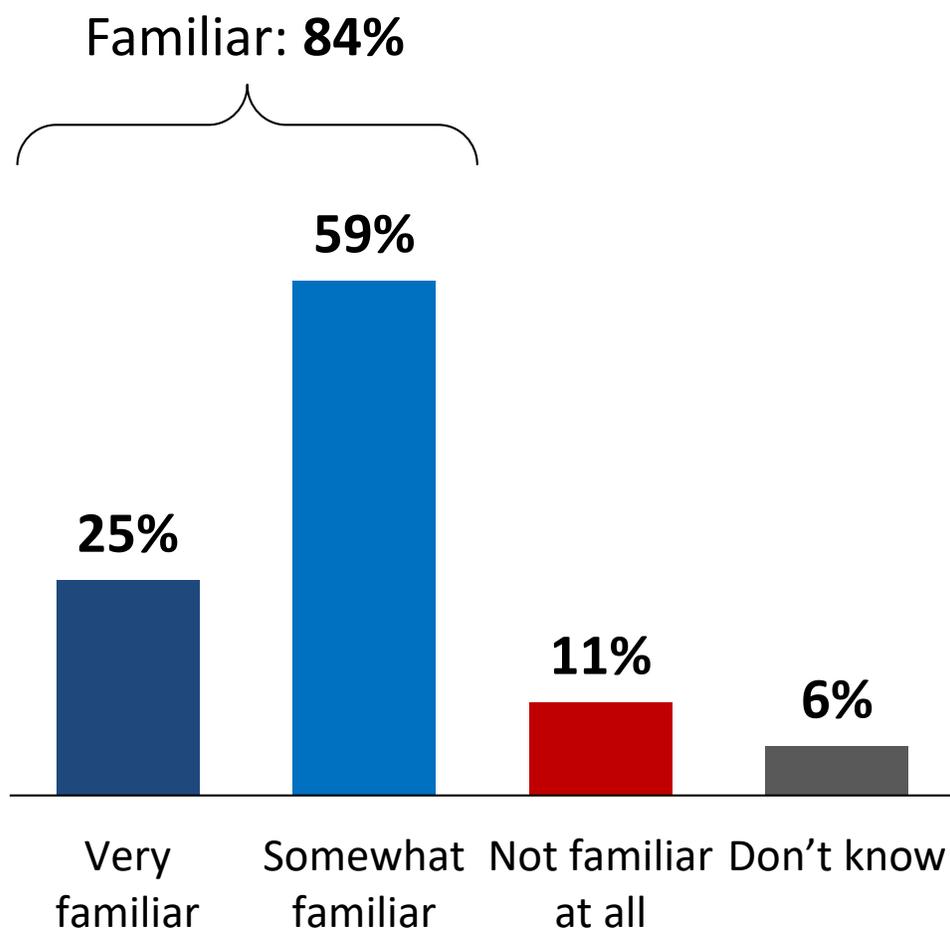


Familiarity with Toronto Hydro



How familiar are you with **Toronto Hydro**?

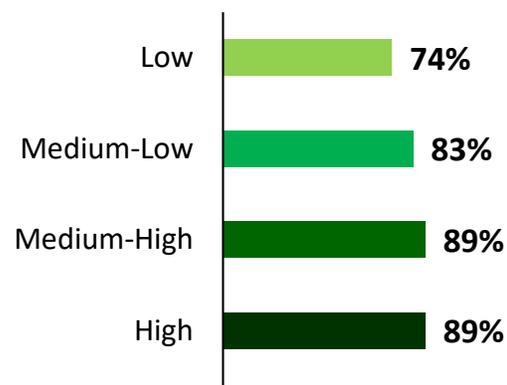
[asked all respondents, n=600]



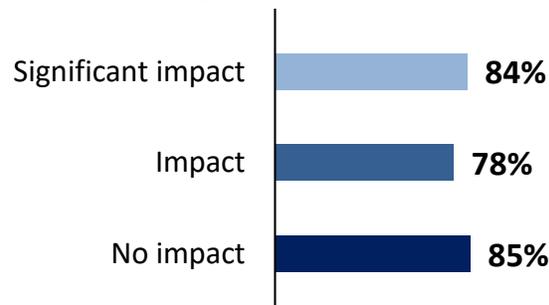
Segmentation

Those who say "Familiar":

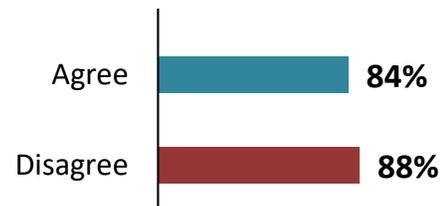
Annual Consumption



Bill Impact on Finances



Well Served by System

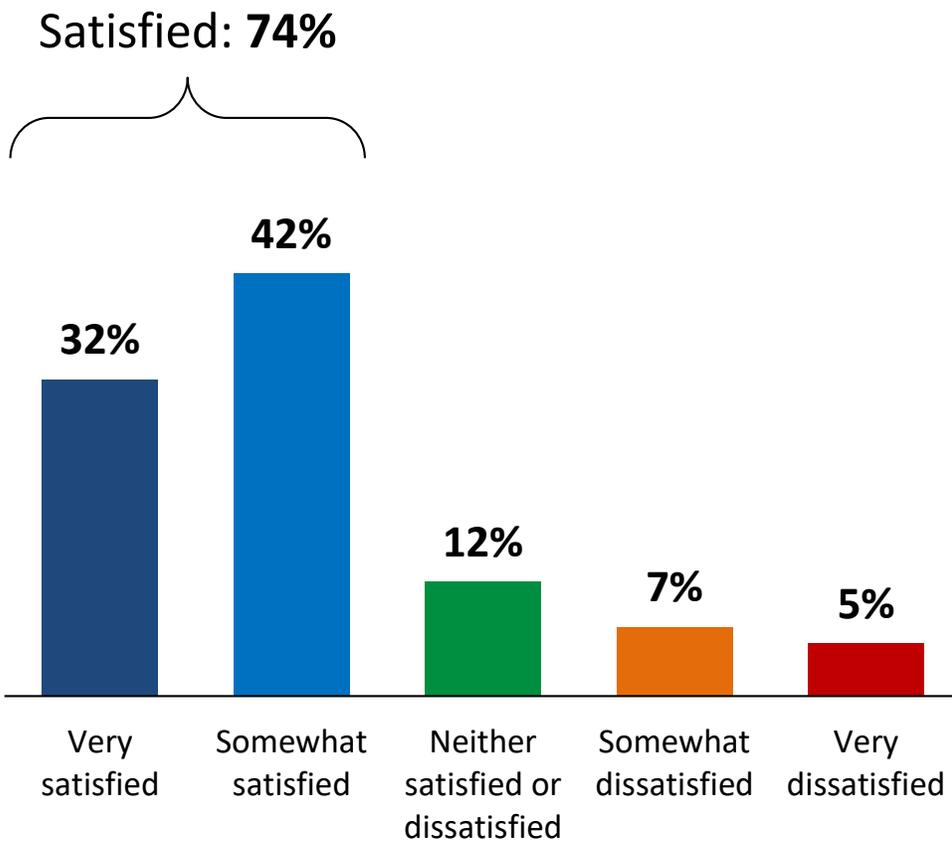


Satisfaction with Services



In general, how satisfied or dissatisfied are you with the services you receive from **Toronto Hydro?**

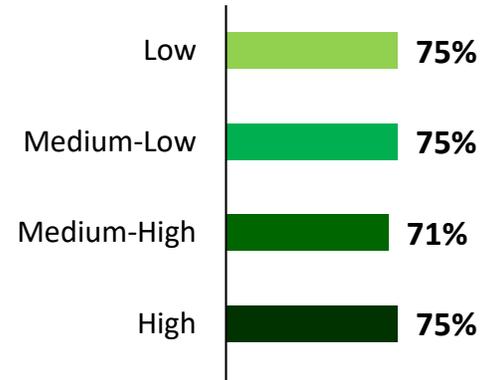
[asked all respondents, n=600]



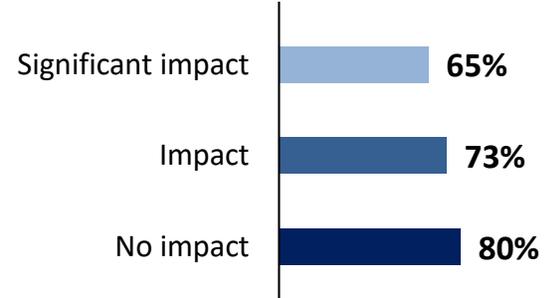
Segmentation

Those who say "Satisfied":

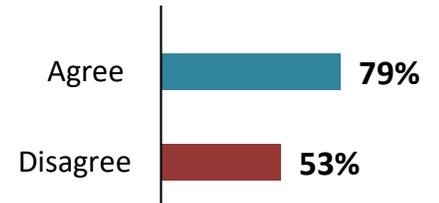
Annual Consumption



Bill Impact on Finances



Well Served by System



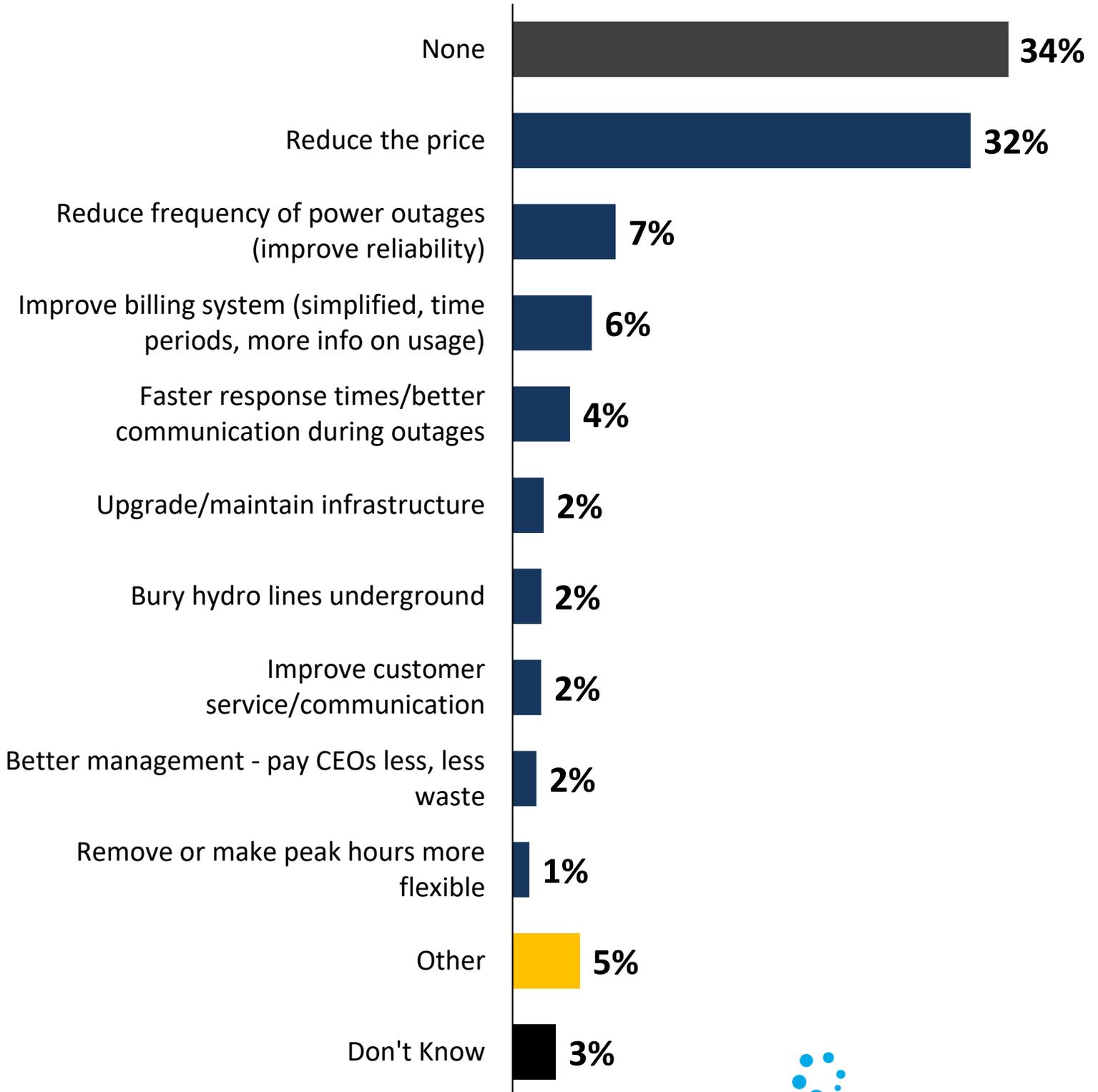
Note: "Don't know" (2%) not shown.

Suggestions for Improved Services



Is there anything in particular that **Toronto Hydro** can do to improve its services to you?

[asked all respondents, n=600]



Note: "Refused" (1%) not shown.

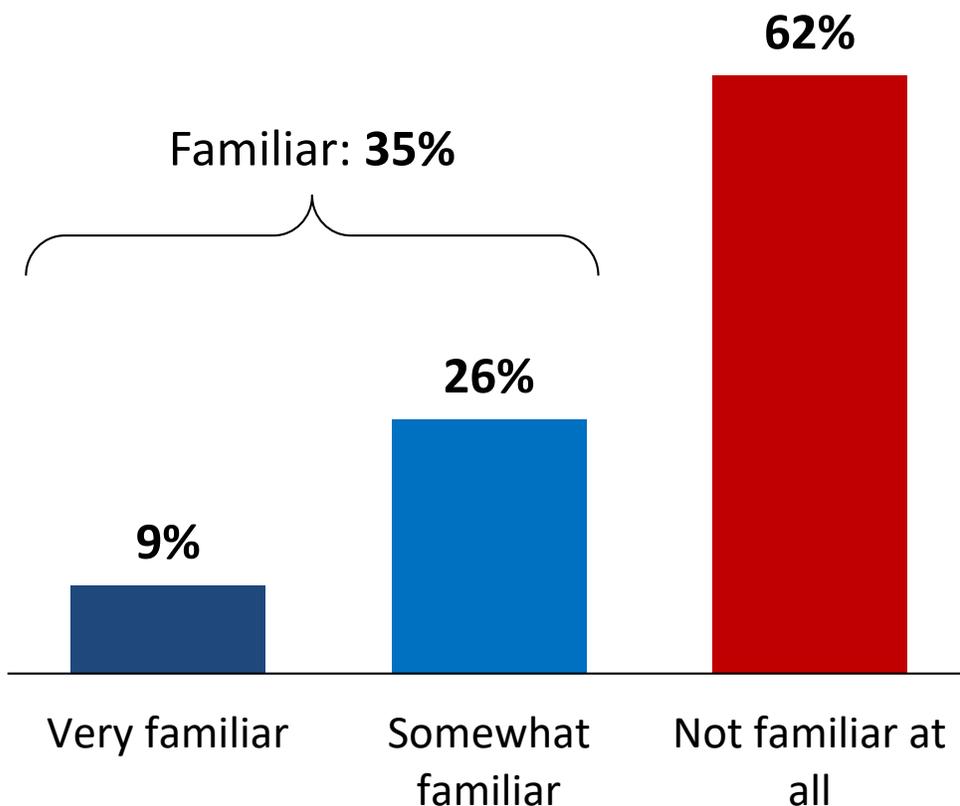
Amount of Bill Retained by Toronto Hydro



While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, they retain about **32%** of the typical residential customer's bill. This is about **\$39** on an average **\$123** monthly residential electricity 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 percentage of your electricity bill that is retained by **Toronto Hydro**?

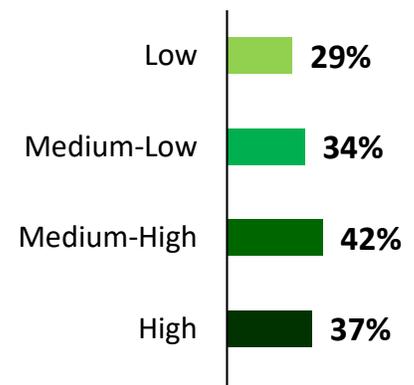
[asked all respondents, n=600]



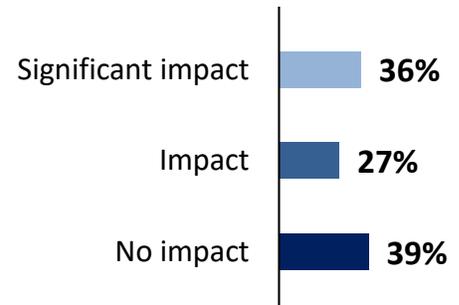
Segmentation

Those who say "Familiar":

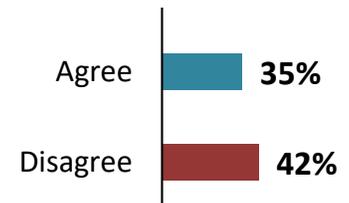
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (2%) not shown.

Familiarity with Ontario Energy Board

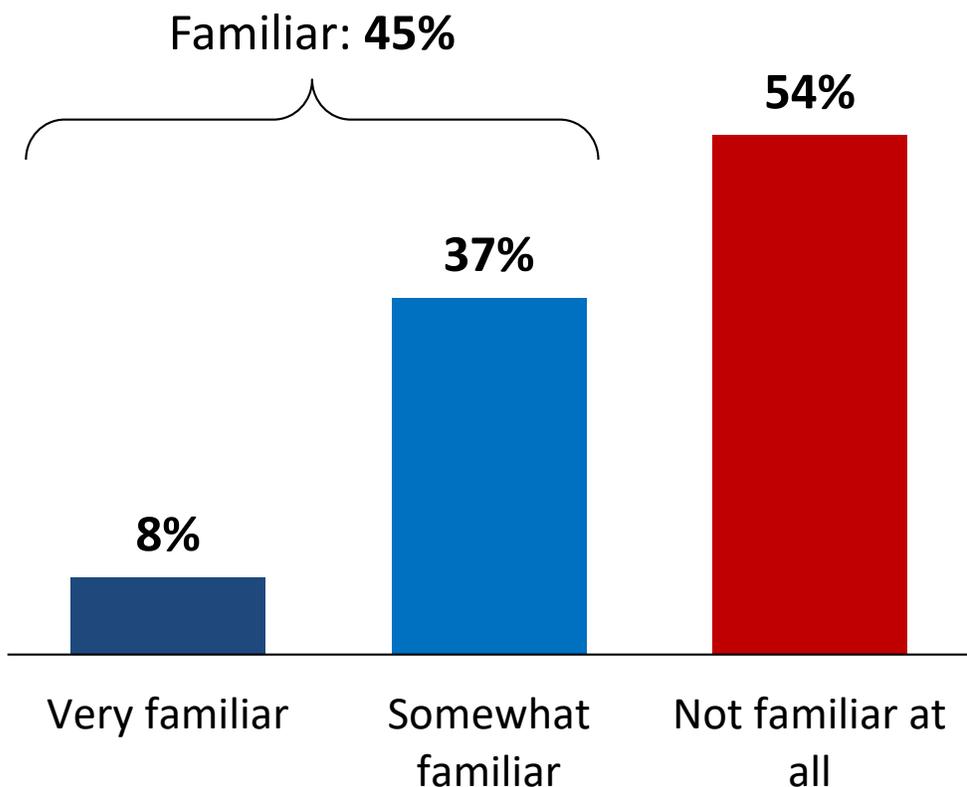


Electricity distributors are required to file a rate application with the Ontario Energy Board (OEB) to request a change in distribution rates based on their plans for capital and operating spending. Toronto Hydro is now consulting on its plans for 2020 to 2024.

The OEB is mandated to protect consumers with respect to prices and the reliability and quality of electricity service.

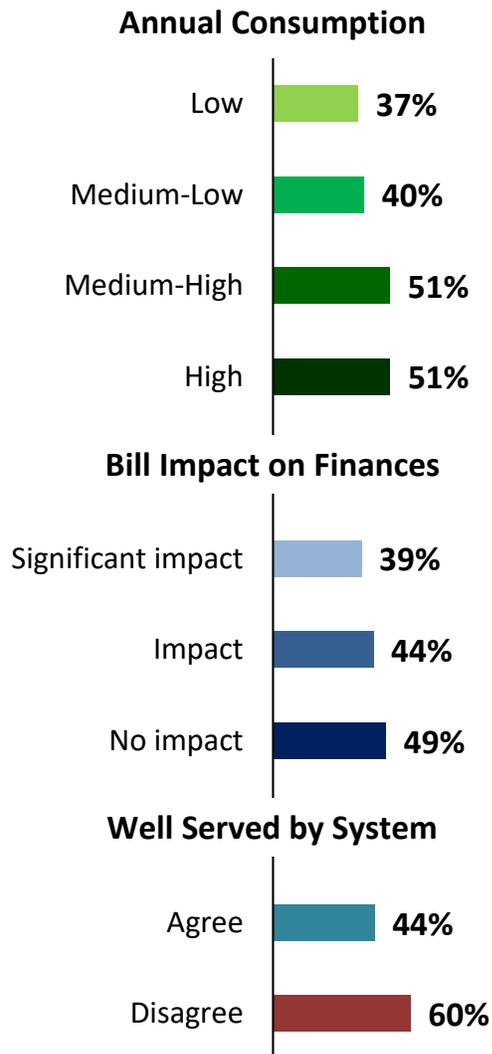
How familiar would you say you are with the Ontario Energy Board or “OEB”?

[asked all respondents, n=600]



Segmentation

Those who say “Familiar”:



Note: “Don’t Know” (1%) not shown.

Customer Engagement Process

Preamble



As part of **Toronto Hydro's** consultation, it has developed a five-phase approach to gathering and responding to customer feedback.

- First, **Toronto Hydro** identified customer priorities through a series of surveys and focus groups;
- Then, used this customer feedback to guide development of its Draft Plan;
- Now, **Toronto Hydro** is in the process of collecting customer feedback on its Draft Plan;
- The next phases will include re-examining its Draft Plan based on customer feedback and preparing a submission to the OEB.

This survey is part of the third stage of **collecting customer feedback on the Draft Plan.**

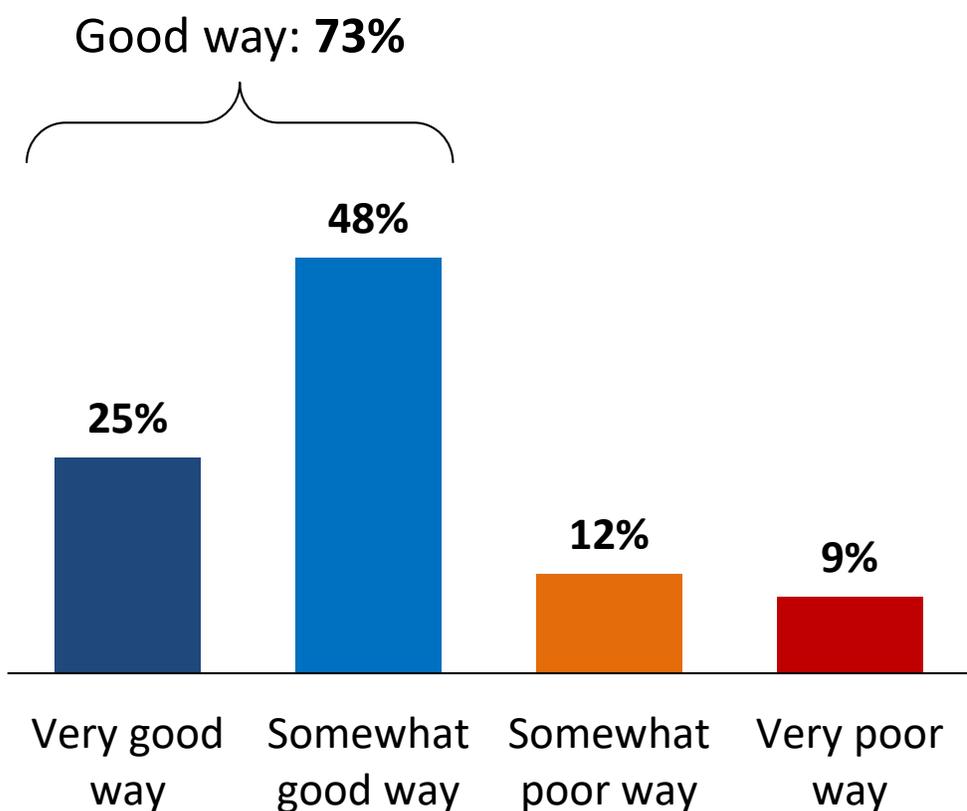


Feedback on Customer Engagement Process



Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into **Toronto Hydro's** plan?

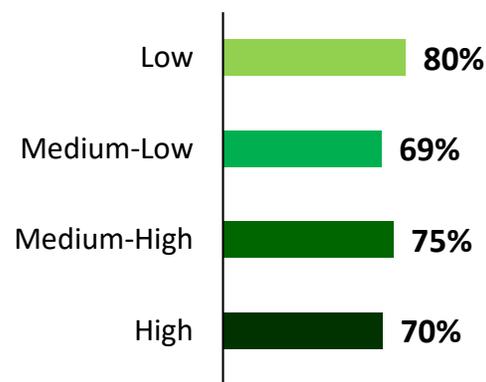
[asked all respondents, n=600]



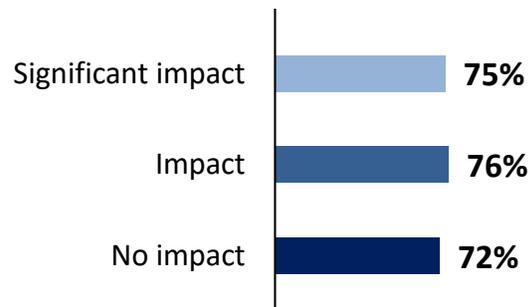
Segmentation

Those who say "Good Way":

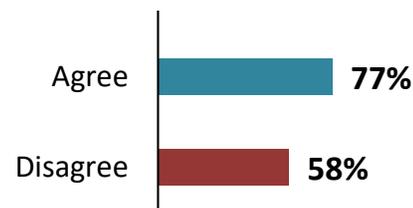
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (6%) not shown.

Customer Priorities

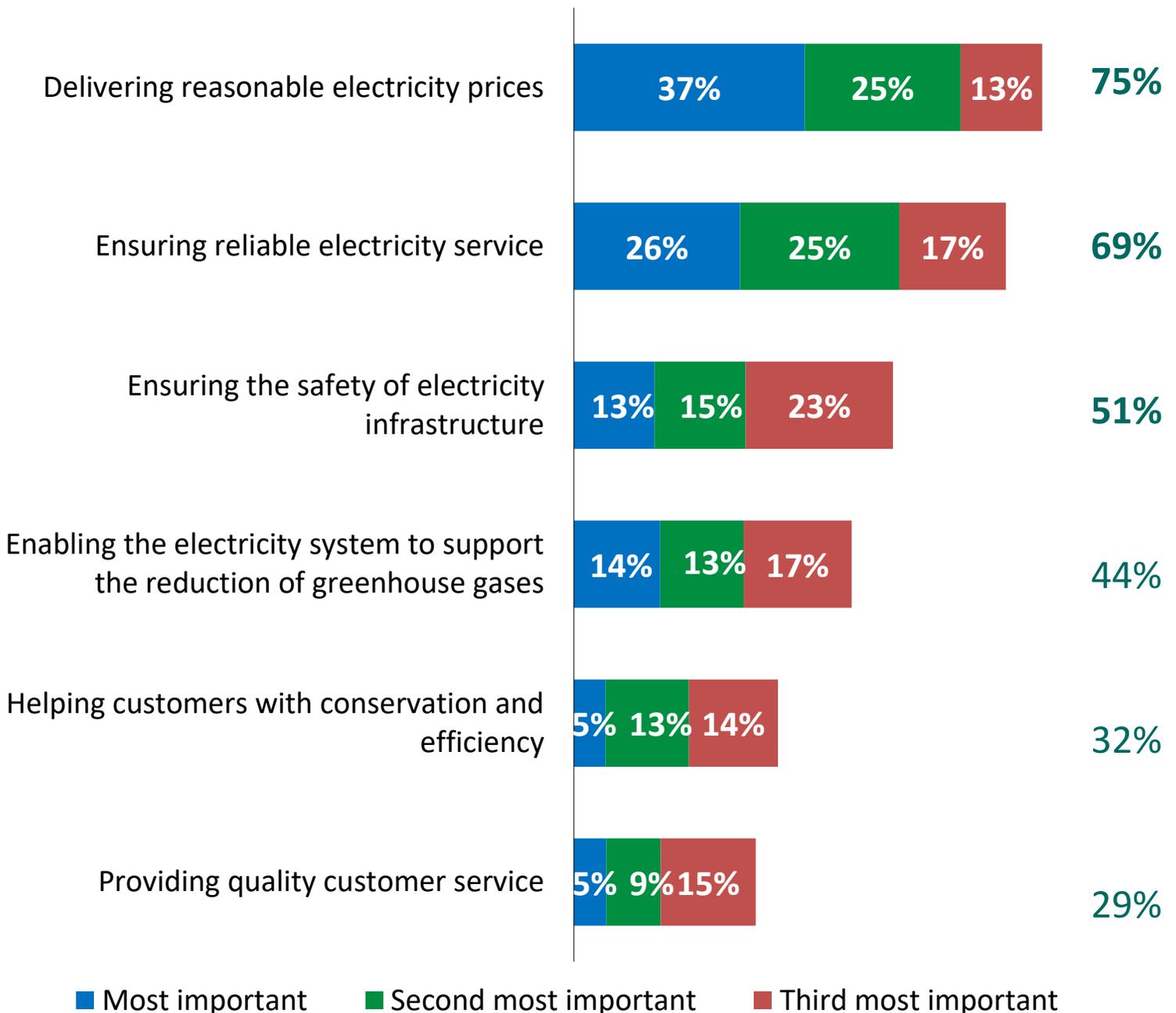


Toronto Hydro wants to better understand customer priorities. In the first phase of customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for **Toronto Hydro**.

Among the following customer identified priorities, please tell me which one is the most important to you.

[asked all respondents, n=600]

Top 3 Priority

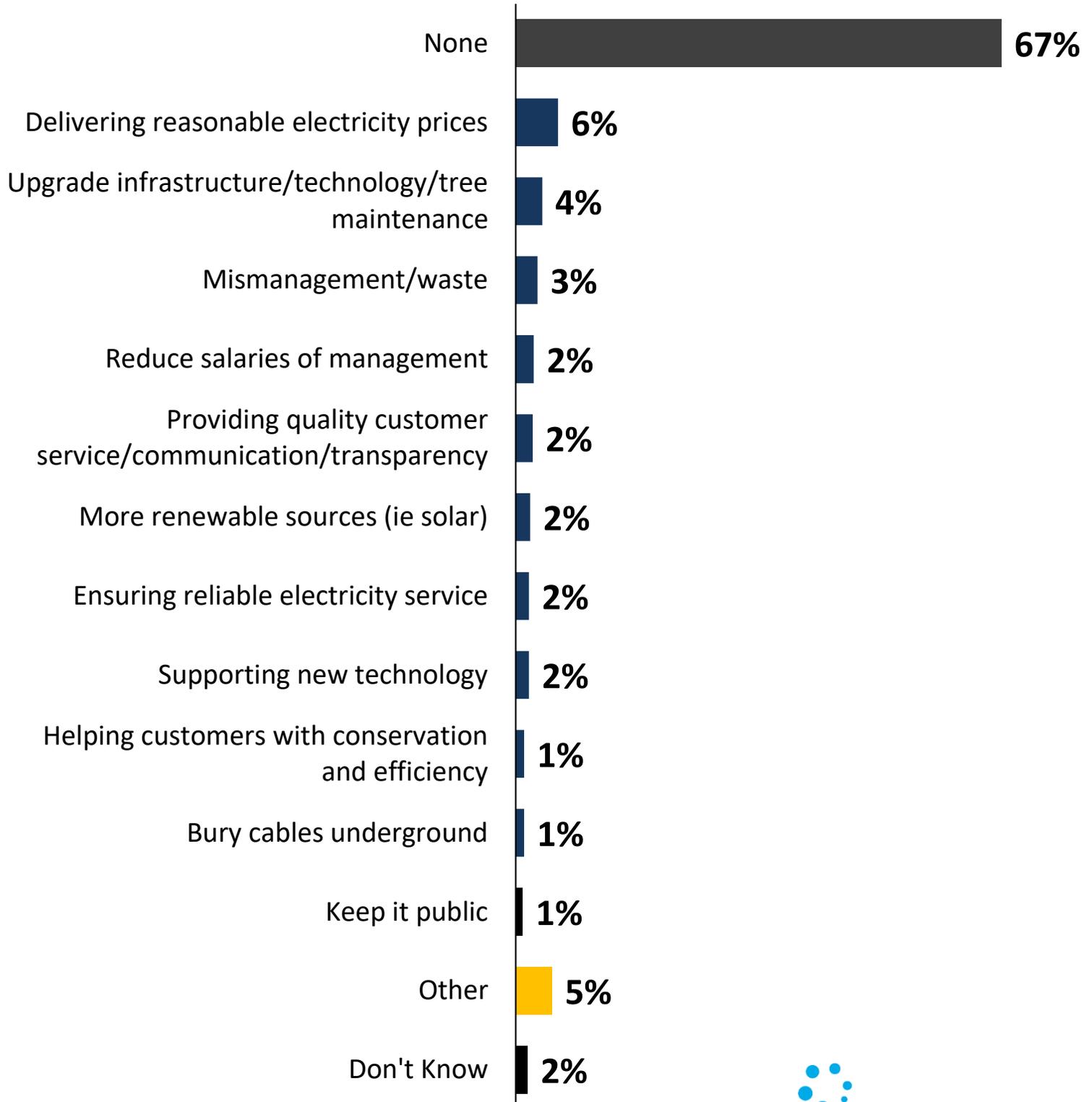


Additional Customer Priorities



Are there any other important priorities that **Toronto Hydro** should be focusing on that weren't included in the previous list I read to you?

[asked all respondents, n=600]



Planning Principles and Rate Impact

Preamble



Based, in part, on the initial customer input, **Toronto Hydro** has drafted a plan totaling approximately \$4.3B over five years.

Toronto Hydro's proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

This proposed plan translates into an average 3.4% increase in your distribution rates each year from 2020 to 2024. The distribution charges on the monthly bill would increase to \$49 by 2024 for a typical residential customer.

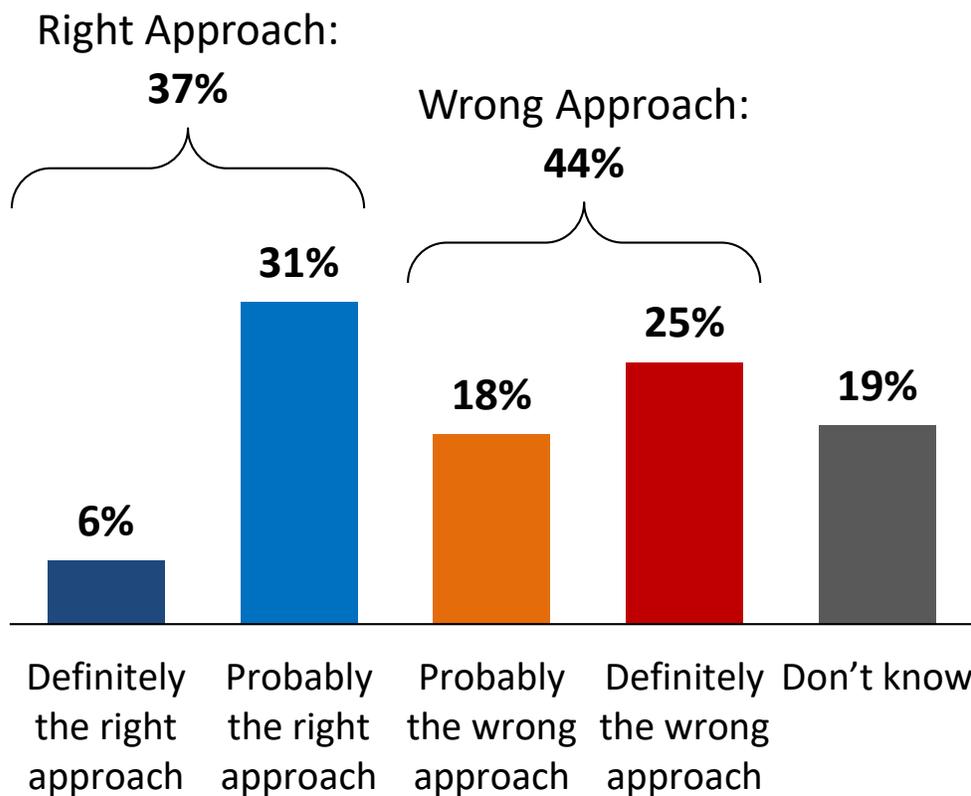


Approach to Planning for the Next Five Years



Do you feel that this is definitely the right approach, probably the right approach, probably the wrong approach or definitely the wrong approach to **Toronto Hydro's** planning for the next five years or would you say you don't know?

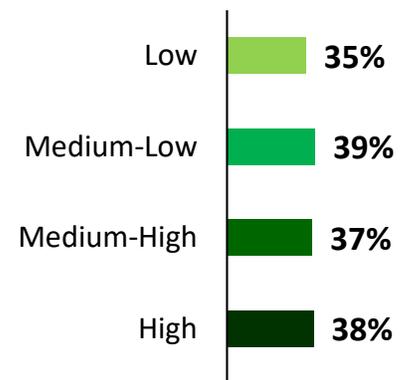
[asked all respondents, n=600]



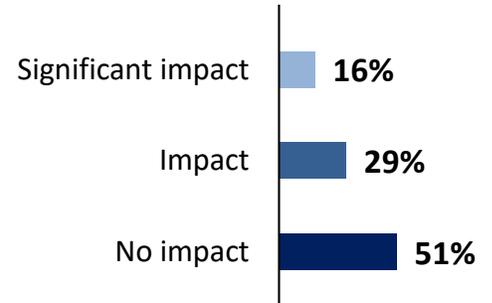
Segmentation

Those who say "Right Approach":

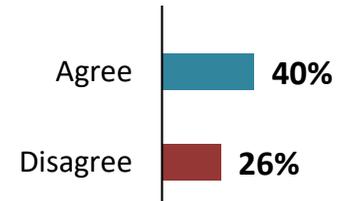
Annual Consumption



Bill Impact on Finances



Well Served by System



Gathering Feedback on Capital Investment Decisions



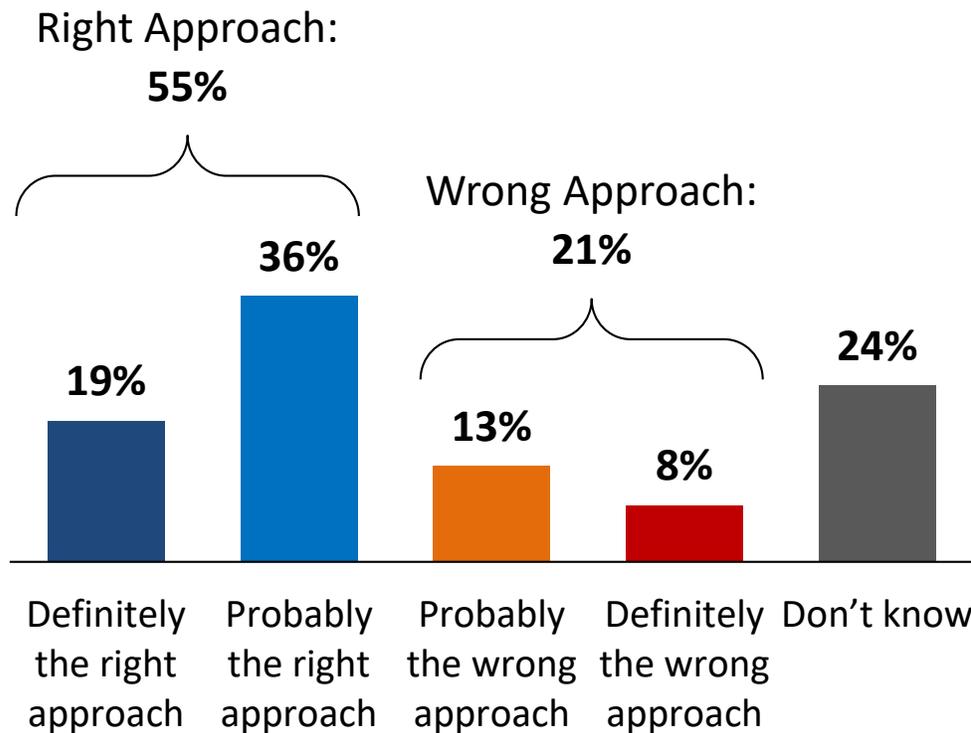
Toronto Hydro's total spending is benchmarked by the OEB against other utilities in Ontario. Toronto Hydro's operating costs of \$305 per customer are within \$1 of the provincial average.

However **Toronto Hydro's** capital investment costs are \$739 per customer which are \$245 more than the provincial average.

Since a number of capital investment decisions are based trade-offs between costs and customer outcomes – like services and reliability levels – the remaining questions in this survey ask for your feedback on those choices.

Do you feel that gathering feedback on capital investment decisions is *definitely the right approach, probably the right approach, probably the wrong approach, definitely the wrong approach or would you say you don't know?*

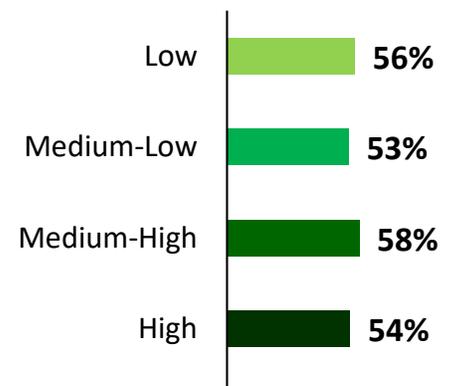
[asked all respondents, n=600]



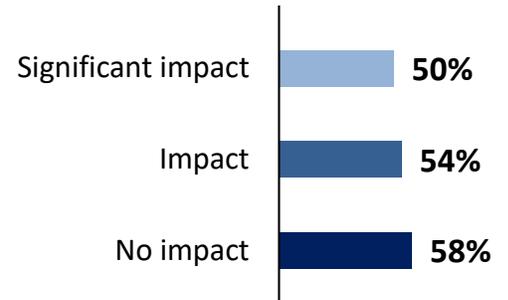
Segmentation

Those who say "Right Approach":

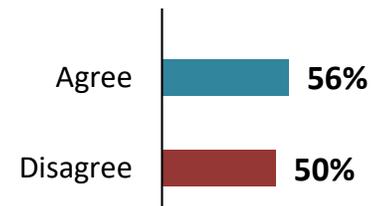
Annual Consumption



Bill Impact on Finances



Well Served by System



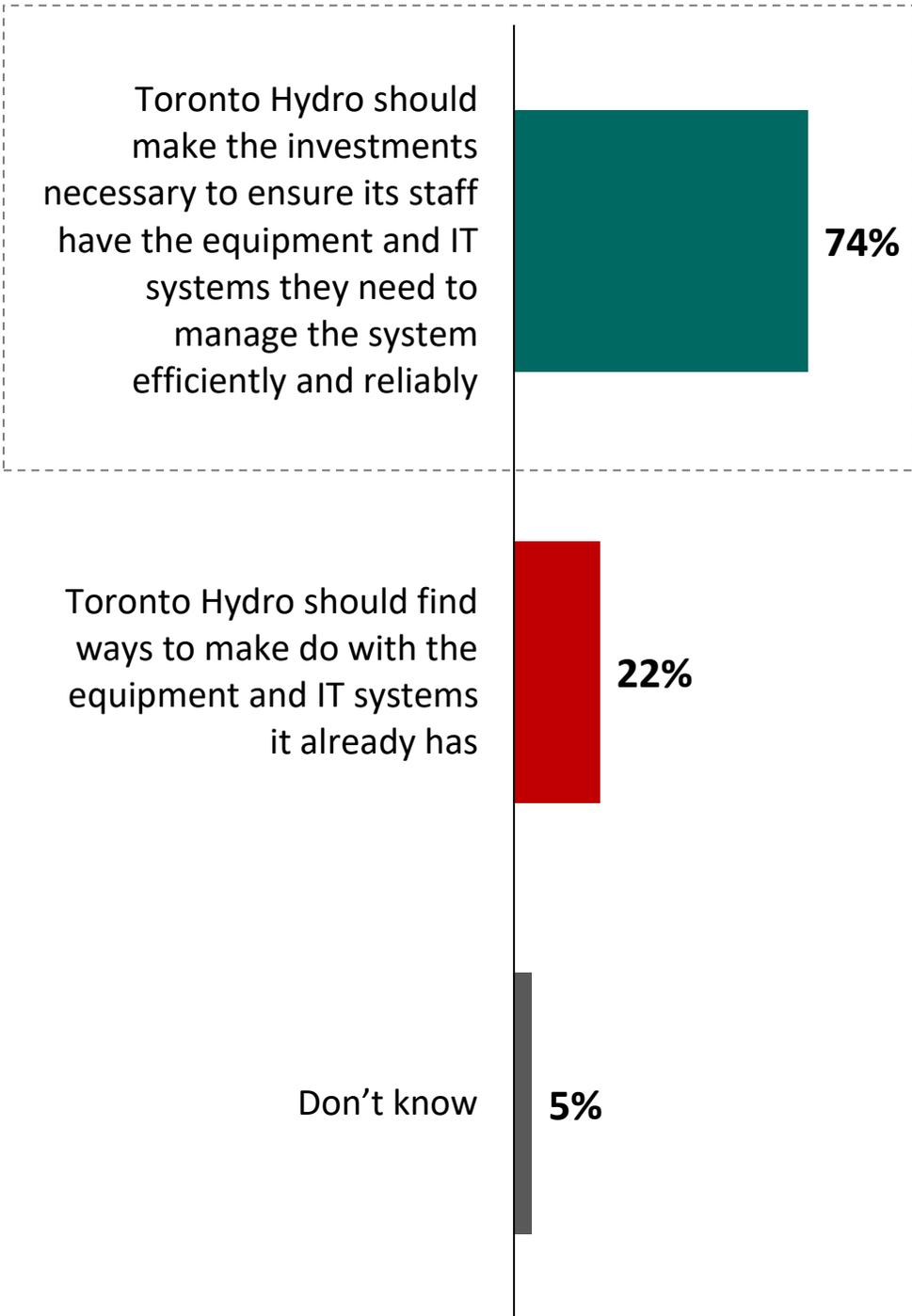
Investing in the Basics



As a company, **Toronto Hydro** needs vehicles and tools to service the power lines and IT systems to manage the system and customer information.

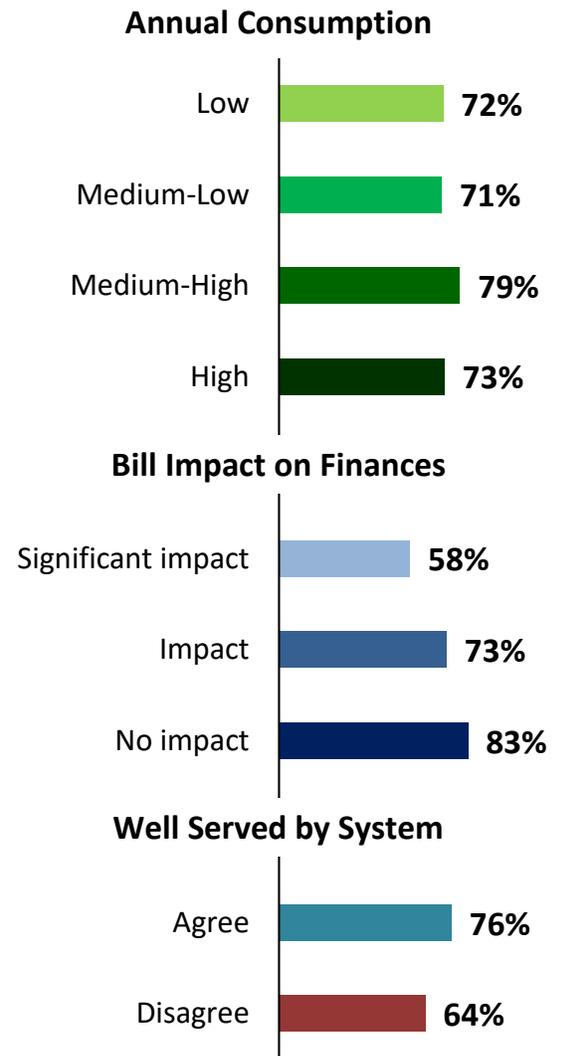
Which of the following statements best represents your point of view?

[asked all respondents, n=600]



Segmentation

Those who say "Make necessary investments":



Addressing Safety and Reliability

Addressing Safety and Reliability

Preamble



Toronto Hydro has identified areas where it could accelerate investments. These accelerated projects could increase the **typical customer's bill by \$2.46 per month by 2024**. These projects are in addition to the 3.4% increase that is currently being proposed.

Toronto Hydro wants to get your feedback on particular projects before deciding whether or not to accelerate its investment plan in certain specific areas.

Right now, the typical **Toronto Hydro** customer averages 1.4 outages per year with an average of between 60 and 70 minutes without power over the year. While many of those outages are caused by events outside of **Toronto Hydro's** control, roughly 36% are caused by the failure of aging equipment.

In this proposed plan, **Toronto Hydro's** general approach is to spend just enough on replacing equipment so that most customers can expect a similar level of reliability over the next five years as they are experiencing today, and to provide improved service for those customers whose reliability is poorer or who have special reliability needs such as hospitals.

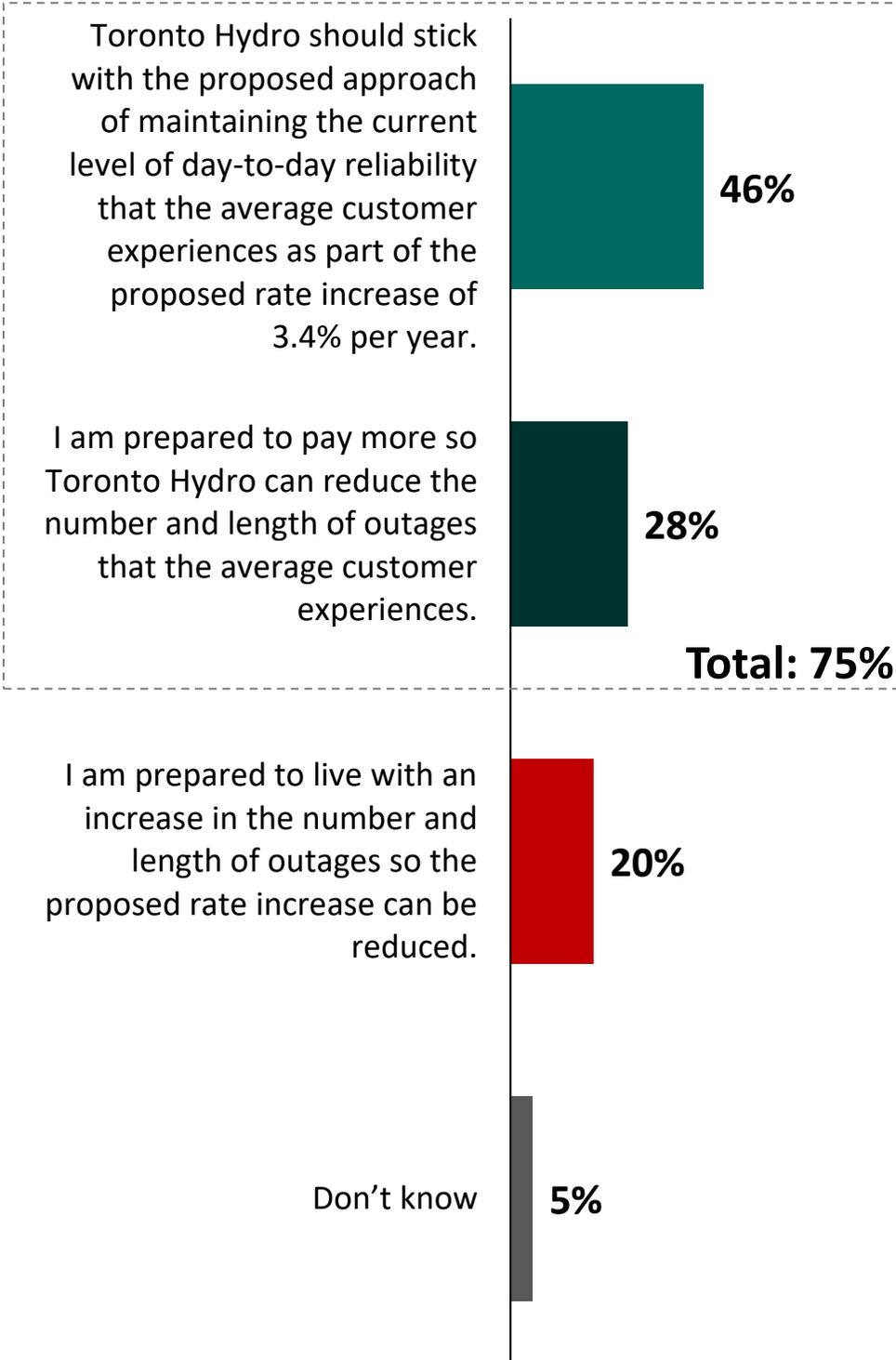


Approach to Addressing Reliability



Which of the following is closest to your point of view regarding **Toronto Hydro's** approach to addressing reliability?

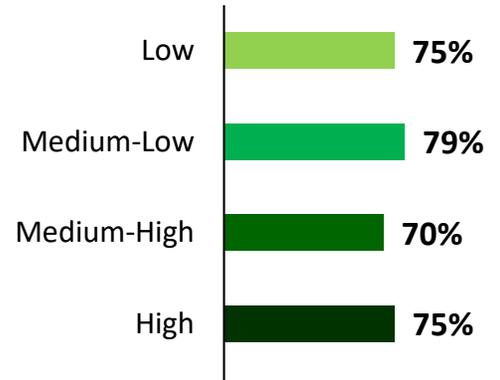
[asked all respondents, n=600]



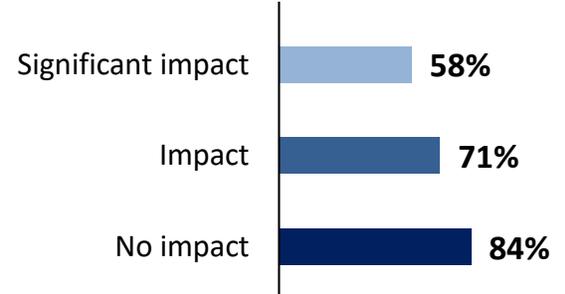
Segmentation

Those who say "Stick with proposed approach or spend more":

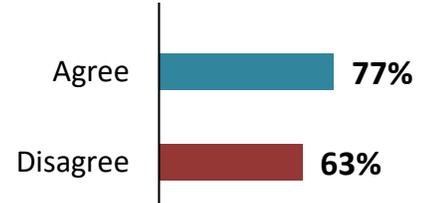
Annual Consumption



Bill Impact on Finances



Bill Impact on Finances



Rear-Lot Replacement



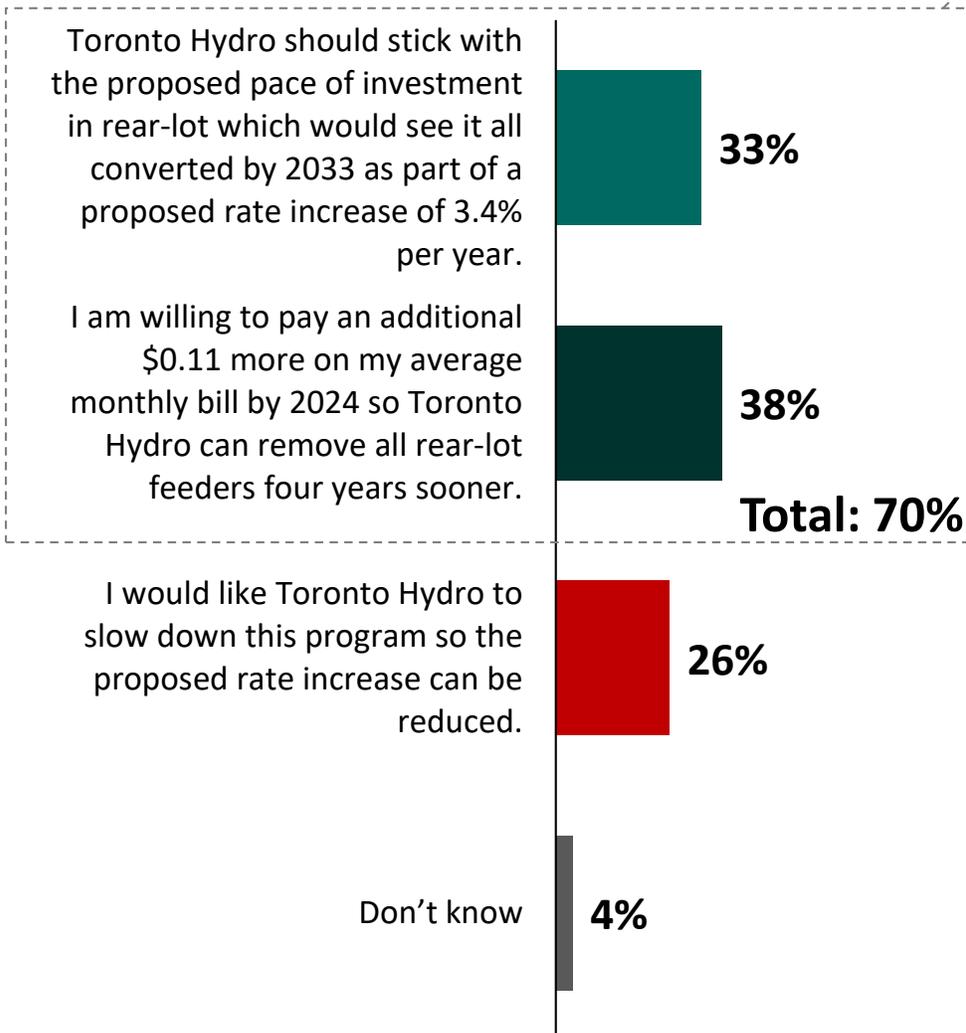
Some customers are served by older types of lines that are more likely to fail, causing more frequent, and longer lasting power outages. These customers are more likely to experience poorer reliability over time than most Toronto Hydro customers. The proposed plan will replace those lines over time but the work could be done faster.

I would like to ask you about two types of lines.

One example is **rear-lot lines**. They go through residential backyards and are often more difficult to service and more exposed to falling branches. The proposed plan will replace all existing rear-lot lines by 2033. **Toronto Hydro** could replace those lines 4 years sooner for an additional cost.

Which of the following statements is closest to your view?

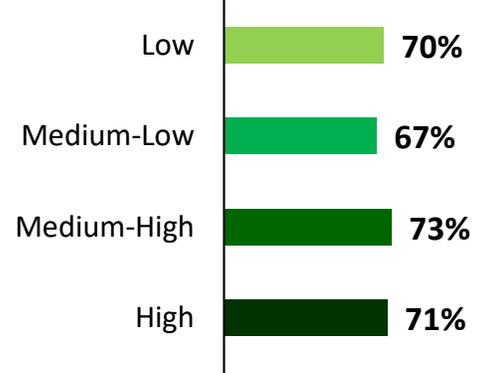
[asked all respondents, n=600]



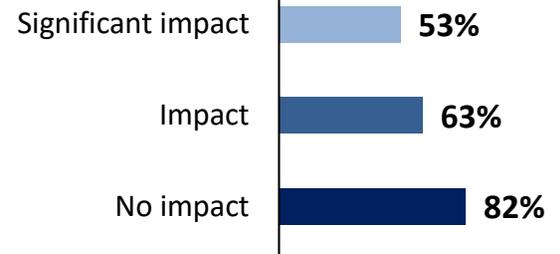
Segmentation

Those who say "Stick with proposed approach or spend more":

Annual Consumption



Bill Impact on Finances



Well Served by System



Direct Buried Cable Replacement

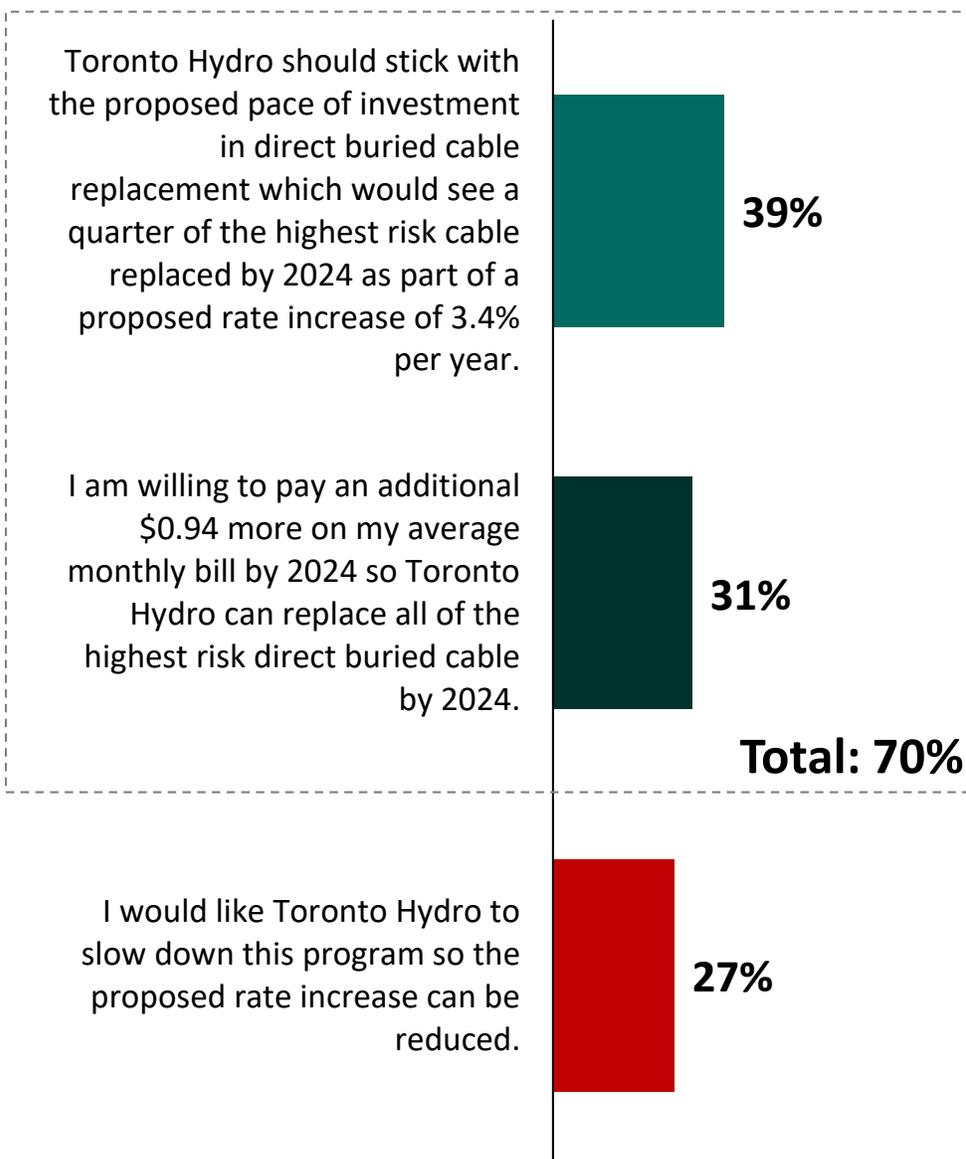


Another example is **direct buried cable** where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system.

Once these cables start to fail, they tend to experience a rash of failures. The proposed plan will replace a quarter of the highest risk direct buried cable by 2024. **Toronto Hydro** could replace all of the highest risk direct buried cable by 2024 for an additional cost.

Which of the following statements is closest to your view?

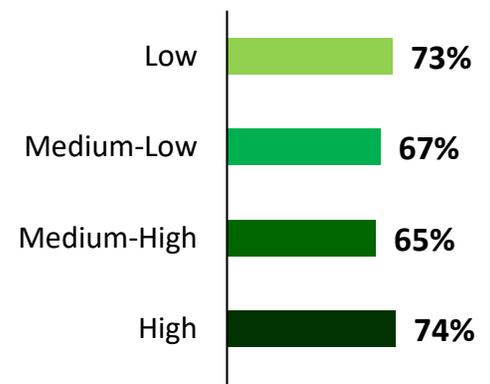
[asked all respondents, n=600]



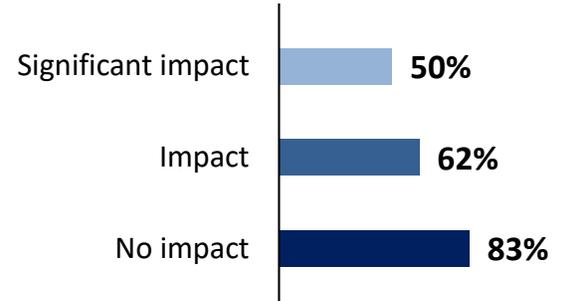
Segmentation

Those who say “Stick with proposed approach or spend more”:

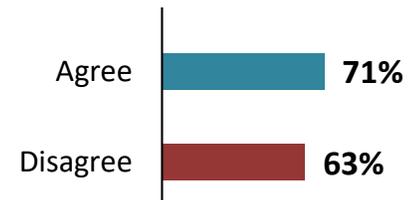
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: “Don’t Know” (3%) not shown.

Paper Insulated Lead Covered (PILC) Preamble



Toronto Hydro has identified three equipment upgrades that are needed within the next few years. If **Toronto Hydro** waits, those upgrades will be more expensive and disruptive as Toronto continues to grow.

Firstly, Paper Insulated Lead Covered (PILC) cable. PILC cable was an old type of underground cable that stopped being installed on **Toronto Hydro's** grid 20 years ago. While the equipment is resilient and is still providing electricity to the downtown core, the outer lead covers can begin to crack and leak oil. Replacing these cables is becoming increasingly difficult and expensive to resource and complete.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049. But **Toronto Hydro** can replace all of this cable ten years earlier by 2039, at an additional cost now. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.

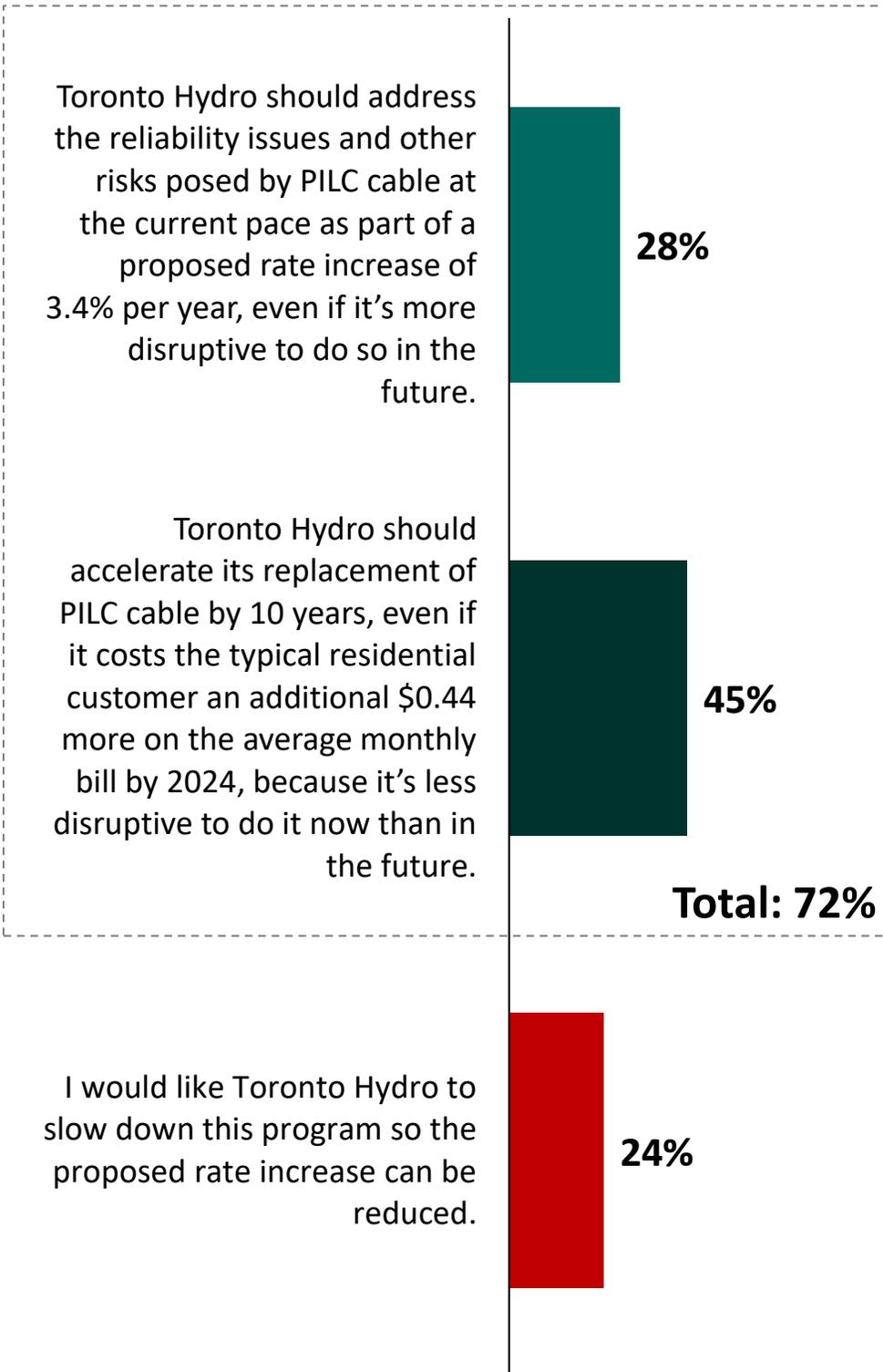


PILC Cable Replacement Program



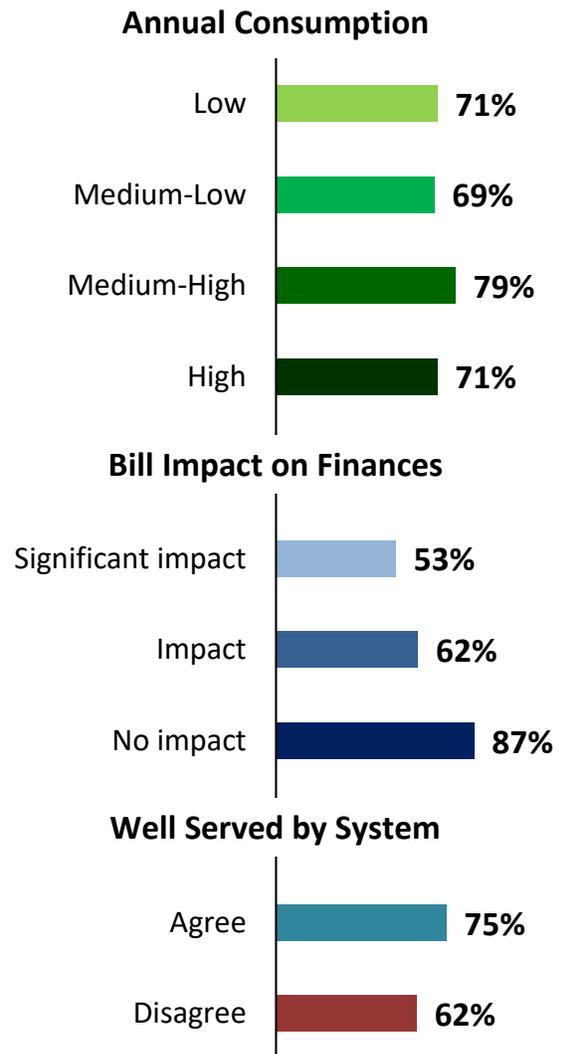
Which of the following is closest to your point of view regarding Toronto Hydro's PILC Cable replacement program?

[asked all respondents, n=600]



Segmentation

Those who say "Stick with proposed approach or spend more":



Note: "Don't Know" (4%) not shown.

Network Unit Replacement Program

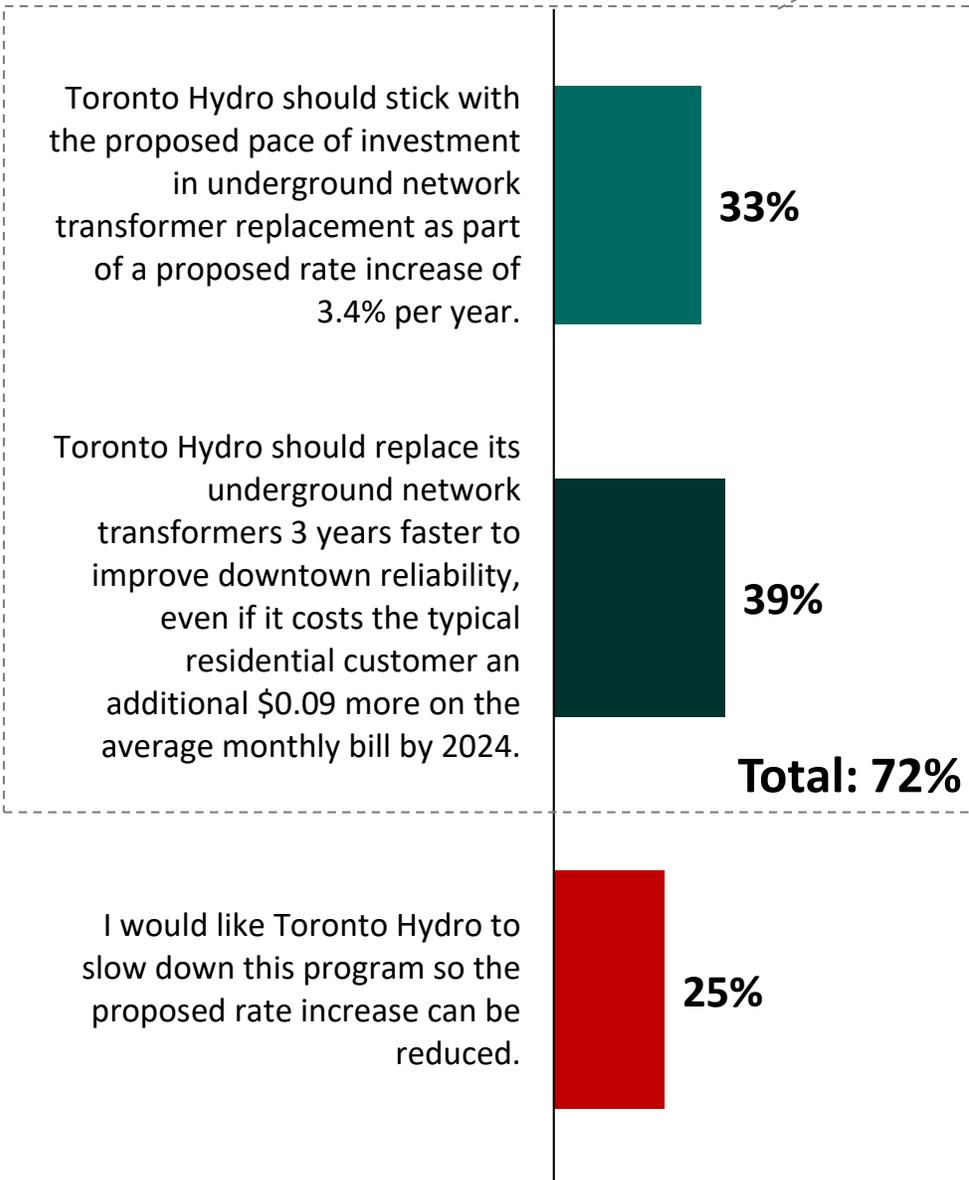


The second upgrade project identified is *Underground Network Transformers*. The key problem with these units is their older design which makes them prone to flooding.

Toronto Hydro plans to replace just enough of these units by 2031 so that outages, due to equipment failure, don't get any worse. But the process could be advanced by three years to replace all these units by 2028.

Which of the following is closest to your point of view regarding **Toronto Hydro's** Network Unit replacement program?

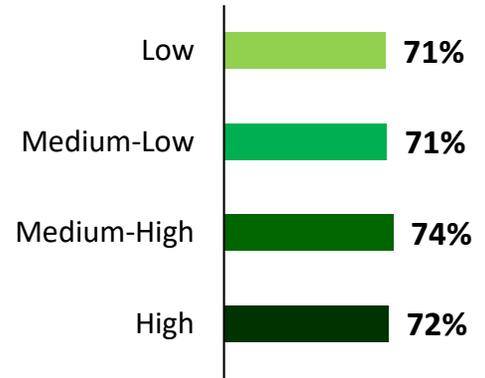
[asked all respondents, n=600]



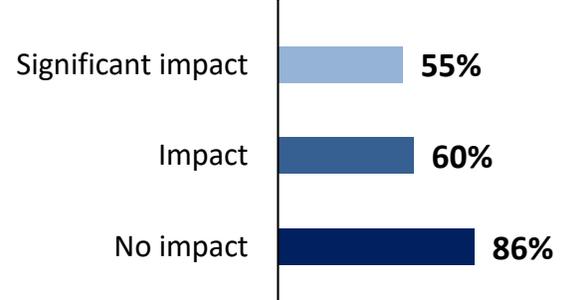
Segmentation

Those who say "Stick with proposed approach or spend more":

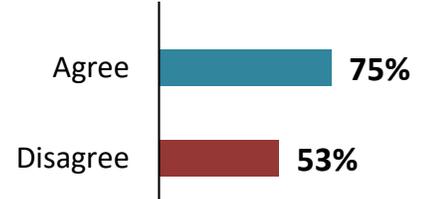
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (3%) not shown.

Cable Chamber Renewal Program

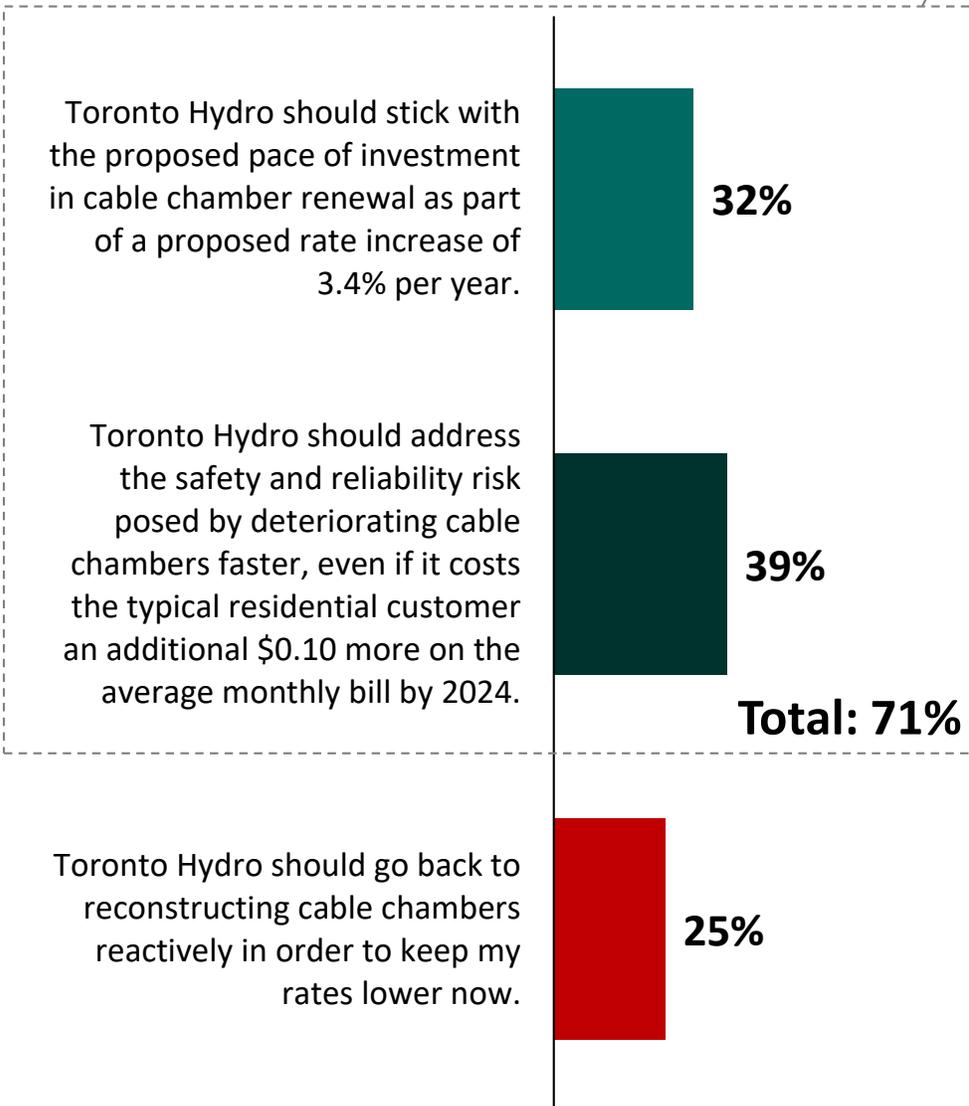


The third upgrade project identified is *Cable Chamber replacement*. Cable Chambers house, protect, and provide access to underground electrical equipment across the city. When they deteriorate or break, this equipment can cause outages and pose anything from a tripping hazard to something more serious like a collapsed chamber.

Toronto Hydro plans to take approximately 30 years to address the chambers in the worst condition. But accelerating the work could halve that period, at an additional cost now.

Which of the following is closest to your point of view regarding **Toronto Hydro's** Cable Chamber renewal program?

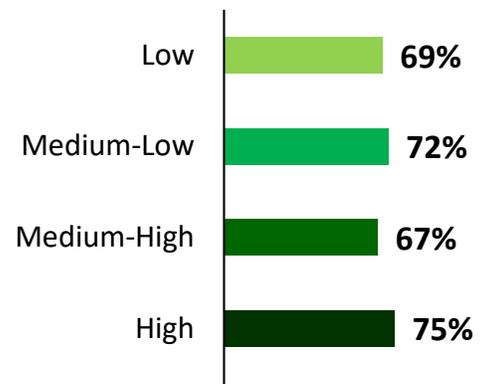
[asked all respondents, n=600]



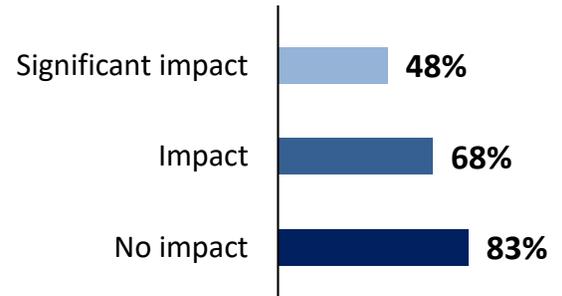
Segmentation

Those who say “Stick with proposed approach or spend more”:

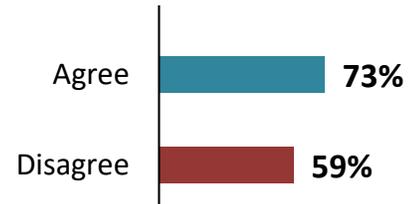
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: “Don’t Know” (4%) not shown.

Dealing with More Frequent Extreme Weather Events

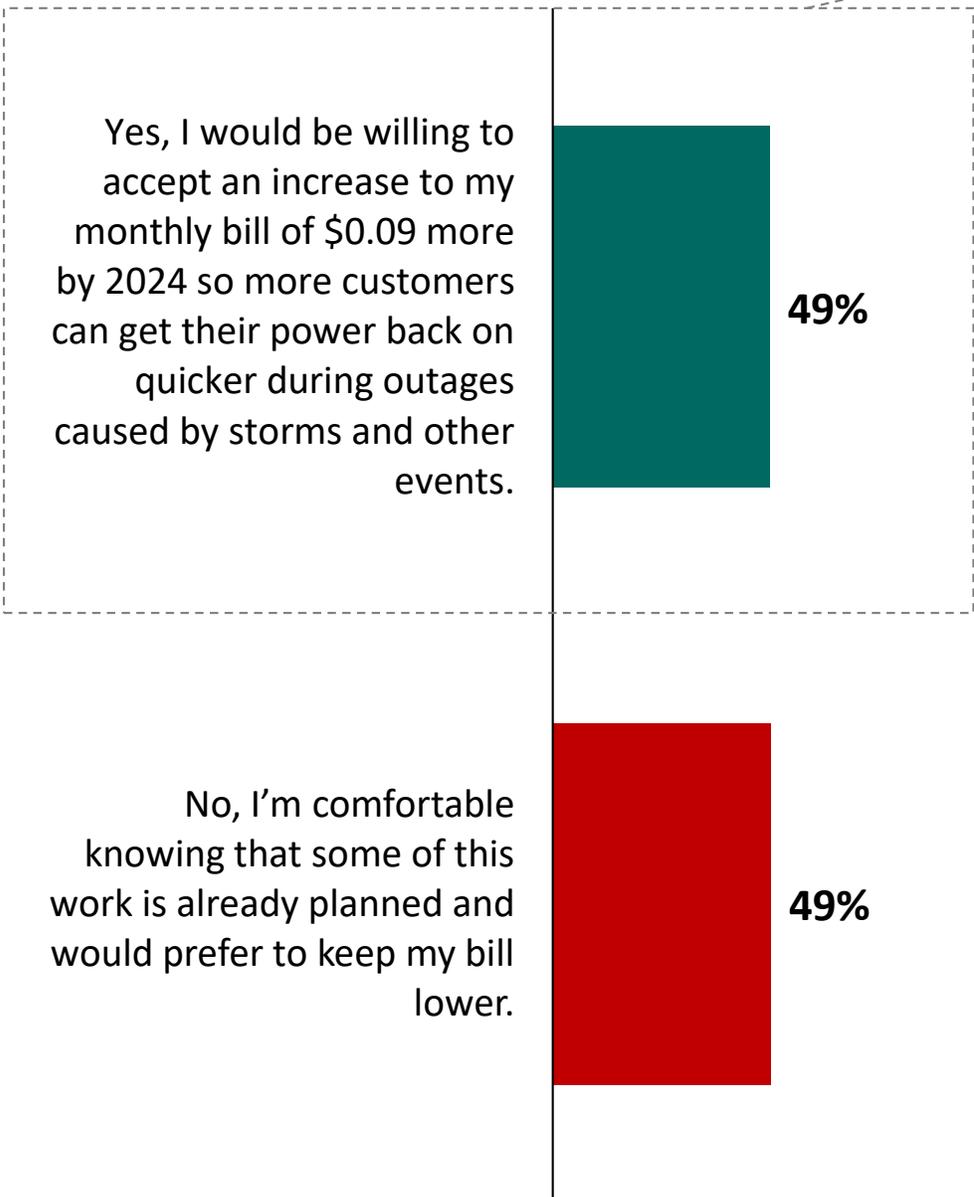


As **Toronto Hydro's** distribution system is exposed to strong winds, freezing rain, and severe flooding, they are proposing a variety of enhancements to improve the resiliency of the distribution system against extreme weather events.

Toronto Hydro could enhance the system further in neighbourhoods outside of downtown. The improvements include adding remotely-operated technology and more back-up links within the grid. This will help **Toronto Hydro** to better isolate the problem and reduce outage times by as much as 50% in these areas.

Which of the following statements best represents your point of view?

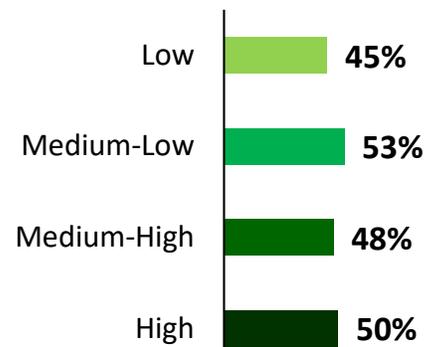
[asked all respondents, n=600]



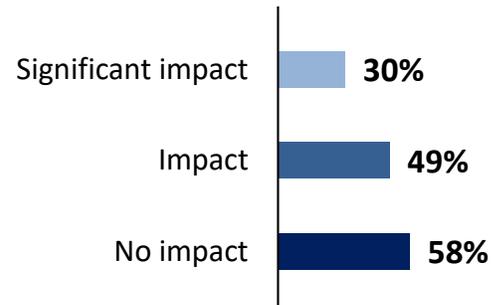
Segmentation

Those who say "Restore power more quickly during outages":

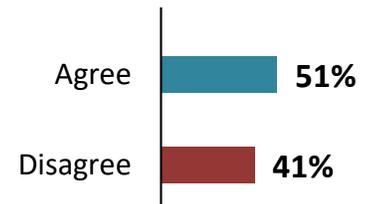
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (2%) not shown.

Innovation and Planning for the Future

Investments in Energy Storage



3% of the proposed budget would be spent on innovation and planning for the future. The following questions are about this aspect of the budget.

Toronto Hydro has already begun to integrate large-scale battery electricity storage into the system. They have now identified more opportunities to partner on a wider range of energy storage projects. Integrating storage into the system can improve reliability and help reduce greenhouse gases, but it is not required to maintain current levels of reliability.

Which of the following is closest to your point of view?

[asked all respondents, n=600]

I would be willing to pay up to \$0.53 more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.

37%

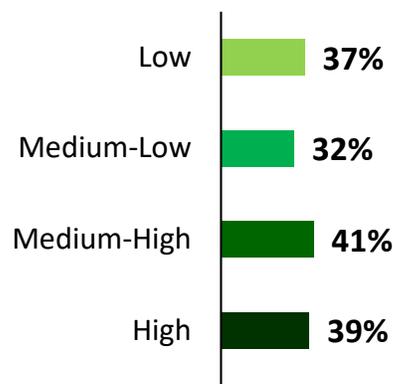
I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.

60%

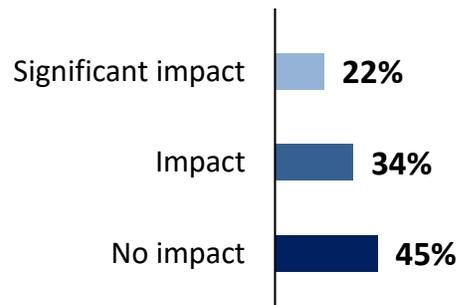
Segmentation

Those who say "Pay more to partner on energy storage projects":

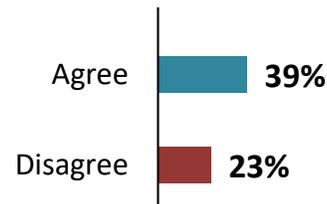
Annual Consumption



Bill Impact on Finances



Well Served by System



Monitoring and Control Equipment

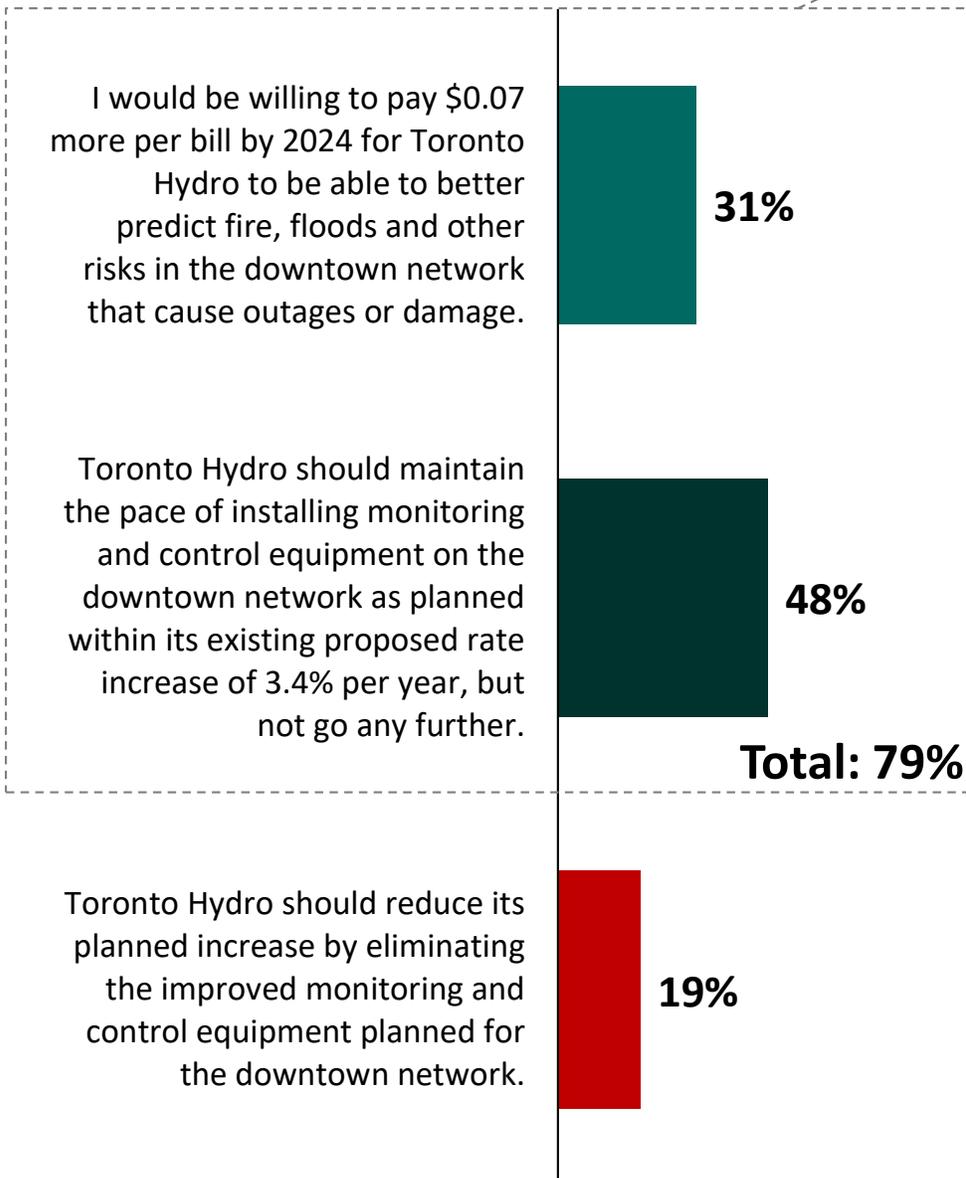
Q New communication technology has revolutionised the way the grid can be managed.

Toronto Hydro plans to take advantage of various new technologies wherever clear benefits can be established.

However, **Toronto Hydro** can improve the reliability of its grid further by installing communication devices in the downtown underground network that detect fire, floods or other risks more quickly.

Which of the following is closest to your point of view?

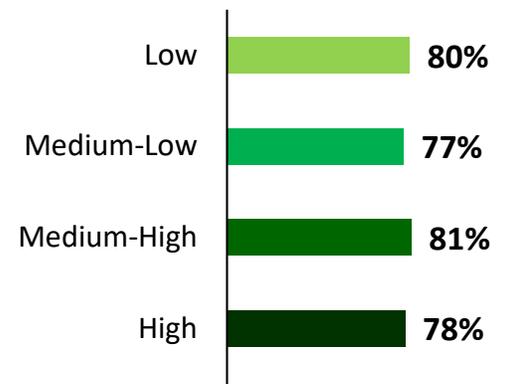
[asked all respondents, n=600]



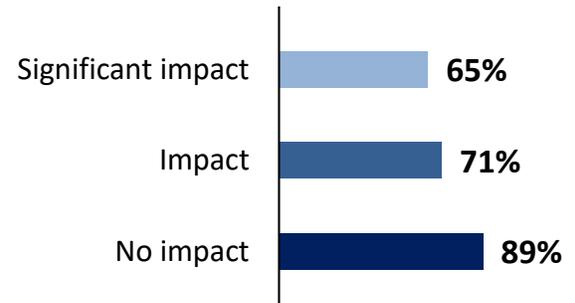
Segmentation

Those who say "Stick with proposed approach or spend more":

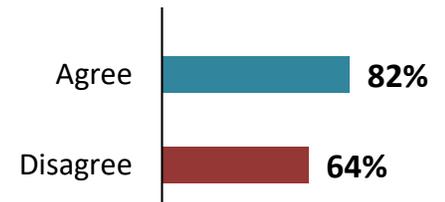
Annual Consumption



Bill Impact on Finances



Well Served by System



Supporting Microgrids

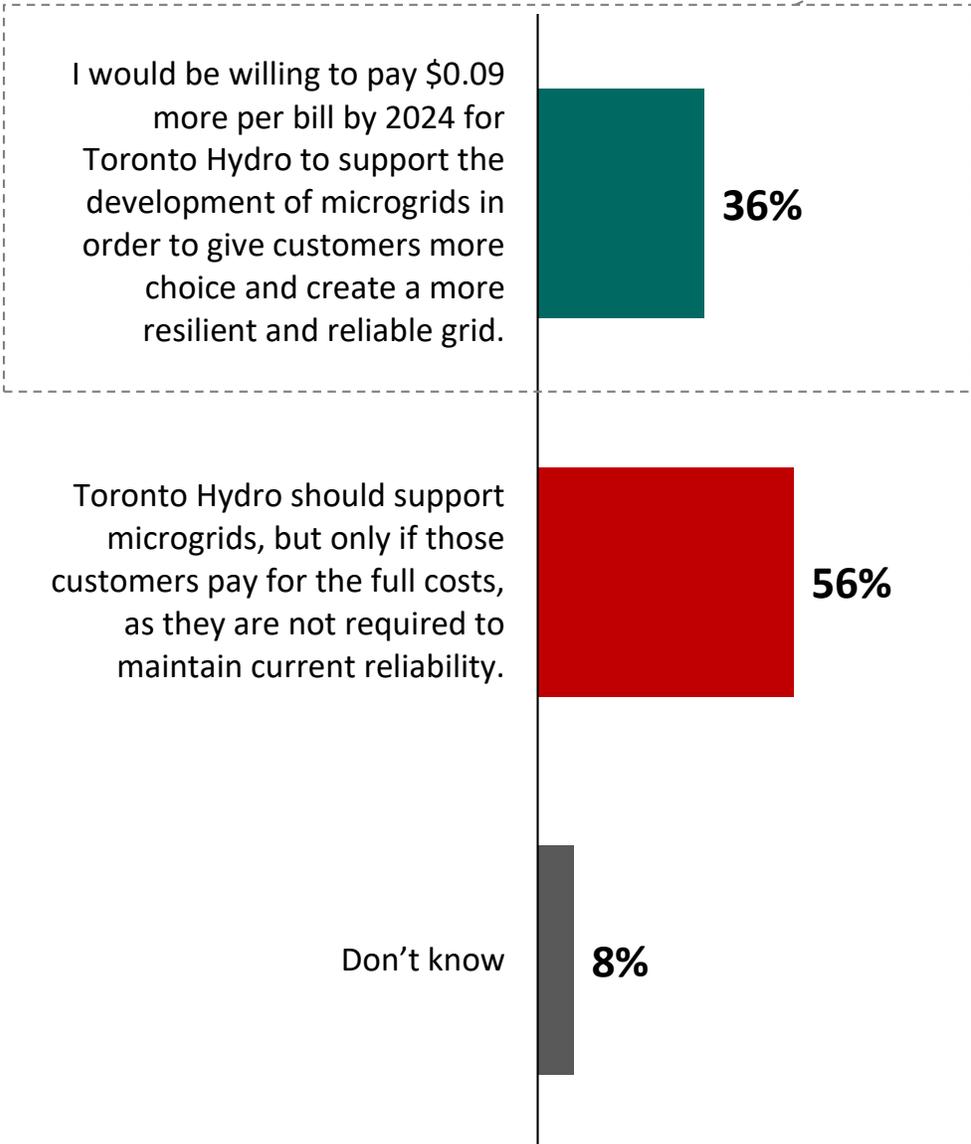


New types of generation (often renewable), storage, and supporting systems are making it possible for communities, institutions or other large customers to develop “microgrids”. They are a local electricity network linking smaller sources of electricity with nearby uses such as homes, businesses and institutions. In the event of a failure of the larger network, a microgrid can seal itself off and continue to provide power locally.

Microgrids would give customers more choices, while creating a more resilient and reliable grid. However, they are not required to maintain current reliability.

Which of the following is closest to your point of view?

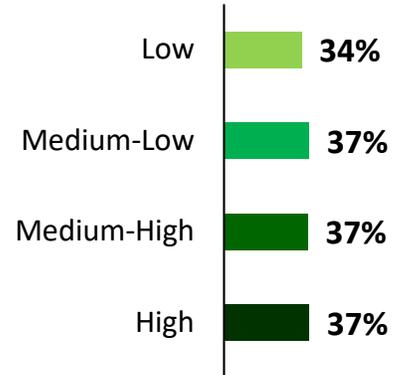
[asked all respondents, n=600]



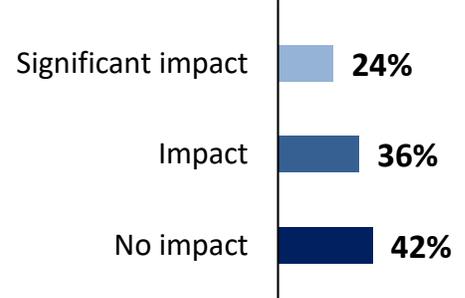
Segmentation

Those who say “Pay more to support microgrids”:

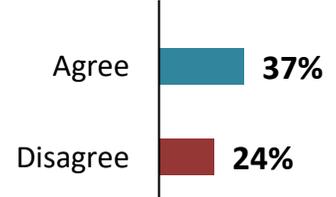
Annual Consumption



Bill Impact on Finances



Well Served by System



Investment Alternatives Summary

Preamble



Toronto Hydro's current proposed plan, which translates into an average 3.4% annual increase, focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

In dollars and cents, that means an average increase to the monthly bill of **\$1.51 each year** for the typical residential customer.

Over the course of the proposed 5-year plan, the typical residential customer will see the distribution portion of their electricity bill **increase by \$7.57**.

As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$42 in 2019** to **\$49 by 2024**.

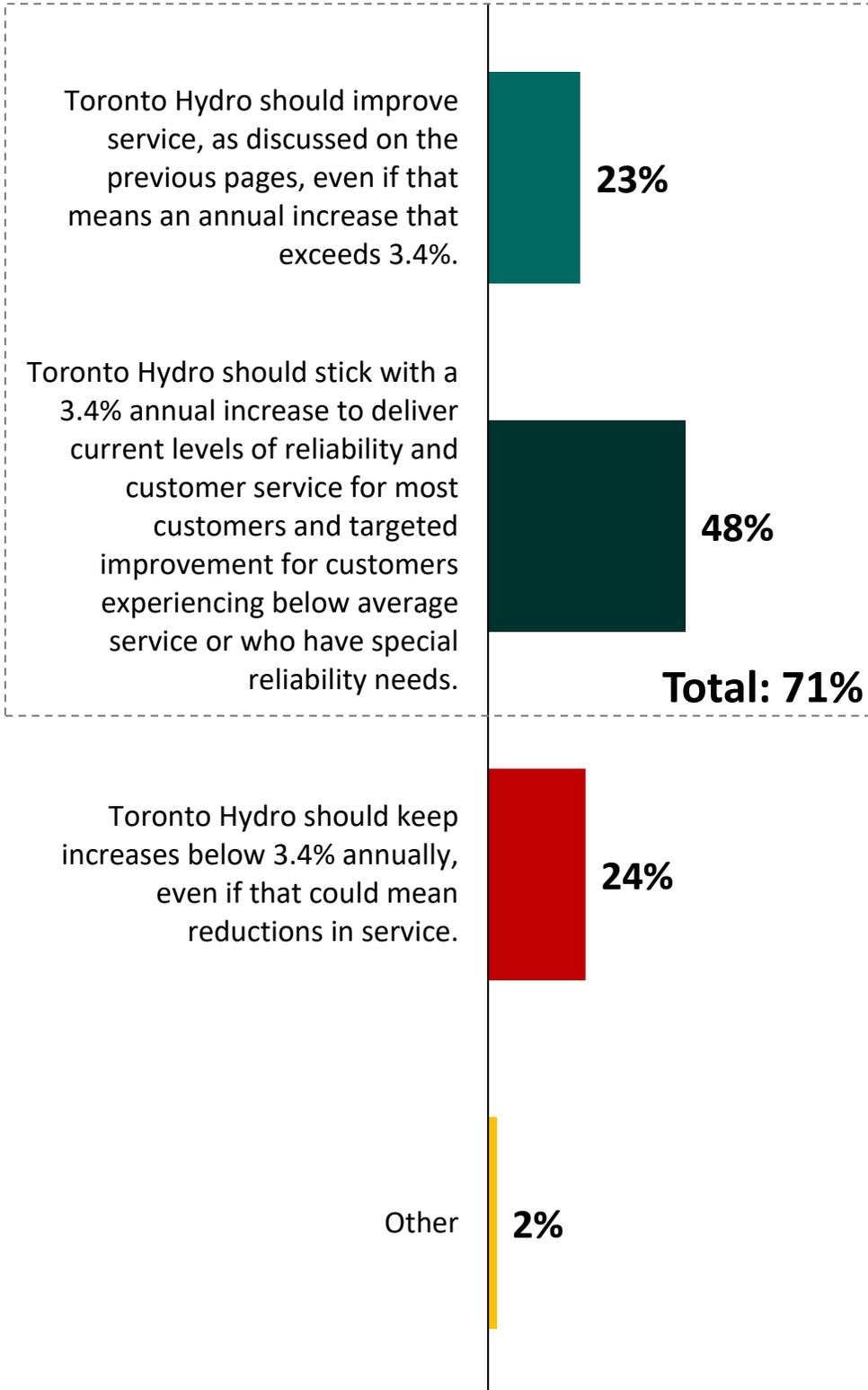


Opinion of Toronto Hydro's Proposed Plan



With regards to **Toronto Hydro's** proposed plan, which of the following statements best represents your view?

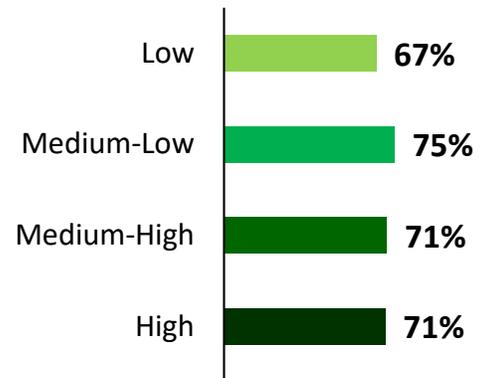
[asked all respondents, n=600]



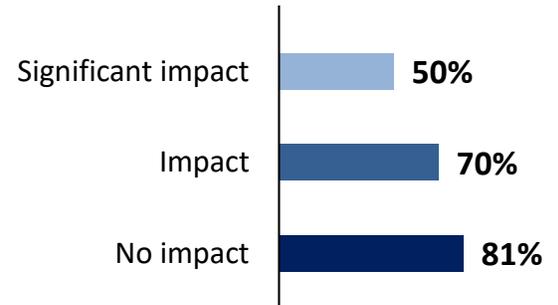
Segmentation

Those who say "Stick with current pace of investment or increase to improve services":

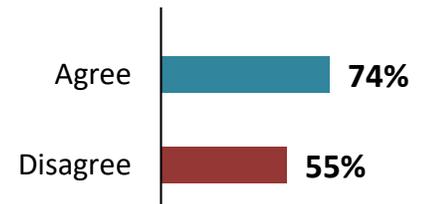
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (3%) not shown.

Opinion of Toronto Hydro's Proposed Plan by Demographics

Q With regards to **Toronto Hydro's** proposed plan, which of the following statements best represents your view?
[asked all respondents, n=600]

Bill Impact on Finances

Opinion of Toronto Hydro's Proposed Plan	The cost of my electricity bill has a major impact on my finances and requires I do without some other important priorities.			Total
	Sig. Impact [n=139]	Impact [n=143]	No Impact [n=303]	
Improve services, increase above 3.4%	10%	14%	31%	23%
Stick with current plan at 3.4%	40%	56%	50%	48%
Keep increases below 3.4%	42%	24%	15%	24%

Low-income Energy Assistance Program (LEAP) Qualification

Opinion of Toronto Hydro's Proposed Plan	LEAP Qualification			Total
	LEAP Qualified [n=64]	Not Qualified (<\$52k) [n=392]	Not Qualified (>\$52k) [n=359]	
Improve services, increase above 3.4%	16%	19%	27%	23%
Stick with current plan at 3.4%	56%	46%	47%	48%
Keep increases below 3.4%	23%	30%	22%	24%

Note: "Other", "Don't Know", "Refused" not shown.

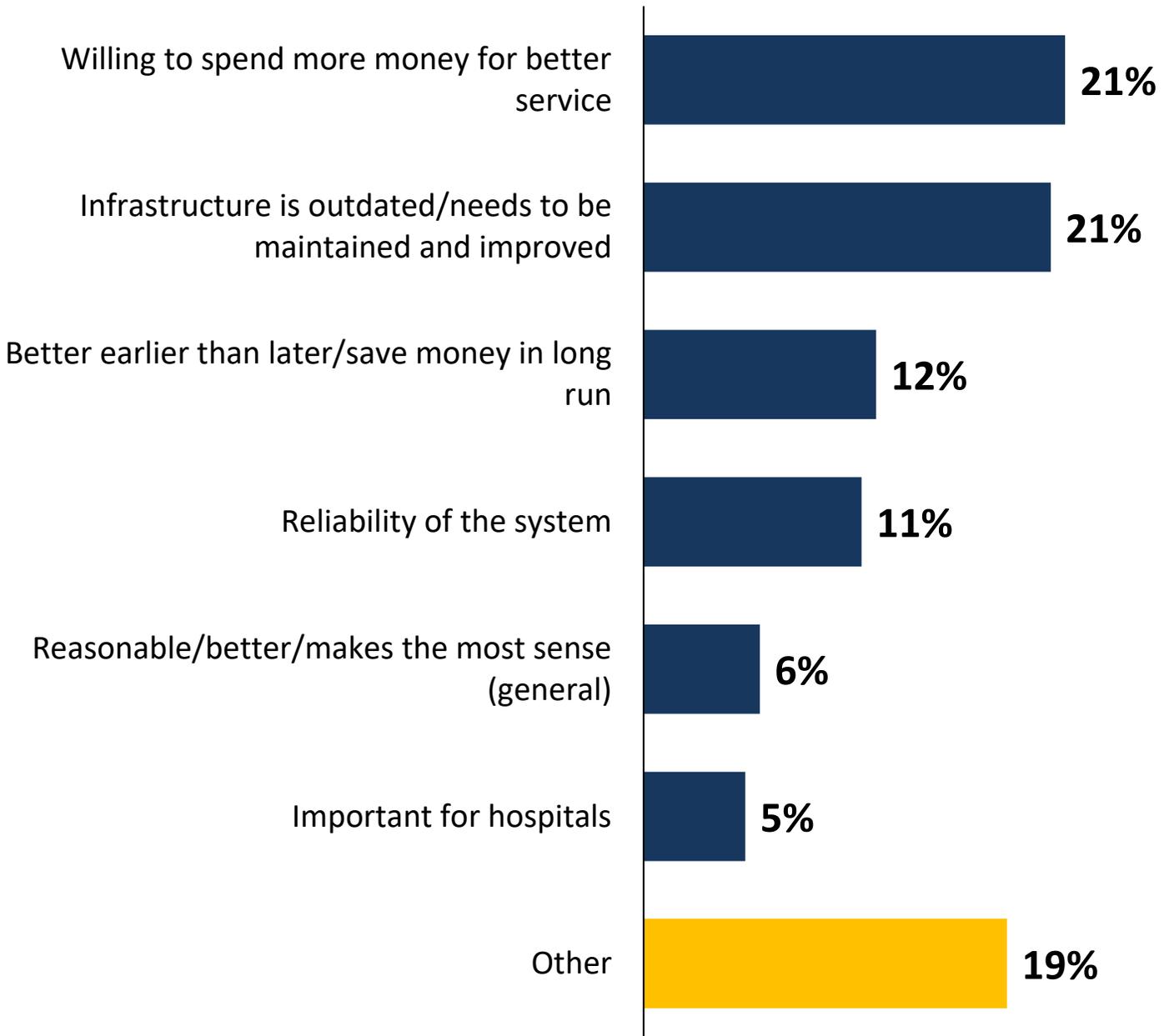
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should improve service, n=135]

For those who answered: Toronto Hydro should improve service, as discussed on the previous pages, even if that means an annual increase that exceeds 3.4%. (n=135)



Note: "None" (1%), "Don't know" (4%), "Refused" (1%) not shown.

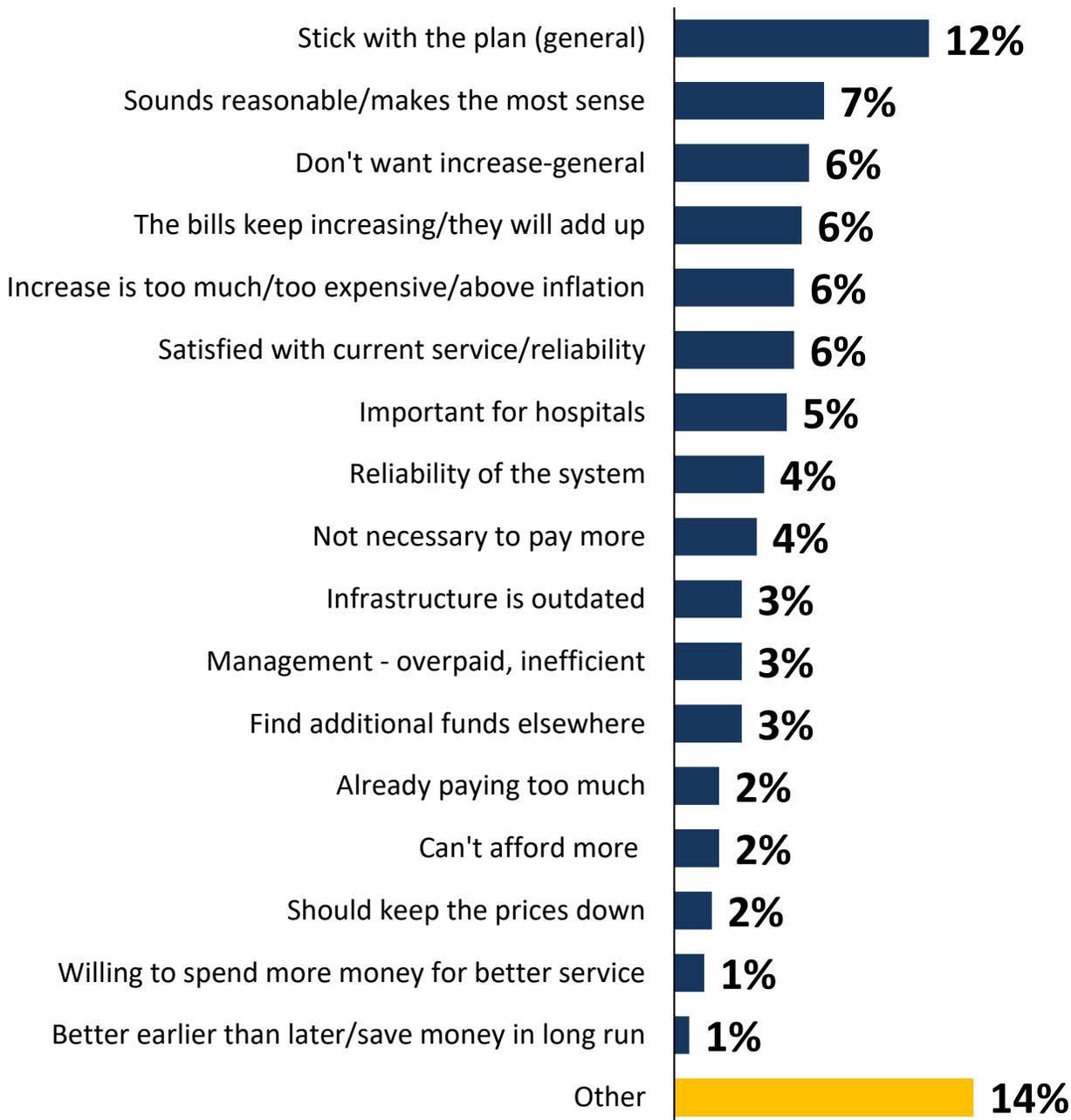
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should stick with proposed plan, n=290]

For those who answered: Toronto Hydro should stick with a 3.4% annual increase to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs. (n=290)



Note: "None" (6%), "Don't know" (6%), "Refused" (2%) not shown.

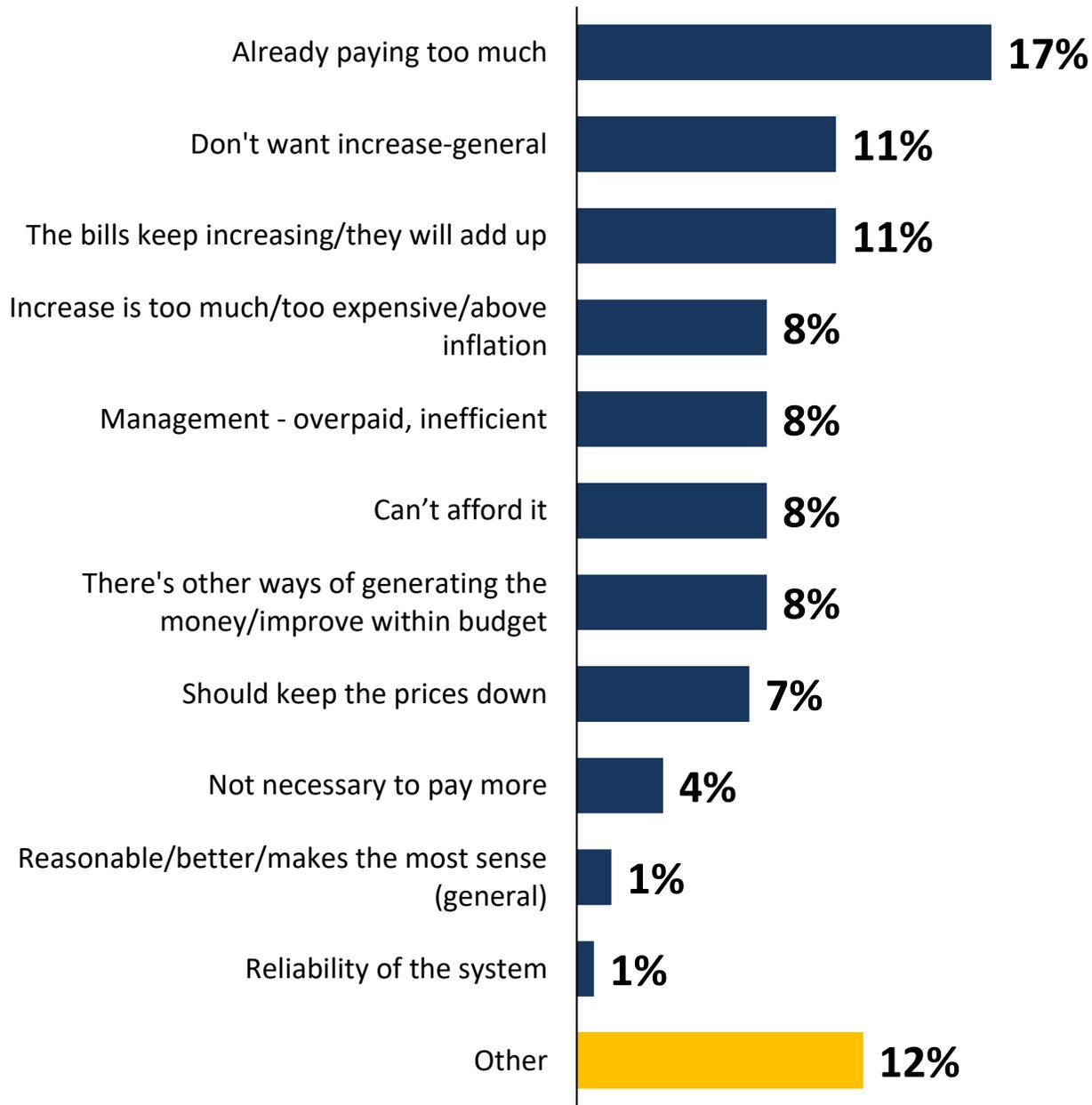
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should keep increases below 3.4%, n=143]

For those who answered: Toronto Hydro should keep increases below 3.4% annually, even if that could mean reductions in service. (n=143)



Note: "None" (2%), "Don't know" (1%), "Refused" (1%) not shown.



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For more information, please contact:

Jason Lockhart

Vice President

(t) 416-642-7177

(e) jlockhart@innovativeresearch.ca

Julian Garas

Senior Consultant

(t) 416-640-4133

(e) jgaras@innovativeresearch.ca

Toronto Hydro 2018 Customer Engagement
**Small Business Telephone
Survey Report**



Survey Methodologies

Field and Design

These are the findings of an Innovative Research Group (INNOVATIVE) telephone survey conducted among **n=215** Toronto Hydro **small business customers** between **May 2 and 14, 2018**.

Quotas were set by electricity consumption levels and geographic considerations from within the Toronto Hydro service territory in order to obtain a representative customer sample.

Small business customers were divided into quartiles based on annual electricity usage to ensure the sample had a proportionate mix of customers from low, medium-low, medium-high, and high electricity usage groups.

The sample has been weighted to n=200 by the quartiles and region to reflect the actual composition of small business customers within the service area.

The margin of error for a sample of n=200 is approximately +/-6.9%. 19 times out of 20.

For the purposes of executing the customer surveys, Toronto Hydro provided INNOVATIVE with a confidential list of customers' contact information. The contact list included only customers with telephone contact information on file and who had been a customer of Toronto Hydro for at least one year. The information contained in the contact list included customer name, telephone number(s), postal code and total annual electricity consumption.

Only one customer per organization was eligible to complete the survey. Respondents were screened to certify that only the personnel responsible for managing or overseeing their electricity bill were interviewed. This step was taken to ensure that survey respondents represented the most qualified person within an organization to answer questions.

Customers were offered a \$20 Amazon Gift Card in appreciation for completing the survey.

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.*

Consumption Quartiles

The tables below illustrate the strata divisions for each rate class, based on consumption quartiles.

Dividing customer sample into quartiles based on known characteristics, including region and annual consumption, was used to develop accurate quotas to ensure the sample was representative of Toronto Hydro's customer base. The tables below show the unweighted and weighted distributions.

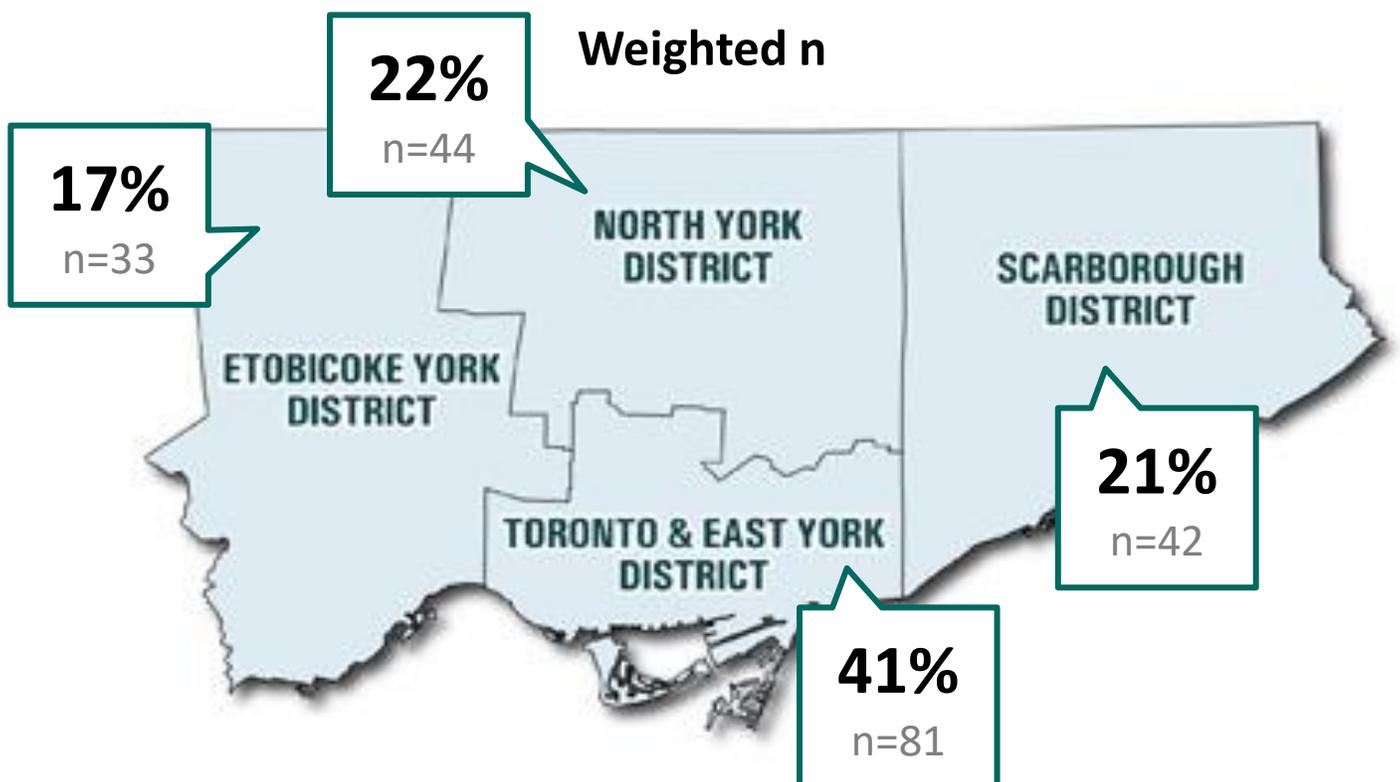
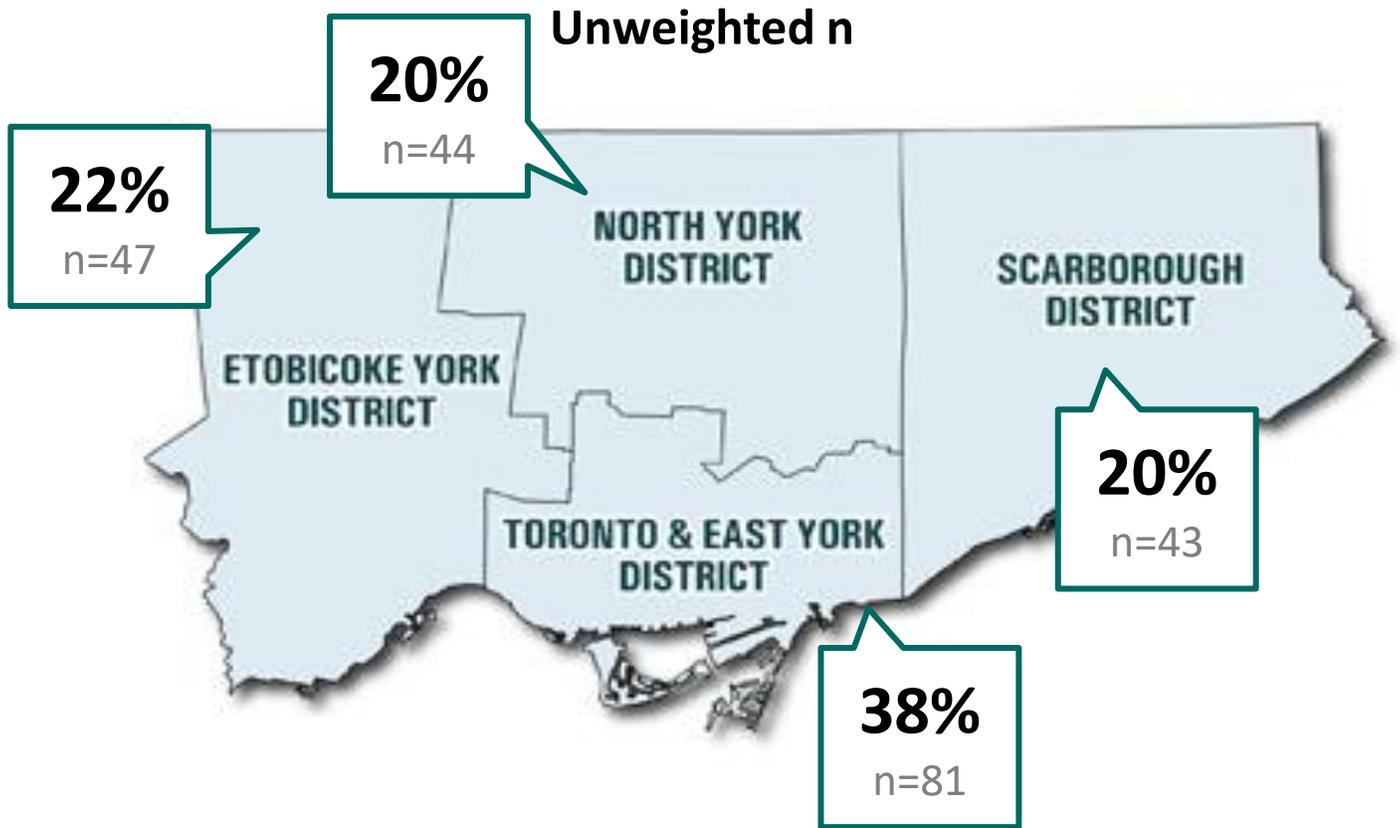
	Consumption Quartiles (Unweighted n)				Total
	Low	Medium-Low	Medium-High	High	
Toronto & East York	15	22	18	26	81
Etobicoke & York	13	13	11	10	47
North York	12	4	14	14	44
Scarborough	12	11	9	11	43
Total	52	50	52	61	215

	Consumption Quartiles (Weighted n)				Total
	Low	Medium-Low	Medium-High	High	
Toronto & East York	20	20	20	20	81
Etobicoke & York	8	8	8	8	33
North York	11	11	11	11	44
Scarborough	10	10	10	10	42
Total	50	50	50	50	200

Regions

The chart below illustrate the overall regional distribution.

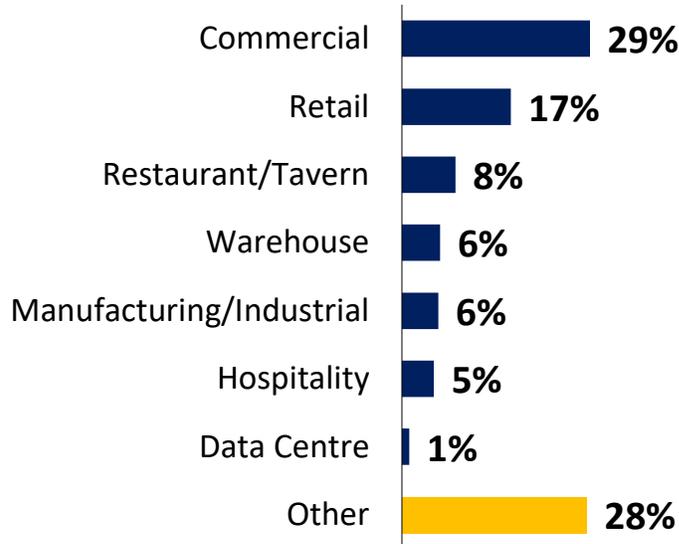
The charts below show the unweighted and weighted distributions.



Segmentation and Demographics

Segmentation & Demographics

Business Sector



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.

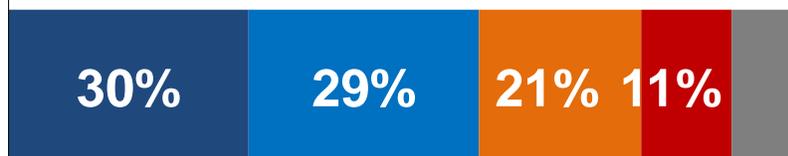
[asked all respondents, n=200]

Customers are well served by the electricity system in Ontario.



Total Agree
85%

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 delayed.



60%

- Strongly agree
- Somewhat disagree
- Don't know/No opinion

- Somewhat agree
- Strongly disagree

Familiarity Preamble



To start, I'd like to ask you a few questions about the electricity system ...

*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; and*
- ***Distribution lines** carry electricity to the homes and businesses in our communities.*

*Today we're going to talk about your **local distribution system** which is maintained and operated by Toronto Hydro.*

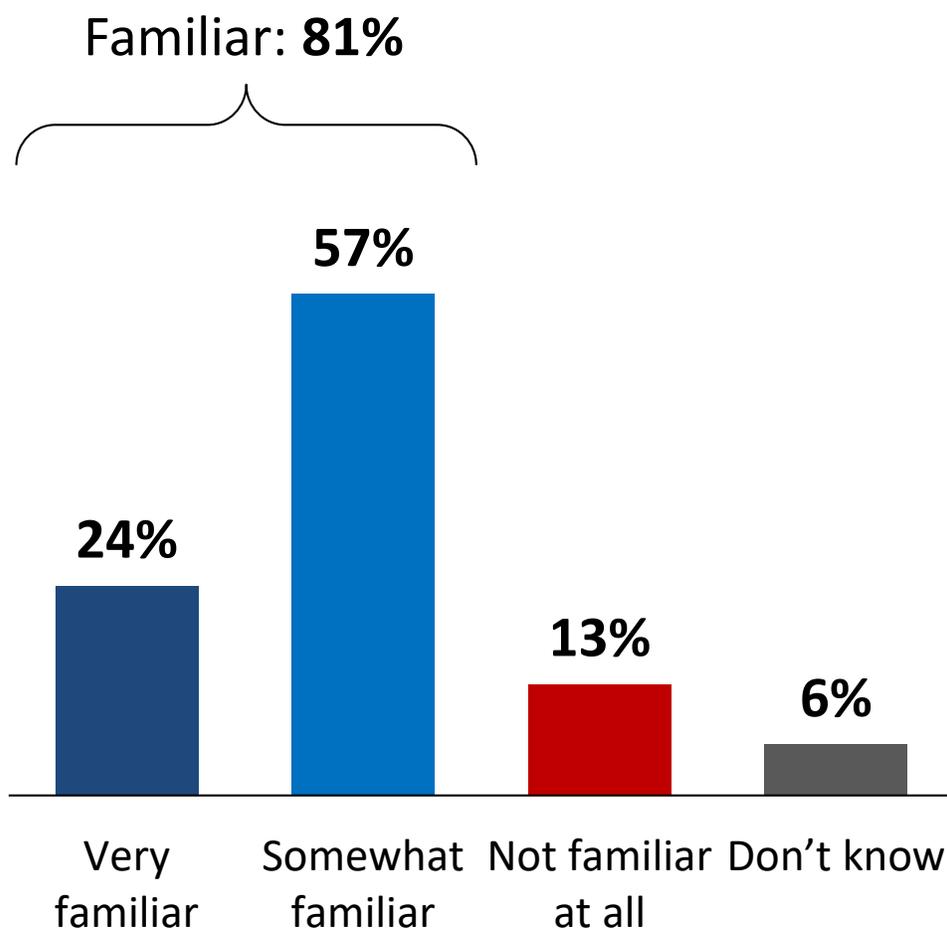


Familiarity with Toronto Hydro



How familiar are you with **Toronto Hydro**?

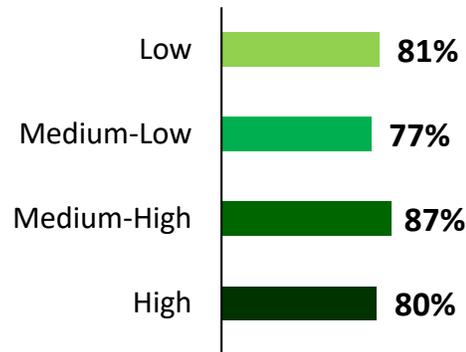
[asked all respondents, n=200]



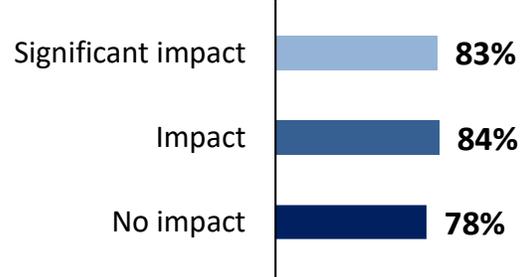
Segmentation

Those who say "Familiar":

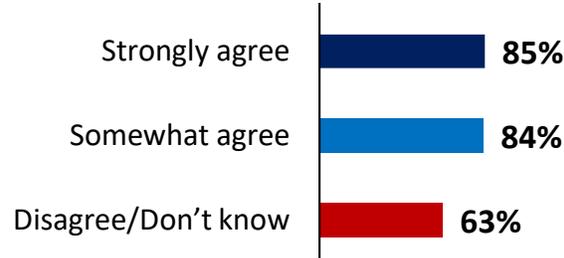
Annual Consumption



Bill Impact on Finances

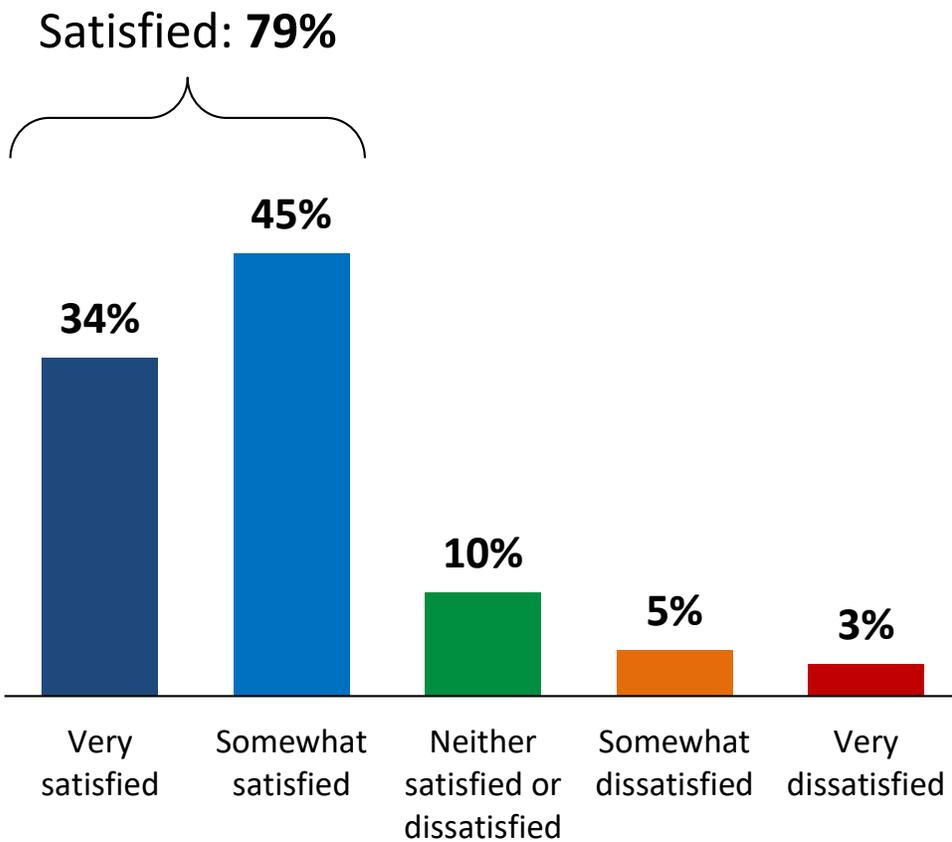


Well Served by System



Satisfaction with Services

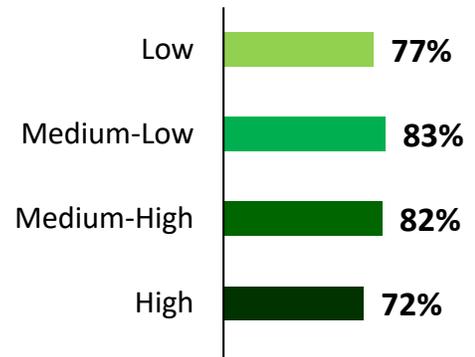
Q In general, how satisfied or dissatisfied are you with the services your organization receives from **Toronto Hydro**?
 [asked all respondents, n=200]



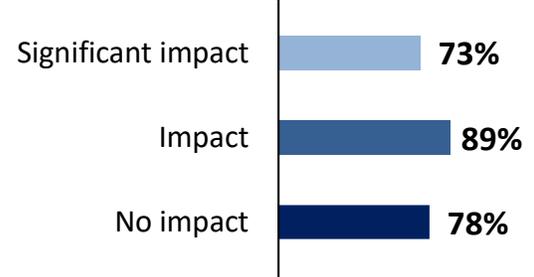
Segmentation

Those who say "Satisfied":

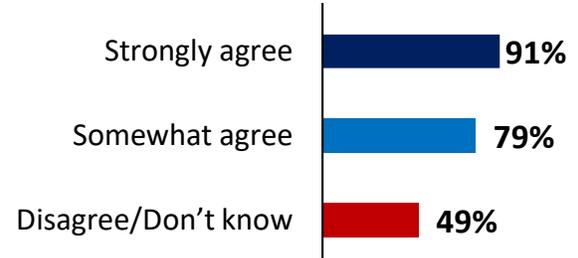
Annual Consumption



Bill Impact on Finances



Well Served by System



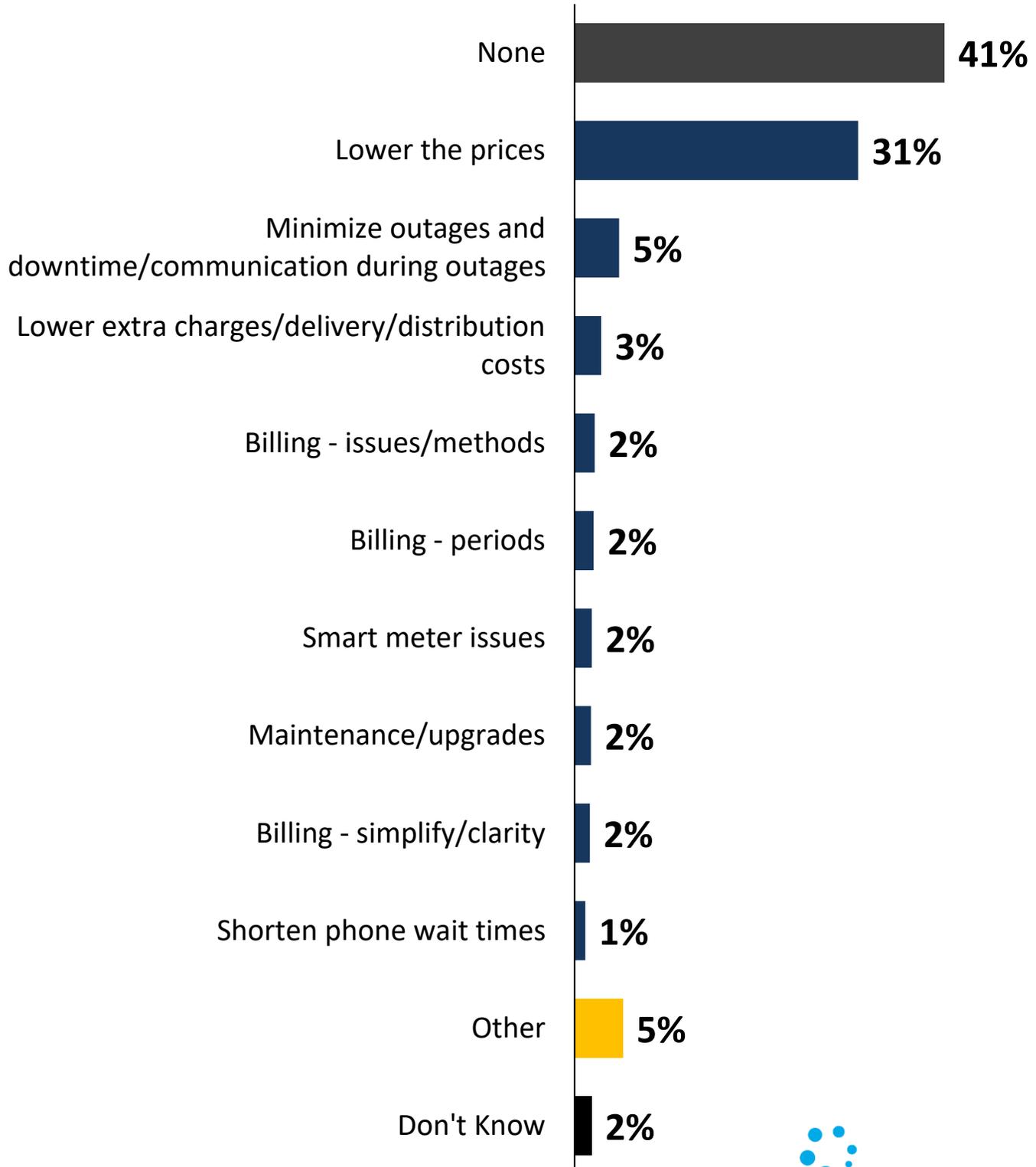
Note: "Don't know" (3%) not shown.

Suggestions for Improved Services



Is there anything in particular that **Toronto Hydro** can do to improve its services to your organization?

[asked all respondents, n=200]



Note: "Refused" (2%) not shown.

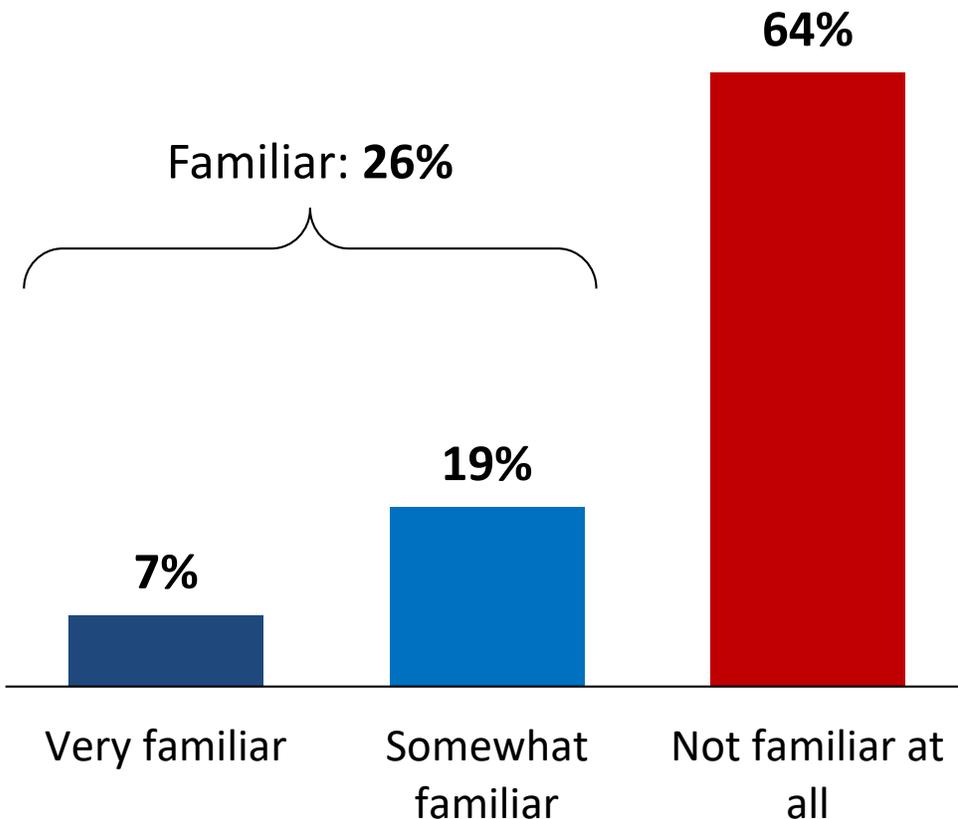
Amount of Bill Retained by Toronto Hydro



While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, they retain about **30%** of the typical small business customer's bill. This is about **\$94** on an average **\$314** monthly small business electricity 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 percentage of your organization's electricity bill that is retained by **Toronto Hydro**?

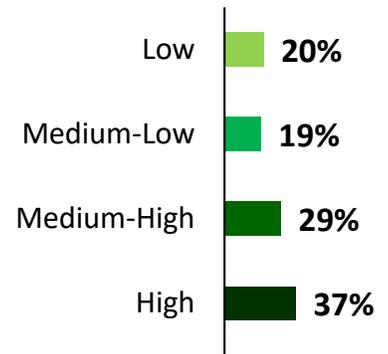
[asked all respondents, n=200]



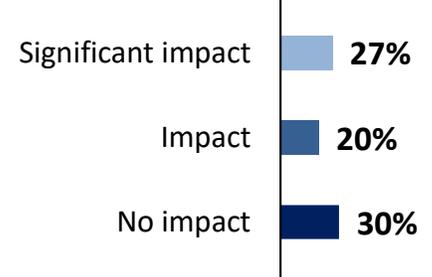
Segmentation

Those who say "Familiar":

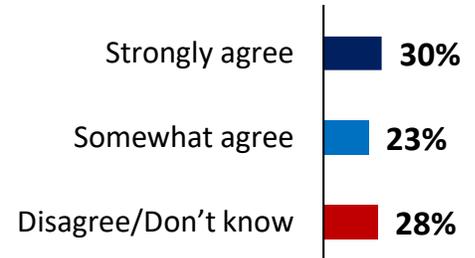
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (10%) not shown.

Familiarity with Ontario Energy Board

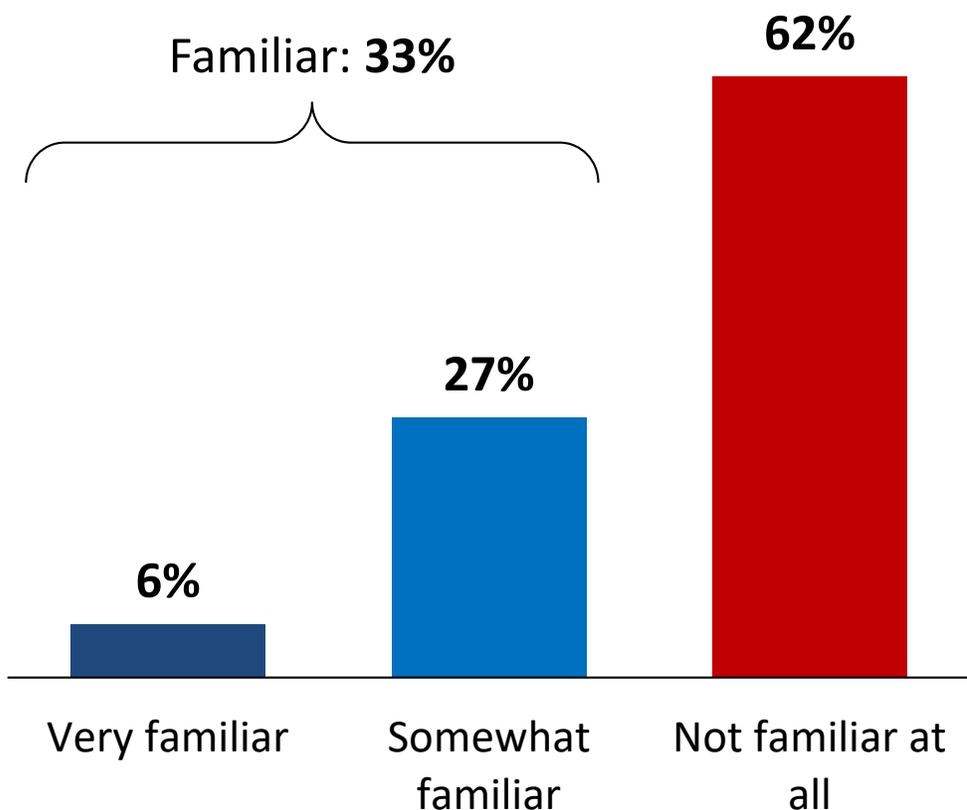


Electricity distributors are required to file a rate application with the Ontario Energy Board (OEB) to request a change in distribution rates based on their plans for capital and operating spending. Toronto Hydro is now consulting on its plans for 2020 to 2024.

The OEB is mandated to protect consumers with respect to prices and the reliability and quality of electricity service.

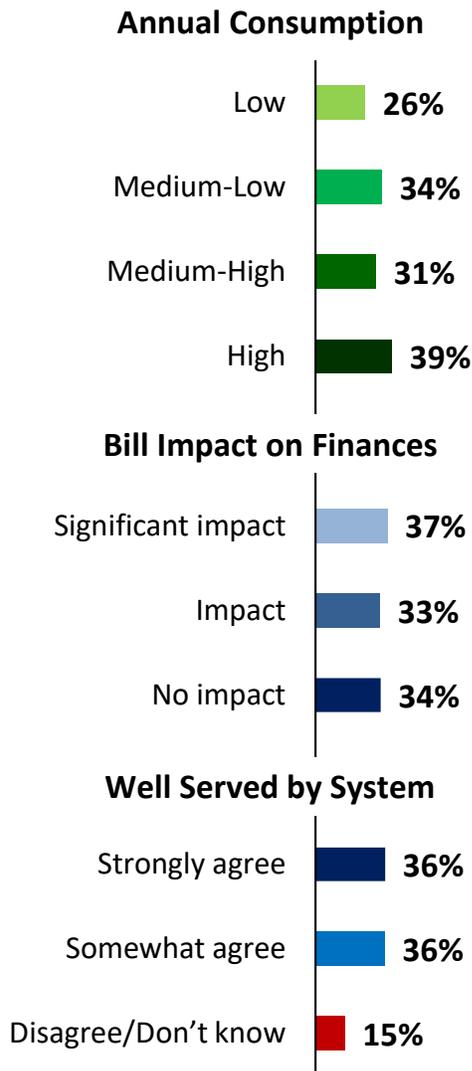
How familiar would you say you are with the Ontario Energy Board or “OEB”?

[asked all respondents, n=200]



Segmentation

Those who say “Familiar”:



Note: “Don't Know” (5%) not shown.

Customer Engagement Process

Preamble



As part of **Toronto Hydro's** consultation, it has developed a five-phase approach to gathering and responding to customer feedback.

- First, **Toronto Hydro** identified customer priorities through a series of surveys and focus groups;
- Then, used this customer feedback to guide development of its Draft Plan;
- Now, **Toronto Hydro** is in the process of collecting customer feedback on its Draft Plan;
- The next phases will include re-examining its Draft Plan based on customer feedback and preparing a submission to the OEB.

This survey is part of the third stage of **collecting customer feedback on the Draft Plan.**

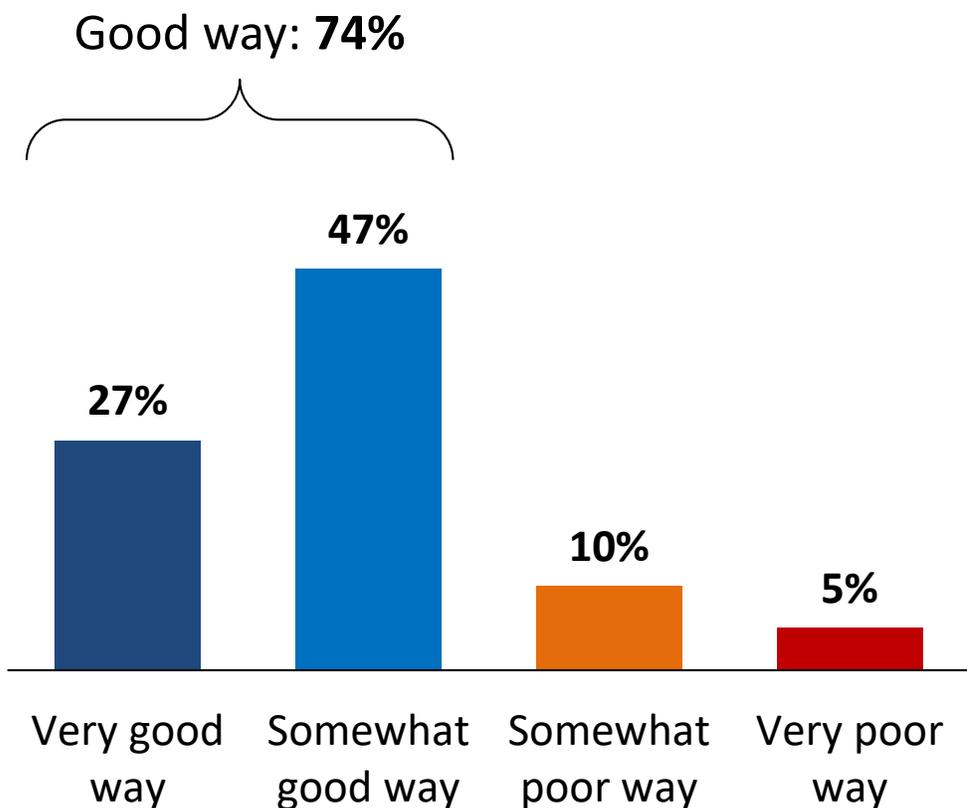


Feedback on Customer Engagement Process



Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into **Toronto Hydro's** plan?

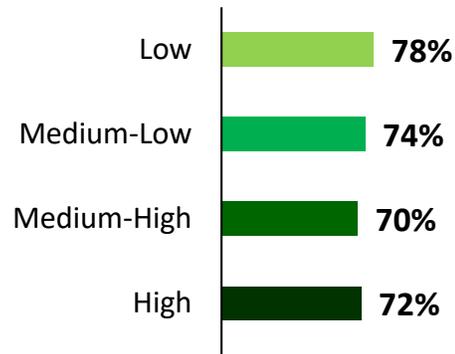
[asked all respondents, n=200]



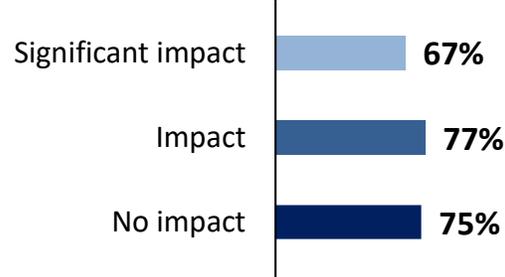
Segmentation

Those who say "Good Way":

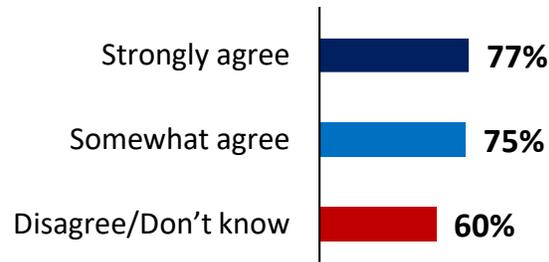
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (12%) not shown.

Customer Priorities

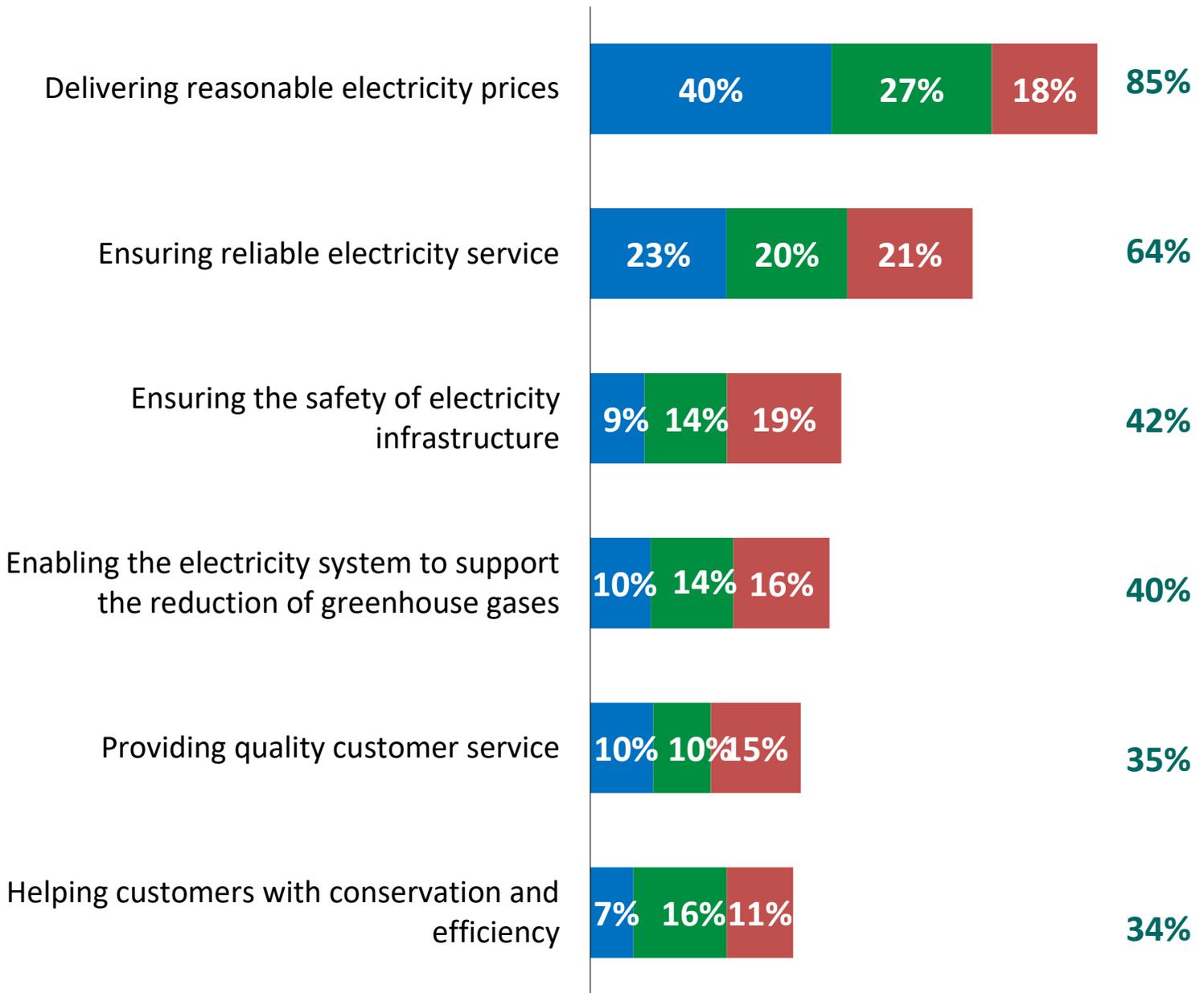


Toronto Hydro wants to better understand customer priorities. In the first phase of customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for **Toronto Hydro**.

Among the following customer identified priorities, please tell me which one is the most important to you.

[asked all respondents, n=200]

Top 3 Priority



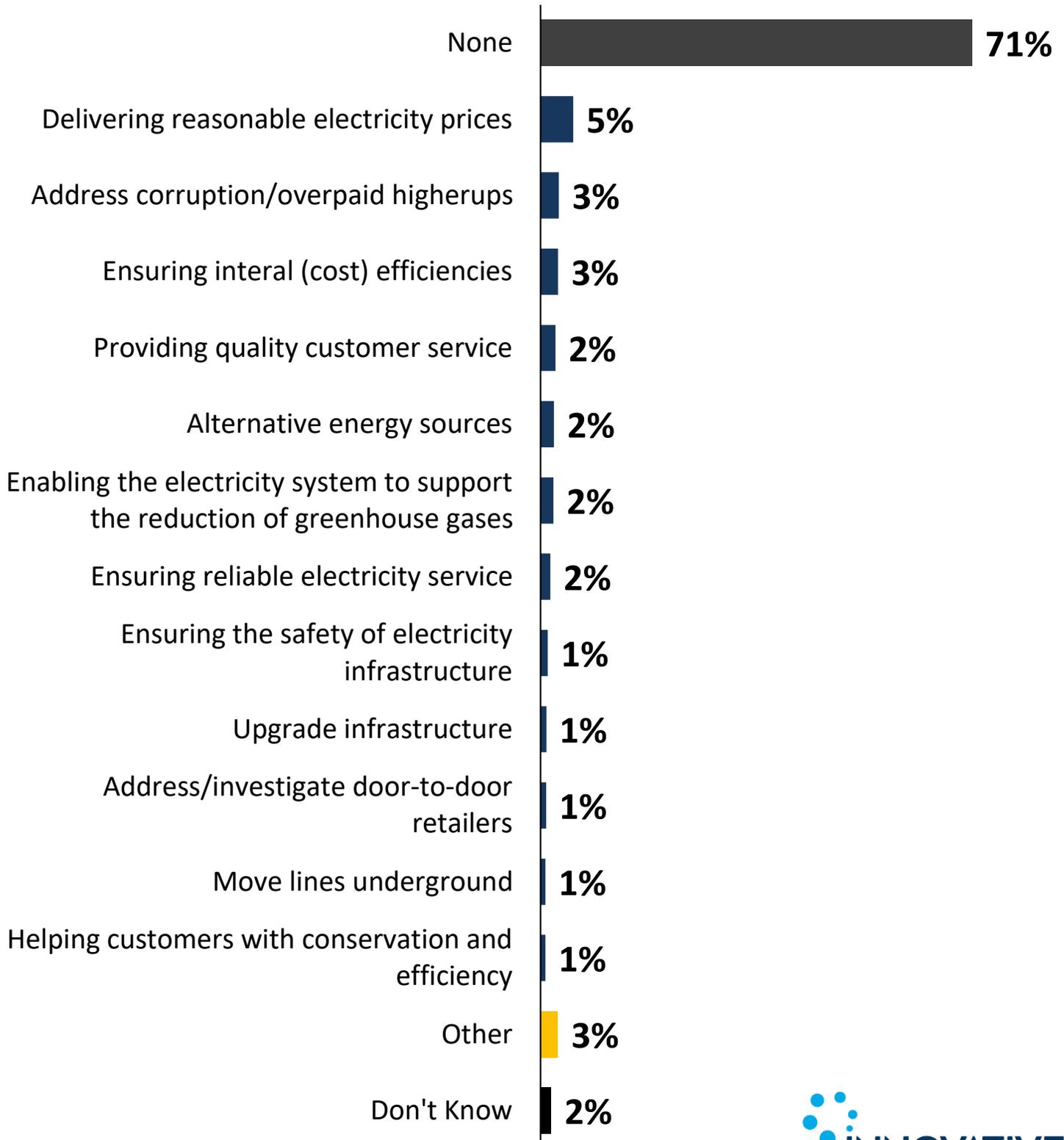
■ Most important
 ■ Second most important
 ■ Third most important

Additional Customer Priorities



Are there any other important priorities that **Toronto Hydro** should be focusing on that weren't included in the previous list I read to you?

[asked all respondents, n=200]



Note: "Refused" (1%) not shown.

Planning Principles and Rate Impact

Preamble



Based, in part, on the initial customer input, **Toronto Hydro** has drafted a plan totaling approximately \$4.3B over five years.

Toronto Hydro's proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

This proposed plan translates into an average 4.4% increase in your organization's distribution rates each year from 2020 to 2024. The distribution charges on the monthly bill would increase to \$126 by 2024 for a typical small business customer.

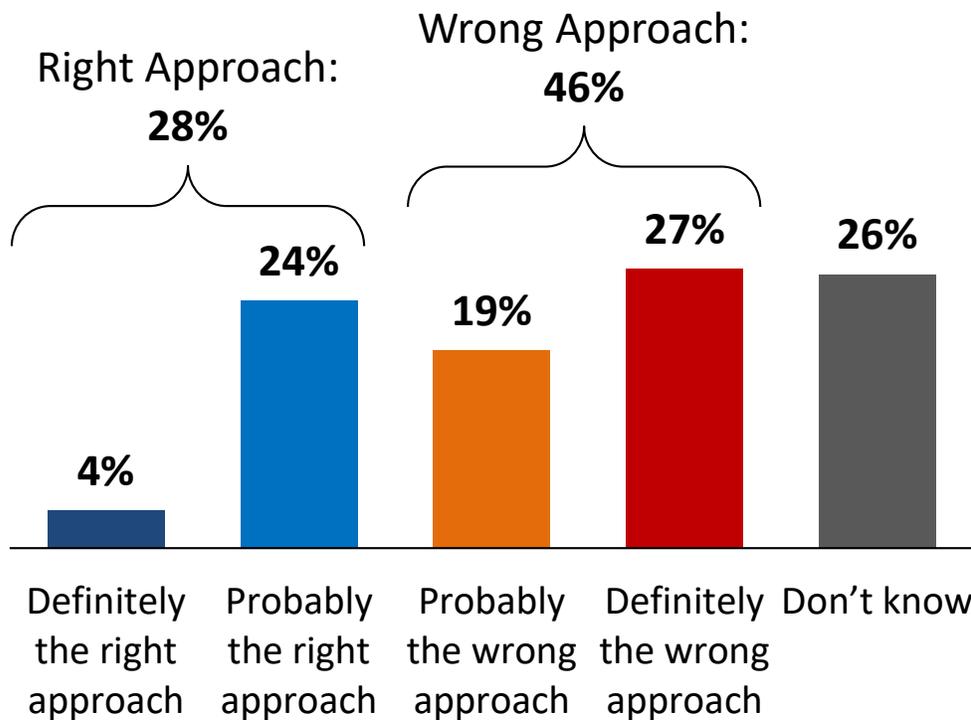


Approach to Planning for the Next Five Years



Do you feel that this is definitely the right approach, probably the right approach, probably the wrong approach or definitely the wrong approach to **Toronto Hydro's** planning for the next five years or would you say you don't know?

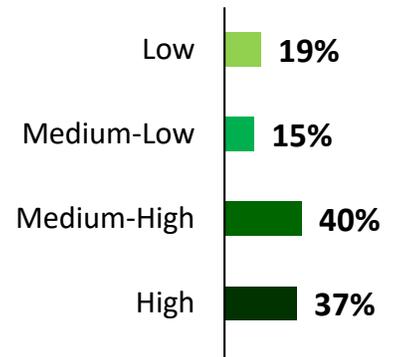
[asked all respondents, n=200]



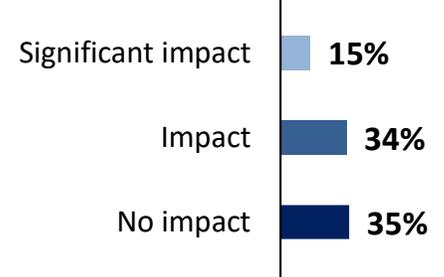
Segmentation

Those who say "Right Approach":

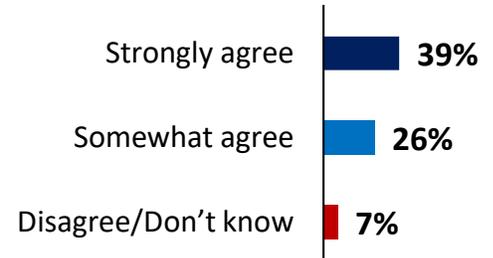
Annual Consumption



Bill Impact on Finances



Well Served by System



Gathering Feedback on Capital Investment Decisions



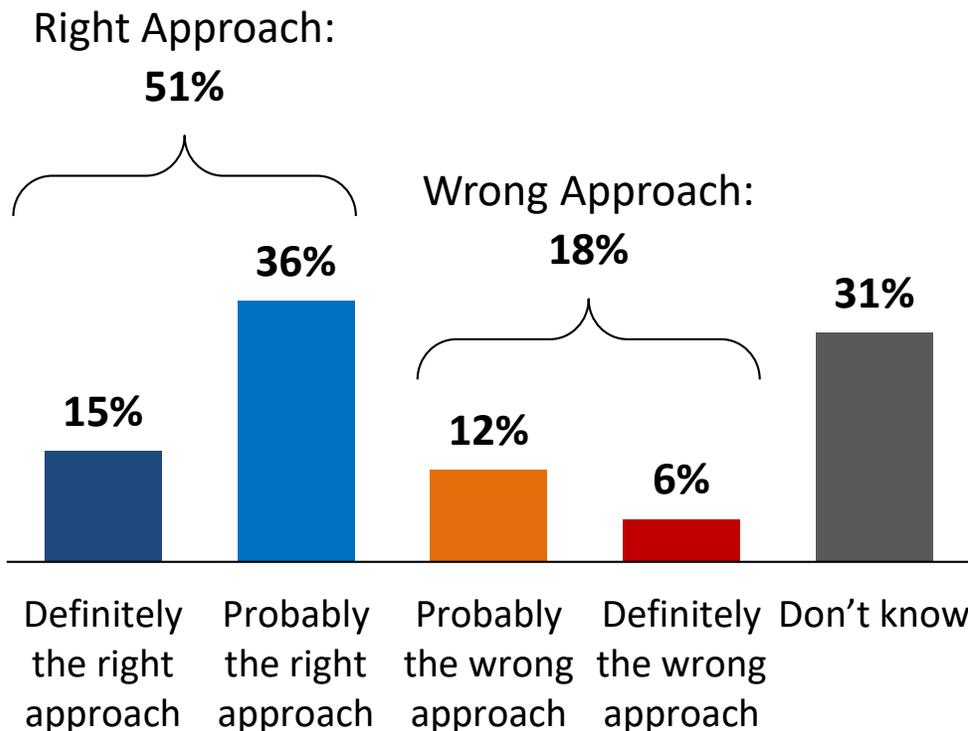
Toronto Hydro's total spending is benchmarked by the OEB against other utilities in Ontario. Toronto Hydro's operating costs of \$305 per customer are within \$1 of the provincial average.

However **Toronto Hydro's** capital investment costs are \$739 per customer which are \$245 more than the provincial average.

Since a number of capital investment decisions are based trade-offs between costs and customer outcomes – like services and reliability levels – the remaining questions in this survey ask for your feedback on those choices.

Do you feel that gathering feedback on capital investment decisions is *definitely the right approach, probably the right approach, probably the wrong approach, definitely the wrong approach or would you say you don't know?*

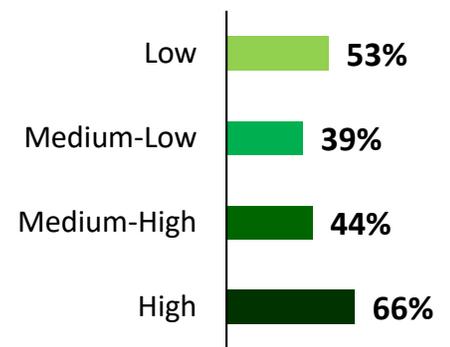
[asked all respondents, n=200]



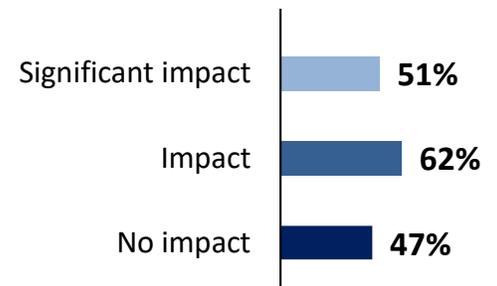
Segmentation

Those who say "Right Approach":

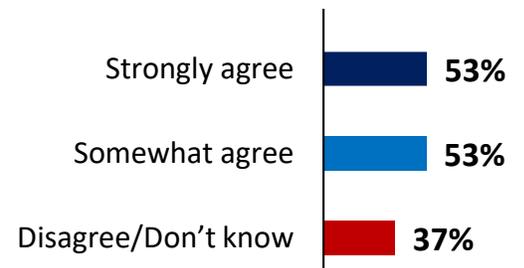
Annual Consumption



Bill Impact on Finances



Well Served by System



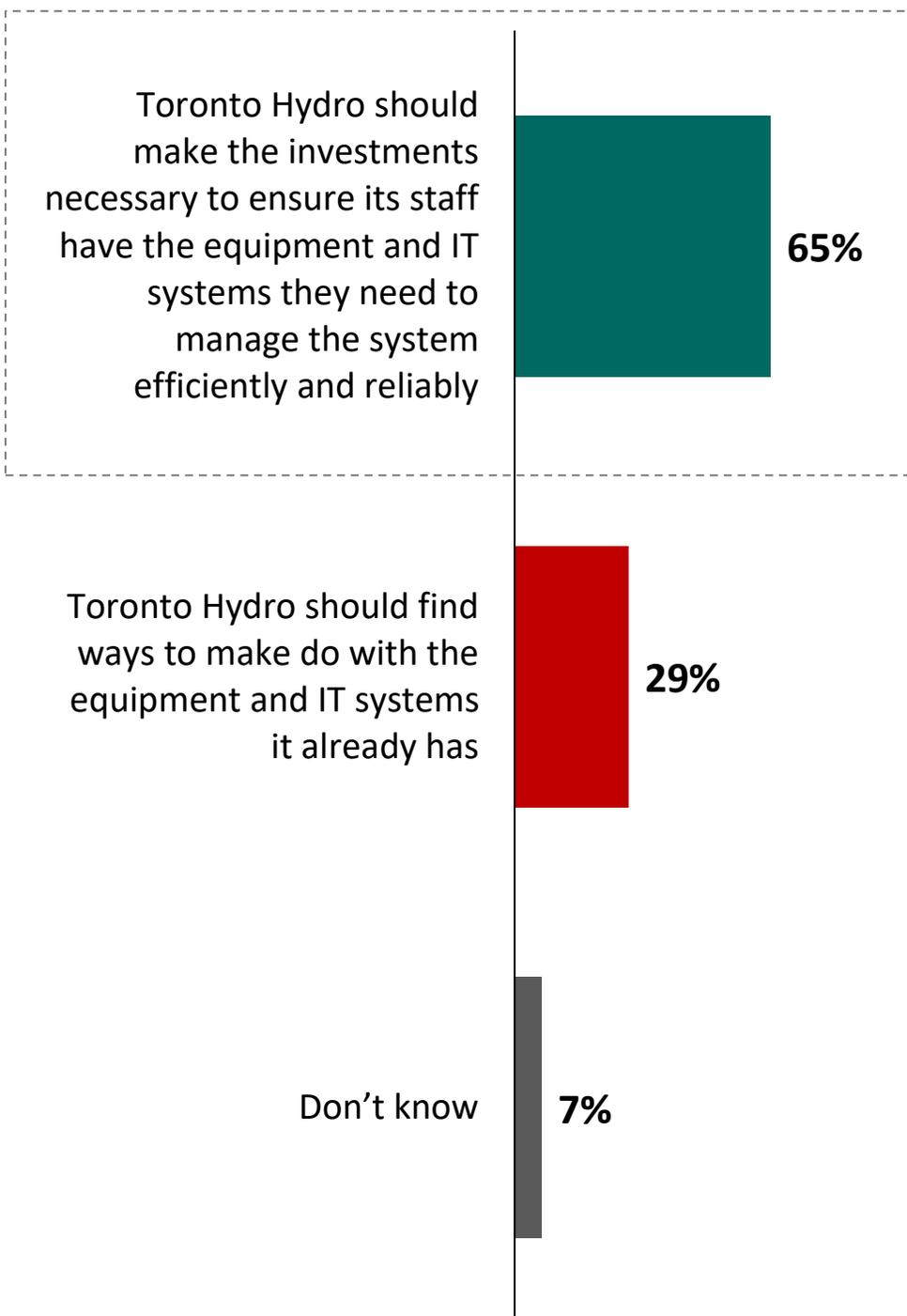
Investing in the Basics



As a company, **Toronto Hydro** needs vehicles and tools to service the power lines and IT systems to manage the system and customer information.

Which of the following statements best represents your point of view?

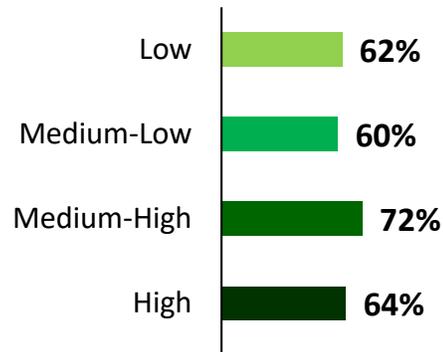
[asked all respondents, n=200]



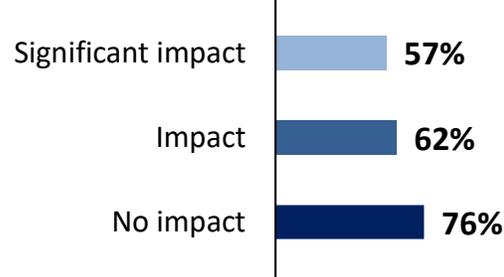
Segmentation

Those who say "Make necessary investments":

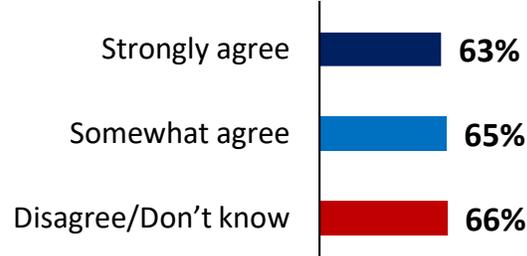
Annual Consumption



Bill Impact on Finances



Well Served by System



Addressing Safety and Reliability

Addressing Safety and Reliability

Preamble



Toronto Hydro has identified areas where it could accelerate investments. These accelerated projects could increase the **typical customer's bill by \$5.73 per month by 2024**. These projects are in addition to the 4.4% increase that is currently being proposed.

Toronto Hydro wants to get your feedback on particular projects before deciding whether or not to accelerate its investment plan in certain specific areas.

Right now, the typical **Toronto Hydro** customer averages 1.4 outages per year with an average of between 60 and 70 minutes without power over the year. While many of those outages are caused by events outside of **Toronto Hydro's** control, roughly 36% are caused by the failure of aging equipment.

In this proposed plan, **Toronto Hydro's** general approach is to spend just enough on replacing equipment so that most customers can expect a similar level of reliability over the next five years as they are experiencing today, and to provide improved service for those customers whose reliability is poorer or who have special reliability needs such as hospitals.

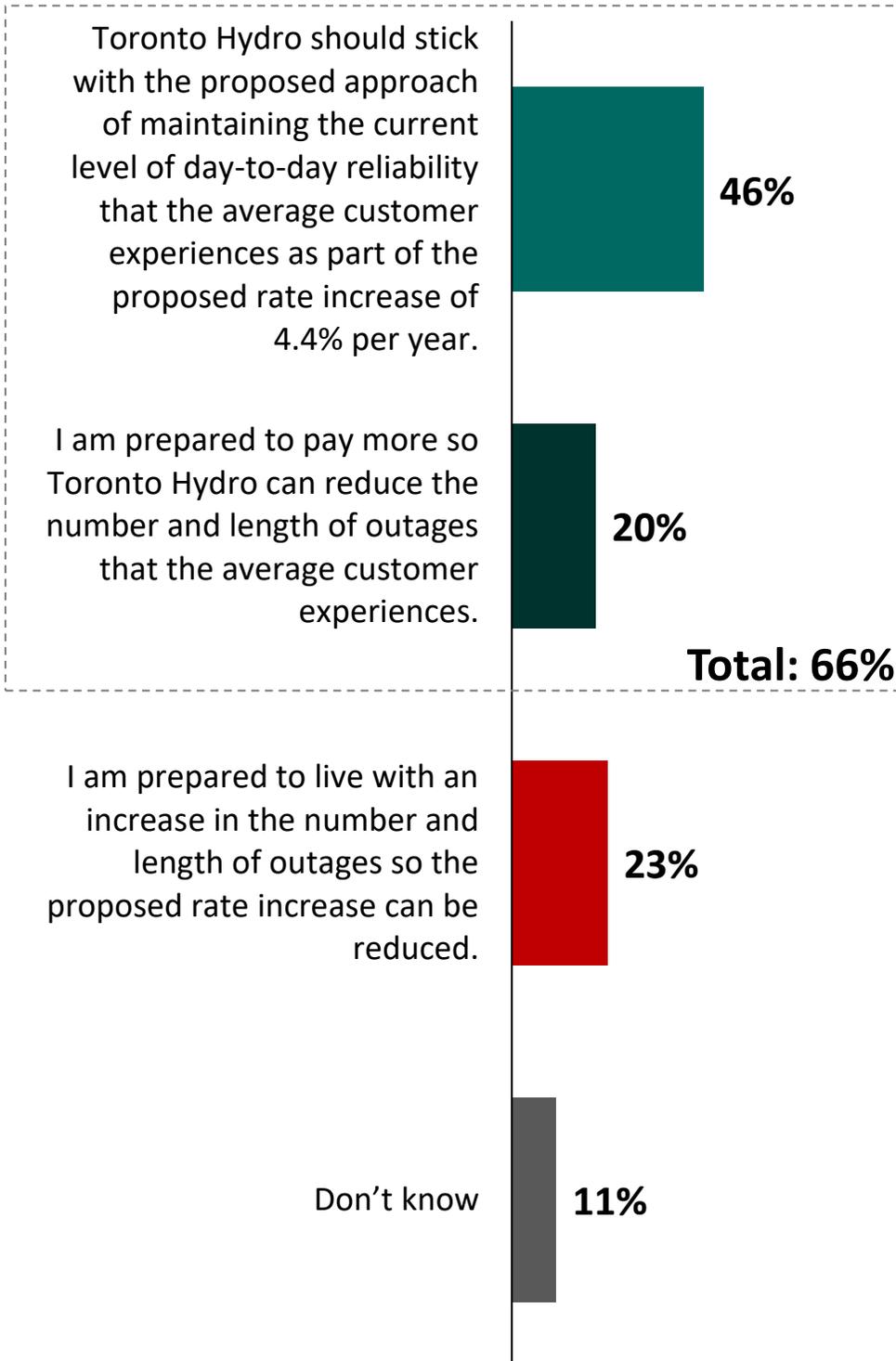


Approach to Addressing Reliability



Which of the following is closest to your point of view regarding **Toronto Hydro's** approach to addressing reliability?

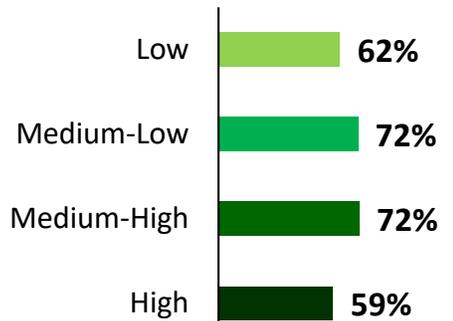
[asked all respondents, n=200]



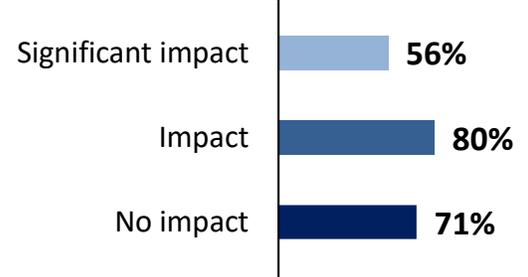
Segmentation

Those who say "Stick with proposed approach or spend more":

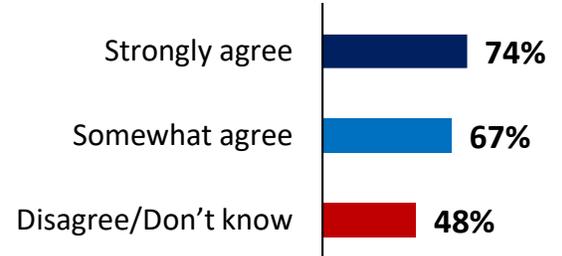
Annual Consumption



Bill Impact on Finances



Well Served by System



Rear-Lot Replacement



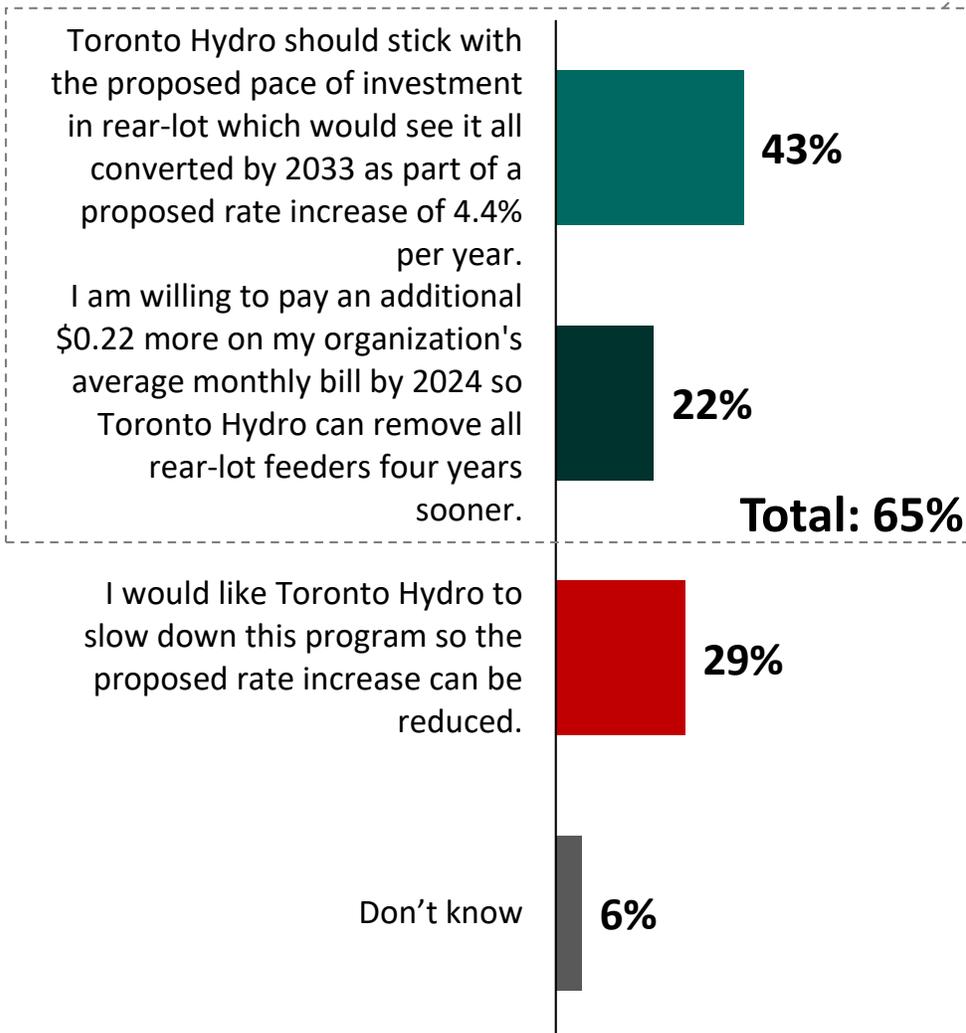
Some customers are served by older types of lines that are more likely to fail, causing more frequent, and longer lasting power outages. These customers are more likely to experience poorer reliability over time than most Toronto Hydro customers. The proposed plan will replace those lines over time but the work could be done faster.

I would like to ask you about two types of lines.

One example is **rear-lot lines**. They go through residential backyards and are often more difficult to service and more exposed to falling branches. The proposed plan will replace all existing rear-lot lines by 2033. **Toronto Hydro** could replace those lines 4 years sooner for an additional cost.

Which of the following statements is closest to your view?

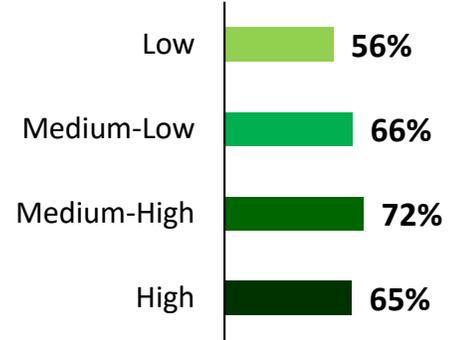
[asked all respondents, n=200]



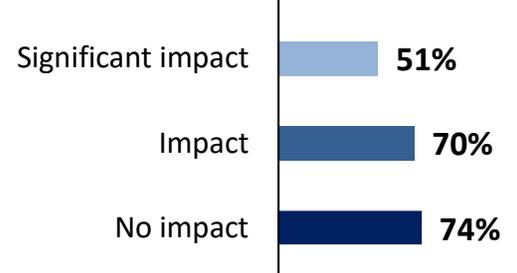
Segmentation

Those who say "Stick with proposed approach or spend more":

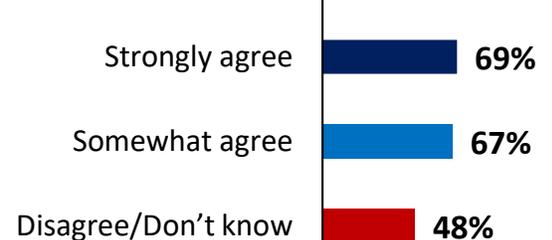
Annual Consumption



Bill Impact on Finances



Well Served by System



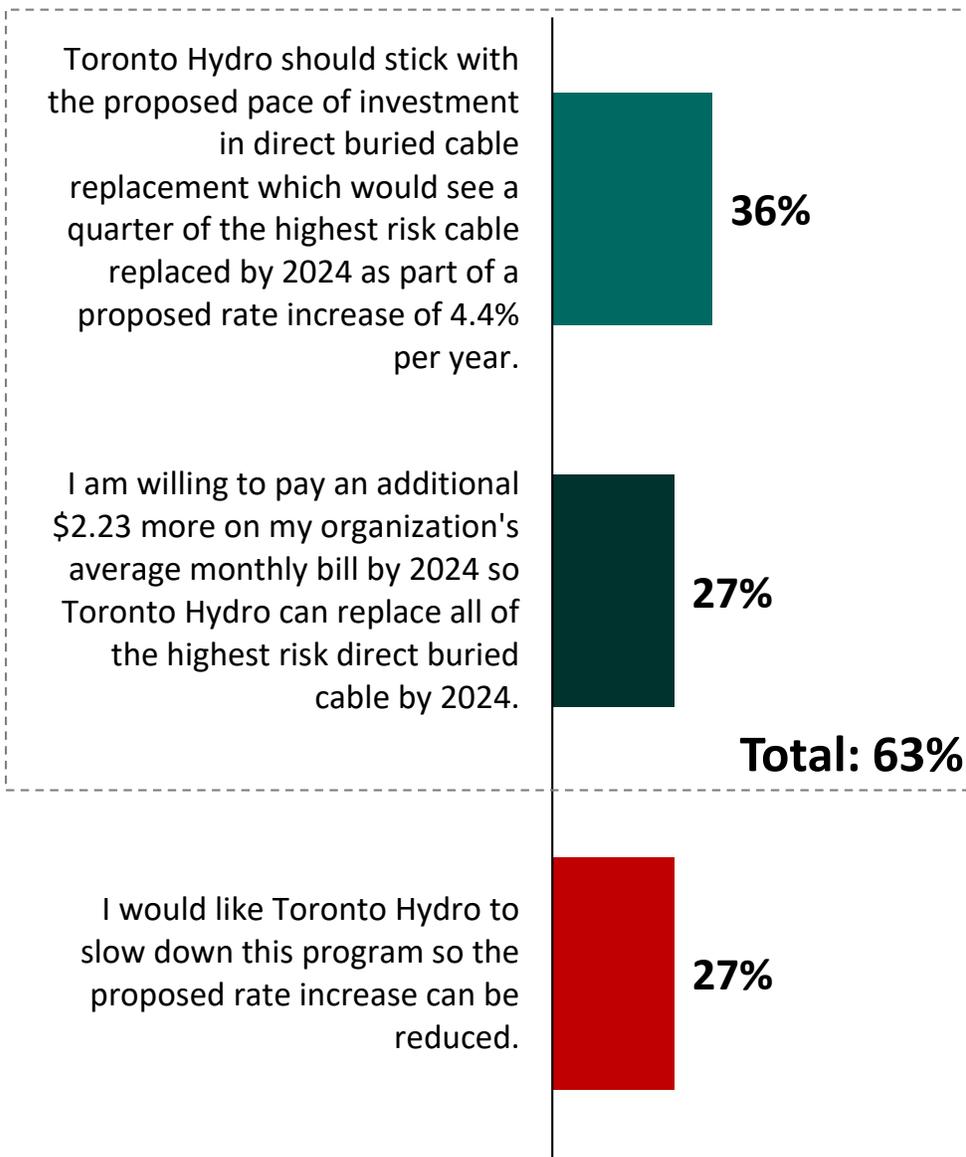
Direct Buried Cable Replacement

Another example is **direct buried cable** where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system.

Once these cables start to fail, they tend to experience a rash of failures. The proposed plan will replace a quarter of the highest risk direct buried cable by 2024. **Toronto Hydro** could replace all of the highest risk direct buried cable by 2024 for an additional cost.

Which of the following statements is closest to your view?

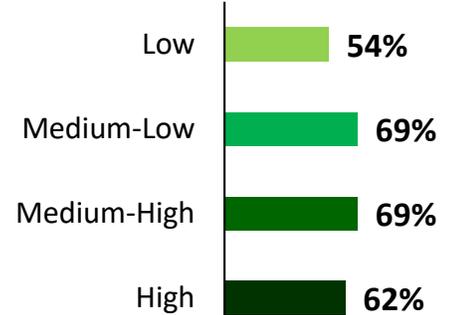
[asked all respondents, n=200]



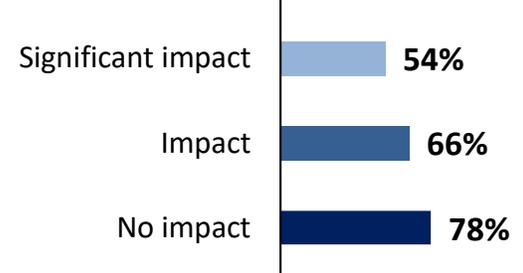
Segmentation

Those who say "Stick with proposed approach or spend more":

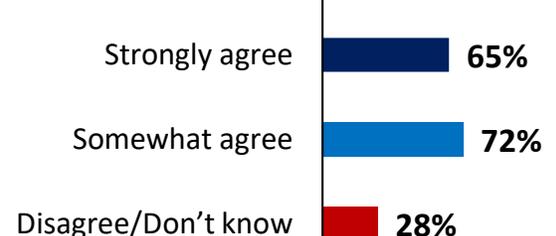
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (9%) not shown.

Paper Insulated Lead Covered (PILC) Preamble



Toronto Hydro has identified three equipment upgrades that are needed within the next few years. If **Toronto Hydro** waits, those upgrades will be more expensive and disruptive as Toronto continues to grow.

Firstly, Paper Insulated Lead Covered (PILC) cable. PILC cable was an old type of underground cable that stopped being installed on **Toronto Hydro's** grid 20 years ago. While the equipment is resilient and is still providing electricity to the downtown core, the outer lead covers can begin to crack and leak oil. Replacing these cables is becoming increasingly difficult and expensive to resource and complete.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049. But **Toronto Hydro** can replace all of this cable ten years earlier by 2039, at an additional cost now. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.

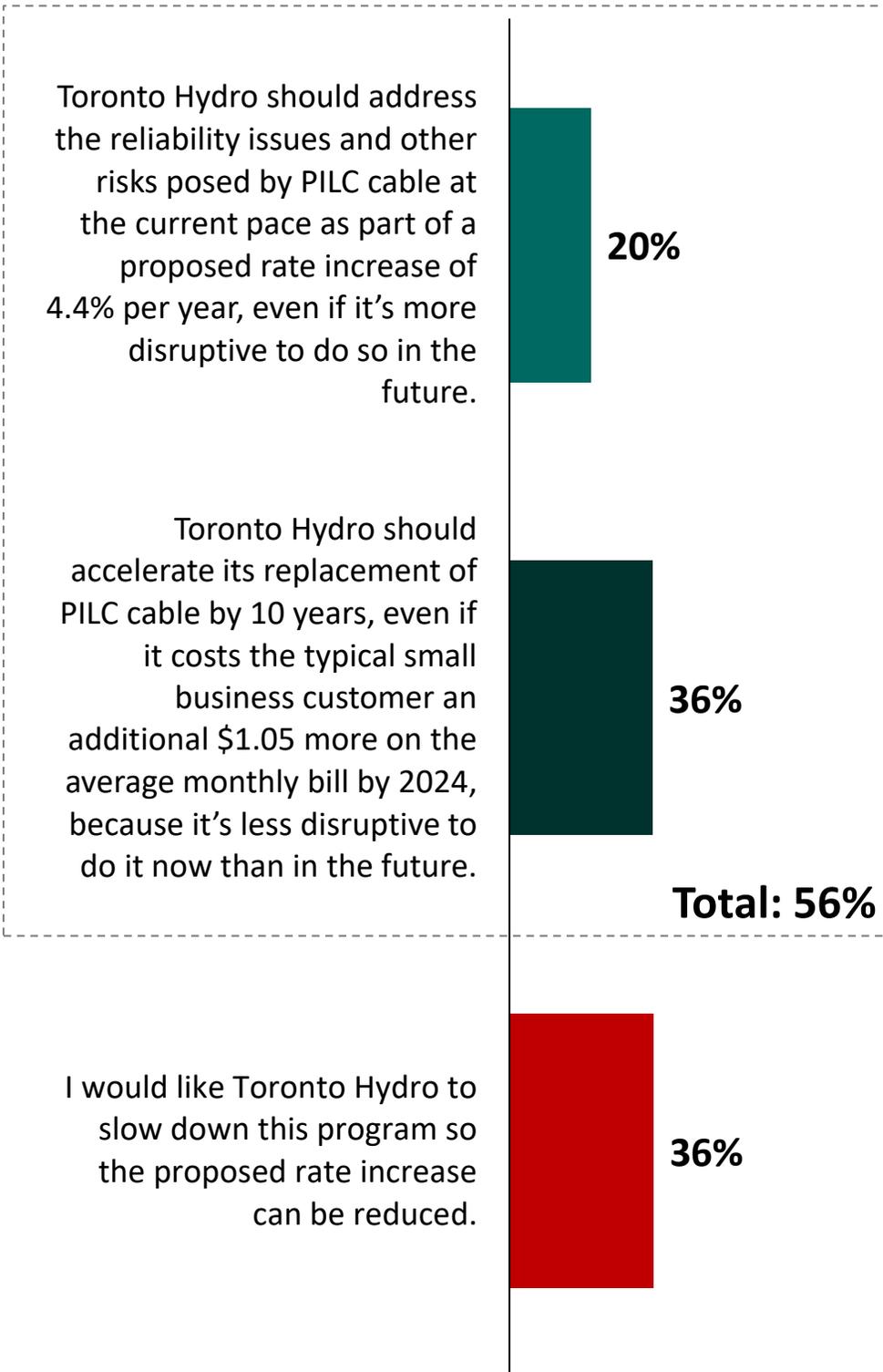


PILC Cable Replacement Program



Which of the following is closest to your point of view regarding **Toronto Hydro's** PILC Cable replacement program?

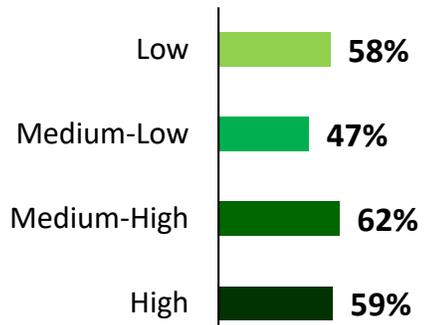
[asked all respondents, n=200]



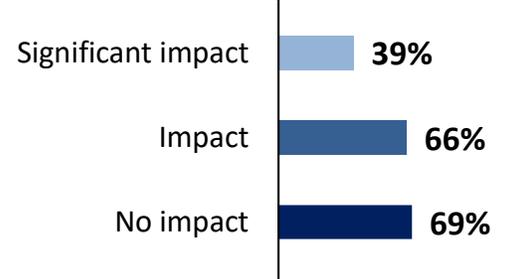
Segmentation

Those who say "Stick with proposed approach or spend more":

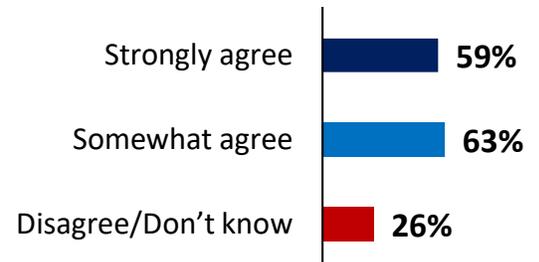
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (8%) not shown.

Network Unit Replacement Program

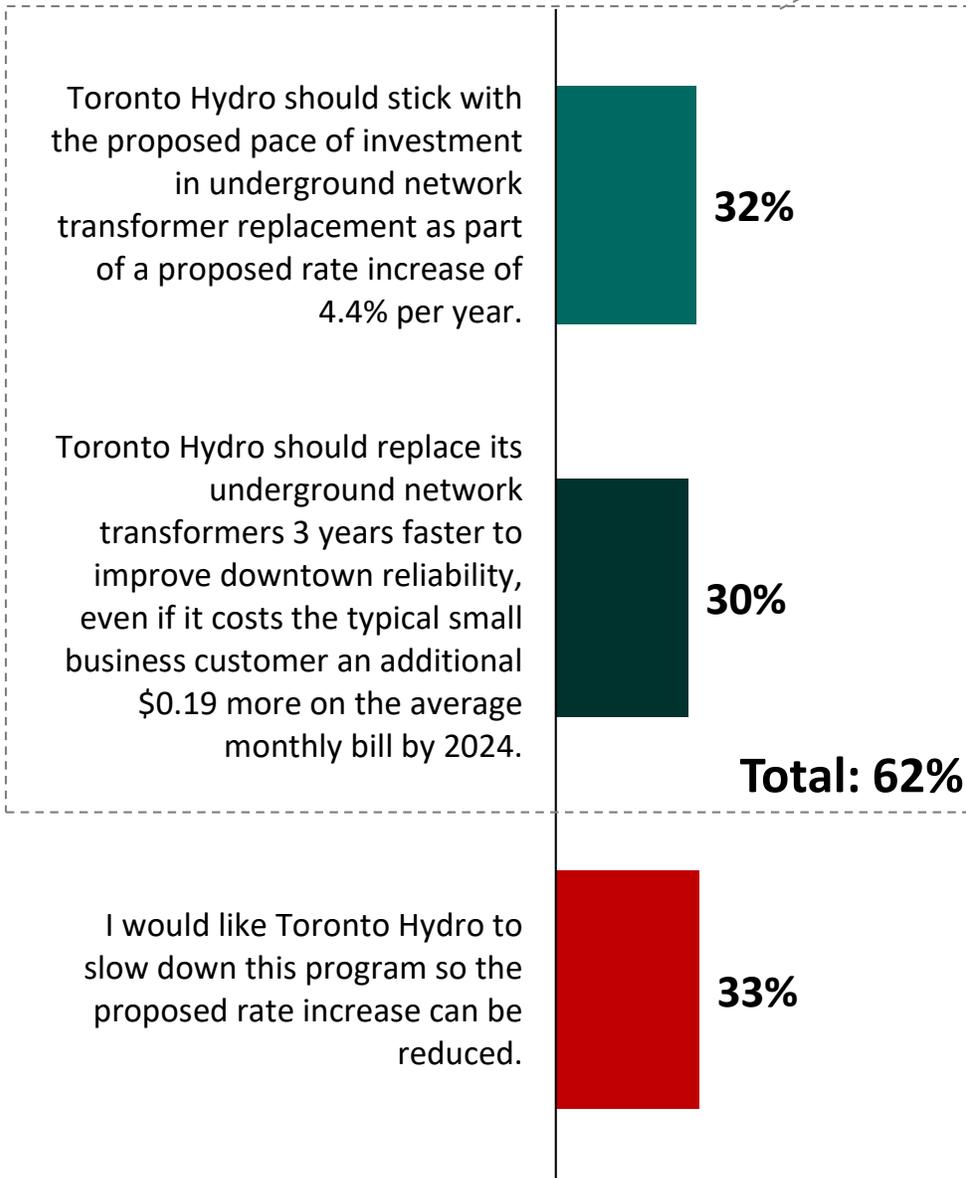


The second upgrade project identified is *Underground Network Transformers*. The key problem with these units is their older design which makes them prone to flooding.

Toronto Hydro plans to replace just enough of these units by 2031 so that outages, due to equipment failure, don't get any worse. But the process could be advanced by three years to replace all these units by 2028.

Which of the following is closest to your point of view regarding **Toronto Hydro's** Network Unit replacement program?

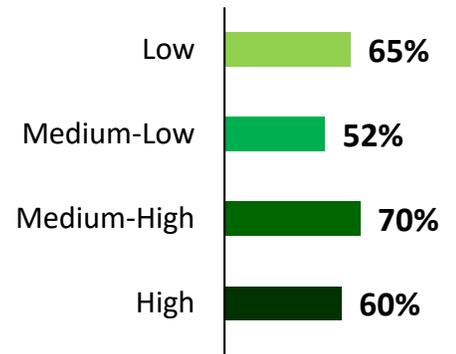
[asked all respondents, n=200]



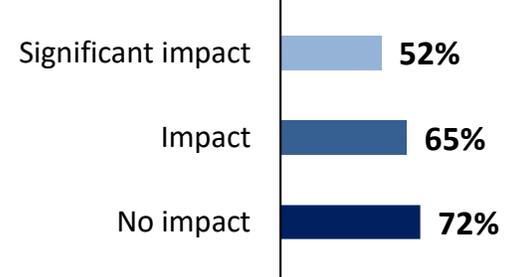
Segmentation

Those who say "Stick with proposed approach or spend more":

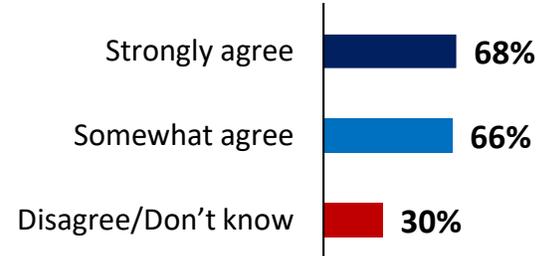
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (6%) not shown.

Cable Chamber Renewal Program

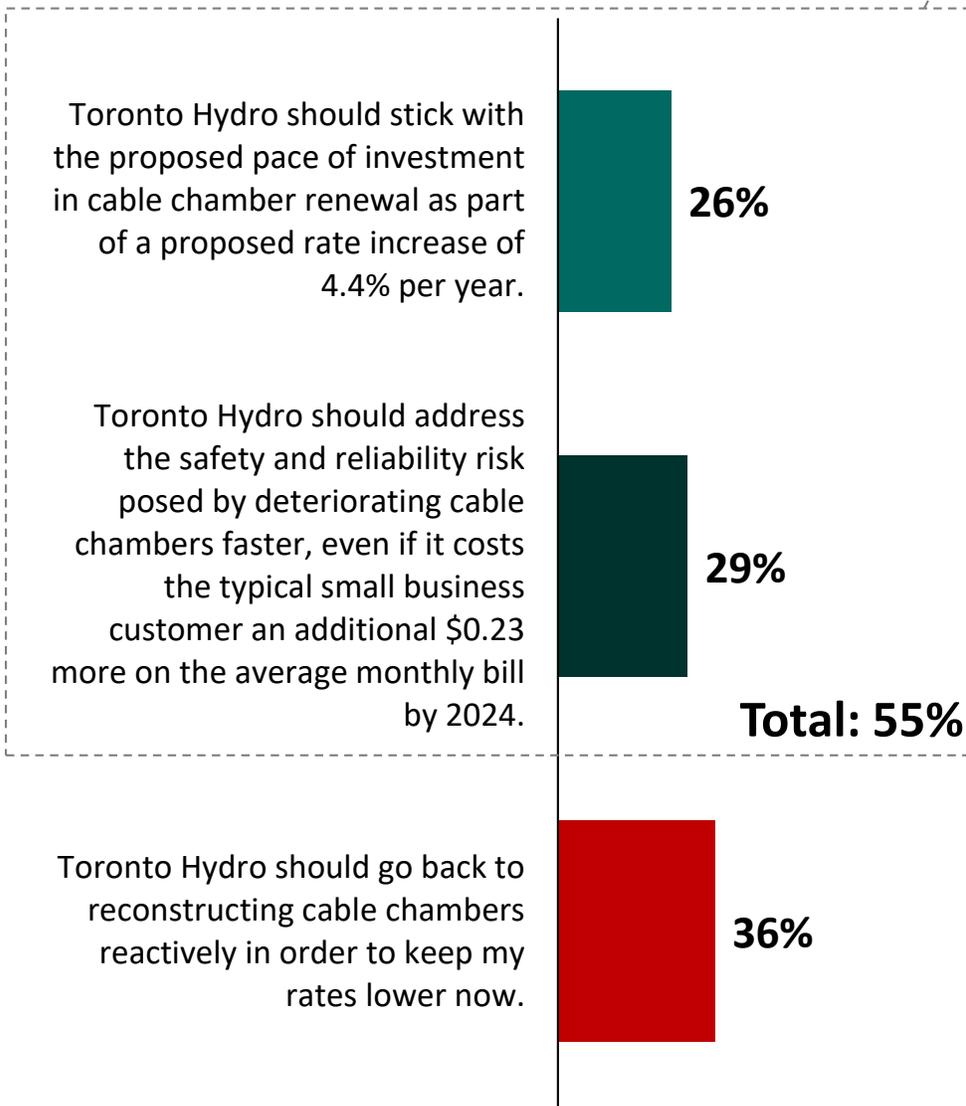


The third upgrade project identified is *Cable Chamber replacement*. Cable Chambers house, protect, and provide access to underground electrical equipment across the city. When they deteriorate or break, this equipment can cause outages and pose anything from a tripping hazard to something more serious like a collapsed chamber.

Toronto Hydro plans to take approximately 30 years to address the chambers in the worst condition. But accelerating the work could halve that period, at an additional cost now.

Which of the following is closest to your point of view regarding **Toronto Hydro's** Cable Chamber renewal program?

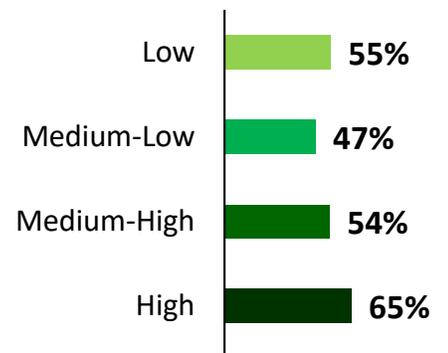
[asked all respondents, n=200]



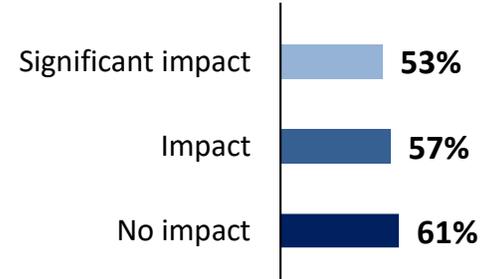
Segmentation

Those who say "Stick with proposed approach or spend more":

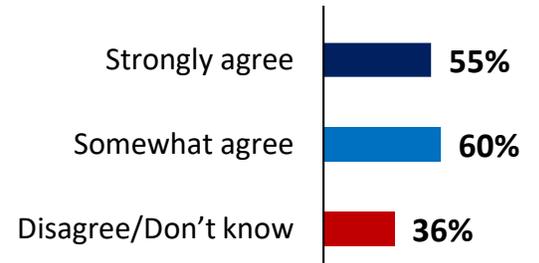
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (9%) not shown.

Dealing with More Frequent Extreme Weather Events

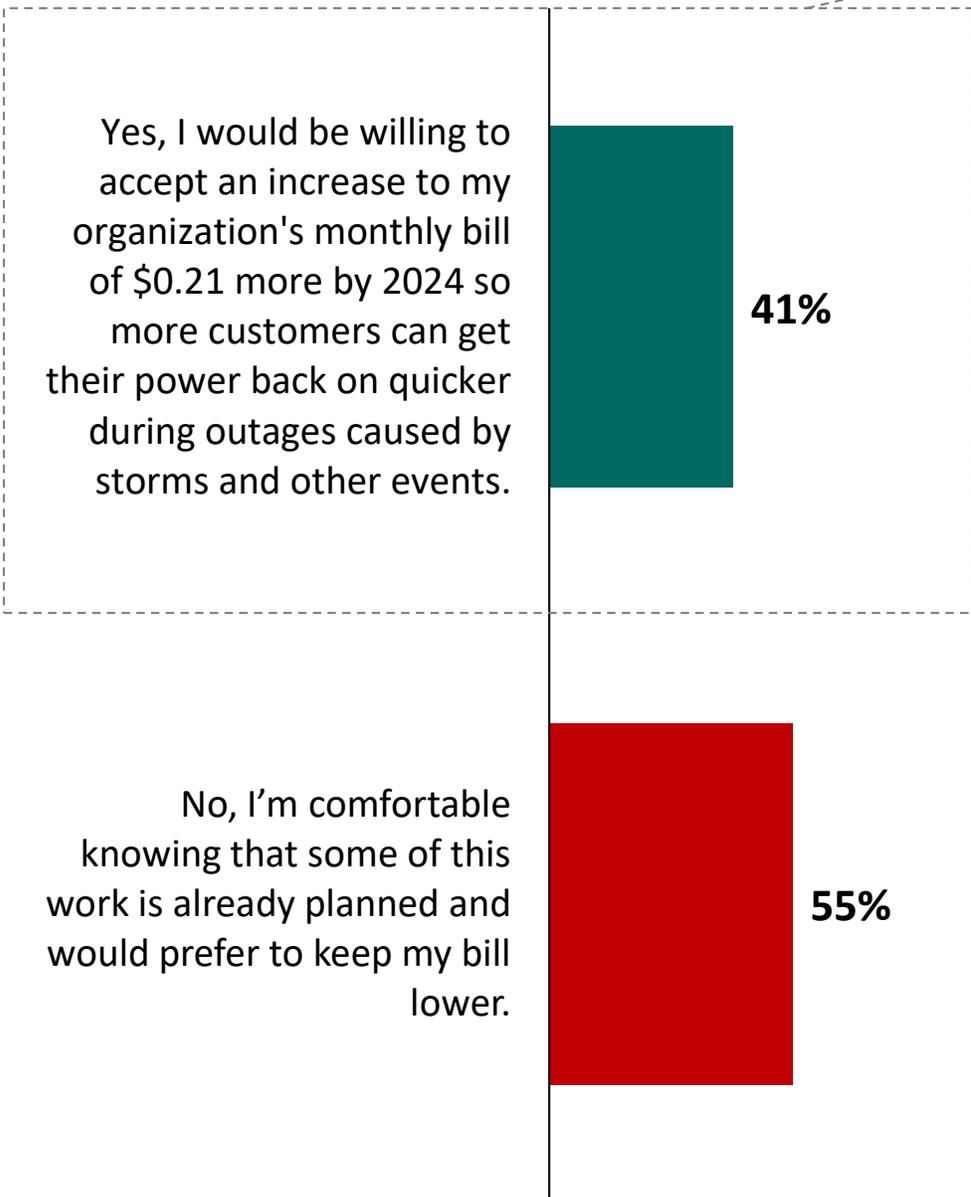


As **Toronto Hydro's** distribution system is exposed to strong winds, freezing rain, and severe flooding, they are proposing a variety of enhancements to improve the resiliency of the distribution system against extreme weather events.

Toronto Hydro could enhance the system further in neighbourhoods outside of downtown. The improvements include adding remotely-operated technology and more back-up links within the grid. This will help **Toronto Hydro** to better isolate the problem and reduce outage times by as much as 50% in these areas.

Which of the following statements best represents your point of view?

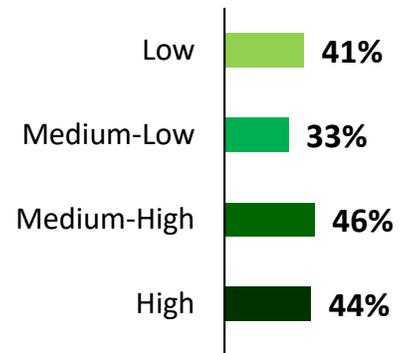
[asked all respondents, n=200]



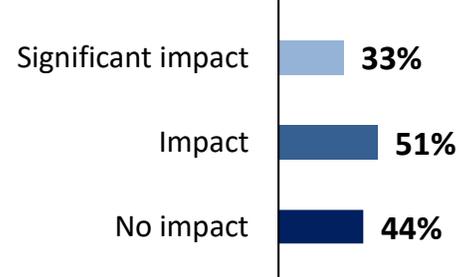
Segmentation

Those who say "Restore power more quickly during outages":

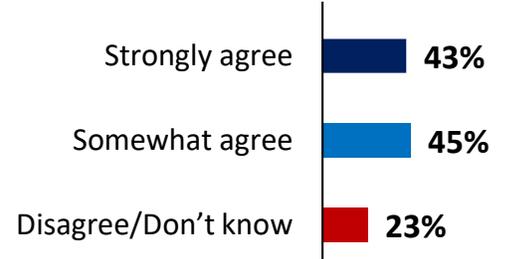
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (4%) not shown.

Innovation and Planning for the Future

Investments in Energy Storage



3% of the proposed budget would be spent on innovation and planning for the future. The following questions are about this aspect of the budget.

Toronto Hydro has already begun to integrate large-scale battery electricity storage into the system. They have now identified more opportunities to partner on a wider range of energy storage projects. Integrating storage into the system can improve reliability and help reduce greenhouse gases, but it is not required to maintain current levels of reliability.

Which of the following is closest to your point of view?

[asked all respondents, n=200]

I would be willing to pay up to \$1.25 more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.

37%

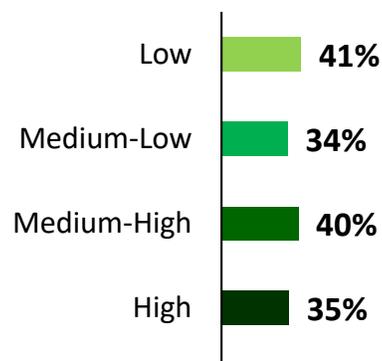
I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.

55%

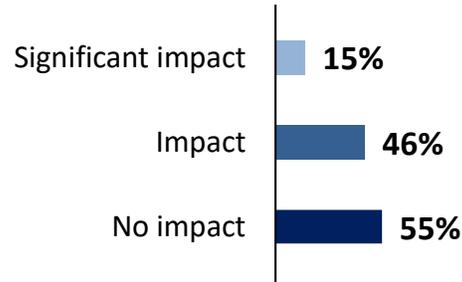
Segmentation

Those who say "Pay more to partner on energy storage projects":

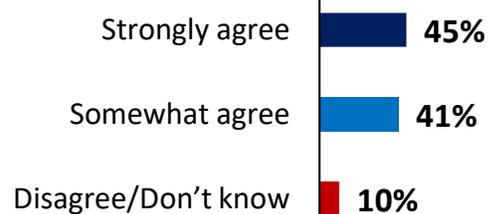
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (8%) not shown.

Monitoring and Control Equipment

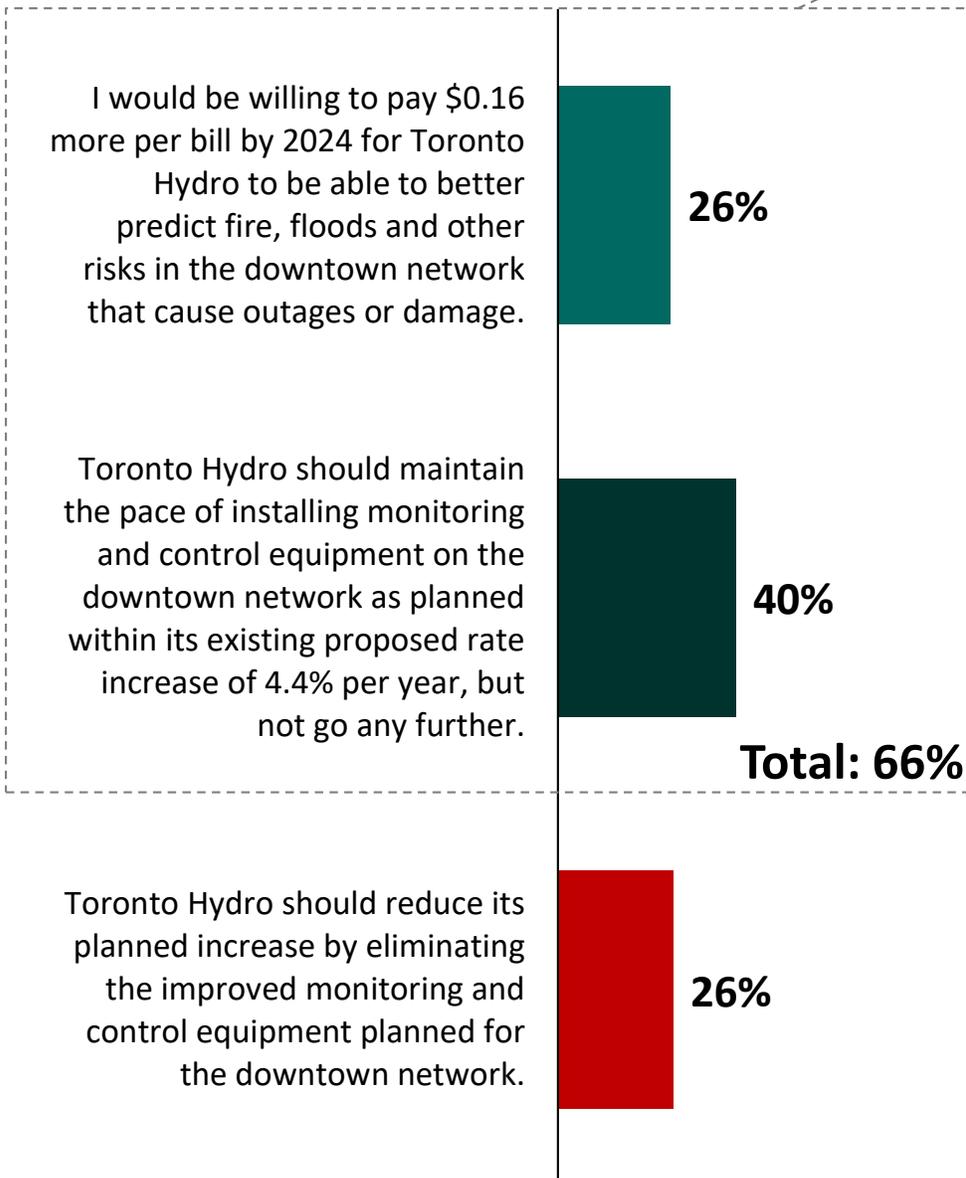
Q New communication technology has revolutionised the way the grid can be managed.

Toronto Hydro plans to take advantage of various new technologies wherever clear benefits can be established.

However, **Toronto Hydro** can improve the reliability of its grid further by installing communication devices in the downtown underground network that detect fire, floods or other risks more quickly.

Which of the following is closest to your point of view?

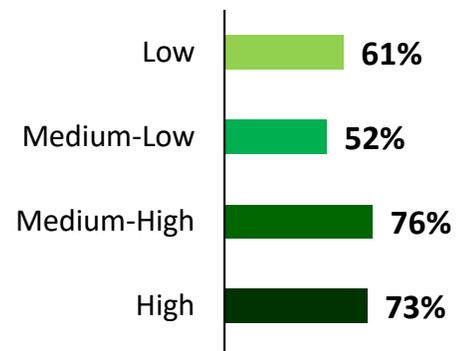
[asked all respondents, n=200]



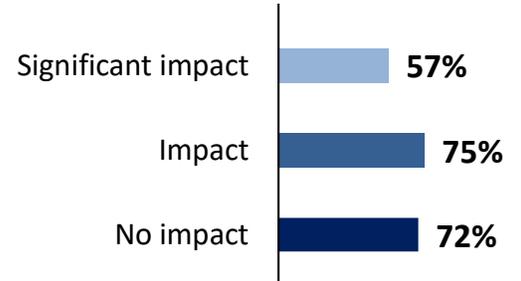
Segmentation

Those who say “Stick with proposed approach or spend more”:

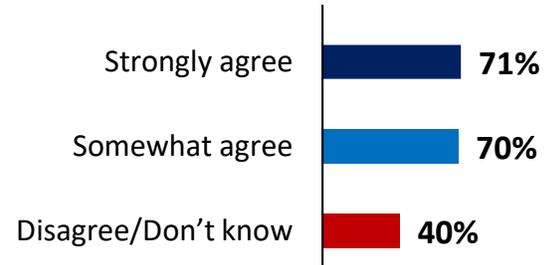
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: “Don’t Know” (8%) not shown.

Supporting Microgrids

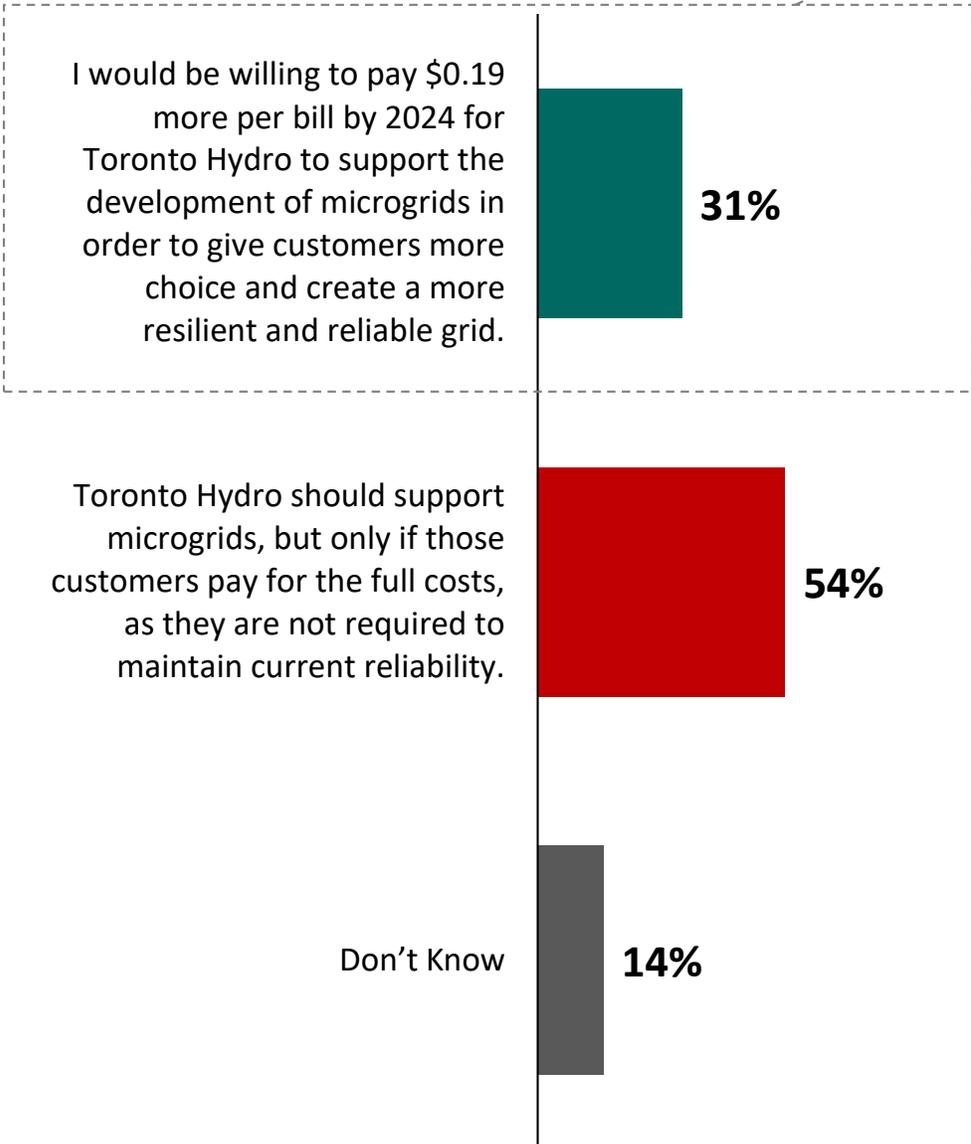


New types of generation (often renewable), storage, and supporting systems are making it possible for communities, institutions or other large customers to develop “microgrids”. They are a local electricity network linking smaller sources of electricity with nearby uses such as homes, businesses and institutions. In the event of a failure of the larger network, a microgrid can seal itself off and continue to provide power locally.

Microgrids would give customers more choices, while creating a more resilient and reliable grid. However, they are not required to maintain current reliability.

Which of the following is closest to your point of view?

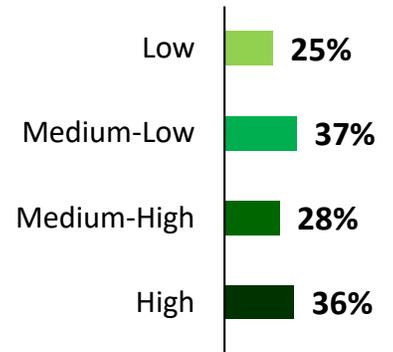
[asked all respondents, n=200]



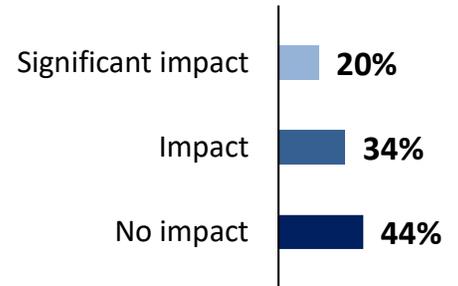
Segmentation

Those who say “Pay more to support microgrids”:

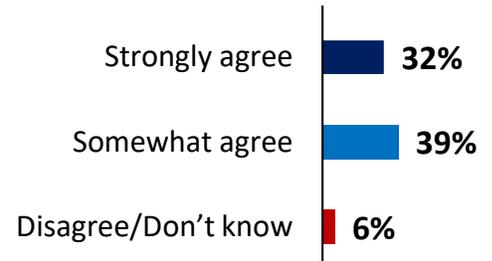
Annual Consumption



Bill Impact on Finances



Well Served by System



Investment Alternatives Summary

Preamble



Toronto Hydro's current proposed plan, which translates into an average 4.4% annual increase, focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

In dollars and cents, that means an average increase to the monthly bill of **\$4.86 each year** for the typical small business customer.

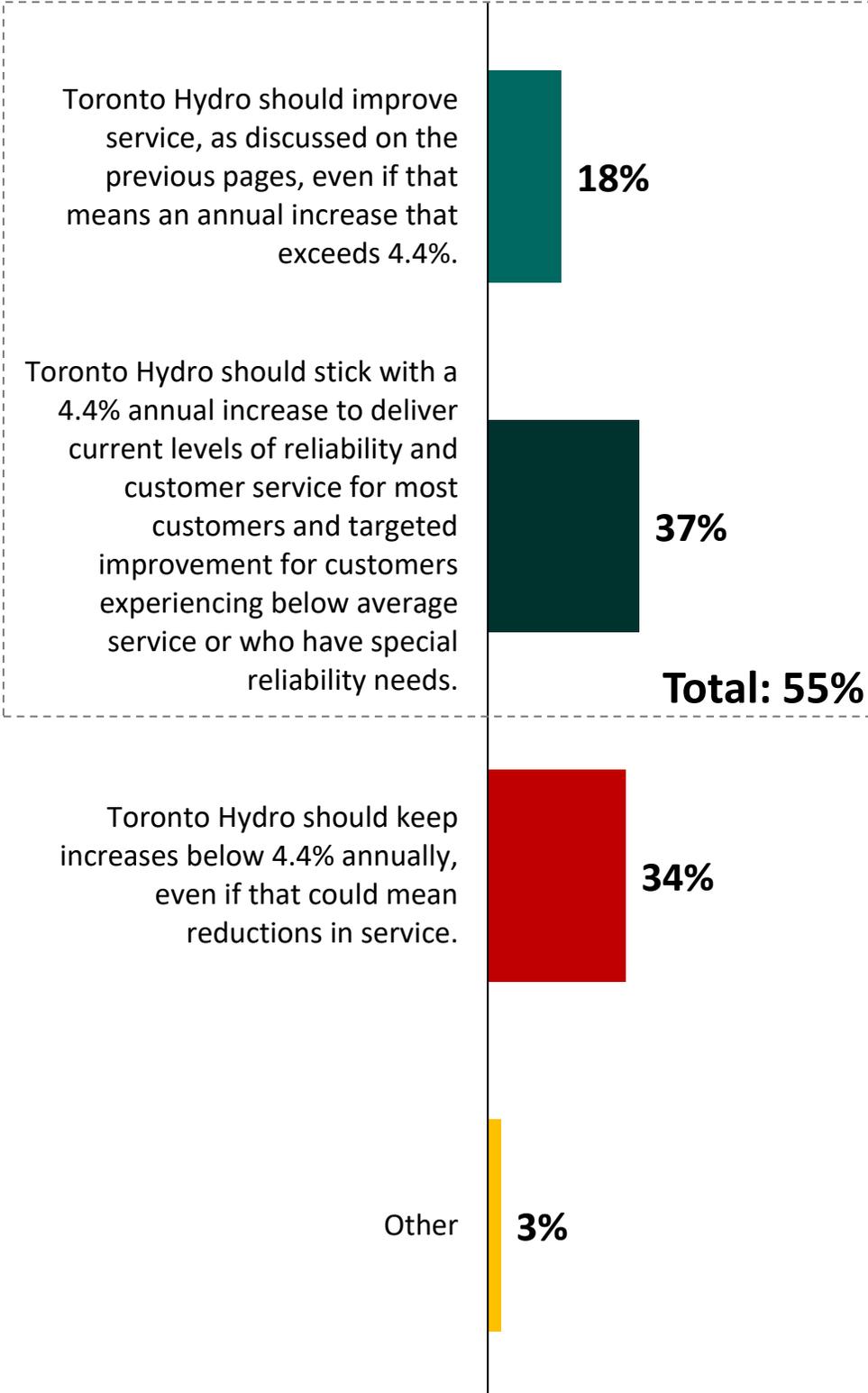
Over the course of the proposed 5-year plan, the typical small business customer will see the distribution portion of their electricity bill **increase by \$24.32**.

As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$102 in 2019** to **\$126 by 2024**.



Opinion of Toronto Hydro's Proposed Plan

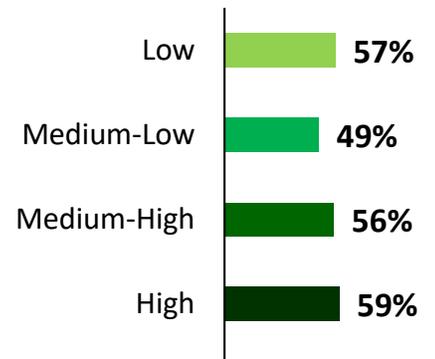
Q With regards to **Toronto Hydro's** proposed plan, which of the following statements best represents your view?
[asked all respondents, n=200]



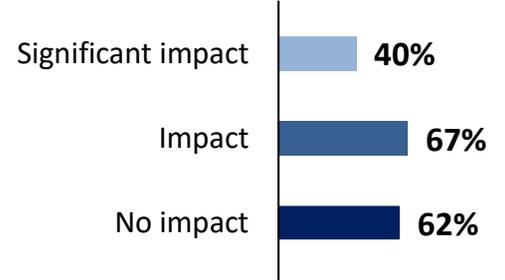
Segmentation

Those who say "Stick with current pace of investment or increase to improve services":

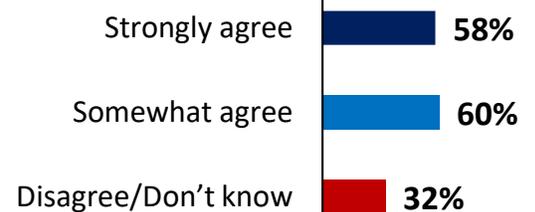
Annual Consumption



Bill Impact on Finances



Well Served by System



Opinion of Toronto Hydro's Proposed Plan by Segmentations

Q With regards to **Toronto Hydro's** proposed plan, which of the following statements best represents your view?
[asked all respondents, n=200]

Bill Impact on Finances

Opinion of Toronto Hydro's Proposed Plan	<i>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 delayed.</i>			Total
	Sig. Impact [n=61]	Impact [n=59]	No Impact [n=64]	
Improve services, increase above 4.4%	13%	20%	23%	18%
Stick with current plan at 4.4%	27%	47%	40%	37%
Keep increases below 4.4%	47%	31%	27%	34%

Well Served by System

Opinion of Toronto Hydro's Proposed Plan	<i>Customers are well served by the electricity system in Ontario.</i>			Total
	Strongly agree [n=66]	Somewhat agree [n=104]	Disagree/Don't know [n=30]	
Improve services, increase above 4.4%	22%	20%	3%	18%
Stick with current plan at 4.4%	36%	40%	29%	37%
Keep increases below 4.4%	35%	34%	32%	34%

Note: "Other" and "Don't Know" not shown.

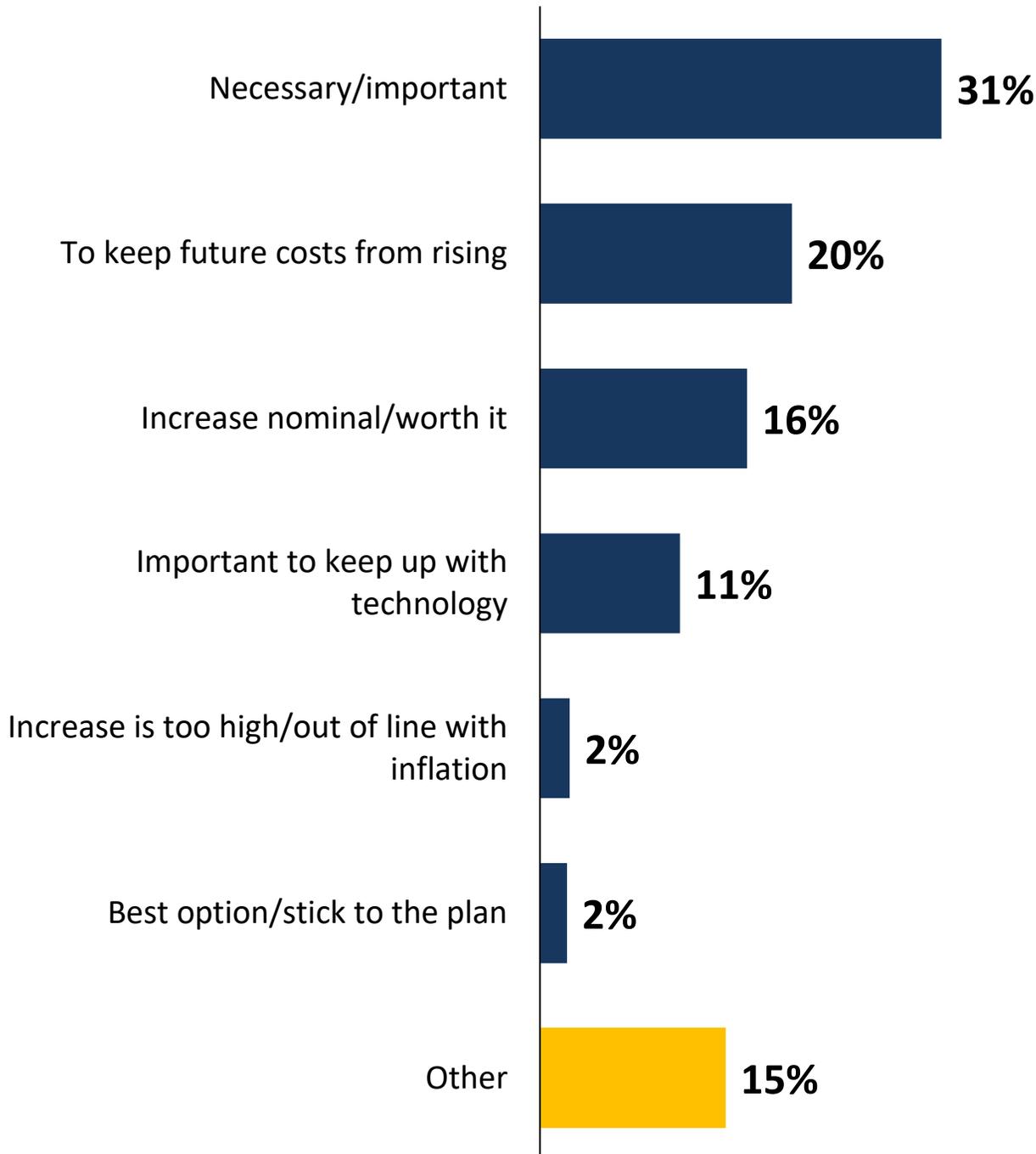
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should improve service, n=36]

For those who answered: Toronto Hydro should improve service, as discussed on the previous pages, even if that means an annual increase that exceeds 4.4%. (n=36)



Note: "Refused" (3%) not shown.

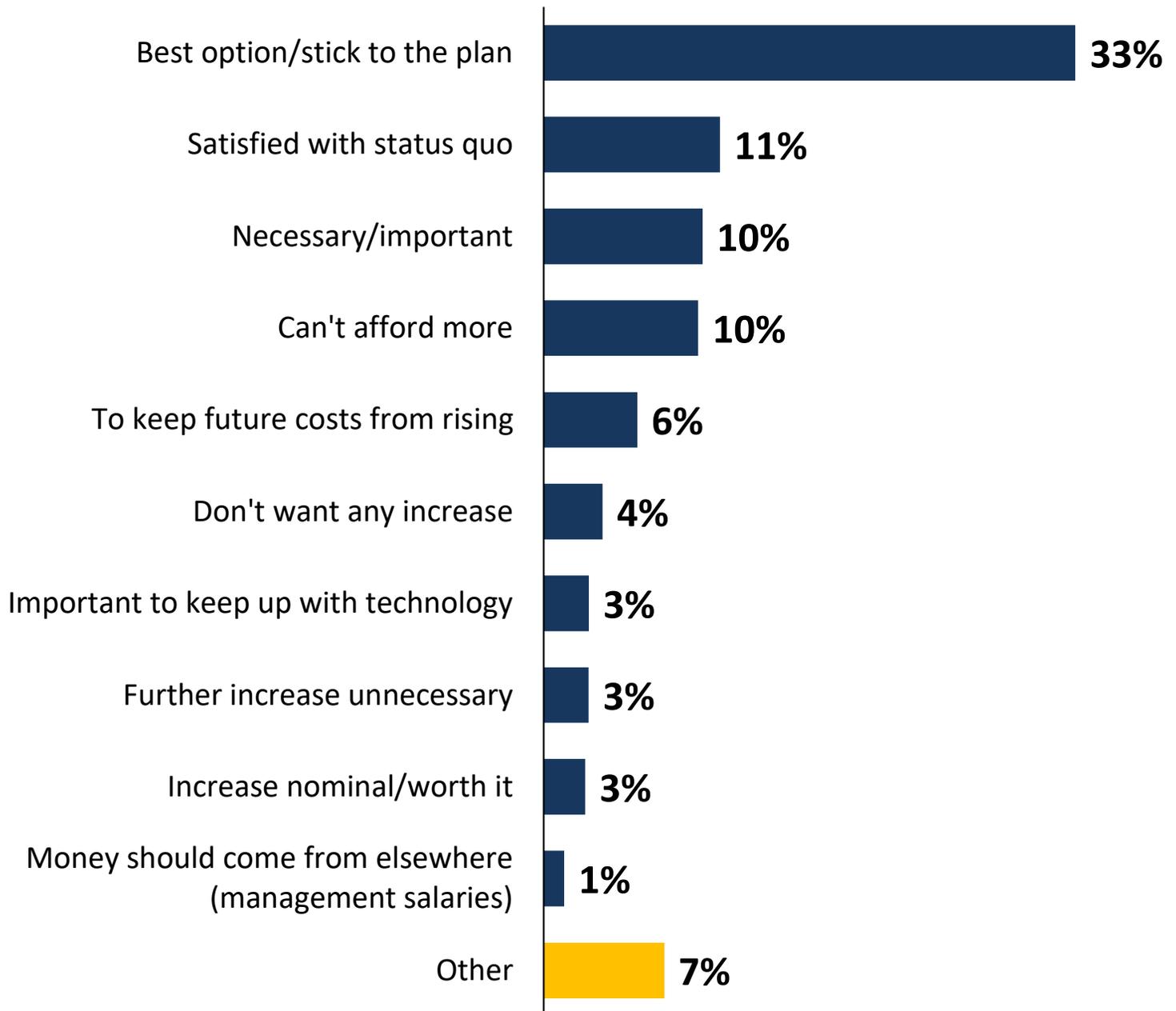
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should stick with proposed plan, n=74]

For those who answered: Toronto Hydro should stick with a 4.4% annual increase to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs. (n=74)



Note: "None" (6%), "Don't Know" (3%), "Refused" (1%) not shown.

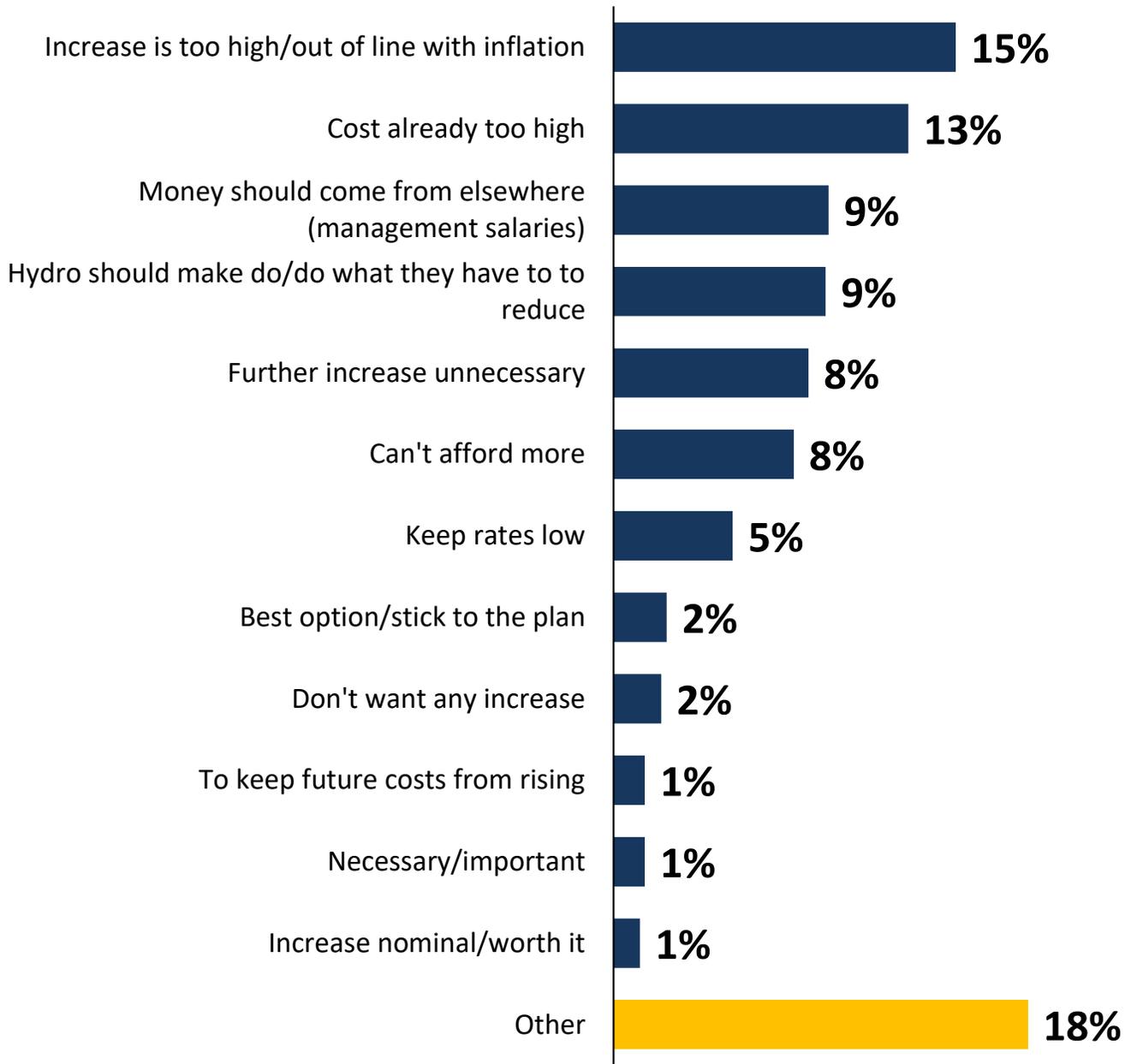
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should keep increases below 4.4%, n=67]

For those who answered: Toronto Hydro should keep increases below 4.4% annually, even if that could mean reductions in service. (n=67)



Note: "Don't Know" (3%) and "Refused" (3%) not shown.



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For more information, please contact:

Jason Lockhart

Vice President

(t) 416-642-7177

(e) jlockhart@innovativeresearch.ca

Julian Garas

Senior Consultant

(t) 416-640-4133

(e) jgaras@innovativeresearch.ca

Toronto Hydro 2018 Customer Engagement
**Mid-Market Telephone
Survey Report**



Survey Methodologies

Field and Design

These are the findings of an Innovative Research Group (INNOVATIVE) telephone survey conducted among **n=202** Toronto Hydro **mid-sized business customers** between **May 2 and 14, 2018**.

Quotas were set by electricity consumption levels and geographic considerations from within the Toronto Hydro service territory in order to obtain a representative customer sample.

Mid-sized business customers were divided into quartiles based on annual electricity usage to ensure the sample had a proportionate mix of customers from low, medium-low, medium-high, and high electricity usage groups.

The sample has been weighted to n=200 by the quartiles and region to reflect the actual composition of mid-sized business customers within the service area.

The margin of error for a sample of n=200 is approximately +/-6.9%. 19 times out of 20.

For the purposes of executing the customer surveys, Toronto Hydro provided INNOVATIVE with a confidential list of customers' contact information. The contact list included only customers with telephone contact information on file and who had been a customer of Toronto Hydro for at least one year. The information contained in the contact list included customer name, telephone number(s), postal code and total annual electricity consumption.

Only one customer per organization was eligible to complete the survey. Respondents were screened to certify that only the personnel responsible for managing or overseeing their electricity bill were interviewed. This step was taken to ensure that survey respondents represented the most qualified person within an organization to answer questions.

Customers were offered a \$20 Amazon Gift Card in appreciation for completing the survey.

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.*

Consumption Quartiles

The tables below illustrate the strata divisions for each rate class, based on consumption quartiles.

Dividing customer sample into quartiles based on known characteristics, including region and annual consumption, was used to develop accurate quotas to ensure the sample was representative of Toronto Hydro's customer base. The tables below show the unweighted and weighted distributions.

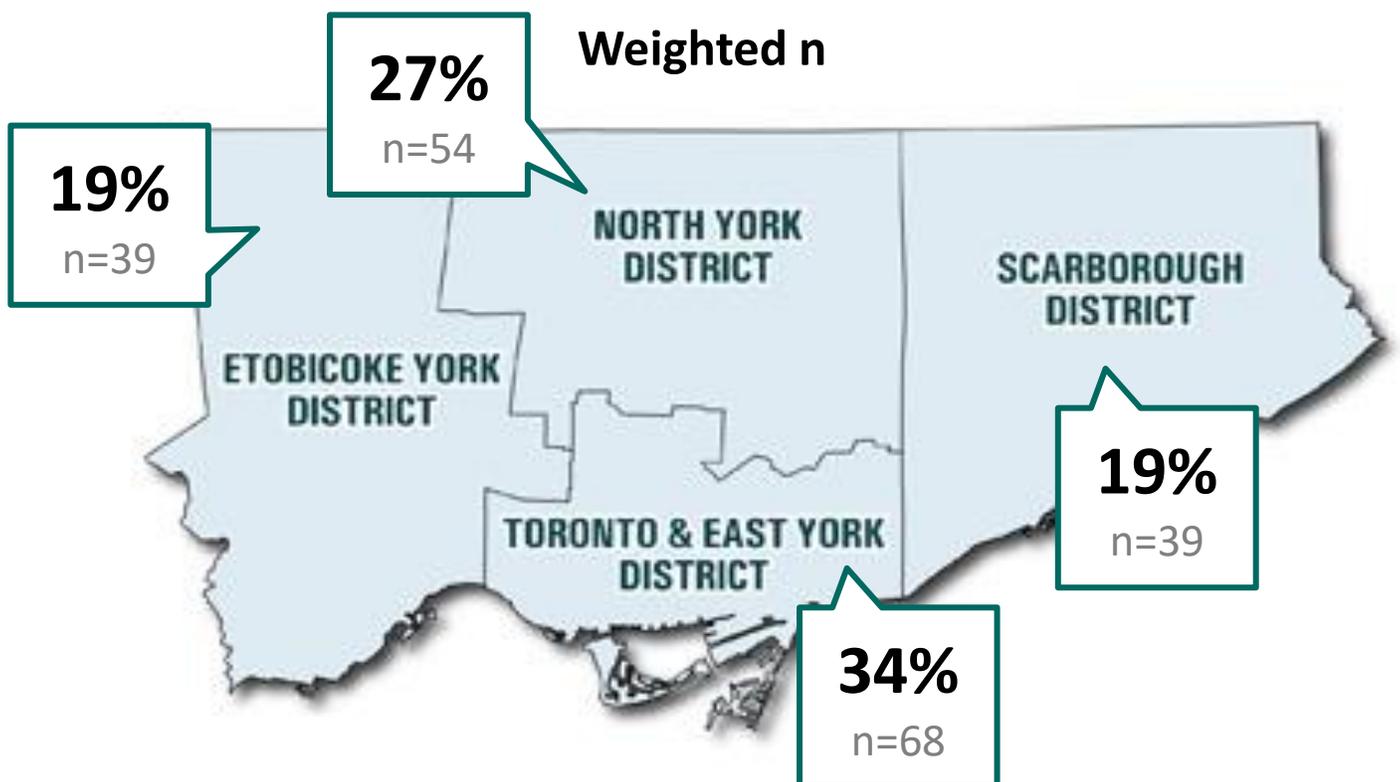
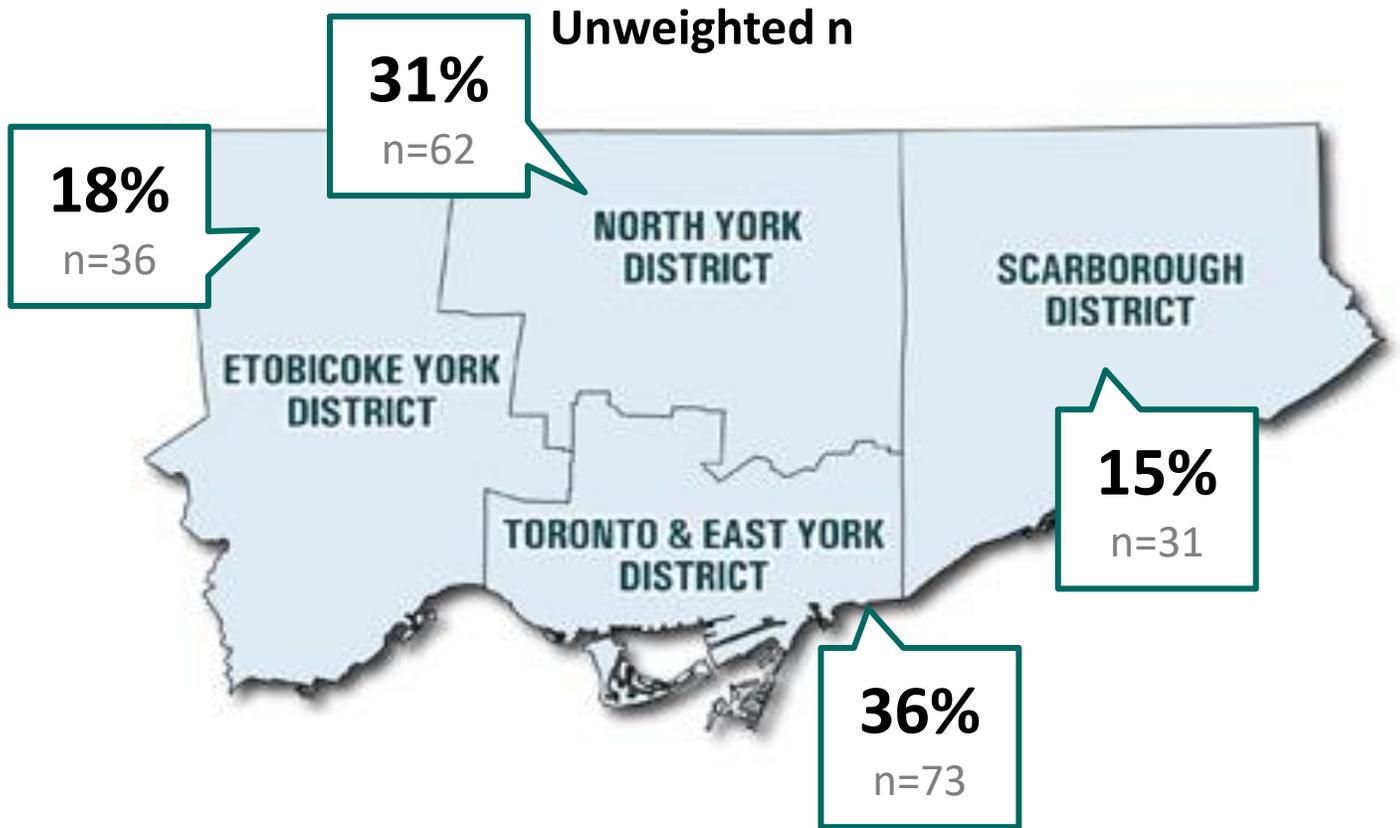
	Consumption Quartiles (Unweighted n)				Total
	Low	Medium-Low	Medium-High	High	
Toronto & East York	13	21	21	18	73
Etobicoke & York	13	9	8	6	36
North York	19	13	12	18	62
Scarborough	5	9	9	8	31
Total	50	52	50	50	202

	Consumption Quartiles (Weighted n)				Total
	Low	Medium-Low	Medium-High	High	
Toronto & East York	17	17	17	17	68
Etobicoke & York	10	10	10	10	39
North York	14	14	14	14	54
Scarborough	10	10	10	10	39
Total	50	50	50	50	200

Regions

The charts below illustrate the overall regional distribution.

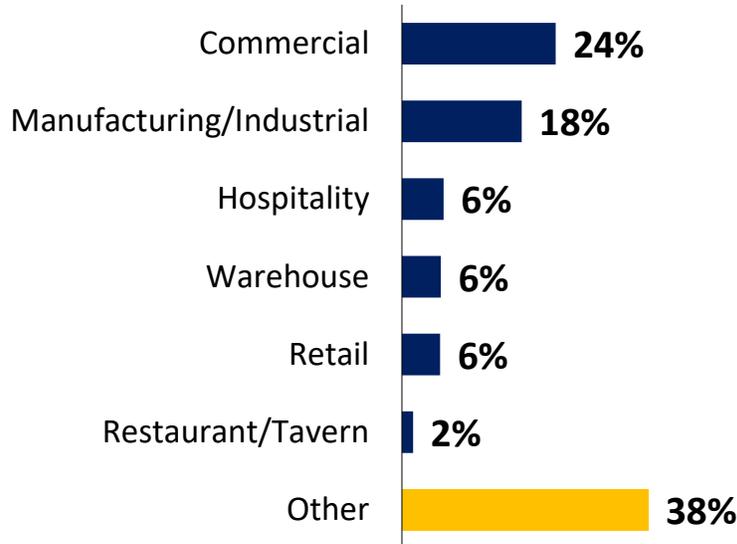
The charts below show the unweighted and weighted distributions.



Segmentation and Demographics

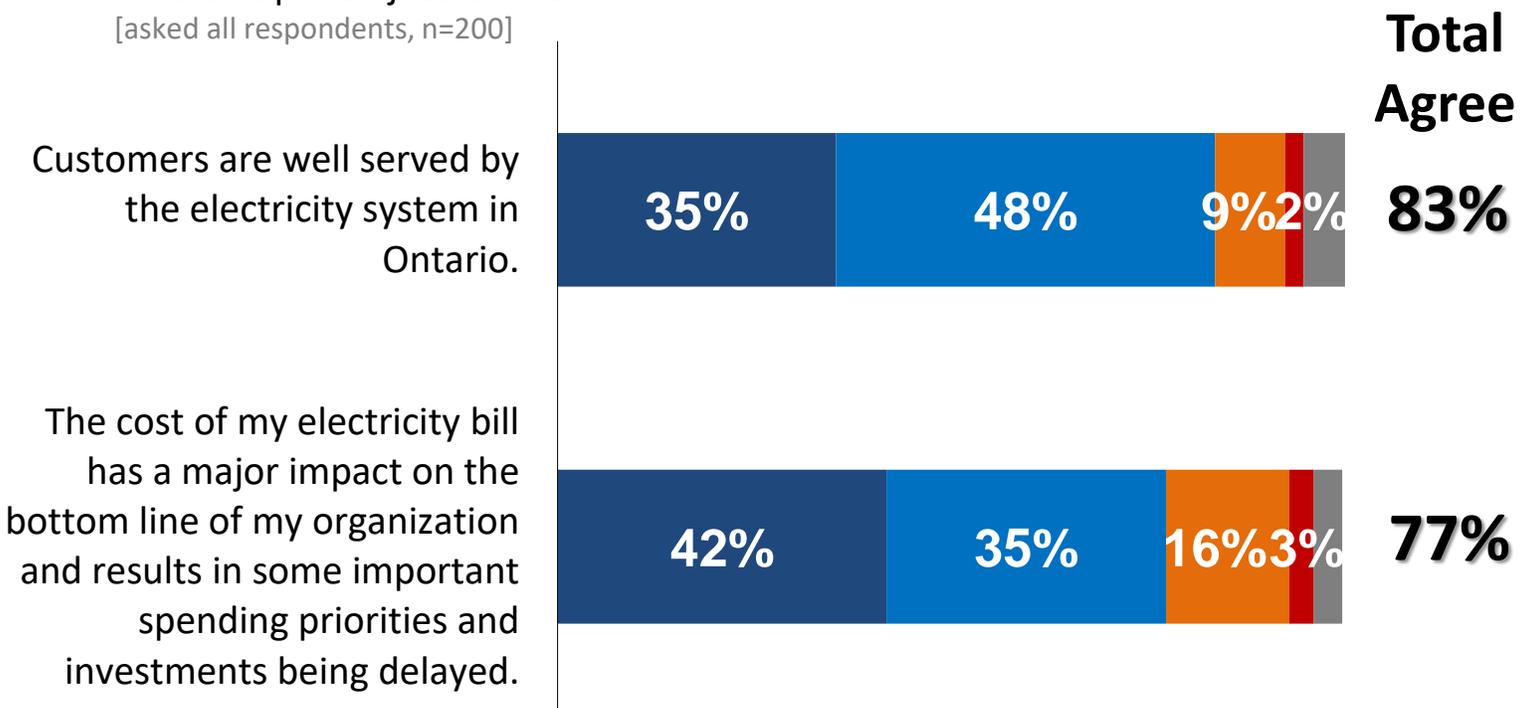
Segmentation & Demographics

Business Sector



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.

[asked all respondents, n=200]



- Strongly agree
- Somewhat disagree
- Don't know/No opinion

- Somewhat agree
- Strongly disagree

Familiarity Preamble



To start, I'd like to ask you a few questions about the electricity system ...

*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; and*
- ***Distribution lines** carry electricity to the homes and businesses in our communities.*

*Today we're going to talk about your **local distribution system** which is maintained and operated by Toronto Hydro.*

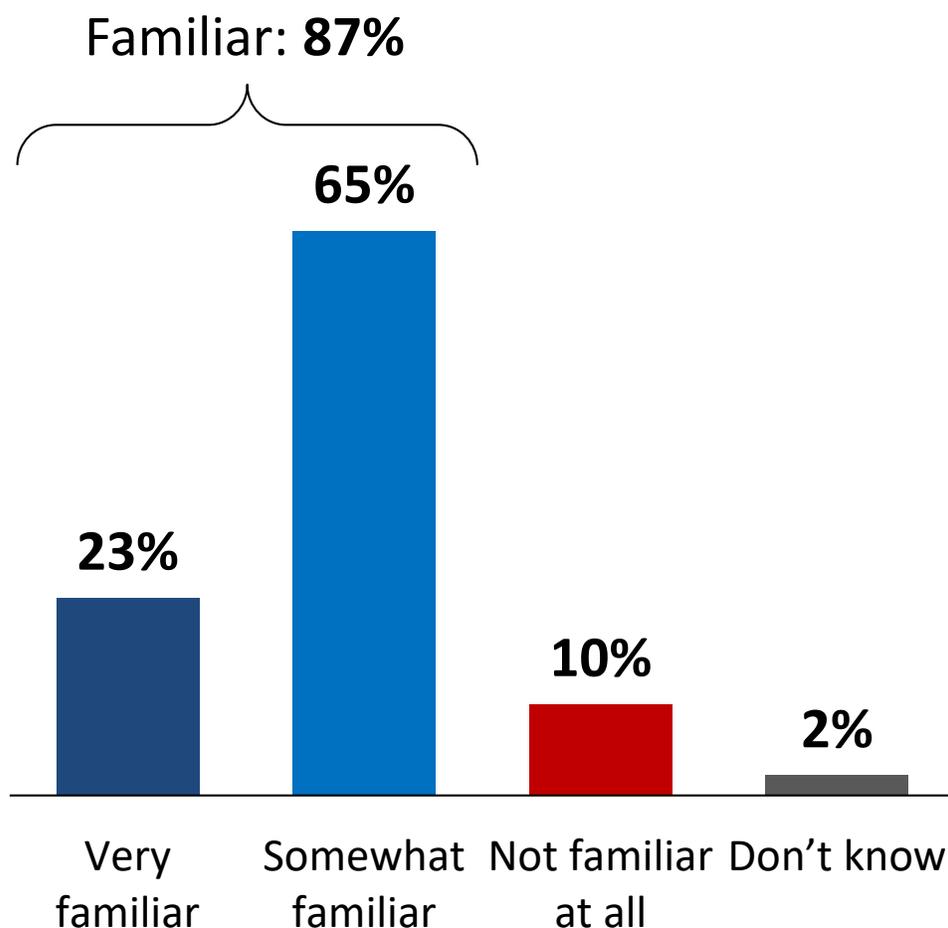


Familiarity with Toronto Hydro



How familiar are you with **Toronto Hydro**?

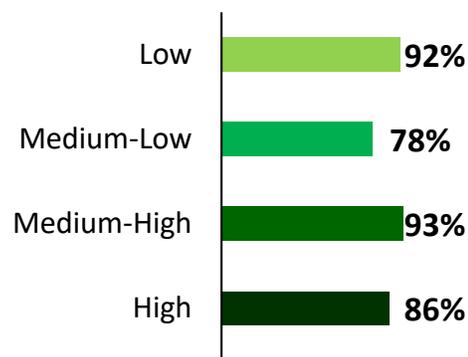
[asked all respondents, n=200]



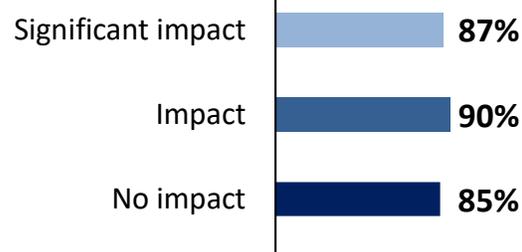
Segmentation

Those who say "Familiar":

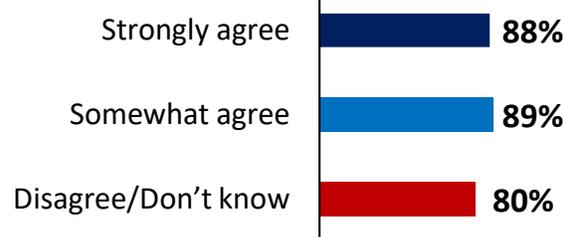
Annual Consumption



Bill Impact on Finances

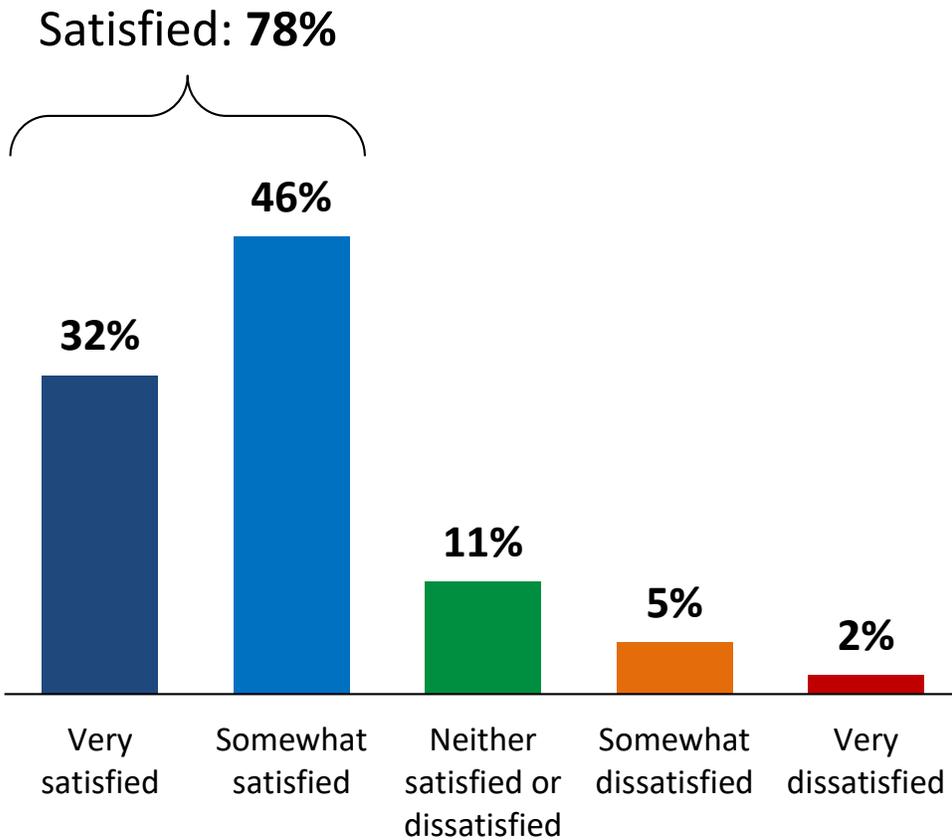


Well Served by System



Satisfaction with Services

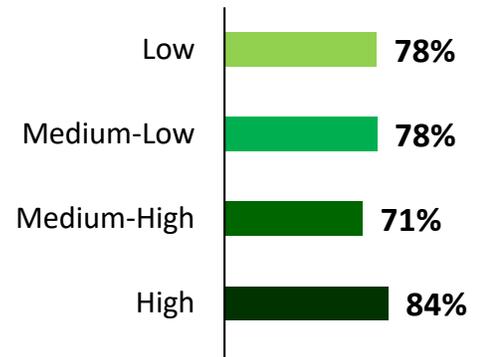
Q In general, how satisfied or dissatisfied are you with the services your organization receives from **Toronto Hydro**?
 [asked all respondents, n=200]



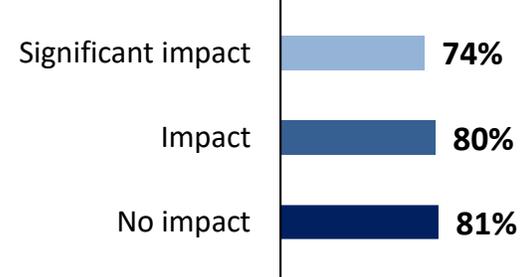
Segmentation

Those who say "Satisfied":

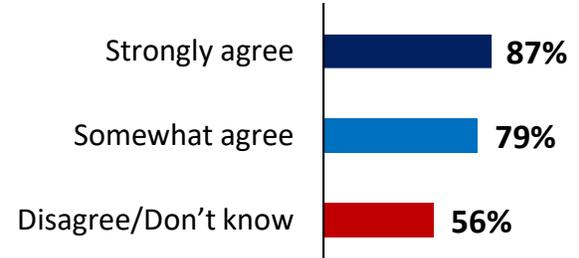
Annual Consumption



Bill Impact on Finances



Well Served by System



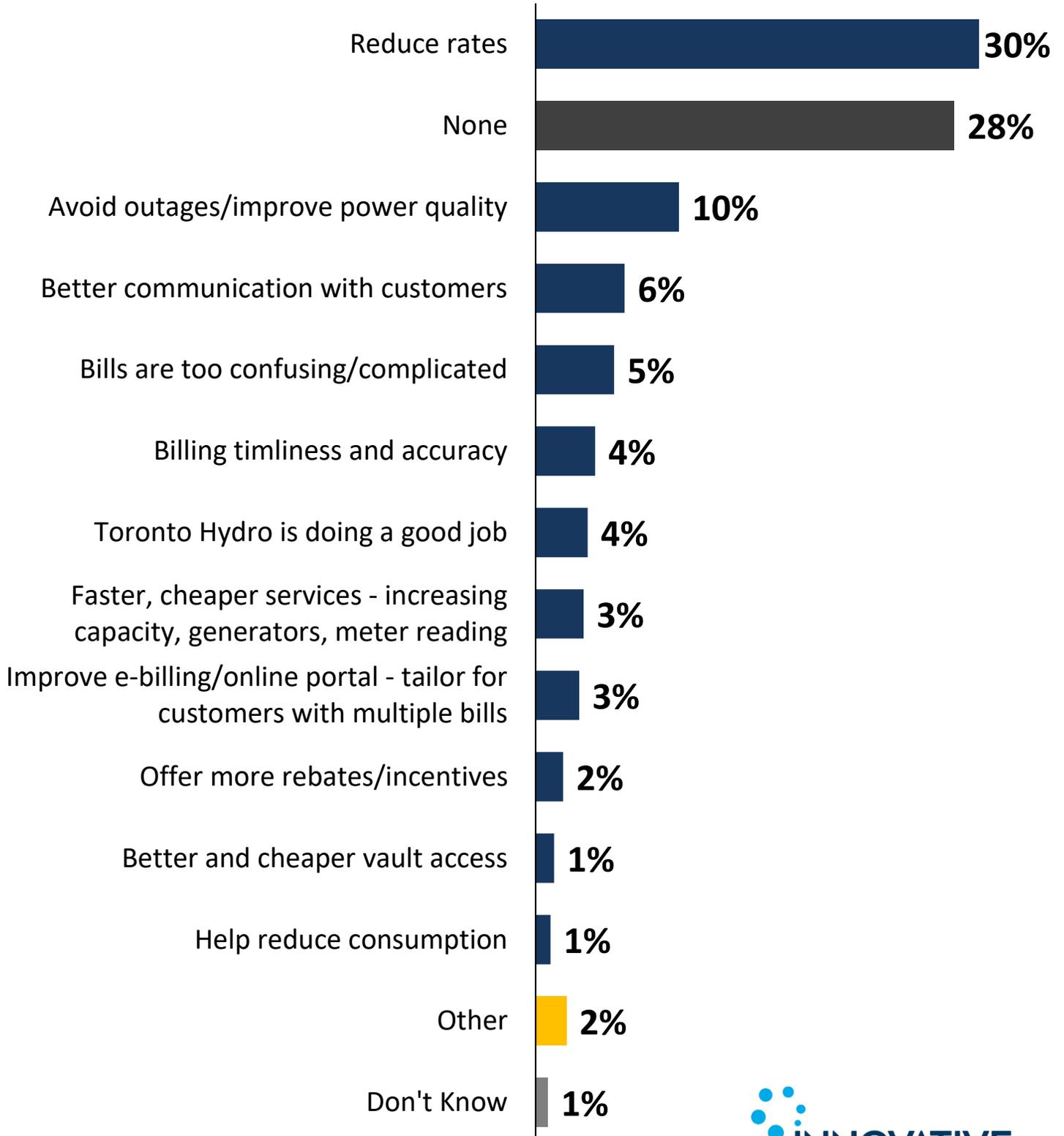
Note: "Don't know" (3%) not shown.

Suggestions for Improved Services



Is there anything in particular that **Toronto Hydro** can do to improve its services to your organization?

[asked all respondents, n=200]



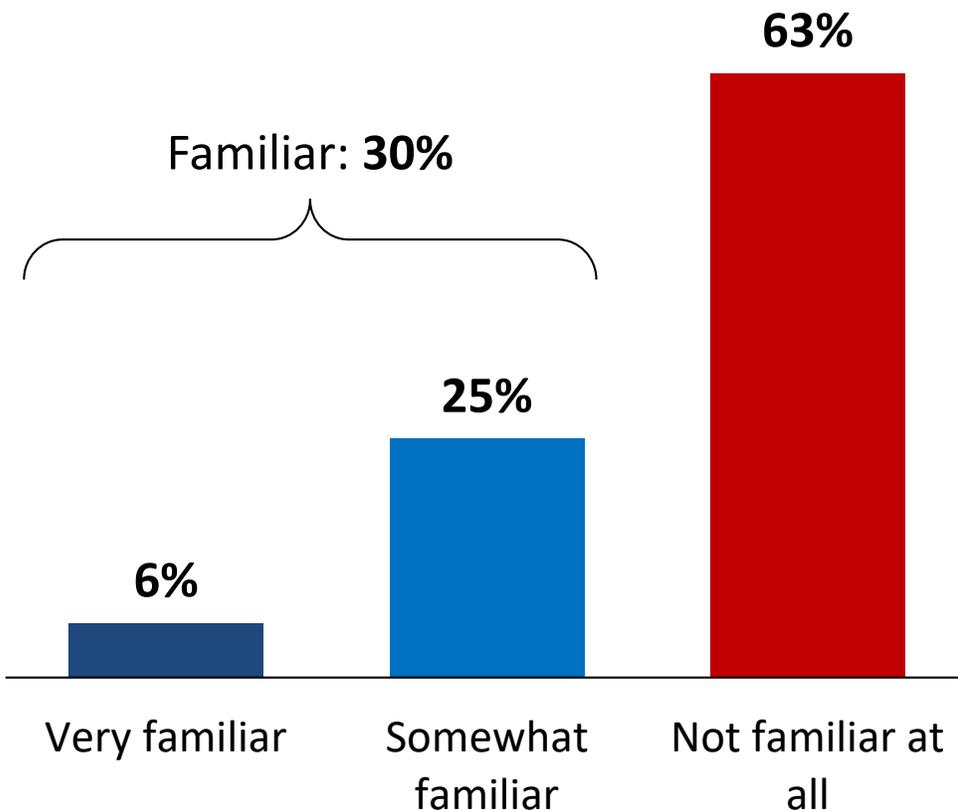
Amount of Bill Retained by Toronto Hydro



While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, they retain about **10%** of the typical mid-sized business customer's bill. This is about **\$1,290** on an average **\$13,513** monthly mid-sized business electricity 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 percentage of your organization's electricity bill that is retained by **Toronto Hydro**?

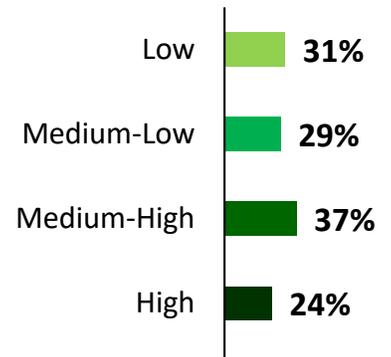
[asked all respondents, n=200]



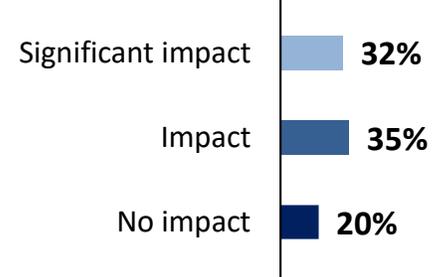
Segmentation

Those who say "Familiar":

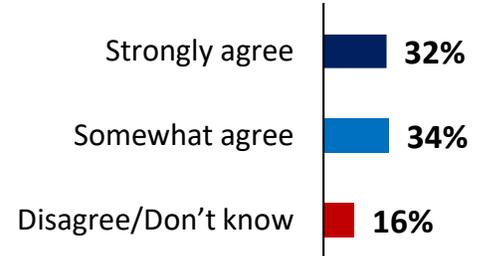
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (7%) not shown.

Familiarity with Ontario Energy Board

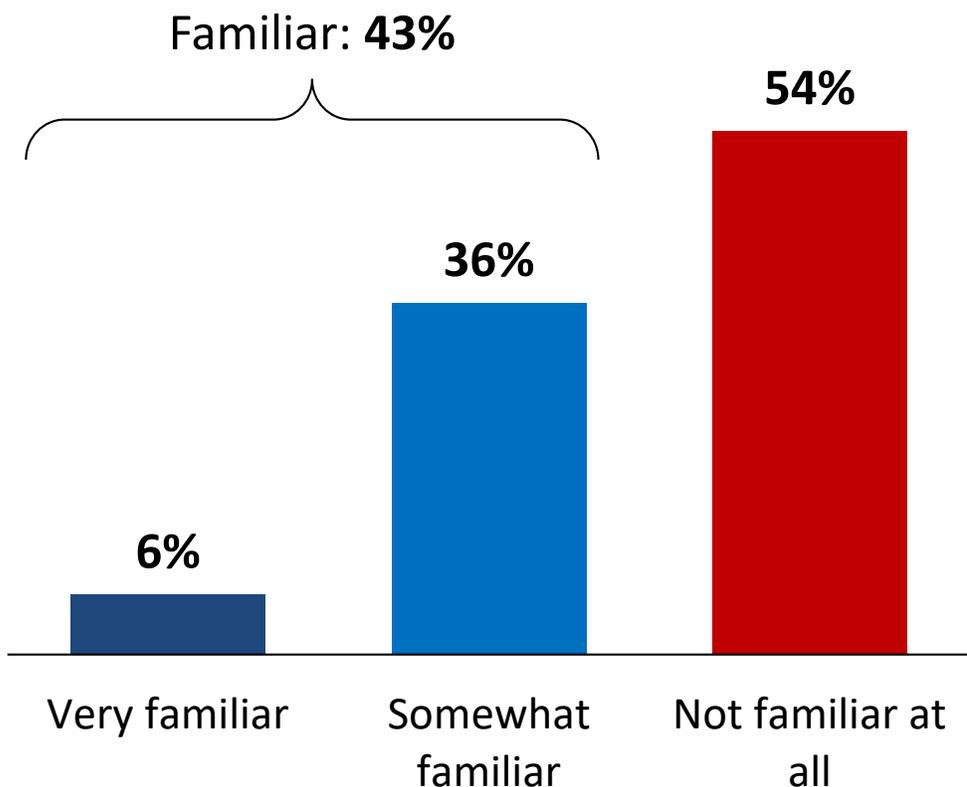


Electricity distributors are required to file a rate application with the Ontario Energy Board (OEB) to request a change in distribution rates based on their plans for capital and operating spending. Toronto Hydro is now consulting on its plans for 2020 to 2024.

The OEB is mandated to protect consumers with respect to prices and the reliability and quality of electricity service.

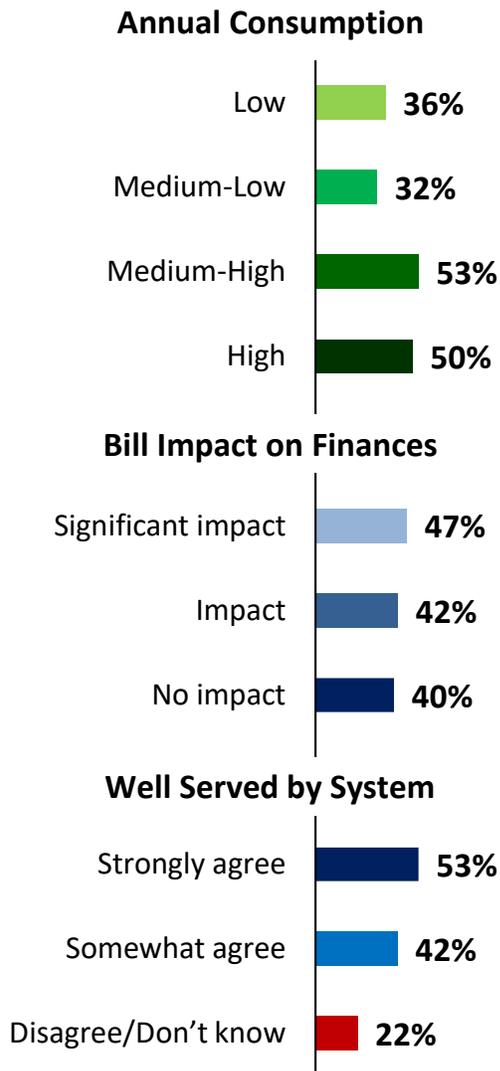
How familiar would you say you are with the Ontario Energy Board or “OEB”?

[asked all respondents, n=200]



Segmentation

Those who say “Familiar”:



Note: “Don’t Know” (3%) not shown.

Customer Engagement Process

Preamble



As part of **Toronto Hydro's** consultation, it has developed a five-phase approach to gathering and responding to customer feedback.

- First, **Toronto Hydro** identified customer priorities through a series of surveys and focus groups;
- Then, used this customer feedback to guide development of its Draft Plan;
- Now, **Toronto Hydro** is in the process of collecting customer feedback on its Draft Plan;
- The next phases will include re-examining its Draft Plan based on customer feedback and preparing a submission to the OEB.

This survey is part of the third stage of **collecting customer feedback on the Draft Plan.**

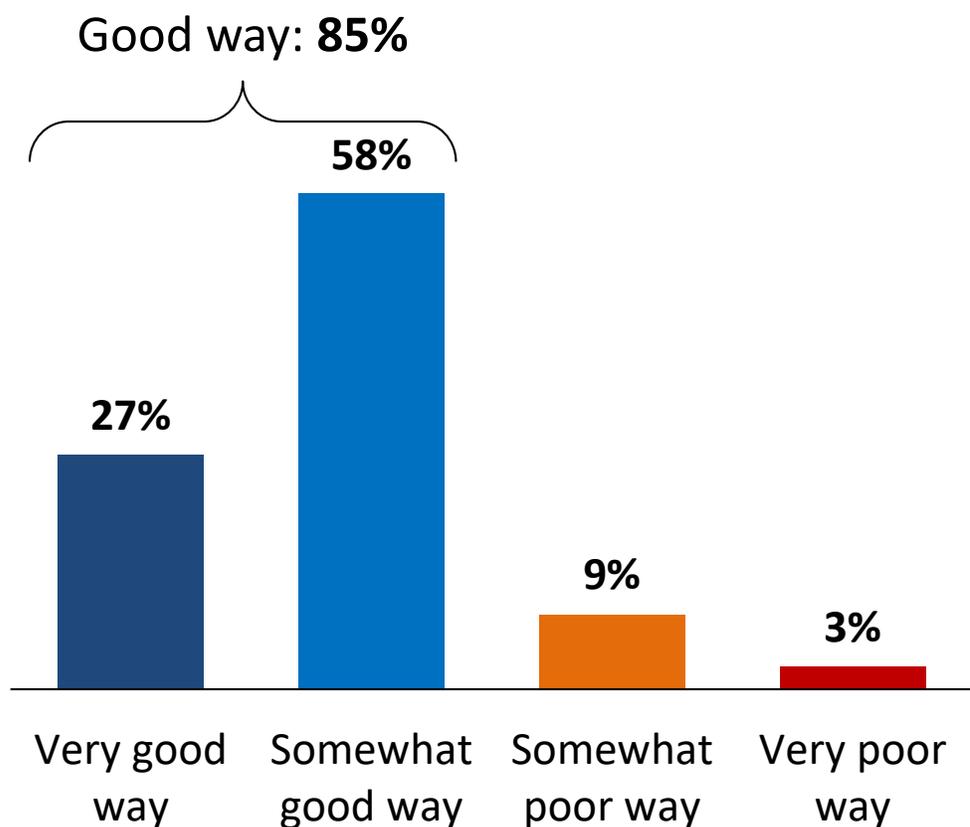


Feedback on Customer Engagement Process



Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into **Toronto Hydro's** plan?

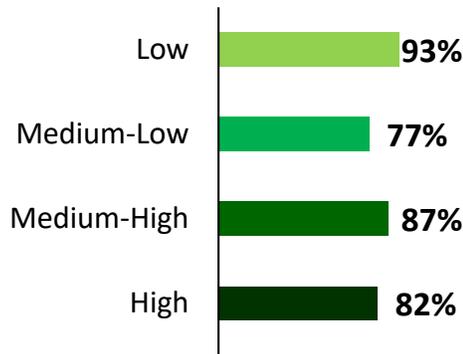
[asked all respondents, n=200]



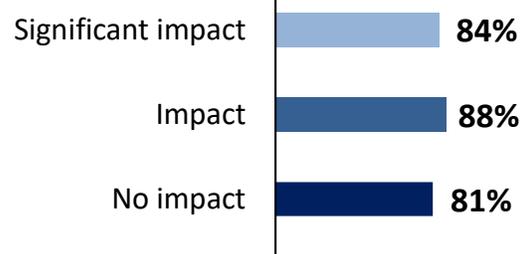
Segmentation

Those who say "Good Way":

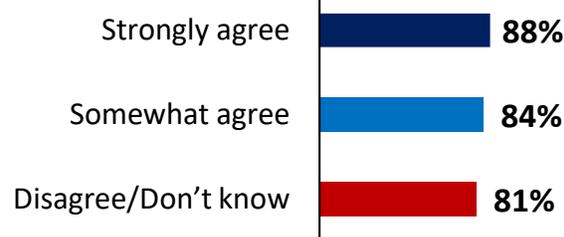
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (4%) not shown.

Customer Priorities

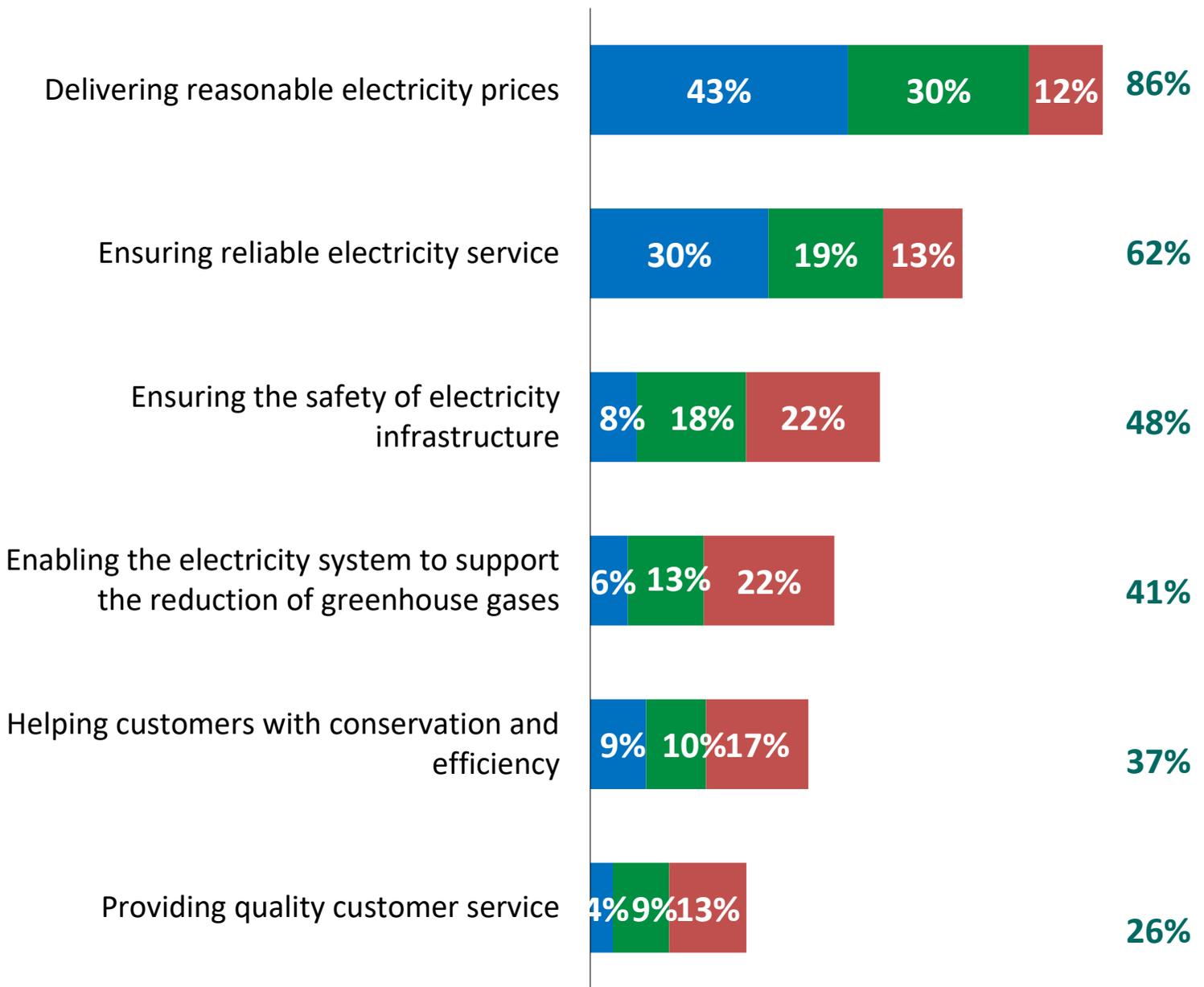


Toronto Hydro wants to better understand customer priorities. In the first phase of customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for **Toronto Hydro**.

Among the following customer identified priorities, please tell me which one is the most important to you.

[asked all respondents, n=200]

Top 3 Priority



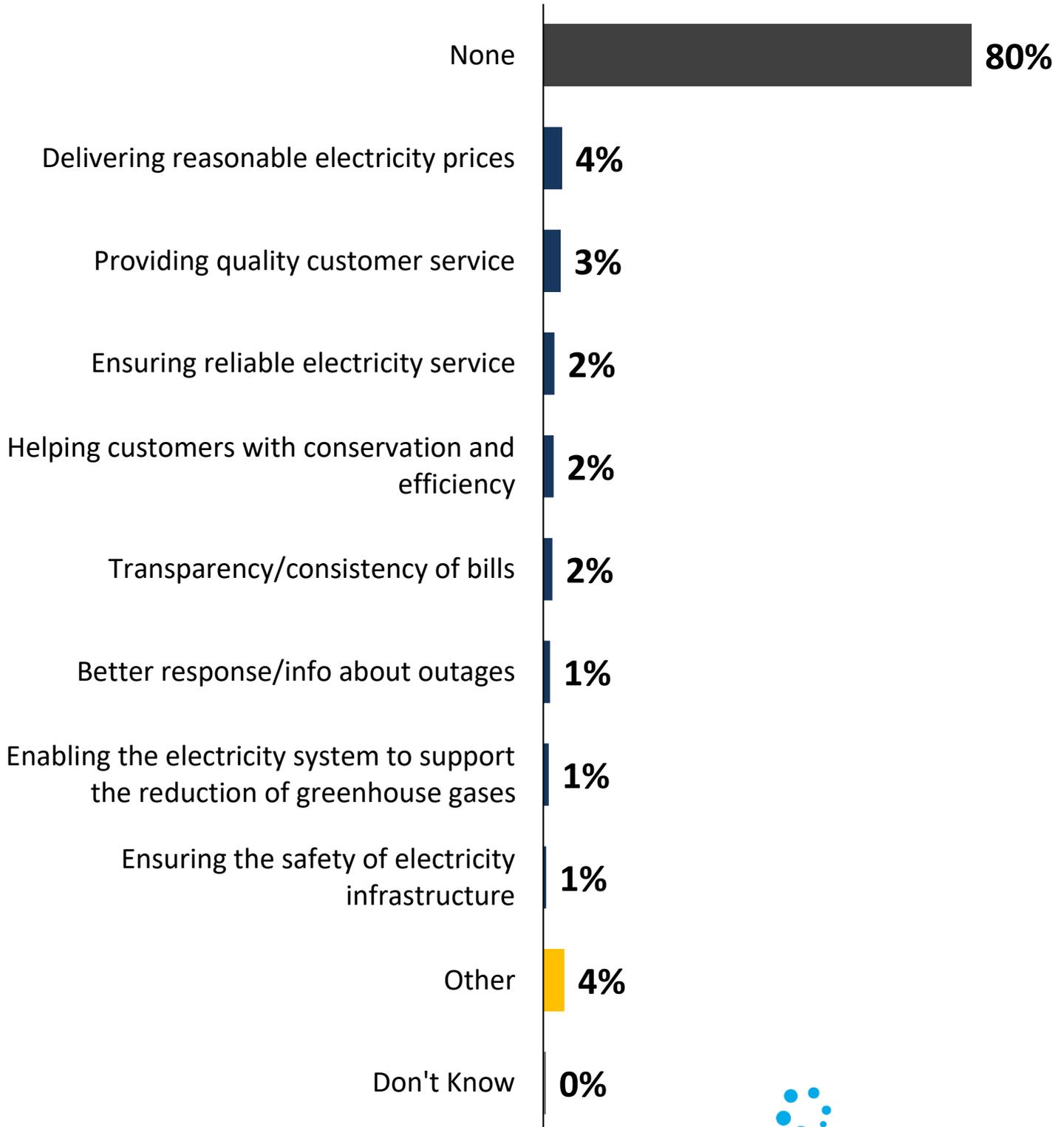
■ Most important
 ■ Second most important
 ■ Third most important

Additional Customer Priorities



Are there any other important priorities that **Toronto Hydro** should be focusing on that weren't included in the previous list I read to you?

[asked all respondents, n=200]



Planning Principles and Rate Impact

Preamble



Based, in part, on the initial customer input, **Toronto Hydro** has drafted a plan totaling approximately \$4.3B over five years.

Toronto Hydro's proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

This proposed plan translates into an average 3.9% increase in your organization's distribution rates each year from 2020 to 2024. The distribution charges on the monthly bill would increase to \$2,023 by 2024 for a typical mid-sized business customer.

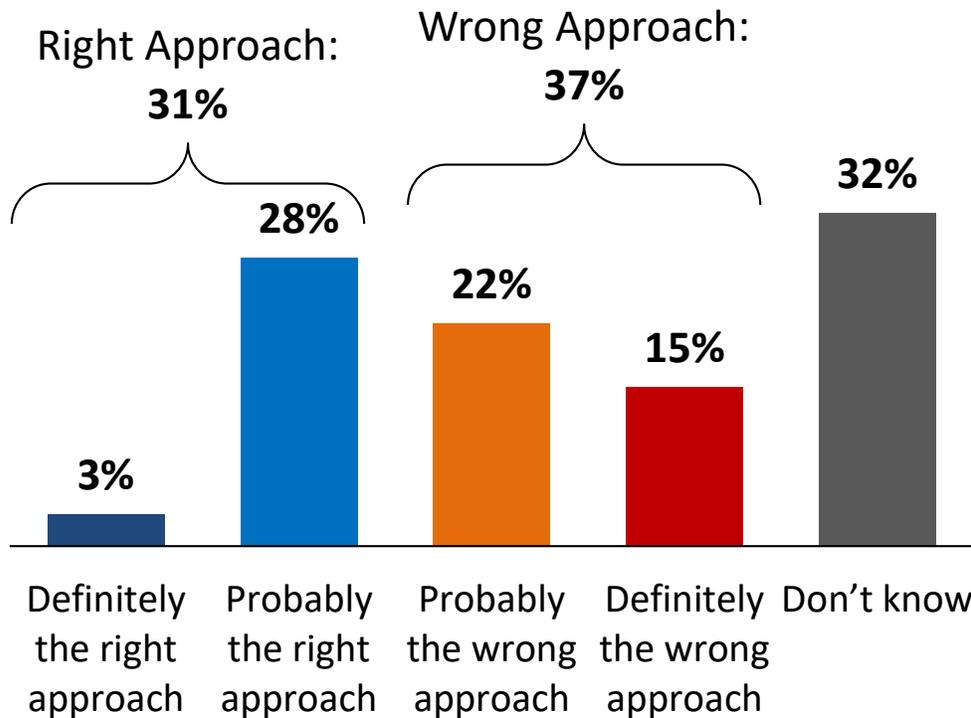


Approach to Planning for the Next Five Years



Do you feel that this is definitely the right approach, probably the right approach, probably the wrong approach or definitely the wrong approach to **Toronto Hydro's** planning for the next five years or would you say you don't know?

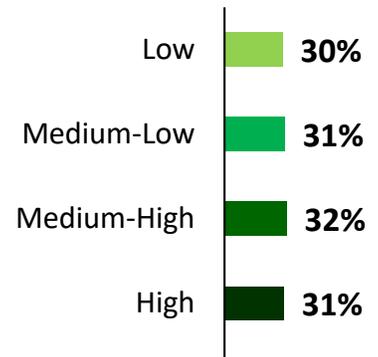
[asked all respondents, n=200]



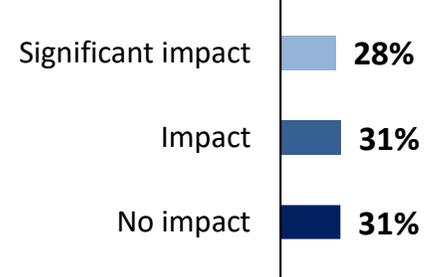
Segmentation

Those who say "Right Approach":

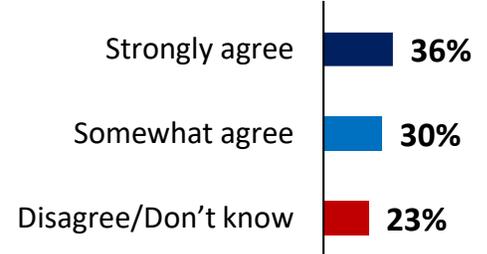
Annual Consumption



Bill Impact on Finances



Well Served by System



Gathering Feedback on Capital Investment Decisions



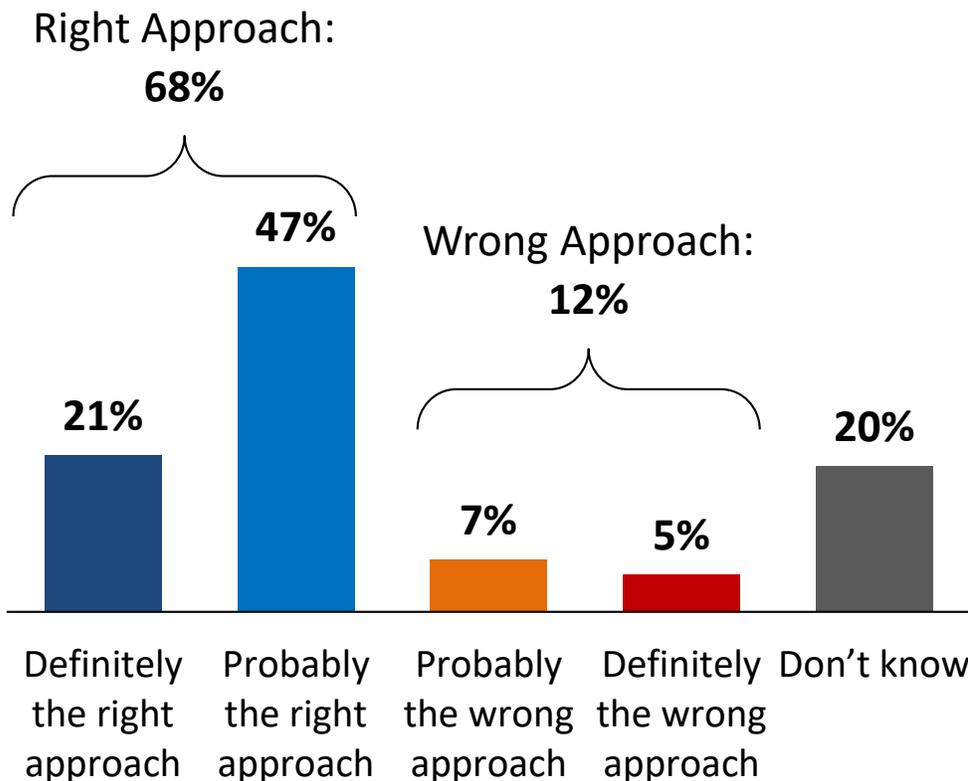
Toronto Hydro's total spending is benchmarked by the OEB against other utilities in Ontario. Toronto Hydro's operating costs of \$305 per customer are within \$1 of the provincial average.

However **Toronto Hydro's** capital investment costs are \$739 per customer which are \$245 more than the provincial average.

Since a number of capital investment decisions are based trade-offs between costs and customer outcomes – like services and reliability levels – the remaining questions in this survey ask for your feedback on those choices.

Do you feel that gathering feedback on capital investment decisions is *definitely the right approach, probably the right approach, probably the wrong approach, definitely the wrong approach or would you say you don't know?*

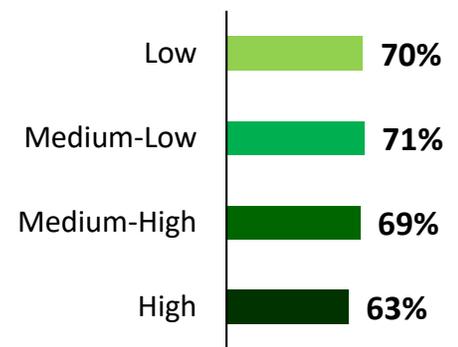
[asked all respondents, n=200]



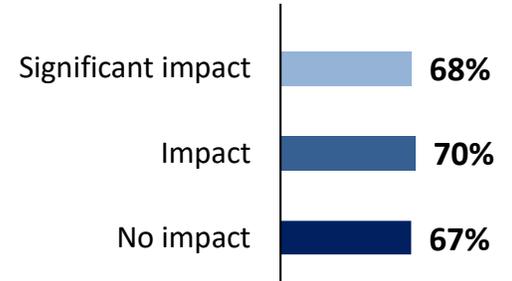
Segmentation

Those who say "Right Approach":

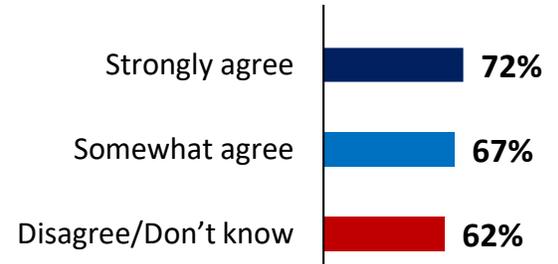
Annual Consumption



Bill Impact on Finances



Well Served by System



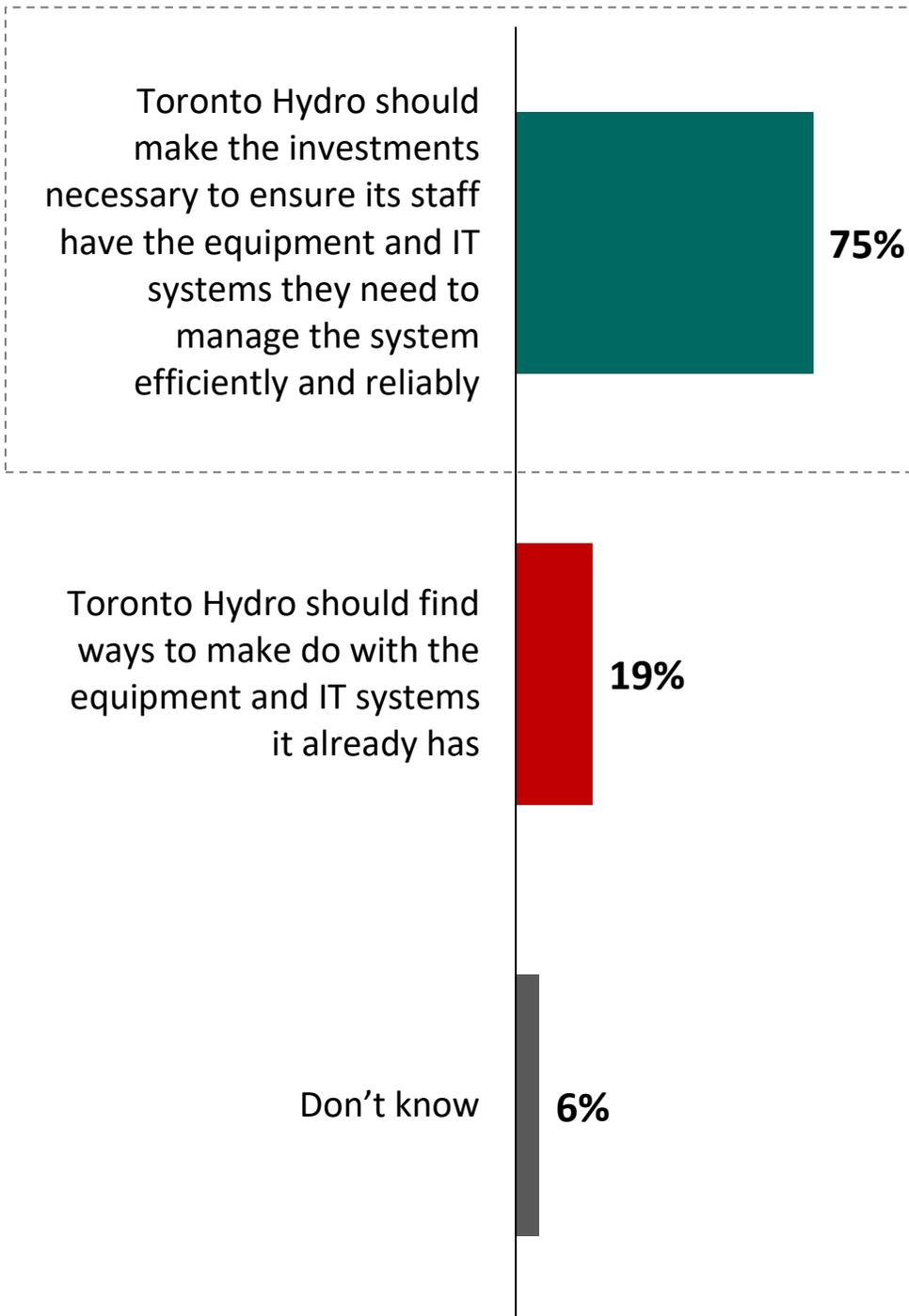
Investing in the Basics



As a company, **Toronto Hydro** needs vehicles and tools to service the power lines and IT systems to manage the system and customer information.

Which of the following statements best represents your point of view?

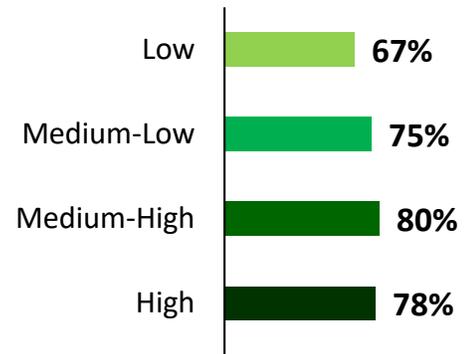
[asked all respondents, n=200]



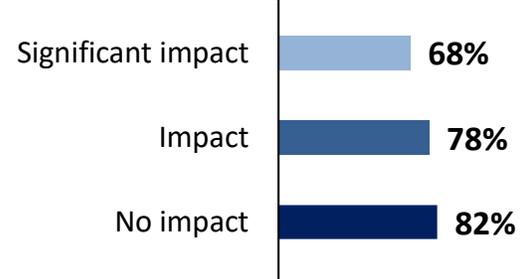
Segmentation

Those who say "Make necessary investments":

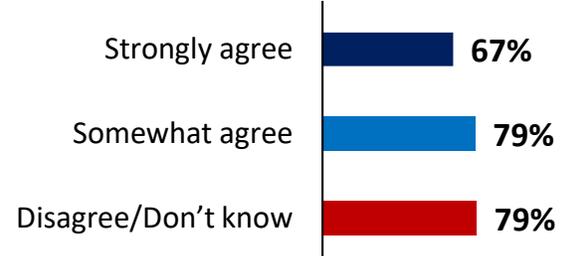
Annual Consumption



Bill Impact on Finances



Well Served by System



Addressing Safety and Reliability

Addressing Safety and Reliability

Preamble



Toronto Hydro has identified areas where it could accelerate investments. These accelerated projects could increase the **typical customer's bill by \$100 per month by 2024**. These projects are in addition to the 3.9% increase that is currently being proposed.

Toronto Hydro wants to get your feedback on particular projects before deciding whether or not to accelerate its investment plan in certain specific areas.

Right now, the typical **Toronto Hydro** customer averages 1.4 outages per year with an average of between 60 and 70 minutes without power over the year. While many of those outages are caused by events outside of **Toronto Hydro's** control, roughly 36% are caused by the failure of aging equipment.

In this proposed plan, **Toronto Hydro's** general approach is to spend just enough on replacing equipment so that most customers can expect a similar level of reliability over the next five years as they are experiencing today, and to provide improved service for those customers whose reliability is poorer or who have special reliability needs such as hospitals.

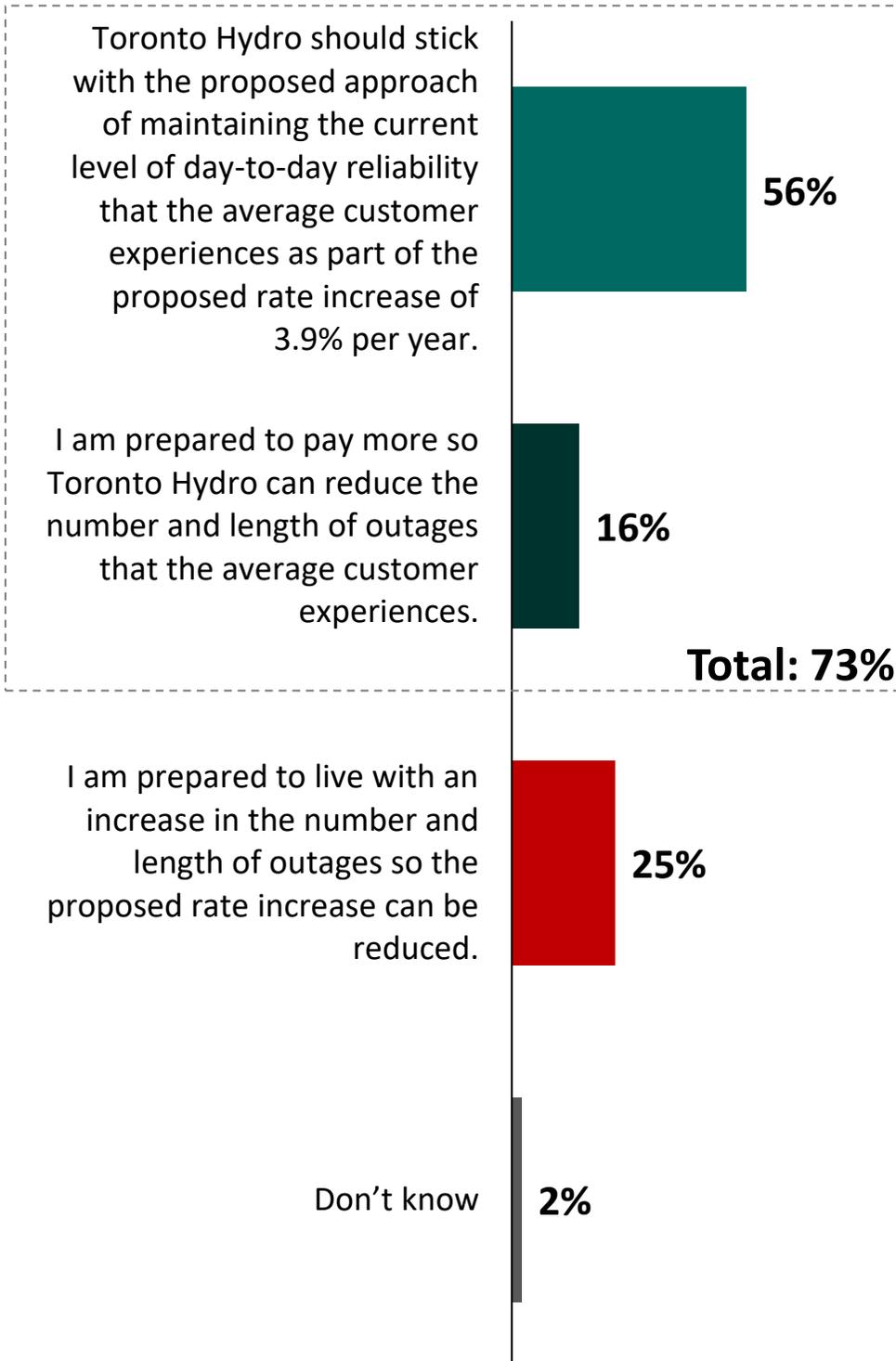


Approach to Addressing Reliability



Which of the following is closest to your point of view regarding **Toronto Hydro's** approach to addressing reliability?

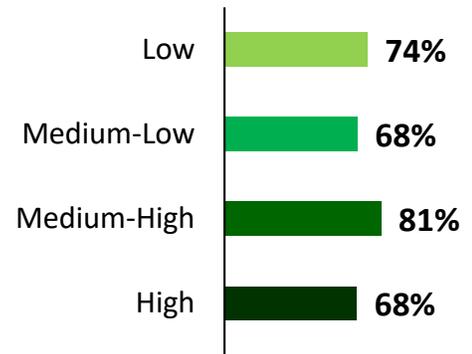
[asked all respondents, n=200]



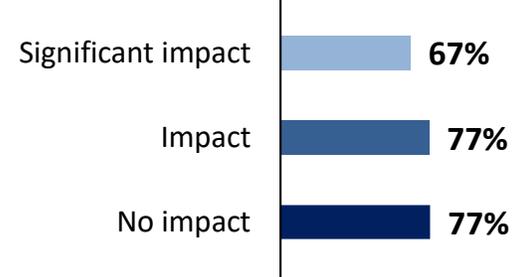
Segmentation

Those who say "Stick with proposed approach or spend more":

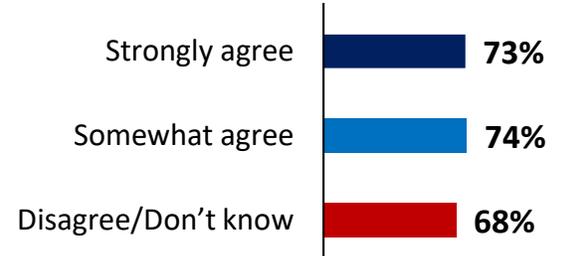
Annual Consumption



Bill Impact on Finances



Well Served by System



Rear-Lot Replacement



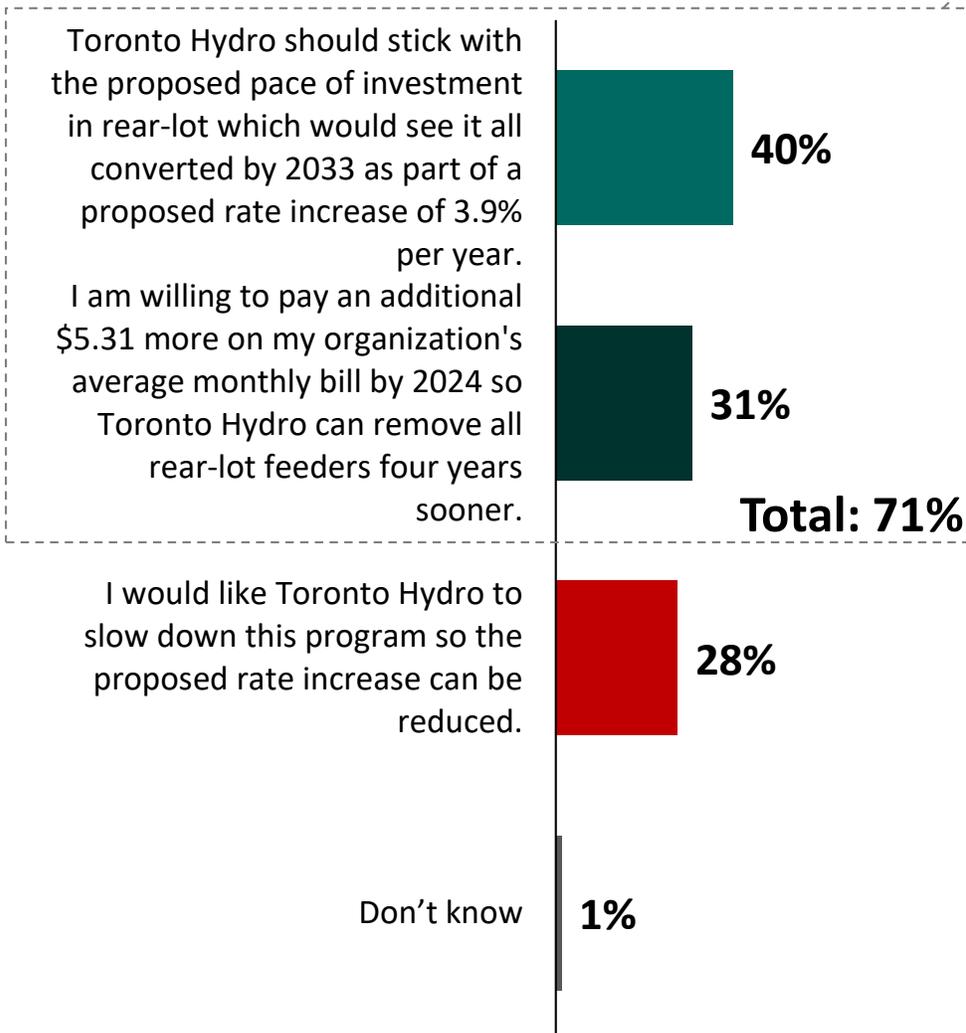
Some customers are served by older types of lines that are more likely to fail, causing more frequent, and longer lasting power outages. These customers are more likely to experience poorer reliability over time than most Toronto Hydro customers. The proposed plan will replace those lines over time but the work could be done faster.

I would like to ask you about two types of lines.

One example is **rear-lot lines**. They go through residential backyards and are often more difficult to service and more exposed to falling branches. The proposed plan will replace all existing rear-lot lines by 2033. **Toronto Hydro** could replace those lines 4 years sooner for an additional cost.

Which of the following statements is closest to your view?

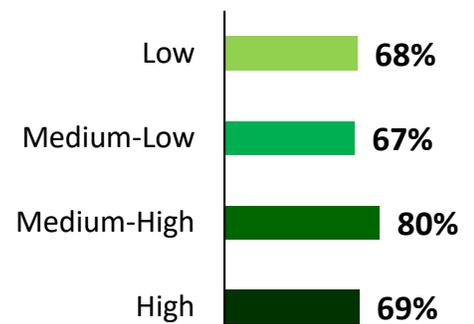
[asked all respondents, n=200]



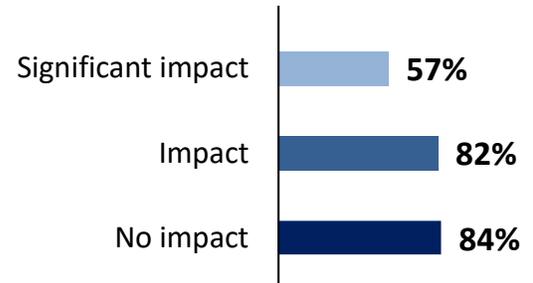
Segmentation

Those who say "Stick with proposed approach or spend more":

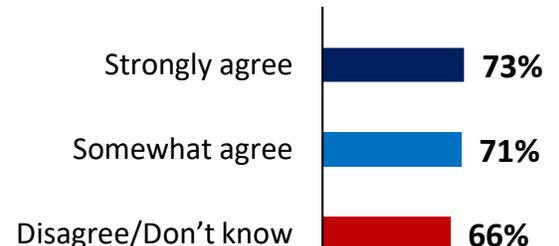
Annual Consumption



Bill Impact on Finances



Well Served by System



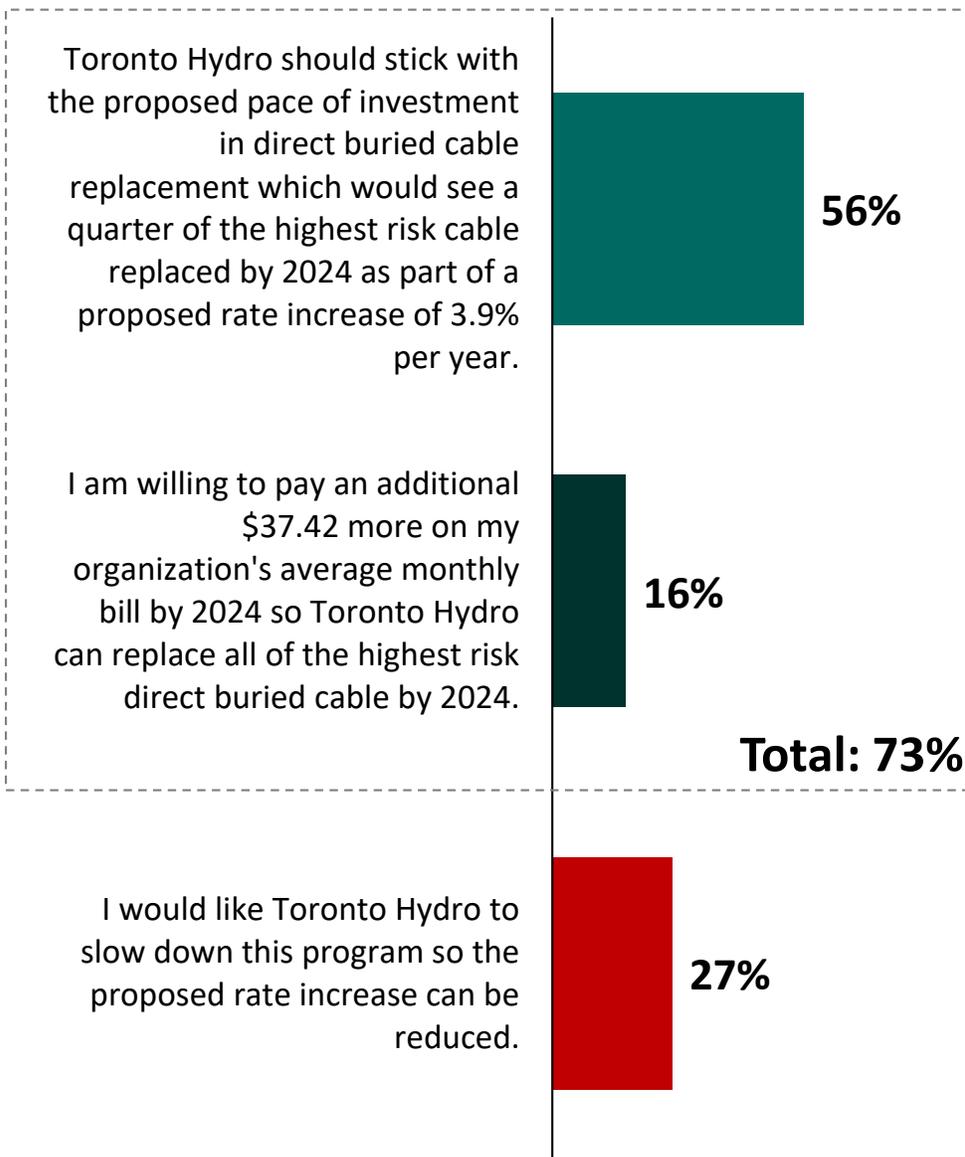
Direct Buried Cable Replacement

Another example is **direct buried cable** where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system.

Once these cables start to fail, they tend to experience a rash of failures. The proposed plan will replace a quarter of the highest risk direct buried cable by 2024. **Toronto Hydro** could replace all of the highest risk direct buried cable by 2024 for an additional cost.

Which of the following statements is closest to your view?

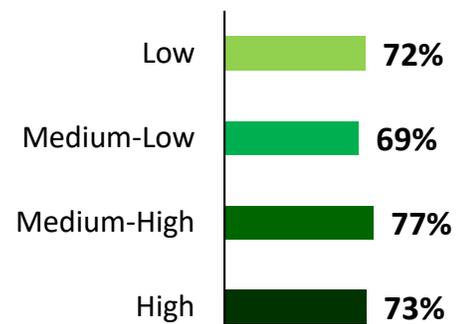
[asked all respondents, n=200]



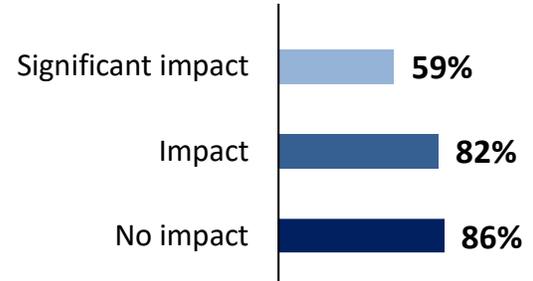
Segmentation

Those who say "Stick with proposed approach or spend more":

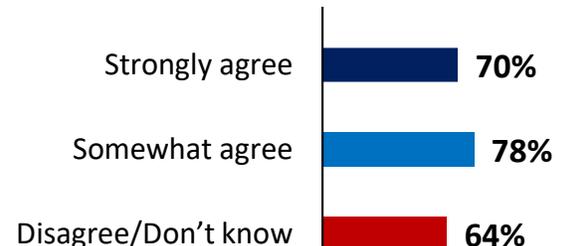
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (1%) not shown.

Paper Insulated Lead Covered (PILC) Preamble



Toronto Hydro has identified three equipment upgrades that are needed within the next few years. If **Toronto Hydro** waits, those upgrades will be more expensive and disruptive as Toronto continues to grow.

Firstly, Paper Insulated Lead Covered (PILC) cable. PILC cable was an old type of underground cable that stopped being installed on **Toronto Hydro's** grid 20 years ago. While the equipment is resilient and is still providing electricity to the downtown core, the outer lead covers can begin to crack and leak oil. Replacing these cables is becoming increasingly difficult and expensive to resource and complete.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049. But **Toronto Hydro** can replace all of this cable ten years earlier by 2039, at an additional cost now. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.

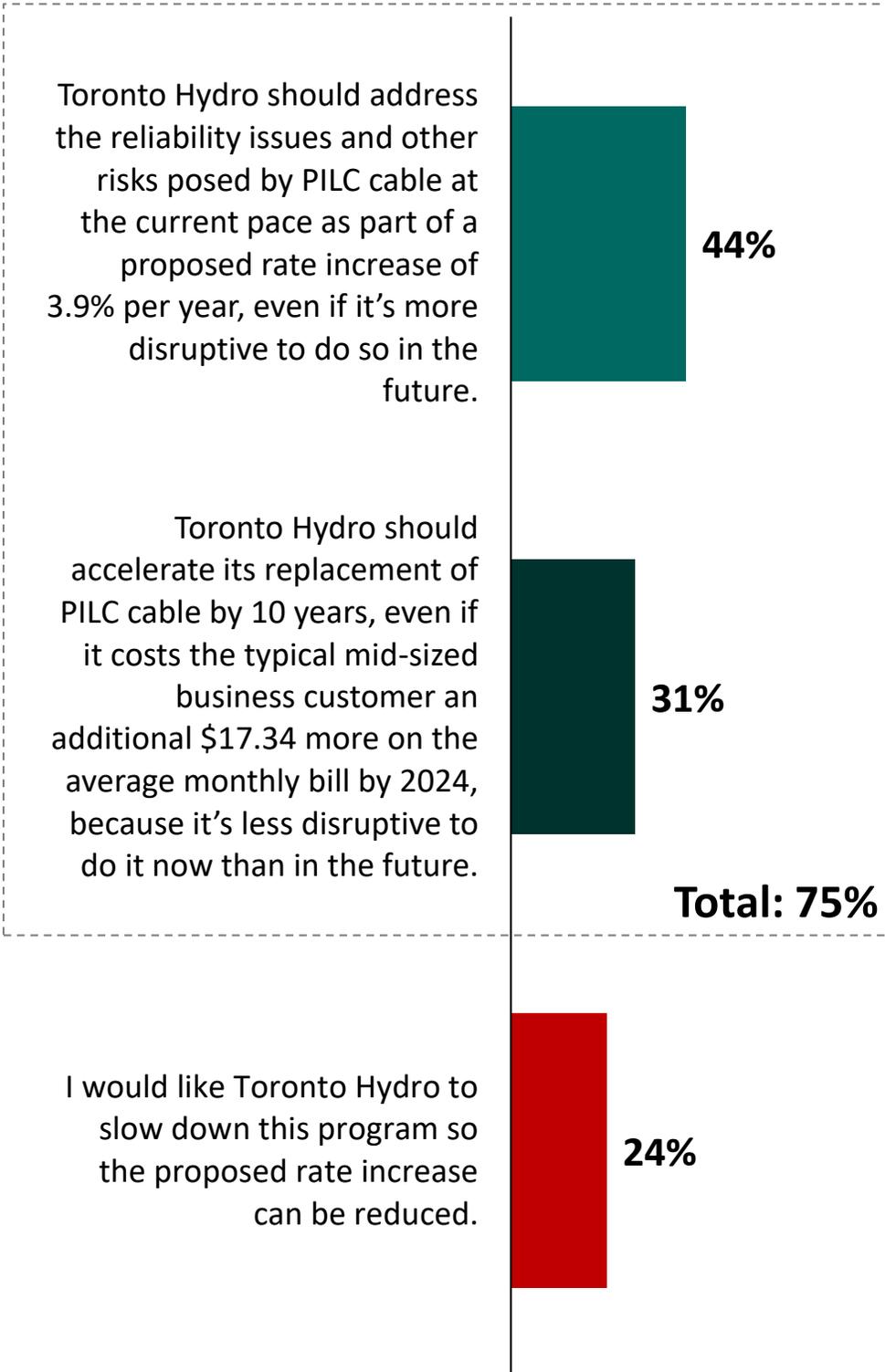


PILC Cable Replacement Program



Which of the following is closest to your point of view regarding **Toronto Hydro's** PILC Cable replacement program?

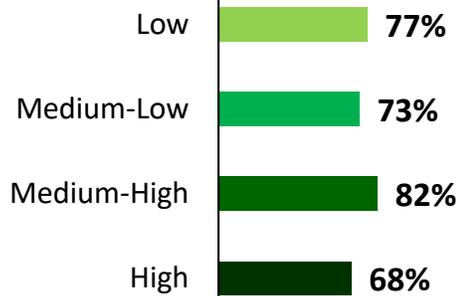
[asked all respondents, n=200]



Segmentation

Those who say "Stick with proposed approach or spend more":

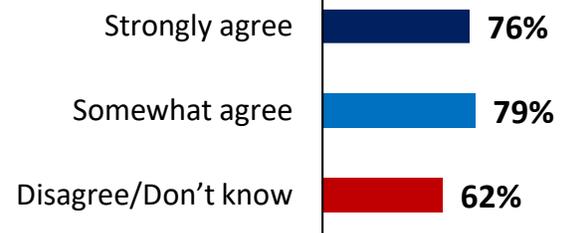
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (1%) not shown.

Network Unit Replacement Program

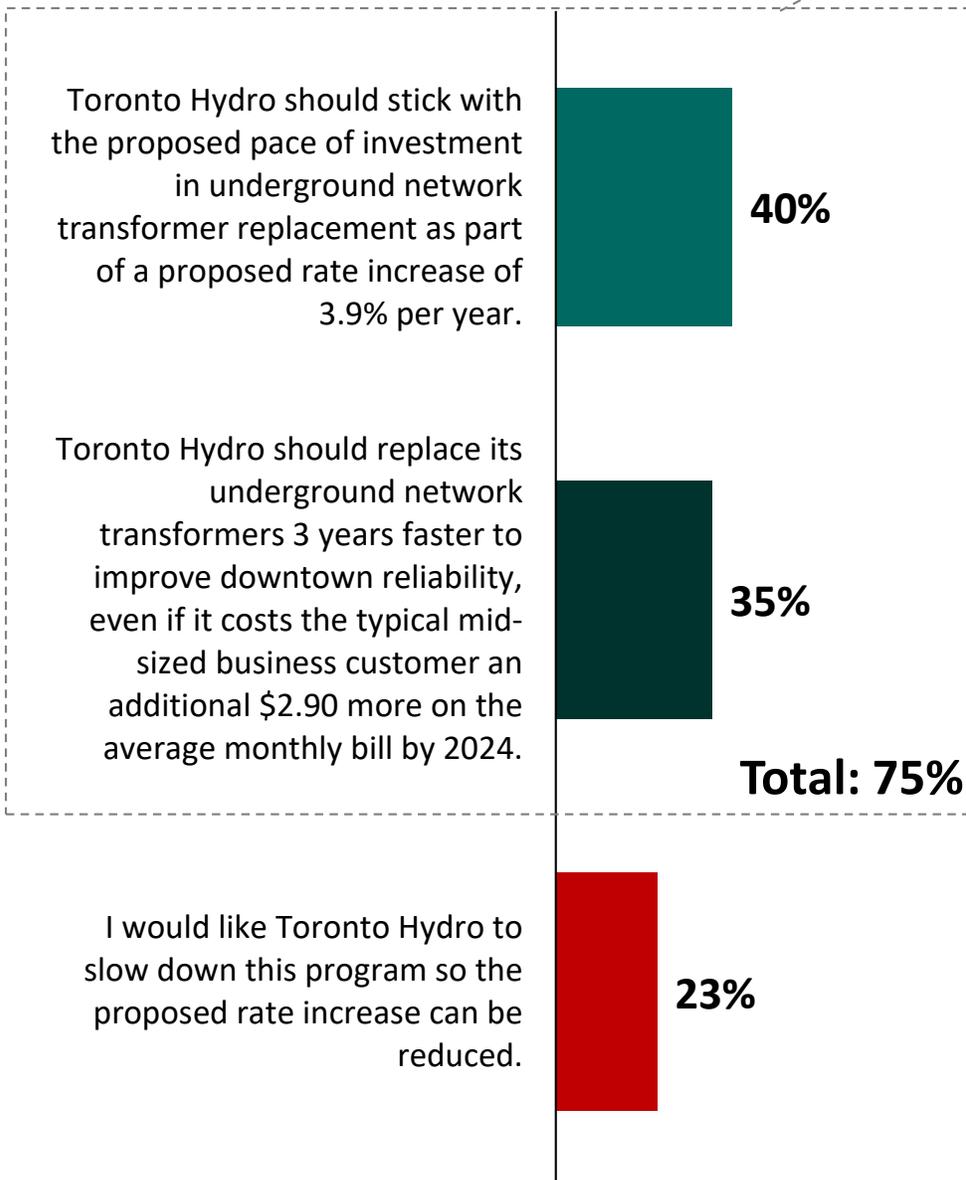


The second upgrade project identified is *Underground Network Transformers*. The key problem with these units is their older design which makes them prone to flooding.

Toronto Hydro plans to replace just enough of these units by 2031 so that outages, due to equipment failure, don't get any worse. But the process could be advanced by three years to replace all these units by 2028.

Which of the following is closest to your point of view regarding **Toronto Hydro's** Network Unit replacement program?

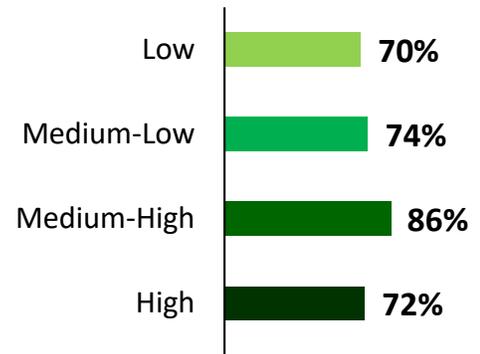
[asked all respondents, n=200]



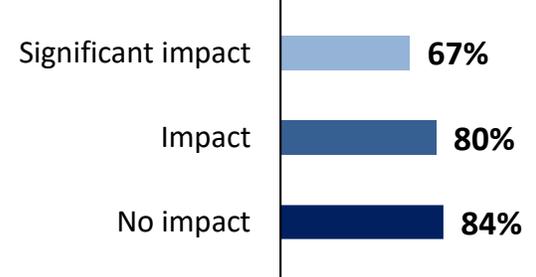
Segmentation

Those who say "Stick with proposed approach or spend more":

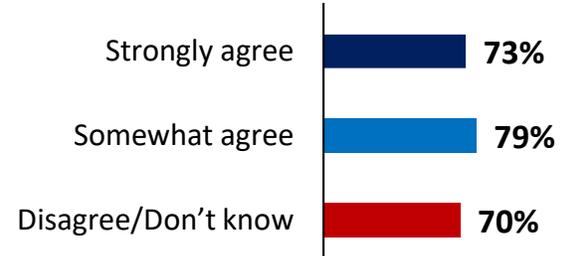
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (2%) not shown.

Cable Chamber Renewal Program

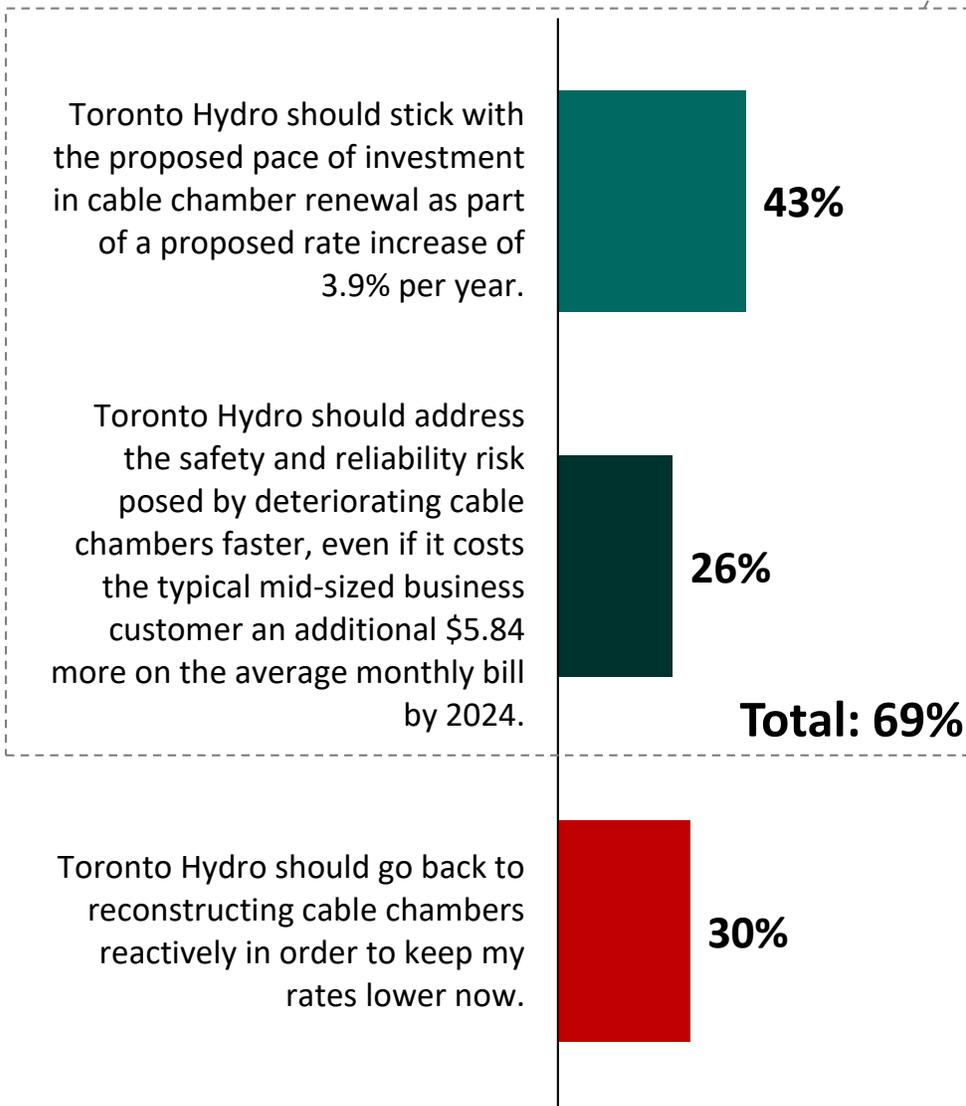


The third upgrade project identified is *Cable Chamber replacement*. Cable Chambers house, protect, and provide access to underground electrical equipment across the city. When they deteriorate or break, this equipment can cause outages and pose anything from a tripping hazard to something more serious like a collapsed chamber.

Toronto Hydro plans to take approximately 30 years to address the chambers in the worst condition. But accelerating the work could halve that period, at an additional cost now.

Which of the following is closest to your point of view regarding **Toronto Hydro's** Cable Chamber renewal program?

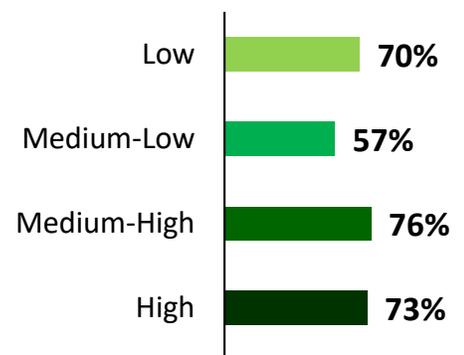
[asked all respondents, n=200]



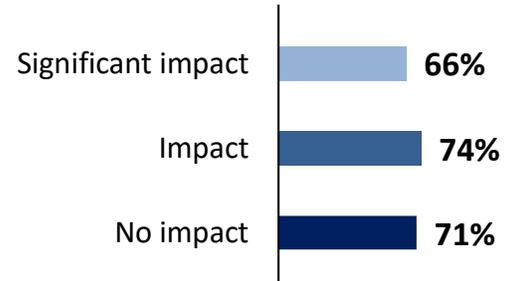
Segmentation

Those who say “Stick with proposed approach or spend more”:

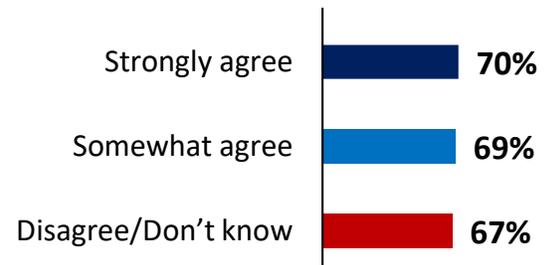
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: “Don't Know” (1%) not shown.

Dealing with More Frequent Extreme Weather Events

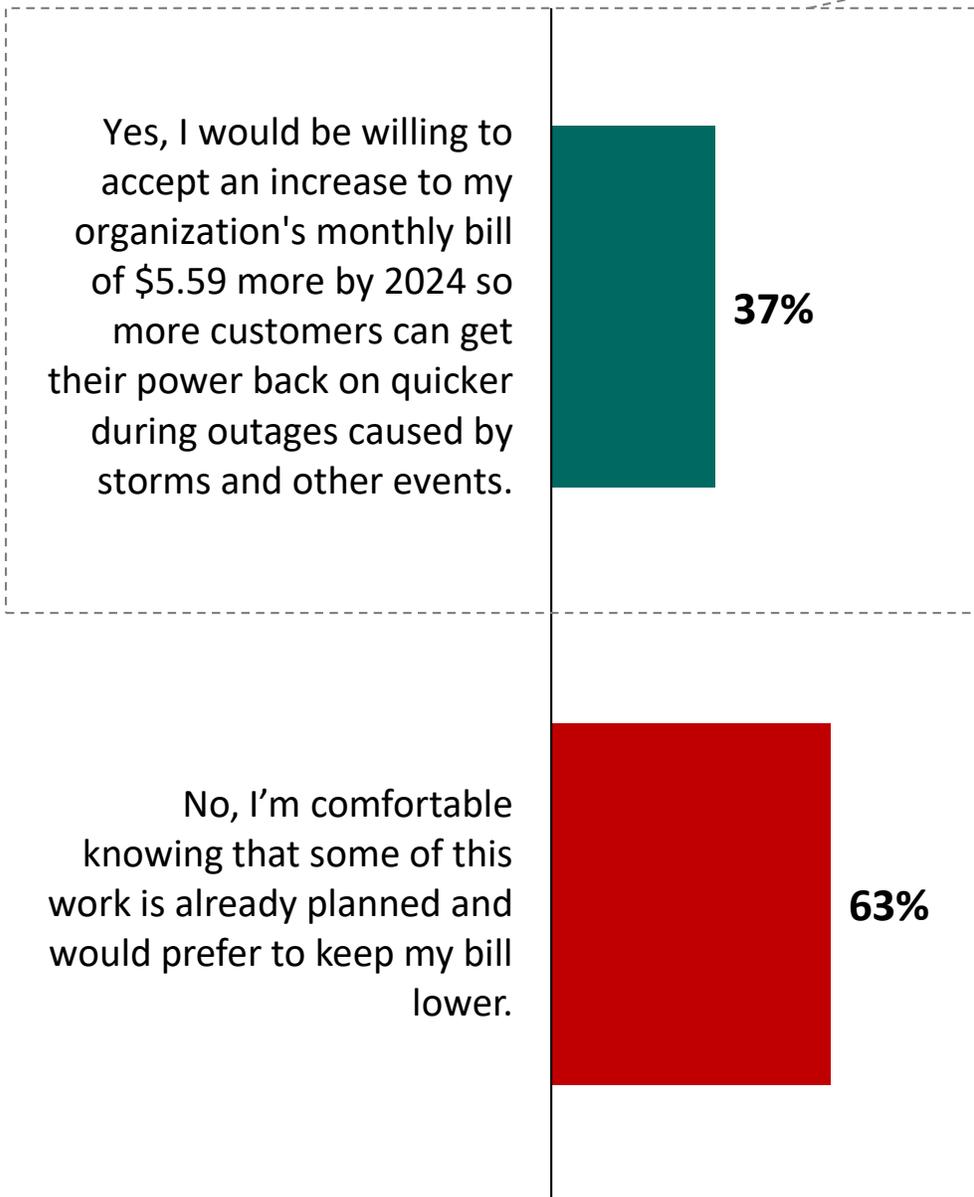


As **Toronto Hydro's** distribution system is exposed to strong winds, freezing rain, and severe flooding, they are proposing a variety of enhancements to improve the resiliency of the distribution system against extreme weather events.

Toronto Hydro could enhance the system further in neighbourhoods outside of downtown. The improvements include adding remotely-operated technology and more back-up links within the grid. This will help **Toronto Hydro** to better isolate the problem and reduce outage times by as much as 50% in these areas.

Which of the following statements best represents your point of view?

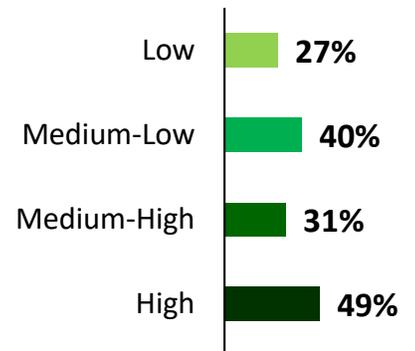
[asked all respondents, n=200]



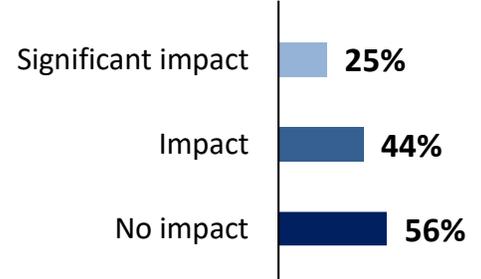
Segmentation

Those who say "Restore power more quickly during outages":

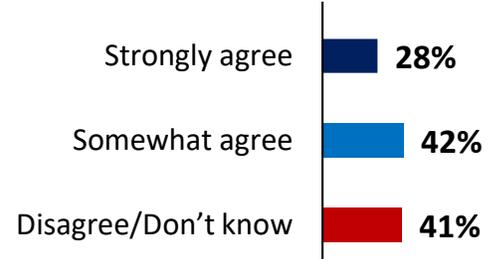
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (1%) not shown.

Innovation and Planning for the Future

Investments in Energy Storage

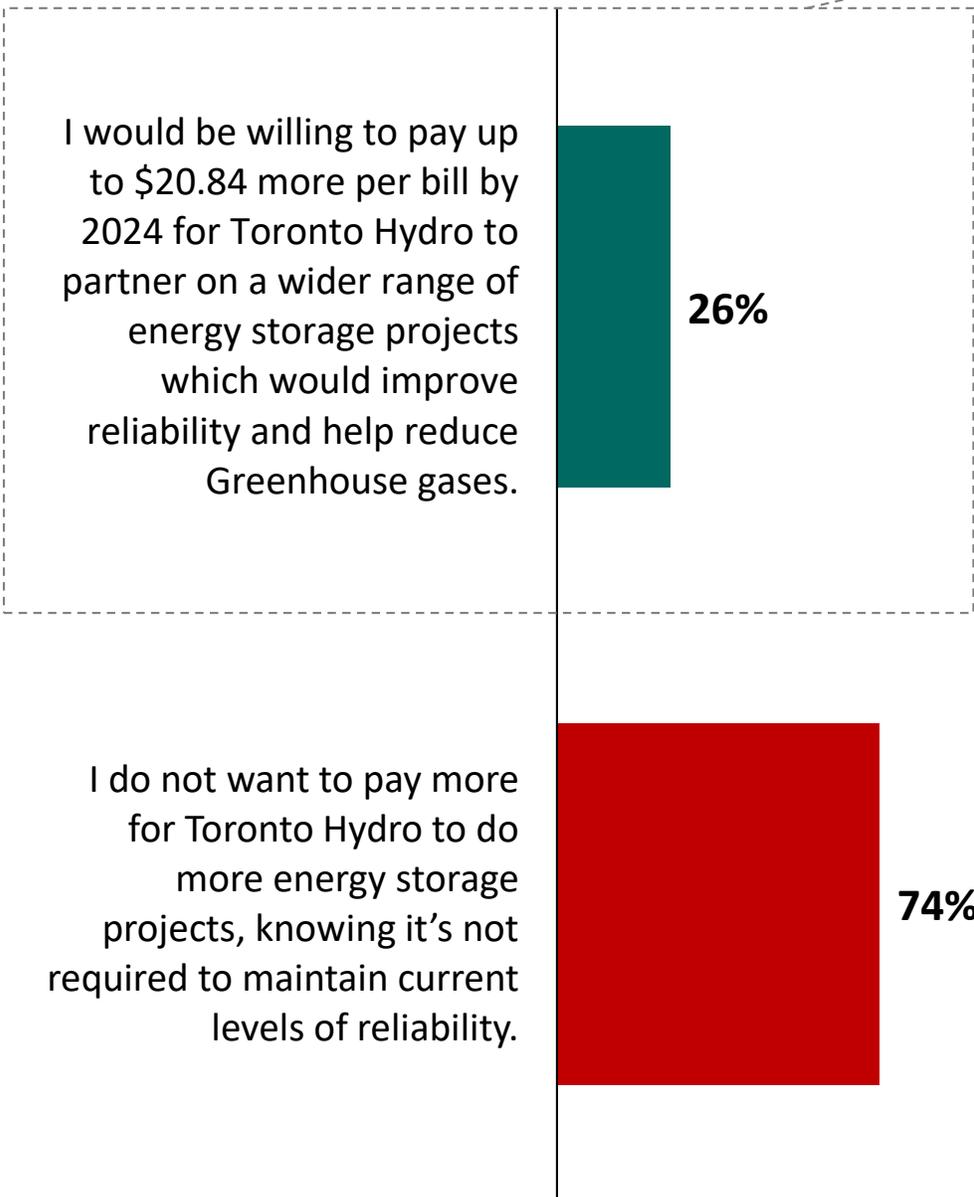


3% of the proposed budget would be spent on innovation and planning for the future. The following questions are about this aspect of the budget.

Toronto Hydro has already begun to integrate large-scale battery electricity storage into the system. They have now identified more opportunities to partner on a wider range of energy storage projects. Integrating storage into the system can improve reliability and help reduce greenhouse gases, but it is not required to maintain current levels of reliability.

Which of the following is closest to your point of view?

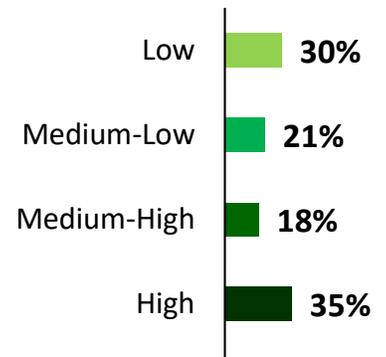
[asked all respondents, n=200]



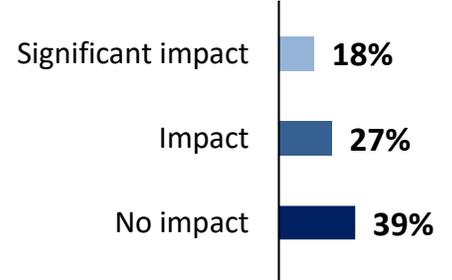
Segmentation

Those who say "Pay more to partner on energy storage projects":

Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (1%) not shown.

Monitoring and Control Equipment

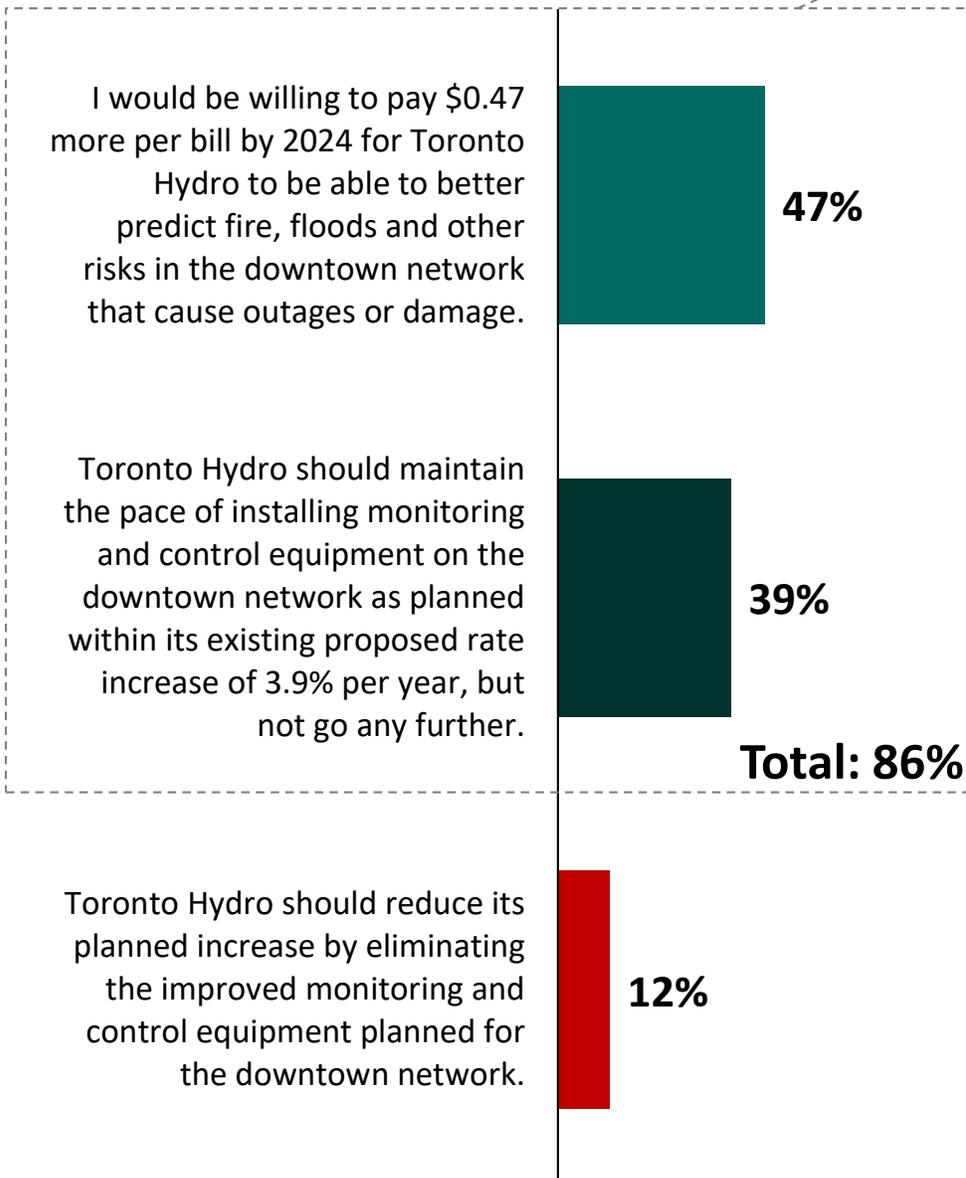
Q New communication technology has revolutionised the way the grid can be managed.

Toronto Hydro plans to take advantage of various new technologies wherever clear benefits can be established.

However, **Toronto Hydro** can improve the reliability of its grid further by installing communication devices in the downtown underground network that detect fire, floods or other risks more quickly.

Which of the following is closest to your point of view?

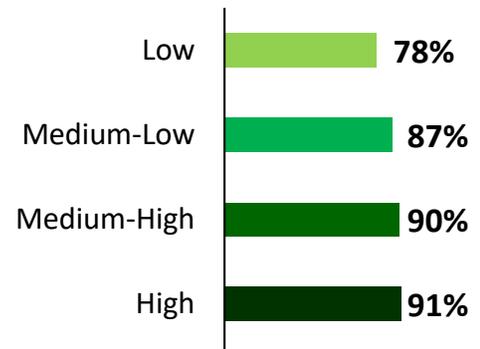
[asked all respondents, n=200]



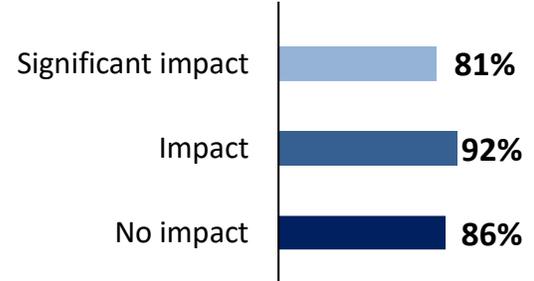
Segmentation

Those who say “Stick with proposed approach or spend more”:

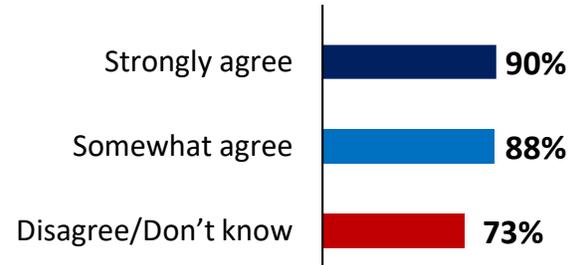
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: “Don’t Know” (2%) not shown.

Supporting Microgrids

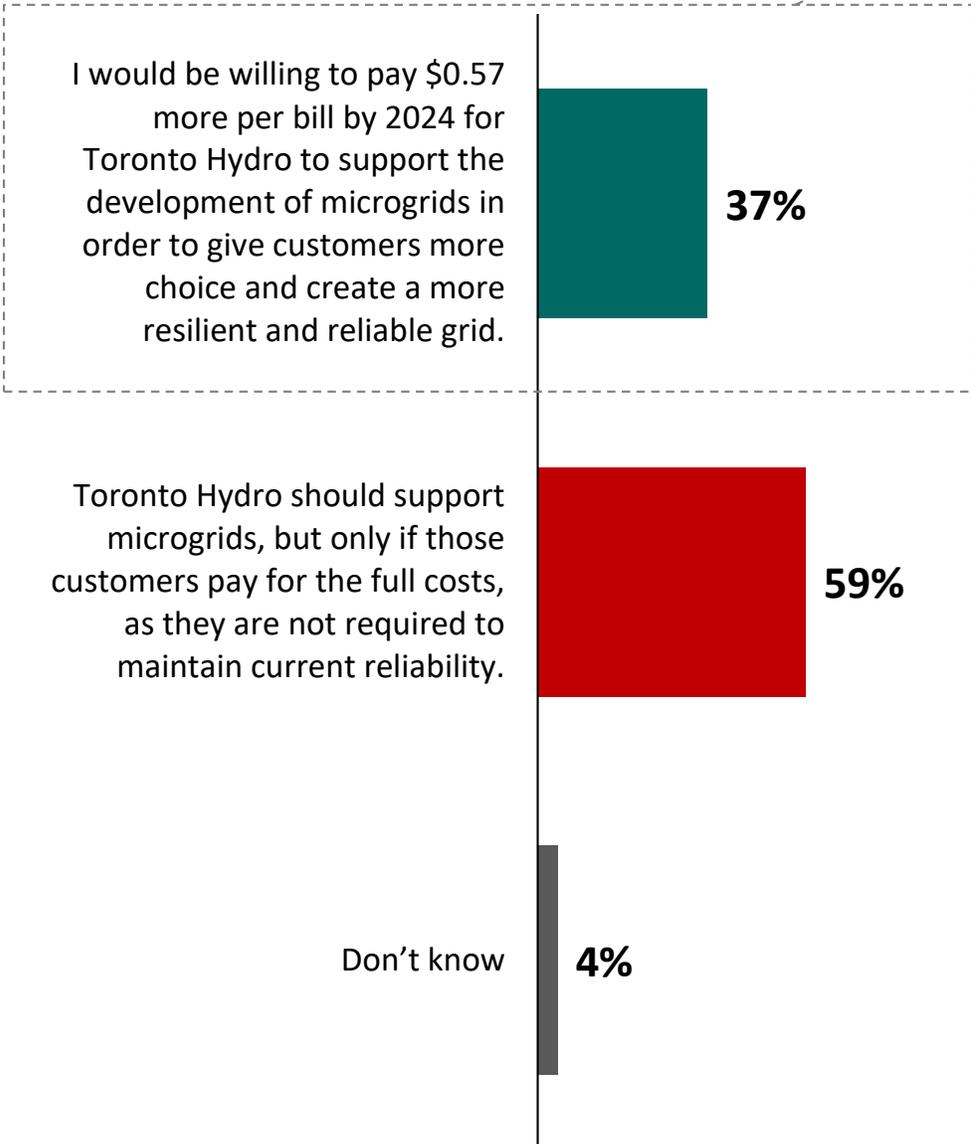


New types of generation (often renewable), storage, and supporting systems are making it possible for communities, institutions or other large customers to develop “microgrids”. They are a local electricity network linking smaller sources of electricity with nearby uses such as homes, businesses and institutions. In the event of a failure of the larger network, a microgrid can seal itself off and continue to provide power locally.

Microgrids would give customers more choices, while creating a more resilient and reliable grid. However, they are not required to maintain current reliability.

Which of the following is closest to your point of view?

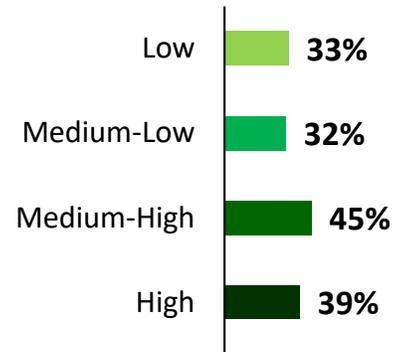
[asked all respondents, n=200]



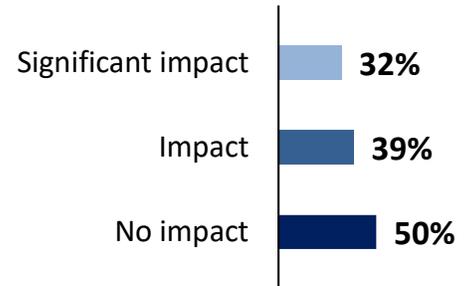
Segmentation

Those who say “Pay more to support microgrids”:

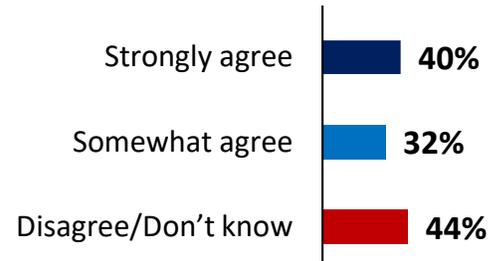
Annual Consumption



Bill Impact on Finances



Well Served by System



Investment Alternatives Summary

Preamble



Toronto Hydro's current proposed plan, which translates into an average 3.9% annual increase, focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

In dollars and cents, that means an average increase to the monthly bill of **\$70.26 each year** for the typical mid-sized business customer.

Over the course of the proposed 5-year plan, the typical mid-sized business customer will see the distribution portion of their electricity bill **increase by \$351**.

As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$1,671 in 2019** to **\$2,023 by 2024**.

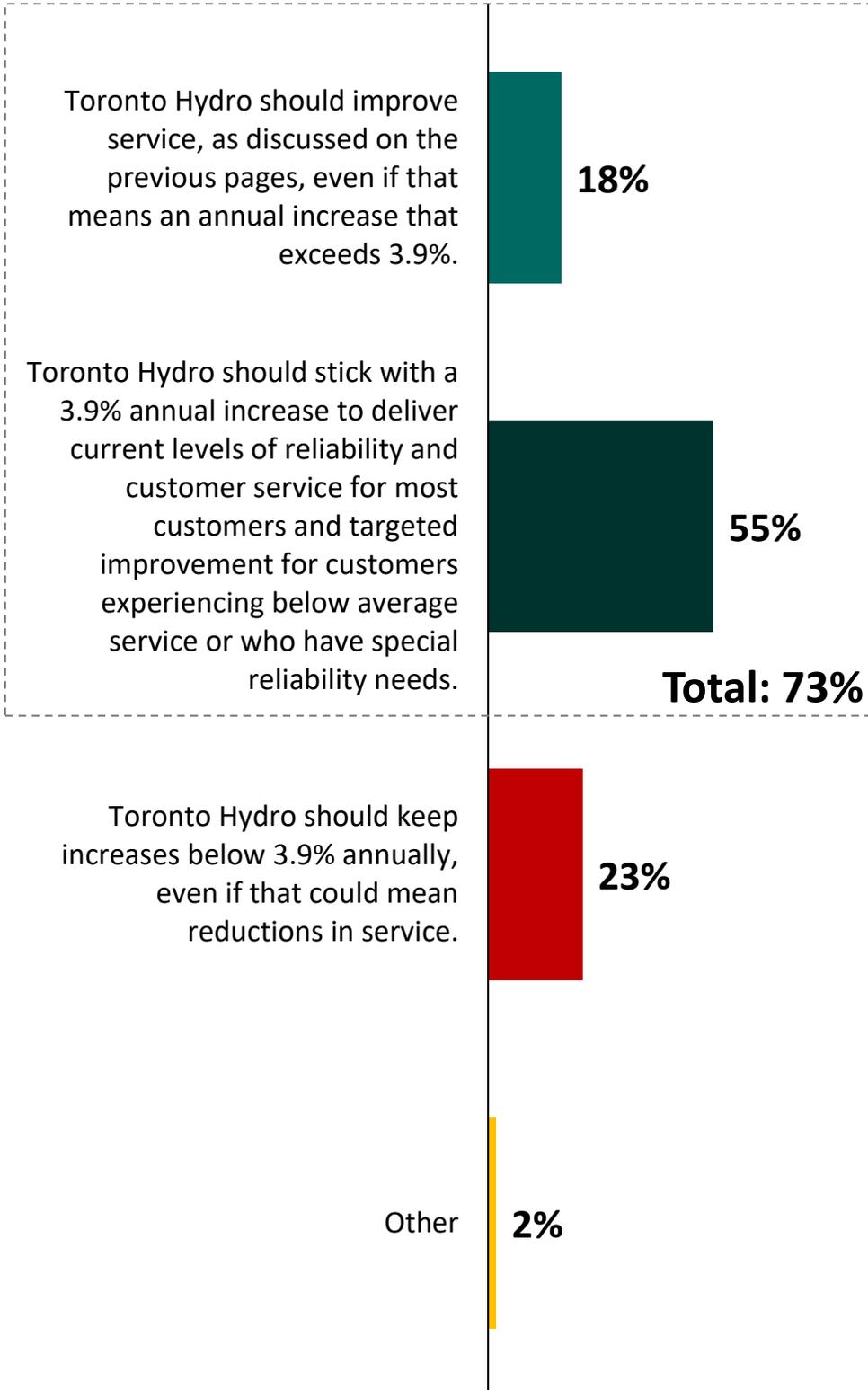


Opinion of Toronto Hydro's Proposed Plan



With regards to **Toronto Hydro's** proposed plan, which of the following statements best represents your view?

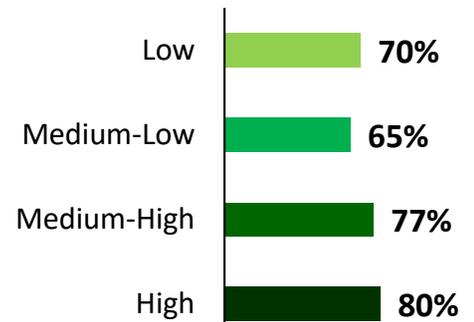
[asked all respondents, n=200]



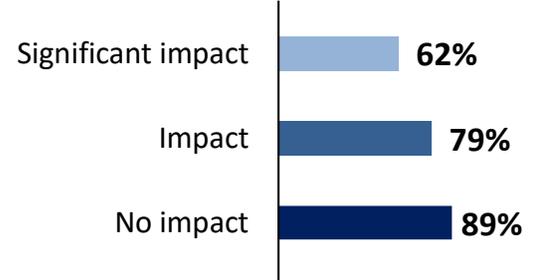
Segmentation

Those who say "Stick with current pace of investment or increase to improve services":

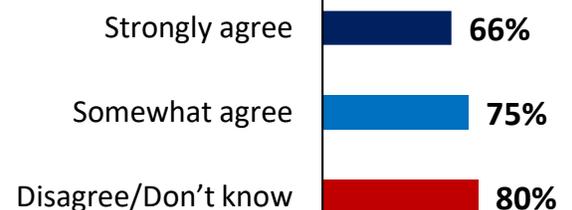
Annual Consumption



Bill Impact on Finances



Well Served by System



Note: "Don't Know" (2%) not shown.

Opinion of Toronto Hydro's Proposed Plan by Segmentations

Q With regards to **Toronto Hydro's** proposed plan, which of the following statements best represents your view?
[asked all respondents, n=200]

Bill Impact on Finances

Opinion of Toronto Hydro's Proposed Plan	<i>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 delayed.</i>			Total
	Sig. Impact [n=84]	Impact [n=71]	No Impact [n=38]	
Improve services, increase above 3.9%	12%	18%	33%	18%
Stick with current plan at 3.9%	49%	61%	56%	55%
Keep increases below 3.9%	32%	19%	11%	23%

Well Served by System

Opinion of Toronto Hydro's Proposed Plan	<i>Customers are well served by the electricity system in Ontario.</i>			Total
	Strongly agree [n=71]	Somewhat agree [n=96]	Disagree/Don't know [n=33]	
Improve services, increase above 3.9%	17%	18%	18%	18%
Stick with current plan at 3.9%	49%	57%	63%	55%
Keep increases below 3.9%	31%	19%	20%	23%

Note: "Other" and "Don't Know" not shown.

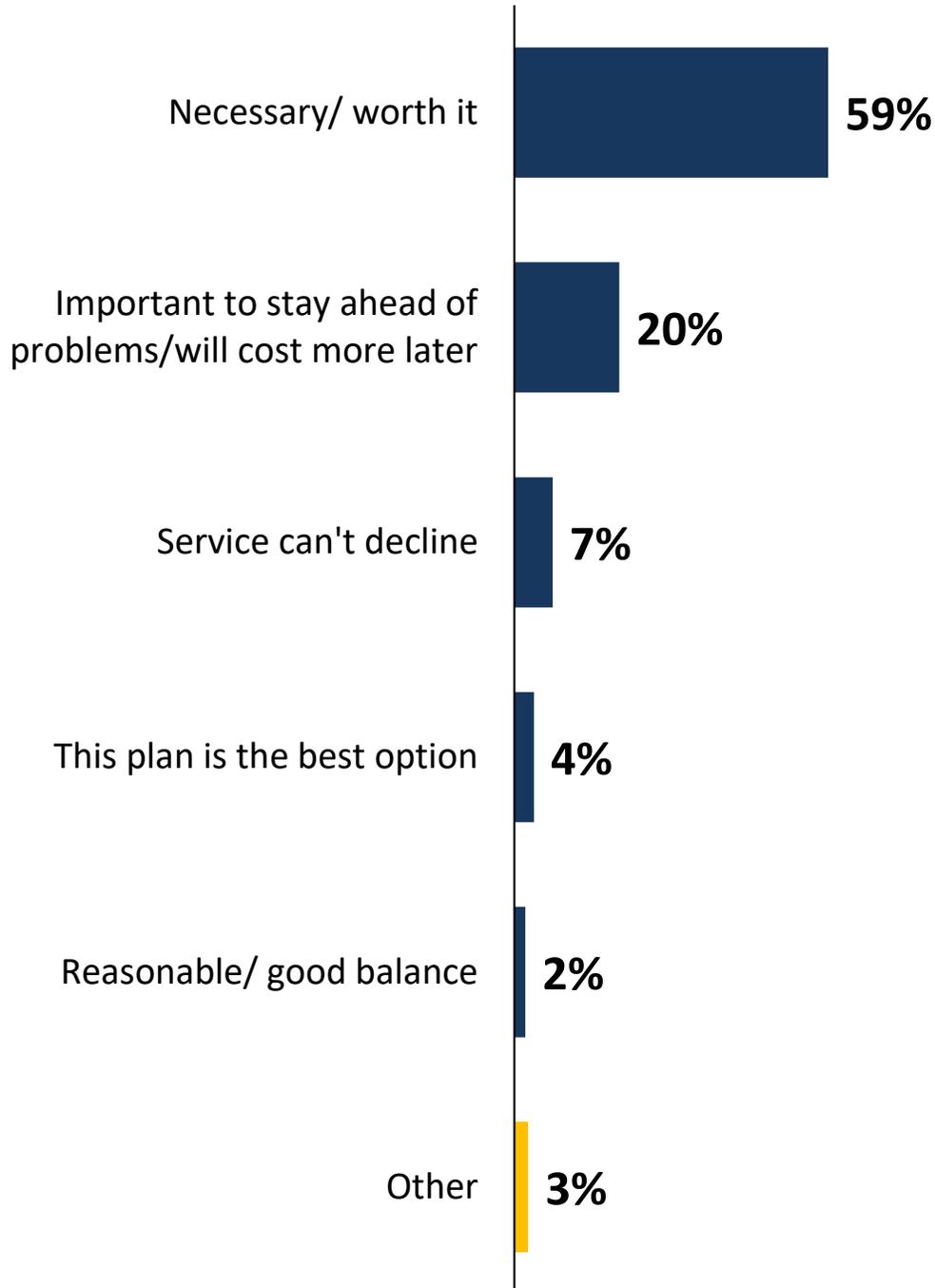
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should improve service, n=36]

For those who answered: Toronto Hydro should improve service, as discussed on the previous pages, even if that means an annual increase that exceeds 3.9%. (n=36)



Note: "None" (6%) not shown.

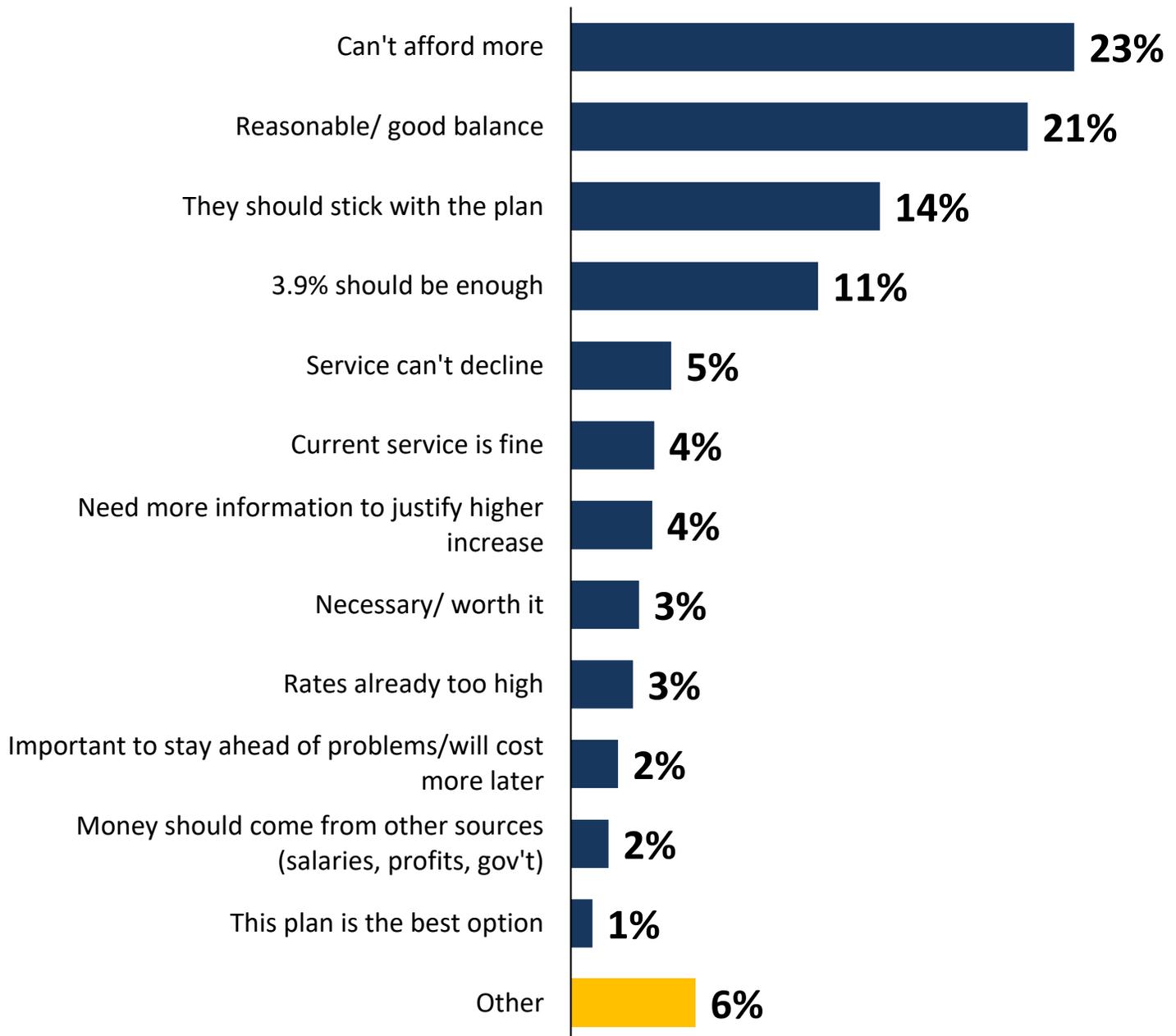
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should stick with proposed plan, n=110]

For those who answered: Toronto Hydro should stick with a 3.9% annual increase to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs. (n=110)



Note: "None" (3%) not shown.

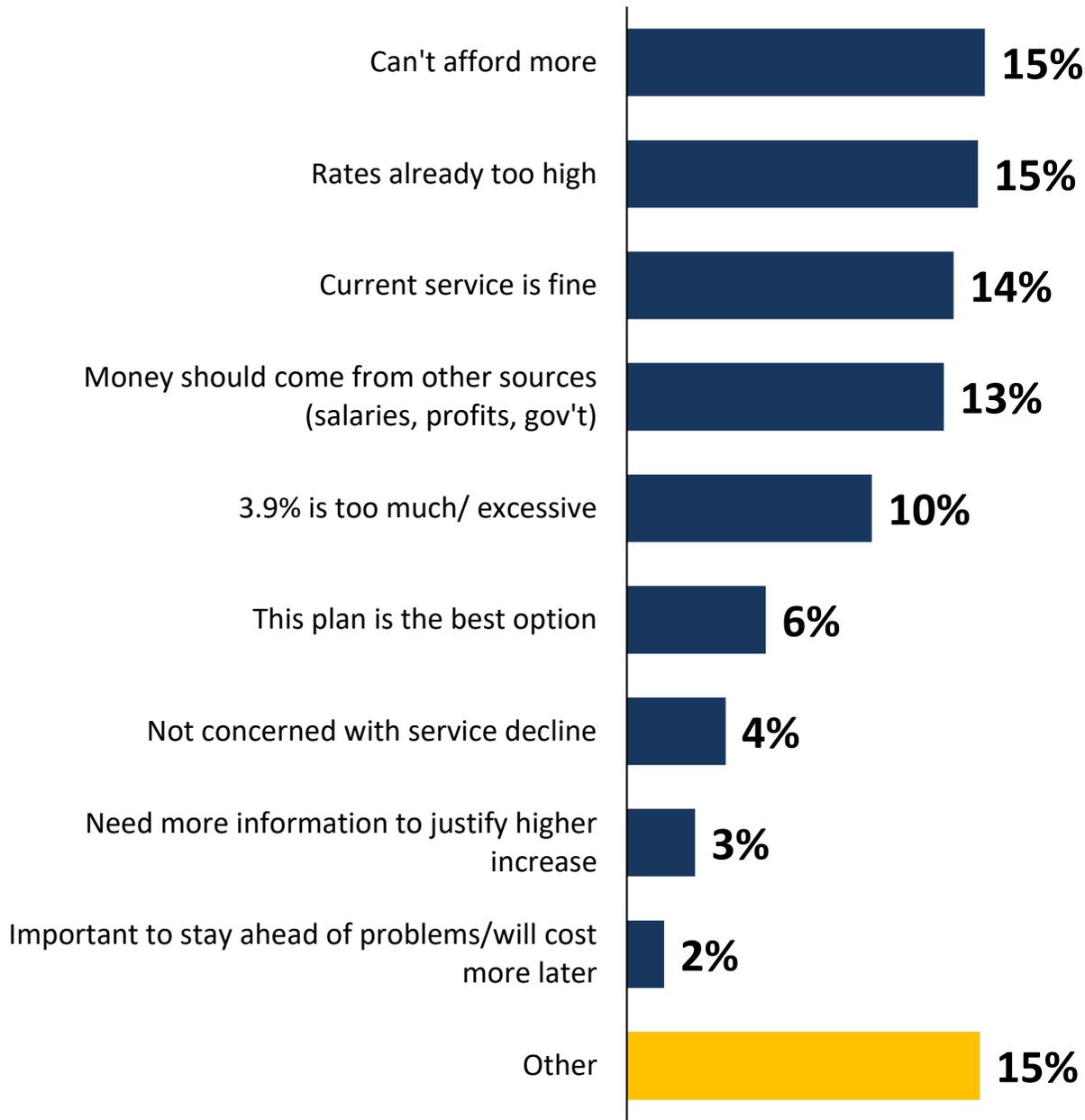
Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked of those who say Toronto Hydro should keep increases below 3.9%, n=46]

For those who answered: Toronto Hydro should keep increases below 3.9% annually, even if that could mean reductions in service. (n=46)



Note: "Don't know" (2%) and "None" (3%) not shown.



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For more information, please contact:

Jason Lockhart

Vice President

(t) 416-642-7177

(e) jlockhart@innovativeresearch.ca

Julian Garas

Senior Consultant

(t) 416-640-4133

(e) jgaras@innovativeresearch.ca

Toronto Hydro 2018 Customer Engagement
**Key Account Telephone
Survey Report**



Survey Methodologies



Field and Design

These are the findings of an Innovative Research Group (INNOVATIVE) online survey conducted among **n=37** Toronto Hydro **Key Accounts** between **June 7 and 18, 2018**.

Toronto Hydro provided INNOVATIVE with an email contact list consisting of the prime contact for each of its 336 Key Accounts. INNOVATIVE provided each Key Account contact with a unique URL via an email invitation so that only customers identified by Toronto Hydro were able to complete the survey and complete the survey only once.

Only one customer per organization was eligible to complete the survey. Respondents were screened to certify that only the personnel responsible for managing or overseeing their electricity bill were interviewed. This step was taken to ensure that survey respondents represented the most qualified person within an organization to answer questions.

Customers were sent three reminder emails to encourage survey participation. In addition, Toronto Hydro staff followed up with customers by telephone to encourage survey participation.

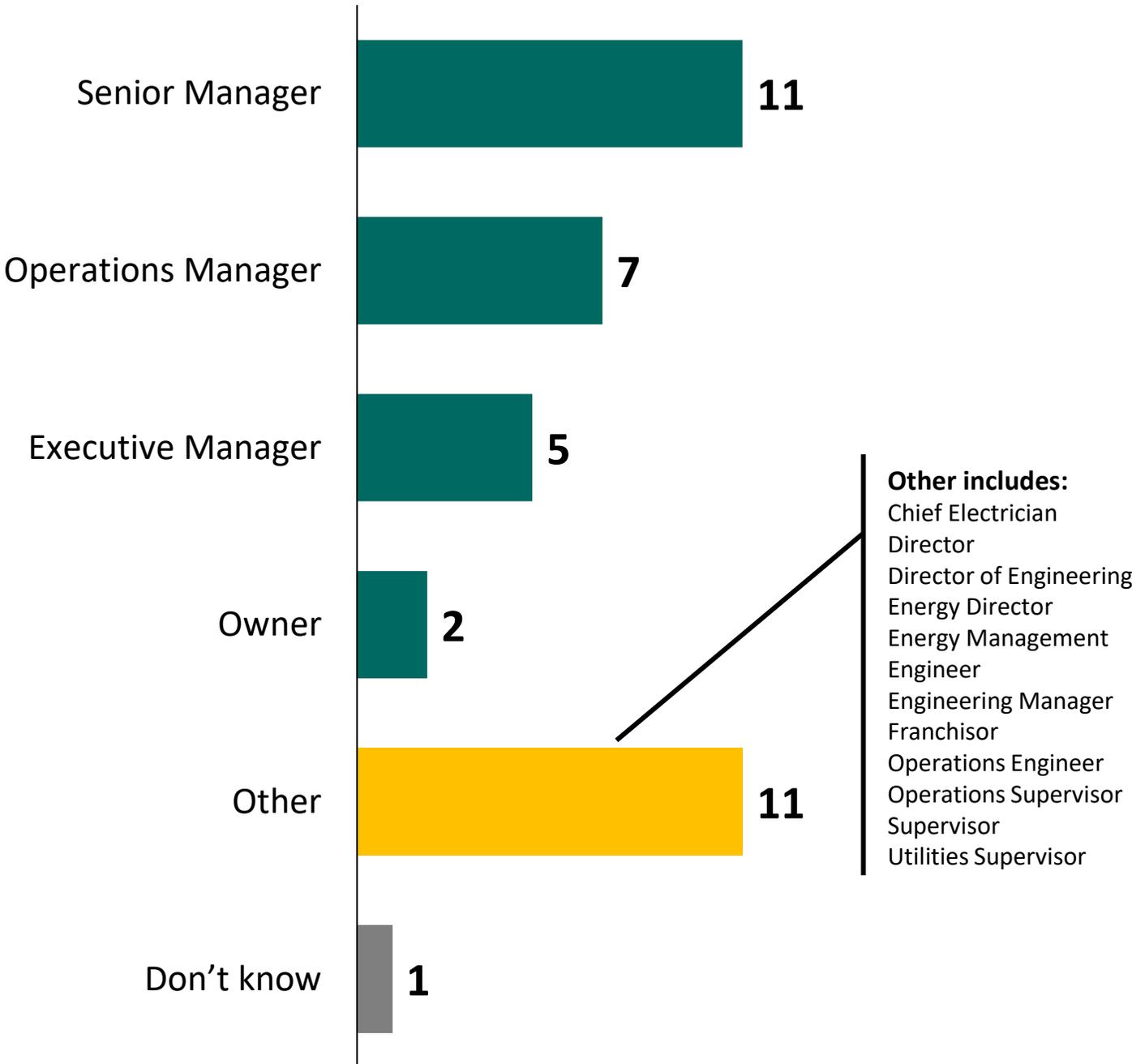
Individual Key Account responses were anonymous and no identifiable respondent information was shared with Toronto Hydro. Responses were combined to protect the confidentiality of individual Key Accounts.

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.*

Demographics

Role within Organization

Q What occupation or position best describes your role at your organization?
[asked all respondents, n=37]

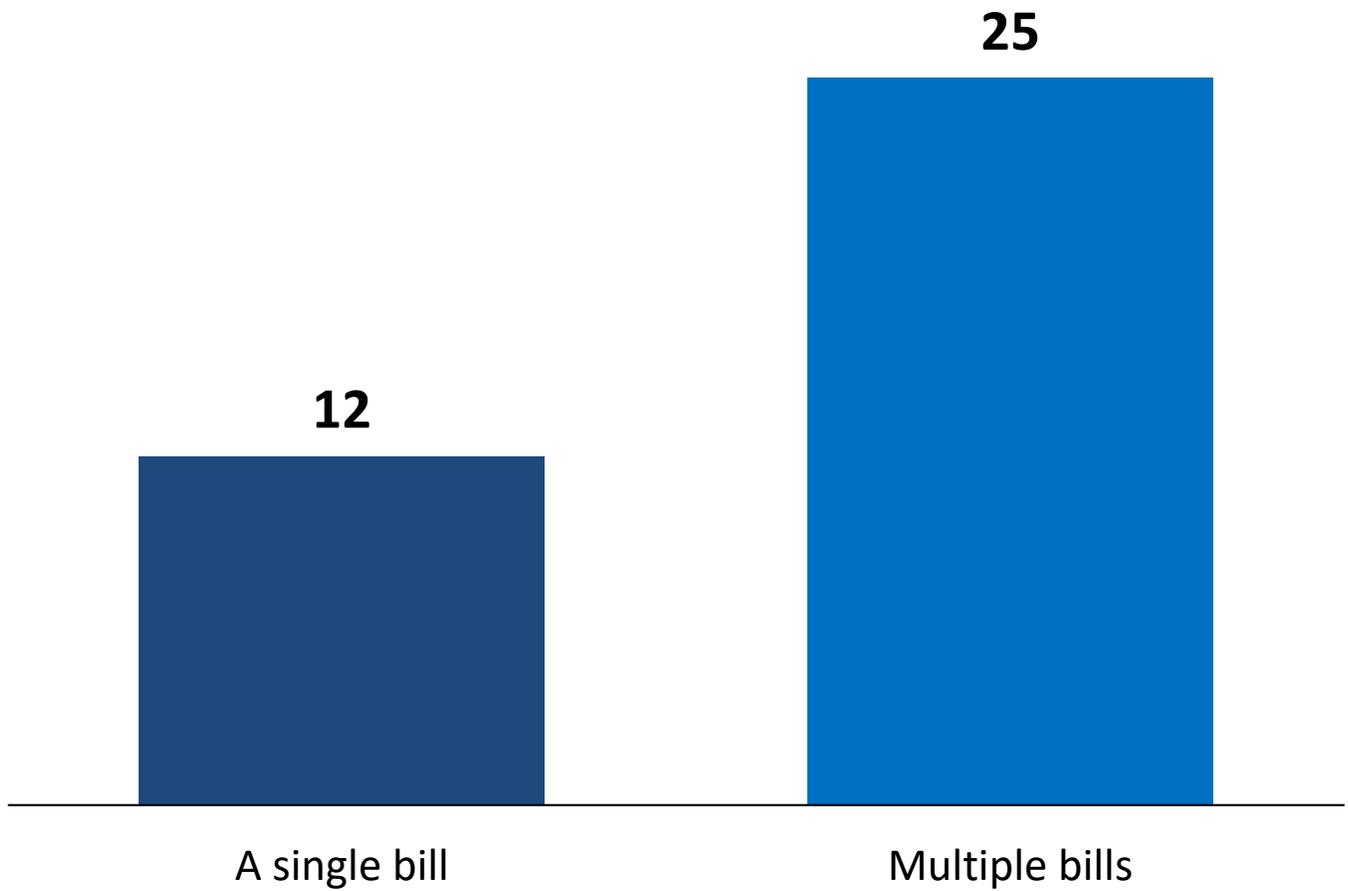


Number of Bills



Does your organization receive a single bill or multiple bills from Toronto Hydro?

[asked all respondents, n=37]

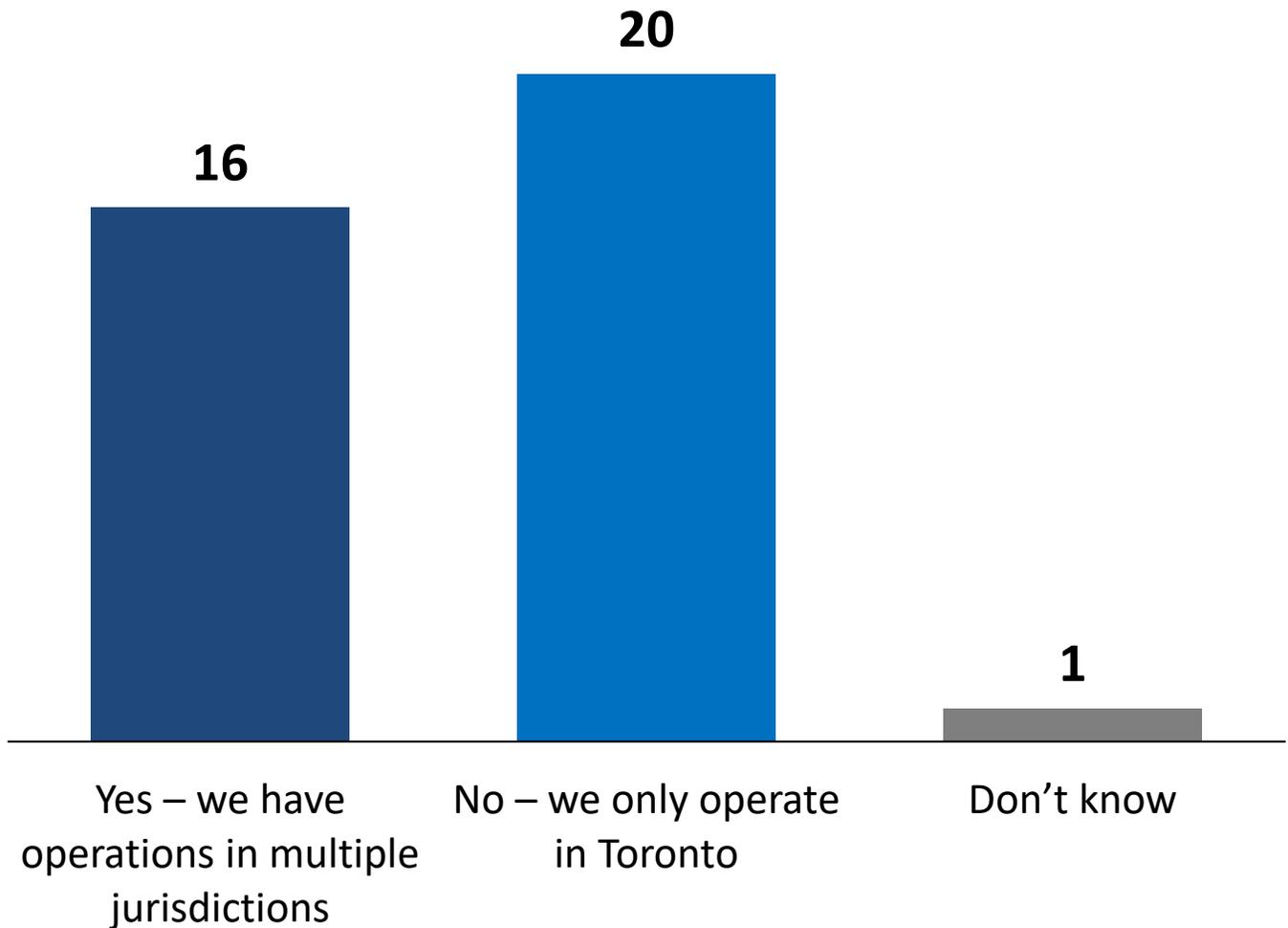


Other Utilities



Does your organization receive electrical bills from utilities other than Toronto Hydro?

[asked all respondents, n=37]



General Satisfaction

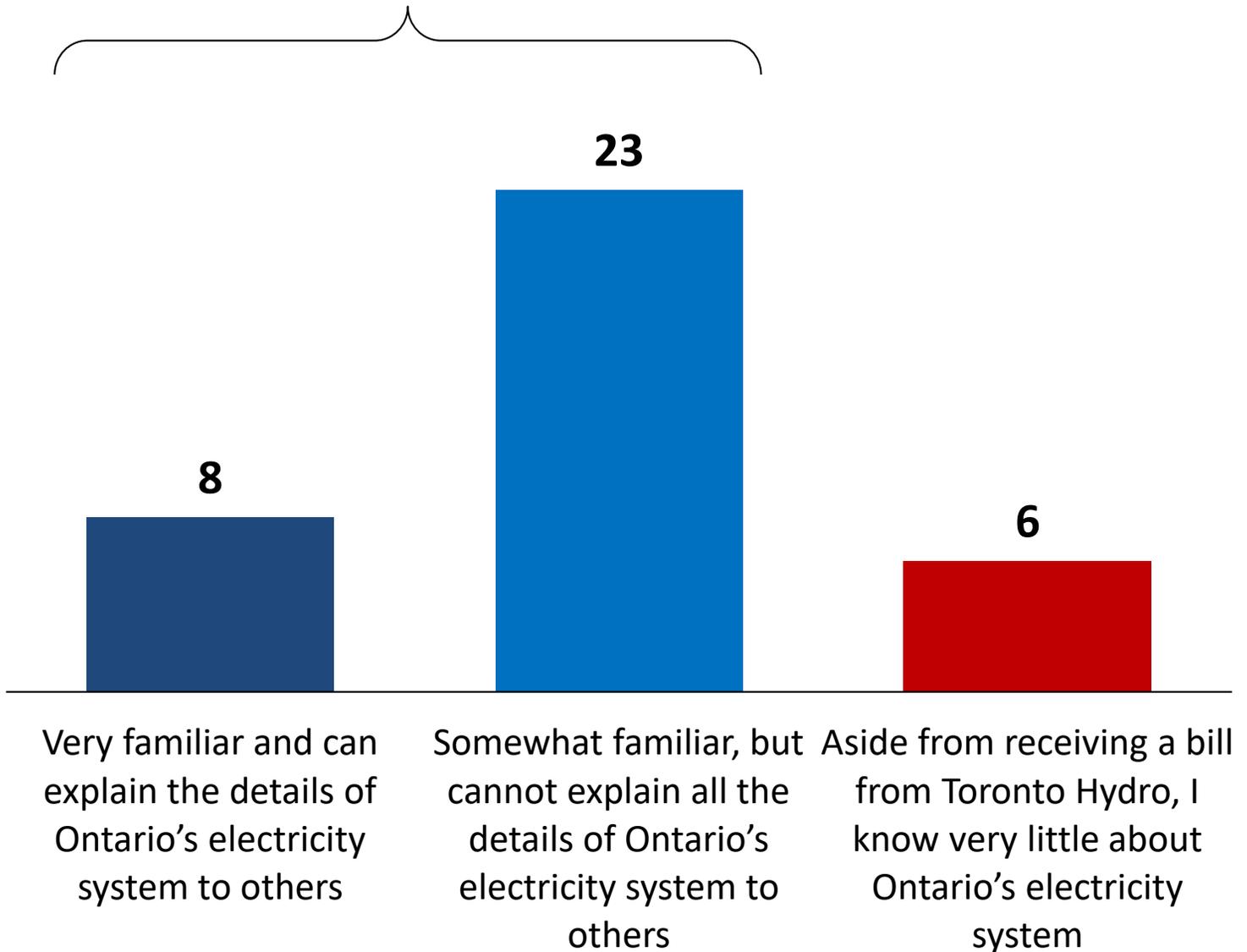
Familiarity with Electricity System



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?

[asked all respondents, n=37]

Familiar: **31**



Satisfaction with Services

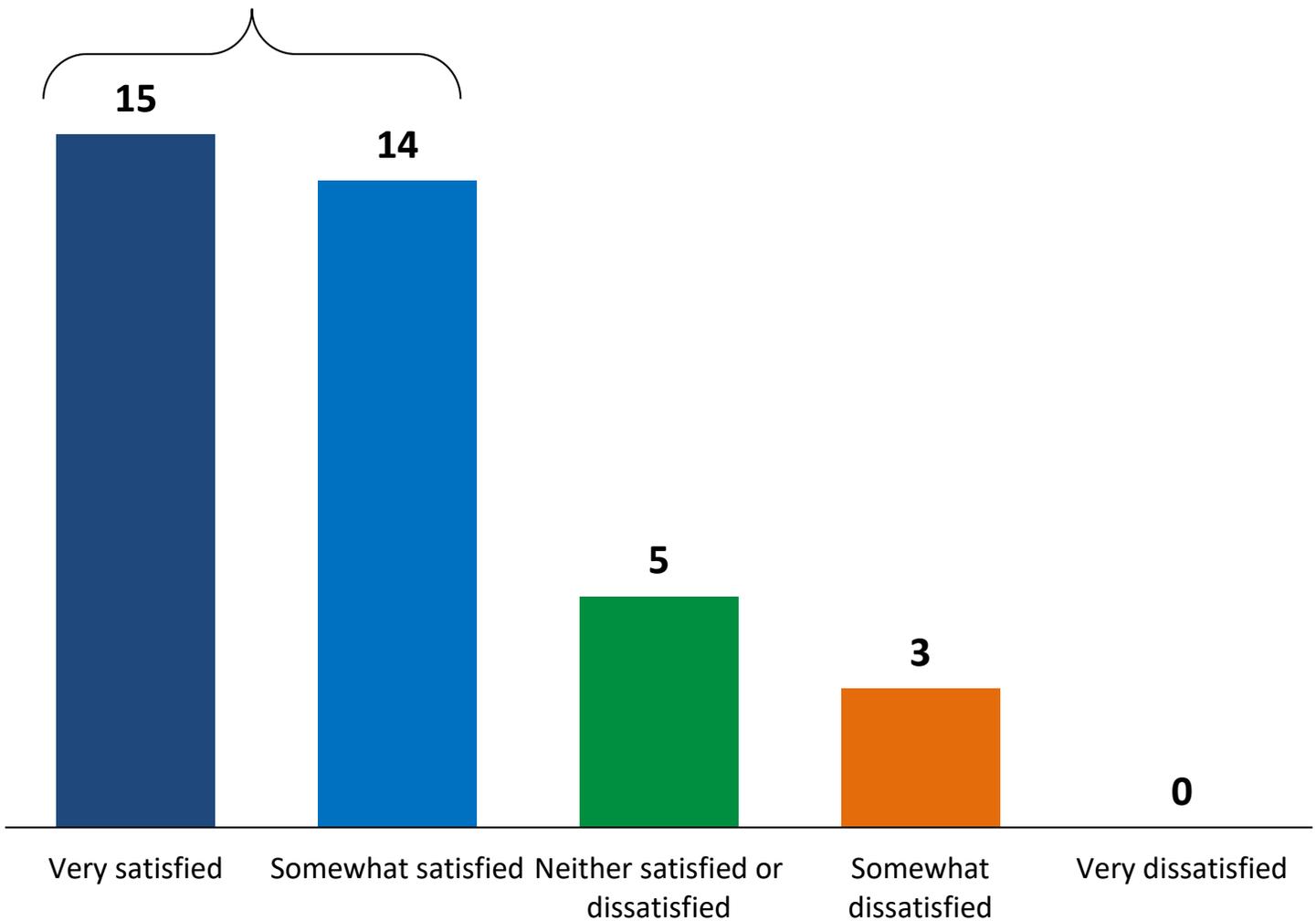


As you may know, Toronto Hydro operates and maintains the local electricity distribution system, reads meters, calculates your charges, answers your calls, responds during outages and clears trees and brush from power lines. Toronto Hydro does not set the commodity price of electricity or the Global Adjustment charge.

Generally, how satisfied are you with the service your organization receives from Toronto Hydro?

[asked all respondents, n=37]

Satisfied: **29**



Suggestions for Improved Services



Is there anything in particular that **Toronto Hydro** can do to improve its services to your organization? [**Sample verbatims**]

[asked all respondents, n=37]

Quicker responses:

- “Quicker and more streamlined response time from Toronto Hydro”
- “Faster response times”
- “Quicker response to service calls”

Improve Reliability:

- “Power supply quality/reliability is very poor and 20-40 power quality events, such as voltage sags and interruptions, are experienced every year”
- “Here in Scarborough, we are experiencing lots of power surges that affect our Building Automation and Elevator systems. Hoping they can lessen the occurrence of power surges”

Improve Communication:

- “Streamline communication”
- “Notification and Communication of Toronto Hydro site could be improved.”
- “Using the online site is VERY confusing now that it’s been changed”
- “Access to real time billing for monitoring the electricity consumption”
- “Better coordination for crews coming onto our site”
- “Toronto Hydro must streamline the processes and teams responsible for supporting large scale capital infrastructure projects”

Support with Global Adjustment:

- “Better details on global adjustment”
- “Assist customers with Global Adjustment reduction efforts and predicting the peak days of the year as a value added service.”
- “Commodity price of electricity or the Global Adjustment charge should be clear to all users.”

Energy Awareness

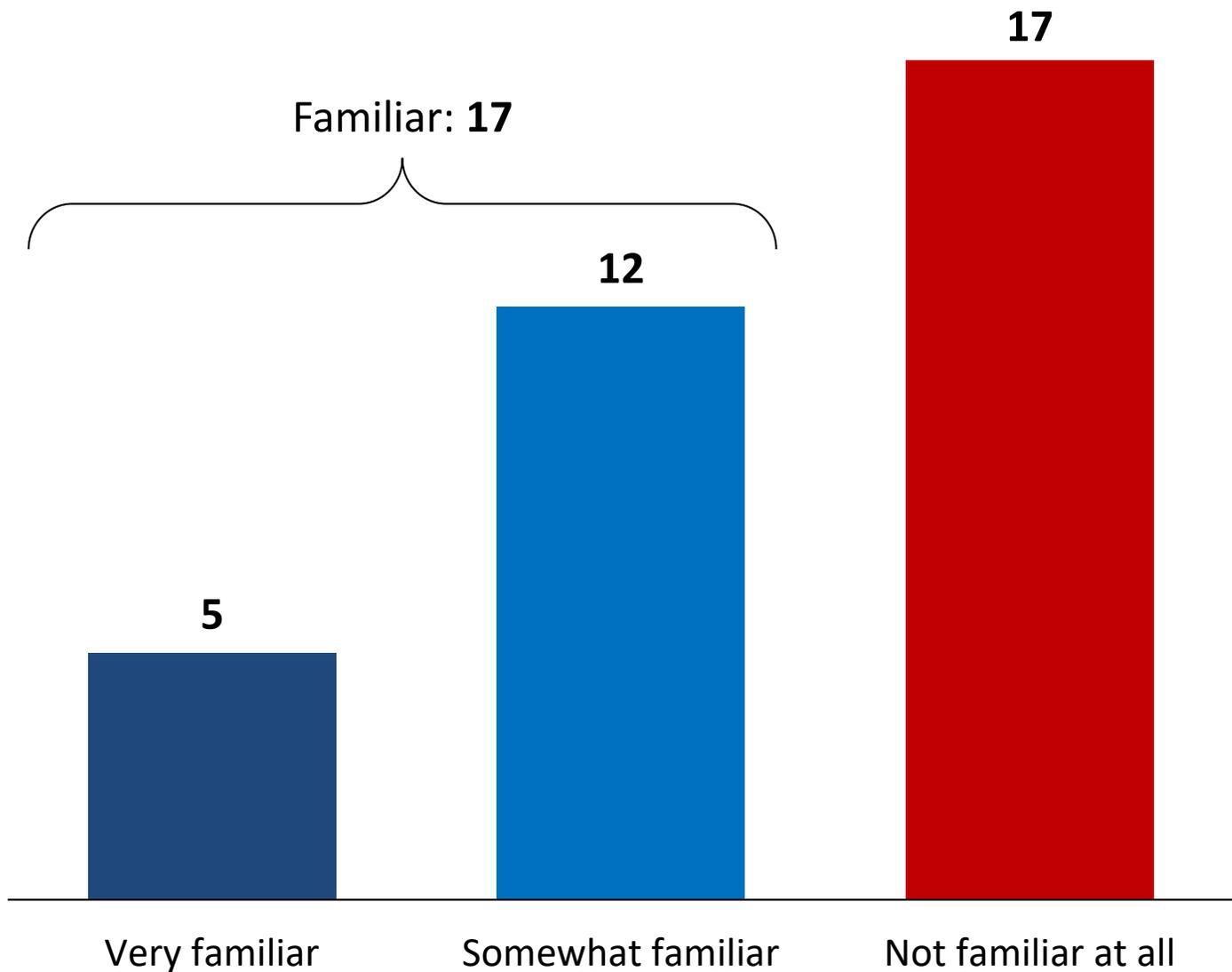
Amount of Bill Retained by Toronto Hydro



While Toronto Hydro is responsible for collecting payment for the entire electricity bill, it retains anywhere from 7% to 10% 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.

Before this survey, how familiar were you with the percentage of your organization's electricity bill that is retained by **Toronto Hydro**?

[asked all respondents, n=37]



Note: "Don't Know" (3) not shown.

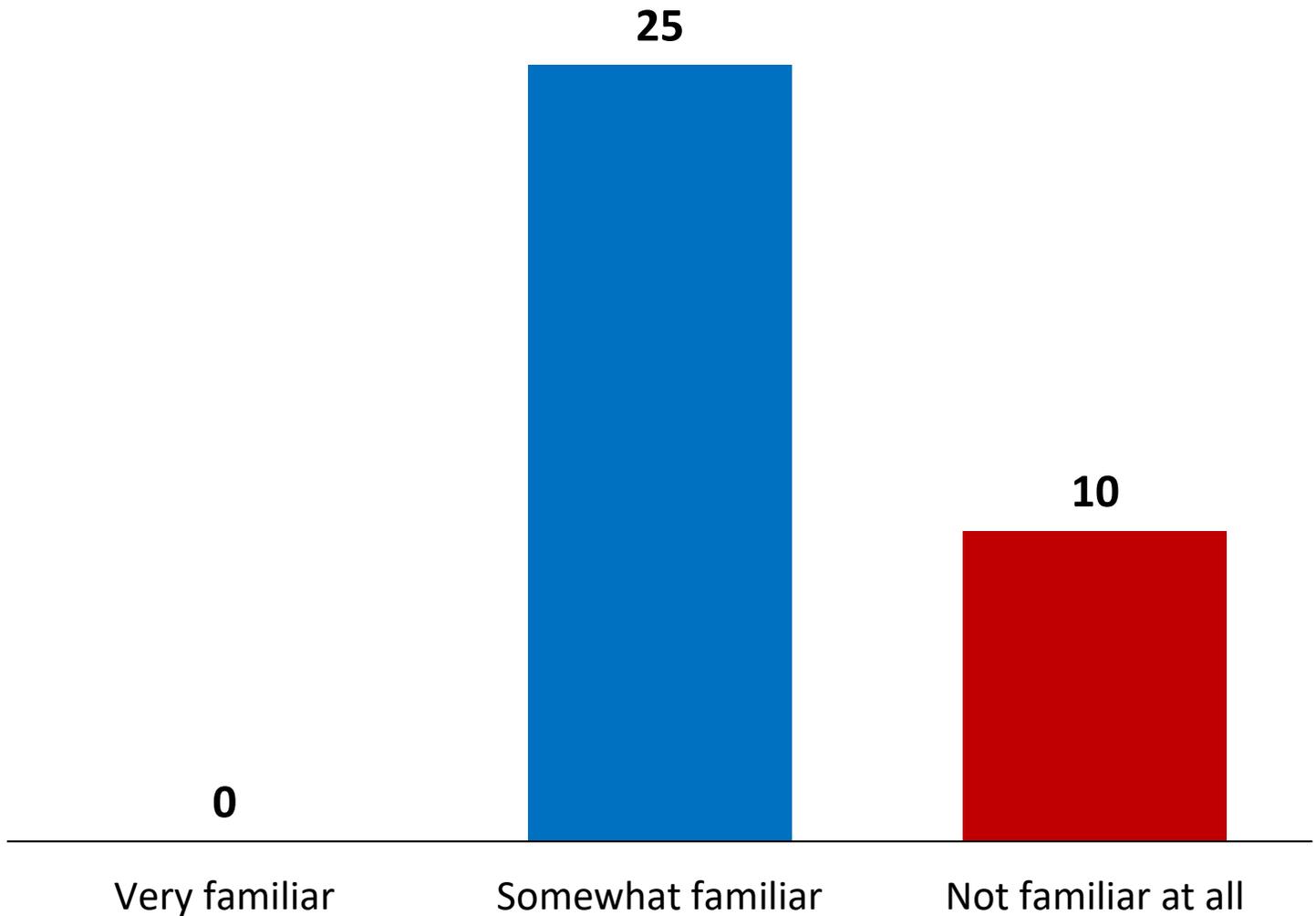
Familiarity with Ontario Energy Board

 Electricity distributors are required to file a rate application with the Ontario Energy Board (OEB) to request a change in distribution rates based on the company's plans for capital and operating spending. Toronto Hydro is now consulting on its plans for 2020 to 2024.

The OEB is mandated to protect consumers with respect to prices and the reliability and quality of electricity service.

How familiar would you say you are with the Ontario Energy Board?

[asked all respondents, n=37]



Note: "Don't Know" (2) not shown.

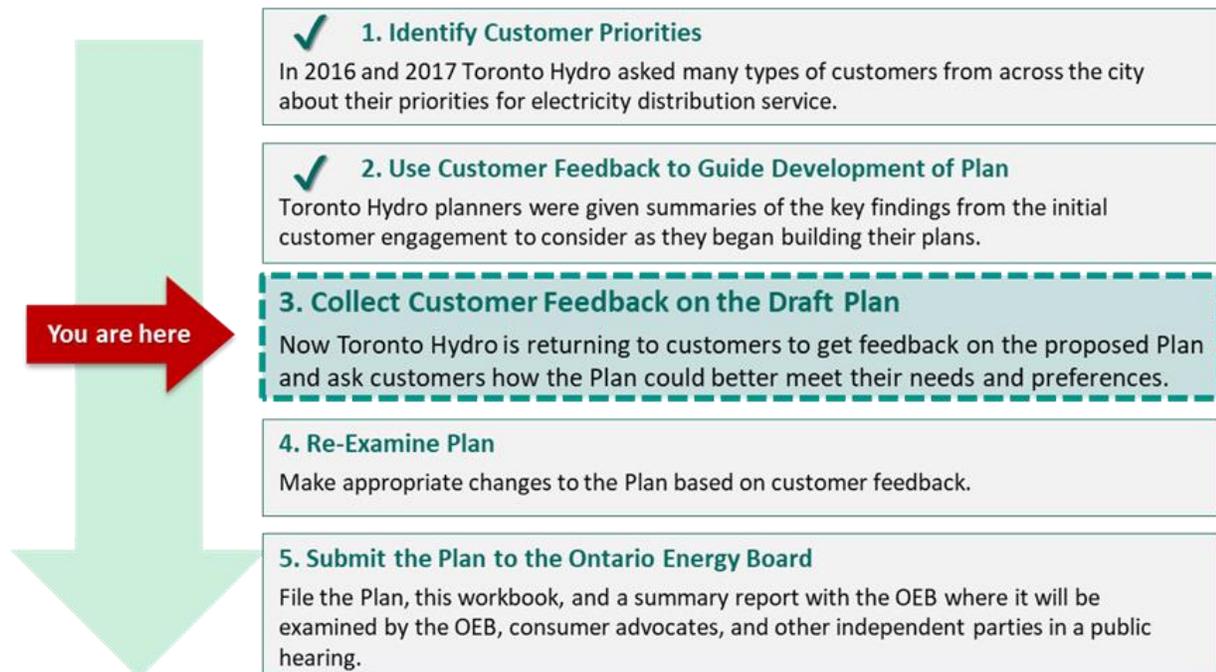
Engagement Process

Customer Engagement Process

Preamble



Toronto Hydro has developed a five phase approach to gathering and responding to customer feedback.



You may recall being asked to complete a survey in early 2017. That was part of the first phase of Toronto Hydro's customer engagement. This survey is part of the third stage of collecting customer feedback on the Draft Plan.

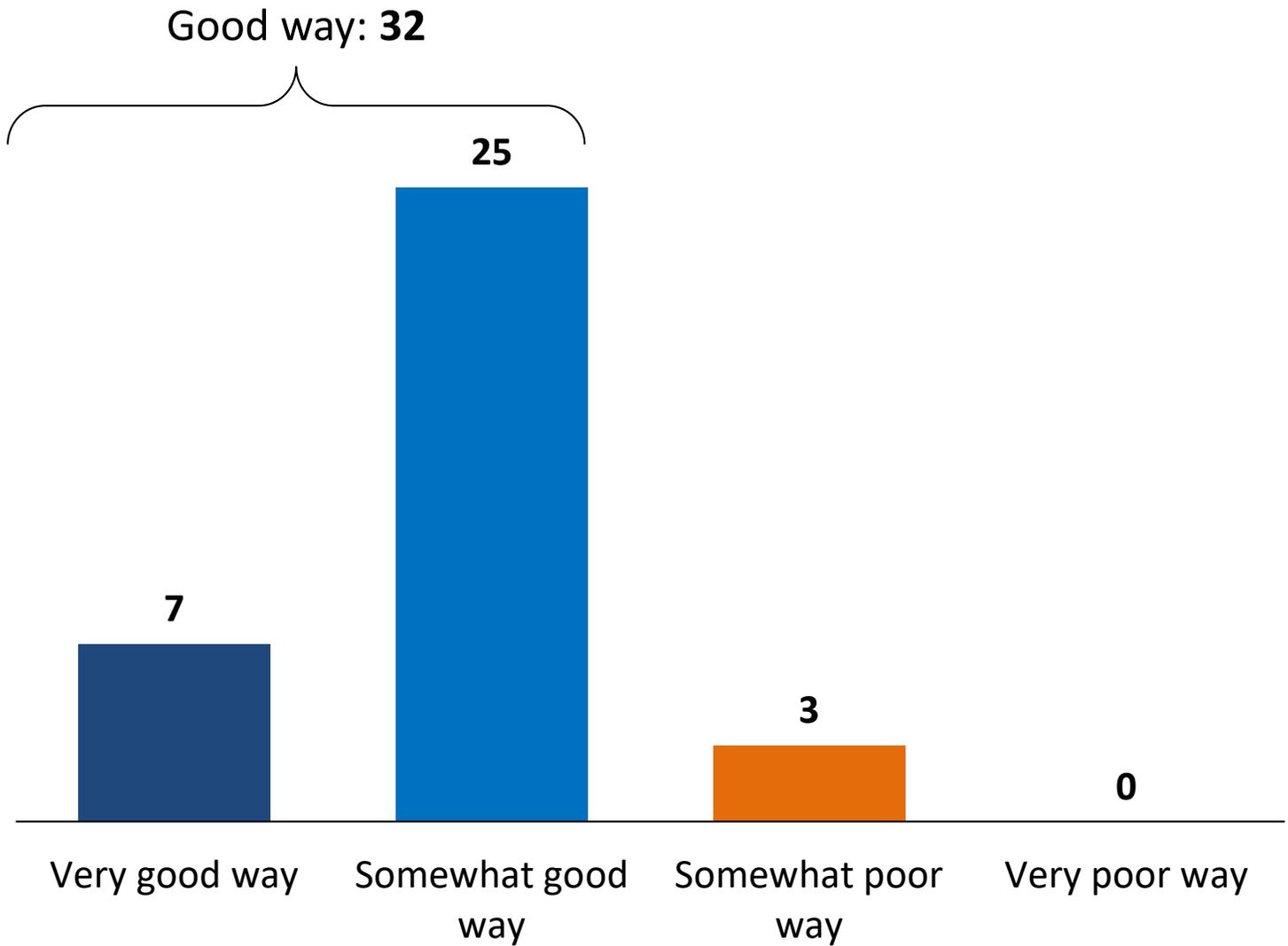


Feedback on Customer Engagement Process



Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into Toronto Hydro's plan?

[asked all respondents, n=37]



Note: "Don't Know" (2) not shown.

Customer Priorities



In response to customer engagement efforts over the past year, Toronto Hydro customers identified a diverse range of customer stated priorities, ranging from price and reliability to customer service, outages and helping customers conserve electricity.

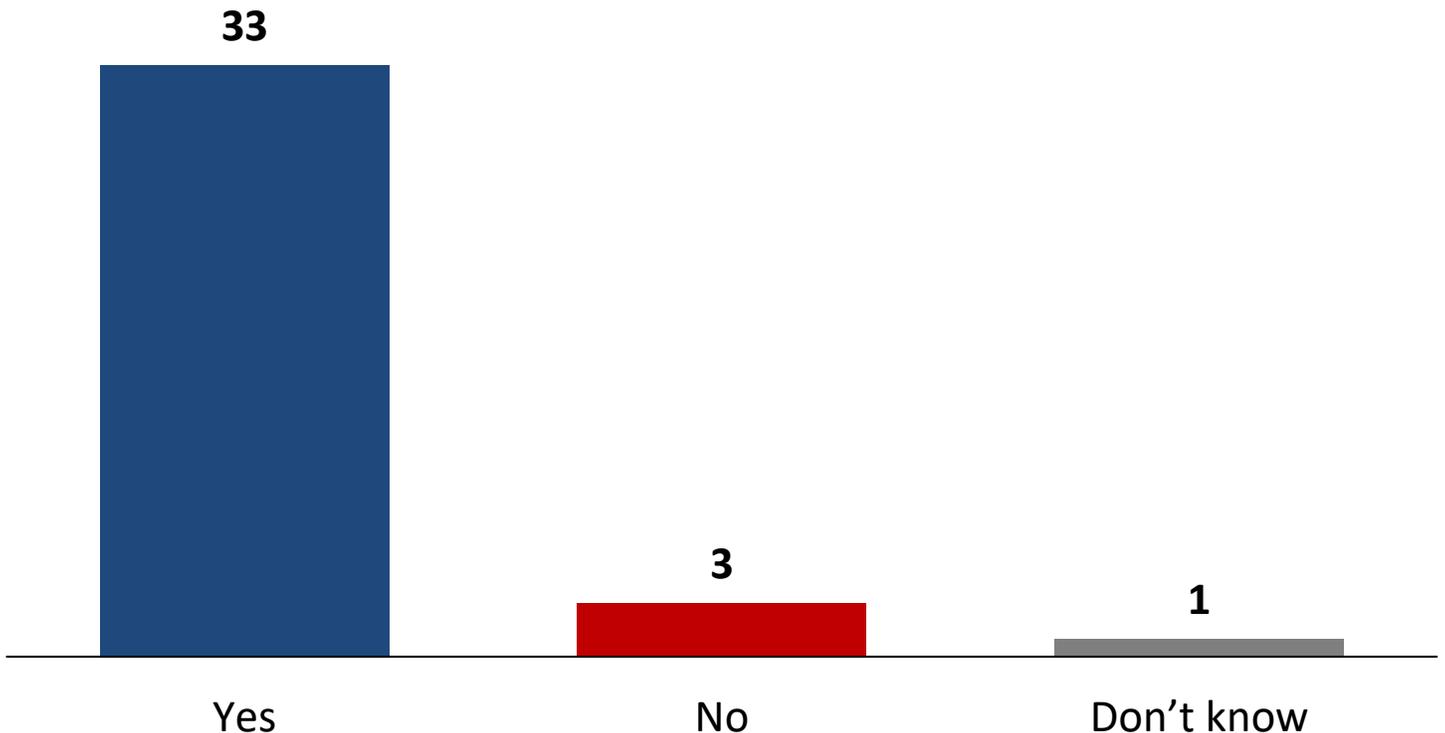
Understanding that not all customers value and prioritize the same things, Toronto Hydro is working to find a balance that works for all customers.

In February and March of 2017, Key Account customers told Toronto Hydro that the three most important priorities were:

1. Ensuring reliable electrical service;
2. Delivering reasonable electricity prices, and;
3. Preventing or reducing the length of prolonged power outages caused by extreme weather (e.g. high winds, floods and ice storms)

Are these three customer identified priorities aligned with what you expect Toronto Hydro to focus on?

[asked all respondents, n=37]



Additional Customer Priorities



Are there any other priorities that you would rank ahead of the priorities above that Toronto Hydro should focus on?

[asked all respondents who say did not agree with the top three priorities identified or don't know if they agree, n=4]

“Single points of contact for all Toronto Hydro matters. Improve power quality management, improve aging infrastructure”

“REMOVE PRICE - you guys only control local distribution costs... the majority of the bill is out of your control... demand costs from you guys is peanuts on the overall hydro bill... PLEASE focus on distribution reliability for outage recovery, resilience and power quality.”

Trade-Offs

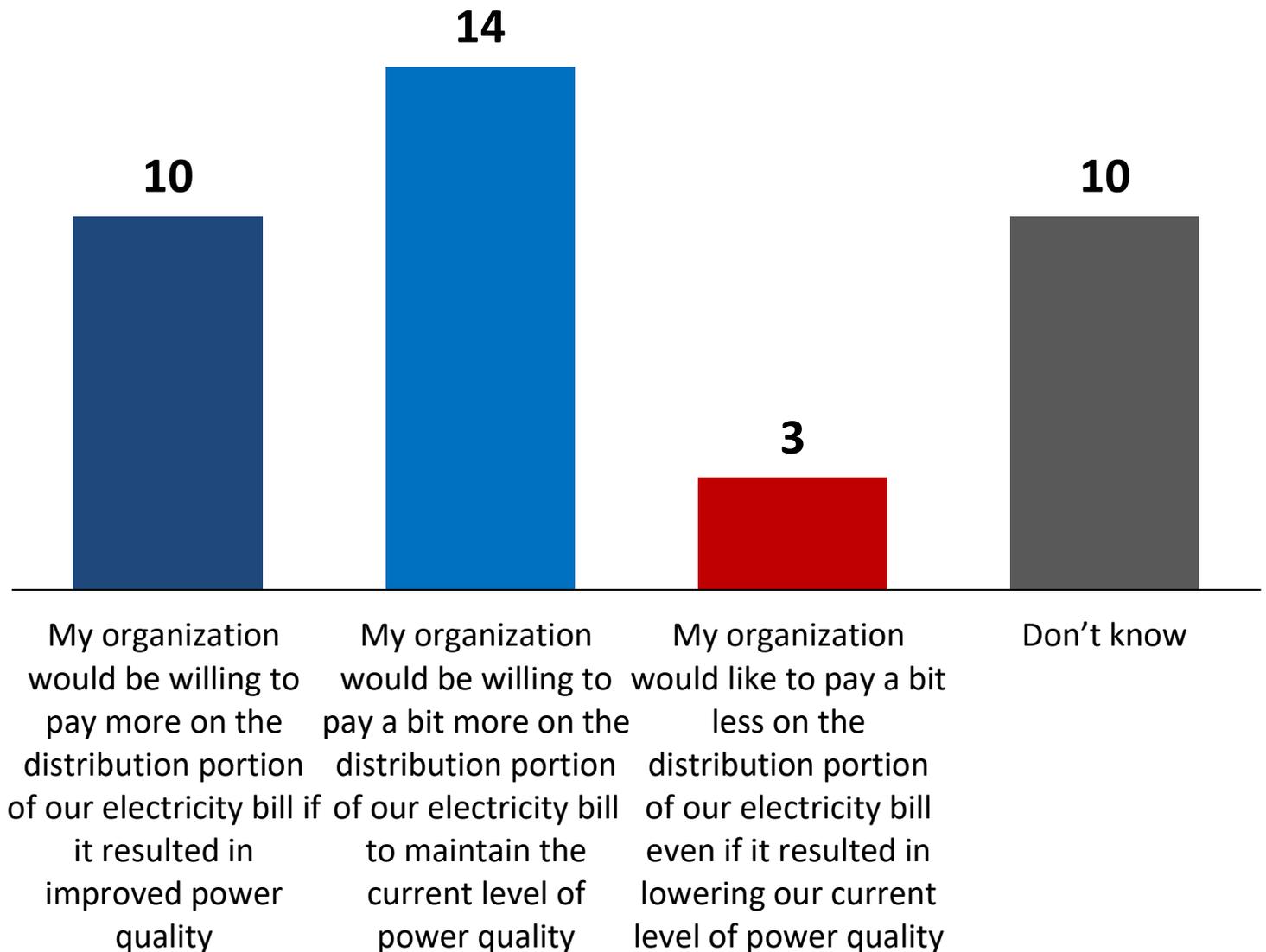
Trade-Offs



In the survey, Key Accounts customers identified power quality was the top priority not among those listed to choose from. Toronto Hydro would like to know how important power quality relative to the cost of your electricity bill.

Thinking about the trade-offs between power quality and the cost of your electricity bill, which of the following statements best represents your general point of view?

[asked all respondents, n=37]



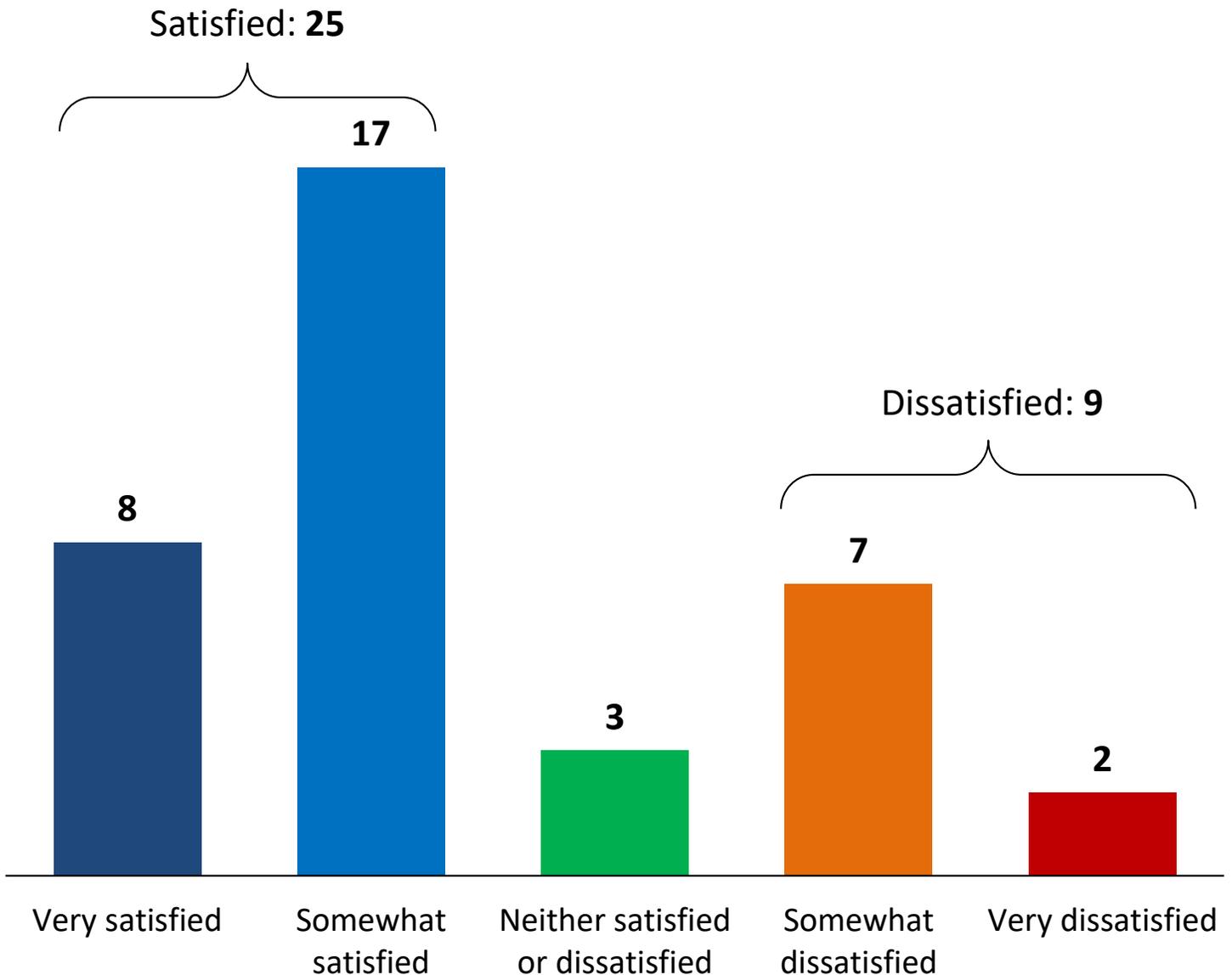
Reliability



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

The reliability of your electricity service (as judged by the number of power outages you experience).

[asked all respondents, n=37]



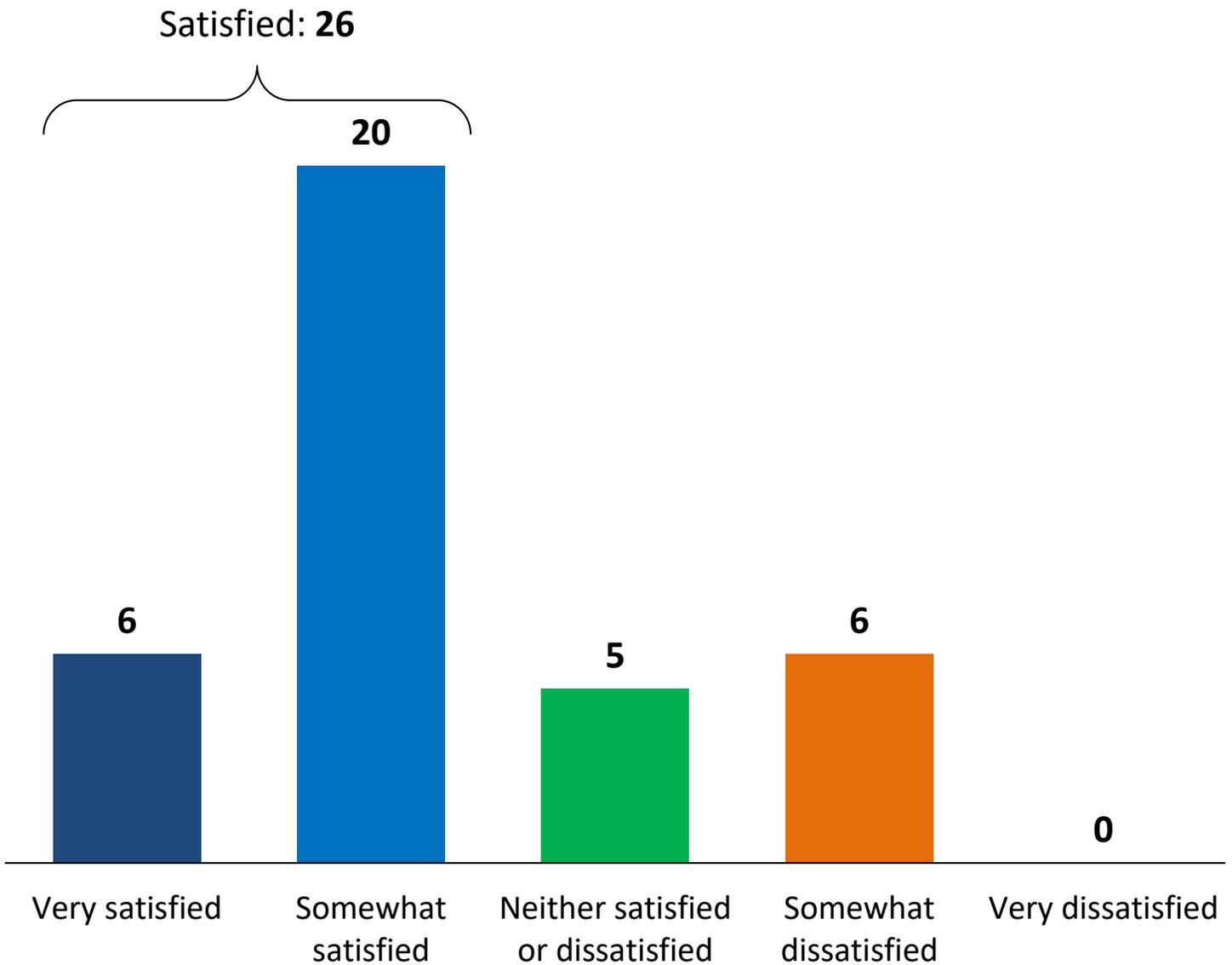
Outage Length



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

The amount of time it takes to restore power when power outages occur.

[asked all respondents, n=37]



Planning Principles and Rate Impact



With customer feedback in mind, Toronto Hydro is proposing a plan that is responsive to:



1. Legal requirements by continuing to meet its obligations, including safety;



2. Customer feedback by:
- a) Keeping distribution price increases as low as possible;
 - b) Maintaining long-term performance for customers experiencing average or better service;
 - c) Improve service levels for customers experiencing below average service or who have special reliability needs (e.g. hospitals); and,
 - d) Balancing other customer priorities (e.g. customer service) with the need to contain rate increases.



3. Business input by relying on expert analysis and professional judgment to develop construction and operations programs that address technical and operational requirements.

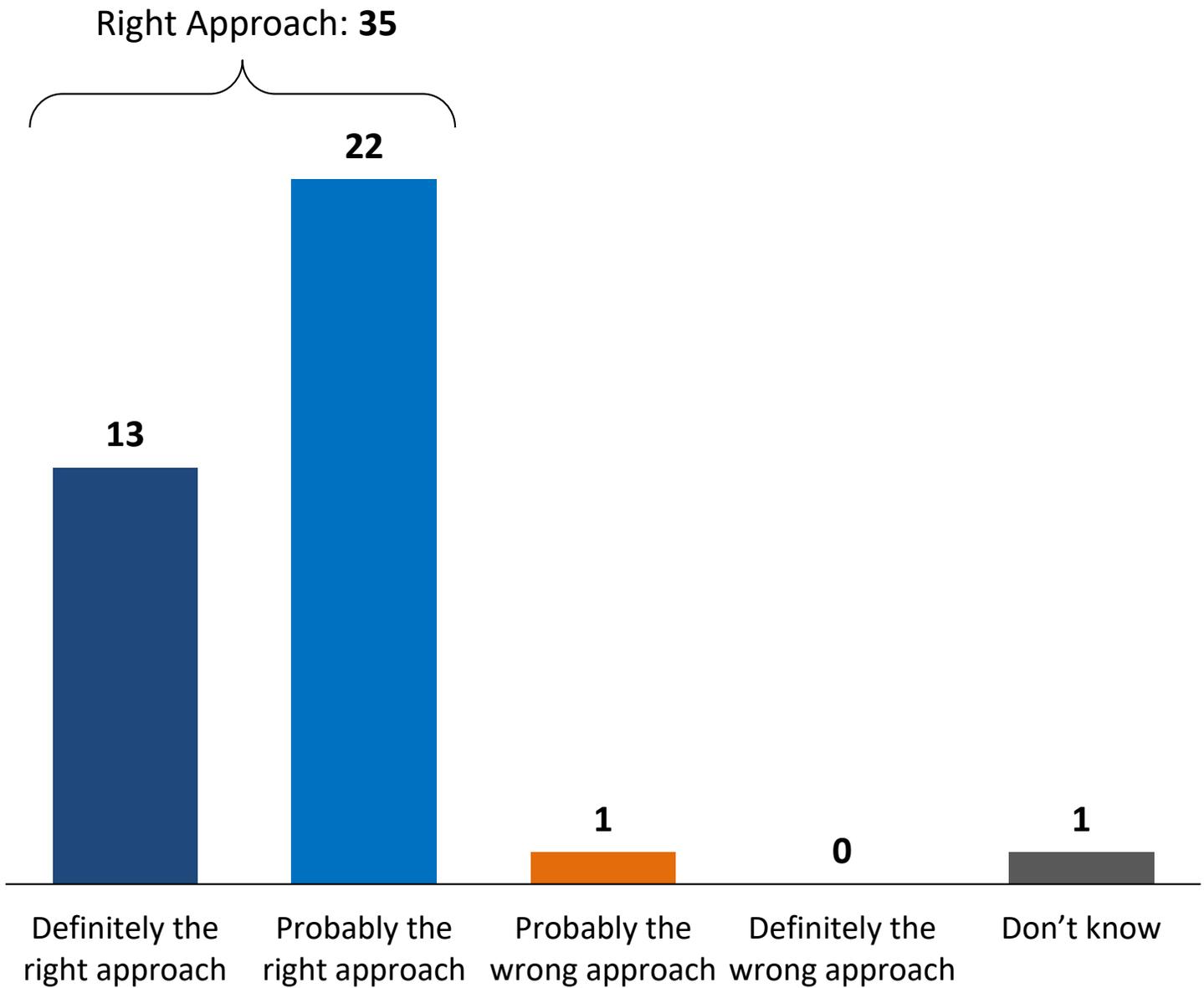


Planning Principles



Does this seem like the right approach or the wrong approach?

[asked all respondents, n=37]



Planning Principles



And why do you say that? [Sample verbatims]

[asked all respondents, n=37]

Right Approach (n=35)

Balance Approach:

- “Meeting legal obligations, lowering prices and maintaining good customer services is a win-win proposition”
- “We realize that we do not live in a perfect world and some things will occur so it cannot only be price as service is important just as much”
- “Customers want lower rates but not at the cost of compromising service”
- “It address all facets to deliver reliable power to end customers”

The approach has limitations:

- “Surveys are only one method of feedback. For us, we have accounts across the city and the service/quality is not always consistent”
- “It seems like a global or motherhood approach. The questions seem skewed”
- “The question is phrased with only limited option of answers”

Helps Inform Customers:

- “Hydro is working better now at trying to foster information to their clients”
- “Customers will be enlightened of the electricity supply management”

Wrong Approach (n=1)

Building code:

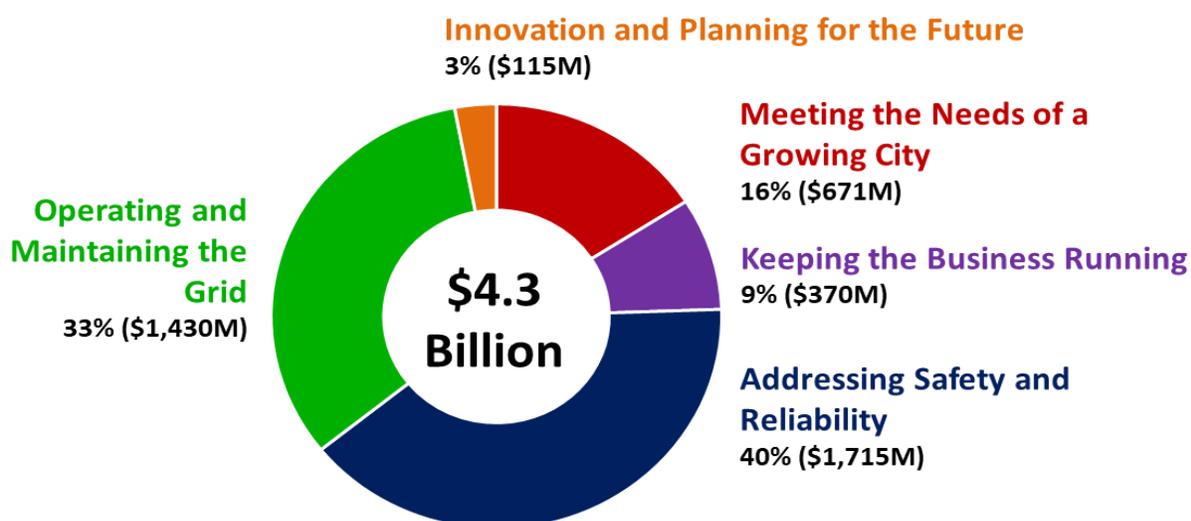
“You rank "Tariff docs" then "service needs" then "business planning"... Nowhere do you address the comment I routinely brought up at the IESO LAC (Local Advisory Committees) meeting for Toronto Hydro where I whine that the Ontario building code only has to be exceeded by 15% to get a building permit from the Toronto Planning department... We are knocking down 10 story low rise buildings and replacing them with 50+ story high rise buildings yet we DO NOT demand that the kWhrs/m2 projected to ground level be EQUAL or less than the building replaced.”

Investment Alternatives Preamble



Toronto Hydro has drafted a plan totaling approximately \$4.3B over five years. The plan considered Toronto Hydro's legal obligations, engineering expertise and customers' needs and preferences when developing the plan. There are five key budget categories.

To learn more about each category, simply hover over the title.



Toronto Hydro's proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, such as hospitals, industrial customers, and financial centres.

This proposed plan could translate into an annual average increase in your distribution rates of between 2.3% and 3.9% from 2020 to 2024.



Opinion of Toronto Hydro's Proposed Plan

Q With regards to Toronto Hydro's proposed plan, which of the following statements best represents your view?

[asked all respondents, n=37]



Opinion of Toronto Hydro's Proposed Plan



And why do you say that?

[asked all respondents, n=37]

Improve Service (n=4)

Reliability:

- “This will prevent occasional brief outages that affect our operation”
- “Reliability is the most important aspect of the system”
- “Reliability is Key - prices will increase regardless”

Maintain Service (n=25)

Increase is reasonable as long as the service quality can be maintained:

- “The increase of 3.9 percent over four years is appropriate as long as service and reliability is not reduced”
- “I agree that the service should be at least maintained or even improved even we have to pay the related cost with an increase in distribution charges of maximum up to 4%”
- “New customer accounts should not impact existing rates but it is important to maintain the grid and ensure reliability”

Can't Afford More:

- “We don't need another price increase as cost of living is already high. So maintaining is key”
- “We have paid enough for the hydro”

Generally Positive:

- “That would be in our best interest”
- “It's consistent with the objectives from its customers”
- “The right thing to do”

Reduce Cost (n=2)

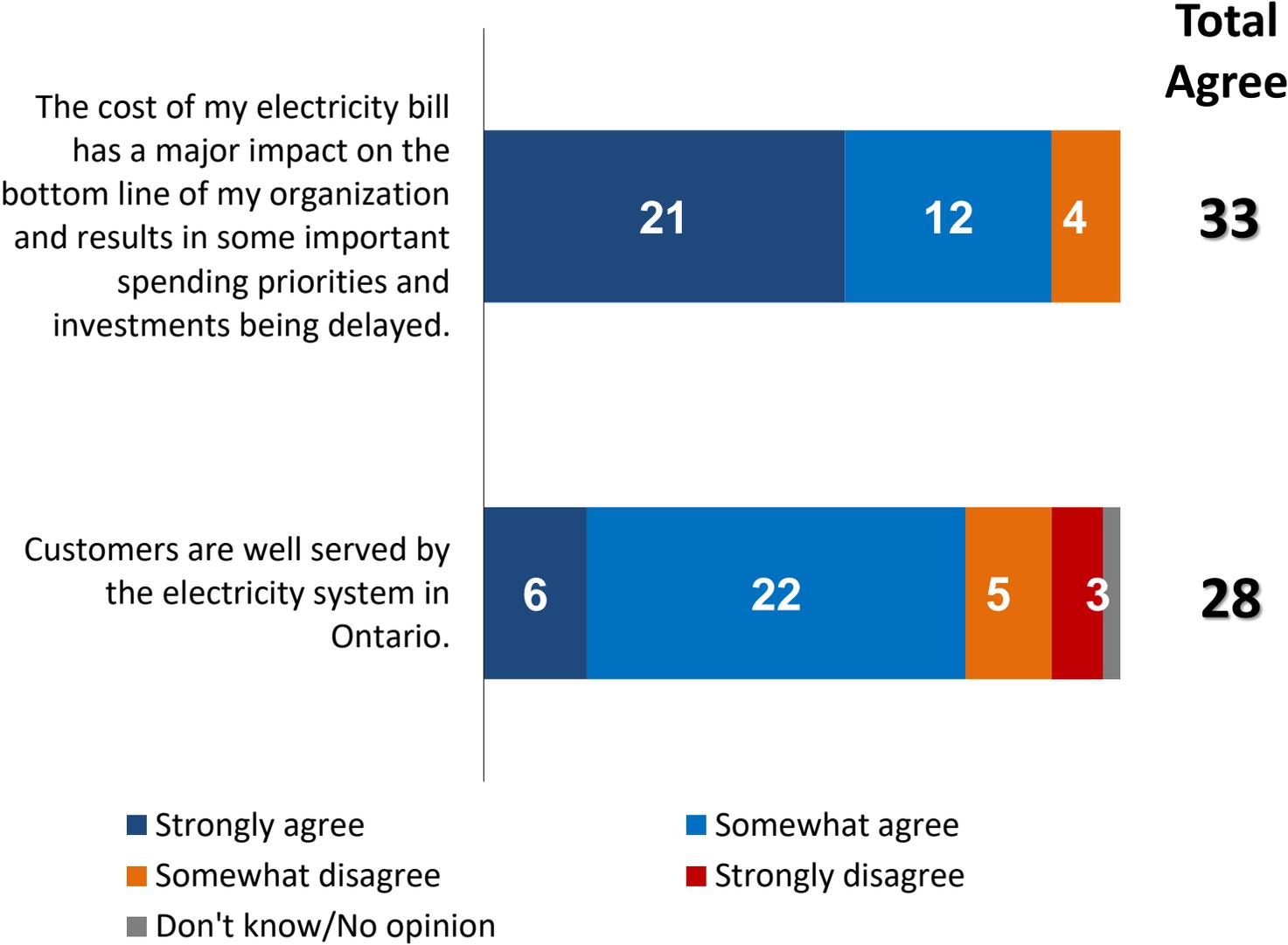
No comment:

- “No comment”
- “No further comments”

Energy Opinions

Energy Opinions

Q 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.
[asked all respondents, n=37]



Final Comments

Additional Comments



Before this survey concludes, do you have any additional comments or feedback you'd like to share with Toronto Hydro?

[asked all respondents, n=37]

Rates:

- “Hoping that the electricity rates will go down”
- “Please keep the hydro price down”
- “The overall cost of electricity in Ontario is high and puts companies that are owned by US parents at a competitive disadvantage. Hydro cost are a significant influencing factor of the cost of manufacturing in our business and therefore has been a limiting factor for growth in our business in Ontario, compared to our US manufacturing plants. If we want to grow the manufacturing foot print in Ontario we need to reduce overall cost of Hydro, otherwise we will continue to loose jobs to the US or Mexico from Ontario.”
- “My organization along with many others are being billed more then 55% towards alternative power (Global Adjustment) for more then a decade. I believe the amount of money that is being spent towards the Global Adjustment should have yielded better results instead of the excuses that more money is needed to increase better service. My company a lone has paid over \$500,000 annually for Global Adjustment. Times that by 10 years and you have 5 million dollars over that period of time, and that one company. It is very difficult to know what your budget is when you have no idea what your charges are going to be on the adjustment. You want us to help you, you should help us so we can give back”
- “Hydro doesn't regulate the global adjustment however, we should be fighting for your customers and collect part of it to offset any increase to our billing”

Reliability:

- “Any power interruption is a major problem. A blip can cause expensive equipment damage and an extended power outage seriously affects our business partners”
- “Critical facilities such as hospitals must be given higher priority for power reliability/quality improvements given the risk of power interruptions on vulnerable occupants”

Note: Respondents with no comment not shown.

Additional Comments



Before this survey concludes, do you have any additional comments or feedback you'd like to share with Toronto Hydro?

[asked all respondents, n=37]

General Positive Comments:

- "We have been happy with the service to date"
- "It's good that you are reaching out to your customers to help inform your strategic investments"
- "I've been involved with Toronto Hydro in the commercial industry and I find their support to be above average and the incentive programs division is outstanding"
- "Toronto Hydro contact representatives are the top in the industry. Victor da Rosa is a well respected representative and cares about his customers. Always helpful and a true professional. Jen Grado is also a great service provider. She was very helpful with a challenge our company was faced and she did a great job. Thank you for having them be our contact"
- "In my experience Toronto Hydro has been quite reliable and attentive to our critical needs. Outages are responded to very quickly and usually resolved in a timely manner as well. The crews, contractors and staff have all been attentive and courteous. We have taken advantage of some of the cost saving opportunities through Save on Energy program and have received exceptional customer service from those assisting with our projects. We understand that electricity prices are based on many variables beyond the control of Toronto Hydro but hope Toronto Hydro will continue to find ways to reduce associated electricity costs as they represent nearly 70% of the total cost of all utilities at our organization but less than 35% of the total consumption"

Other Comments:

- "Please do not sacrifice the condominium needs and obligations with loose and easy advice to proceed with projects without full analysis and scrutiny of the proposals and service providers. The lay person expects that when Toronto Hydro says it's a good project that you have scrutinized and analyzed the details...you don't do this"
- "Every homeowner and business owner should be encouraged and somewhat compensated to install standby generators at their location"
- "Suggesting to have account manager for big organizations in order to clear any concern or challenge in the shortest possible time"
- "Trust we will have a good operating relationship with Toronto Hydro because we have our own medium voltage infrastructure and we have internal staffs to carry out the related medium voltage switching which will impact the upstream Toronto Hydro distribution network. Thanks."
- "PLEASE get going on smart grid generation ability."
- "The province has spent far too much on windmills and solar photovoltaics when not needed. The nuclear burden cost wise is not sustainable, Pickering is too old. Storage is being viewed far too narrow as electricity storage and not energy storage, gas and hydro must be viewed together"
- "Publicize energy saving & monitoring technologies in more forums to build know-how better"

Note: Respondents with no comment not shown.



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For more information, please contact:

Jason Lockhart

Vice President

(t) 416-642-7177

(e) jlockhart@innovativeresearch.ca

Julian Garas

Senior Consultant

(t) 416-640-4133

(e) jgaras@innovativeresearch.ca

Customer Feedback Portal

Understanding Customer Needs and Preferences



Welcome to Toronto Hydro's Planning Consultation!

We need your input on choices that will affect the service you receive from Toronto Hydro and the price you pay for that service.

- 1** In Ontario, electricity distributors are regulated by the **Ontario Energy Board (OEB)**, the provincial energy regulator.
- 2** Toronto Hydro is developing its business plan for 2020 to 2024. This plan will determine the investments Toronto Hydro makes in equipment and infrastructure, the services it provides you as a customer, and the rates you pay.
- 3** **Your electricity rates pay for this plan so your views must be considered.**
- 4** You don't need to be an electricity expert to participate in this consultation. This workbook is focused on basic choices and provides the background information you need to answer the questions.
- 5** **Your feedback will be presented to the OEB when Toronto Hydro files its application with the OEB.**

In appreciation of your time, those who complete the questions that follow will be invited to enter a draw to win one of four (4) \$500 prepaid credit cards.

All of your individual responses will be kept confidential. Innovative Research Group (INNOVATIVE), an independent research company, has been hired to gather your feedback. INNOVATIVE will combine your responses with others to provide an overall report to Toronto Hydro.

About you.

In order to have a better sense of the type of customers providing feedback, please answer the questions below.

Are you completing this questionnaire as a...

Residential Customer

Small Business Customer

More about you

The information below is only being requested for statistical purposes to better understand the different types of customers providing feedback to Toronto Hydro.

R1. Please enter the first 3 characters of your residential postal code.

(_ _ _)

R2. Are you the person primarily responsible for paying the electricity bill in your household?

- Yes – I pay the bill
- Yes – Shared responsibility
- No

R3. Which of the following best describes your living situation?

- I pay rent for my housing
- I own my home
- I live in housing where I do not pay rent

R4. How would you describe your primary residence?

- A fully-detached home
- A semi-detached home
- An apartment or condo building fewer than 5 storeys
- An apartment or condo building 5 storeys or higher
- Other

R5. How long have you been a Toronto Hydro residential customer?

- Less than 2 years
- 2 to less than 5 years
- 5 to less than 10 years
- 10 to less than 20 years
- 20 years or more

More about your organization

The information below is only being requested for statistical purposes to better understand the different types of customers providing feedback to Toronto Hydro.

B1. Please enter the first 3 characters of your organization's postal code.

(_ _ _)

B2. As part of your job, do you **make decisions** or **influence decisions** about electricity management?

Yes

No

B3. Thinking about the areas of your organization that you manage, how much would you estimate is spent every month on electricity as a Toronto Hydro customer?

Less than \$500

\$500 to less than \$1,000

\$1,000 to less than \$1,500

\$1,500 to less than \$2,000

\$2,000 or more

Don't know

B4. Which of the following best describes the sector in which your business operates?

Commercial

Manufacturing/Industrial

Data Centre

Hospitality

Restaurant/Tavern

Retail

Warehouse

Other

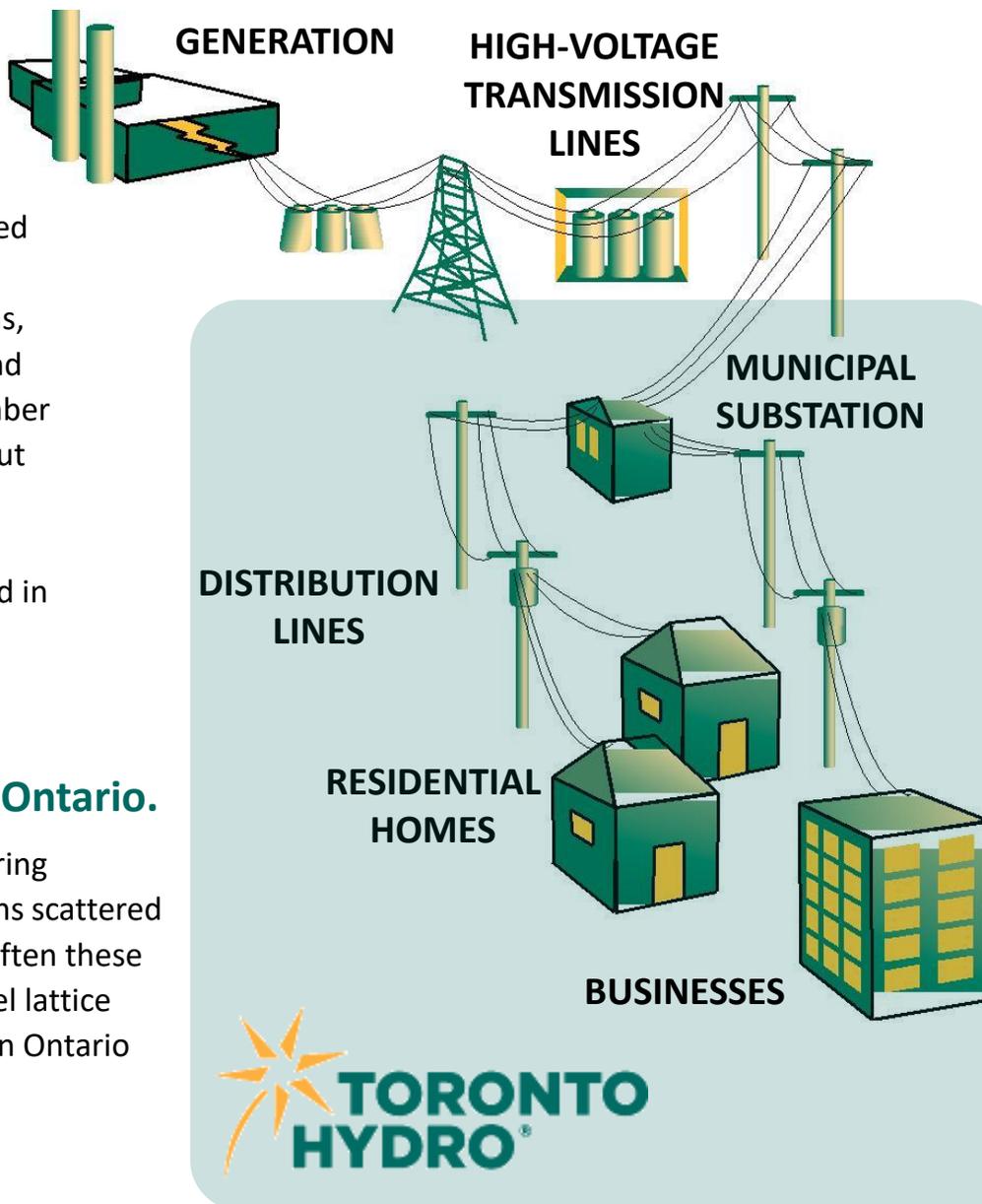
Where does Toronto Hydro fit within the electricity system?

There are three main parts to Ontario's electricity system:

1) Generation

Where electricity comes from.

The electricity you use is generated from a mix of nuclear generation stations, water power installations, natural gas generating plants, wind turbines, and solar panels. A number of companies own these plants but Ontario Power Generation, a provincial crown corporation, generates most of the power used in Ontario.



2) Transmission

Electricity travels across Ontario.

High voltage transmission lines bring electricity from generating stations scattered across the province to Toronto. Often these lines are suspended on large, steel lattice towers. Almost all of these lines in Ontario are owned by Hydro One.

3) Local Distribution

Delivering power to homes and businesses in your community.

Toronto Hydro runs the part of the electricity system that directly serves you. Distribution stations receive and convert electricity to safer voltages. Distribution poles, wires, and underground cables deliver it to your home or business. Toronto Hydro builds and operates this distribution system, reads meters, calculates and collects bills for all parts of the electricity system, answers customer calls, and delivers conservation programs. Toronto Hydro is owned by the City of Toronto. Its activities are funded by rates set by the OEB, not by government tax dollars.

Continued from
previous page

Fast Facts

- 100% owned by the City of Toronto
- Established in 1911
- Amalgamation of six utilities in 1998 across “metro Toronto”
- Owns and operates the electricity distribution system for Canada’s largest city
- Delivers electricity to approximately 766,000 customers in the City of Toronto
- Distributes approximately 20% of the electricity consumed in Ontario
- 1,490 employees
- \$4.1 billion in capital assets
- ***Toronto Hydro does not generate electricity***
- ***Toronto Hydro does not receive taxpayer money to fund its operations or investments***
- ***Toronto Hydro is entirely funded through the rates its customers pay***



Q1. Before this consultation, 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 and could explain the details of Ontario's electricity system, and Toronto Hydro's role in it, to others
- Somewhat familiar, but could not explain all the details of Ontario's electricity system to others
- Have heard of some of the terms and organizations mentioned in this workbook, but knew very little about Ontario's electricity system
- Aside from receiving a bill from Toronto Hydro, I knew nothing about Ontario's electricity system
- Don't know

Toronto Hydro operates and maintains the local electricity distribution system, delivers electricity throughout the community, reads meters, calculates and collects customer electricity bills, answers customer calls, responds during outages, clears trees and brush from power lines, and delivers conservation and demand programs.

Q2. Generally, how satisfied or dissatisfied are you with the services you receive from Toronto Hydro?

- Very satisfied
- Somewhat satisfied
- Neither satisfied nor dissatisfied
- Somewhat dissatisfied
- Very dissatisfied
- Don't know

Q3. Is there anything in particular that Toronto Hydro can do to improve its services to you?

Where does your money go?

Every item and charge on your bill is either mandated by the provincial government or approved by the Ontario Energy Board.

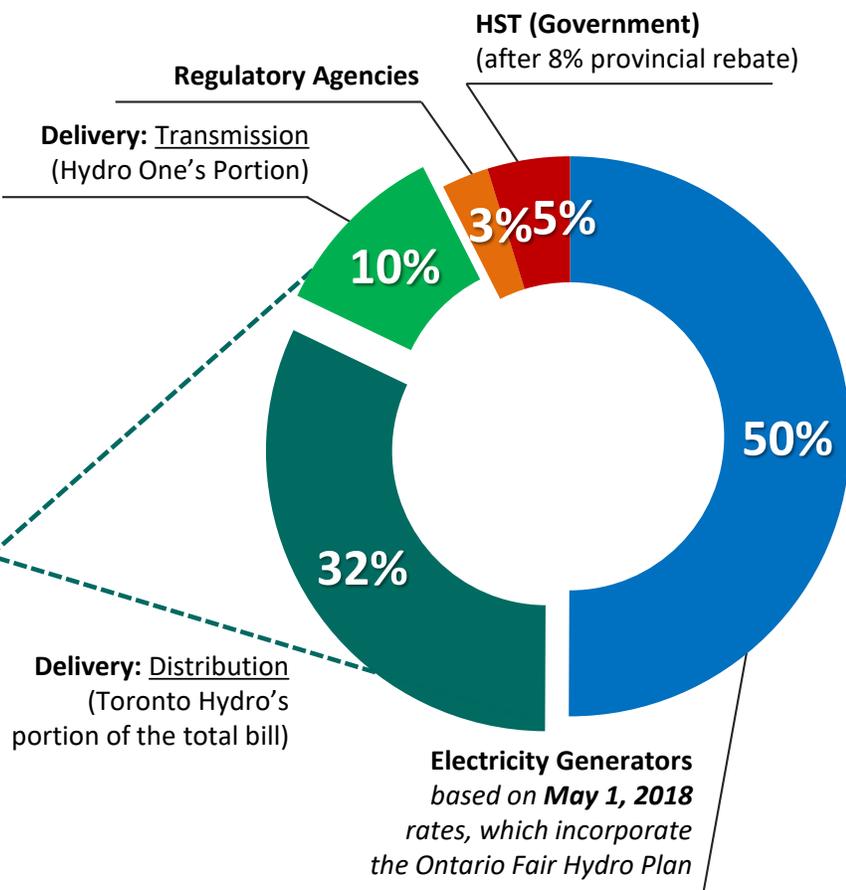
For the average residential customer, about **32%** of the bill goes to pay for the Toronto Hydro distribution system. The rest of the bill goes to power generation companies, transmission companies, the federal and provincial governments, and regulatory agencies.

Toronto Hydro is responsible for billing customers for all of these costs, including any applicable taxes. The “Delivery” charge pays for both the cost of transmission and the cost of distribution. Only the distribution portion is retained by Toronto Hydro to pay for its part of the system.

Typical Residential Bill

Sample Toronto Hydro Monthly Bill (Based on consumption of 750 kWh)	
Account Number: 000 000 000 000 0000	
Meter Number: 00000000	
Your Electricity Charges	
Electricity	
On-Peak (Highest Price) @ \$0.132 /kWh	17.82
Mid-Peak (Mid Price) @ \$0.095 /kWh	11.99
Off-Peak (Lowest Price) @ \$0.065 /kWh	31.69
Delivery	52.21
Regulatory Charges	3.28
Debt Retirement Charge[†]	0.00
Total Electricity Charges	\$116.99
HST	15.21
8% Provincial Rebate*	(-\$9.36)
* The Ontario government is providing a rebate on your electricity costs equal to the provincial portion of the HST	
Total Amount	\$122.84

Toronto Hydro's
portion of the bill:
\$39.19



Q4. Before this engagement, how familiar were you with the percentage of your electricity bill that is retained by Toronto Hydro?

- Very familiar
- Somewhat familiar
- Not familiar

How will your views impact Toronto Hydro's plans and rates?

The Ontario Energy Board (OEB) sets electricity rates in Ontario.

Electricity distributors like Toronto Hydro are funded by the distribution rates paid by their customers. Electricity distributors are required to file a rate application with the OEB to request a change in distribution rates based on their plans for capital and operating spending. Toronto Hydro is consulting now on its plans for 2020 to 2024.

As a customer, how are my interests protected?

The OEB requires electricity distributors, like Toronto Hydro to consider customer needs and preferences as it develops its business plan and distribution system plan.

The OEB then reviews Toronto Hydro's plans and proposed rates in an open and transparent public process known as a rate hearing. Any individual or group may participate during Toronto Hydro's application to ask questions or challenge Toronto Hydro's plans and assumptions. Toronto Hydro will be held accountable for the way you were consulted, the information shared with you and the ways in which the plan considers what you say.

At the end of the process, the OEB weighs the evidence and decides on the rates Toronto Hydro can charge its customers.

How does Enhanced Customer Engagement work?

Toronto Hydro has developed a five phase approach to gathering and responding to customer feedback.

✓ 1. Identify Customer Priorities

In 2016 and 2017 Toronto Hydro asked many types of customers from across the city about their priorities for electricity distribution service.

✓ 2. Use Customer Feedback to Guide Development of 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

Now Toronto Hydro is returning to customers to get feedback on the proposed Plan and ask customers how the Plan could better meet their needs and preferences.

4. Re-Examine Plan

Make appropriate changes to the Plan based on customer feedback.

5. Submit the Plan to the Ontario Energy Board

File the Plan, this workbook, and a summary report with the OEB where it will be examined by the OEB, consumer advocates, and other independent parties in a public hearing.

[Link to next page](#)

You are here

Continued from
previous page

Q5. Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into Toronto Hydro's plan?

- Very good way
- Somewhat good way
- Somewhat poor way
- Very poor way
- Don't know

Q6. Are there things that you would change about how Toronto Hydro brings customer needs and preferences into Toronto Hydro's plan? If so, what would you change?

Continued from previous page



In the initial customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for Toronto Hydro. They are:

- *Delivering reasonable electricity prices*
- *Ensuring reliable electricity service*
- *Ensuring the safety of electricity infrastructure*
- *Enabling the electricity system to support the reduction of greenhouse gases*
- *Helping customers with conservation and efficiency*
- *Providing quality customer service*

More information on the initial round of customer input can be found [here](#).

Q7. Are there any priorities on the list above that you feel don't belong? If so, please specify.

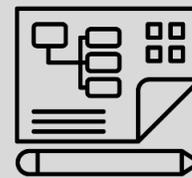
Q8. Are there any priorities that you would add to the list above? If so, please specify which priorities you would add.

Q9. Please rank your Top 3 priorities from the list below.

Drag and drop the priorities in order, starting with the priority most important to you, followed by the second most important, and ending with the third most important.

Priorities	Top 3 Ranking
Reasonable Prices	1
Reliability	2
Safety	3
Helping to reduce greenhouse gases	
Helping customers conserve	
Customer service	
Other [Please specify:_____]	
Other [Please specify:_____]	

Building Toronto Hydro's Plan



With this customer feedback in mind, Toronto Hydro is proposing a Plan that is responsive to:



1. Legal requirements by continuing to meet its obligations, including safety;



2. Customer feedback by:
 - a) Keeping distribution price increases as low as possible;
 - b) Maintaining long-term performance for customers experiencing average or better service;
 - c) Improve service levels for customers experiencing below average service or who have special reliability needs (e.g. hospitals); and,
 - d) Balancing other customer priorities (e.g. customer service) with the need to contain rate increases.



3. Business input by relying on expert analysis and professional judgment to develop construction and operations programs that address technical and operational requirements.

More information on Toronto Hydro's planning process [here](#).

Q10. Does this seem like the right approach or the wrong approach?

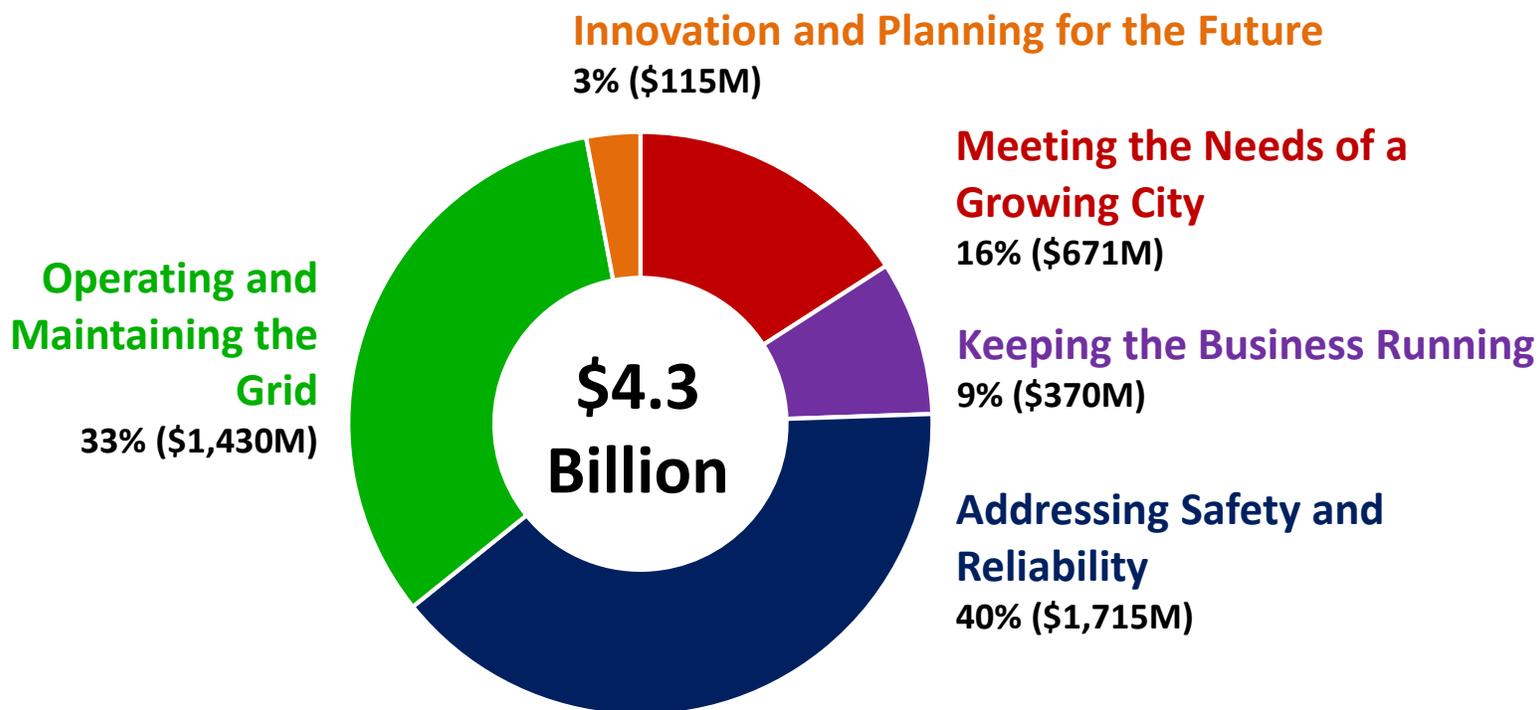
- Definitely the right approach
- Probably the right approach
- Probably the wrong approach
- Definitely the wrong approach
- Not sure
- Don't know

Q11. Is there is anything in particular you would change about this approach or any other comments you would like to make?

The Current Plan and Your Rates

Based on the initial customer input and the approach outlined on the previous page, Toronto Hydro has developed a plan totalling approximately \$4.3B over five years. **There are five key budget categories.**

To learn more about each category, simply hover over the title.



That translates into an average 3.4% increase in your distribution rates in each of the five years of the plan. This compares to an average increase of 5.8% per year in Toronto Hydro's current plan for 2015 to 2019.



- In dollars and cents, that means an **average increase to the monthly bill of \$1.51 each year** for the typical residential customer.
- Over the course of the proposed 5-year plan, the typical residential customer will see the distribution portion of their electricity bill **increase by \$7.57**.
- As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$41.60 in 2019 to \$49.17 by 2024**.

The next section of this workbook will explore some of the choices Toronto Hydro needs to make to finalize this plan. However, before that discussion, we would like to get your initial feedback on the cost of the current version of the plan.

Continued from previous page

Q12. Which of the following statements best represents your view about a 3.4% annual increase to deliver current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs?

- I support it
- I don't like the increase but I think it's necessary
- I oppose it
- Don't know

Q13. Do you have any comments you wish to add?

[Roll-over definitions for pie chart]

Meeting the Needs of a Growing City

As the Local Distribution Company for the City of Toronto, Toronto Hydro has an obligation to connect customers to its grid, meet its legal obligations with respect to safety, the environment and other areas, and provide basic levels of service.

Keeping the Business Running

Investments in this category provide business continuity and support the core functions of the utility: fleet, facilities, and information technology and security.

Addressing Safety and Reliability

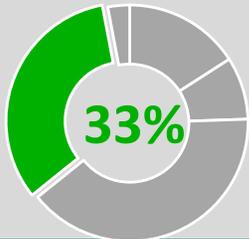
Customers expect Toronto Hydro to provide a reliable source of electricity. Investments in this category are directed toward all types of assets that are old or in poor condition and need to be replaced in order to prevent deteriorating service and keep the system running safely.

Operating and Maintaining the Grid

Toronto Hydro's grid is a 24/7 operation. These investments fund the day-to-day activities of the utility, including a control room, customer care services, maintenance work, storm and outage response crews, and standard administrative functions.

Innovation and Planning for the Future

Toronto Hydro deploys new technologies and conventional technologies in new ways to modernize the distribution system and generate benefits that provide cost savings and better service levels.



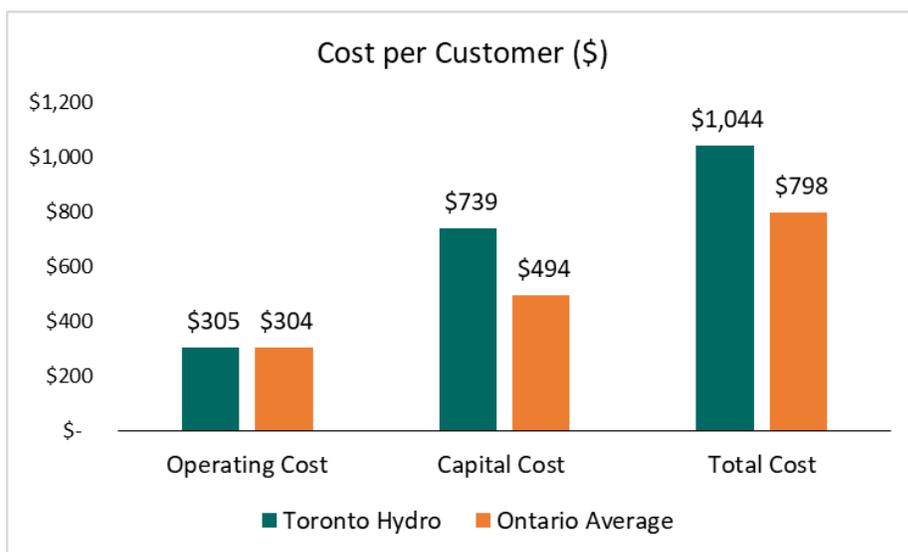
Making Choices

The following sections will ask about some key choices that could impact your rates.

Toronto Hydro's total spending is benchmarked by the OEB against other utilities in Ontario. In the last year of publicly available data collected by the OEB, Toronto Hydro's total cost per customer of \$1,044 is higher than the average Ontario utility cost of \$798. Those total costs are a combination of Toronto Hydro's operating and capital costs.

Toronto Hydro's **operating costs** of \$305 per customer are close to the Ontario average of \$304 dollars per customer. The choices in the operating budget are primarily driven by technical analysis and expert assessments of best practices.

As promised earlier, this customer feedback portal does not ask questions that expect you to be an electricity expert.



The OEB runs an open and transparent review process where experts from the OEB and intervenor groups review and challenge the Toronto Hydro's analyses and assessments. You are welcome to participate in the OEB process if you are interested in those issues. Details can be found [here](#).

This consultation is focused on capital investments. Toronto Hydro's capital costs are \$739 per customer compared to an Ontario average of \$494 per customer. Some of this spending is required by the standards that apply to all electricity distributors, or technical analysis of requirements. In other cases, the final amount Toronto Hydro spends is based on choices on the appropriate balance between cost and other outcomes that matter to customers. Since you as a customer are the best judge of which outcomes are most important to you, the remaining questions in this workbook ask for your feedback on those choices.

Again, the following sections will ask about some key choices that could impact your rates.

At the end of the portal, you will have an opportunity to review your responses and their impact on your bill. You will then be able to adjust your choices to provide what you feel is the best balance.

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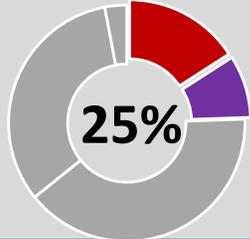
This workbook leaves detailed discussion of Toronto Hydro's operating budget to experts from the OEB and intervenors in the formal OEB review; the workbook focuses on collecting your view on competing trade-offs in infrastructure investments.

Q14. Does this seem like the right approach or the wrong approach to you?

- Definitely the right approach
- Probably the right approach
- Probably the wrong approach
- Definitely the wrong approach
- Don't know

Q15. Is there is anything in particular you would change about this approach or any other comments you would like to make?

Investing in the Basics



Meeting the Needs of a Growing City

Toronto is Growing. Toronto Hydro has an obligation to serve it.

You just have to drive around Toronto to see how quickly this community of over 2.9 million people is growing. New condos, office buildings, and transit projects are creating increasing demands on the electricity grid. Toronto Hydro is required to connect new customers to the grid and move infrastructure at the request of government, including for transit projects or road widening.



Beyond this, Toronto Hydro's efforts to meet the needs of a growing city include making investments that meet new demands on the grid in ways that at least maintain current reliability.

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Keeping the Business Running

In addition to maintaining the distribution grid, Toronto Hydro has to ensure that it invests in tools required to keep up with the needs of customers and the grid. The types of tools in this category are:

- **Information Technology:** systems required to securely operate the distribution system, manage customer information and privacy, and keep personnel working effectively and efficiently
- **Vehicles:** bucket trucks and other vehicles used to move personnel and supplies around the city to support the safe and reliable operation of the grid
- **Facilities:** offices and operations centers that house the people, vehicles, and equipment needed to serve customers

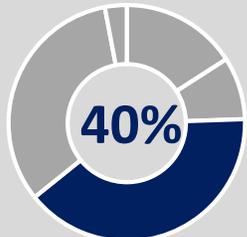


When deciding whether to continue to maintain existing tools or replace them, Toronto Hydro considers whether the risks and costs of continuing to use them outweighs the benefits of waiting longer to replace them. For example, Toronto Hydro intends to replace its system used for customer service and billing: the old version has reached the end of its useful life, no longer has full vendor support, and efforts to keep it going are becoming expensive and increasing the risks that Toronto Hydro cannot get accurate bills to customers on time.

Q16. As a company, Toronto Hydro needs vehicles and tools to service the power lines and IT systems to manage the system and customer information. Which of the following statements best represents your point of view?

- Toronto Hydro should find ways to make do with the equipment and IT systems it already has
- Toronto Hydro should make the investments necessary to ensure its staff have the equipment and IT systems they need to manage the system efficiently and reliably
- Don't know

Q17. Additional Feedback (Optional)



Addressing Safety and Reliability

What's in this category?

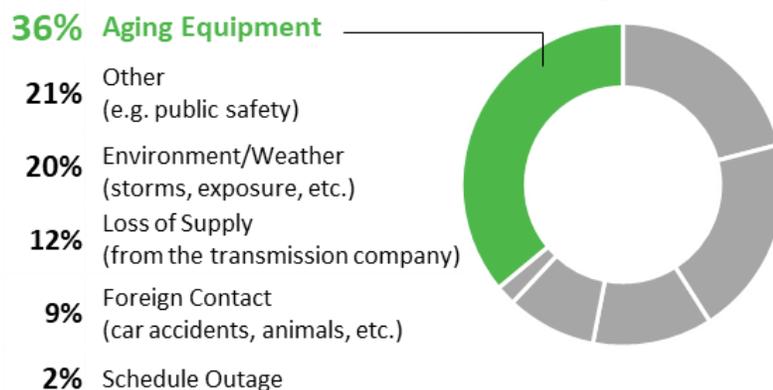
40% of Toronto Hydro's proposed budget will go towards ensuring safety and reliability is maintained and service improvements are made for customers experiencing below average reliability or who have special reliability needs (e.g. hospitals).

There are many reasons for poorer reliability (e.g. outages). In any given year, reliability can increase or decrease in response to unusual weather events. In fact, roughly 20% of all outages are caused by ice storms, severe winds, extreme rainfall, and other environmental events. However, the largest number of outages, roughly 36% of them, can be attributed to aging equipment.

Toronto Hydro measures both how many interruptions customers experience and how long those outages last. Over the past five years, excluding major events like ice storms, the average customer has experienced:

- Average of **1.4** outages per year.
- Between **60** and **70** minutes without power per year.

Aging equipment is responsible for approximately 36% of Outages

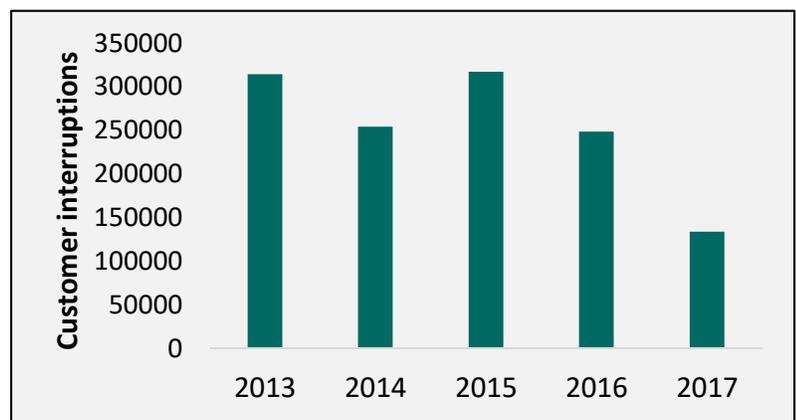


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Approximately one-third of Toronto Hydro's distribution assets are beyond their expected useful lives or will reach their expected end of useful life within the next five years. Toronto Hydro takes a stewardship approach to that challenge: investing in infrastructure that benefits today's customers and future generations of customers.

Toronto Hydro's current five year plan (2015-2019) ramped up investment in replacing old equipment **and the average number and length of outages has been declining**. The chart below illustrates this improvement for people who were having the worst experiences.

In the new plan, Toronto Hydro's general approach is to spend just enough on the grid so that most customers can expect a similar level of reliability over the next five years as they are experiencing today, and to provide improved service for those customers whose reliability is poorer or who have special reliability needs (e.g. hospitals).

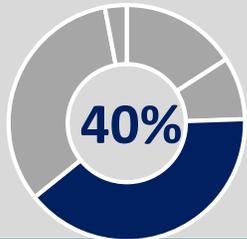


of Customer Interruptions on Poor Performing Circuits

Q18. Which of the following is closest to your point of view regarding Toronto Hydro's stewardship approach to addressing reliability?

- Toronto Hydro should stick with the proposed approach of maintaining the current level of day-to-day reliability that the average customer experiences respectively as part of the proposed rate increase of 3.4% per year.
- I am prepared to pay more so Toronto Hydro can reduce the number and length of outages that the average customer experiences.
- I am prepared to live with an increase in the number and length of outages so the proposed rate increase can be reduced.
- Don't know

Q19. Additional Feedback (Optional)



Dealing with types of lines that fail more often with more problems

Should we spend more to replace lines that cause more complicated problems more often?

While this is a general question, there are two particular types of neighbourhood power lines where there is a pressing issue - Rear-Lot Feeders and Direct Buried Cable. These are old technologies that have been in use for more than 50 years. While initially they served Toronto Hydro customers well, they now pose reliability and safety concerns. Customers served by these lines are more likely to experience power outages, and when they do those outages are more likely to last longer and be more expensive to fix.



- **Rear-Lot** refers to a type of overhead construction installed in residential backyards during the 1950s and 1960s. Because rear-lot lines are in customers' backyards, they are often difficult for crews to reach and have more exposure to risks such as falling trees and branches. Working on these lines often causes additional disruption and inconvenience to customers. Outages on rear-lot lines are about 1.3 hours longer on average as compared to outages on other power lines.
- **Direct Buried Cable** refers to a legacy type of underground construction where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system. Once these cables start to fail, they tend to experience a rash of failures. On average 800 customers are affected by each buried cable failure and the outages last longer than average (between 4 and 24 hours).

Toronto Hydro's initial plan will phase out rear-lot feeders by 2033 and a quarter of the highest risk direct buried cable by 2024. Converting these lines faster will improve reliability for customers served by this type of equipment.

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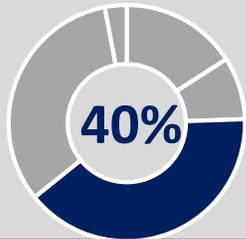
Q20. Which of the following is closest to your point of view regarding Toronto Hydro's *rear-lot* replacement programs?

- Toronto Hydro should stick with the proposed pace of investment in rear-lot which would see it all converted by 2033 as part of a proposed rate increase of 3.4% per year.
- I am willing to pay an additional \$0.02 per month annually (\$0.11 more on the average monthly bill by 2024) so Toronto Hydro can remove all rear-lot feeders by 2029 (four years sooner).
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
- Don't know

Q21. Which of the following is closest to your point of view regarding Toronto Hydro's *direct buried cable* replacement programs?

- Toronto Hydro should stick with the proposed pace of investment in direct buried cable replacement which would see a quarter of the highest risk cable replaced by 2024 as part of a proposed rate increase of 3.4% per year.
- I am willing to pay an additional \$0.19 per month annually (\$0.94 more on the average monthly bill by 2024) so Toronto Hydro can replace all of the highest risk direct buried cable by 2024.
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
- Don't know

Q22. Additional Feedback (Optional)



Dealing with complicated projects in built up areas

Should we spend more now to avoid increased cost and disruption later?

In order to keep rate increases down, Toronto Hydro has focused its spending on dealing with more urgent and immediate needs. However, with the current pace of growth in Toronto, there are a number of locations where Toronto Hydro knows that it will need to conduct work within a few years and where planned and current development will make those projects more expensive and more disruptive if Toronto Hydro waits.

Paper Insulated Lead Covered (PILC) Cable

One major example of this is PILC cable. PILC cable was the first type of underground cable installed as part of Toronto Hydro's grid and a lot of it is still providing electricity to the downtown core.

While this is a resilient type of equipment, all of these cables were installed more than 20 years ago. As these cables begin to age, the outer lead covers can begin to crack and leak oil.

Environmental regulations have changed, making it more costly and difficult to remove and replace these cables. As workers who first installed these types of cables continue to retire, fewer trades people have the expertise to deal with this equipment.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049 while still meeting legal, safety, and regulatory obligations. However, as the downtown core becomes more densely populated, it becomes increasingly more difficult, complex, and expensive to complete this type of work.

Toronto Hydro has identified an opportunity to replace all of this cable by 2039 by replacing these assets proactively, instead of relying solely on maintenance, refurbishment, and reactive replacement. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.



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previous page

Q23. Which of the following is closest to your point of view regarding Toronto Hydro's *PILC Cable* replacement program?

- Toronto Hydro should address the reliability issues and other risks posed by PILC cable at the current pace (completed by 2049) as part of a proposed rate increase of 3.4% per year, even if it's more disruptive to do so in the future.
- Toronto Hydro should accelerate its replacement of PILC cable by 10 years, even if it costs the typical residential customer an additional \$0.09 per month annually (\$0.44 more on the average monthly bill by 2024), because it's less disruptive to do it now than in the future.
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced
- Don't know

Q24. Additional Feedback (Optional)

Continued from previous page

Underground Network Transformers

Other underground infrastructure in the downtown core also faces some of the same challenges as PILC cable. Underground network transformers, units whose old design makes them prone to flooding, are located in areas that have been growing in terms of density and congestion. It is more difficult to do this work as time goes on.

Toronto Hydro's current plan (2015-2019) is dealing with the most pressing of these units that pose safety and reliability concerns. In the plan for 2020 to 2024, the focus is to replace just enough of these units so that outages, due to equipment failure, don't get any worse.

However the new units are significantly superior to the existing infrastructure. Much of the old infrastructure is not designed for the flooding that has become increasingly common and which can cause equipment failure and public safety hazards. The new network units are submersible and equipped with sensors to monitor transformer, protector, and vault conditions, resulting in the cost-effective reduction of reliability, environmental, and safety risks.

While the proposed plan would replace all the unit by 2031, the process could be advanced by three years to replace all these units by 2028.



Q25. Which of the following is closest to your point of view regarding Toronto Hydro's *Network Unit* replacement program?

- Toronto Hydro should stick with the proposed pace of investment in underground network transformer replacement as part of a proposed rate increase of 3.4% per year.
- Toronto Hydro should replace its underground network transformers 3 years faster to improve downtown reliability, even if it costs the typical residential customer an additional \$0.02 per month annually (\$0.09 more on the average monthly bill by 2024).
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced
- Don't know

Q26. Additional Feedback (Optional)

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Cable Chambers

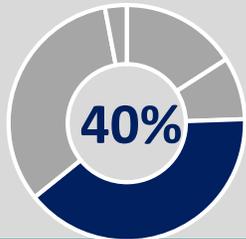
Cable chambers are a third example of equipment that will become more costly and disruptive to fix over time. Cable chambers house, protect, and provide access to underground electrical equipment across the city. There are over 10,000 in Toronto, but many of them – including the majority of the roughly 500 that are in the most urgent need of attention – are downtown where they are subject to increased foot traffic. When they deteriorate or break, they can pose anything from a tripping hazard to something much more serious in the case of a collapsed chamber. Such instances can also cause long outages, either by damaging equipment or requiring the power to be turned off to the cables in the chamber so repairs can be made.

As part of its plan, Toronto Hydro is now taking a proactive approach to rebuilding hundreds of cable chambers at risk of failing. At the current pace, it would take approximately 30 years to address the chambers in the worst condition. Accelerating the work could halve that period, at an additional cost now.

Q27. Which of the following is closest to your point of view regarding Toronto Hydro's *Cable Chamber* renewal program?

- Toronto Hydro should stick with the proposed pace of investment in cable chamber renewal as part of a proposed rate increase of 3.4% per year.
- Toronto Hydro should address the safety and reliability risk posed by deteriorating cable chambers faster, even if it costs the typical residential customer an additional \$0.02 per month (\$0.10 more on the average monthly bill by 2024).
- Toronto Hydro should go back to reconstructing cable chambers reactively in order to keep my rates lower now.
- Don't know

Q28. Additional Feedback *(Optional)*



Dealing with more frequent extreme weather events

Should we spend more to make the distribution system more resilient to the effects of major storms?

Toronto Hydro's distribution system is exposed to the elements: strong winds, freezing rain, and severe flooding have all caused at least one widespread outage in Toronto in recent years. While it may be impossible or impractical to completely guard against extreme weather, steps can be taken to "harden" the distribution system. Toronto Hydro is proposing a variety of enhancements to continue to build resiliency. Toronto Hydro is looking for your opinion on whether it should do more in one area in particular: the overhead system outside of the downtown core.



System Restoration Improvements

This type of work makes it easier for Toronto Hydro to restore power customers outside of the downtown following an outage. By adding remotely-operated technology, more back-up links within the grid, and other improvements, Toronto Hydro can better isolate the problem and get more customers' power back on faster.

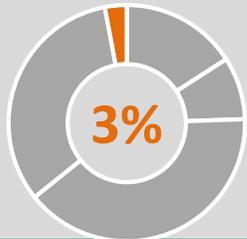
Given customer desires to keep rate increases down, Toronto Hydro is currently proposing to reduce spending in this category. Improvements have already been made to some parts of the City and the reliability of this part of the overhead system has shown improvement in recent years. It is possible for Toronto Hydro to address more areas during 2020 to 2024 not yet benefiting from these improvements.

Q29. Should Toronto Hydro spend more now to speed up the pace of reducing outage times by up to 50% in neighbourhoods outside of downtown?

- Yes, I would be willing to accept an increase to my monthly bill of \$0.02 in each of the five years of the plan (\$0.09 more by 2024) so more customers can get their power back on quicker during outages caused by storms and other events.
- No, I'm comfortable knowing that some of this work is already planned and would prefer to keep my bill lower.
- Don't know

Q30. Additional Feedback (Optional)

Innovation and Planning for the Future



Bring New Technology into the Toronto Hydro System

Technology is changing how people use electricity and the demands on the grid. Customers are not just taking power from the grid, they are also using technology like solar panels to produce their own power and send any extra back to the grid. Toronto Hydro is currently implementing new technologies in a limited manner and could increase the pace of that investment.

Energy Storage

Toronto Hydro has already begun to integrate large-scale electricity storage into the system. Storage provides a number of benefits to customers:

- It supports reliability by providing electricity when the connection to generators is interrupted
- It can allow low cost electricity generated in off-peak hours to be available during peak demands.
- It helps intermittent renewable sources such as wind and solar integrate into the system, thereby increasing the availability of clean energy and reducing greenhouse gases (GHGs).
- It helps to enable the integration of electric vehicles into the system without requiring major increases in more traditional wires and transformers to deal with electric vehicle charging needs.



Crosstown Battery Storage (3D rendering of Phase 1)

Storage also provides a number of benefits that are invisible to customers but critical to the stability of the grid including power quality, load following, and frequency regulation.

Continued from previous page

Right now Toronto Hydro is primarily using energy storage where there is an immediate benefit to the system. For example, at one of Toronto Hydro's most congested downtown stations (Cecil TS), battery storage and conservation solutions are being used to delay a necessary upgrade for approximately five to six years. This approach is expected to reduce the total overall cost to ratepayers by approximately \$6 million.



Poletop Energy Storage Unit

Toronto Hydro has identified a number of additional energy storage-related projects with critical large-scale public and private sector customers with a defined project need. These batteries would be located at host sites and provide benefits locally and to the distribution system. The host would pay most of the costs. Customers like you would pay for the portion that relates to the benefit they receive (e.g. area reliability).

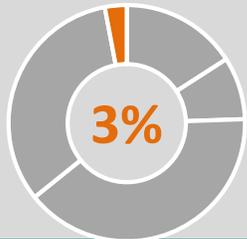
These projects would improve reliability and help reduce GHGs but are not required to maintain current reliability. Pursuing these projects would increase the average annual bill impact of the plan by up to \$0.11 per month or a total of \$0.53 by 2024.

Q31. Which of the following is closest to your point of view?

- I would be willing to pay up to \$0.53 more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.
- No, I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.
- Don't know

Q32. Additional Feedback (Optional)

Innovation and Planning for the Future

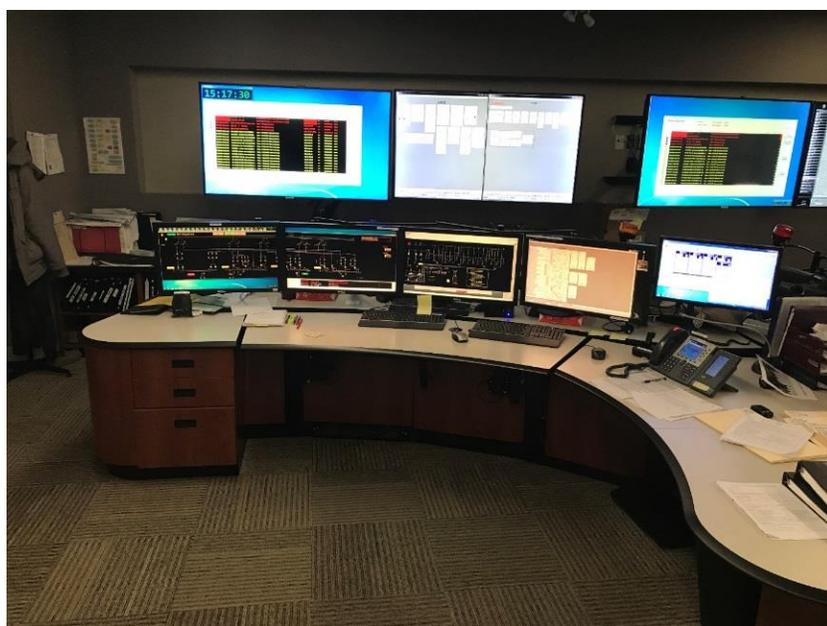


Monitoring and Control Equipment

New communication technology has revolutionised the way the grid can be managed. New remote switches allow a Toronto Hydro system manager to restore power to many customers by flicking a switch in a control room before the line crew even leaves to repair the break. Remote monitors allow system managers to pinpoint where the break occurred instead of sending crews out in trucks visually inspecting the line. Environmental monitors at critical equipment facilities such as major transformers can identify changing conditions that threaten equipment before the equipment fails so preventative action can be taken to avoid an outage in the first place.

Within the base budget covered by the 3.4% annual increase, Toronto Hydro's new construction takes advantage of these new technologies wherever clear benefits can be established.

However, Toronto Hydro can improve the reliability of its grid by adding these devices to lines and transformers. In particular, installing devices in the downtown underground network that detect fire, floods or other risks can be completed more quickly.



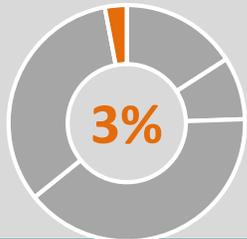
Toronto Hydro Control Room

Q33. Which of the following is closest to your point of view?

- I would be willing to pay \$0.07 more per bill by 2024 for Toronto Hydro to be able to better predict fire, floods and other risks in the downtown network that cause outages or damage.
- Toronto Hydro should maintain the pace of installing monitoring and control equipment on the downtown network as planned within its existing proposed rate increase of 3.4% per year, but not go any further.
- Toronto Hydro should reduce its planned increase by eliminating the improved monitoring and control equipment planned for the downtown network.
- Don't know

Q34. Additional Feedback (Optional)

Innovation and Planning for the Future



Microgrids

New types of generation (often renewable), storage, and supporting systems are making it possible for communities, institutions or other large customers to develop “microgrids”. These are a local electricity network linking smaller sources of electricity with nearby uses such as homes, businesses and institutions. In the event of a failure of the larger network, a microgrid can seal itself off and continue to provide power locally. These offer customers increased choice for power supply, cost management, and improved resilience.



Microgrids would give customers more choices, while creating a more resilient and reliable grid. While spending on microgrids does benefit customers who are not on microgrids, those benefits are not required to maintain current reliability.

Q35. Which of the following is closest to your point of view?

- I would be willing to pay \$0.09 more per bill by 2024 for Toronto Hydro to support the development of microgrids in order to give customers more choice and create a more resilient and reliable grid.
- Toronto Hydro should support microgrids, but only if those customers pay for the full costs, as they are not required to maintain current reliability.
- Don't know

Q36. Additional Feedback (Optional)

Investment Alternatives Summary

Throughout this portal, you have been asked about some key choices that could impact your rates.

First a quick reminder:

- Toronto Hydro's current proposed plan would result in a monthly **bill increase of \$1.51 each year** for the typical residential customer.
- Over the course of the proposed 5-year plan, the typical residential customer will see the distribution portion of their electricity bill **increase by \$7.57**.
- As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$41.60 in 2019 to \$49.17 by 2024**.

Below are your answers to questions that could impact your rates. At the bottom of this page you will find the total bill impact of all the answers you gave that would result in a bill increase.

Having seen the total bill impact, please review your answers and change your responses if you desire. Your potential rate impact will be re-calculated and you will have the opportunity to adjust your answers again until you feel you've reached the best balance for you.

Addressing Safety & Reliability: Rear-lot replacement program

- Toronto Hydro should stick with the proposed pace of investment in rear-lot which would see it all converted by 2033 as part of a proposed rate increase of 3.4% per year.
- I am willing to pay an additional \$0.02 per month annually (\$0.11 more on the average monthly bill by 2024) so Toronto Hydro can remove all rear-lot feeders by 2029 (four years sooner).
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
- Don't know

Addressing Safety & Reliability : Direct buried cable replacement program

- Toronto Hydro should stick with the proposed pace of investment in direct buried cable replacement which would see a quarter of the highest risk cable replaced by 2024 as part of a proposed rate increase of 3.4% per year.
- I am willing to pay an additional \$0.19 per month annually (\$0.94 more on the average monthly bill by 2024) so Toronto Hydro can replace all of the highest risk direct buried cable by 2024.
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
- Don't know

Continued from previous page

Addressing Safety & Reliability : Paper Insulated Lead Covered (PILC) cable replacement program

- Toronto Hydro should address the reliability issues and other risks posed by PILC cable at the current pace (completed by 2049) as part of a proposed rate increase of 3.4% per year, even if it's more disruptive to do so in the future.
- Toronto Hydro should accelerate its replacement of PILC cable by 10 years, even if it costs the typical residential customer an additional \$0.09 per month annually (\$0.44 more on the average monthly bill by 2024), because it's less disruptive to do it now than in the future.
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced
- Don't know

Addressing Safety & Reliability : Network Unit replacement program

- Toronto Hydro should stick with the proposed pace of investment in underground network transformer replacement as part of a proposed rate increase of 3.4% per year.
- Toronto Hydro should replace its underground network transformers 3 years faster to improve downtown reliability, even if it costs the typical residential customer an additional \$0.02 per month annually (\$0.09 more on the average monthly bill by 2024).
- I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced
- Don't know

Addressing Safety & Reliability : Cable chamber renewal program

- Toronto Hydro should stick with the proposed pace of investment in cable chamber renewal as part of a proposed rate increase of 3.4% per year.
- Toronto Hydro should address the safety and reliability risk posed by deteriorating cable chambers faster, even if it costs the typical residential customer an additional \$0.02 per month (\$0.10 more on the average monthly bill by 2024).
- Toronto Hydro should go back to reconstructing cable chambers reactively in order to keep my rates lower now.
- Don't know

Addressing Safety & Reliability : System Restoration Improvements

- Yes, I would be willing to accept an increase to my monthly bill of \$0.02 in each of the five years of the plan (\$0.09 more by 2024) so more customers can get their power back on quicker during outages caused by storms and other events.
- No, I'm comfortable knowing that some of this work is already planned and would prefer to keep my bill lower.
- Don't know

Continued from previous page

Innovation & Planning for the Future: Investments in energy storage projects

- I would be willing to pay up to \$0.53 more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.
- No, I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.
- Don't know

Innovation & Planning for the Future: Investments in monitoring and control equipment

- I would be willing to pay \$0.07 more per bill by 2024 for Toronto Hydro to be able to better predict fire, floods and other risks in the downtown network that cause outages or damage.
- Toronto Hydro should maintain the pace of installing monitoring and control equipment on the downtown network as planned within its existing proposed rate increase of 3.4% per year, but not go any further.
- Toronto Hydro should reduce its planned increase by eliminating the improved monitoring and control equipment planned for the downtown network.
- Don't know

Innovation & Planning for the Future: Investments in microgrids

- I would be willing to pay \$0.09 more per bill by 2024 for Toronto Hydro to support the development of microgrids in order to give customers more choice and create a more resilient and reliable grid.
- Toronto Hydro should support microgrids, but only if those customers pay for the full costs, as they are not required to maintain current reliability.
- Don't know

Based on your responses above, by 2024, the incremental bill impact of your choices would result in:

+\$X.XX per month

in addition to the estimated \$49.17 in distribution charges on the average residential customer's electricity bill.

If you are satisfied with your responses above, click CONTINUE to submit your choices. If you would like to adjust your choices, please do so above, and click RECALCULATE in order to see your revised estimated bill impact. Note: you can adjust your answers and recalculate your bill impact as many times as you would like in order to find the best balance for you.

- RECALCULATE** - I would like to recalculate my estimated bill impact based on my adjusted choices above.

Customer Feedback:

Investment Alternatives

Q38. With regards to Toronto Hydro's proposed plan, which of the following statements best represents your view?

- Toronto Hydro should improve service, as discussed on the previous pages, even if that means an annual increase that exceeds 3.4%
- Toronto Hydro should stick with a 3.4% annual increase to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs.
- Toronto Hydro should keep increases below 3.4% annually, even if that could mean reductions in service.
- Other [Please specify: _____]
- Don't know

Q39. Now that you have considered the various choices Toronto has to make and the cost implications of those choices, do you have any final comments for Toronto Hydro?

Customer Feedback



Q40. Please indicate the extent to which you agree or disagree with the following statement:

The cost of my electricity bill has a major impact on my household finances and requires I do without some other important priorities.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree
- Don't know

Customer Feedback:

Final Thoughts



Overall Impression: What did you think about the customer feedback portal?

Volume of Information: Did Toronto Hydro provide too much information, not enough, or just the right amount?

Content Covered: Was there any content missing that you would have liked to have seen included?

Outstanding Questions: Is there anything that you would still like answered?

Suggestions for Future Consultations: How would you prefer to participate in these consultations?

Thanks for participating!

You have now completed the customer feedback portal.

Please enter your email and customer billing address if you wish to be entered into the draw for your chance to win one of four \$500 prepaid credit cards.

Your email will be used to contact you if you are one of the randomly selected prize winners and your billing address will be used to verify that you are a Toronto Hydro customer. Your email and customer billing address will be treated as strictly confidential and will not be shared with any third parties. This information will be deleted once the draw is complete.

Email Address: _____

Confirm Email: _____

Billing Address

Street Address: _____

Apartment #: _____

Postal Code: _____

NOTE: only Toronto Hydro customers are permitted to participate in this voluntary review, therefore, postal codes are collected and used by Innovative Research Group Inc. solely for maintaining the integrity of the consultation by validating legitimate participation in the process. Your personal information shall remain under the custody and control of Innovative Research Group Inc. and will not be disclosed to any third parties.

SUBMIT

Appendix

Additional Links to Information

Legal & Regulatory Obligations



There are three key organizations responsible for setting the policy direction of Ontario's electricity system. The decisions made by these organizations impact how utilities operate their business and serve customers.

Toronto Hydro is also held accountable by an ombudsman which acts as an independent bridge between people and their government.



Policy

The **Ontario Ministry of Energy** creates energy policy for the province.

Operations and Planning



The **Independent Electricity System Operator (IESO)** manages the provincial electricity grid, plans for the province's future energy needs, and develops conservation programs.

Regulation



The electricity industry in Ontario is regulated by the **Ontario Energy Board (OEB)**, which was created through provincial legislation. One of the OEB's roles is to review the business and distribution plans of all electricity distributors and set the rates that they charge customers.

Ombudsman Toronto



If Toronto Hydro is unable to resolve a customer complaint, you may bring your complaint to **Ombudsman Toronto** which listens to and investigates complaints and concerns about City administration and unfairness in the delivery of City services, including at Toronto Hydro. They are independent and impartial.



Business Input

Toronto Hydro's team of engineering and technical experts closely monitors the external pressures on the distribution system, develops solutions to address these challenges, and recommends investments that inform the business plan.



Infrastructure Health

- A large part of Toronto Hydro's distribution system was installed in the 1950s and 1960s. This infrastructure has served the city well and beyond its expected lifespan.
- Toronto Hydro has been actively renewing its electrical distribution system over the past few years, and that work must continue to maintain current levels of reliability.



A Growing City

- Toronto Hydro is serving a growing city. It has nearly a quarter of a million more residents than it did a decade ago.
- Toronto's highest growth neighbourhoods are all located in Downtown. For example, the population of the Waterfront neighbourhood increased by over 50% between 2011 and 2016.



Innovation

- Enhancing the distribution system to enable the mass adoption of electric vehicles in the near future.
- Investing in technology that enables enhanced tools and information for customers to better manage and monitor their electricity consumption.



Cyber Security

- Taking proactive steps to prevent cyber attacks that could impact the protection of customer information and distribution system reliability.



Climate Change Preparedness

- Taking proactive steps to prevent or reduce the length of prolonged power outages caused by extreme weather (e.g. high winds, floods and ice storms).

What has Toronto Hydro heard from customers?

**Pop Up
Page 11**

What do customers think about Toronto Hydro?

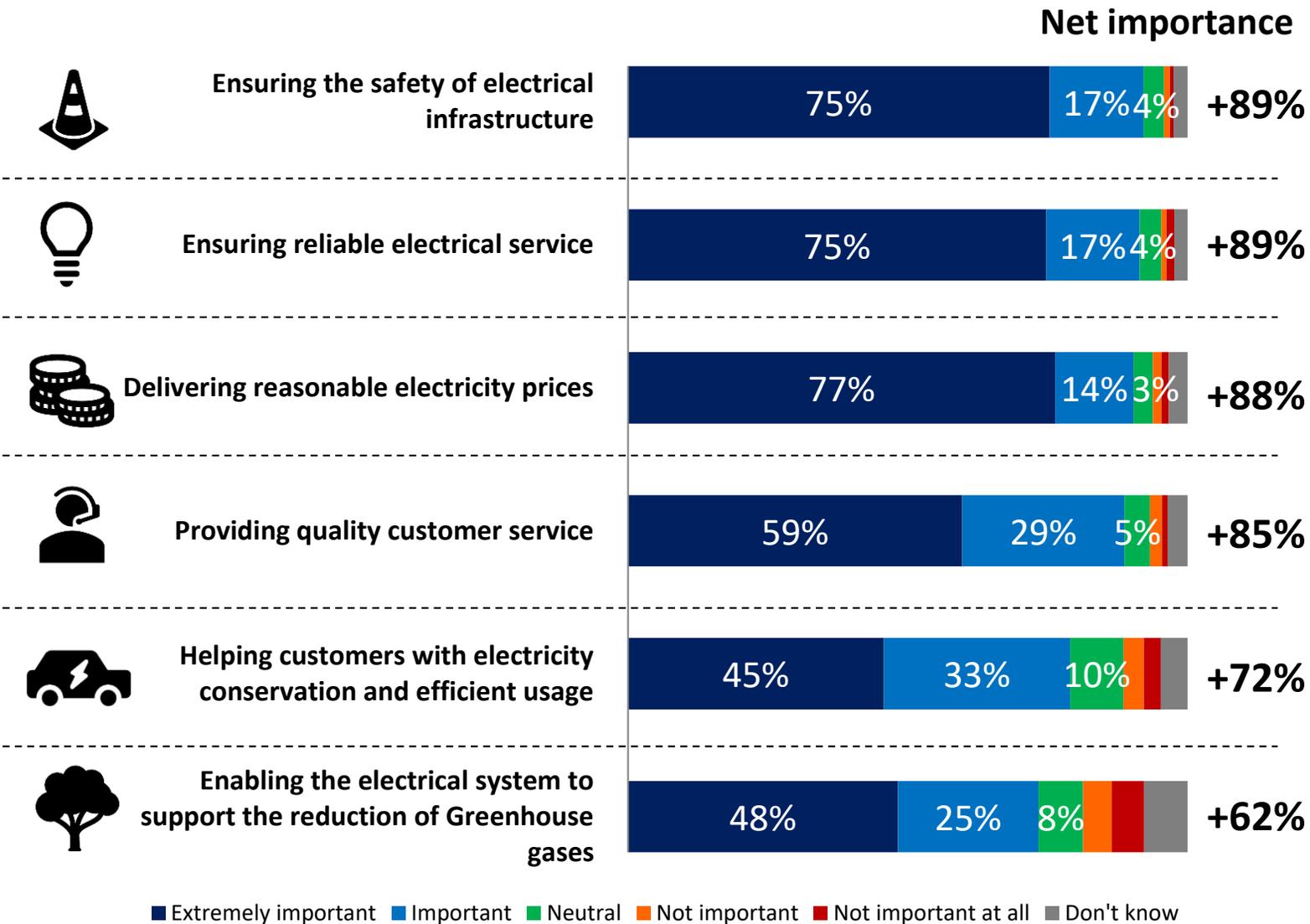
December 2016 Low-volume (Residential & Small Business) Customer Satisfaction Scorecard Survey



- **83%** say they are satisfied with the **services** they receive from Toronto Hydro.
- **84%** say they are satisfied with the **reliability** of the electricity they receive from Toronto Hydro.

What do Toronto Hydro customers think the utility should focus on?

A key focus of Toronto Hydro’s early customer engagement for this plan is understanding the key outcomes of concern to customers. Six key outcomes were identified through discussions and then rated by customers in the December 2016 Customer Satisfaction Survey.

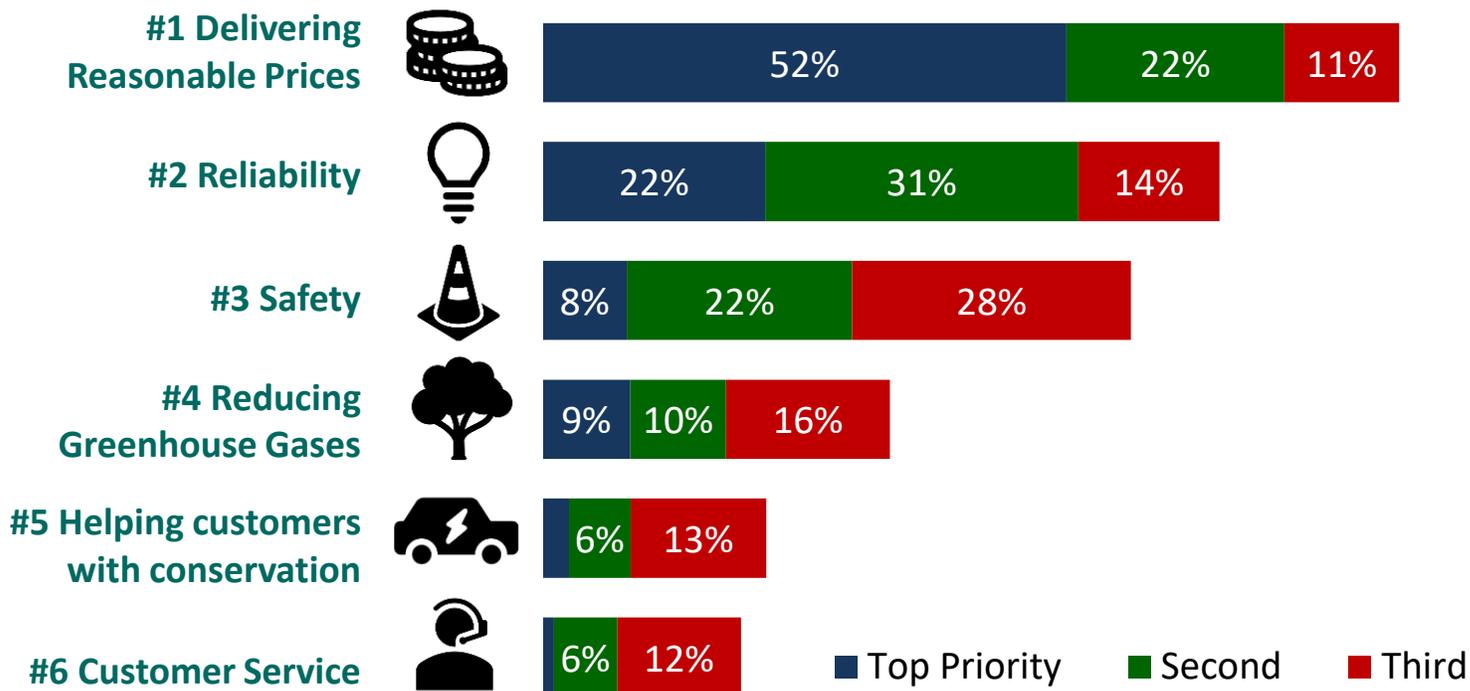


Continued from
previous page

Pop Up
Page 11

How do customer rank priorities?

While all six areas of focus for Toronto Hydro are deemed as important priorities to customers, in the survey, customers ranked some priorities higher than others.



Appendix 3.2.1



Residential Ratepayer Survey

Customer Consultation

Toronto Hydro Electric System Ltd
14 Carlton Street
Toronto, ON, M5B 1K5

May 2018

Prepared by:

Innovative Research Group, Inc.
www.innovativeresearch.ca

Vancouver
888 Dunsmuir Street, Suite 350
Vancouver, BC | V6C 3K4

Toronto
56 The Esplanade, Suite 310
Toronto, Ontario | M5E 1A7



A. INTRODUCTION

INTRO. Hello, my name is _____ and I'm calling from **Innovative Research Group** on behalf of **Toronto Hydro**, your local electricity distributor.

Innovative Research Group is a national public opinion research firm. **We need your input on choices that will affect the service you receive from Toronto Hydro and the price you pay for that service.** Your answers will be combined with others to protect your privacy.

This survey should take about 20 minutes to complete. We know your time is valuable so at the end of the survey, you will have the opportunity to provide your name and email to receive a \$10 Amazon Gift Card.

- A1.** Would you mind if I had **about 20** minutes of your time to ask you some questions? **All your responses will be kept strictly confidential.**

01	Yes	[continue]
02	No - Not responsible for paying bill	[go to TRANSFER-1]
03	No - Bad time	[Arrange Callback]
99	Refused (DO NOT READ)	[Terminate]

MONIT. This call may be monitored or audio taped for quality control and evaluation purposes.

01	PRESS TO CONTINUE	[continue]
----	-------------------	------------

- CELL. Are you currently operating a car, truck or other motor vehicle?

01	Yes	[Arrange Callback]
02	No	[continue]
99	Refused (DO NOT READ)	[Terminate]

- A2.** Are you the person primarily responsible for paying the electricity bill in your household?

01	Yes - I pay the bill	[continue]
02	Yes - Shared responsibility	[continue]
03	No	[go to TRANSFER-1]
98	Don't know (DO NOT READ)	[Terminate]

TRANSFER-1. Can I speak with the person in your household who usually pays the electricity bill?

01	Yes	[Back to INTRO]
02	No – Not available/Bad time	[Arrange Callback]
98	Don't know (DO NOT READ)	[Terminate]
99	Refused (DO NOT READ)	[Terminate]

A3. Can you confirm that your household receives an electricity bill from **Toronto Hydro**?

01	Yes	[continue]
02	No	[Terminate]
98	Don't know	[Terminate]

GENDER. [Interviewer Note: By observation]

01	Male
02	Female

B. SYSTEM FAMILIARITY

B4. To start, I'd like to ask you a few questions about the electricity system ...

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; and
- **Distribution lines** carry electricity to the homes and businesses in our communities.

Today we're going to talk about your **local distribution system** which is maintained and operated by Toronto Hydro.

How familiar are you with **Toronto Hydro**? Would you say you are *very familiar, somewhat familiar, or not familiar at all*?

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

B5. In general, how satisfied or dissatisfied are you with the services you receive from **Toronto Hydro**? Would you say you are *very satisfied, somewhat satisfied, neither satisfied or dissatisfied, somewhat dissatisfied, very dissatisfied, or would you say you don't know*?

01	Very satisfied
02	Somewhat satisfied
03	Neither satisfied or dissatisfied
04	Somewhat dissatisfied
05	Very dissatisfied
98	Don't know
99	Refused (DO NOT READ)

B6. Is there anything in particular that **Toronto Hydro** can do to improve its services to you?

[OPEN]

B7. I'd now like to talk with you about your electricity bill ...

While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, they retain about **32%** of the typical residential customer's bill. This is about **\$39** on an average **\$123** monthly residential electricity 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 percentage of your electricity bill that is retained by **Toronto Hydro**? Would you say... **[READ LIST]**

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

C. CUSTOMER ENGAGEMENT PROCESS

- C8. Electricity distributors are required to file a rate application with the Ontario Energy Board (OEB) to request a change in distribution rates based on their plans for capital and operating spending. Toronto Hydro is now consulting on its plans for 2020 to 2024.

The OEB is mandated to protect consumers with respect to prices and the reliability and quality of electricity service.

How familiar would you say you are with the Ontario Energy Board or “OEB”?

Would you say ... **[READ LIST]**

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

- C9. As part of Toronto Hydro’s consultation, it has developed a five-phase approach to gathering and responding to customer feedback.
- First, Toronto Hydro identified customer priorities through a series of surveys and focus groups;
 - Then, used this customer feedback to guide development of its Draft Plan;
 - Now, Toronto Hydro is in the process of collecting customer feedback on its Draft Plan;
 - The next phases will include re-examining its Draft Plan based on customer feedback and preparing a submission to the OEB.

This survey is part of the third stage of **collecting customer feedback on the Draft Plan**.

Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into Toronto Hydro’s plan?

Would you say ... **[READ LIST]**

01	Very good way
02	Somewhat good way
03	Somewhat poor way
04	Very poor way
98	Don't know

- C10. Toronto Hydro wants to better understand customer priorities. In the first phase of customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for Toronto Hydro.
- C11. Among the following customer identified priorities, please tell me which one is the most important to you.

READ OPTIONS; RANDOMIZE LIST

01	Delivering reasonable electricity prices
02	Ensuring reliable electricity service
03	Ensuring the safety of electricity infrastructure
04	Enabling the electricity system to support the reduction of greenhouse gases
05	Helping customers with conservation and efficiency
06	Providing quality customer service

- C12. What is the next most important priority you think **Toronto Hydro** should focus on?
[Remove answer from C11 if asked to read again]
- C13. And what do you consider the third most important priority?
[Remove answer from C11 and C12 if asked to read again]
- C14. Are there any other important priorities that **Toronto Hydro** should be focusing on that weren't included in the previous list I read to you? **[OPEN]**

D. PLANNING PRINCIPLES AND RATE IMPACT

- D15. Based, in part, on the initial customer input, Toronto Hydro has drafted a plan totaling approximately \$4.3B over five years.

Toronto Hydro's proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

This proposed plan translates into an average 3.4% increase in your distribution rates each year from 2020 to 2024. The distribution charges on the monthly bill would increase to \$49 by 2024 for a typical residential customer.

Do you feel that this is *definitely the right approach*, *probably the right approach*, *probably the wrong approach* or *definitely the wrong approach* to Toronto Hydro's planning for the next five years or *would you say you don't know*?

01	Definitely the right approach
02	Probably the right approach
03	Probably the wrong approach
04	Definitely the wrong approach
98	Don't know

E. MAKING CHOICES

- E16. Toronto Hydro's total spending is benchmarked by the OEB against other utilities in Ontario. Toronto Hydro's operating costs of \$305 per customer are within \$1 of the provincial average.

However Toronto Hydro's capital investment costs are \$739 per customer which are \$245 more than the provincial average.

Since a number of capital investment decisions are based trade-offs between costs and customer outcomes – like services and reliability levels – the remaining questions in this survey ask for your feedback on those choices.

- E17. Do you feel that gathering feedback on capital investment decisions is *definitely the right approach, probably the right approach, probably the wrong approach, definitely the wrong approach or would you say you don't know?*

01	Definitely the right approach
02	Probably the right approach
03	Probably the wrong approach
04	Definitely the wrong approach
98	Don't know

F. INVESTING IN THE BASICS

F18. As a company, Toronto Hydro needs vehicles and tools to service the power lines and IT systems to manage the system and customer information.

Which of the following statements best represents your point of view? [READ LIST; Rotate 01 and 02]

01	Toronto Hydro should find ways to make do with the equipment and IT systems it already has
02	Toronto Hydro should make the investments necessary to ensure its staff have the equipment and IT systems they need to manage the system efficiently and reliably
98	Don't know

PREAMBLE TO NEXT SECTION

F19. Toronto Hydro has identified areas where it could accelerate investments. These accelerated projects could increase the **typical customer's bill by \$2.46** per month by 2024. These projects are in addition to the 3.4% increase that is currently being proposed.

Toronto Hydro wants to get your feedback on particular projects before deciding whether or not to accelerate its investment plan in certain specific areas.

G. ADDRESSING SAFETY AND RELIABILITY

- G20. Right now, the typical Toronto Hydro customer averages 1.4 outages per year with an average of between 60 and 70 minutes without power over the year. While many of those outages are caused by events outside of Toronto Hydro's control, roughly 36% are caused by the failure of aging equipment.

In this proposed plan, Toronto Hydro's general approach is to spend just enough on replacing equipment so that most customers can expect a similar level of reliability over the next five years as they are experiencing today, and to provide improved service for those customers whose reliability is poorer or who have special reliability needs such as hospitals.

Which of the following is closest to your point of view regarding Toronto Hydro's approach to addressing reliability? **[READ LIST; Rotate 01 and 03]**

01	Toronto Hydro should stick with the proposed approach of maintaining the current level of day-to-day reliability that the average customer experiences as part of the proposed rate increase of 3.4% per year.
02	I am prepared to pay more so Toronto Hydro can reduce the number and length of outages that the average customer experiences.
03	I am prepared to live with an increase in the number and length of outages so the proposed rate increase can be reduced.
98	Don't know

Dealing with types of lines that fail more often with more problems

G21. Some customers are served by older types of lines that are more likely to fail, causing more frequent, and longer lasting power outages. These customers are more likely to experience poorer reliability over time than most Toronto Hydro customers. The proposed plan will replace those lines over time but the work could be done faster.

I would like to ask you about two types of lines.

G22. One example is **rear-lot lines**. They go through residential backyards and are often more difficult to service and more exposed to falling branches. The proposed plan will replace all existing rear-lot lines by 2033. Toronto Hydro could replace those lines 4 years sooner for an additional cost.

Which of the following statements is closest to your view? [**READ LIST; ROTATE 01 and 03**]

01	Toronto Hydro should stick with the proposed pace of investment in rear-lot which would see it all converted by 2033 as part of a proposed rate increase of 3.4% per year.
02	I am willing to pay an additional \$0.11 more on my average monthly bill by 2024 so Toronto Hydro can remove all rear-lot feeders four years sooner.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don't know

G23. Another example is **direct buried cable** where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system.

Once these cables start to fail, they tend to experience a rash of failures. The proposed plan will replace a **quarter** of the highest risk direct buried cable by **2024**. Toronto Hydro could replace all of the highest risk direct buried cable by 2024 for an additional cost.

Which of the following statements is closest to your view? [**READ LIST; ROTATE 01 and 03**]

01	Toronto Hydro should stick with the proposed pace of investment in direct buried cable replacement which would see a quarter of the highest risk cable replaced by 2024 as part of a proposed rate increase of 3.4% per year.
02	I am willing to pay an additional \$0.94 more on my average monthly bill by 2024 so Toronto Hydro can replace all of the highest risk direct buried cable by 2024.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don't know

Paper Insulated Lead Covered (PILC)

G24. Toronto Hydro has identified three equipment upgrades that are needed within the next few years. If Toronto Hydro waits, those upgrades will be more expensive and disruptive as Toronto continues to grow.

Firstly, Paper Insulated Lead Covered (PILC) cable. PILC cable was an old type of underground cable that stopped being installed on Toronto Hydro’s grid 20 years ago. While the equipment is resilient and is still providing electricity to the downtown core, the outer lead covers can begin to crack and leak oil. Replacing these cables is becoming increasingly difficult and expensive to resource and complete.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049. But Toronto Hydro can replace all of this cable ten years earlier by 2039, at an additional cost now. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.

Which of the following is closest to your point of view regarding Toronto Hydro’s PILC Cable replacement program? **[READ LIST ; ROTATE 01 and 03]**

01	Toronto Hydro should address the reliability issues and other risks posed by PILC cable at the current pace as part of a proposed rate increase of 3.4% per year, even if it’s more disruptive to do so in the future.
02	Toronto Hydro should accelerate its replacement of PILC cable by 10 years, even if it costs the typical residential customer an additional \$0.44 more on the average monthly bill by 2024, because it’s less disruptive to do it now than in the future.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don’t know

Underground Network Transformers

G25. The second upgrade project identified is *Underground Network Transformers*. The key problem with these units is their older design which makes them prone to flooding.

Toronto Hydro plans to replace just enough of these units by 2031 so that outages, due to equipment failure, don’t get any worse. But the process could be advanced by three years to replace all these units by 2028.

G26. Which of the following is closest to your point of view regarding Toronto Hydro’s Network Unit replacement program? **[READ LIST ; ROTATE 01 and 03]**

01	Toronto Hydro should stick with the proposed pace of investment in underground network transformer replacement as part of a proposed rate increase of 3.4% per year.
02	Toronto Hydro should replace its underground network transformers 3 years faster to improve downtown reliability, even if it costs the typical residential customer an additional \$0.09 more on the average monthly bill by 2024.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don’t know

Cable Chambers

- G27. The third upgrade project identified is Cable Chamber replacement. Cable Chambers house, protect, and provide access to underground electrical equipment across the city. When they deteriorate or break, this equipment can cause outages and pose anything from a tripping hazard to something more serious like a collapsed chamber.

Toronto Hydro plans to take approximately 30 years to address the chambers in the worst condition. But accelerating the work could halve that period, at an additional cost now.

- G28. Which of the following is closest to your point of view regarding Toronto Hydro's Cable Chamber renewal program? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should stick with the proposed pace of investment in cable chamber renewal as part of a proposed rate increase of 3.4% per year.
02	Toronto Hydro should address the safety and reliability risk posed by deteriorating cable chambers faster, even if it costs the typical residential customer an additional \$0.10 more on the average monthly bill by 2024.
03	Toronto Hydro should go back to reconstructing cable chambers reactively in order to keep my rates lower now.
98	Don't know

Dealing with more frequent extreme weather events

- G29. As Toronto Hydro's distribution system is exposed to strong winds, freezing rain, and severe flooding, they are proposing a variety of enhancements to improve the resiliency of the distribution system against extreme weather events.

Toronto Hydro could enhance the system further in neighbourhoods outside of downtown. The improvements include adding remotely-operated technology and more back-up links within the grid. This will help Toronto Hydro to better isolate the problem and reduce outage times by as much as 50% in these areas.

Which of the following statements best represents your point of view? **[READ LIST; ROTATE 01 and 02]**

01	Yes, I would be willing to accept an increase to my monthly bill of \$0.09 more by 2024 so more customers can get their power back on quicker during outages caused by storms and other events.
02	No, I'm comfortable knowing that some of this work is already planned and would prefer to keep my bill lower.
98	Don't know

H. INNOVATION AND PLANNING FOR THE FUTURE

- H30. 3% of the proposed budget would be spent on innovation and planning for the future. The following questions are about this aspect of the budget.

Toronto Hydro has already begun to integrate large-scale battery electricity storage into the system. They have now identified more opportunities to partner on a wider range of energy storage projects. Integrating storage into the system can improve reliability and help reduce greenhouse gases, but it is not required to maintain current levels of reliability.

Which of the following is closest to your point of view? **[READ LIST; ROTATE 01 and 02]**

01	I would be willing to pay up to \$0.53 more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.
02	I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.
98	Don't know

- H31. New communication technology has revolutionised the way the grid can be managed.

Toronto Hydro plans to take advantage of various new technologies wherever clear benefits can be established.

However, Toronto Hydro can improve the reliability of its grid further by installing communication devices in the downtown underground network that detect fire, floods or other risks more quickly.

Which of the following is closest to your point of view? **[READ LIST; ROTATE 01 and 03]**

01	I would be willing to pay \$0.07 more per bill by 2024 for Toronto Hydro to be able to better predict fire, floods and other risks in the downtown network that cause outages or damage.
02	Toronto Hydro should maintain the pace of installing monitoring and control equipment on the downtown network as planned within its existing proposed rate increase of 3.4% per year, but not go any further.
03	Toronto Hydro should reduce its planned increase by eliminating the improved monitoring and control equipment planned for the downtown network.
98	Don't know

H32. New types of generation (often renewable), storage, and supporting systems are making it possible for communities, institutions or other large customers to develop “microgrids”. They are a local electricity network linking smaller sources of electricity with nearby uses such as homes, businesses and institutions. In the event of a failure of the larger network, a microgrid can seal itself off and continue to provide power locally.

Microgrids would give customers more choices, while creating a more resilient and reliable grid. However, they are not required to maintain current reliability.

Which is the following is closest to your point of view? **[READ LIST; ROTATE 01 and 02]**

01	I would be willing to pay \$0.09 more per bill by 2024 for Toronto Hydro to support the development of microgrids in order to give customers more choice and create a more resilient and reliable grid.
02	Toronto Hydro should support microgrids, but only if those customers pay for the full costs, as they are not required to maintain current reliability.
98	Don't know

I. INVESTMENT ALTERNATIVES SUMMARY

133. Toronto Hydro’s current proposed plan, which translates into an average 3.4% annual increase, focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

In dollars and cents, that means an average increase to the monthly bill of **\$1.51 each year** for the typical residential customer.

Over the course of the proposed 5-year plan, the typical residential customer will see the distribution portion of their electricity bill **increase by \$7.57**.

As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$42 in 2019** to **\$49 by 2024**.

134. With regards to Toronto Hydro’s proposed plan, which of the following statements best represents your view? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should improve service, as discussed on the previous pages, even if that means an annual increase that exceeds 3.4%.
02	Toronto Hydro should stick with a 3.4% annual increase to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs.
03	Toronto Hydro should keep increases below 3.4% annually, even if that could mean reductions in service.
88	Other [Please specify]
98	Don’t know

ASK if 01, 02, 03 or 98

135. And why do you say that? **[OPEN]**

J. SEGMENTATION AND DEMOGRAPHICS

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.

01	Strongly agree
02	Somewhat agree
03	Somewhat disagree
04	Strongly disagree
98	Don't know/ No opinion
99	Refused (DO NOT READ)

[ROTATE]

J36. The cost of my electricity bill has a major impact on my finances and requires I do without some other important priorities.

J37. Customers are well served by the electricity system in Ontario.

[END BATTERY]

The following questions are only being requested for statistical purposes to better understand the different types of customers providing feedback to Toronto Hydro.

J38. Which of the following best describes your living situation?

01	I pay rent for my housing	
02	I own my home	
03	I live in housing where I do not pay rent	

J39. How would you describe your primary residence?

01	A fully-detached home	
02	A semi-detached home	
03	An apartment or condo building fewer than 5 storeys	
04	An apartment or condo building 5 storeys or higher	
88	Other	

J40. Some financial assistance programs are targeted based on income and the number of people in the home. To better allow us to understand the needs of customers who may be eligible for different programs, can you please tell me how many people reside in your home , including yourself (adults and children)?

01	Record NUMERIC response only	
98	Don't know [DO NOT READ]	

J41. To the best of your ability, please tell me which of the following categories best describes your household's AFTER TAX income. **[READ LIST]**

01	Less than \$28,000	
02	Just over \$28,000 to \$39,000	
03	Just over \$39,000 to \$48,000	
04	Just over \$48,000 to \$52,000	
05	More than \$52,000	
98	Not sure [DO NOT READ]	
99	Refused [DO NOT READ]	

J42. In order to claim your **\$10 Amazon Gift Card**, please provide me with the following information... *[Note: Please read back name and email before proceeding to end]*

Your first and last name: _____ **[RECORD and CONFIRM]**

Your email address: _____ **[RECORD and CONFIRM]**

Your mailing address (if no internet access/email account): _____ **[RECORD and CONFIRM]**

THANK and END SURVEY

Thank you very much for taking the time to complete this survey.

Appendix 3.2.2



Small Business Ratepayer Survey

Customer Consultation

Toronto Hydro Electric System Ltd
14 Carlton Street
Toronto, ON, M5B 1K5

May 2018

Prepared by:

Innovative Research Group, Inc.
www.innovativeresearch.ca

Vancouver
888 Dunsmuir Street, Suite 350
Vancouver, BC | V6C 3K4

Toronto
56 The Esplanade, Suite 310
Toronto, Ontario | M5E 1A7



A. INTRODUCTION

INTRO. Hello, my name is _____ and I'm calling from **Innovative Research Group** on behalf of **Toronto Hydro**, your local electricity distributor.

Innovative Research Group is a national public opinion research firm. **We need your input on choices that will affect the service you receive from Toronto Hydro and the price you pay for that service.** Your answers will be combined with others to protect your privacy.

This survey should take about 20 minutes to complete. We know your time is valuable so at the end of the survey, you will have the opportunity to provide your name and email to receive a \$20 Amazon Gift Card.

Can I please speak to the person who is in-charge of managing the electricity bill at your organization?

- | | |
|---|------------------------|
| 1) Yes, speaking <contact on the line> | [skip to A1] |
| 2) Yes <transferred to contact> | [skip to A1] |
| 3) No <not the right contact person> | [GO to "NEW"] |
| 4) No <busy> "When is a good time to callback?" | [record callback time] |
| 5) Maybe <may I ask who is calling?> | [skip to GATE] |

NEW. And ... can I have their ...

First Name _____
Last Name _____
Title/Position _____
Phone Number _____

ASK to be transferred ...

- if transferred → go to **A2**
- if not transferred → **Thank & Add to Callback List**

GATE. Hello, my name is _____ and I'm calling from **Innovative Research** on behalf of **Toronto Hydro**, your local electricity utility.

INTERVIEWER NOTE: If gatekeeper asks the purpose of call → I'd like to ask the person in-charge of managing the electricity bill at your organization a few questions concerning a **Toronto Hydro** customer consultation.

- | | |
|--|--|
| 1) Yes <transferred to contact> | [skip to A2] |
| 2) No <not available> "When is a good time to callback?" | [record call-back time
and go to "NEW"] |
| 3) No <not interested in talking> | [Thank & Terminate] |

A1 QUAL PREAMBLE:

Read preamble again, if transferred to new person:

Hello, my name is _____ and I'm calling from **Innovative Research** on behalf of **Toronto Hydro**, your local electricity utility.

Innovative Research is a national public opinion research firm. We have been hired by **Toronto Hydro** to help them better understand the needs and preferences of non-residential customers who are responsible for paying their organization's electricity bill.

A1. Can I have roughly **20 minutes** of your time to ask you some questions? All your responses will be kept strictly confidential.

- | | | |
|--|---|---------------------|
| Yes - I don't mind | 1 | [CONTINUE] |
| No - Not primary bill payer (i.e. not best person to speak to) | 2 | [go to TRANSFER] |
| No - BAD TIME | 3 | [ARRANGE CALLBACK] |
| No - HARD REFUSAL | 4 | [THANK & TERMINATE] |

MONIT [INTERNAL]

This call may be monitored or audio taped for quality control and evaluation purposes.

PRESS TO CONTINUE 1

A2. Can you confirm that your organization receives an electricity or hydro bill from **Toronto Hydro**

- | | | |
|------------------|----|---------------------|
| YES | 1 | [CONTINUE] |
| NO | 2 | [THANK & TERMINATE] |
| DK (volunteered) | 98 | [THANK & TERMINATE] |

Only those in charge of managing/overseeing organizations electricity bill will be interviewed.

A3. As part of your job, are you in charge of managing or overseeing your organization's electricity or hydro bill?

- | | | |
|-----|---|--|
| YES | 1 | [CONTINUE] |
| NO | 2 | "Can I speak to the person who manages your organization's electricity bill?"
[Return to NEW] |
| DK | 3 | "Can I speak to the person who manages your organization's electricity bill?"
[Return to NEW] |

TRANSFER

Can I please speak to the person who is in-charge of managing the electricity bill at your organization?

- | | | |
|--|---|-------------------------|
| Yes | 1 | [BACK TO <i>INTRO</i>] |
| No - NOT AVAILABLE/BAD TIME - (ARRANGE CALLBACK) | 2 | [ARRANGE CALLBACK] |
| No - HARD REFUSAL | 3 | [THANK & TERMINATE] |

B. SYSTEM FAMILIARITY

B4. To start, I'd like to ask you a few questions about the electricity system ...

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; and
- **Distribution lines** carry electricity to the homes and businesses in our communities.

Today we're going to talk about your **local distribution system** which is maintained and operated by Toronto Hydro.

How familiar are you with **Toronto Hydro**? Would you say you are *very familiar, somewhat familiar, or not familiar at all*?

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

B5. In general, how satisfied or dissatisfied are you with the services your organization receives from **Toronto Hydro**? Would you say you are *very satisfied, somewhat satisfied, neither satisfied or dissatisfied, somewhat dissatisfied, very dissatisfied, or would you say you don't know*?

01	Very satisfied
02	Somewhat satisfied
03	Neither satisfied or dissatisfied
04	Somewhat dissatisfied
05	Very dissatisfied
98	Don't know
99	Refused (DO NOT READ)

B6. Is there anything in particular that **Toronto Hydro** can do to improve its services to your organization?

[OPEN]

B7. I'd now like to talk with you about your organization's electricity bill ...

While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, they retain about **30%** of the typical small business customer's bill. This is about **\$94** on an average **\$314** monthly small business electricity 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 percentage of your organization's electricity bill that is retained by **Toronto Hydro**? Would you say... **[READ LIST]**

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

C. CUSTOMER ENGAGEMENT PROCESS

- C8. Electricity distributors are required to file a rate application with the Ontario Energy Board (OEB) to request a change in distribution rates based on their plans for capital and operating spending. Toronto Hydro is now consulting on its plans for 2020 to 2024.

The OEB is mandated to protect consumers with respect to prices and the reliability and quality of electricity service.

How familiar would you say you are with the Ontario Energy Board or “OEB”?

Would you say ... **[READ LIST]**

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

- C9. As part of Toronto Hydro’s consultation, it has developed a five-phase approach to gathering and responding to customer feedback.
- First, Toronto Hydro identified customer priorities through a series of surveys and focus groups;
 - Then, used this customer feedback to guide development of its Draft Plan;
 - Now, Toronto Hydro is in the process of collecting customer feedback on its Draft Plan;
 - The next phases will include re-examining its Draft Plan based on customer feedback and preparing a submission to the OEB.

This survey is part of the third stage of **collecting customer feedback on the Draft Plan**.

Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into Toronto Hydro’s plan?

Would you say ... **[READ LIST]**

01	Very good way
02	Somewhat good way
03	Somewhat poor way
04	Very poor way
98	Don't know

- C10. Toronto Hydro wants to better understand customer priorities. In the first phase of customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for Toronto Hydro.
- C11. Among the following customer identified priorities, please tell me which one is the most important to you.

READ OPTIONS; RANDOMIZE LIST

01	Delivering reasonable electricity prices
02	Ensuring reliable electricity service
03	Ensuring the safety of electricity infrastructure
04	Enabling the electricity system to support the reduction of greenhouse gases
05	Helping customers with conservation and efficiency
06	Providing quality customer service

- C12. What is the next most important priority you think **Toronto Hydro** should focus on?
[Remove answer from C11 if asked to read again]
- C13. And what do you consider the third most important priority?
[Remove answer from C11 and C12 if asked to read again]
- C14. Are there any other important priorities that **Toronto Hydro** should be focusing on that weren't included in the previous list I read to you? **[OPEN]**

D. PLANNING PRINCIPLES AND RATE IMPACT

- D15. Based, in part, on the initial customer input, Toronto Hydro has drafted a plan totaling approximately \$4.3B over five years.

Toronto Hydro's proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

This proposed plan translates into an average 4.4% increase in your organization's distribution rates each year from 2020 to 2024. The distribution charges on the monthly bill would increase to \$126 by 2024 for a typical small business customer.

Do you feel that this is *definitely the right approach*, *probably the right approach*, *probably the wrong approach* or *definitely the wrong approach* to Toronto Hydro's planning for the next five years or *would you say you don't know*?

01	Definitely the right approach
02	Probably the right approach
03	Probably the wrong approach
04	Definitely the wrong approach
98	Don't know

E. MAKING CHOICES

- E16. Toronto Hydro's total spending is benchmarked by the OEB against other utilities in Ontario. Toronto Hydro's operating costs of \$305 per customer are within \$1 of the provincial average.

However Toronto Hydro's capital investment costs are \$739 per customer which are \$245 more than the provincial average.

Since a number of capital investment decisions are based trade-offs between costs and customer outcomes – like services and reliability levels – the remaining questions in this survey ask for your feedback on those choices.

- E17. Do you feel that gathering feedback on capital investment decisions is *definitely the right approach, probably the right approach, probably the wrong approach, definitely the wrong approach or would you say you don't know?*

01	Definitely the right approach
02	Probably the right approach
03	Probably the wrong approach
04	Definitely the wrong approach
98	Don't know

F. INVESTING IN THE BASICS

F18. As a company, Toronto Hydro needs vehicles and tools to service the power lines and IT systems to manage the system and customer information.

Which of the following statements best represents your point of view? **[READ LIST; Rotate 01 and 02]**

01	Toronto Hydro should find ways to make do with the equipment and IT systems it already has
02	Toronto Hydro should make the investments necessary to ensure its staff have the equipment and IT systems they need to manage the system efficiently and reliably
98	Don't know

PREAMBLE TO NEXT SECTION

F19. Toronto Hydro has identified areas where it could accelerate investments. These accelerated projects could increase the **typical customer's bill by \$5.73** per month by 2024. These projects are in addition to the 4.4% increase that is currently being proposed.

Toronto Hydro wants to get your feedback on particular projects before deciding whether or not to accelerate its investment plan in certain specific areas.

G. ADDRESSING SAFETY AND RELIABILITY

- G20. Right now, the typical Toronto Hydro customer averages 1.4 outages per year with an average of between 60 and 70 minutes without power over the year. While many of those outages are caused by events outside of Toronto Hydro’s control, roughly 36% are caused by the failure of aging equipment.

In this proposed plan, Toronto Hydro’s general approach is to spend just enough on replacing equipment so that most customers can expect a similar level of reliability over the next five years as they are experiencing today, and to provide improved service for those customers whose reliability is poorer or who have special reliability needs such as hospitals.

Which of the following is closest to your point of view regarding Toronto Hydro’s approach to addressing reliability? **[READ LIST; Rotate 01 and 03]**

01	Toronto Hydro should stick with the proposed approach of maintaining the current level of day-to-day reliability that the average customer experiences as part of the proposed rate increase of 4.4% per year.
02	I am prepared to pay more so Toronto Hydro can reduce the number and length of outages that the average customer experiences.
03	I am prepared to live with an increase in the number and length of outages so the proposed rate increase can be reduced.
98	Don’t know

Dealing with types of lines that fail more often with more problems

G21. Some customers are served by older types of lines that are more likely to fail, causing more frequent, and longer lasting power outages. These customers are more likely to experience poorer reliability over time than most Toronto Hydro customers. The proposed plan will replace those lines over time but the work could be done faster.

I would like to ask you about two types of lines.

G22. One example is **rear-lot lines**. They go through residential backyards and are often more difficult to service and more exposed to falling branches. The proposed plan will replace all existing rear-lot lines by 2033. Toronto Hydro could replace those lines 4 years sooner for an additional cost.

Which of the following statements is closest to your view? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should stick with the proposed pace of investment in rear-lot which would see it all converted by 2033 as part of a proposed rate increase of 4.4% per year.
02	I am willing to pay an additional \$0.22 more on my organization's average monthly bill by 2024 so Toronto Hydro can remove all rear-lot feeders four years sooner.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don't know

G23. Another example is **direct buried cable** where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system.

Once these cables start to fail, they tend to experience a rash of failures. The proposed plan will replace a **quarter** of the highest risk direct buried cable by **2024**. Toronto Hydro could replace all of the highest risk direct buried cable by 2024 for an additional cost.

Which of the following statements is closest to your view? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should stick with the proposed pace of investment in direct buried cable replacement which would see a quarter of the highest risk cable replaced by 2024 as part of a proposed rate increase of 4.4% per year.
02	I am willing to pay an additional \$2.23 more on my organization's average monthly bill by 2024 so Toronto Hydro can replace all of the highest risk direct buried cable by 2024.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don't know

Paper Insulated Lead Covered (PILC)

G24. Toronto Hydro has identified three equipment upgrades that are needed within the next few years. If Toronto Hydro waits, those upgrades will be more expensive and disruptive as Toronto continues to grow.

Firstly, Paper Insulated Lead Covered (PILC) cable. PILC cable was an old type of underground cable that stopped being installed on Toronto Hydro’s grid 20 years ago. While the equipment is resilient and is still providing electricity to the downtown core, the outer lead covers can begin to crack and leak oil. Replacing these cables is becoming increasingly difficult and expensive to resource and complete.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049. But Toronto Hydro can replace all of this cable ten years earlier by 2039, at an additional cost now. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.

Which of the following is closest to your point of view regarding Toronto Hydro’s PILC Cable replacement program? **[READ LIST ; ROTATE 01 and 03]**

01	Toronto Hydro should address the reliability issues and other risks posed by PILC cable at the current pace as part of a proposed rate increase of 4.4% per year, even if it’s more disruptive to do so in the future.
02	Toronto Hydro should accelerate its replacement of PILC cable by 10 years, even if it costs the typical small business customer an additional \$1.05 more on the average monthly bill by 2024, because it’s less disruptive to do it now than in the future.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don’t know

Underground Network Transformers

G25. The second upgrade project identified is *Underground Network Transformers*. The key problem with these units is their older design which makes them prone to flooding.

Toronto Hydro plans to replace just enough of these units by 2031 so that outages, due to equipment failure, don’t get any worse. But the process could be advanced by three years to replace all these units by 2028.

G26. Which of the following is closest to your point of view regarding Toronto Hydro’s Network Unit replacement program? **[READ LIST ; ROTATE 01 and 03]**

01	Toronto Hydro should stick with the proposed pace of investment in underground network transformer replacement as part of a proposed rate increase of 4.4% per year.
02	Toronto Hydro should replace its underground network transformers 3 years faster to improve downtown reliability, even if it costs the typical small business customer an additional \$0.19 more on the average monthly bill by 2024.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don’t know

Cable Chambers

G27. The third upgrade project identified is Cable Chamber replacement. Cable Chambers house, protect, and provide access to underground electrical equipment across the city. When they deteriorate or break, this equipment can cause outages and pose anything from a tripping hazard to something more serious like a collapsed chamber.

Toronto Hydro plans to take approximately 30 years to address the chambers in the worst condition. But accelerating the work could halve that period, at an additional cost now.

G28. Which of the following is closest to your point of view regarding Toronto Hydro's Cable Chamber renewal program? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should stick with the proposed pace of investment in cable chamber renewal as part of a proposed rate increase of 4.4% per year.
02	Toronto Hydro should address the safety and reliability risk posed by deteriorating cable chambers faster, even if it costs the typical small business customer an additional \$0.23 more on the average monthly bill by 2024.
03	Toronto Hydro should go back to reconstructing cable chambers reactively in order to keep my rates lower now.
98	Don't know

Dealing with more frequent extreme weather events

G29. As Toronto Hydro's distribution system is exposed to strong winds, freezing rain, and severe flooding, they are proposing a variety of enhancements to improve the resiliency of the distribution system against extreme weather events.

Toronto Hydro could enhance the system further in neighbourhoods outside of downtown. The improvements include adding remotely-operated technology and more back-up links within the grid. This will help Toronto Hydro to better isolate the problem and reduce outage times by as much as 50% in these areas.

Which of the following statements best represents your point of view? **[READ LIST; ROTATE 01 and 02]**

01	Yes, I would be willing to accept an increase to my organization's monthly bill of \$0.21 more by 2024 so more customers can get their power back on quicker during outages caused by storms and other events.
02	No, I'm comfortable knowing that some of this work is already planned and would prefer to keep my bill lower.
98	Don't know

H. INNOVATION AND PLANNING FOR THE FUTURE

- H30. 3% of the proposed budget would be spent on innovation and planning for the future. The following questions are about this aspect of the budget.

Toronto Hydro has already begun to integrate large-scale battery electricity storage into the system. They have now identified more opportunities to partner on a wider range of energy storage projects. Integrating storage into the system can improve reliability and help reduce greenhouse gases, but it is not required to maintain current levels of reliability.

Which of the following is closest to your point of view? **[READ LIST; ROTATE 01 and 02]**

01	I would be willing to pay up to \$1.25 more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.
02	I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.
98	Don't know

- H31. New communication technology has revolutionised the way the grid can be managed.

Toronto Hydro plans to take advantage of various new technologies wherever clear benefits can be established.

However, Toronto Hydro can improve the reliability of its grid further by installing communication devices in the downtown underground network that detect fire, floods or other risks more quickly.

Which of the following is closest to your point of view? **[READ LIST; ROTATE 01 and 03]**

01	I would be willing to pay \$0.16 more per bill by 2024 for Toronto Hydro to be able to better predict fire, floods and other risks in the downtown network that cause outages or damage.
02	Toronto Hydro should maintain the pace of installing monitoring and control equipment on the downtown network as planned within its existing proposed rate increase of 4.4% per year, but not go any further.
03	Toronto Hydro should reduce its planned increase by eliminating the improved monitoring and control equipment planned for the downtown network.
98	Don't know

- H32. New types of generation (often renewable), storage, and supporting systems are making it possible for communities, institutions or other large customers to develop “microgrids”. They are a local electricity network linking smaller sources of electricity with nearby uses such as homes, businesses and institutions. In the event of a failure of the larger network, a microgrid can seal itself off and continue to provide power locally.

Microgrids would give customers more choices, while creating a more resilient and reliable grid. However, they are not required to maintain current reliability.

Which is the following is closest to your point of view? **[READ LIST; ROTATE 01 and 02]**

01	I would be willing to pay \$0.19 more per bill by 2024 for Toronto Hydro to support the development of microgrids in order to give customers more choice and create a more resilient and reliable grid.
02	Toronto Hydro should support microgrids, but only if those customers pay for the full costs, as they are not required to maintain current reliability.
98	Don't know

I. INVESTMENT ALTERNATIVES SUMMARY

I33. Toronto Hydro’s current proposed plan, which translates into an average 4.4% annual increase, focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

In dollars and cents, that means an average increase to the monthly bill of **\$4.86 each year** for the typical small business customer.

Over the course of the proposed 5-year plan, the typical small business customer will see the distribution portion of their electricity bill **increase by \$24.32**.

As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$102 in 2019** to **\$126 by 2024**.

I34. With regards to Toronto Hydro’s proposed plan, which of the following statements best represents your view? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should improve service, as discussed on the previous pages, even if that means an annual increase that exceeds 4.4%.
02	Toronto Hydro should stick with a 4.4% annual increase to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs.
03	Toronto Hydro should keep increases below 4.4% annually, even if that could mean reductions in service.
88	Other [Please specify]
98	Don’t know

ASK if 01, 02, 03 or 98

I35. And why do you say that? **[OPEN]**

J. SEGMENTATION AND DEMOGRAPHICS

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.

01	Strongly agree
02	Somewhat agree
03	Somewhat disagree
04	Strongly disagree
98	Don't know/ No opinion
99	Refused (DO NOT READ)

[ROTATE]

J36. 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 delayed.

J37. Customers are well served by the electricity system in Ontario.

[END BATTERY]

The following questions are only being requested for statistical purposes to better understand the different types of customers providing feedback to Toronto Hydro.

J38. Which of the following best describes the sector in which your business operates? **[READ LIST]**

01	Commercial	
02	Manufacturing/Industrial	
03	Data Centre	
04	Hospitality	
05	Restaurant/Tavern	
06	Retail	
07	Warehouse	
88	Other [Please specify: _____]	

J39. In order to claim your **\$20 Amazon Gift Card**, please provide me with the following information... *[Note: Please read back name and email before proceeding to end]*

Your first and last name: _____ **[RECORD and CONFIRM]**

Your email address: _____ **[RECORD and CONFIRM]**

Your business mailing address (if no internet access/email account):
 _____ **[RECORD and CONFIRM]**

THANK and END SURVEY

Thank you very much for taking the time to complete this survey.

Appendix 3.2.3



Mid-Market Ratepayer Survey

Customer Consultation

Toronto Hydro Electric System Ltd
14 Carlton Street
Toronto, ON, M5B 1K5

May 2018

Prepared by:

Innovative Research Group, Inc.
www.innovativeresearch.ca

Vancouver
888 Dunsmuir Street, Suite 350
Vancouver, BC | V6C 3K4

Toronto
56 The Esplanade, Suite 310
Toronto, Ontario | M5E 1A7



A. INTRODUCTION

INTRO. Hello, my name is _____ and I'm calling from **Innovative Research Group** on behalf of **Toronto Hydro**, your local electricity distributor.

Innovative Research Group is a national public opinion research firm. **We need your input on choices that will affect the service you receive from Toronto Hydro and the price you pay for that service.** Your answers will be combined with others to protect your privacy.

This survey should take about 20 minutes to complete. We know your time is valuable so at the end of the survey, you will have the opportunity to provide your name and email to receive a \$20 Amazon Gift Card.

Can I please speak to the person who is in-charge of managing the electricity bill at your organization?

- | | |
|---|------------------------|
| 1) Yes, speaking <contact on the line> | [skip to A1] |
| 2) Yes <transferred to contact> | [skip to A1] |
| 3) No <not the right contact person> | [GO to "NEW"] |
| 4) No <busy> "When is a good time to callback?" | [record callback time] |
| 5) Maybe <may I ask who is calling?> | [skip to GATE] |

NEW. And ... can I have their ...

First Name _____
Last Name _____
Title/Position _____
Phone Number _____

ASK to be transferred ...

- if transferred → go to **A2**
- if not transferred → **Thank & Add to Callback List**

GATE. Hello, my name is _____ and I'm calling from **Innovative Research** on behalf of **Toronto Hydro**, your local electricity utility.

INTERVIEWER NOTE: If gatekeeper asks the purpose of call → I'd like to ask the person in-charge of managing the electricity bill at your organization a few questions concerning a **Toronto Hydro** customer consultation.

- | | |
|--|--|
| 1) Yes <transferred to contact> | [skip to A2] |
| 2) No <not available> "When is a good time to callback?" | [record call-back time
and go to "NEW"] |
| 3) No <not interested in talking> | [Thank & Terminate] |

A1 QUAL PREAMBLE:

Read preamble again, if transferred to new person:

Hello, my name is _____ and I'm calling from **Innovative Research** on behalf of **Toronto Hydro**, your local electricity utility.

Innovative Research is a national public opinion research firm. We have been hired by **Toronto Hydro** to help them better understand the needs and preferences of non-residential customers who are responsible for paying their organization's electricity bill.

A1. Can I have roughly **20 minutes** of your time to ask you some questions? All your responses will be kept strictly confidential.

- | | | |
|--|---|---------------------|
| Yes - I don't mind | 1 | [CONTINUE] |
| No - Not primary bill payer (i.e. not best person to speak to) | 2 | [go to TRANSFER] |
| No - BAD TIME | 3 | [ARRANGE CALLBACK] |
| No - HARD REFUSAL | 4 | [THANK & TERMINATE] |

MONIT [INTERNAL]

This call may be monitored or audio taped for quality control and evaluation purposes.

PRESS TO CONTINUE 1

A2. Can you confirm that your organization receives an electricity or hydro bill from **Toronto Hydro**

- | | | |
|------------------|----|---------------------|
| YES | 1 | [CONTINUE] |
| NO | 2 | [THANK & TERMINATE] |
| DK (volunteered) | 98 | [THANK & TERMINATE] |

Only those in charge of managing/overseeing organizations electricity bill will be interviewed.

A3. As part of your job, are you in charge of managing or overseeing your organization's electricity or hydro bill?

- | | | |
|-----|---|--|
| YES | 1 | [CONTINUE] |
| NO | 2 | "Can I speak to the person who manages your organization's electricity bill?"
[Return to NEW] |
| DK | 3 | "Can I speak to the person who manages your organization's electricity bill?"
[Return to NEW] |

TRANSFER

Can I please speak to the person who is in-charge of managing the electricity bill at your organization?

- | | | |
|--|---|-------------------------|
| Yes | 1 | [BACK TO <i>INTRO</i>] |
| No - NOT AVAILABLE/BAD TIME - (ARRANGE CALLBACK) | 2 | [ARRANGE CALLBACK] |
| No - HARD REFUSAL | 3 | [THANK & TERMINATE] |

B. SYSTEM FAMILIARITY

B4. To start, I'd like to ask you a few questions about the electricity system ...

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; and
- **Distribution lines** carry electricity to the homes and businesses in our communities.

Today we're going to talk about your **local distribution system** which is maintained and operated by Toronto Hydro.

How familiar are you with **Toronto Hydro**? Would you say you are *very familiar, somewhat familiar, or not familiar at all*?

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

B5. In general, how satisfied or dissatisfied are you with the services your organization receives from **Toronto Hydro**? Would you say you are *very satisfied, somewhat satisfied, neither satisfied or dissatisfied, somewhat dissatisfied, very dissatisfied, or would you say you don't know*?

01	Very satisfied
02	Somewhat satisfied
03	Neither satisfied or dissatisfied
04	Somewhat dissatisfied
05	Very dissatisfied
98	Don't know
99	Refused (DO NOT READ)

B6. Is there anything in particular that **Toronto Hydro** can do to improve its services to your organization?

[OPEN]

B7. I'd now like to talk with you about your organization's electricity bill ...

While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, they retain about **10%** of the typical mid-sized business customer's bill. This is about **\$1,290** on an average **\$13,513** monthly mid-sized business' electricity 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 percentage of your organization's electricity bill that is retained by **Toronto Hydro**? Would you say... **[READ LIST]**

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

C. CUSTOMER ENGAGEMENT PROCESS

- C8. Electricity distributors are required to file a rate application with the Ontario Energy Board (OEB) to request a change in distribution rates based on their plans for capital and operating spending. Toronto Hydro is now consulting on its plans for 2020 to 2024.

The OEB is mandated to protect consumers with respect to prices and the reliability and quality of electricity service.

How familiar would you say you are with the Ontario Energy Board or “OEB”?

Would you say ... **[READ LIST]**

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know
99	Refused (DO NOT READ)

- C9. As part of Toronto Hydro’s consultation, it has developed a five-phase approach to gathering and responding to customer feedback.
- First, Toronto Hydro identified customer priorities through a series of surveys and focus groups;
 - Then, used this customer feedback to guide development of its Draft Plan;
 - Now, Toronto Hydro is in the process of collecting customer feedback on its Draft Plan;
 - The next phases will include re-examining its Draft Plan based on customer feedback and preparing a submission to the OEB.

This survey is part of the third stage of **collecting customer feedback on the Draft Plan**.

Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into Toronto Hydro’s plan?

Would you say ... **[READ LIST]**

01	Very good way
02	Somewhat good way
03	Somewhat poor way
04	Very poor way
98	Don't know

- C10. Toronto Hydro wants to better understand customer priorities. In the first phase of customer engagement, residential and small business customers identified six core priorities which they believe should be a focus for Toronto Hydro.
- C11. Among the following customer identified priorities, please tell me which one is the most important to you.

READ OPTIONS; RANDOMIZE LIST

01	Delivering reasonable electricity prices
02	Ensuring reliable electricity service
03	Ensuring the safety of electricity infrastructure
04	Enabling the electricity system to support the reduction of greenhouse gases
05	Helping customers with conservation and efficiency
06	Providing quality customer service

- C12. What is the next most important priority you think **Toronto Hydro** should focus on?
[Remove answer from C11 if asked to read again]
- C13. And what do you consider the third most important priority?
[Remove answer from C11 and C12 if asked to read again]
- C14. Are there any other important priorities that **Toronto Hydro** should be focusing on that weren't included in the previous list I read to you? **[OPEN]**

D. PLANNING PRINCIPLES AND RATE IMPACT

- D15. Based, in part, on the initial customer input, Toronto Hydro has drafted a plan totaling approximately \$4.3B over five years.

Toronto Hydro's proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

This proposed plan translates into an average 3.9% increase in your organization's distribution rates each year from 2020 to 2024. The distribution charges on the monthly bill would increase to \$2,023 by 2024 for a typical mid-sized business customer.

Do you feel that this is *definitely the right approach*, *probably the right approach*, *probably the wrong approach* or *definitely the wrong approach* to Toronto Hydro's planning for the next five years or *would you say you don't know*?

01	Definitely the right approach
02	Probably the right approach
03	Probably the wrong approach
04	Definitely the wrong approach
98	Don't know

E. MAKING CHOICES

- E16. Toronto Hydro's total spending is benchmarked by the OEB against other utilities in Ontario. Toronto Hydro's operating costs of \$305 per customer are within \$1 of the provincial average.

However Toronto Hydro's capital investment costs are \$739 per customer which are \$245 more than the provincial average.

Since a number of capital investment decisions are based trade-offs between costs and customer outcomes – like services and reliability levels – the remaining questions in this survey ask for your feedback on those choices.

- E17. Do you feel that gathering feedback on capital investment decisions is *definitely the right approach, probably the right approach, probably the wrong approach, definitely the wrong approach or would you say you don't know?*

01	Definitely the right approach
02	Probably the right approach
03	Probably the wrong approach
04	Definitely the wrong approach
98	Don't know

F. INVESTING IN THE BASICS

F18. As a company, Toronto Hydro needs vehicles and tools to service the power lines and IT systems to manage the system and customer information.

Which of the following statements best represents your point of view? **[READ LIST; Rotate 01 and 02]**

01	Toronto Hydro should find ways to make do with the equipment and IT systems it already has
02	Toronto Hydro should make the investments necessary to ensure its staff have the equipment and IT systems they need to manage the system efficiently and reliably
98	Don't know

PREAMBLE TO NEXT SECTION

F19. Toronto Hydro has identified areas where it could accelerate investments. These accelerated projects could increase the **typical customer's bill by \$100** per month by 2024. These projects are in addition to the 3.9% increase that is currently being proposed.

Toronto Hydro wants to get your feedback on particular projects before deciding whether or not to accelerate its investment plan in certain specific areas.

G. ADDRESSING SAFETY AND RELIABILITY

- G20. Right now, the typical Toronto Hydro customer averages 1.4 outages per year with an average of between 60 and 70 minutes without power over the year. While many of those outages are caused by events outside of Toronto Hydro's control, roughly 36% are caused by the failure of aging equipment.

In this proposed plan, Toronto Hydro's general approach is to spend just enough on replacing equipment so that most customers can expect a similar level of reliability over the next five years as they are experiencing today, and to provide improved service for those customers whose reliability is poorer or who have special reliability needs such as hospitals.

Which of the following is closest to your point of view regarding Toronto Hydro's approach to addressing reliability? **[READ LIST; Rotate 01 and 03]**

01	Toronto Hydro should stick with the proposed approach of maintaining the current level of day-to-day reliability that the average customer experiences as part of the proposed rate increase of 3.9% per year.
02	I am prepared to pay more so Toronto Hydro can reduce the number and length of outages that the average customer experiences.
03	I am prepared to live with an increase in the number and length of outages so the proposed rate increase can be reduced.
98	Don't know

Dealing with types of lines that fail more often with more problems

G21. Some customers are served by older types of lines that are more likely to fail, causing more frequent, and longer lasting power outages. These customers are more likely to experience poorer reliability over time than most Toronto Hydro customers. The proposed plan will replace those lines over time but the work could be done faster.

I would like to ask you about two types of lines.

G22. One example is **rear-lot lines**. They go through residential backyards and are often more difficult to service and more exposed to falling branches. The proposed plan will replace all existing rear-lot lines by 2033. Toronto Hydro could replace those lines 4 years sooner for an additional cost.

Which of the following statements is closest to your view? [**READ LIST; ROTATE 01 and 03**]

01	Toronto Hydro should stick with the proposed pace of investment in rear-lot which would see it all converted by 2033 as part of a proposed rate increase of 3.9% per year.
02	I am willing to pay an additional \$5.31 more on my organization's average monthly bill by 2024 so Toronto Hydro can remove all rear-lot feeders four years sooner.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don't know

G23. Another example is **direct buried cable** where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system.

Once these cables start to fail, they tend to experience a rash of failures. The proposed plan will replace a **quarter** of the highest risk direct buried cable by **2024**. Toronto Hydro could replace all of the highest risk direct buried cable by 2024 for an additional cost.

Which of the following statements is closest to your view? [**READ LIST; ROTATE 01 and 03**]

01	Toronto Hydro should stick with the proposed pace of investment in direct buried cable replacement which would see a quarter of the highest risk cable replaced by 2024 as part of a proposed rate increase of 3.9% per year.
02	I am willing to pay an additional \$37.42 more on my organization's average monthly bill by 2024 so Toronto Hydro can replace all of the highest risk direct buried cable by 2024.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don't know

Paper Insulated Lead Covered (PILC)

G24. Toronto Hydro has identified three equipment upgrades that are needed within the next few years. If Toronto Hydro waits, those upgrades will be more expensive and disruptive as Toronto continues to grow.

Firstly, Paper Insulated Lead Covered (PILC) cable. PILC cable was an old type of underground cable that stopped being installed on Toronto Hydro's grid 20 years ago. While the equipment is resilient and is still providing electricity to the downtown core, the outer lead covers can begin to crack and leak oil. Replacing these cables is becoming increasingly difficult and expensive to resource and complete.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049. But Toronto Hydro can replace all of this cable ten years earlier by 2039, at an additional cost now. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.

Which of the following is closest to your point of view regarding Toronto Hydro's PILC Cable replacement program? **[READ LIST ; ROTATE 01 and 03]**

01	Toronto Hydro should address the reliability issues and other risks posed by PILC cable at the current pace as part of a proposed rate increase of 3.9% per year, even if it's more disruptive to do so in the future.
02	Toronto Hydro should accelerate its replacement of PILC cable by 10 years, even if it costs the typical mid-sized business customer an additional \$17.34 more on the average monthly bill by 2024, because it's less disruptive to do it now than in the future.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don't know

Underground Network Transformers

G25. The second upgrade project identified is *Underground Network Transformers*. The key problem with these units is their older design which makes them prone to flooding.

Toronto Hydro plans to replace just enough of these units by 2031 so that outages, due to equipment failure, don't get any worse. But the process could be advanced by three years to replace all these units by 2028.

G26. Which of the following is closest to your point of view regarding Toronto Hydro's Network Unit replacement program? **[READ LIST ; ROTATE 01 and 03]**

01	Toronto Hydro should stick with the proposed pace of investment in underground network transformer replacement as part of a proposed rate increase of 3.9% per year.
02	Toronto Hydro should replace its underground network transformers 3 years faster to improve downtown reliability, even if it costs the typical mid-sized business customer an additional \$2.90 more on the average monthly bill by 2024.
03	I would like Toronto Hydro to slow down this program so the proposed rate increase can be reduced.
98	Don't know

Cable Chambers

G27. The third upgrade project identified is Cable Chamber replacement. Cable Chambers house, protect, and provide access to underground electrical equipment across the city. When they deteriorate or break, this equipment can cause outages and pose anything from a tripping hazard to something more serious like a collapsed chamber.

Toronto Hydro plans to take approximately 30 years to address the chambers in the worst condition. But accelerating the work could halve that period, at an additional cost now.

G28. Which of the following is closest to your point of view regarding Toronto Hydro’s Cable Chamber renewal program? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should stick with the proposed pace of investment in cable chamber renewal as part of a proposed rate increase of 3.9% per year.
02	Toronto Hydro should address the safety and reliability risk posed by deteriorating cable chambers faster, even if it costs the typical mid-sized business customer an additional \$5.84 more on the average monthly bill by 2024.
03	Toronto Hydro should go back to reconstructing cable chambers reactively in order to keep my rates lower now.
98	Don’t know

Dealing with more frequent extreme weather events

G29. As Toronto Hydro’s distribution system is exposed to strong winds, freezing rain, and severe flooding, they are proposing a variety of enhancements to improve the resiliency of the distribution system against extreme weather events.

Toronto Hydro could enhance the system further in neighbourhoods outside of downtown. The improvements include adding remotely-operated technology and more back-up links within the grid. This will help Toronto Hydro to better isolate the problem and reduce outage times by as much as 50% in these areas.

Which of the following statements best represents your point of view? **[READ LIST; ROTATE 01 and 02]**

01	Yes, I would be willing to accept an increase to my organization’s monthly bill of \$5.59 more by 2024 so more customers can get their power back on quicker during outages caused by storms and other events.
02	No, I’m comfortable knowing that some of this work is already planned and would prefer to keep my bill lower.
98	Don’t know

H. INNOVATION AND PLANNING FOR THE FUTURE

- H30. 3% of the proposed budget would be spent on innovation and planning for the future. The following questions are about this aspect of the budget.

Toronto Hydro has already begun to integrate large-scale battery electricity storage into the system. They have now identified more opportunities to partner on a wider range of energy storage projects. Integrating storage into the system can improve reliability and help reduce greenhouse gases, but it is not required to maintain current levels of reliability.

Which of the following is closest to your point of view? **[READ LIST; ROTATE 01 and 02]**

01	I would be willing to pay up to \$20.84 more per bill by 2024 for Toronto Hydro to partner on a wider range of energy storage projects which would improve reliability and help reduce Greenhouse gases.
02	I do not want to pay more for Toronto Hydro to do more energy storage projects, knowing it's not required to maintain current levels of reliability.
98	Don't know

- H31. New communication technology has revolutionised the way the grid can be managed.

Toronto Hydro plans to take advantage of various new technologies wherever clear benefits can be established.

However, Toronto Hydro can improve the reliability of its grid further by installing communication devices in the downtown underground network that detect fire, floods or other risks more quickly.

Which of the following is closest to your point of view? **[READ LIST; ROTATE 01 and 03]**

01	I would be willing to pay \$0.47 more per bill by 2024 for Toronto Hydro to be able to better predict fire, floods and other risks in the downtown network that cause outages or damage.
02	Toronto Hydro should maintain the pace of installing monitoring and control equipment on the downtown network as planned within its existing proposed rate increase of 3.9% per year, but not go any further.
03	Toronto Hydro should reduce its planned increase by eliminating the improved monitoring and control equipment planned for the downtown network.
98	Don't know

- H32. New types of generation (often renewable), storage, and supporting systems are making it possible for communities, institutions or other large customers to develop “microgrids”. They are a local electricity network linking smaller sources of electricity with nearby uses such as homes, businesses and institutions. In the event of a failure of the larger network, a microgrid can seal itself off and continue to provide power locally.

Microgrids would give customers more choices, while creating a more resilient and reliable grid. However, they are not required to maintain current reliability.

Which is the following is closest to your point of view? **[READ LIST; ROTATE 01 and 02]**

01	I would be willing to pay \$0.57 more per bill by 2024 for Toronto Hydro to support the development of microgrids in order to give customers more choice and create a more resilient and reliable grid.
02	Toronto Hydro should support microgrids, but only if those customers pay for the full costs, as they are not required to maintain current reliability.
98	Don't know

I. INVESTMENT ALTERNATIVES SUMMARY

133. Toronto Hydro’s current proposed plan, which translates into an average 3.9% annual increase, focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, like hospitals.

In dollars and cents, that means an average increase to the monthly bill of **\$70.26 each year** for the typical mid-sized business customer.

Over the course of the proposed 5-year plan, the typical mid-sized business customer will see the distribution portion of their electricity bill **increase by \$351**.

As a result, the distribution charges on the monthly bill would increase from a proposed amount of **\$1,671 in 2019** to **\$2,023 by 2024**.

134. With regards to Toronto Hydro’s proposed plan, which of the following statements best represents your view? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should improve service, as discussed on the previous pages, even if that means an annual increase that exceeds 3.9%.
02	Toronto Hydro should stick with a 3.9% annual increase to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs.
03	Toronto Hydro should keep increases below 3.9% annually, even if that could mean reductions in service.
88	Other [Please specify]
98	Don’t know

ASK if 01, 02, 03 or 98

135. And why do you say that? **[OPEN]**

J. SEGMENTATION AND DEMOGRAPHICS

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.

01	Strongly agree
02	Somewhat agree
03	Somewhat disagree
04	Strongly disagree
98	Don't know/ No opinion
99	Refused (DO NOT READ)

[ROTATE]

J36. 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 delayed.

J37. Customers are well served by the electricity system in Ontario.

[END BATTERY]

The following questions are only being requested for statistical purposes to better understand the different types of customers providing feedback to Toronto Hydro.

J38. Which of the following best describes the sector in which your business operates? **[READ LIST]**

01	Commercial	
02	Manufacturing/Industrial	
03	Data Centre	
04	Hospitality	
05	Restaurant/Tavern	
06	Retail	
07	Warehouse	
88	Other [Please specify: _____]	

J39. In order to claim your **\$20 Amazon Gift Card**, please provide me with the following information... *[Note: Please read back name and email before proceeding to end]*

Your first and last name: _____ **[RECORD and CONFIRM]**

Your email address: _____ **[RECORD and CONFIRM]**

Your business mailing address (if no internet access/email account):
 _____ **[RECORD and CONFIRM]**

THANK and END SURVEY

Thank you very much for taking the time to complete this survey.

Appendix 3.2.4



Key Accounts Engagement

Customer Consultation

June 2018

Prepared by:

Innovative Research Group, Inc.
www.innovativeresearch.ca

Vancouver
888 Dunsmuir Street, Suite 350
Vancouver BC | V6C 3K4

Toronto
56 The Esplanade, Suite 310
Toronto, Ontario | M5E 1A7



Survey Introduction

Thank you for participating in this online survey.

Innovative Research Group is a national public opinion research and consultation firm. **Toronto Hydro** has hired us to help it better understand the needs and preferences of its largest customers –Key Account customers like you – as well as identify the priorities where you think it should focus its resources.

Last year, Toronto Hydro conducted an online survey about your needs and preferences. Those results informed Toronto Hydro’s proposed plans, on which this survey is intended to get your feedback.

This survey should take you **approximately 10 minutes** to complete and your answers will be combined with others to protect your anonymity. While we’ve been provided your name and email address, no information that could be used to identify you or your company will be shared with Toronto Hydro.

Please answer all questions to the best of your ability. When answering the questions, please provide us with the response that holds most true for you. If you’re unsure of how to answer a question or feel you don’t know, please use the “don’t know” or equivalent option.

Again, all information provided will be treated confidentially.

Note: *While you may be a Toronto Hydro residential customer, for the purposes of this survey, please answer the questions from the perspective of the business or organization that you represent.*

Thank you for your time,
Innovative Research Group

Click [here](#) for the **Innovative Research Group Inc.’s** privacy policy.

Page break.

A. SEGMENTATION

Most segmentation provided as sample variables.

A1. What occupation or position best describes your role at your organization?

Code	Response	
01	Owner	
02	Executive Manager	
03	Senior Manager	
04	Operations Manager	
88	Other [please specify: _____]	
98	Don't know	

A2. Does your organization receive a single bill or multiple bills from Toronto Hydro?

01	A single bill	
02	Multiple bills	
98	Don't know	

A3. Does your organization receive electrical bills from utilities other than Toronto Hydro?

01	Yes - we have operations in multiple jurisdictions	
02	No - we only operate in Toronto	
98	Don't know	

A1-A3 on the same page.

B. GENERAL SATISFACTION

- B4. 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?

Code	Response	
01	Very familiar and can explain the details of Ontario's electricity system to others	
02	Somewhat familiar, but <u>cannot</u> explain all the details of Ontario's electricity system to others	
03	Aside from receiving a bill from Toronto Hydro, I know very little about Ontario's electricity system	
98	Don't know	

Core Measure

- B5. 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.

Generally, how satisfied are you with the service your organization receives from **Toronto Hydro**?

Code	Response	
01	Very satisfied	
02	Somewhat satisfied	
03	Neither satisfied or dissatisfied	
04	Somewhat dissatisfied	
05	Very dissatisfied	
98	Don't know	

- B6. Is there anything in particular that **Toronto Hydro** can do to improve its services to your organization? **[OPEN]**

B4-B6 on the same page.

C. PRICE

- C7. While **Toronto Hydro** is responsible for collecting payment for the entire electricity bill, it retains anywhere from 7% to 10% 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.

Key Account Type	Typical % of Bill Retained by Toronto Hydro
Multi-bill Aggregated Key Account (GS>50kW)	10%
1MW to 5MW Key Accounts	7%
5MW+ Key Accounts	8%

Before this survey, how familiar were you with the percentage of your organization's electricity bill that went to **Toronto Hydro**?

Code	Response
01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know

D. CUSTOMER ENGAGEMENT PROCESS

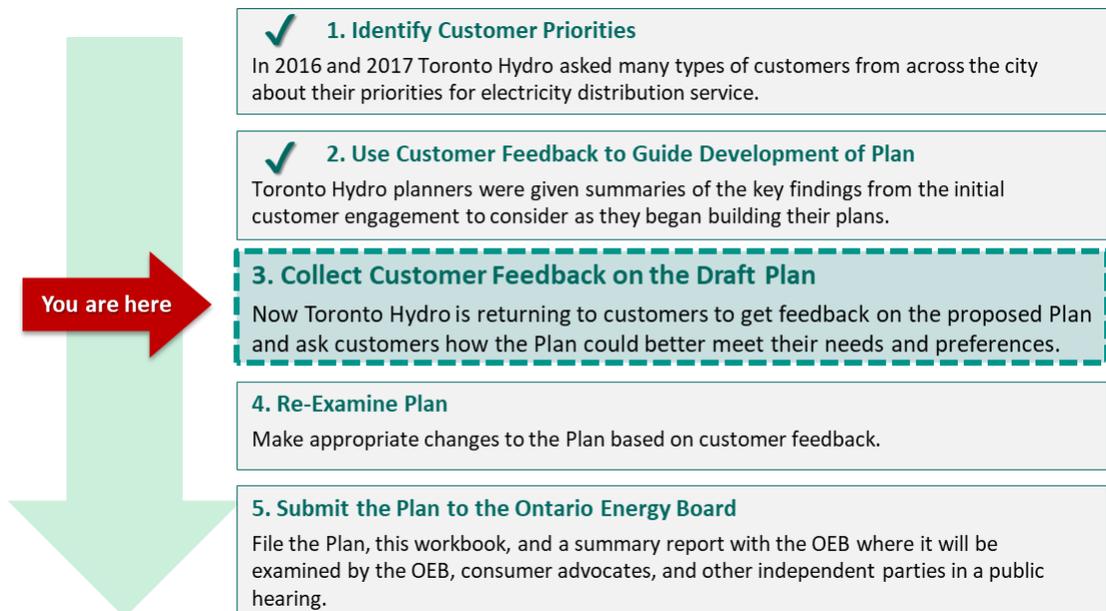
- D8. Electricity distributors are required to file a rate application with the Ontario Energy Board (OEB) to request a change in distribution rates based on the company’s plans for capital and operating spending. Toronto Hydro is now consulting on its plans for 2020 to 2024.

The OEB is mandated to protect consumers with respect to prices and the reliability and quality of electricity service.

How familiar would you say you are with the Ontario Energy Board?

01	Very familiar
02	Somewhat familiar
03	Not familiar at all
98	Don't know

- D9. Toronto Hydro has developed a five phase approach to gathering and responding to customer feedback.



You may recall being asked to complete a survey in early 2017. That was part of the first phase of Toronto Hydro’s customer engagement. This survey is part of the third stage of **collecting customer feedback on the Draft Plan**.

Does this Customer Engagement process seem like a good way or a poor way to bring customer needs and preferences into Toronto Hydro’s plan?

01	Very good way
02	Somewhat good way
03	Somewhat poor way
04	Very poor way
98	Don't know

E. CUSTOMER PRIORITIES

E10. In response to customer engagement efforts over the past year, **Toronto Hydro** customers identified a diverse range of customer stated priorities, ranging from price and reliability to customer service, outages and helping customers conserve electricity.

Understanding that not all customers value and prioritize the same things, **Toronto Hydro** is working to find a balance that works for all customers.

E11. In February and March of 2017, Key Account customers, told **Toronto Hydro** that the three most important priorities were:

1. Ensuring reliable electrical service;
2. Delivering reasonable electricity prices, and;
3. Preventing or reducing the length of prolonged power outages causes by extreme weather (e.g. high winds, floods and ice storms)

Are these *three customer identified priorities* aligned with what you expect **Toronto Hydro** to focus on?

01	Yes	SKIP TO E13
02	No	CONTINUE
98	Don't know	CONTINUE

E12. Are there any other priorities that you would rank ahead of the priorities above that **Toronto Hydro** should focus on? [OPEN]

98	Don't know
----	------------

E13. In the survey, Key Accounts customers identified power quality was the top priority not among those listed to choose from. Toronto Hydro would like to know how important power quality relative to the cost of your electricity bill.

Thinking about the trade-offs between power quality and the cost of your electricity bill, which of the following statements best represents your general point of view?

Code	Response	
01	My organization would be willing to pay more on the distribution portion of our electricity bill if it resulted in improved power quality	
02	My organization would be willing to pay a bit more on the distribution portion of our electricity bill to maintain the current level of power quality	
03	My organization would like to pay a bit less on the distribution portion of our electricity bill even if it resulted in lowering our current level of power quality	
98	Don't know	

F. RELIABILITY

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

Code	Response	
01	Very satisfied	
02	Somewhat satisfied	
03	Neither satisfied or dissatisfied	
04	Somewhat dissatisfied	
05	Very dissatisfied	
98	Don't know	

[DO NOT RANDOMIZE]

- F14. The reliability of your electricity service (as judged by the number of power outages you experience).
- F15. The amount of time it takes to restore power when power outages occur.

[END BATTERY]

G. PLANNING PRINCIPLES AND RATE IMPACT

G16. With customer feedback in mind, Toronto Hydro is proposing a plan that is responsive to:



1. Legal requirements by continuing to meet its obligations, including safety;



2. Customer feedback by:



- a) Keeping distribution price increases as low as possible;
- b) Maintaining long-term performance for customers experiencing average or better service;
- c) Improve service levels for customers experiencing below average service or who have special reliability needs (e.g. hospitals); and,
- d) Balancing other customer priorities (e.g. customer service) with the need to contain rate increases.



3. Business input by relying on expert analysis and professional judgment to develop construction and operations programs that address technical and operational requirements.

Does this seem like the right approach or the wrong approach?

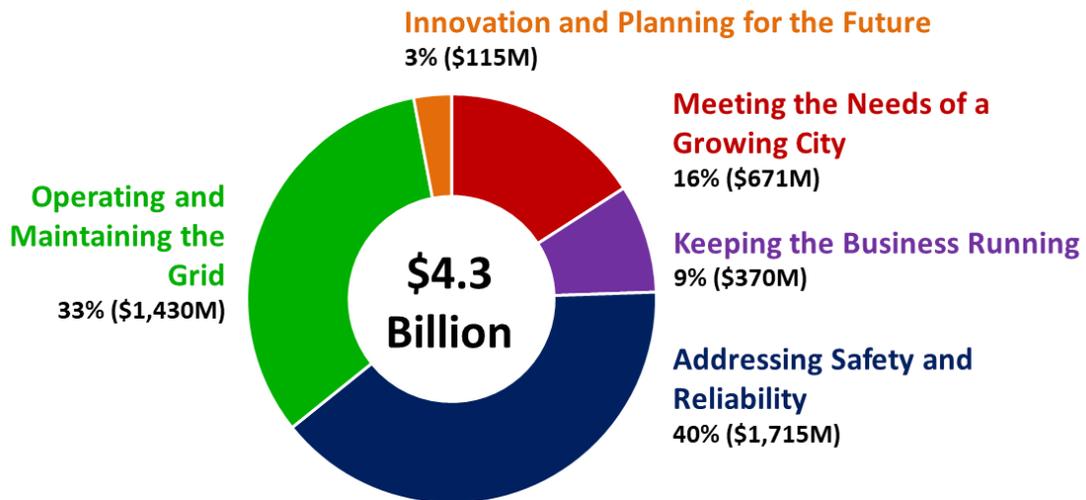
01	Definitely the right approach
02	Probably the right approach
03	Probably the wrong approach
04	Definitely the wrong approach
98	Don't know

G17. And why do you say that? **[OPEN]**

H. INVESTMENT ALTERNATIVES SUMMARY

- H18. **Toronto Hydro** has drafted a plan totaling approximately \$4.3B over five years. The plan considered Toronto Hydro’s legal obligations, engineering expertise and customers’ needs and preferences when developing the plan. **There are five key budget categories.**

To learn more about each category, simply hover over the title.



Toronto Hydro’s proposed plan focuses on delivering current levels of reliability and customer service for most customers and targeted improvements for customers experiencing below average service or who have special reliability needs, such as hospitals, industrial customers, and financial centres.

This proposed plan could translate into an annual average increase in your distribution rates of between 2.3% and 3.9% from 2020 to 2024.

- H19. With regards to Toronto Hydro’s proposed plan, which of the following statements best represents your view? **[READ LIST; ROTATE 01 and 03]**

01	Toronto Hydro should improve service even if that means an annual increase that exceeds the proposed plan.
02	Toronto Hydro should stick with the proposed plan to deliver current levels of reliability and customer service for most customers and targeted improvement for customers experiencing below average service or who have special reliability needs.
03	Toronto Hydro should keep increases below the proposed plan, even if that could mean reductions in service.
88	Other [Please specify]
98	Don’t know

- H20. And why do you say that? **[OPEN]**

I. ENVIRONMENTAL CONTROLS

The survey is almost complete, with only a few general questions about Ontario’s electricity system remaining.

For each statement, indicate to what extent you agree or disagree. If you don’t know enough to say or don’t have an opinion, please indicate below.

01	Strongly agree
02	Somewhat agree
03	Somewhat disagree
04	Strongly disagree
98	Don’t know/No opinion

[ROTATE]

- I21. 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.
- I22. Business customers are well served by the electricity system in Ontario.

[END BATTERY]

- I23. 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.

[OPEN]

THANK and END SURVEY

Thank you for taking the time to complete this survey.

If you have additional feedback you’d like to share with Toronto Hydro or questions, please feel free to contact your account representative leads:

Commercial | Jen Grado, jgrado@torontohydro.com

Industrial | Dilesh Thurai, dthurai@torontohydro.com

Municipal, Academic, Health | Dean Anderson, danderson@torontohydro.com

Multi-Unit Residential, Social | Mike Mulqueen, mmulqueen@torontohydro.com

OEB Appendix 2-AC Customer Engagement Activities Summary

Provide a list of customer engagement activities	Provide a list of customer needs and preferences identified through each engagement activity	Actions taken to respond to identified needs and preferences. If no action was taken, explain why.
Planning-Specific Customer Engagement: Phase I - Low Volume Customer Focus Groups - Mid-Market Customer Focus Groups - Low-Volume Customer Needs and Preferences Survey - Key Account Needs and Preferences Survey - Stakeholder In-depth Interviews	Various, including identification and ranking of six key customer priorities. Please refer to: - Exhibit 1B, Tab 3, Schedule 1 - Exhibit 1B, Tab 3, Schedule 1. Appendix A (Innovative Report, Executive Summary and Phase I Appendices)	- Informed the development of the Outcomes Framework - Informed the strategic parameters established for the business plan, which included an upper limit of 3.5% as a cap on the average annual increase to base distribution rates. - Informed the development of the penultimate business plan that was taken back to customers during Phase 2 Customer Engagement. See also: - Exhibit 1B, Tab 2, Schedule 1 - Exhibit 1B, Tab 1, Schedule 1 - Exhibit 2B, Section E2 - Exhibit 4A, Tab 1, Schedule 1
Planning-Specific Customer Engagement: Phase II - Online Customer Feedback Portal ("Workbook") - Residential Telephone Survey - Small Business Telephone Survey - Mid-Market Telephone Survey - Key Account Online Survey	Various, including general support for the business plan and strong support for doing more to address the risk of network vault floods and fires. Please refer to: - Exhibit 1B, Tab 3, Schedule 1 - Exhibit 1B, Tab 3, Schedule 1. Appendix A (Innovative Report, Executive Summary and Phase 2 Appendices)	- Customers generally supported Toronto Hydro's proposed plan. - Minor adjustments to the pace of two capital programs to address the risk of network vault floods and fires that received particularly strong support across customers classes. See also: - Exhibit 2B, Section E2
Ongoing Customer Engagement	Various Please refer to: - Exhibit 1B, Tab 3, Schedule 1 - Exhibit 4A, Tab 2, Schedule 14	- Informs the continuous improvement of Toronto Hydro's customer services - Informs the execution of Toronto Hydro's capital work - Informs the development of Toronto Hydro's capital programs

1 **STAKEHOLDER CONSULTATIONS**

2

3 **1. INTRODUCTION**

4 This schedule discusses the stakeholder consultation sessions held by Toronto Hydro in
5 connection with the development of this Application. These sessions were distinct from
6 the Customer Engagement activities described in Exhibit 1B, Tab 3, Schedule 1.

7

8 The Appendix to this schedule is a Toronto Hydro report that includes a list of
9 participants, applicable Terms of Reference, and agendas for the consultation sessions.
10 Participants were invited to provide feedback on the report and none was received.

11

12 **2. PURPOSE**

13 Toronto Hydro is committed to fostering and maintaining constructive relationships
14 with its stakeholders. The utility actively pursues an open dialogue with relevant parties
15 with a view to facilitating a more effective and efficient regulatory hearing process by:

- 16 • Helping to inform Toronto Hydro’s analysis and evidence;
- 17 • Providing parties with an early view of the form and substance of parts of this
18 Application, as well as Toronto Hydro’s plans, to assist their preparation;
- 19 • Exploring the potential for consensus among the parties on elements of
20 regulatory procedure and associated timing; and
- 21 • Establishing and reinforcing lines of communication to facilitate dialogue during
22 the hearing process without incremental procedural steps.

1 **3. APPROACH**

2 Toronto Hydro held two phases of stakeholder consultation prior to filing the
3 Application. Both phases were conducted on a without-prejudice basis for the purpose
4 of facilitating a constructive and open dialogue among the parties.

5
6 Parties that frequently participate in Toronto Hydro’s proceedings before the OEB (i.e.
7 participants in EB-2014-0116 and EB-2015-0173), were invited to participate. Parties in
8 attendance for each session are listed in the Appendix to this schedule.

9
10 Phase 1 consisted of consultations held with individual participants between April 16
11 and May 2, 2018. Toronto Hydro circulated Terms of Reference (see the Appendix) in
12 advance of each consultation to outline parameters for the discussion. Toronto Hydro
13 explored with stakeholders topics related to matters of substance and procedure,
14 including principles, facts, concepts, and perspectives relevant to this CIR application.
15 An identical agenda was used for each individual consultation, and is included in the
16 Appendix to this schedule.

17
18 Phase 2 was a joint consultation with all participants held on July 16, 2018. The same
19 Terms of Reference for Phase 1 was circulated in advance of Phase 2 consultation. The
20 objective of this session was to maximize the opportunity to build a common
21 understanding in respect of Toronto Hydro’s Application prior to the filing. At this
22 session, Toronto Hydro reported back to stakeholders regarding the status and
23 evolution of its Application, including certain structural, methodological, and procedural
24 aspects. The agenda for this session is included in the Appendix to this schedule.

- 1 The entire process assisted Toronto Hydro in developing the Application. Toronto Hydro
- 2 appreciates the time and contributions of those who participated in the stakeholder
- 3 consultations, and recognizes the value that constructive dialogue brings to the hearing
- 4 room process.

Toronto Hydro 2020-2024 CIR Stakeholder Consultation Report

This Report describes Toronto Hydro’s Stakeholder Consultations held in preparation for its 2020-2024 CIR Application.

Table 1 lists the organizations invited to participate in Toronto Hydro’s stakeholder consultation process. Parties were provided Terms of Reference, included in Appendix A, in advance of their participation in the sessions.

Table 1: Participants in Stakeholder Consultations¹

Invited	Attended
AMPCO	Yes
BOMA	No
CCC	Yes
Energy Probe	Yes
SEC	Yes
SIA	No
VECC	Yes

Individual consultations were held with participants between April 16, 2018 and May 2, 2018. The agenda for these sessions is included in Appendix B.

A joint consultation with all participants was held July 16, 2018. The agenda for that session is included in Appendix C.

¹ OEB Staff were invited to, and attended, Toronto Hydro’s Phase 2 Consultation on July 16, 2018.

APPENDIX A: Terms of Reference

Stakeholder Consultation: 2020-2024 Custom Incentive Regulation Application Terms of Reference

What is the Purpose of this Document?

This document is intended to set out principles and logistical details relevant to a pre-filing stakeholder consultation regarding Toronto Hydro-Electric System Limited's ("THESL") 2020-2024 Custom Incentive Regulation ("CIR") application.

Why is THESL Engaging in this Consultation?

THESL is committed to fostering and maintaining constructive relationships with its stakeholders and believes that active two-way engagement is critical to achieving this objective.

THESL views this consultation as an opportunity to achieve a number of positive outcomes regarding this regulatory application, including enhanced engagement with customers and other interested/affected parties, contributing to hearing efficiency, and incorporating stakeholder perspective and feedback into its ultimate filing.

THESL expects that this multi-session consultation will provide stakeholders with insight into the utility's business drivers, as well as its approaches and methodologies as they relate to this CIR application. Additionally, THESL believes that it is also important to receive, understand the perspectives, input and feedback of stakeholders and requests the assistance of consultation participants in this regard.

What are the Guiding Principles for this Consultation?

THESL is seeking early and substantive input on its CIR application. While THESL is ultimately responsible for putting forward its application, it believes that constructive dialogue with stakeholders regarding the structure and content of the CIR will lead to a better application and a more effective hearing process.

THESL seeks to create an environment that supports open and candid discussion. This consultation will be carried out on a without-prejudice basis. Information obtained or shared during this consultation will not be used for any other purpose, with the exception of the limited information referenced in the Consultation Report (discussed below). THESL makes this commitment to participating stakeholders and in turn expects participating stakeholders to abide by the same commitment.

Who are the Invited Participants for this Consultation?

This consultation is focused on those stakeholders who are actively involved in THESL's regulatory processes such as intervenors and OEB staff. THESL encourages the attendance and engagement of stakeholders directly, as well as through external legal or consultant representatives.

What is the Format of this Consultation?

THESL plans to host two types of sessions with participants. The first sessions will be one-on-one meetings with participants at THESL's office. Subject to stakeholder feedback, the second session will be a large group session with all participants. These sessions will take place at the THESL office, the OEB office, or another suitably large venue. Brief outlines of each session are set out below. THESL seeks and

encourages live dialogue during the sessions, however will also provide participants an opportunity to provide comments and questions on an ongoing basis until the application is filed.

Session #1: One-on-One Discussions

This is an opportunity to discuss principles, facts, concepts and perspectives relevant to the CIR application. General topics include THESL's business needs/drivers, regulatory concepts and models (as relevant) with a view towards developing potential approaches to THESL's CIR application. THESL anticipates that the one-on-one format will maximize the opportunity to directly engage with our stakeholders.

Session #2: Large Group Discussion (Proposed)

This is an opportunity to report back to participants regarding the status and evolution of the CIR application and discuss certain structural and methodological aspects of the CIR application. THESL anticipates that a large group discussion will maximize the opportunity to build a common understanding of the CIR application prior to the filing.

Additional Consultation Opportunities

THESL seeks to maintain open channels of dialogue and engagement. In addition to the two sessions outlined above, THESL invites participants to approach THESL with any concerns, questions, or other matters relevant to this application.

What Will THESL File with the OEB Regarding this Consultation?

THESL will prepare a Report that may be submitted to the OEB. This report will include these Terms of Reference, identify attendees at each meeting, and include copies of agendas and generic correspondence sent to participants. No notes or characterizations of the actual consultations will form part of the Consultation Report. Stakeholders will be provided an opportunity to review and comment on the Consultation Report prior to its finalization.

How Do Participants Receive Funding for the Consultation?

THESL will fund intervenor participation at the OEB's approved tariff rates, on the basis of one attendee per stakeholder at each meeting. To the extent that stakeholders are of the view that funding for additional participants is required, THESL will address these requests on a case-by-case basis.

Who is the Contact at THESL for this Consultation?

Please direct any questions or concerns of a general nature to:

regulatoryaffairs@torontohydro.com

APPENDIX B: Agenda for Phase 1 Consultation

Toronto Hydro 2020-24 CIR Application

Intervenor Stakeholding – Without Prejudice

Procedural Questions

1. What is your reflection on proportionate review at this stage? How do you think it should be applied to Toronto Hydro?
2. What is going well / poorly in other applications (procedurally)? What are applicants doing well, and what could they improve on?
3. What types of information would you be most interested in receiving from Toronto Hydro in a larger format pre-filing stakeholder session?
4. How do you think should Toronto Hydro talk to customers about the Ontario Fair Hydro Plan?
5. Are there any other matters of procedure that you'd like to talk to us about?

Content Questions

1. What approach to outcomes should a utility like Toronto Hydro take in their applications (both conceptually and in the evidence)?
2. What is your expectation regarding the role of asset condition in long-term capital planning?
3. Would you like to see anything new/different in utilities' Custom IR rate frameworks/formulas?
4. Are there any other substantive matters that you'd like to talk about?

APPENDIX C: Agenda for Phase 2 Consultation

AGENDA

**Toronto Hydro 2020 Custom IR Application
Stakeholder Session**

July 16, 2018

**14 Carlton Street
THESL Corporate Office**

Attendees	OEB Staff Ratepayer and Public Interest Group Intervenors from 2015 CIR Toronto Hydro Staff
Meeting Room	Lawrence Room, 5 th Floor
12:30 – 1:00	Light Lunch
1:00 – 1:10	Introductory Remarks
1:10 – 1:30	Application Overview
1:30 – 2:00	Customer Engagement and Business Planning
2:00 – 2:30	Asset Condition Assessment
2:30 – 2:45	Break & Refreshments
2:45 – 3:45	OM&A and Capital Programs Overview
3:45 – 4:20	Proceeding Schedule
4:20 – 4:30	Closing Remarks

Enclosed:
Terms of Reference

1 **CUSTOMER SUMMARY**

2

3 Attached please find Toronto Hydro's Customer Summary, provided in accordance with

4 Filing Requirement 2.1.3.

Understanding Toronto Hydro's Rate Application

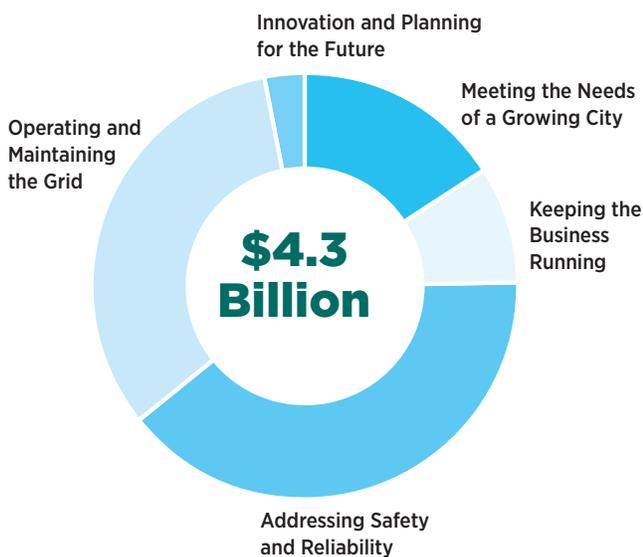
Toronto Hydro's Plan

Toronto Hydro is the electricity distributor that serves the city of Toronto. We're responsible for nearly one fifth of the electricity used in Ontario. We own and operate the poles, wires and other equipment needed to deliver power to homes and businesses.

We're proposing a five-year plan for **2020 to 2024**. The plan meets the needs of a growing city, addresses deteriorating infrastructure, and helps us prepare for more extreme weather and cyber threats.

We're seeking approval for distribution rates from 2020 to 2024 to fund the plan. The Ontario Energy Board and consumer groups will review our plan in a rigorous, transparent public hearing process.

For more on Toronto Hydro's Plan, see Exhibit 1B: Executive Summary and Business Plan



Customer Engagement

Electricity is an important resource in our customers' daily lives. So as we prepared our plan for 2020 to 2024, we asked customers what they thought. They told us price, reliability and safety were their top three priorities, and we developed a plan with those in mind. When we put that plan back to customers, we heard from over **10,000** people and businesses across the city. **71%** of residential customers supported the plan or one that does even more to improve services.

For more on Toronto Hydro's Customer Engagement process, see Exhibit 1B: Customer Engagement

- 1. Ask Customers what the Plan's Priorities should be.**
- 2. Use Customer Priorities to prepare the Plan.**
- 3. Ask Customers about the Plan.**
- 4. Use Customer Feedback to finalize the Plan.**
- 5. Submit the Plan to the Ontario Energy Board.**

Costs of the Plan: Average Annual Rate Increase of 1.7%

Funding the plan requires increases to monthly distribution rates. For a residential customer who uses 750 kWh per month, distribution rates would increase by an average of **\$0.77 (1.7%)** per month, annually from 2020 to 2024. This includes a decrease of \$2.32 in 2020, the first year of the plan.

Bill Impact

	Usage [kWh]	Change in bill	2020 Proposed	2021 Proposed	2022 Proposed	2023 Proposed	2024 Proposed	Average (\$)
Residential (typical)	650	\$/30 days	-1.77	1.37	1.07	1.89	1.83	\$0.88
		%	-4.1%	3.3%	2.5%	4.3%	4.0%	
Residential (750 kW)	750	\$/30 days	-2.32	1.37	1.07	1.89	1.83	\$0.77
		%	-5.3%	3.3%	2.5%	4.3%	4.0%	
General Service <50 kW (typical)	2,800	\$/30 days	-5.91	4.35	3.38	5.97	5.78	\$2.71
		%	-4.4%	3.3%	2.5%	4.3%	4.0%	

Toronto Hydro's Performance

Outcomes and Performance Measurement

Customers want to know that Toronto Hydro's 2020 to 2024 performance will provide them with value for money. We're proposing to report on **44** performance measures that will track how well we're doing.

For more on Toronto Hydro's Performance, See Exhibit 1B: Outcomes and Performance

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

Past Performance and Continuous Improvement

Our previous plans are working and our performance is improving.

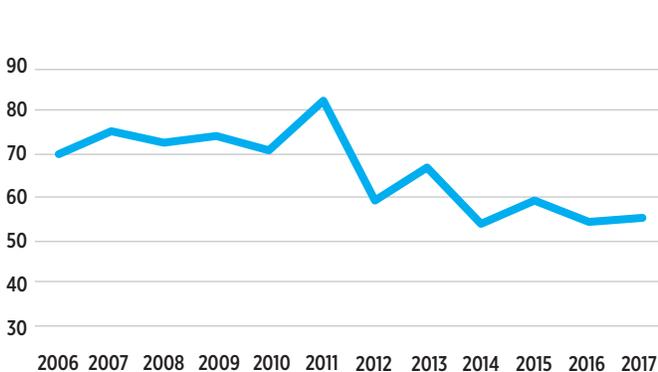
We're getting faster at connecting new customers. And we're exceeding industry standards for meeting scheduled appointments, answering calls on time and providing accurate bills.

We're also making the grid more reliable. Outages that aren't related to major events, like wind and ice storms, are becoming shorter and less frequent.

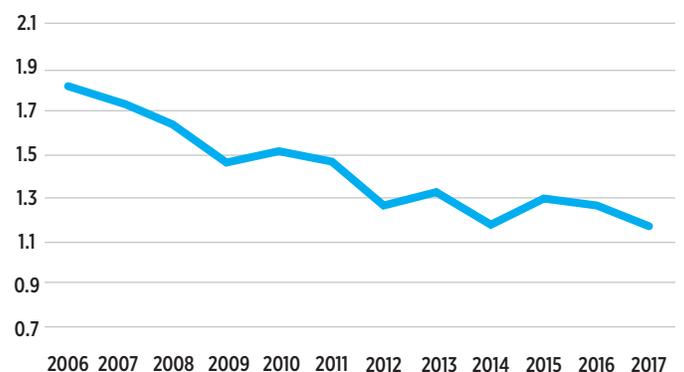
Performance Categories	Measures	2013	2014	2015	2016	2017	Industry
Service Quality	New Residential/Small Business Services Connected on Time	94.2%	91.5%	96.9%	97.7%	98.3%	90.0%
	Scheduled Appointments Met On Time	99.6%	99.8%	99.9%	99.5%	99.4%	90.0%
	Telephone Calls Answered On Time	82.0%	71.9%	76.8%	64.7%	77.9%	65.0%
Customer Satisfaction	Billing Accuracy	-	96.6%	97.5%	98.8%	99.2%	98.0%

System Reliability

Duration of Outages (minutes per year)*



Frequency of Outages (number per year)*



*Excludes Loss of Supply from Hydro One and Major Event Days

1 **COMMUNITY MEETINGS**

2

3 This schedule provides information in relation to the OEB-hosted community meetings
4 described in the Filing Requirements.

5

6 Toronto Hydro proposes four community meetings. Toronto Hydro recommends one
7 community meeting in each of Scarborough, North York, Etobicoke, and downtown in
8 order to reflect the geographic diversity of the service area. Toronto Hydro further
9 recommends that one of the community meetings be webcast.

10

11 There are many suitable locations in Toronto for these community meetings, including
12 civic/community centres, schools, and libraries. Many of these locations are in close
13 proximity to public transit. Toronto Hydro intends to work with the OEB to finalize
14 locations, dates, and times for the community meetings, and to issue such bill inserts
15 and such other advertising as may be stipulated by the OEB.

1 **LETTERS OF COMMENT RESPONSES**

2

3 Pursuant to section 2.1.7 of the OEB’s Chapter 2 of the Filing Requirements for
4 Electricity Distribution Rate Applications (July 12, 2018), Toronto Hydro provides in this
5 schedule responses to all public letters of comment currently on the record. The utility
6 will further update this section with any additional letters received and replies provided
7 prior to the argument phase of the proceeding.

8

9 Toronto Hydro notes that a number of the letters of comment received to date were
10 submitted either before or after the community meetings for this application, which
11 were held from November 22 through December 6, 2018. Toronto Hydro did not have
12 access to the list of attendees for those meetings, and unless they have self-identified as
13 a community meeting attendee, it is not possible for Toronto Hydro to identify which of
14 these individuals attended the community meetings, and may or may not be responding
15 to what they heard from the utility, the OEB, or others at the community meetings. For
16 that reason, unless the commenter has self-identified as a community meeting
17 attendee, Toronto Hydro has responded to each letter assuming that the writers were
18 not in attendance at the community meetings. Toronto Hydro apologizes to the authors
19 of the letters if it is repeating something that they may have already heard from the
20 utility or others during the community meetings, and encourages any and all customers
21 to contact Toronto Hydro at any time should they have questions, comments or
22 concerns via

23 <https://www.torontohydro.com/sites/electricsystem/Pages/ContactUs.aspx> .

24

25 Please also see the process and results for Toronto Hydro’s customer engagement
26 activities, including those related to this application, in Exhibit 1B, Tab 2, Schedule 1.

1 Letter of Comment: Dean Lancaster: October 4, 2018

2 I do not believe Toronto Hydro has sufficiently informed the public on why rates are
3 increasing. Rates should be decreasing assuming Toronto Hydro is operating in the
4 interest of the people of Toronto, and any rate increase should be carefully considered
5 along with supporting data to provide evidence as to the reasoning behind rate
6 increases. Toronto Hydro should be requested to justify it's rates vs. other similar
7 jurisdictions with a similar power distribution model (i.e. benchmarking against other
8 Hydro-power majority source providers) along with exploring any opportunities for cost
9 reduction through modernization etc. I believe careful regulation and transparent
10 accounting practices are vital to ensuring a "good deal" for the people of Ontario within
11 our current energy operating model - and with today's data-driven accounting
12 platforms, this should be very easy to implement whilst balancing regulatory burden on
13 Toronto Hydro.

14

15 Toronto Hydro Reply

16 Dear Mr. Lancaster,

17 Thank you for your letter of comment. Toronto Hydro recognizes your frustration in
18 lacking access to information about how we have informed the public on why rates are
19 increasing, and your interest in us supporting the proposed increase with data and
20 evidence.

21

22 Toronto Hydro has taken a number of steps to not only inform, but also engage the
23 public about the amount of the proposed rate increase, and why we believe this plan
24 achieves the appropriate balance between factors such as price, safety, reliability, and
25 service. In addition to our ongoing customer engagement activities, as part of
26 developing our plan and having that plan tested by the Ontario Energy Board in an open

1 public process, Toronto Hydro heard from over 10,000 customers, through channels
2 that include:

- 3 • Phase 1 customer engagement (2016/17): we asked for input and feedback from
4 customers about their needs, priorities and outcomes they value – we used the
5 results to help develop our business plan.
- 6 • Phase 2 customer engagement (2018): before we filed our business plan with the
7 Ontario Energy Board, we went back to customers to confirm that we correctly
8 understood their input from phase 1, and then asked for additional customer
9 input and feedback on the plan itself (including costs of the plan). Approximately
10 2/3 of customers supported Toronto Hydro’s plan, or one that does even more
11 to improve services.
- 12 • Community Meetings (2018): after we filed our business plan with the Ontario
13 Energy Board, we attended six community meetings between November 22 and
14 December 6, 2018 to make a presentation on our plan (including the costs),
15 receive feedback from customers and others in attendance, and answer
16 questions.

17
18 Toronto Hydro’s costs take up approximately one third of the average residential
19 customer’s bill. As a result of Toronto Hydro’s five year plan for 2020-2024, a typical
20 residential customer can expect an average annual increase of 1.7% on the Delivery line
21 of the bill, and less than half of one percent on the total electricity bill. We have
22 supported our request for this increase with approximately 4,300 pages of data and
23 evidence filed with the Ontario Energy Board, including many details about our
24 accounting assumptions and practices.

1 Toronto Hydro believes that the proposed rate increase is necessary to keep the lights
2 on, maintain a grid that provides a safe source of electricity, and ensure that we are a
3 steward of long-term service and value for our customers. Factors driving this rate
4 increase include deteriorating infrastructure, a growing city, more extreme weather,
5 workforce retirements and renewal, and technology advancements including protecting
6 against cyber threats.

7

8 We're always looking for ways to minimize cost and rate increases through finding
9 productivity and efficiencies in our plans and work. For example, as part of reducing our
10 facilities footprint in Toronto, we consolidated from 7 operating centers down into 4. As
11 part of this consolidation, we sold properties, and are returning proceeds of close to
12 \$140M to customers to help reduce bills.

13

14 As part of our business plan, Toronto Hydro asked external experts to assess our
15 performance, including benchmarking with respect to productivity, reliability, and
16 unit/cost efficiency. The results of those studies (which are publicly filed with our plan)
17 demonstrate that Toronto Hydro's performance is similar or better than peer utilities.

18

19 Finally, Toronto Hydro took what it heard from customers about their priorities, and
20 used this to create a customer-focused outcomes framework to measure its
21 performance during the plan. As part of this plan, we propose to publicly report
22 annually on how we're performing against over 40 unique measures that relate to our
23 goals and objectives – measures such as how frequently you lose power, and when you
24 do lose power, how long it takes us to get it back on.

1 If you are interested in learning more about Toronto Hydro’s proposed plan, the
2 executive summary of Toronto Hydro’s application to the Ontario Energy Board may be
3 a helpful document to begin with, and is available at Exhibit 1B, Tab 1, Schedule 1.

4

5 Letter of Comment: Lilly Mclsaac: November 20, 2018

6 I object to rate changes and believe that ratepayers deserve to have more options
7 regarding electricity use and billing. As a homeowner, I do not require a smart meter to
8 tell me when to use my electricity and I never consented to time of use rates or to
9 having a smart meter (RF) emitting device installed on my property. I have developed a
10 disability called microwave sickness which prevents me from being in areas where there
11 are wireless and radio frequencies. It has gotten to the point where I cannot even live
12 comfortably in my own home because I have: headaches (particularly tension headaches
13 along the sides of the head and temple area, heart palpitations and a pressure in the
14 chest (a feeling that the heart wants to jump out of the chest while at the same time the
15 chest is being stepped upon), skin burning, redness, rashes and tingling (particularly on
16 the face and arms), difficulties sleeping (sleep is interrupted, light, dreamless and leaves
17 the person feeling tired in the morning), Tinnitus (ringing in the ears), fatigue and
18 tiredness during the day (even after many hours of sleep, tiredness pervades the day),
19 and cognitive decline (memory and concentration difficulties – a “brain fog”. All of these
20 symptoms either disappear or get better when I am in an environment without wireless
21 and radio frequencies, but they return when I am home. People who have symptoms
22 form microwave radiation exposure need accommodation and the ability to opt out of
23 the smart meter / time of use billing without additional costs to do so. I would like
24 Toronto Hydro to offer an opt out for people with disabilities due to radio frequency
25 and microwave (EMF) exposure such as myself. We deserve to live in a safe home
26 without being penalized for asking that the meter be an analogue meter and one which

1 does not emit harmful emissions. The public has not seen any benefits to having a
2 smart meter and in fact, the smart meter program increased costs for consumers, yet no
3 one has seen any benefit, except for the electricity providers who saved on the cost of
4 employing meter readers. That savings has not been passed on to consumers, not have
5 consumers seen a decrease in electricity bills due to having a smart meter. Our smart
6 meter is "on" all of the time - even when we turn off our electricity inside our home.
7 The signals wake us up every hour at night and prevents us from getting proper sleep.
8 We have tracked this and it happens at approximately the same time every night. We
9 would like the OMB to change the billing to allow for an opt out of the smart meter
10 program and not agree to more rate increases. Thank you.

11

12 Toronto Hydro Reply

13 Dear Ms. McIsaac,

14 Thank you for your letter of comment. Toronto Hydro is sorry to hear about your
15 experience, which we understand must be difficult.

16

17 Toronto Hydro uses a smart meter system that uses wireless technology to deliver the
18 data from each meter to our billing system. Each smart meter has a low power
19 transmitter that communicates with a device known as a gatekeeper, which in turn
20 delivers the meter reading data to our billing system.

21

22 Toronto Hydro's customers have identified safe operation of the distribution system as
23 one of their top three priorities. Toronto Hydro will only install smart meter models
24 that have been extensively tested by the manufacturer and clearly demonstrate Radio
25 Frequency ("RF") emissions that are below the City of Toronto precautionary
26 recommendations and the Health Canada Safety Code 6 guideline.

1 These meters are valuable tools in maintaining the safety and reliability of the grid, as
2 they assist distributors in identifying outages, including during major weather events.

3

4 Toronto Hydro is not able to offer you the ability to opt-out of Time of Use rates or using
5 a smart meter, as they are required by provincial law and regulation. Although Toronto
6 Hydro is able install a non-RF transmitting smart meter equipped with a regular
7 telephone connection for you. There is however a cost associated with the installation
8 of the telephone connection and its monthly operation, currently \$201.77 and
9 \$23.13/month respectively.

10

11 Regarding rate increases and our plan to invest in the grid, you may also be interested in
12 our reply to Mr. Lancaster's letter of October 4, 2018.

13

14 Letter of Comment: Beverly Brooks: November 22, 2018

15 This session was extremely disappointing. Neither the OEB or Toronto Hydro has any
16 answers to questions. The first gentleman who gave a presentation had some excellent
17 questions – the same questions that he had in a previous occasion. No answers were
18 provided and he commented that he had never received answers to his previous
19 questions. I strongly oppose the rate increases – nothing I heard tonight justifies the
20 increases.

21

22 Toronto Hydro Reply

23 Dear Ms. Brooks,

24 Thank you for your letter of comment. Toronto Hydro is sorry that you were
25 disappointed with the community meeting presentations and responses to questions by
26 OEB and Toronto Hydro staff. Recognizing the value of your time, if you have any

1 specific feedback on how we in particular can do better, we would appreciate receiving
2 that.

3

4 Regarding the gentleman who provided the presentation and asked questions, we
5 believe you are speaking about Mr. Hann. We did not have the information readily
6 available to answer those questions at the community meeting, and even if we had,
7 providing the answers would have taken a number of hours and eliminated the time for
8 other customers to provide their feedback and ask questions at the meeting. As you
9 may recall, during the community meeting, we committed to providing written answers
10 to Mr. Hann's questions on the public record as part of our application process before
11 the Ontario Energy Board. As the OEB has since granted Mr. Hann intervenor status in
12 this proceeding, he has now filed those and other questions in writing and Toronto
13 Hydro is responding to them as part of the public record at the same time as filing this
14 reply to your letter of comment.

15

16 Regarding rate increases and our plan to invest in the grid, you may also be interested in
17 our reply to Mr. Lancaster's letter of October 4, 2018.

18

19 Letter of Comment: Christine Douglas: November 22, 2018

20 Please see the attached. I prepared a chart which is attached. The charges are in
21 addition to my usage. As a single individual I am paying as much as a neighbour who is
22 using hydro electricity – air conditioner, washer dryer, heat & I am paying as much as
23 she and her family of 4 people.

24 Attachment:

25 Toronto Hydro Charges

DATE	DAYS	USAGE	CHARGES
MAY 9/11	40	49.06	53.46
MAR 4/13	63	93.76	91.61
MAY 2/13	61	91.56	88.66
SEPT 11/13	99	95.13	137.99
OCT 30.13	62	82.92	91.17
DEC 31/13	60	83.41	87.86
TOTAL:	385	495.84	550.75

FEB 28/14	63	95.16	96.81
MAY 1/14	60	90.33	91.41
JUL 18/14	60	87.19	89.92
AUG 29/14	62	98.07	97.77
OCT 30/14	60	88.13	89.58
DEC 31/14	60	117.335	74.32
TOTAL:	365	576.215	539.81

MAR 2/15	63	106.22	100.95
MAY 1/15	62	97.88	95.45
JUN 30.15	58	87.9	81.36
AUG 31/15	62	101.35	91.5
OCT 28/15	58	92.42	83.82
DEC 30/15	61	98.83	87.28
TOTAL:	364	584.6	540.36

FEB 26/16	62	109.43	105.04
APR 29/16	63	108.83	122.37
JUN 28/16	58	103.05	115.15
AUG 29/16	62	147.09	148.97
SEPT 29/16	31	75.63	71.85
OCT 28/16	31	48.04	57.24
NOV 29/16	30	50.77	57.3
DEC 30/16	29	50.46	56.79
TOTAL	366	693.3	734.71

JAN 30.17	33	57.89	59.13
FEB 28/17	29	52.85	50.45
MAR 28/17	28	53.46	49.64
MAY 1/17	34	60.59	58.76
MAY 29.17	28	44.05	47.15
JUN 28/17	30	44.04	49.16
JUL 28/17	32	41.42	51.54
SEPT 28/17	30	37.92	48.21
OCT 30.17	32	39.08	50.5
NOV 28/17	29	38.79	47.5
TOTAL	305	470.09	512.04

DATE	DAYS	USAGE	CHARGES
JAN 2/18	30	40.37	49.03
JAN 30.18	33	47.73	59.15
FEB 27.18	28	40.44	50.45
MAR 28/18	29	42.17	52.11
APR 27/18	32	48.56	58.05
MAY 31/18	32	48.56	58.05
JUN 28/18	28	40.45	50.01
JUL28/18	32	45.97	50.01
AUG 29/18	30	42.81	53.4
OCT 1.18	33	44.21	57.66
OCT 29.18	28	38.75	49.34
TOTAL	335	480.02	587.26

1

2 Toronto Hydro Reply

3 Dear Ms. Douglas,

4 Thank you for your letter of comment. Toronto Hydro apologizes that you are finding it
 5 difficult to understand your charges compared with those of a neighbour, and we
 6 recognize that it is complicated to do so. As you may know, the methodology and
 7 presentation of the electricity bill in Ontario is largely set by provincial law and

1 regulation, and there are a lot of complex charges and credits that go into your bill each
2 month.

3

4 Thank you for preparing a table setting out your charges over several years, however
5 without additional information about your and your neighbour's households, plus her
6 consent for privacy purposes, we cannot give you a precise explanation of what is
7 happening with your bill versus hers. Nevertheless, Toronto Hydro's experience is that
8 there are a few common drivers for questions such as yours, relating to the different
9 types of charges on the bill.

10

11 *The Delivery Line:*

12 Your column labelled charges represents the delivery line on the bill, which represents
13 the cost of getting power from generators to your home, and ensuring electricity is
14 available when you need it. The delivery line is made up of a number of costs (some
15 ours and some related to others), such as:

- 16 • Toronto Hydro costs: this is your distribution charge, which is invested into the
17 local distribution grid to maintain safety and reliability of our infrastructure, help
18 support a growing city, and enable us to plan for and respond to extreme
19 weather. This part of your bill may also include certain credits or charges related
20 to temporary, unpredictable, or deferred costs for delivering electricity and
21 services to customers.
- 22 • Non-Toronto Hydro costs:
 - 23 ○ Transmission rates which we collect on behalf of companies such as
24 Hydro One
 - 25 ○ Pass-through charges in the form of rate riders that credit customers or
26 collect from customers historic over-charges or under-charges on parts of

1 the bill related to transmission, generation and other commodity costs,
2 and other provincially-administered charges.

3
4 *Your Overall Bill*

5 Provincial and OEB law and regulation mean that your delivery line and overall bill is
6 partially based on your overall consumption. This means it includes both charges that
7 do change depending on how much electricity you use (called variable charges) and
8 those which don't change depending how much electricity you use (called fixed
9 charges). The fixed portion of the charge helps cover the costs of the poles and wires
10 that are
11 available 24/7 to deliver electricity to your home, on demand. Because of this, changes
12 in the amount you pay on your delivery line often do not move by the same amount, or
13 even in the same direction, as changes in how much electricity you use (called kilowatt
14 hours or kWh).

15
16 Some of the common factors you may wish to consider in addition to those mentioned
17 in your letter that influence the amount of energy usage and contribute to differences in
18 charges between households include:

- 19 • Size and type of home
- 20 • Upgraded insulation or windows
- 21 • Heating and cooling factors such as gas or electric heating or air conditioning
22 systems, baseboard or portable heaters, thermostat settings, heated floors,
23 heated driveways, pool pumps, etc.
- 24 • Gas or electric water heating

25 Types and frequency of appliances in use, and their energy efficiency ratings.

1 We hope this information provides some additional insight into what may be driving the
2 difference in charges. For further background on rates, please visit Toronto Hydro's
3 website at www.torontohydro.com/rates, or for additional tips on managing energy
4 usage, please visit <http://www.torontohydro.com/saveonenergy>.

5

6 Letter of Comment: Weston Trott: November 22, 2018

7 More transparency on Rates – How are distribution rates calculated? Show fixed and
8 variable cost on the bill – Bill is not transparent.

9 Is the system working to allow utilities to ask and the reduce after the ask? It seems it
10 does not work to have the utilities ask for the sky why not keep them honest from the
11 beginning? The stats for reducing by 38% shows it does not work the current ask
12 system.

13

14 Toronto Hydro Reply

15 Dear. Mr. Trott,

16 Thank you for your letter of comment. Toronto Hydro recognizes that the bill is
17 complicated, and that you are frustrated by the way that the charges are calculated. As
18 you may know, the methodology and presentation of the electricity bill in Ontario is
19 largely set by provincial law and regulation, and there are a lot of complex charges and
20 credits that go into your bill each month.

21

22 On the Toronto Hydro website we try to break down the bill and explain it as best as we
23 can:

24 http://www.torontohydro.com/sites/electricsystem/residential/yourbilloverview/Pages
25 [/BillFormat.aspx](http://www.torontohydro.com/sites/electricsystem/residential/yourbilloverview/Pages/BillFormat.aspx).

1 Please see our reply to Ms. Douglas' letter of November 22, 2018 for your questions
2 regarding distribution rates and the way charges are calculated.

3

4 Regarding your interest in how our plan has been developed and how the OEB will test it
5 and ensure it strikes the right balance, we have supported our plan with 4,300 pages of
6 evidence and data, and that plan is now before the regulator in a public process where
7 the OEB, customer advocacy groups and other experts are scrutinizing and challenging
8 it. Please also see our reply to Mr. Lancaster's letter of October 4, 2018.

9

10 Letter of Comment: An Ge: November 26, 2018

11 I'm very concerned and confused about your Delivery Charge. Delivery Charge should
12 not be a fixed rate. It should be determined by the actual usage. The higher usage, the
13 higher the delivery charge; the lower usage, the lower the delivery charge should be.
14 Not on some fixed nonsense charge, IF someone is away from home for, say 6 mnths,
15 barely have usage on the energy, only incur fixed cost of delivery charge. So re-define
16 the delivery charge.

17

18 Toronto Hydro Reply

19 Dear Mr. Ge,

20 Thank you for your letter of comment. Toronto Hydro recognizes that the bill is
21 complicated, and that you are frustrated by the fixed charges in the Delivery line.

22 Provincial and OEB law, regulation and methodology for charges mean that your
23 delivery line and overall bill is partially based on your overall consumption and partially
24 based on fixed charges. This means it includes both charges that do change depending
25 on how much electricity you use (called variable charges) and those which don't change
26 depending how much electricity you use (called fixed charges). The fixed portion of the

1 charge helps cover the costs of the poles and wires that are available 24/7 to deliver
2 electricity to your home, on demand.

3

4 Please see our reply to Ms. Douglas' letter of November 22, 2018 regarding the specific
5 concerns that you raise in your letter regarding the delivery charge.

6

7 Letter of Comment: Caleb Kouahou: November 26, 2018

8 I'm concerned by the transmission poles (high tension) crossing residential area (like
9 South Etobicoke) with risk of cancer.

10 Also the risk related to 50+ old nuclear plant and the safety gap for example populations
11 not sensibilised or distributed the RADBLOCK pills.

12

13 Toronto Hydro Reply

14 Dear Mr. Kouahou,

15 Thank you for your letter. Toronto Hydro is the local distributor of electricity in Toronto,
16 and owns and operates the poles and wires that bring electricity to your home. The
17 transmission lines and nuclear plants are owned and operated by others such as Hydro
18 One and Ontario Power Generation.

19

20 For more information about your local grid and our plan to invest it in, please see our
21 reply to Mr. Lancaster's letter of October 4, 2018.

22

23 Letter of Comment: Sijing Liu: November 26, 2018

24 The Delivery Charge on a typical Residential Bill should NOT be set as a fixed rate. It
25 should be billed based on the actual usage of energy. It's not fair to set delivery charge

1 a set rate. We use only <\$20 energy bill, but our delivery charge is always around >\$35.
2 Is this Normal for a typical bill?
3 Anyways, delivery charge needs restructured however it's determined.

4
5 Toronto Hydro Reply

6 Dear Ms. Liu,

7 Thank you for your letter of comment. Toronto Hydro recognizes that the bill is
8 complicated, and that you are frustrated by the fixed charges in the Delivery line.
9 Provincial and OEB law, regulation and methodology for charges mean that your
10 delivery line and overall bill is partially based on your overall consumption and partially
11 based on fixed charges. This means it includes both charges that do change depending
12 on how much electricity you use (called variable charges) and those which don't change
13 depending how much electricity you use (called fixed charges). The fixed portion of the
14 charge helps cover the costs of the poles and wires that are available 24/7 to deliver
15 electricity to your home, on demand.

16
17 Please see our reply to Ms. Douglas' letter of November 22, 2018 regarding your
18 comments regarding delivery charges. For more information about your local grid and
19 our plan to invest it in, please see our reply to Mr. Lancaster's letter of October 4, 2018.

20
21 Letter of Comment: Slobodan and Dobrila Vujinovic: November 26, 2018

22 I participated in TIME OF USE for many years being probably among the first to apply.
23 Now my husband Slobodan age 86 and myself Dobrila age 83 are not able to adjust our
24 use no more It puts in need to use electricity when it is the most expensive increasing
25 our financial burden as well as time of use schedule loosing any purpose. We are not

1 only old but old timers as well and know and participate in all possible means to save
2 electricity not only for people of Ontario but for our own budget.
3 Please assist.

4

5 Toronto Hydro Reply

6 Dear Mr. and Mrs. Vujnovic,

7 Thank you for your letter of comment. While Toronto Hydro recognizes that not all
8 customers favour Time of Use rates, Toronto Hydro is required by provincial law and
9 regulation to bill customers in accordance with that pricing structure. To help
10 customers better manage their energy costs, please visit Toronto Hydro's website for
11 additional information and tips.

12 <http://www.torontohydro.com/saveonenergy>

13

14 Please see our reply to Ms. Douglas' letter of November 22, 2018 regarding delivery
15 charges. For more information about your local grid and our plan to invest it in, please
16 see our reply to Mr. Lancaster's letter of October 4, 2018.

17

18 Letter of Comment: Bill Gaw: November 29, 2018

19 Thank you for the opportunity to hear about and question Toronto Hydro's Rate
20 Application for 2020-2024 at the Scarborough Civic Centre Community Meeting on
21 November 26.

22

23 I have no issue with the proposed cost recovery rates, but I notice a couple of elements
24 in the application that seem odd and might bear close examination by the Board.

25 "approximately a quarter of the utility's asset base continues to operate beyond useful
26 life..." and "continued investment is required to ensure there is no deterioration in

1 recently stabilized system performance" do not suggest a strong plan to eliminate the
2 "beyond" part, but simply to maintain the current level of stuff "past their useful life"
3 and accept whatever level of outages that implies.

4

5 I think it would be more appropriate to declare an ambition to reduce the "population
6 of assets beyond their useful life" to less than 1% by 2024, and plan to drive it down
7 from that level going forward until we bump into the structural minimum.

8 In section D 3.1.2 Asset Replacement Policy, "Toronto Hydro does not have a dedicated
9 proactive renewal strategy for overhead conductors. Where appropriate conductors are
10 replaced as part of a planned area rebuild or reactively upon failure due to age..."

11 Given the illustrated property damage, and potential personal injury risk due to
12 "porcelain pothead failure" plus the know-how to replace "legacy porcelain insulators
13 with new polymeric equivalents", a "dedicated proactive renewal strategy" could be a
14 good thing - perhaps it would even reduce the maintenance expense of "washing the
15 porcelain insulators every six months."

16

17 Similarly, if we recognize "below ground rotted poles" and "car accidents" as known
18 risks of catastrophic pole failures, replacement of old wooden poles with new wooden
19 poles rather than composite, concrete, or steel poles, and leaving the new poles
20 unprotected by concrete-steel guard posts, are questionable practices. Those new
21 wooden poles are subject to Toronto's belligerent woodpeckers, unnecessarily reduce
22 our forest carbon absorption somewhere in Canada, and maintain a continuing risk of
23 pole fires.

24

25 I did not see a compelling justification for choosing wooden poles going forward.

1 The argument that "removed assets are typically refurbished and kept as spares due to
2 the scarcity of these obsolete asset types" seems seriously dubious. It might make at
3 least as much sense to chuck the obsolete stuff and invest the savings from
4 refurbishment expenses into fixing the next repair with current standard equipment.
5 That might also conveniently drive down the inventory of obsolete assets that will need
6 continued investment in the future.

7

8 Toronto Hydro Reply

9 Dear Mr. Gaw,

10 Thank you for your letter, and for your support of the proposed rate increase. We
11 acknowledge your preference for a plan that would:

- 12 • do more to reduce the population of assets beyond useful life to less than 1% by
13 2024 (compared with Toronto Hydro's current age profile at approximately a
14 quarter of assets past end of useful life);
- 15 • eliminate the practice of using refurbished assets removed from service for
16 spare parts and instead redirect the expenses of refurbishment (and inventory)
17 to additional investment;
- 18 • create a dedicated proactive renewal strategy for areas such as overhead
19 conductors (e.g. porcelain insulators); and
- 20 • eliminate wooden poles as a replacement option.

21

22 Toronto Hydro has developed and refined its plan taking into account customer
23 feedback that limiting price increases was a paramount concern, to the degree that
24 doing so would not adversely affect service performance, and that performance would
25 improve in certain areas. This means that our plan does not include all the reasonable
26 funding requests that it assesses are appropriate given the needs of the system. We

1 constrained our capital plan, even though a higher level is preferable from an asset
2 management perspective to better manage certain elevated asset risks.

3

4 For more information about your local grid and our plan to invest it in, please see our
5 reply to Mr. Lancaster's letter of October 4, 2018.

6

7 Letter of Comment: Bruce Bryden: December 4, 2018

8 Allow me to get all the information on my bill as on my Micro fit Meter Credit, and not
9 have to use a computer to gain this information.

10

11 Toronto Hydro Reply

12 Dear Mr. Bryden,

13 Thank you for your letter of comment. Toronto Hydro recognizes that the bill is
14 complicated, and that you are frustrated by the way that the information is presented.
15 As you may know, the methodology and presentation of the electricity bill in Ontario is
16 largely set by provincial law and regulation, and there are a lot of complex charges and
17 credits that go into your bill each month. As a MicroFIT customer, we appreciate that
18 you may want additional billing information and as you may be aware, MicroFIT
19 generation detail is available on Toronto Hydro's PowerLens web portal. Accessing the
20 portal may be an added step, however, it does provide a wealth of account specific
21 information useful for validating your charges and managing your electricity usage. To
22 reduce this effort, we are planning an enhancement that will enable customers to enroll
23 in auto receipt of regular emails providing information specific to their needs.

24

25 For more information about your local grid and our plan to invest it in, please see our
26 reply to Mr. Lancaster's letter of October 4, 2018.

1 Letter of Comment: Joe Gudinkas: December 4, 2018

2 In the light of how Hydro is going wild, these meetings are very useful.

3

4 Toronto Hydro Reply

5 Dear Mr. Gudinkas,

6 Thank you for your letter, and we appreciate that you found the community meeting
7 useful.

8 For more information about your local grid and our plan to invest it in, please see our
9 reply to Mr. Lancaster's letter of October 4, 2018.

10

11 Letter of Comment: Josephine Ng: December 4, 2018

12 The changes I experienced are fine

- 13 1. Monthly bills
- 14 2. Summer deals
- 15 etc.

16 I did climate change research for a project and I knew nothing about the OEB. By
17 coming to this meeting I can clarify the things that matter. I feel better about
18 consuming electricity and conserving energy. I'm a new Toronto Hydro customer, but it
19 was really important to make me be at the meeting. I feel appreciated to be someone
20 that was here. So all I can think about now is that I pay hydro and get it at home and
21 that's great! Thank you.

1 Toronto Hydro Reply

2 Dear Ms. Ng,

3 Thank you for your letter, and we appreciate that you found the community meeting to
4 be a positive experience, and that your experience with your bill, conservation, and
5 incentives has also been positive.

6

7 For more information about your local grid and our plan to invest it in, please see our
8 reply to Mr. Lancaster's letter of October 4, 2018.

9

10 Letter of Comment: Paul Stuewe: December 4, 2018

11 The proposed changes will have no impact on my family. However, I am very concerned
12 about how people on fixed incomes, and people who are just getting by, will be
13 affected. I hoped that this would be addressed during this meeting; it was certainly
14 raised, but I wasn't impressed by the somewhat vague response of the OEB chairman.

15

16 Toronto Hydro Reply

17 Dear Mr. Stuewe,

18 Thank you for your letter and your interest in help for those needing assistance paying
19 their bills. A number of assistance programs are available with different types of
20 support ranging from helping customers reduce their electricity usage to on-bill credits
21 to help offset monthly charges. The following are programs available for eligible
22 customers:

- 23 • The Independent Electricity System Operator's Home Assistance Program
24 provides energy-efficient upgrades from free light bulbs to appliances;
- 25 • The Ontario Energy Board's Low-Income Energy Assistance Program (LEAP)
26 provides a one-time emergency grant to help pay your electricity bill;

- 1 • The Ontario Energy Board’s Ontario Electricity Support Program (OESP) provides
2 an on-bill credit each month to qualifying households. In 2017, this program was
3 expanded to include more eligible households, and;
- 4 • The provincial Affordability Fund provides free upgrades to help lower electricity
5 costs.

6 Toronto Hydro uses a number of communication channels to make customers aware of
7 these programs. Additional information is available at www.torontohydro.com/help or
8 through the Customer Care team at 416-542-8000.

9

10 Letter of Comment: Greg Pimento: December 10, 2018

11 I attended the public meeting in Etobicoke on Dec 6th and would like to go on record as
12 not supporting Toronto Hydro’s application for a rate increase.

13

14 When compared against our natural gas supplier Toronto Hydro does not do well. This
15 is from both a cost and level of service perspective. Both services are regulated but the
16 differences in their structures make for the differences we’ve experienced as
17 consumers, to my judgement. I pick natural gas over hydro every time.

18

19 Given the growth in Toronto I do not understand the need for the increased rate, unless
20 the existing rate payers are subsidizing the capital costs of new connections. I also find
21 the inflexibility with the acceptance of micro-grids bothersome and poorly justified by
22 Toronto Hydro.

23

24 I know it is not under Toronto Hydro’s or the OEB’s control but I want to also go on
25 record that the level of Global Adjustment is totally unacceptable. Incremental power
26 production rates are close to 3 cents whereas the GA is three time that amount. Poorly

1 managed is the only conclusion I can determine.

2

3 I would be interested in helping in any way feasible knowing that the task at hand is
4 massive at best.

5

6 Thanks for the opportunity to attend and see the presentations.

7

8 Best Regards,

9 Greg Pimento

10

11 Toronto Hydro Reply

12 Dear Mr. Pimento,

13 Thank you for your letter, and we appreciate that you found the community meeting to
14 be a positive experience.

15

16 With respect to your concern about the differences in electricity and natural gas pricing,
17 there are significant differences between the costs of generation and distribution of
18 these fuel types, which leads to differences between costs, prices and services. For
19 more information about the drivers of Toronto Hydro's costs, our plan to invest in the
20 grid, and our performance and efforts to mitigate your rate increases, please see our
21 reply to Mr. Lancaster's letter of October 4, 2018.

22

23 Regarding your questions about whether ratepayers are subsidizing developers and new
24 customers, the Ontario Energy Board has regulations designed so that each type of
25 customer pays their own way and cross-subsidization is avoided. This includes
26 calculations around capital costs and a complete economic evaluation designed to

1 ensure developers pay their fair share. Toronto Hydro has a responsibility to connect
2 customers to the grid and make sure enough capacity exists so that those new
3 customers can receive a safe and reliable source of power.

4

5 Regarding your comments about the unacceptability of the global adjustment, we
6 appreciate your recognition that this is not included in our part of the bill and we do not
7 control it.

1 **RATE FRAMEWORK**

2

3 This schedule describes Toronto Hydro’s rate framework for the 2020 to 2024 plan
4 period. The utility’s proposed rate framework continues the rate framework approved
5 by the OEB in Toronto Hydro’s 2015-2019 Rate Application.¹ The framework is aligned
6 with OEB policy, and based on sound ratemaking principles. It has been structured in a
7 way that includes productivity gains as part of the rate adjustment mechanism,
8 constrains operational funding increases going forward at less than the rate of inflation,
9 and reconciles a price-cap formula with funding requirements to address Toronto
10 Hydro’s significant, multi-year investment needs over the 2020 to 2024 period.

11

12 **1. SUMMARY**

13 Toronto Hydro’s rate framework is a modification of the standard Fourth Generation
14 Incentive Rate-Setting (“4th Generation IR”) IR approach. The framework is
15 comprehensive, covers the entirety of the application’s term, and is informed by
16 Toronto Hydro’s forecasts. It is also informed by the OEB’s current inflation and
17 productivity analysis, and is aligned with Toronto Hydro’s third party benchmarking of
18 Toronto Hydro’s costs. As noted, the framework is a continuation of the framework
19 approved by the OEB in the utility’s 2015-2019 Rate Application. As explained below,
20 this includes the modifications required by the OEB in its 2015 decision, as related to the
21 application of the stretch factor to capital and the inclusion of a growth variable to
22 capture changes in revenue occurring due to changes in customers and loads.²
23 Year 1 is a traditional rebasing year, with costs allocated and rates set on the basis of a
24 forecast Test Year.

¹ EB-2014-0116 Decision and Order (December 29, 2015).

² Ibid.

1 Distribution rates in Years 2 through 5 are adjusted annually by a Custom Price Cap
2 Index (“CPCI”), as follows:

3

4

$$\text{CPCI} = I - X + C - g$$

5

6 Where,

7

- “I” is the OEB’s inflation factor, determined annually;

8

- “X” is the sum of:

9

- The OEB’s productivity factor, as of the date of filing; and

10

- Toronto Hydro’s custom stretch factor;

11

- “C” provides funds incremental to “I – X” that are necessary to reconcile Toronto Hydro’s capital need within a PCI framework;

12

13

- “g” captures revenue growth occurring due to customer and/or load changes over the forecast period, based on Toronto Hydro’s forecast of loads and customers for the 2021-2024 period;

14

15

16

17 **2. YEAR 1: STANDARD REBASING**

18

The first year of the proposed rate application is a standard rebasing year, consistent

19

with the OEB’s 4th Generation IR approach. Toronto Hydro developed and has

20

submitted in this application a forecast of its base revenue requirement for 2020. The

21

utility developed forecasts of its costs based on its capital and operational plans for

22

2020. The Distribution System Plan (“DSP”) and Operations, Maintenance, and

23

Administration (“OM&A”) evidence contained in Exhibits 2B and 4A, respectively,

24

provides the details supporting these projected costs. The calculated revenue

25

requirement resulting from these projections is detailed in the Revenue Requirement

26

evidence filed at Exhibit 6, Tab 1.

1 Similarly, Toronto Hydro employed the OEB’s Cost Allocation model to allocate the
2 revenue requirement to its eight rate classes, and developed base distribution rates for
3 each class. The standard rebasing approach maintains revenue-to-cost ratios for each
4 class within the boundaries set out in the OEB’s 2011 Review of Electricity Cost
5 Allocation Policy.³ For more information about Toronto Hydro’s Cost Allocation and
6 Rate Design, please refer to Exhibits 7 and 8, respectively.

7

8 In addition to base distribution rates, Toronto Hydro is applying to clear a number of
9 Deferral and Variance accounts. Based on the values Toronto Hydro has proposed for
10 clearance, a number of new rate riders are proposed for implementation beginning in
11 2020 pursuant to various clearance time frames. For more information about Toronto
12 Hydro’s proposed rate riders, please refer to Exhibit 9, Tab 3.

13

14 **3. YEARS 2 TO 5: CUSTOM PRICE CAP INDEX (“CPCI”)**

15 Under 4th Generation IR, rates in the years following a rebasing year are subject to an
16 incentive rate mechanism (“IRM”). The IRM is a formulaic approach to rate making
17 under which distribution rates are adjusted annually using a two-component PCI:

18

19

$$\text{PCI} = \text{I} - \text{X}$$

20

21 The I-factor is intended to reflect changes to the input prices faced by the industry (i.e.
22 inflation), while the X-factor is intended to capture changes in the productivity of the
23 Ontario electricity distribution industry as a whole, and differences among utilities
24 within it.

³ EB-2010-0219, EB-2012-0383 and OEB letter issued June 12, 2015 Issuance of New Cost Allocation Policy for Street Lighting Rate Class.

1 In the RRFE Report, the OEB offers alternative forms of rate making “to accommodate
2 differences in the operations of distributors, some of which have capital programs that
3 are expected to be significant.”⁴ The OEB notes that the CIR option in particular “will be
4 most appropriate for distributors with significant large multi-year [...] investment
5 commitments that exceed historical levels,” whereas 4th Generation IR is more suitable
6 for utilities with “some” incremental needs.⁵ The evidence at Exhibit 1B, Tab 2,
7 Schedule 4 and the DSP at Exhibit 2B discuss Toronto Hydro’s capital investment needs
8 and, by extension, the appropriateness of the CIR option in greater detail.

9
10 A challenge for CIR applicants like Toronto Hydro is to reconcile their significantly large,
11 multi-year investment commitments within a framework that aligns with RRFE guidance.
12 To this end, Toronto Hydro proposes that these needs be reconciled within a CPCI
13 framework that entrenches the OEB’s inflation and productivity factors within a
14 formulaic approach to adjusting distribution rates, with customization as set out in this
15 evidence. The following subsections set out the approach in more detail.

16

17 **3.1 Inflation and Productivity Factors**

18 In 2013, the OEB updated its standard rate adjustment parameters following a
19 consultation process that explicitly considered:⁶

- 20 1) The development of a more Ontario-specific inflation factor;
- 21 2) The estimation of long-run Ontario electricity distribution total factor
22 productivity (“TFP”); and
- 23 3) The development and implementation of total cost benchmarking.

⁴ RRFE Report at page 9.

⁵ RRFE Report at page 14.

⁶ EB-2010-0379, Report of the Board, Rate Setting Parameters and Benchmarking under the Renewed Regulatory Framework for Ontario’s Electricity Distributors (December 4, 2013) [the “OEB Rate Setting Parameters Report”].

1 The OEB decided on a new methodology for the I-factor. The I-factor is based on a
2 30/70 weighting of labour and non-labour sub-indices and is updated annually. The
3 labour sub-index is determined by changes in the average weekly earnings of Ontario
4 workers, and the non-labour sub-index is determined by changes in the Canada Gross
5 Domestic Product Implicit Price Index for final domestic demand.

6
7 Toronto Hydro proposes to use the OEB's I-factor in its CPCI. As the value for the I-
8 factor is updated annually, Toronto Hydro will incorporate the updated value into its
9 CPCI to appropriately adjust base distribution rates for the following year.

10

11 The productivity factor, one of the two X-factor components, was also updated. The
12 productivity factor is intended to estimate the overall trend in the productivity of the
13 electricity distribution industry in Ontario by measuring changes in TFP, defined by
14 Pacific Economics Group ("PEG") as a "comprehensive measure of the extent to which
15 firms convert inputs into outputs."⁷

16

17 In its report, PEG used an indexing method to estimate TFP for the Ontario distribution
18 sector based on data from the 2002 to 2012 period.⁸ This sample excluded the
19 experience of both Toronto Hydro and Hydro One because, as a result of their large size
20 relative to the rest of the industry, PEG determined that they were exerting a
21 disproportionate impact on industry TFP.⁹ Toronto Hydro presumes that this principle
22 would have held if one or both had outperformed the sector on TFP.

⁷ Pacific Economics Group (2013), Productivity and Benchmarking Research in Support of Incentive Rate Setting in Ontario, (corrected January 24, 2014) at page 12 [the "PEG Report"].

⁸ PEG suggests that a ten-year horizon is the minimum required for TFP Indexing.

⁹ PEG Report, *supra* note 7 at page 4.

1 The result of PEG’s analysis that excluded the two utilities suggested that industry TFP
2 over that period changed at an average annual rate of -0.33 percent. That is, TFP for the
3 sector actually declined over that period. In alignment with PEG’s recommendation, the
4 OEB ultimately adopted a zero productivity factor as a matter of policy, inclusive of an
5 implicit stretch of 0.33 percent.

6
7 Toronto Hydro proposes to embed the OEB’s productivity with its implicit incremental
8 stretch factor unchanged within the proposed CPCI, fixed throughout the term of the
9 ratemaking period.

11 **3.2 Custom Stretch Factor**

12 The second component of the X-factor is an explicit stretch factor. According to the
13 OEB, “stretch factors promote, recognize, and reward distributors for efficiency
14 improvements relative to the expected sector productivity trend.”¹⁰ Under the current
15 methodology, which was updated most recently in 2013, utilities are assigned one of
16 five stretch factors. This occurs on the basis of a comparison of the utility’s total costs
17 relative to their predicted total costs. The predicted total costs are determined using a
18 total cost econometric model developed by PEG.¹¹

19
20 As part of this application, Toronto Hydro is submitting alternative total cost
21 benchmarking, the details of which can be found in the Power System Engineering’s
22 (“PSE”) Econometric Benchmarking Report, at Exhibit 1B, Tab 4, Schedule 2 (the “PSE
23 Report”). The alternative total cost benchmarking model prepared by PSE for Toronto
24 Hydro is econometric in nature (similar to PEG’s model) and includes an expanded data
25 set. The results are statistically significant and relevant to the OEB’s consideration of

¹⁰ OEB Rate Setting Parameters Report, *supra* note 6 at page 18.

¹¹ OEB Rate Setting Parameters Report, *supra* note 6 at page 19.

1 Toronto Hydro's performance. The PSE Report also addresses the benchmarking
2 comments set out in the OEB Decision in Toronto Hydro's 2015-2019 Rate Application.¹²

3
4 The PSE Report provides an appropriate and robust basis for setting Toronto Hydro's
5 stretch factor. As noted in the PSE Report, Toronto Hydro's forecasts of its total costs
6 are within 10 percent of its predicted total costs. Utilities within this demarcation point
7 are assigned to Group III of the OEB's benchmarking cohorts, implying a stretch factor of
8 0.30 percent. Toronto Hydro therefore proposes that the stretch factor in the proposed
9 CPCI framework be set at 0.30 percent, and fixed throughout the term of the
10 ratemaking period.

11
12 Toronto Hydro's proposed plan and resulting revenue requirement in this CIR
13 application reflects the results of a total cost econometric forecasting model, as
14 envisioned in the Filing Requirements. A custom element of this CIR Application is using
15 a PSE forecasting model in place of a PEG forecasting model.

16 17 **3.3 Custom Capital Factor**

18 The premise of the inclusion of a custom capital factor ("C-factor") is to reconcile the
19 OEB's guidance that the CIR framework is best suited for utilities with significant, multi-
20 year capital investment requirements as it is clear that the standard 4th Generation IR
21 framework is not.

22
23 The proposed C-factor is designed as a rate adjustment mechanism that is directly
24 proportional to the degree of capital investment required by Toronto Hydro, as detailed

¹² Supra note 1 at pp.16-17.

1 in its DSP (Exhibit 2B). It is comprised of two sub-components that serve two primary
 2 functions:

- 3 • Reconcile Toronto Hydro’s capital investment need in a price cap framework;
- 4 and
- 5 • Return to ratepayers the funding already provided for capital through the
- 6 standard “I – X” increase.

7
 8 The first sub-component, termed “C_n”, is determined as the percent change in total
 9 revenue requirement that is attributable to changes in capital-related revenue
 10 requirement – that is, depreciation, return on equity, interest and PILs/taxes. Changes
 11 in capital-related revenue requirement are based on forecast changes in average annual
 12 rate base, associated depreciation, and taxes. Tax rates and the cost of capital are
 13 maintained at their 2020 levels, consistent with the standard 4th Generation IR
 14 treatment and the OEB approved treatment in Toronto Hydro’s 2015-2019 Rate
 15 Application.

16
 17 The OEB approved values of C_n from the 2015-2019 Rate Application are shown in Table
 18 1 below.¹³

19
 20 **Table 1: OEB Approved C_n factors for 2016-2019**

2016	2017	2018	2019
4.07	7.60	5.99	4.43

21
 22 For the current application, C_n for 2021-2024 is be determined on the following basis:

¹³ EB-2014-0116 Draft Rate Order Update (February 29, 2016) page 6.

1 **Table 2: Calculation of C_n (\$ Millions)**

Revenue Requirement Component ¹⁴	2020	2021	2022	2023	2024
Ratebase	4,615.3	4,829.0	5,081.6	5,374.5	5,650.0
Interest Expense	100.8	105.5	111.0	117.4	123.4
Return on Equity	162.8	170.4	179.3	189.6	199.3
Depreciation	268.7	281.9	293.1	310.9	325.4
PILs/Taxes	34.7	36.5	32.7	35.7	42.2
Capital-related RR (A)	567.0	594.3	616.0	653.6	690.3
OM&A	277.5	280.0	282.5	285.1	287.6
Revenue Offsets	-47.7	-48.1	-48.5	-49.0	-49.4
Total RR (B)	796.8	826.2	850.0	889.6	928.5
$C_n = (A_{yx} - A_{y(x-1)}) / B_{y(x-1)}$		3.43%	2.63%	4.42%	4.12%

2

3 For example, in the above table, the change in forecast capital related revenue
 4 requirement from 2020 to 2021 is \$27.3 million (\$594.3 million minus \$567.0 million).
 5 The total revenue requirement in 2020 is \$796.8 million. C_n for 2020 is therefore:

6

7
$$C_n = (594.3 - 567.0) / 796.8 = 3.43\%.$$

8

9 The values shown in Table 2 are filed as part of the OEB's Revenue Requirement
 10 Workforms, at Exhibit 6, Tab 1, Schedules 2-6. Capital-related revenue requirement, as
 11 noted, is determined on a forecast basis. By contrast, OM&A and Revenue Offsets are
 12 assumed to increase by "I - X".

13

14 The values of C_n represent the amount by which base rates would need to be increased
 15 to fund Toronto Hydro's capital needs over the course of the rate term.

¹⁴ Each component can be found in the Revenue Requirement Workforms filed as Exhibit 6, Tab 1, Schedule 2-6.

1 With the inclusion of C_n in the CPCI, Toronto Hydro would receive sufficient funding for
 2 its capital needs as presented in the DSP. However, the “I – X” increase already included
 3 in the CPCI formula does provide some degree of incremental funding for capital.
 4 Absent adjustment, the CPCI formula with just C_n would risk over-funding relative to
 5 Toronto Hydro’s capital needs. This risk is removed in the CPCI through a scaling of the
 6 C_n values. Termed S_{cap} , this scaling factor is calculated in the following fashion:

$$S_{cap} = (\text{capital-related revenue requirement}) / (\text{total revenue requirement})$$

7
 8
 9
 10 This scaling reduces the incremental funding for capital to capture just the capital
 11 component incremental to the “I – X” already included in the CPCI. Table 3 provides the
 12 information inputs for calculating S_{cap} for 2021-2024.

13
 14 **Table 3: Revenue Requirement Components for Determining S_{cap}**

Revenue Requirement Component	2021	2022	2023	2024
Interest	105.5	111.0	117.4	123.4
ROE	170.4	179.3	189.6	199.3
Depreciation	281.9	293.1	310.9	325.4
PILs/Taxes	36.5	32.7	35.7	42.2
Capital-related RR (A)	594.3	616.0	653.6	690.3
OM&A	280.0	282.5	285.1	287.6
Revenue Offsets	-48.1	-48.5	-49.0	-49.4
Total RR (B)	826.2	850.0	889.6	928.5
$S_{cap} = A / B$	71.9%	72.5%	73.5%	74.3%

15
 16 In Toronto Hydro’s 2015-2019 Rate Application, the scaling factor was applied to a full “I
 17 – X”. However, the OEB ruled that the scaling should only apply to “I”, so that the

1 stretch factor incentive remained a component of the capital funding.¹⁵ Toronto
 2 Hydro’s proposed CPCI conforms to this finding.

3
 4 **3.4 Growth Factor**

5 In its 2015 Decision, the OEB found that the inclusion of a growth variable in the CPCI
 6 was warranted to capture the change in distribution revenue that would naturally occur
 7 (in the absence of any rate changes) due to changes in billing units (customer numbers
 8 and loads) over the forecast period.¹⁶

9
 10 Toronto Hydro has accordingly included the growth term, “g”, in the CPCI. The value of
 11 the growth term is determined based on Toronto Hydro’s forecast of loads and
 12 customers for the 2021-2024 period,¹⁷ applied to 2020 proposed rates. This
 13 methodology is consistent with the OEB’s approved methodology in Toronto Hydro’s
 14 2015-2019 Rate Application, and results in a g-factor value of 0.2 percent. Calculation of
 15 the g factor is shown in Table 4, below.

16
 17 **Table 4: Forecast Revenue at 2020 Proposed Rates (\$ Millions)**

	2020	2021	2022	2023	2024	Annual Average
Revenue at 2020 Rates	796.8	797.8	799.8	801.6	804.8	
Annual Growth Rate		0.1%	0.2%	0.2%	0.4%	0.2%

18
 19 The above discussion sets out the variables that constitute Toronto Hydro’s proposed
 20 CPCI. The resulting CPCI value for a given year would, in keeping with IRM principles, be
 21 applied to all distribution rates from the previous year to determine the following year’s
 22 distribution rates.

¹⁵ Supra note 1 at page 18.

¹⁶ Supra note 1.

¹⁷ See Exhibit 3, Tab 1, Schedule 1, for Toronto Hydro’s forecast of loads and customers

1 To summarize, the CPCI is determined in the following fashion:

2

3

$$\text{CPCI} = I - X + C - g, \text{ or}$$

4

$$\text{CPCI} = I - X + C_n - (S_{\text{cap}} * I) - g$$

5

6 Where,

7

- “I” is the OEB’s inflation factor, determined annually;

8

- “X” is the sum of:

9

- The OEB’s productivity factor of 0.0 percent; and

10

- Toronto Hydro’s custom stretch factor, applied to both OM&A and capital expenditures;

11

- “C” is the difference between:

13

- C_n , a reflection of Toronto Hydro’s capital investment need, and

14

- $S_{\text{cap}} * I$, an offsetting adjustment required to ensure that the C-factor

15

provides funding only in excess of what is already provided for capital

16

through the inflation factor I;

17

- “g” is the growth factor determined by growth in distribution revenue due to changes in load and customers over the CPCI period.

18

19

20 Table 5, below, shows the components of the CPCI based on an assumed I-factor of 1.2

21

percent, the current OEB approved inflation value, the proposed stretch factor, the

22

forecast values of C_n and S_{cap} , and the g factor, shown in Tables 1 and 2, above.

1 **Table 5: CPCI Values Assuming an Inflation Factor of 1.2% for Each Year**

CPCI Component (%)	2021	2022	2023	2024
I	1.2	1.2	1.2	1.2
X – productivity	0.0	0.0	0.0	0.0
X – custom stretch	0.3	0.3	0.3	0.3
C _n	3.43	2.63	4.42	4.12
S _{cap}	71.9	72.5	73.5	74.3
g	0.2	0.2	0.2	0.2
CPCI	3.26	2.46	4.24	3.93

2

3 For comparison purposes, the CPCI values approved by the OEB in EB-2014-0116 are
4 shown in Table 6 below.¹⁸

5

6 **Table 6: CPCI Values approved in EB-2014-0116**

2016	2017	2018	2019
3.83	7.32	5.67	4.10

7

8 **4. OFF-RAMPS AND Z-FACTOR**

9 Toronto Hydro proposes to apply the OEB’s existing policy with respect to off-ramps.
10 The RRFE Report indicates that each rate-setting method includes a trigger mechanism
11 with an annual return on equity dead band of plus or minus 300 basis points, at which
12 point a regulatory review may be initiated. The OEB approved both a non-capital-
13 related Earnings Sharing Mechanism and a Capital Related Revenue Requirement
14 Variance Account in its EB-2014-0116 decision. Both of these mechanisms were
15 established to protect ratepayers over the term of the CIR period. Toronto Hydro
16 proposes to continue both of these mechanisms for the 2020-2024 period.

¹⁸ EB-2014-0116 Draft Rate Order Update, February 29, 2016, page 6.

1 Finally, the OEB affirmed in its EB-2014-0116 decision that Z-factor relief was available
2 to Toronto Hydro, if required, and based on the generic criteria for such applications.
3 Toronto Hydro relies on this affirmation for the 2020-2024 period, should the need
4 arise.

6 **4.1 Earnings Sharing Mechanism Calculation**

7 In its Decision and Order for Toronto Hydro’s 2015-2019 CIR application, the OEB
8 accepted the utility’s proposal for a symmetrical earnings sharing mechanism (“ESM”),
9 incorporating a 100 basis point dead band. As the OEB approved a separate Capital
10 Related Revenue Requirement Variance Account, it approved the ESM to track the
11 variance between the non-capital related revenue requirement embedded in rates and
12 the actual non-capital related revenue requirement. Non-capital revenue requirement
13 consists of OM&A expenditures and revenue offsets. Toronto Hydro determines
14 whether to track an amount in the ESM variance account by calculating the contribution
15 to ROE from the difference between actual and funded non-capital revenue
16 requirement items. This calculation and determination is performed annually.

18 *4.1.1 Calculation Methodology*

19 To determine the variance in ROE resulting from non-capital related revenue
20 requirement, Toronto Hydro uses an approach consistent with the OEB’s ROE Workform
21 – that is, ROE divided by deemed equity. Specifically, the utility calculates this as
22 follows:

$$24 \quad \frac{(\text{Actual non-capital revenue requirement}) - (\text{Funded non-capital revenue requirement})}{25 \quad \text{Actual equity on a deemed basis}}$$

/ C

- 1 The actual OM&A and revenue offset amounts included in the numerator are obtained
- 2 from Toronto Hydro's RRR filing.¹⁹ The funded amounts result from the base year
- 3 approved OM&A and revenue offsets, adjusted for inflation and productivity.

} / C

¹⁹ These amounts are adjusted, consistent with adjustments included the RRR ROE Workform and to make the actual results comparable to the amounts embedded in base rates.



Econometric Benchmarking of Historical and Projected Total Cost and Reliability Levels

Prepared at the Request of:

Toronto Hydro-Electric System Limited



Prepared by:

Power System Engineering, Inc.

July 16, 2018

Econometric Benchmarking of Historical and Projected Total Cost
and Reliability Levels

for

Toronto Hydro-Electric System Limited

Authors:

Steven A. Fenrick, M.S.

Erik S. Sonju, P.E.

Contact: Steve Fenrick

fenricks@powersystem.org

Direct: 608.268.3549

1532 W. Broadway

Madison, WI 53713

www.powersystem.org

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1 Executive Summary

On October 18, 2012 the Ontario Energy Board (the “Board”) released a report entitled “Renewed Regulatory Framework for Electricity Distributors: A Performance-Based Approach” (“RRF”). In the RRF, three rate-setting methods were discussed. One of those methods was labeled “custom incentive regulation,” or “Custom IR.” This report (the “2018 PSE Report”) uses econometric benchmarking to inform the Board’s decisions regarding Toronto Hydro-Electric System Limited (“Toronto Hydro”) and its Custom IR application

On page 18 of the RRF, the Board states that “[i]n the Custom IR method, rates are set based on a five-year forecast of a distributor’s revenue requirement and sales volumes.” The RRF also lays out the use of benchmarking as a key element to inform the Board of the reasonableness of the revenue forecasts.¹ The 2018 PSE report benchmarks Toronto Hydro’s historical and projected costs, using an econometric benchmarking method. The benchmarking results in this report can be used to evaluate the reasonableness of Toronto Hydro’s revenue forecasts and to inform the appropriate stretch factor in the Custom IR application. PSE’s benchmarking research for this application produces a recommended stretch factor of 0.3%.

In a November 21, 2013 Report of the Board, titled “Rate Setting Parameters and Benchmarking under the Renewed Regulatory Framework for Ontario’s Electricity Distributors” (“November 2013 Board Report”), the Board clearly indicates its preference for econometric benchmarking over peer group benchmarking.² Furthermore, the Board indicated its preference for total cost benchmarking over partial cost benchmarking when calibrating stretch factors.³ Therefore, Power System Engineering, Inc. utilizes econometric benchmarking of total costs in the current report.

PSE was involved in Toronto Hydro’s previous Custom IR application. On December 29, 2015 the Board issued a decision for Toronto Hydro regarding its prior Custom IR application (“2015 Board Decision”). The Board in its 2015 Board Decision addressed three key areas of differences between PSE’s 2015 benchmarking approach and the approach of the OEB staff expert. PSE has addressed these three key areas in the current research. Please see Section 3 of the present report for a detailed description of the three key areas identified in the 2015 Board Decision, and how PSE addresses each one in the current research.

¹ See “Table 1: Rate-Setting Overview – Elements of Three Methods,” on page 13 of the RRF.

² The November 2013 Report is in Case EB-2010-0379.

³ See page 19 of the November 2013 Board Report.

1.1 Purpose of the 2018 PSE Report

Power System Engineering, Inc. (“PSE”) was retained by Toronto Hydro for the purpose of providing a report in connection with the benchmarking of Toronto Hydro’s key operating parameters; in this case total costs and reliability. The benchmarking evaluation in this report is meant to objectively assess the reasonableness of the company’s historical and projected cost and reliability metrics using external, objective, publicly-available data. The report uses the econometric benchmarking approach to study the total cost and reliability performance of Toronto Hydro. It builds upon the benchmarking research in Toronto Hydro’s last Custom IR application and addresses the three key items discussed by the Board in the 2015 Board Decision.

PSE uses econometric benchmarking of total costs to evaluate the reasonableness of Toronto Hydro’s spending forecasts and provide a recommended stretch factor. We also benchmark reliability, because when presented with total cost benchmarking, reliability benchmarking presents a more complete picture of a utility’s performance.

1.2 Overview of PSE’s Benchmarking Process

PSE conducted an econometric total cost and reliability benchmarking study of Toronto Hydro. This study was done as part of Toronto Hydro’s 2020 Custom IR proposal. The purpose of PSE’s benchmarking analysis is to evaluate the reasonableness of Toronto Hydro’s historical and projected total cost amounts and system reliability metrics. This is done by comparing Toronto Hydro’s actual and projected values with the benchmarking model’s predicted values.⁴

The benchmarking analysis uses historical cost and reliability data from a dataset consisting of data from multiple utilities to create a model; this model relates cost and reliability to certain variables. The model is then used to predict Toronto Hydro’s “expected” (benchmarked) cost and reliability. The general approach of our cost benchmarking analysis is as follows:

1. PSE assembled the historical costs of all utilities in the dataset, along with the variables that affect cost, such as number of customers, peak demand, wage levels, forestation levels, etc.
2. Using the historical data, PSE estimated an econometric model that expresses the relationship between the variables and cost. This is a general model that applies to the dataset as a whole.
3. For each utility in the sample, we can then produce “benchmark” values for any given year.

⁴ In this paper we will use “forecasted” or “projected” costs and reliability to refer to Toronto Hydro’s estimates of those values in the future, and “predicted” or “expected” or “benchmark” costs and reliability to refer to the econometric model’s outputs for those metrics.

The benchmark values for any given utility are estimated by inserting the variable values for the specified utility into the model. In Toronto Hydro's case, the benchmarks represent the costs we would expect for an average-performing utility for a given year, with the same variable values faced by Toronto Hydro that year. In other words, the benchmark reflects the performance of a hypothetical average utility that faced Toronto Hydro's actual service territory and regional input price conditions for the given year.

4. We then compare the costs that are **expected** (predicted) for Toronto Hydro by the model to Toronto Hydro's **historical** and 2020 CIR **forecasted** costs. When we evaluate historical costs, we compare the model's expected historical costs for that utility, for that year, to the actual historical costs for that utility in that year. When we evaluate future costs, we compare the model's expected future costs for that utility for a given year to the forecasted costs for that utility for that year; this is done by putting projected values of variables (e.g. number of customers) into the model. The benchmarking process thus allows us to: (1) evaluate the historical cost performance, and (2) evaluate the reasonableness of forecasted costs.⁵

A process similar to the one described above can also be used to evaluate Toronto Hydro's past and future reliability metrics; the difference is that the model generated by Step 1 and Step 2 is an industry-wide reliability model (rather than a cost model); this reliability model expresses the relationship between the variables that affect reliability and the reliability metrics.

In PSE's 2015 Custom IR benchmarking research for Toronto Hydro, we created two total cost models, one using a combined Ontario and U.S. dataset, and a second model using a U.S.-only dataset. During that previous proceeding (EB-2014-0116), the OEB staff consultant (Pacific Economics Group, or "PEG") put forth their own results using a U.S.-only dataset. The ensuing discussion with stakeholders did not appear to take issue with the focus on a U.S.-only dataset to benchmark Toronto Hydro, nor was this mentioned as a key issue in the 2015 Board Decision. For these reasons, PSE's benchmarking dataset for the current research is primarily a U.S. dataset. However, PSE added six Ontario distributors to the dataset for the total cost benchmarking research. These six distributors are the only six in Ontario that contain a portion of their service territory that meets PSE's definition of "congested urban" areas; this definition is used in one of PSE's variables.⁶

⁵ Here "reasonableness" refers to how the forecasted costs compare to the model's expected costs for that utility.

⁶ The six Ontario distributors included in the total cost dataset, besides Toronto Hydro, are: Enersource Mississauga, Horizon Utilities, London Hydro, Kitchener-Wilmont Hydro, Hydro Ottawa, and EnWin. The utility data for Enersource Mississauga and Horizon Utilities are prior to the Alectra Utilities merger. See Section 2.3.4 for a discussion of the "congested urban" variable.

1.3 Total Cost Benchmark Findings

PSE compared Toronto Hydro’s historical and projected total costs against its benchmark costs. The benchmark costs are what the econometric model “expects” Toronto Hydro’s costs to be in any given year, based on the actual or projected values of variables for that year, such as input prices and number of retail customers. The econometric method is described in some detail below in this chapter, and in more detail in Chapter 2.

Total costs are defined as the sum of (1) OM&A expenses, and (2) the depreciation and opportunity costs of capital. This is similar to how revenue requirements are calculated, and so total costs are somewhat analogous to the distribution portion of revenue requirements.⁷ Partial cost benchmarking approaches, such as benchmarking of only OM&A expenses, exclude large categories of costs, which can skew performance evaluations. The Board prefers total cost benchmarking to partial cost benchmarking when determining appropriate stretch factors, as stated in the November 2013 Board Report.

PSE endorses econometric benchmarking because of its increased accuracy relative to peer group approaches. The econometric benchmarking method has many advantages, including:

- The ability to statistically test included variables and results;
- The ability to assess a relatively large number of variables in its analysis; and
- Econometric benchmarking does not require the researcher to choose a peer group or exclude large portions of the available data.

PSE used a total cost econometric benchmarking model to benchmark Toronto Hydro’s historical costs, and its proposed total costs during the Custom IR period (2020 to 2024). PSE first derived an econometric model from the historical dataset (using data from all utilities in the dataset). Using that model and its parameter values, we then calculated total cost benchmarks for Toronto Hydro for each year. For past years, we used Toronto Hydro’s historical variable values to calculate the benchmarks. For 2018 to 2024 benchmarks, we used Toronto Hydro’s projections for the variables that are in the model.

The result is a customized “benchmark” for each year, which can be thought of as the total costs we would expect from an average utility for that year, with those specific operating characteristics. The benchmark costs are then compared to the actual/proposed costs for each year. This process serves as a benchmark evaluation of the company’s historical and proposed total costs.

Our total cost econometric benchmarking results indicate the following findings.

⁷ Total costs are not exactly analogous to revenue requirements, however, because of the generalizations needed to offer a fair analysis between utilities with varying depreciation rates, rate of returns, historical capital addition patterns, and cost definitions.

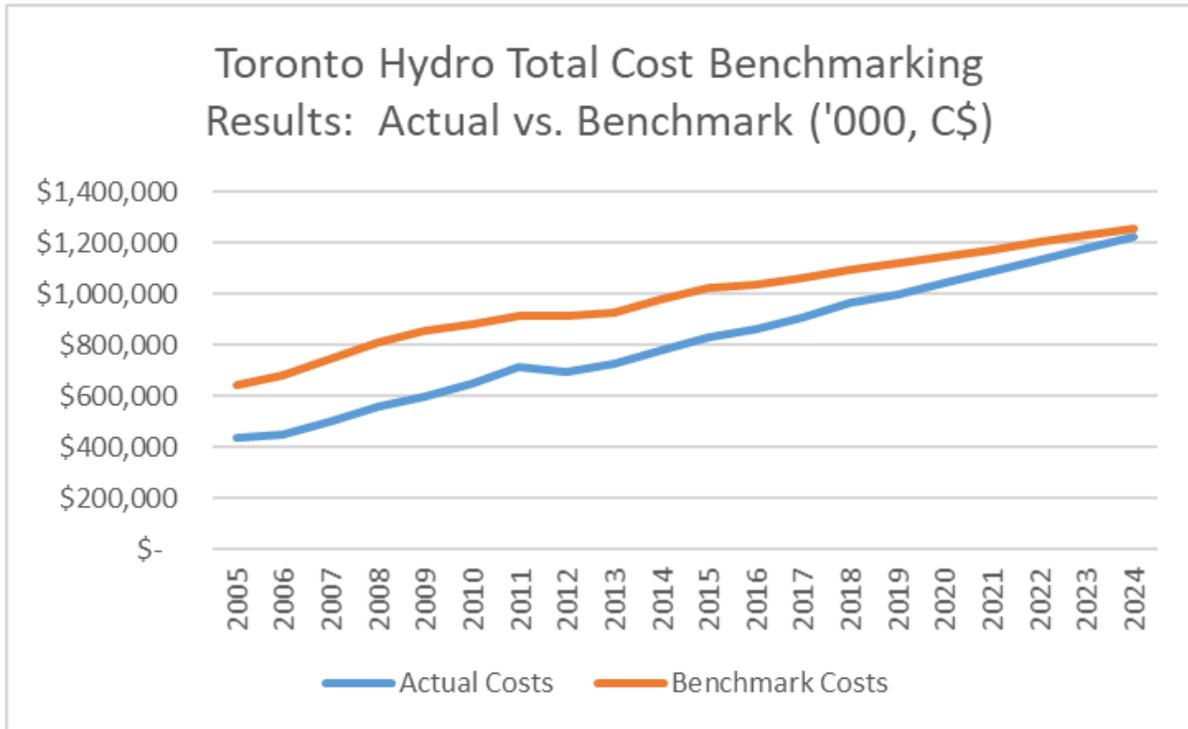
1. The historical average total cost levels of Toronto Hydro from 2015 to 2017 are 18.6% below benchmark expectations. Toronto Hydro total annual costs amounted to around \$157 million below benchmark values in 2017.
2. The projected total cost levels during the Custom IR period of 2020 to 2024 are 6.0% below benchmark expectations. At the company-proposed spending levels, Toronto Hydro's total annual costs are projected to still be around \$32 million below benchmark values in 2024.

The following table and graph illustrate the historical and projected benchmark costs and benchmark costs for Toronto Hydro, using an econometric model derived from a dataset consisting of 83 distributors from the U.S. and 6 distributors from Ontario.

Table 1 Toronto Hydro's Cost Performance 2005-2024

Year	Toronto Hydro Actual Costs ('000, C\$)	Toronto Hydro Benchmark Costs ('000, C\$)	% Difference (Logarithmic)
2005	\$ 436,128	\$ 641,275	-38.6%
2006	\$ 450,686	\$ 681,212	-41.3%
2007	\$ 502,433	\$ 744,486	-39.3%
2008	\$ 556,429	\$ 813,528	-38.0%
2009	\$ 595,932	\$ 852,775	-35.8%
2010	\$ 647,456	\$ 882,130	-30.9%
2011	\$ 710,544	\$ 912,729	-25.0%
2012	\$ 691,388	\$ 910,814	-27.6%
2013	\$ 727,152	\$ 925,488	-24.1%
2014	\$ 777,414	\$ 976,095	-22.8%
2015	\$ 826,886	\$ 1,024,030	-21.4%
2016	\$ 861,394	\$ 1,034,492	-18.3%
2017	\$ 904,560	\$ 1,061,642	-16.0%
<i>2018 (projected)</i>	\$ 964,885	\$ 1,095,430	-12.7%
<i>2019 (projected)</i>	\$ 999,492	\$ 1,122,407	-11.6%
<i>2020 (projected)</i>	\$ 1,044,567	\$ 1,148,601	-9.5%
<i>2021 (projected)</i>	\$ 1,085,324	\$ 1,174,549	-7.9%
<i>2022 (projected)</i>	\$ 1,134,689	\$ 1,201,662	-5.7%
<i>2023 (projected)</i>	\$ 1,180,820	\$ 1,229,463	-4.0%
<i>2024 (projected)</i>	\$ 1,225,282	\$ 1,257,907	-2.6%
Average	%		
Difference			
2015-2017			-18.6%
2020-2024			-6.0%

Figure 1 Toronto Hydro’s Cost Performance 2005-2024



1.4 Reliability Benchmark Findings

In addition to total cost benchmarking, PSE conducted econometric reliability benchmarking of Toronto Hydro’s system average interruption frequency index (“SAIFI”) and the customer average interruption duration index (“CAIDI”). When presented with cost benchmarking, reliability benchmarking presents a more complete picture of a company’s performance, since in general, lower total costs can come at the expense of reliability. Both indexes exclude major event days (“MEDs”) from the calculation of the metrics, which permits them to gauge reliability performance during normal operating conditions.⁸ SAIFI measures how many outages an average customer experiences, whereas CAIDI measures the average duration of those outages. This separates the evaluation into examining how often the system fails (SAIFI) and the length of the company’s restoration time when the system fails (CAIDI).⁹

⁸ This differed from the 2015 CIR reliability benchmarking research, where we included MEDs. The reason for including MEDs in the prior research was that MED exclusion information was not yet available for the Ontario distributors and we included Ontario distributors in the combined dataset. For the 2020 research, we decided to focus on the U.S.-only sample for the current reliability research, because of the limited MED excluded data for Ontario. This allowed us to exclude MEDs and provide a benchmark analysis that excludes the large variations that result from severe weather events.

⁹ Our 2015 CIR research examined SAIFI and SAIDI. However, since SAIDI is the product of SAIFI and CAIDI, the SAIDI index includes both the system failure and the restoration time in the index. Separating the two evaluations

PSE gathered U.S. data for the reliability indexes from annual regulatory filings and the EIA-861 form.¹⁰

PSE's reliability benchmarking analysis resulted in the following findings.

1. Historical SAIFI metrics for Toronto Hydro are considerably higher than the benchmark values.
2. Projected SAIFI metrics remain higher than the benchmarks.
3. Historical CAIDI metrics for Toronto Hydro are considerably lower than the benchmark values.
4. Projected CAIDI metrics for Toronto Hydro continue to be lower than the benchmark values.

The following table and graph illustrate the historical and projected SAIFI values for Toronto Hydro as compared to benchmark values, using a dataset consisting of 73 U.S. distributors.¹¹

provides a cleaner look at how often the grid fails and how long it takes to restore electricity when it does fail.

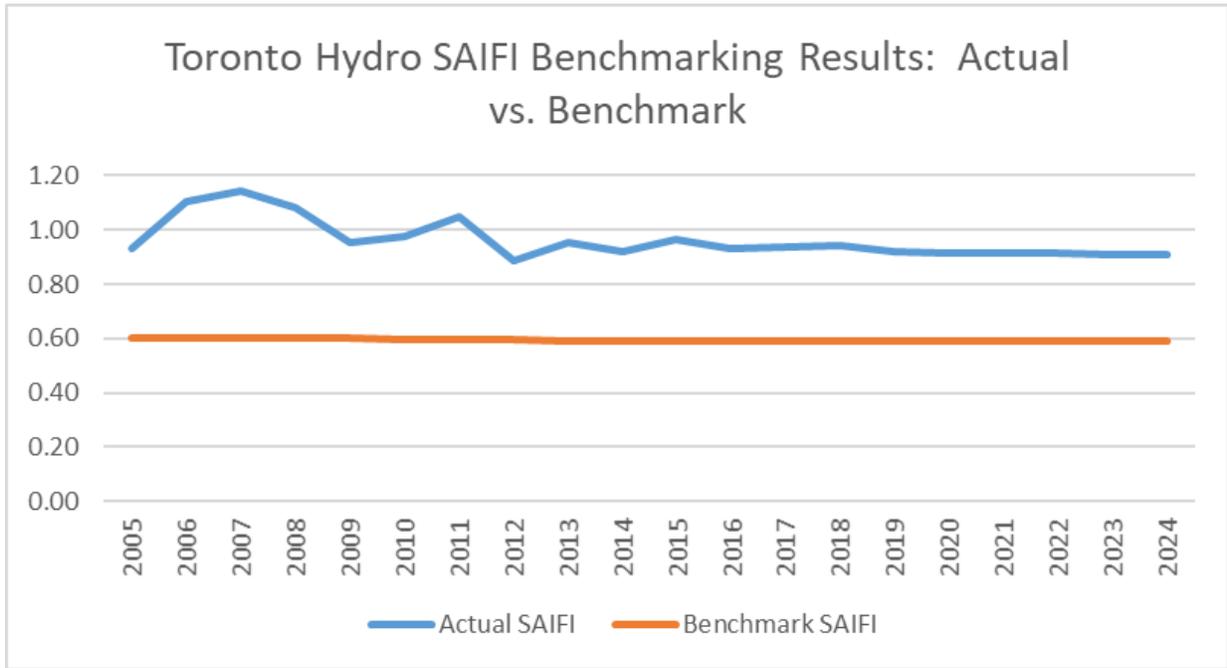
¹⁰ Beginning in 2013, US utilities were required to file reliability data to the Energy Information Administration (EIA). This data is compiled in the EIA-861 form.

¹¹ The reliability sample is smaller than the total cost sample for two reasons: (1) Ontario distributors were not included (because data was not available in some cases and MED exclusion information was not available in other cases), and (2) Some of the U.S. utilities had missing or implausible reliability data, and so were left out of the dataset.

Table 2 Toronto Hydro's SAIFI Performance 2005-2024

Year	Toronto Hydro Actual SAIFI	Toronto Hydro Benchmark SAIFI	% Difference (Logarithmic)
2005	0.93	0.60	43.7%
2006	1.11	0.60	61.2%
2007	1.14	0.60	63.9%
2008	1.08	0.60	58.8%
2009	0.95	0.60	46.4%
2010	0.98	0.60	48.9%
2011	1.05	0.60	56.7%
2012	0.88	0.59	39.8%
2013	0.95	0.59	47.5%
2014	0.92	0.59	44.5%
2015	0.97	0.59	49.7%
2016	0.93	0.59	45.7%
2017	0.94	0.59	46.3%
<i>2018 (projected)</i>	0.94	0.59	46.7%
<i>2019 (projected)</i>	0.92	0.59	44.3%
<i>2020 (projected)</i>	0.92	0.59	44.0%
<i>2021 (projected)</i>	0.91	0.59	43.8%
<i>2022 (projected)</i>	0.91	0.59	43.6%
<i>2023 (projected)</i>	0.91	0.59	43.5%
<i>2024 (projected)</i>	0.91	0.59	43.5%
Average % Difference			
2015-2017			47.2%
2020-2024			43.7%

Figure 2 Toronto Hydro's SAIFI Performance 2005-2024

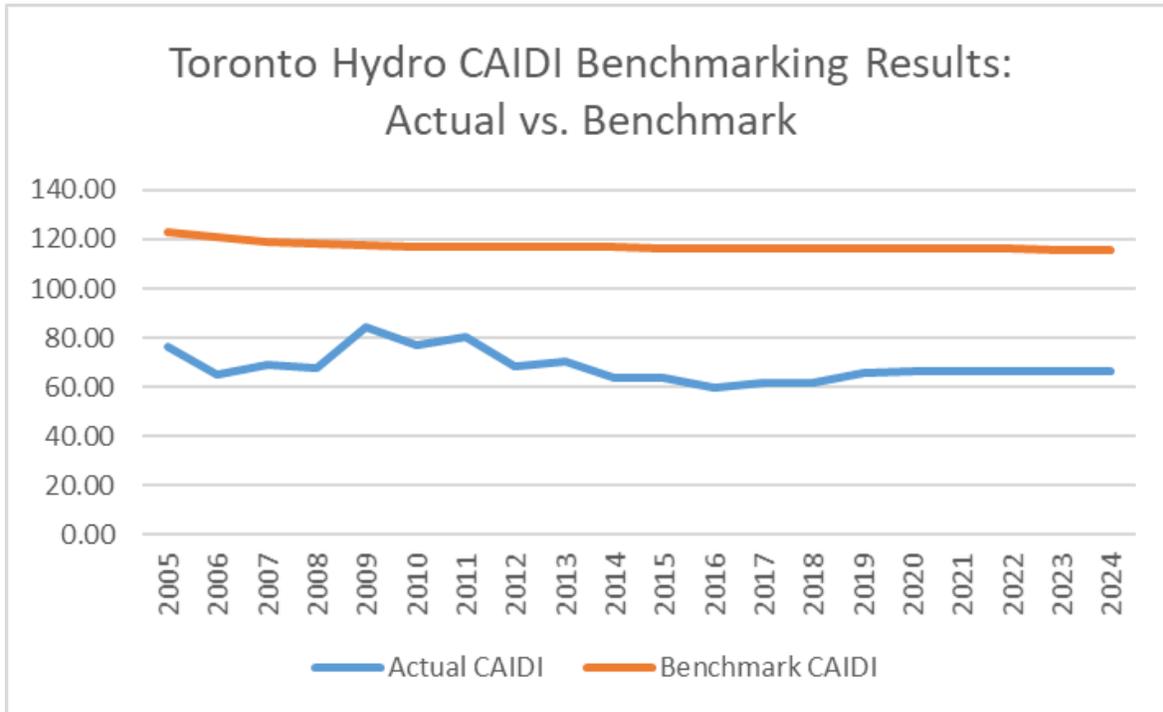


The following table and graph illustrates the historical and projected CAIDI values for Toronto Hydro against the benchmarked values.

Table 3 Toronto Hydro's CAIDI Performance 2005-2024

Year	Toronto Hydro Actual CAIDI	Toronto Hydro Benchmark CAIDI	% Difference (Logarithmic)
2005	76.59	122.67	-47.1%
2006	64.98	121.06	-62.2%
2007	69.12	119.21	-54.5%
2008	67.40	118.13	-56.1%
2009	84.13	117.47	-33.4%
2010	77.30	117.27	-41.7%
2011	80.13	117.12	-38.0%
2012	68.06	116.97	-54.2%
2013	70.61	116.84	-50.4%
2014	63.76	116.67	-60.4%
2015	64.04	116.48	-59.8%
2016	59.71	116.40	-66.8%
2017	61.54	116.26	-63.6%
<i>2018 (projected)</i>	61.96	116.21	-62.9%
<i>2019 (projected)</i>	65.96	116.16	-56.6%
<i>2020 (projected)</i>	66.10	116.11	-56.3%
<i>2021 (projected)</i>	66.21	116.06	-56.1%
<i>2022 (projected)</i>	66.34	116.01	-55.9%
<i>2023 (projected)</i>	66.51	115.95	-55.6%
<i>2024 (projected)</i>	66.64	115.90	-55.3%
Average % Difference			
2015-2017			-63.4%
2020-2024			-55.9%

Figure 3 Toronto Hydro’s CAIDI Performance 2005-2024



1.5 Custom IR Conclusions

PSE’s benchmark research leads us to the following conclusions relating to the company’s Custom IR proposal:

1. **The PSE recommended stretch factor for Toronto Hydro’s CIR is 0.3%.** This is grounded in the precedent of the 4GIR Decision, where distributors with total cost benchmark scores between plus/minus 10% are given the middle stretch factor of 0.3%. While a moderate stretch factor that requires Toronto Hydro to exceed the industry productivity expectation may be appropriate, the company should certainly not receive the most extreme stretch factor of 0.6%, which should be reserved for the poorest total cost performers. Based on PSE’s results, Toronto Hydro is certainly not a poor total cost performer when an appropriate dataset is used in the benchmark analysis, with variables

that accurately account for Toronto Hydro's highly congested urban characteristics. The 4GIR decision and a 0.3% stretch factor align with the following results:

- a. Toronto Hydro is entering the Custom IR period with total costs below benchmark values by 16.0% in 2017. The most recent 3-year average from 2015 to 2017 shows Toronto Hydro's costs are 18.6% below benchmark expectations.
 - b. Toronto Hydro's Custom IR period (2020 through 2024) total cost level projections remain within the 0.3% stretch factor threshold of +/- 10% during the CIR years. The 2020 to 2024 average benchmarking score is -6.0%.
2. **The Custom IR proposed spending levels of Toronto Hydro continue the better-than-expected cost performance of Toronto Hydro (i.e., proposed costs are lower than expected).** If actual spending comes in at the proposed spending levels, Toronto Hydro's total annual costs are projected to be approximately \$32 million below benchmark values in 2024.
 3. **Toronto Hydro's capital infrastructure seems to be producing a higher than expected number of outages.** The company's SAIFI for their 2015-2017 average is 47.2% above benchmark expectations. This implies Toronto Hydro customers experience 47.2% more outages than our models predict.
 4. **Toronto Hydro's response to outages, measured by CAIDI, is faster than expected.** The company's 2015-2017 average is 63.4% below benchmark expectations. This implies that Toronto Hydro customers experience 63.4% shorter outage minutes per outage event than our models predict.

2 Total Cost Benchmarking Model: Dataset, Model Details, Variables

The benchmarking approach used in this report is the econometric approach. This is the most accurate and fair method to use when comparing utility cost and reliability levels. It is also the method preferred by the Board in the 4GIR Decision.

The econometric approach explicitly adjusts for differences in utilities' service territories. In the power distribution industry, simple comparisons of "raw" or unadjusted costs or reliability indexes do not result in appropriate performance comparisons. Uncontrollable factors, such as service territory characteristics and/or regional input prices, influence total costs. Therefore, more sophisticated tools that normalize for specific influencing factors must be employed to accurately assess performance. Otherwise, a utility could be rewarded (or punished) for simply having a favorable (or unfavorable) service territory or regional input price level. With this concept in mind, PSE has developed an econometric benchmarking model that considers factors that have proven to be statistically influential on distribution utility costs.

The econometric benchmarking approach relies on comparing actual data values to the predicted values obtained from the econometric models. The predicted or expected values obtained from the model represent the values we would expect from that utility for a given year, considering the specific operating characteristics faced by that utility that year (e.g., input prices, business condition variables, etc.).

To create an econometric benchmark, the researcher determines an appropriate functional form (a model) for the relationship between the studied metric and factors (variables) that influence it. This is done by using appropriate econometric methods to obtain parameter estimates for each variable of the specified model. The model is based on a particular dataset (in this case, a U.S. sample plus seven Ontario distributors including Toronto Hydro), and quantifies the relationship between the studied metric (total costs) and the variables that drive that metric (input prices, business condition variables, etc.).¹²

A more detailed description of the econometric method is given in Chapter 2.4 below.

2.1 Summary of Dataset

The data for the utilities used in the study were acquired from publicly available data sources.

¹² The model for reliability does not include the six Ontario utilities due to the limited data availability of reliability metrics with MEDs excluded.

There are 83 U.S. utilities in the sample for the cost model, plus seven Ontario distributors (including Toronto Hydro). The observations for the U.S. sample span the years 2002 to 2016. The observations for the Ontario distributors span the years 2005 to 2016.¹³ Eight data points fall outside that range: Toronto Hydro’s projected data from 2017-2024. The total number of observations in the dataset is 1,318.¹⁴ Observations were excluded if key data (cost or outputs) were missing or implausible. Additional exclusions were made due to mergers, or where there was missing or implausible explanatory variable data. The large number of observations is more than sufficient for the creation of a statistically robust econometric model.

Ontario distributors were added if a portion of their service territory was classified as “congested urban” (see Section 2.3.4). This added six Ontario distributors to the sample. No other Ontario distributors have been identified as containing “congested urban” service territory.

2.2 Summary of Variables

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.

The output variables used in the total cost econometric benchmarking research are:

- Retail customers, and
- Maximum peak demand.

The business condition variables used in the total cost econometric benchmarking research are:

- Regional input prices;
- Percent electric customers (out of total gas and electric customers);
- Standard deviation of the elevation within the territory;
- Forestation of the service territory;
- Percent service territory classified as congested urban;
- Percent smart meters deployed on system;
- Percent distribution plant that is underground;
- Percent distribution plant that is underground multiplied by the congested urban variable;
- An Ontario binary variable indicating whether the distributor operates in Ontario or the

¹³ 2005 is the first available year of Uniform System of Account data for the Ontario distributors.

¹⁴ These total observations and the reported total cost model include Toronto Hydro’s observations. However, when constructing the Toronto Hydro benchmarks, the company’s observations are excluded from the modeling dataset to assure the benchmark is external to Toronto Hydro.

- U.S.; and
- A time trend variable

2.3 Details of the Total Cost Model

2.3.1 The Definition of “Costs”

Both OM&A and total costs used in the benchmarking models for the U.S. distributors are derived using FERC Form 1 filing data.¹⁵ United States investor-owned utilities (“IOUs”) 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, generation, customer billing, administrative and general). The Form 1 also includes plant in service and accumulated depreciation information that is used in constructing capital costs.

The Ontario utilities use the Reporting and Record Keeping Requirements (“RRR”) rules for data in formulating the OM&A and total costs; these costs were used in the benchmarking models. Trial balance data for 2005 to 2016 was requested and sent from the Ontario Energy Board; this data enabled a consistent OM&A series in each year of the sample for the Ontario distributors, Toronto Hydro, and the U.S. sample.

PSE used a definition of “cost” for Toronto Hydro and the Ontario distributors that allowed us to achieve comparability with the definition used for the U.S. sample. PSE began with the benchmark-based cost definition used by the Board Staff’s consultant (PEG) in the 4th Generation Incentive Regulation proceeding. PSE then added Toronto Hydro’s high-voltage expenses to the company’s cost definition. The FERC Form 1 does not break down high- versus low-voltage distribution expenses like Ontario reporting does. For that reason, Toronto Hydro’s and the Ontario distributors’ high-voltage expenses have been added to make costs comparable. For the same reasons, contributions in aid of construction (“CIAC”) have been excluded from both Toronto Hydro’s and the other six Ontario distributors’ cost definition, due to those expenses not being included in the U.S. Form 1 data. Bad debt expenses have been excluded for all utilities, to match the 4GIR benchmark-based definition.

Pension and benefit costs have remained in the cost definition, because these costs appear to not be accurately disaggregated for the Ontario distributors.¹⁶ If we excluded pension and benefit costs, this would likely create an inconsistent treatment between the U.S. and Ontario distributors.

¹⁵ All FERC data was downloaded by PSE from SNL Energy’s database tool.

¹⁶ In the trial balance data, numerous distributors report zero pensions and benefits in accounts 5645 and 5646 (or if not zero, then implausibly low values). For example, in 2016 Enersource reports \$62,510 spent on pensions and benefits.

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 the Ontario distributors; this issue was one of the key areas discussed by the Board in the 2015 Board Decision. We further discuss excluding CSI expenses in Chapter 3. The table below summarizes the cost definition treatment.

Table 4 Cost Definitions

Cost Element	Treatment
4th Generation IR Benchmark-Based Costs	Used this as a starting point for the cost definition
CIAC	Not included in Toronto Hydro costs or the Ontario distributor costs, since U.S. cost data does not include CIAC
High Voltage Expenses	Added to Toronto Hydro and the Ontario distributor costs, since U.S. cost data includes distribution high voltage costs
Customer Service and Information (CSI) Expenses	Excluded CSI expenses for all utilities, since there is a possibility that CDM expenses are included in the U.S. utility CSI expense category. This exclusion assures consistency in the cost definition and addresses one of the Board’s key issues from the 2015 Decision.

2.3.2 Output Variables

The total cost model includes two output variables. The first is the total number of customers served, the second is the maximum peak demand for each utility since 2002. For U.S. utilities, the output variables are calculated from FERC Form 1s gathered from SNL Energy’s dataset.¹⁷ For the Ontario distributors, the output variables are from the RRR data. The forecasted output data for Toronto Hydro was provided to PSE by the company.

2.3.3 Business Condition Variables: Input Prices

The majority of the business condition variables are discussed in the following section (2.3.4). 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 (using the perpetual inventory capital cost method) is discussed in detail later. The OM&A input price captures the regional market price level that each sampled company encounters when

¹⁷ For the U.S. utilities, an adjustment was made to the peak demands reported in their FERC Form 1s, due to required “sales for resale” loads being included in the reported system peak demands. PSE adjusted the reported peak demands by the ratio of (retail sales) to (retail sales plus required sales for resale).

procuring OM&A inputs, such as employees or materials and services. There are two components used to construct the OM&A input price: labour and non-labour.

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 of wage levels for each job occupation by city and metropolitan area. For Toronto Hydro and the other six Ontario distributors, we gathered occupation wage estimates from the 2011 Canadian census, using wage data for the city they serve, translated job occupations to match their U.S. counterparts, and then weighted the job occupation wages by the BLS estimates.¹⁸ This provides consistency between the U.S. and Ontario distributors regarding labour input prices and puts the input price in terms of each country’s currency.

The non-labour component of the OM&A input price uses the gross domestic product price index (“GDP-PI”) for the U.S. utilities. The Ontario non-labour component uses the same GDP-PI in each year, but adjusted for the purchasing power parity (“PPP”) index. This translates the non-labour input price component into Canadian dollars.

To construct the overall OM&A input price, we weighted each index using a 70% labour and a 30% non-labour rate. This was the same weighting used in the 4GIR TFP and benchmarking research. Using the capital and OM&A cost shares, PSE calculated a 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 purchases (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.

2.3.4 Business Condition Variables: Other

There are eight business condition variables aside from input prices, plus a time trend variable. 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

¹⁸ For Enersource Mississauga, PSE used City of Toronto data to formulate the wage level, since no data was available specifically for Mississauga.

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 and the six Ontario distributors, since they do not serve natural gas customers.

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.

The **percentage of forestation** variable is based on GIS land cover maps. PSE 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 forestation, the higher OM&A costs required for right-of-way clearing and service restoration activities. GIS variable data is available for all sampled U.S. utilities and for Toronto Hydro and the six Ontario distributors.

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 is constructed using a combination of the following factors:

- Engineering knowledge of the physical constraints necessitating a complex and costly subterranean civil infrastructure,
- Classification of geographical areas developed from aerial imagery of urban areas with populations over 200,000, and
- GIS analysis of area classifications within a utility service territory.

The variable measures the percentage of service territory classified as congested urban area.

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 territory. Likewise, we expect that the amount (or percentage) of congested urban area within a utility service territory has a variable impact on this incremental cost. The parameter value for this variable is expected to be positive, indicating a positive correlation of percent congested urban with total costs. Please see the Appendix for detailed maps used for the calculation.

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 electricity rates (TOU) that can create efficiencies for power suppliers. Since this study is focused on distribution total costs, we would expect a positive coefficient on the percent smart meter variable.

The **percent underground** variable measures the percentage of gross distribution plant in service that is underground. The variable has two possible impacts on total costs. The first is that underground lines have typically higher upfront costs than their overhead counterparts. Higher capital costs are especially large in urban settings. However, underground lines will also tend to lower OM&A expenses, due to lower exposure to environmental events and elements.

The **percent underground multiplied by congested urban variable** provides the interaction between the percent underground variable and the congested urban variable. Constructing underground lines in urban settings is far more costly than in more rural settings. For example, underground lines in rural settings can be “direct buried” without the need for concrete-enclosed banks and other capital infrastructure. We would expect a positive coefficient on the variable.

The **Ontario binary variable** measures the estimated cost differences between operating in Ontario versus the U.S. The variable is set equal to “1” if the utility operates in Ontario and “0” if the utility operates in the States. This variable adjusts for regulatory and other differences that may impact distribution costs between the two countries.

The **time trend** variable captures a general industry total cost level trend over the studied period. The time trend could reflect industry trends or influences that are not captured by the current variables (or perhaps even not captured by any possible variables). Time trend variables are often found in translog cost functions and econometric total cost benchmarking research. A similar variable was included in the 4GIR benchmarking models.

2.3.5 Projected Variable Values

For the years 2018-2024, projected values were used for Toronto Hydro’s variables.

Input prices are calculated using the same procedures as the historical data, but with inflation projections. Input prices are divided into two categories: capital and OM&A. There are two components used to construct the OM&A input price: labour and non-labour. The non-labour OM&A component is based on the Conference Board of Canada’s projections for the GDP-IPI as of April 2018. The projections range from 2.34% in 2018 to 1.99% in 2022 (we used the 2022 growth rate for 2023 and 2024). The labour component uses the Conference Board of Canada’s

projections for average weekly earnings in Ontario. This ranges from 3.71% in 2018 to 2.49% in 2022 (we again used the 2022 growth rate for 2023 and 2024). The capital category is set to increase using the Conference Board of Canada's projections for Engineering Structures, Electric power generation, transmission, and distribution. This ranges from annual growth rates of 2.69% in 2018 to 2.18% in 2022, with 2.18% serving as the basis for the 2023 and 2024 growth rate.

The plant additions for 2018-2024 are based on Toronto Hydro projections. OM&A cost projections are set based on Toronto Hydro projections for 2018, 2019, and 2020 and then escalated following the inflation factor formula proposed by Toronto Hydro. This equals 1.82% growth per year from the 2020 value. This 1.82% projection is based on an assumed weighting of 30% labour and 70% non-labour within OM&A, using the Conference Board of Canada's projections for Average Weekly Earnings in Ontario (labour component) and their GDP-IPI projections (non-labour component) in 2021. This OM&A inflation value is 2.12%; then we subtract the X factor and stretch factor, which are set at 0.0% and 0.3%, respectively.

The projections for the other variables in the model are given below.

- **Retail customers** projections for 2018 to 2024 were given to PSE by Toronto Hydro.
- **Maximum peak demand** projections for 2018 to 2024 were given to PSE by Toronto Hydro.
- The **percentage of electric customers** is set to stay at 100% for Toronto Hydro.
- The **standard deviation of elevation** is set to stay at the historical value.
- The **percentage of forestation** variable is set to stay at the historical value.
- The **percent congested urban** variable is at the historical value of congested urban areas for Toronto Hydro.
- The **percent smart meter** variable uses the AMI meter projections provided to PSE by Toronto Hydro.
- The **percentage underground** variable is set at the historical value.
- The **percentage underground multiplied by the congested urban** variable is set at the historical value.
- The **time trend** variable continues to increase by one every year into the forecasted years.

2.3.6 2020 CIR Total Cost Variables Compared to 2015 CIR Total Cost Variables

The variables included in the present total cost model are similar to the variables used in PSE's 2015 CIR total cost research. The primary differences between the model variables in the present report and the 2015 CIR U.S. total cost model (discussed in Section 3) are as follows:

1. The 2015 CIR research used an "urban core" binary variable, whereas the present research instead uses a "congested urban" continuous variable.
2. The 2015 CIR research defined the maximum peak demand variable in terms of the peak demand for any given year, i.e. the peak demand changed every year. In contrast, the present research defines the maximum peak demand variable in terms of the peak demand since 2002, i.e. the highest demand level in the range applies to every subsequent year. The latter method is a better measure of the capacity level required for a utility to build its system to meet the historic maximum demand.
3. Three new variables have been constructed and included in the 2020 CIR research:
 - (i) The percentage of smart meters;
 - (ii) The percent of plant underground, multiplied by the new "congested urban" variable; and
 - (iii) An Ontario binary variable.

These variables capture the costs of adding smart meters, undergrounding in urban areas, and providing service in a different country than the majority of the sample, all of which are significant cost drivers.

4. Two variables that were used in the 2015 CIR total cost research have been dropped. These variables are:
 - (i) The percent residential deliveries out of total deliveries, and
 - (ii) The percentage of distribution plant out of total electric plant.

The "percentage of distribution plant out of total electric plant" variable was dropped due to its incorrect coefficient sign.¹⁹ The "percent residential deliveries out of total deliveries" variable was dropped because PSE could not identify the logical connection between total costs and percent residential deliveries served, as separate from the maximum peak demand variable. The "percent residential deliveries" variable would make sense as a proxy for load factor if the output variable were based on deliveries (rather than peak demand). However, since we are using an output variable that directly measures maximum

¹⁹ The coefficient in the model is negative, whereas we would expect the coefficient to be positive, due to the expected economies of scope in providing more than just electric distribution service.

peak demand in the model, there is no valid reason to include the “percentage of residential deliveries” variable in the total cost model.

2.3.7 Perpetual Inventory Capital Cost Method

This report evaluates Toronto Hydro’s capital costs as a component of the total cost definition. PSE’s measure of capital cost is based on a service price approach. This approach has a solid basis in economic theory, and is the same method chosen by PEG in their 4th Generation IR research.²⁰ It allows for a clear-cut and standardized way to account for differences between utilities with respect to historical plant additions. The service price approach also has ample precedent in government-sponsored cost research. It is used by the Bureau of Labor Statistics of the U.S. Department of Labor in computing multi-factor productivity indexes for the U.S. private business sector and for several subsectors, including the utility services industry.

Based on this approach, the cost of capital in each period t is the product of indices of the capital service price and capital quantity in place at the end of the prior period. The formula for this is given by:

$$CK_t = WKS_t \cdot XK_{t-1}$$

Here, in each period t , 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 at the start of the period.

The capital quantity index is constructed using inflation-adjusted data on the value of net utility plant in a benchmark year, and on gross plant additions in subsequent years. It also uses an assumption about service lives. We use 1989 as the benchmark year in the current study for all U.S. utilities. We use 2002 as the benchmark year for Toronto Hydro because this is the earliest available year to begin the capital series. We use 2002 as the benchmark year for the six Ontario distributors to match the Toronto Hydro benchmark year and to avoid making imputations on the capital additions for years prior to 2002.

Based on the benchmark year, a “triangulated weighted average” (“TWA”) is used to calculate the capital stock in 2002. Subsequent years use the previous year’s capital stock and escalate it by plant additions minus depreciation. This method is used both for Toronto Hydro, the six Ontario distributors, and U.S. distributors. The formulas for the capital quantity index in 2002 and in subsequent years are provided below.²¹

²⁰ See Hall and Jorgensen (1967) for a discussion of the use of service price methods for measuring capital cost.

²¹ For the U.S. utilities, the beginning year is 1989 instead of 2002.

$$XK_{2002}^i = \frac{Net\ Plant_{2002}^i}{TWA_{2002}^i}$$

$$XK_t^i = XK_{t-1}^i * d + \frac{Add_t^i}{WKA_t^i}$$

Under the service price approach employed in this study, capital cost 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. We use the same value as was used in 4GIR (4.59%) for this parameter in the study.

The variable that the capital service price components have in common is WKA_t . This is an index of the price of capital assets used in power distribution. We compute this index using data on differences in the cost of constructing utility plant between regions, and within regions over time. In particular, for U.S. distributors we use the Handy-Whitman indexes for total power distribution plant, which vary over time and across six geographic regions. For Toronto Hydro and the six Ontario distributors, we used the Handy-Whitman index for the North Atlantic region.

We determine the relative levels of utility plant asset prices for 2012 by using the City Cost Indexes for electrical work in RSMeans' *Heavy Construction Cost Data*. These indexes 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. The level of the asset price index for each utility is the simple average of the RSMeans index values for cities in the service territory. This same source is used for the U.S., the six Ontario distributors, and Toronto Hydro.²² The index is already adjusted for currency differences between the two countries.

²² For the Enersource Mississauga observation, we used the City of Toronto to set the level of the asset price index, since Mississauga is not included in the RSMeans data.

2.3.8 Total Cost Sample

There are 90 utilities included in the total cost sample (this number includes Toronto Hydro). A diverse dataset including utilities with varying operational conditions is necessary to determine the influence on costs resulting from those conditions. There are many U.S. utilities in the PSE dataset which are larger than Toronto Hydro, and many that are smaller than Toronto Hydro. The utilities are listed in the following table, along with their 2016 number of customers.

Table 5 Total Cost Sample

Company Name	Number of Customers (2016)	Company Name	Number of Customers (2016)
Alabama Power Company	1,468,744	London Hydro	155,496
ALLETE (Minnesota Power)	145,622	Louisville Gas and Electric Company	404,744
Appalachian Power Company	956,718	Madison Gas and Electric Company	150,491
Arizona Public Service Company	1,193,511	MDU Resources Group, Inc.	142,948
Atlantic City Electric Company	548,442	Metropolitan Edison Company	562,850
Avista Corporation	374,507	Mississippi Power Company	187,553
Baltimore Gas and Electric Company	1,268,995	Monongahela Power Company	389,759
Black Hills Power, Inc.	71,081	Nevada Power Company	903,198
Central Hudson Gas & Electric Corporation	261,411	New York State Electric & Gas Corporation	890,260
Central Maine Power Company	619,312	Niagara Mohawk Power Corporation	1,323,415
Cleco Power LLC	288,013	Northern Indiana Public Service Company	464,146
Cleveland Electric Illuminating Company	747,748	Northern States Power Company - MN	1,454,285
Commonwealth Edison Company	3,953,907	Northern States Power Company - WI	256,540
Connecticut Light and Power Company	1,238,337	Ohio Edison Company	1,041,123
Consolidated Edison Company of New York,	3,420,121	Oklahoma Gas and Electric Company	830,057
Consumers Energy Company	1,804,630	Orange and Rockland Utilities, Inc.	229,533
Delmarva Power & Light Company	516,709	Pacific Gas and Electric Company	5,428,390
DTE Electric Company	2,169,416	PECO Energy Company	1,613,041
Duke Energy Carolinas, LLC	2,519,317	Pennsylvania Electric Company	587,251
Duke Energy Florida, LLC	1,743,136	Pennsylvania Power Company	164,285
Duke Energy Indiana, LLC	812,986	Portland General Electric Company	859,396
Duke Energy Kentucky, Inc.	140,014	Potomac Electric Power Company	848,171
Duke Energy Ohio, Inc.	706,793	PPL Electric Utilities Corporation	1,426,676
Duke Energy Progress, LLC	1,526,422	Public Service Company of Colorado	1,441,982
Duquesne Light Company	587,954	Public Service Company of New Hampshire	507,998
El Paso Electric Company	408,504	Public Service Company of Oklahoma	547,142
Empire District Electric Company	170,529	Public Service Electric and Gas Company	2,227,065
Enersource Mississauga	204,728	Puget Sound Energy, Inc.	1,119,711
Entergy Arkansas, Inc.	706,879	San Diego Gas & Electric Co.	1,425,132
Entergy Mississippi, Inc.	446,654	South Carolina Electric & Gas Co.	705,025
Entergy New Orleans, Inc.	198,416	Southern California Edison Company	5,049,192
EnWin	87,901	Southern Indiana Gas and Electric Company, Inc.	148,429
Florida Power & Light Company	4,840,266	Southwestern Public Service Company	389,483
Gulf Power Company	453,136	Tampa Electric Company	730,503
Horizon Utilities	244,114	Toronto Hydro	761,920
Hydro Ottawa	327,880	Toledo Edison Company	309,060
Idaho Power Co.	529,901	Tucson Electric Power Company	419,845
Indiana Michigan Power Company	589,041	Union Electric Company	1,208,934
Indianapolis Power & Light Company	486,827	United Illuminating Company	332,381
Jersey Central Power & Light Company	1,113,459	Virginia Electric and Power Company	2,550,018
Kansas City Power & Light Company	531,630	West Penn Power Company	723,352
Kansas Gas and Electric Company	325,932	Western Massachusetts Electric Company	209,939
Kentucky Power Company	168,848	Wisconsin Electric Power Company	1,142,983
Kentucky Utilities Company	547,069	Wisconsin Power and Light Company	466,052
Kitchener-Wilmont Hydro	94,058	Wisconsin Public Service Corporation	449,877

2.4 Econometric Method (Detailed)

The benchmarking approach used in this report is the econometric approach. PSE believes this is the most accurate and fair method to use when comparing utility cost and reliability levels. It is also the method preferred by the Board in the 4GIR Decision.

The econometric approach explicitly adjusts for differences in utilities' service territories. In the power distribution industry, simple comparisons of costs or reliability indexes do not result in appropriate comparisons when evaluating performance. Uncontrollable factors such as service territory characteristics influence total costs. Therefore, more sophisticated tools that normalize for specific influencing factors must be employed to accurately assess performance. With this concept in mind, PSE has developed an econometric benchmarking model that considers factors that have proven to be statistically influential on distribution utility costs.

The econometric benchmarking approach relies on comparing actual data values to the predicted values, which are obtained from the econometric models. The researcher determines an appropriate functional form (a model) for the relationship between the studied metric and factors (variables) that influence it. This is done by using appropriate econometric methods to obtain parameter estimates for each variable of the specified model.

In this report, we estimate the translog cost function, which is well established in academic literature and provides a high level of flexibility in estimating costs. This is also the functional form preferred by the Board in the 4th Generation IR proceeding.

Cost predictions for each firm are obtained by inserting company-specific variable values into the estimated equation for a given year. Performance is defined as the percentage difference between the observed (or projected) data to the predicted value of the data for the year in question, as shown below.

$$Performance = \ln \left(\frac{Observed\ Cost\ Data}{Predicted\ Cost\ Data} \right)$$

NOTE: The term “ln” above denotes the natural log. The formula above is utilized for calculating percentage differences. It is typically used by both PSE and PEG to display benchmark scores.

2.4.1 Estimation Procedure and Translog Cost Function

As a starting point, we assume that the relationship between a utility's cost and the conditions that affect it, called “cost drivers” (i.e., the variables), can be quantified and captured by a statistical function. This function, called a “cost function,” allows PSE to specify cost as a dependent variable

that can be explained by relevant independent or explanatory variables and associated parameters; the latter captures the effect of the independent variables on cost. Such a cost function is estimated using econometric techniques that rest on certain fundamental assumptions.

In general, cost is assumed to be a function of: input prices, the output produced by the firm, and other independent variables that affect cost but are outside management's control. While a function specified in this manner can capture a reasonable level of cost variability, it does not explain all the elements that affect cost. Therefore, the function includes a random noise term to account for such idiosyncratic factors.

The following equation provides an example of a simple cost function:

$$C = \beta_0 + \beta_1 * Y + \varepsilon$$

In this equation, the terms C and Y, denote cost and output, respectively. The beta terms denote model parameters that capture the magnitude and sign of the effect of the explanatory variables on cost, and the error term captures random noise. The latter is assumed to be independent of the explanatory variables.

The data used to estimate this cost relationship can consist of different types of observations, as follows:

- Data from a single utility with multiple time observations (time series data),
- Data from many utilities observed at a single time period (cross-sectional data), or
- Data from many utilities 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 utilities with multiple observations starting in 2002 and extending to 2016 (or 2024 for Toronto Hydro). The model specification adjusts for heteroskedacity.

2.4.2 Statistical Tests

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. In particular, standard errors of parameter estimates, which measure the precision that a parameter is estimated, are used to construct a test of a relevant hypothesis. The null 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 percent confidence threshold for first-order terms in our research.

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 costs rise as the number of customers served increases (i.e. the customer parameter would be positively signed).

A 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 reflects the performance of an average utility facing the business conditions of the utility whose values are used to generate the benchmark. A benchmark can be determined for a particular utility for any given year; the particular business conditions and variables for that year are put into the model, producing an “expected” or benchmark value for that year.

If a given utility’s actual cost is below the benchmark cost (for a given year or time period), 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, the utility’s 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 not statistically significantly different to the average.

3 The Board's Three Key Areas on 2015 Total Cost Benchmarking

In the 2015 Board Decision, the Board identified three key areas where the benchmarking evidence differed between the experts. On page 15, the Board wrote:

The experts' evidence on benchmarking differs in three key areas;

1. The Urban core variable
2. Approach to CDM costs
3. Asset price inflation costs (capital cost escalation rate)

The Board then addressed its conclusions in each of the three key areas on pages 16 to 18 of the 2015 Board Decision. PSE has re-examined the 2015 Board Decision and has addressed these three key areas identified by the Board. We discuss each area and the approach taken by PSE in the current benchmarking research for the 2020 CIR application.

3.1 Urban Core Variable

The Board states on page 16 of the 2015 Board Decision: “While the OEB agrees that the premise of an urban core variable warrants further investigation, it cannot determine that the evidence demonstrates that it exists.”

The Board cited the small sample size of four utilities that PSE used for the binary variable as one of the reasons for not being able to determine the validity of the variable.²³ The Board also notes that the Board Staff consultant, PEG, substituted in a dummy variable constituting 27 US cities. However, this variable included a number of cities that do not have a population or urban density similar to Toronto. The Board cited the city of Buffalo as an example of a city that PEG defined as an urban core city that does not match well with Toronto.

The Board also notes that it was not clear as to how much of the Toronto Hydro service area is part of the urban core and what capital projects are proposed to occur in that area.

²³ Page 16 of the 2015 Board Decision.

3.1.1 PSE's Solution to the Urban Core Variable

PSE noted the Board's reluctance in 2015 to depend on a variable that only included four observations (the four utilities with cities that had populations which exceeded one million, i.e. the "urban core" cities). We also noted the Board's reluctance to follow the PEG approach to the variable (including a binary variable of dissimilar cities).

PSE's recommended solution is as follows: rather than create a binary variable of four cities with similar population thresholds as Toronto, we used publicly available aerial imagery to examine the above-grade physical characteristics of cities with populations above 200,000, identified geographical areas within a GIS platform defined by PSE as "congested urban," and calculated the percentage of each utility's service territory that falls under this definition. This vastly improves upon the previously applied binary variable of four utilities, by replacing it with a continuous variable with varying percentages for each utility. The solution has resulted in a "congested urban" value that is above zero for over 40 U.S. utilities, Toronto Hydro, and six Ontario distributors.

Rather than using the blunt instrument of a binary variable that designates a utility as either a "one" or "zero" based on a given criteria, we calculate distinct values for each utility, based on the percentage of congested urban area within their respective service territories. Both PSE and PEG used the blunt urban core binary variable in the 2015 benchmarking research (albeit based on different criteria). However, the "congested urban" variable used in the present report uses the continuous variable approach. It should be noted that most of the other variables in the model (e.g., percent forestation, percent electric customers, etc.) are also continuous variables, rather than binary. This approach to the congested urban variable is a vast improvement from the 2015 research, and should help alleviate the Board's concerns. PSE's research produces evidence that serving a dense urban core increases cost and, therefore, serving a highly congested urban area should be adjusted for within the econometric total cost model. PSE makes this adjustment in our current research.

3.1.1.1 Definition of Congested Urban Area

PSE defines "congested urban" as a geographical area of a major urban load center with physical constraints that necessitate a complex and costly subterranean civil infrastructure for housing and operating electric distribution plant. Electrical equipment unique to such subterranean infrastructure is also required in these congested urban areas.

Characteristics of a major urban load center include a concentration of high-rise and mid-rise buildings.²⁴ Such a concentration of buildings results in a large amount of electric energy and demand within a relatively small geographical area. Physical constraints of congested urban areas

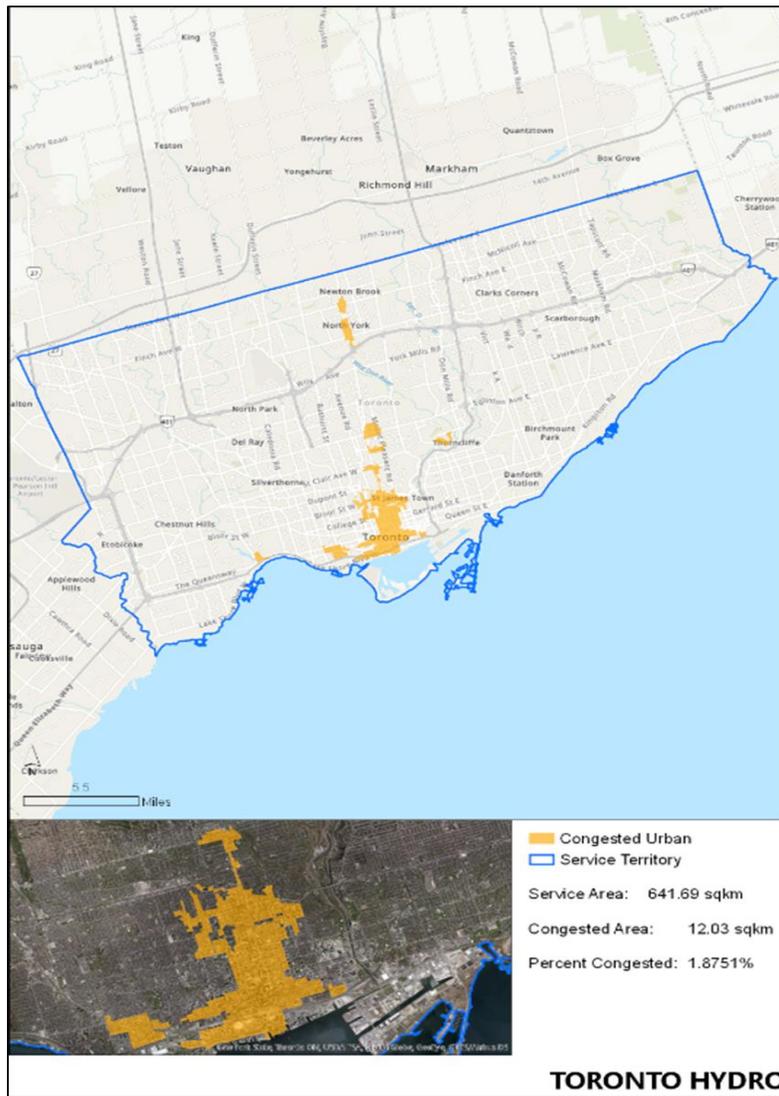
²⁴ For PSE's assessment, mid-rise buildings are defined as 7 to 12 stories and high-rise buildings are defined as 13 stories and greater.

necessitate subterranean civil infrastructure for housing electric distribution plant. For example, underground vaults may be required in areas where building setbacks, sidewalks, and roads do not accommodate the presence of overhead or pad-mounted electric utility lines and equipment. The combination of these factors (increased demand concentration plus lack of space for traditional equipment) results in the necessity of subterranean civil infrastructure, and corresponding electrical equipment, that is complex and costly to construction and maintain.

3.1.1.2 Congested Urban Area within Toronto Hydro's Service Territory

Guided by the considerations discussed above, PSE used publicly available aerial imagery of the City of Toronto, and a customized GIS tool that mapped each utility's service territory and the area identified as congested urban within that territory, to delineate congested urban areas. The map below illustrates the congested urban area (designated in orange) within the City of Toronto. This area accounts for a relatively large portion of the downtown area. The congested urban area also constitutes portions of midtown.

Figure 4 Toronto Hydro Congested Urban Map



3.1.1.3 Congested Urban Area for Other Cities

PSE undertook the approach used for the Toronto Hydro service territory and applied it to US cities with populations greater than 200,000 served by utilities within the dataset. We also applied the same approach to all Ontario distributors that served cities that had populations greater than 200,000 and contained congested urban territory. We only included the Ontario utilities that contained congested urban territory in their service territory in the sample. The maps for each corresponding sampled utility are provided in the Appendix to this report.

3.2 Approach to CDM Costs

On page 17 of the 2015 Board Decision, the Board writes:

The two experts took different approaches to account for CDM expenses. The issue arose as CDM expenses are reflected in the costs of the U.S. utility sample but not those of Toronto Hydro. PEG's approach was to eliminate customer service and information (CSI) expenses from the U.S. utility sample as CDM expenses account for the largest share of CSI costs. PSE's approach was to add CSI costs back to its U.S. cost measure, while also adding in Toronto Hydro's actual and projected CDM expenses.

The Board did not state its preference between the two approaches. PSE believes that both approaches are valid, as they assure a consistent cost definition between Toronto Hydro and the U.S. sample. In an effort to reduce potential differences and address this key area identified by the Board, PSE has adopted PEG's methodology in our current research and eliminated CSI expenses for the U.S. sample and for Toronto Hydro.

3.3 Asset Price Inflation Costs (Capital Cost Escalation Rate)

PSE used an asset price inflation assumption in our 2015 research that projected a rate of 4.55%. During the 2015 CIR proceeding, PEG stated that a 2% growth rate was a more reasonable assumption. PSE argued that 2% was too low, based on historical growth rates of electric distribution asset inflation. PSE noted that PEG's analysis was distorted due to declining interest rates during the recent time frame.

The Board stated on page 18 of the 2015 Board Decision that “[t]he OEB considers the asset price inflation value used by PEG to be more appropriate.”

PSE noted PEG's recent research where they used a 2.58% assumption in their research for Oshawa PUC.²⁵ This growth rate used by PEG was based on using the Conference Board of Canada price projections for “Engineering Structures, Electric power generation, transmission, and distribution.” PSE did not note any objections regarding the use of these price projections for the asset price inflation assumption.

²⁵ PEG Report, “Benchmarking the Forecasted Cost of Oshawa PUC Networks”, December 18, 2014. EB-2014-0101, Exhibit 10, Tab A.

For this research, PSE gathered the same price projections from the Conference Board of Canada as used by PEG in the Oshawa PUC research and applied the growth rates to the asset price inflation assumption for 2018 to 2024. As of April 2018, the Conference Board of Canada had the 2018 growth rate at 2.69%, and the 2019, 2020, 2021, and 2022 growth rates at 2.18%. PSE then applied the 2022 growth rate of 2.18% to the remaining CIR period.

4 Total Cost Benchmarking Results

The estimates from the total cost model are presented in the following table. The results in the table show that the cost function parameter estimates have plausible signs and magnitudes. The output variables are fully interacted based on the translog cost function specification. The business condition variables have both a first order term and a quadratic term to capture the curvature in the cost impact as the value increases or decreases from the sample mean. The first order terms of all variables have the theoretically expected signs and are statistically significant at the standard 90% confidence level.

Table 6 Total Cost Model Estimates

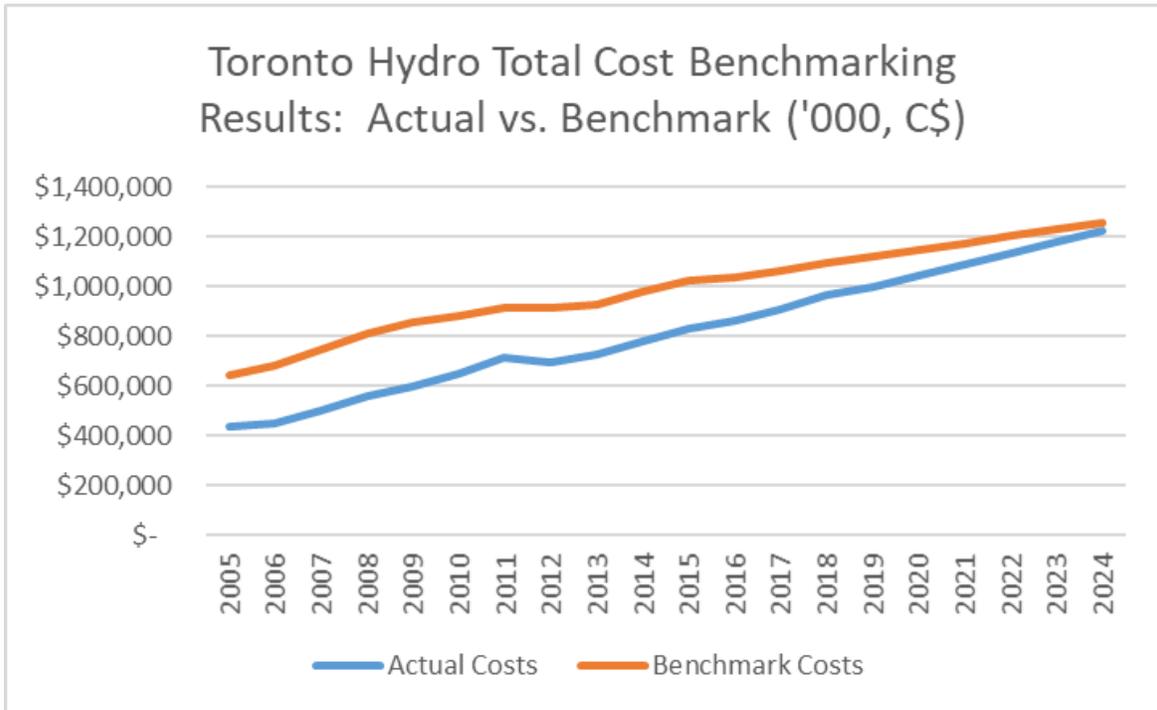
Total Cost Model Estimates					
VARIABLE KEY					
N = Number of Retail Customers					
D = Maximum peak demand					
%E = Percent of electric customers					
El = Elevation standard deviation					
%F = Percent forestation					
%CU = Percent congested urban					
%AMI = Percent AMI meters					
%UG = Percent underground distribution plant					
%UGU = %UG * %CU					
Ontario = Binary variable for Ontario distributor					
Trend = Number of years since 2001					
EXPLANATORY VARIABLE	ESTIMATED COEFFICIENT	T STATISTIC	EXPLANATORY VARIABLE	ESTIMATED COEFFICIENT	T STATISTIC
N	0.715	67.903	%UG	-0.077	-4.676
N*N	0.213	15.334	%UG*%UG	-0.002	-0.482
N*D	-0.308	-23.501	%UGU	104.843	10.564
			%UGU*%UGU	6080.017	7.620
D	0.261	24.040	Ontario	-0.304	-35.592
D*D	0.145	25.346			
			Trend	-0.005	-8.463
%E	0.407	17.431			
%E*%E	0.348	10.766	Constant	12.780	535.646
El	0.102	6.816			
El*El	-0.007	-3.942	Adjusted R-Squared		0.992
%F	0.081	18.163			
%F*%F	0.007	12.977	Sample Period:		2002-2024
%CU	160.845	19.382	Number of Observations		1318
%CU*%CU	-5664.714	-12.751			
%AMI	0.109	2.581			
%AMI*%AMI	-0.029	-0.642			

The next table and figure break down the benchmark total costs and company total costs from 2005 to 2024. Toronto Hydro has consistently been below its expected benchmark levels. During the most recent historical period of 2015 to 2017, Toronto Hydro's costs are 18.6% below the benchmark values. During the CIR period of 2020 to 2024, Toronto Hydro's costs are 6.0% below the benchmark values on average.

Table 7 Toronto Hydro's Cost Performance 2005-2024

Year	Toronto Hydro Actual Costs ('000, C\$)	Toronto Hydro Benchmark Costs ('000, C\$)	% Difference (Logarithmic)
2005	\$ 436,128	\$ 641,275	-38.6%
2006	\$ 450,686	\$ 681,212	-41.3%
2007	\$ 502,433	\$ 744,486	-39.3%
2008	\$ 556,429	\$ 813,528	-38.0%
2009	\$ 595,932	\$ 852,775	-35.8%
2010	\$ 647,456	\$ 882,130	-30.9%
2011	\$ 710,544	\$ 912,729	-25.0%
2012	\$ 691,388	\$ 910,814	-27.6%
2013	\$ 727,152	\$ 925,488	-24.1%
2014	\$ 777,414	\$ 976,095	-22.8%
2015	\$ 826,886	\$ 1,024,030	-21.4%
2016	\$ 861,394	\$ 1,034,492	-18.3%
2017	\$ 904,560	\$ 1,061,642	-16.0%
<i>2018 (projected)</i>	\$ 964,885	\$ 1,095,430	-12.7%
<i>2019 (projected)</i>	\$ 999,492	\$ 1,122,407	-11.6%
<i>2020 (projected)</i>	\$ 1,044,567	\$ 1,148,601	-9.5%
<i>2021 (projected)</i>	\$ 1,085,324	\$ 1,174,549	-7.9%
<i>2022 (projected)</i>	\$ 1,134,689	\$ 1,201,662	-5.7%
<i>2023 (projected)</i>	\$ 1,180,820	\$ 1,229,463	-4.0%
<i>2024 (projected)</i>	\$ 1,225,282	\$ 1,257,907	-2.6%
Average % Difference			
2015-2017			-18.6%
2020-2024			-6.0%

Figure 5 Toronto Hydro's Cost Performance 2005-2024



5 Reliability Benchmarking: Variable Definitions, Datasets, Models

5.1 Reliability Benchmarking: Summary

To present a more complete picture of Toronto Hydro’s total cost performance, PSE also benchmarked reliability. To benchmark reliability, we need standard reliability metrics. Nearly all jurisdictions that require reporting of reliability indicators include the metrics of SAIDI, SAIFI, and CAIDI.²⁶ 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 study 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. Since SAIDI is the product of both SAIFI and CAIDI, it would be redundant to measure all three.

Several jurisdictions exclude extraordinary events from reliability statistics, with the goal of increasing historical comparability. The bulk of excluded events stem from major storms. These severe storms vary in number and intensity from year to year. MED definitions are determined by each regulatory commission. Definitions vary by state; some use the IEEE standard 1366-2003 to determine what constitutes a MED.²⁷ Other states have customized definitions. For example, in some states if 10 percent of a utility’s customers experience an outage lasting more than a 24-hour period, a MED has occurred. States are gradually shifting towards the IEEE standard; however, considerable differences across states remain. As a result, we benchmark Toronto Hydro’s reliability using the IEEE method for Toronto Hydro. Toronto Hydro also reported its reliability index using a sustained outage definition of five minutes, which matches what most of the sample uses as a sustained outage definition.

²⁶ Some states only require reporting of two of these measures. However, the excluded indicator can still be determined by the researcher. SAIDI is equal to the product of SAIFI and CAIDI.

²⁷ The IEEE 1366-2003 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).

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.

5.2 Data Sources

The industry reliability data for U.S. utilities is gathered through reports and rate case filings made public by state commissions and through the EIA-861 form. Reliability indices for Toronto Hydro were gathered directly from the company.

The variable values that appear in both the total cost model and the reliability model are equal. For example, the “percent forestation” variable will have the same value for a given utility/year in both models. The reliability benchmarking models we developed use the following variables:

- Number of customers;
- Percent forestation;
- Percent underground (in SAIFI model only);
- Standard deviation of the elevation changes in the service territory (in CAIDI model only);
- Square kilometers of territory per customer;
- Percent smart meters (in CAIDI model only);
- Percent congested urban in service territory (in CAIDI model only); and
- IEEE binary variable (in SAIFI model only).

5.3 Reliability Dataset

The reliability dataset is comprised of 74 distributors (this number includes Toronto Hydro). The dataset is the same for both the SAIFI and CAIDI models. The data for the U.S. utilities in each sample spans the years 2010 to 2016. Given the changes in reliability reporting and automation, we started the sample in 2010 to get more recent results. In each sample, some utilities have data available from 2010 to 2016, while others have more limited data available. We also inserted future reliability metric projections from Toronto Hydro, which assume full funding of the proposed capital program. The following table lists the utilities comprising the reliability sample, along with their 2016 number of customers.

Table 8 Sampled Utilities for Reliability Benchmarking

Company Name	Number of Customers (2016)	Company Name	Number of Customers (2016)
Alabama Power Company	1,468,744	Metropolitan Edison Company	562,850
ALLETE (Minnesota Power)	145,622	Monongahela Power Company	389,759
Appalachian Power Company	956,718	Nevada Power Company	903,198
Arizona Public Service Company	1,193,511	New York State Electric & Gas Corporation	890,260
Atlantic City Electric Company	548,442	Niagara Mohawk Power Corporation	1,323,415
Avista Corporation	374,507	Northern Indiana Public Service Company	464,146
Baltimore Gas and Electric Company	1,268,995	Northern States Power Company - WI	256,540
Central Hudson Gas & Electric Corporation	261,411	Ohio Edison Company	1,041,123
Central Maine Power Company	619,312	Oklahoma Gas and Electric Company	830,057
Cleveland Electric Illuminating Company	747,748	Orange and Rockland Utilities, Inc.	229,533
Commonwealth Edison Company	3,953,907	Pacific Gas and Electric Company	5,428,390
Connecticut Light and Power Company	1,238,337	PECO Energy Company	1,613,041
Consolidated Edison Company of New York,	3,420,121	Pennsylvania Electric Company	587,251
Consumers Energy Company	1,804,630	Pennsylvania Power Company	164,285
DTE Electric Company	2,169,416	Portland General Electric Company	859,396
Duke Energy Carolinas, LLC	2,519,317	Potomac Electric Power Company	848,171
Duke Energy Florida, LLC	1,743,136	PPL Electric Utilities Corporation	1,426,676
Duke Energy Indiana, LLC	812,986	Public Service Company of Colorado	1,441,982
Duke Energy Kentucky, Inc.	140,014	Public Service Company of New Hampshire	507,998
Duke Energy Ohio, Inc.	706,793	Public Service Company of Oklahoma	547,142
Duquesne Light Company	587,954	Public Service Electric and Gas Company	2,227,065
El Paso Electric Company	408,504	Puget Sound Energy, Inc.	1,119,711
Empire District Electric Company	170,529	San Diego Gas & Electric Co.	1,425,132
Entergy Arkansas, Inc.	706,879	South Carolina Electric & Gas Co.	705,025
Entergy Mississippi, Inc.	446,654	Southern California Edison Company	5,049,192
Entergy New Orleans, Inc.	198,416	Southern Indiana Gas and Electric Company, Inc.	148,429
Florida Power & Light Company	4,840,266	Tampa Electric Company	730,503
Gulf Power Company	453,136	THESL	761,920
Idaho Power Co.	529,901	Toledo Edison Company	309,060
Indiana Michigan Power Company	589,041	Union Electric Company	1,208,934
Indianapolis Power & Light Company	486,827	United Illuminating Company	332,381
Jersey Central Power & Light Company	1,113,459	Virginia Electric and Power Company	2,550,018
Kansas Gas and Electric Company	325,932	West Penn Power Company	723,352
Kentucky Power Company	168,848	Western Massachusetts Electric Company	209,939
Kentucky Utilities Company	547,069	Wisconsin Electric Power Company	1,142,983
Louisville Gas and Electric Company	404,744	Wisconsin Power and Light Company	466,052
Madison Gas and Electric Company	150,491	Wisconsin Public Service Corporation	449,877

5.4 Econometric Reliability Benchmarking Model

The basic econometric benchmarking procedure for reliability is similar to the one described for the total cost modeling. PSE’s method applies regression techniques to the sampled data to form a mathematical model. The model accepts inputs (forestation levels, wind speeds, etc.) and produces an expected reliability index for each utility for a given year. By using the model, given a set of

operating conditions, PSE can estimate an “expected” or benchmark reliability level for each utility in each year.

This technique allows for “apples-to-apples” comparisons, and therefore produces a more accurate assessment of performance (relative to simply making industry comparisons of “raw” CAIDI and SAIFI).

Each model includes utilities with varying time-series lengths covering the years 2010 to 2016.²⁸ This type of dataset requires an estimation procedure that accounts for the cross-sectional time-series (“panel”) nature of the data. We use an estimator that corrects for cross-sectional heterogeneity and addresses the panel form of the data.

The results from the SAIFI and CAIDI models are presented in the following two tables.

Table 9 SAIFI Econometric Model Coefficients

Variable	Coefficient Estimate	T-Stat
Constant	-0.454	-3.800
Number of Customers	-0.011	-1.565
% Forestation	0.018	1.936
% Underground	-0.336	-24.433
Sq. KM per Customer	0.020	1.675
IEEE	0.168	10.147

Table 10 CAIDI Econometric Model Coefficients

Variable	Coefficient Estimate	T-Stat
Constant	4.465	56.155
Number of Customers	0.024	5.399
% Forestation	0.090	21.325
S.D of Elevation	0.061	9.060
Sq. KM per Customer	0.064	5.999
% AMI	-0.090	-8.383
% Congested Urban	6.688	2.709

²⁸ Utilities in the United States began reporting reliability metrics at different times.

6 Reliability Benchmarking Results

We find that Toronto Hydro's 2015-2017 average SAIFI is 47.2% above the benchmark value. Our research on Toronto Hydro's 2015-2017 average CAIDI indicates that the reliability level is 63.4% below the benchmark value.

The year-by-year breakdowns for both SAIFI and CAIDI are provided in the following tables. These tables provide both the actual reliability values for Toronto Hydro, along with the econometric benchmark value.

Table 11 Toronto Hydro’s SAIFI Performance 2005-2024

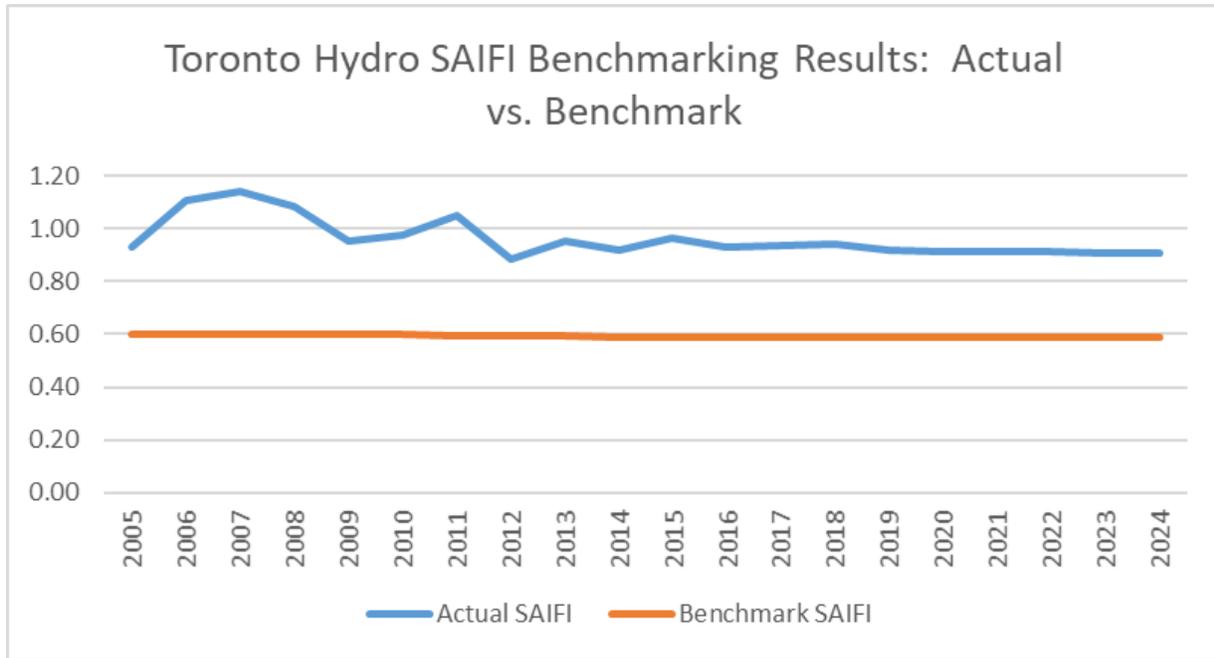
Year	Toronto Hydro Actual SAIFI	Toronto Hydro Benchmark SAIFI	% Difference (Logarithmic)
2005	0.93	0.60	43.7%
2006	1.11	0.60	61.2%
2007	1.14	0.60	63.9%
2008	1.08	0.60	58.8%
2009	0.95	0.60	46.4%
2010	0.98	0.60	48.9%
2011	1.05	0.60	56.7%
2012	0.88	0.59	39.8%
2013	0.95	0.59	47.5%
2014	0.92	0.59	44.5%
2015	0.97	0.59	49.7%
2016	0.93	0.59	45.7%
2017	0.94	0.59	46.3%
<i>2018 (projected)</i>	0.94	0.59	46.7%
<i>2019 (projected)</i>	0.92	0.59	44.3%
<i>2020 (projected)</i>	0.92	0.59	44.0%
<i>2021 (projected)</i>	0.91	0.59	43.8%
<i>2022 (projected)</i>	0.91	0.59	43.6%
<i>2023 (projected)</i>	0.91	0.59	43.5%
<i>2024 (projected)</i>	0.91	0.59	43.5%
Average % Difference			
2015-2017			47.2%
2020-2024			43.7%

Table 12 Toronto Hydro’s CAIDI Performance 2005-2024

Year	Toronto Hydro Actual CAIDI	Toronto Hydro Benchmark CAIDI	% Difference (Logarithmic)
2005	76.59	122.67	-47.1%
2006	64.98	121.06	-62.2%
2007	69.12	119.21	-54.5%
2008	67.40	118.13	-56.1%
2009	84.13	117.47	-33.4%
2010	77.30	117.27	-41.7%
2011	80.13	117.12	-38.0%
2012	68.06	116.97	-54.2%
2013	70.61	116.84	-50.4%
2014	63.76	116.67	-60.4%
2015	64.04	116.48	-59.8%
2016	59.71	116.40	-66.8%
2017	61.54	116.26	-63.6%
<i>2018 (projected)</i>	61.96	116.21	-62.9%
<i>2019 (projected)</i>	65.96	116.16	-56.6%
<i>2020 (projected)</i>	66.10	116.11	-56.3%
<i>2021 (projected)</i>	66.21	116.06	-56.1%
<i>2022 (projected)</i>	66.34	116.01	-55.9%
<i>2023 (projected)</i>	66.51	115.95	-55.6%
<i>2024 (projected)</i>	66.64	115.90	-55.3%
Average % Difference			
2015-2017			-63.4%
2019-2024			-55.9%

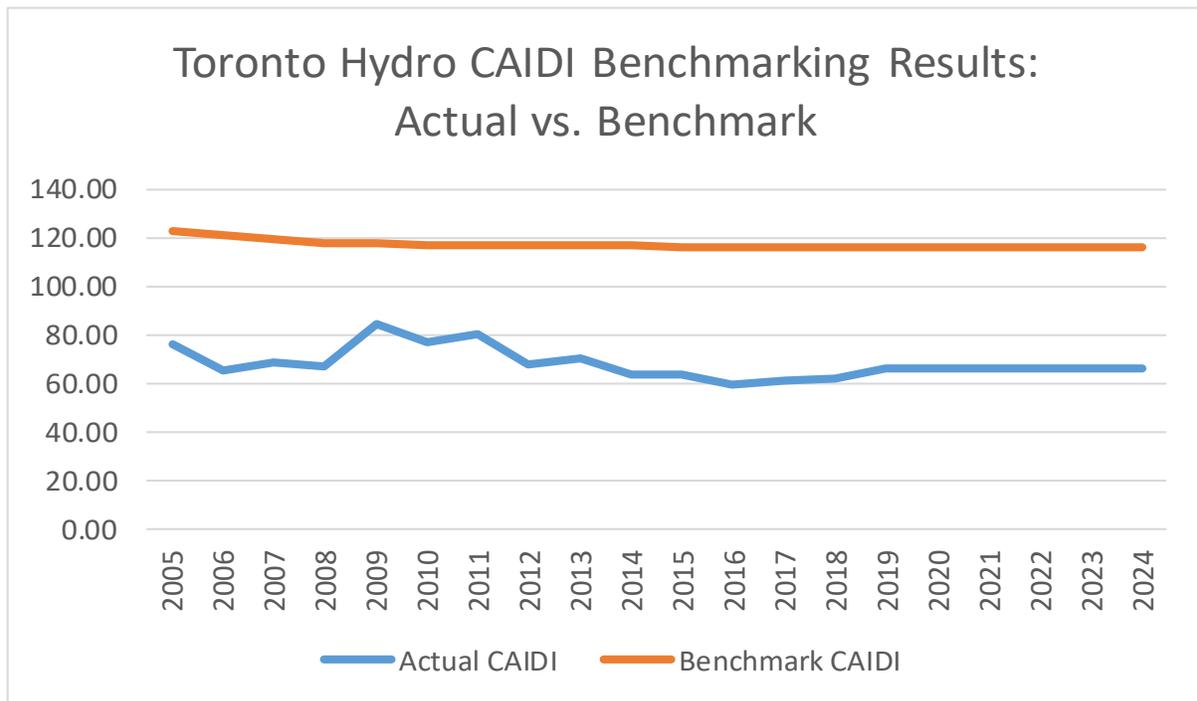
The figure below illustrates Toronto Hydro’s SAIFI values compared to the benchmark values.

Figure 6 Toronto Hydro’s SAIFI Performance 2005-2024



The figure below illustrates Toronto Hydro’s CAIDI values compared to the benchmark values.

Figure 7 Toronto Hydro’s CAIDI Performance 2005-2024



7 Importance of U.S. Data for Benchmarking Toronto Hydro

In PSE’s 2015 Custom IR benchmarking research for Toronto Hydro, we presented a combined Ontario and U.S. dataset and a U.S.-only dataset. During that previous proceeding (EB-2014-0116), the OEB staff consultant put forth their own results using a U.S.-only dataset. The ensuing discussion with stakeholders did not appear to take issue with the focus on a U.S.-only dataset to benchmark Toronto Hydro, nor was this mentioned as a key issue in the 2015 Board Decision. For these reasons, PSE’s cost benchmarking dataset for the current research is a U.S dataset plus Toronto Hydro, supplemented with six Ontario distributors that contain “congested urban” service territory. The reliability dataset is a U.S. dataset plus Toronto Hydro.

We emphasize the importance of including U.S. distributors into any benchmark evaluation involving Toronto Hydro (or any other extreme outlier in the Ontario dataset). While an Ontario-only dataset is appropriate for the clear majority of Ontario distributors, an Ontario-only dataset will not produce reliable results for Toronto Hydro, due to its outlier status within that dataset. This outlier status is shown by the fact that Toronto Hydro has over double the number of customers than the next largest distributor (prior to Alectra Utilities being formed), except for the extremely rural Hydro One Networks. Additionally, Toronto Hydro’s “congested urban” variable is over three times as large as the next closest Ontario peer.

A benchmarking exercise evaluates utility performance relative to a given sample, which produces a benchmark value for each utility in the sample. The benchmark value is generated using the specific utility’s independent variable values; this process assumes it has average efficiency relative to the sample. Thus, Toronto Hydro’s benchmark values represent the values we would expect from an average utility with Toronto Hydro’s specific circumstances, regional input prices, and service territory. If the average efficiency embodied in the benchmark value is generated using firms that are very dissimilar to the utility being benchmarked (i.e., if the benchmarked utility is an outlier), then its performance evaluation has a higher chance of being inaccurate.

The estimation procedure is designed to fit the data through the mean of model variables. As a result, parameter estimates are most accurate for those utilities with operating conditions that vary within a reasonable range of the mean of model variables. The further a utility’s operating conditions are from the mean, especially if there are few sample observations “near” the utility (i.e. close in magnitude), the less accurate the cost benchmark based on the model will be. The inclusion of U.S. utilities ensures that Toronto Hydro is more in the “middle of the pack” in the dataset.

8 Cost Benchmarking Results and Stretch Factor Recommendation

In the 2015 Board Decision, the Board identified three key areas where the benchmarking evidence differed between the experts.

On page 15, the Board wrote:

The experts' evidence on benchmarking differs in three key areas;

1. The Urban core variable
2. Approach to CDM costs
3. Asset price inflation costs (capital cost escalation rate)

The Board then addressed its conclusions in each of the three key areas on pages 16 to 18 of the 2015 Board Decision. PSE addressed these three key areas identified by the Board in this 2018 benchmarking study. Please see Section 3 for a more detailed explanation of the three key areas and how PSE addressed each one.

For the most recent three-year historical period (2015-2017), average total cost levels of Toronto Hydro are below benchmark expectations by 18.6%. In the most recent year of 2017, Toronto Hydro's total costs are 16.0% below benchmark expectations. During the CIR period, the scores are projected to trend more toward the benchmark, but remain below benchmark expectations. The 2020 to 2024 CIR average score is approximately 6.0% below benchmark expectations. Assuming that actual spending is at the company's proposed spending levels, Toronto Hydro's 2024 total annual costs are projected to be approximately \$32 million below benchmark expectations.

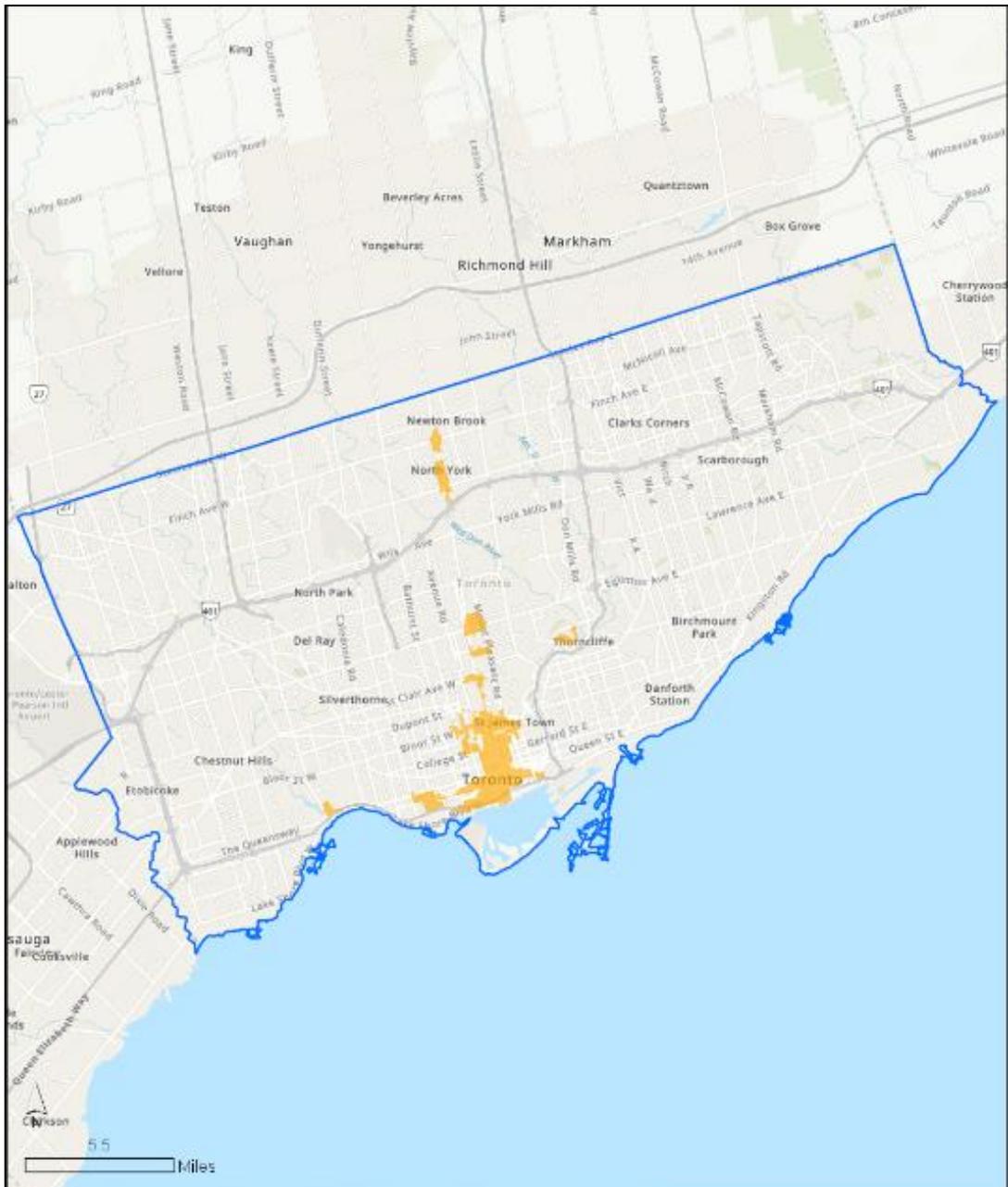
The stretch factors in 4th Generation Incentive Regulation are based on the total cost benchmarking scores of each distributor. Distributors with average scores between -10% to +10% are assigned a stretch factor of 0.30%. Based on PSE's total cost benchmark findings found in this report and the 4th Generation Incentive Regulation Board Decision, we recommend a stretch factor of 0.30% for Toronto Hydro's custom incentive regulation application. This recommendation is based on the full company-proposed spending plan for the CIR period.

9 Appendix: Congested Urban Maps by Sampled Utility

The table below shows the territory designated as “congested urban” along with each utility’s total service territory and the percent congested urban. The maps for each service territory, along with the area designated as congested urban, are provided in the following pages.

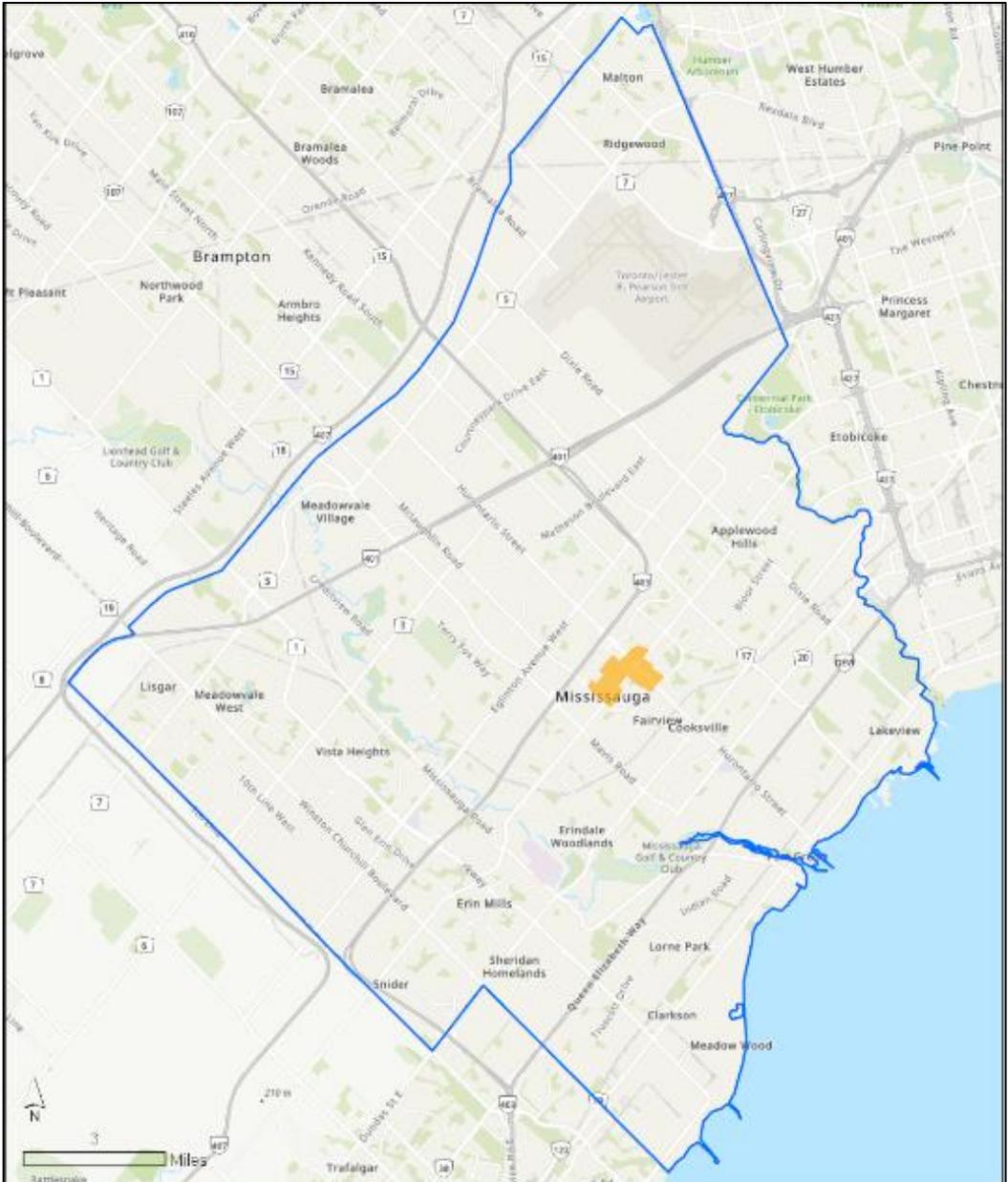
Table 13 “Congested Urban” Percentages

Company Name	Service Area (sqkm)	Congested Area (sqkm)	Percent Congested	Company Name	Service Area (sqkm)	Congested Area (sqkm)	Percent Congested
Toronto Hydro	642	12.03	1.88%	Kentucky Power Co.	9,656	0.00	0.00%
Enersource Hydro Mississauga	289	1.33	0.46%	Kentucky Utilities Co.	15,104	0.40	0.00%
Enwin	124	0.60	0.48%	Louisville Gas & Electric Co.	1,942	1.62	0.08%
Horizon Utilities Corp.	363	0.36	0.10%	Madison Gas & Electric Co.	615	1.16	0.19%
Kitchner-Wilmont Hydro	405	0.53	0.13%	Montana Dakota Utilities Co.	64,726	0.00	0.00%
London Hydro	425	0.62	0.15%	Metropolitan Edison Co.	8,881	0.70	0.01%
Hydro Ottawa	1,113	1.26	0.11%	Mississippi Power Co.	2,985	0.00	0.00%
Alabama Power Co.	55,096	1.60	0.29%	Nevada Power Co.	12,130	9.37	0.08%
Minnesota Power, Inc.	8,035	0.00	0.00%	Monongahela Power Co.	34,322	0.00	0.00%
Appalachian Power Co.	47,417	0.00	0.00%	New York State Electric & Gas Corp.	42,655	0.00	0.00%
Arizona Public Service Co.	90,629	2.66	0.00%	Niagara Mohawk, A National Grid Co.	62,996	1.09	0.00%
Atlantic City Electric Co.	7,096	0.00	0.00%	Northern Indiana Public Service Co.	3,905	0.00	0.00%
Avista Corp.	32,461	0.00	0.00%	Northern States Power Co.	20,727	5.44	0.03%
Baltimore Gas & Electric Co.	5,785	3.45	0.06%	Northern States Power Co. Wisconsin	19,091	0.00	0.00%
Black Hills Power Inc.	9,372	0.00	0.00%	Ohio Edison Co.	14,956	8.88	0.06%
Central Hudson Gas & Electric Corp.	7,221	0.00	0.00%	Orange & Rockland Utilities, Inc.	2,631	0.00	0.00%
Central Maine Power Co.	29,707	0.00	0.00%	Oklahoma Gas & Electric Co. (OG&E)	8,392	9.16	0.11%
Cleco Power LLC	17,806	0.00	0.00%	Pacific Gas and Electric Co.	180,134	15.11	0.01%
Cleveland Electric Illuminating Co.	4,087	0.00	0.00%	PECO Energy Co.	4,880	4.22	0.09%
Commonwealth Edison Co.	27,977	12.73	0.05%	Pennsylvania Electric Co.	45,063	0.00	0.00%
Connecticut Light & Power Co.	11,688	0.00	0.00%	Pennsylvania Power Co.	3,781	0.00	0.00%
Consolidated Edison Co. of New York Inc.	1,661	48.92	2.95%	Portland General Electric Co.	11,545	1.06	0.01%
Consumers Energy Co.	78,367	0.00	0.00%	Potomac Edison Co.	17,957	0.00	0.00%
Delmarva Power & Light Co.	9,120	0.00	0.00%	PPL Electric Utilities Corp.	24,923	0.34	0.00%
Detroit Edison Co.	19,833	8.52	0.04%	PSC of Colorado	21,874	6.60	0.03%
Duke Energy Carolinas, LLC	28,776	3.87	0.01%	PSC of New Hampshire	14,584	0.00	0.00%
Florida Power Corp.	14,519	1.22	0.01%	PSC of Oklahoma	9,946	1.16	0.01%
Duke Energy Indiana, Inc.	11,461	0.00	0.00%	Public Service Electric and Gas Co.	3,583	3.06	0.09%
Duke Energy Kentucky, Inc.	820	0.00	0.00%	Puget Sound Energy, Inc.	23,931	0.00	0.00%
Duke Energy Ohio, Inc.	4,711	1.31	0.03%	San Diego Gas & Electric Co.	10,633	4.90	0.05%
Carolina Power & Light Co.	38,544	1.32	0.00%	South Carolina Electric & Gas Co.	14,431	0.00	0.00%
Duquesne Light Co.	2,078	1.13	0.05%	Southern California Edison Co.	133,616	3.36	0.00%
El Paso Electric CO.	13,573	1.52	0.01%	Southern Indiana Gas & Electric Co.	3,087	0.00	0.00%
Empire District Electric Co.	8,169	0.00	0.00%	Southwestern Public Service Co.	29,243	0.00	0.00%
Entergy Arkansas, Inc.	47,798	0.00	0.00%	Tampa Electric Co.	3,428	1.68	0.05%
Entergy Mississippi, Inc.	18,514	0.00	0.00%	Toledo Edison Co.	5,523	0.93	0.02%
Entergy New Orleans, Inc.	523	3.02	0.58%	Tucson Electric Power Co.	2,746	0.48	0.02%
Florida Power & Light Co.	40,083	3.67	0.01%	Union Electric Co.	29,207	2.60	0.01%
Gulf Power Co.	3,315	0.00	0.00%	United Illuminating Co.	985	0.00	0.00%
Idaho Power Co.	88,854	1.21	0.00%	Virginia Electric & Power Co.	35,901	2.07	0.01%
Indiana Michigan Power Co.	11,440	0.70	0.01%	West Penn Power Co.	25,425	0.00	0.00%
Indianapolis Power & Light Co.	1,558	2.33	0.15%	Western Massachusetts Electric Co.	3,872	0.00	0.00%
Jersey Central Power & Light Co.	8,410	0.00	0.00%	Wisconsin Electric Power Co.	27,022	5.71	0.02%
Kansas City Power & Light Co.	46,444	1.91	0.00%	Wisconsin Power & Light Co.	25,256	0.00	0.00%
KGE, A Westar Energy Co.	11,015	1.17	0.01%	Wisconsin Public Service Corp.	27,670	0.00	0.00%



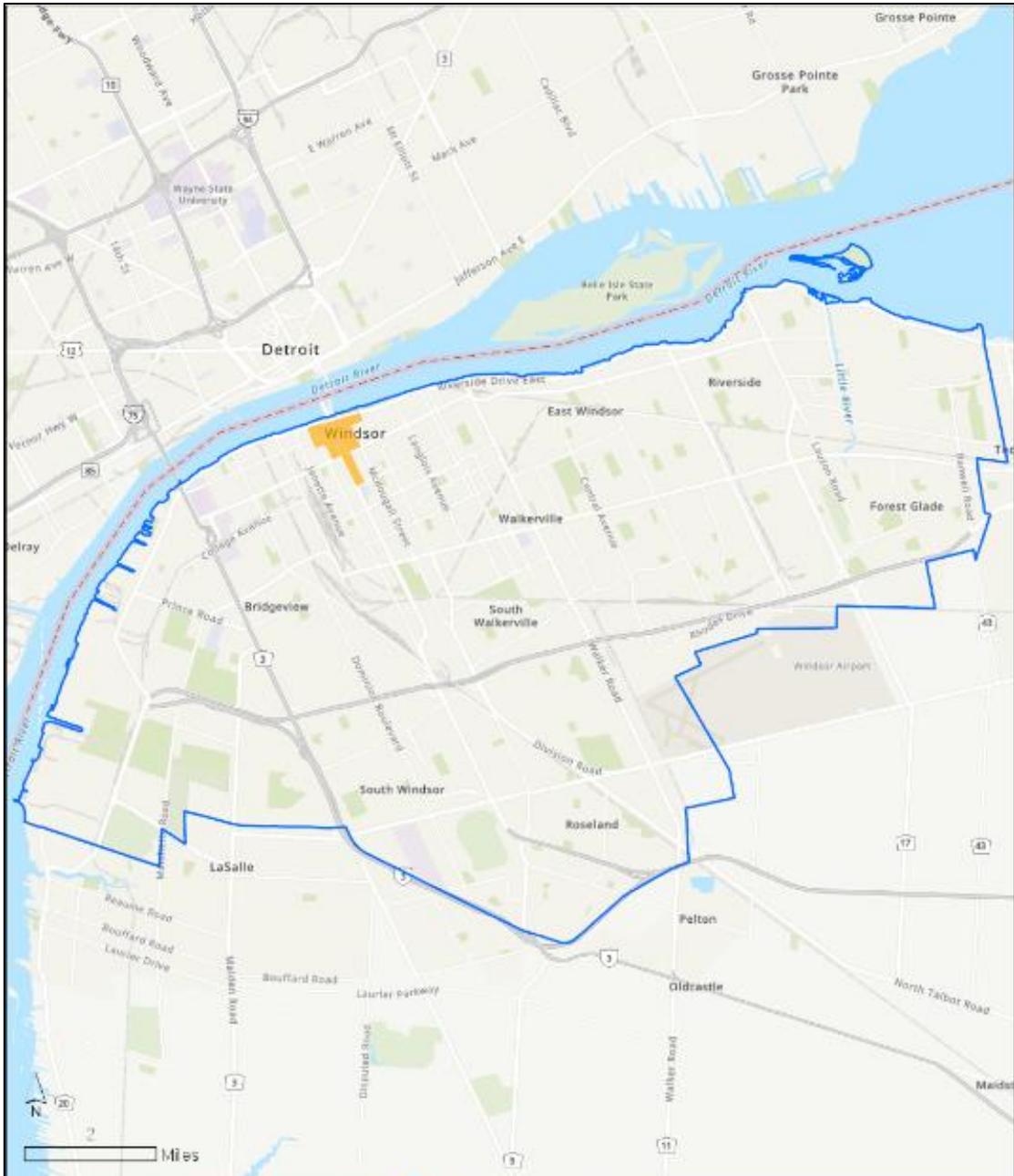
■ Congested Urban
■ Service Territory
 Service Area: 641.69 sqkm
 Congested Area: 12.03 sqkm
 Percent Congested: 1.8751%

TORONTO HYDRO



■ Congested Urban
□ Service Territory
 Service Area: 288.83 sqkm
 Congested Area: 1.33 sqkm
 Percent Congested: 0.4622%

ENERSOURCE HYDRO MISSISSAUGA



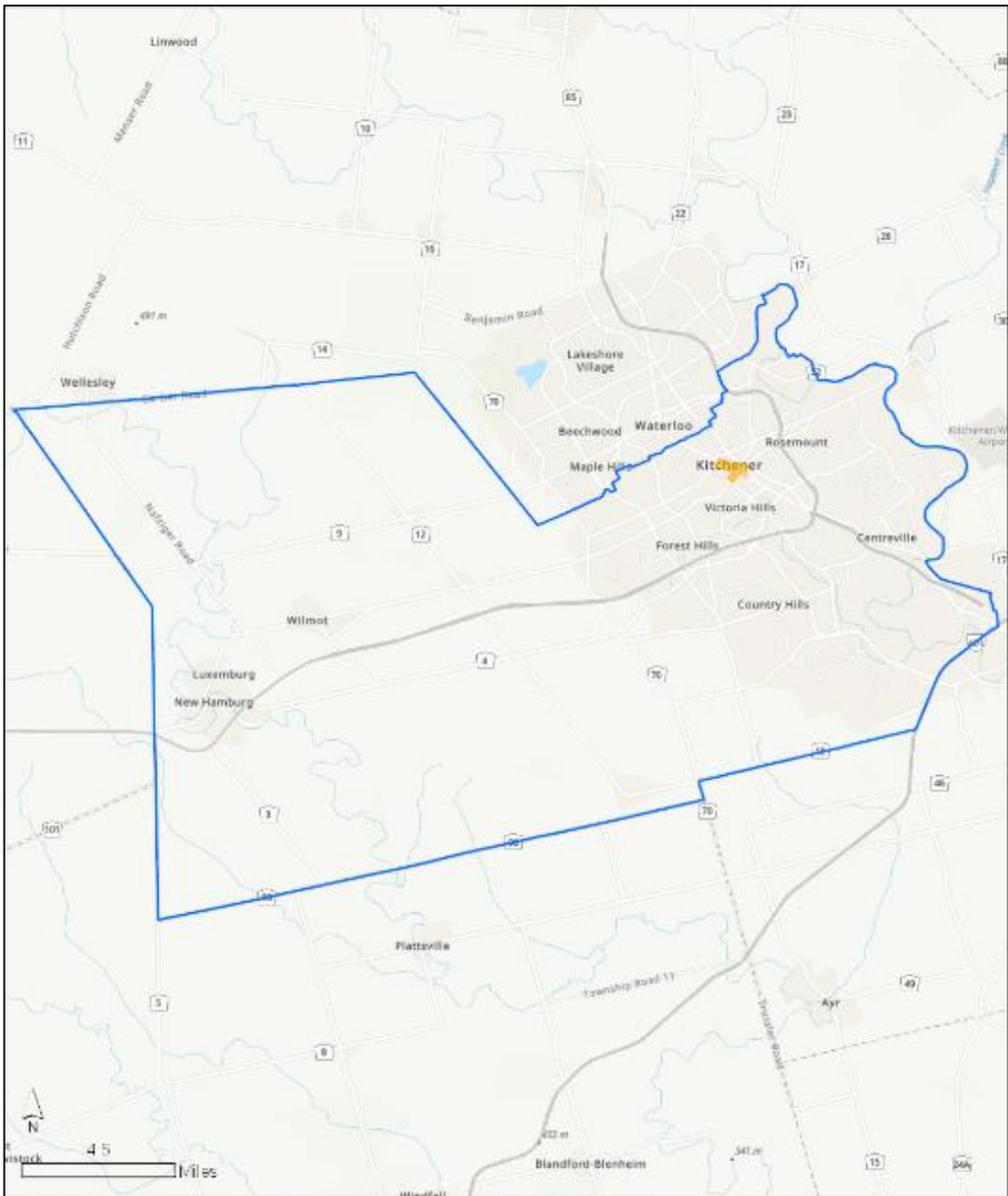
■ Congested Urban
■ Service Territory
 Service Area: 123.78 sqkm
 Congested Area: 0.6 sqkm
 Percent Congested: 0.4816%

ENWIN



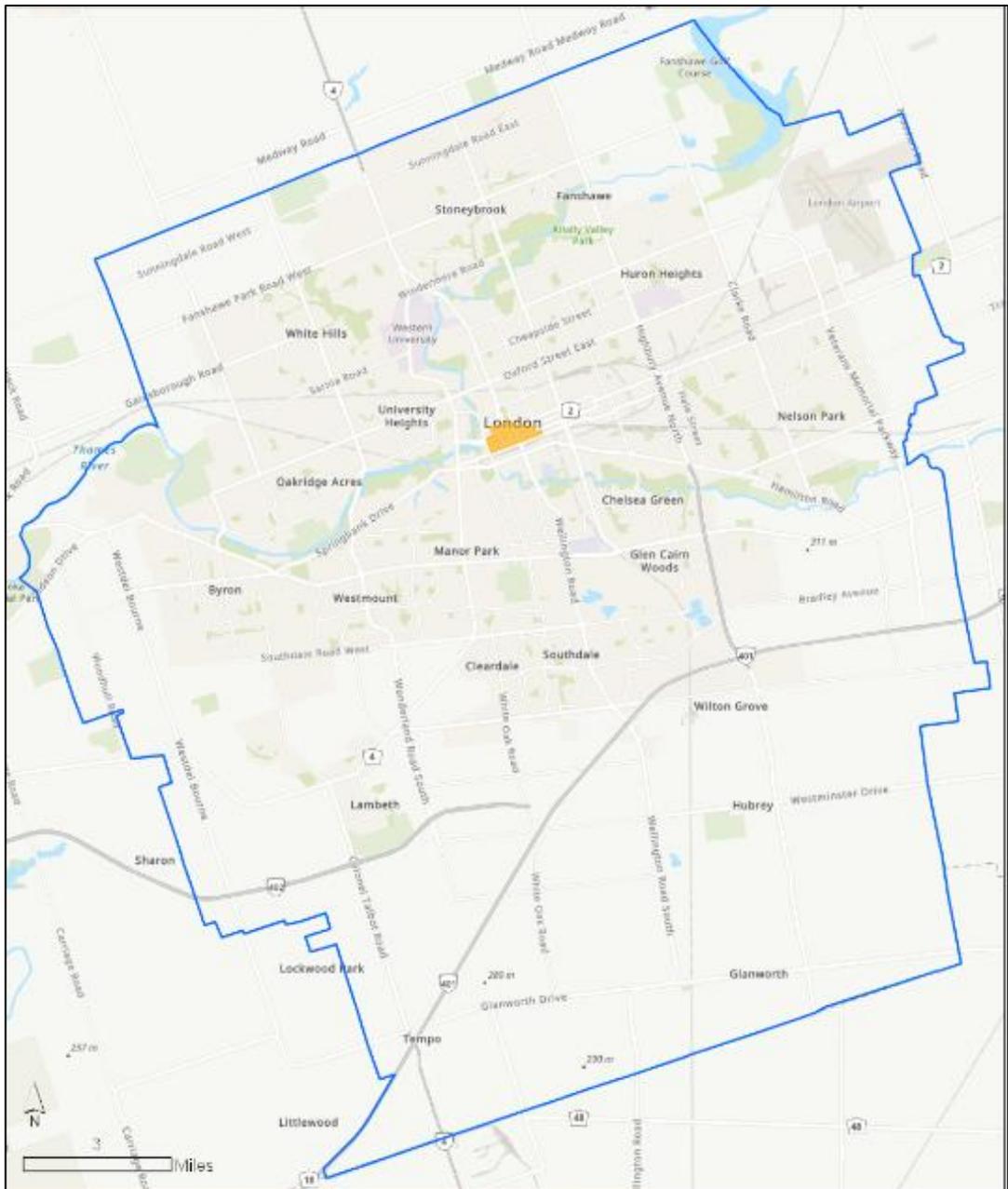
■ Congested Urban
 Service Territory
 Service Area: 362.93 sqkm
 Congested Area: 0.36 sqkm
 Percent Congested: 0.0986%

HORIZON UTILITIES CORP.



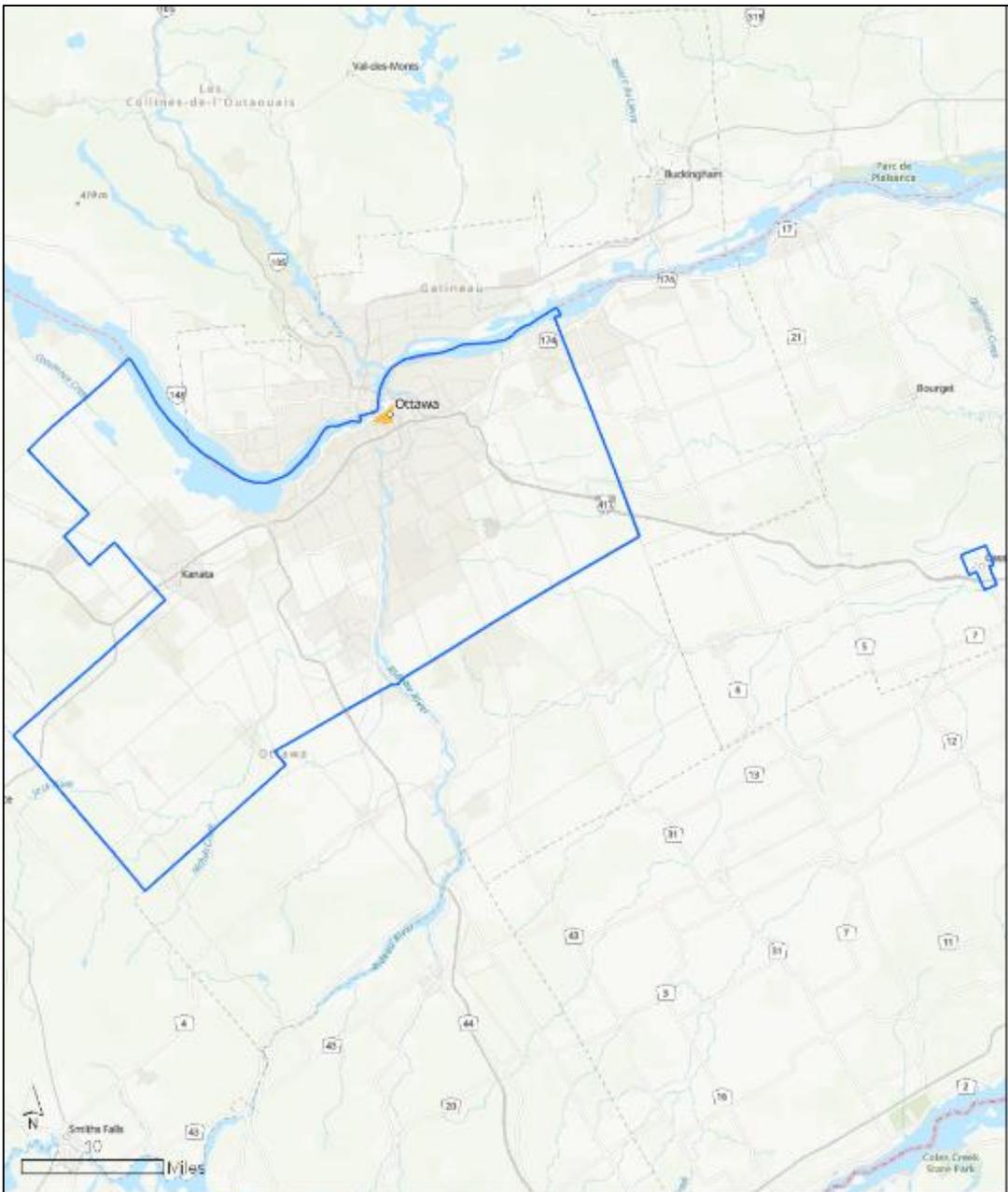
■ Congested Urban
 Service Territory
 Service Area: 404.7 sqkm
 Congested Area: 0.53 sqkm
 Percent Congested: 0.1312%

KITCHENER-WILMONT HYDRO



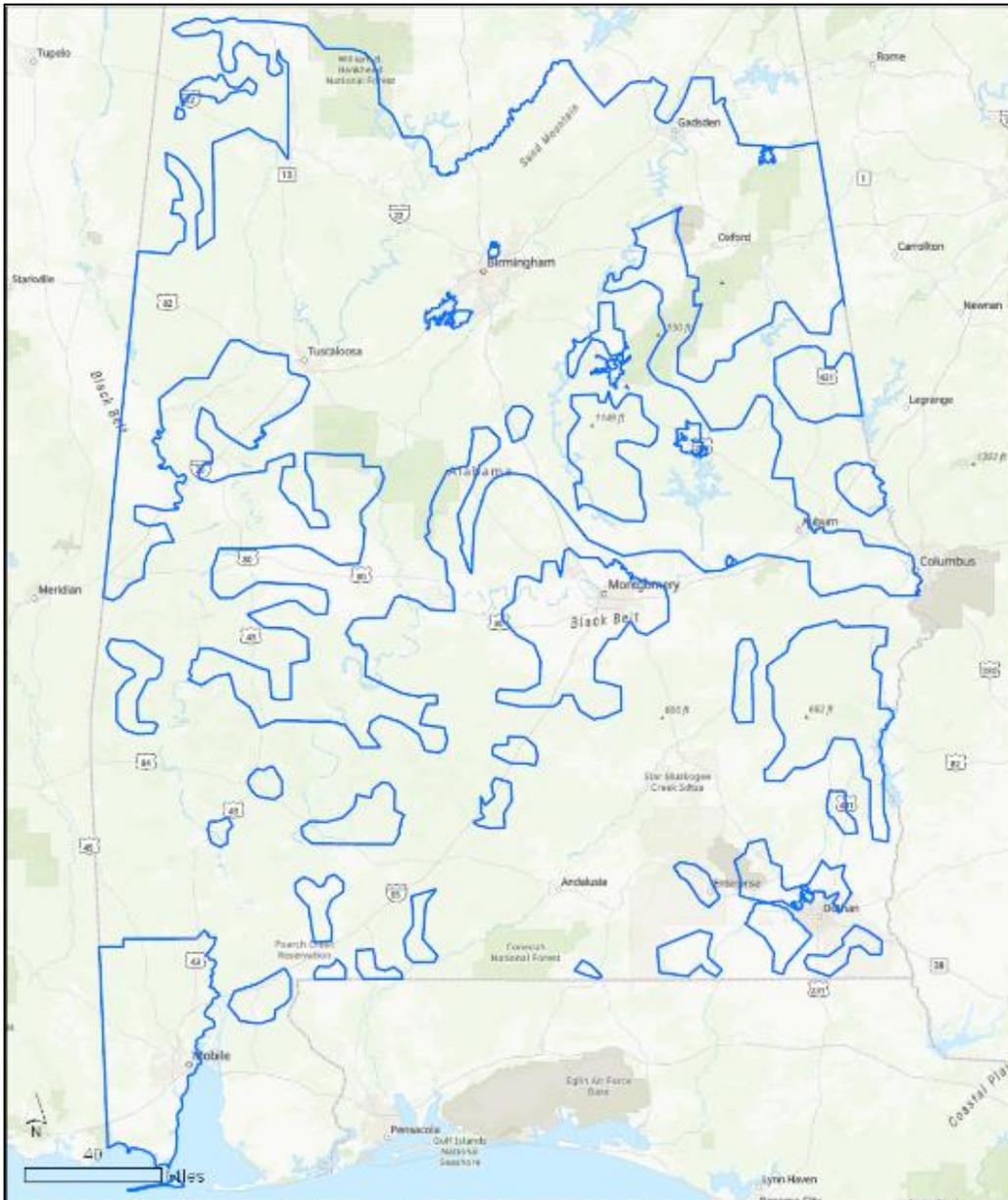
■ Congested Urban
□ Service Territory
 Service Area: 425.17 sqkm
 Congested Area: 0.62 sqkm
 Percent Congested: 0.1468%

LONDON HYDRO



■ Congested Urban
□ Service Territory
 Service Area: 1112.7 sqkm
 Congested Area: 1.26 sqkm
 Percent Congested: 0.1132%

HYDRO OTTAWA



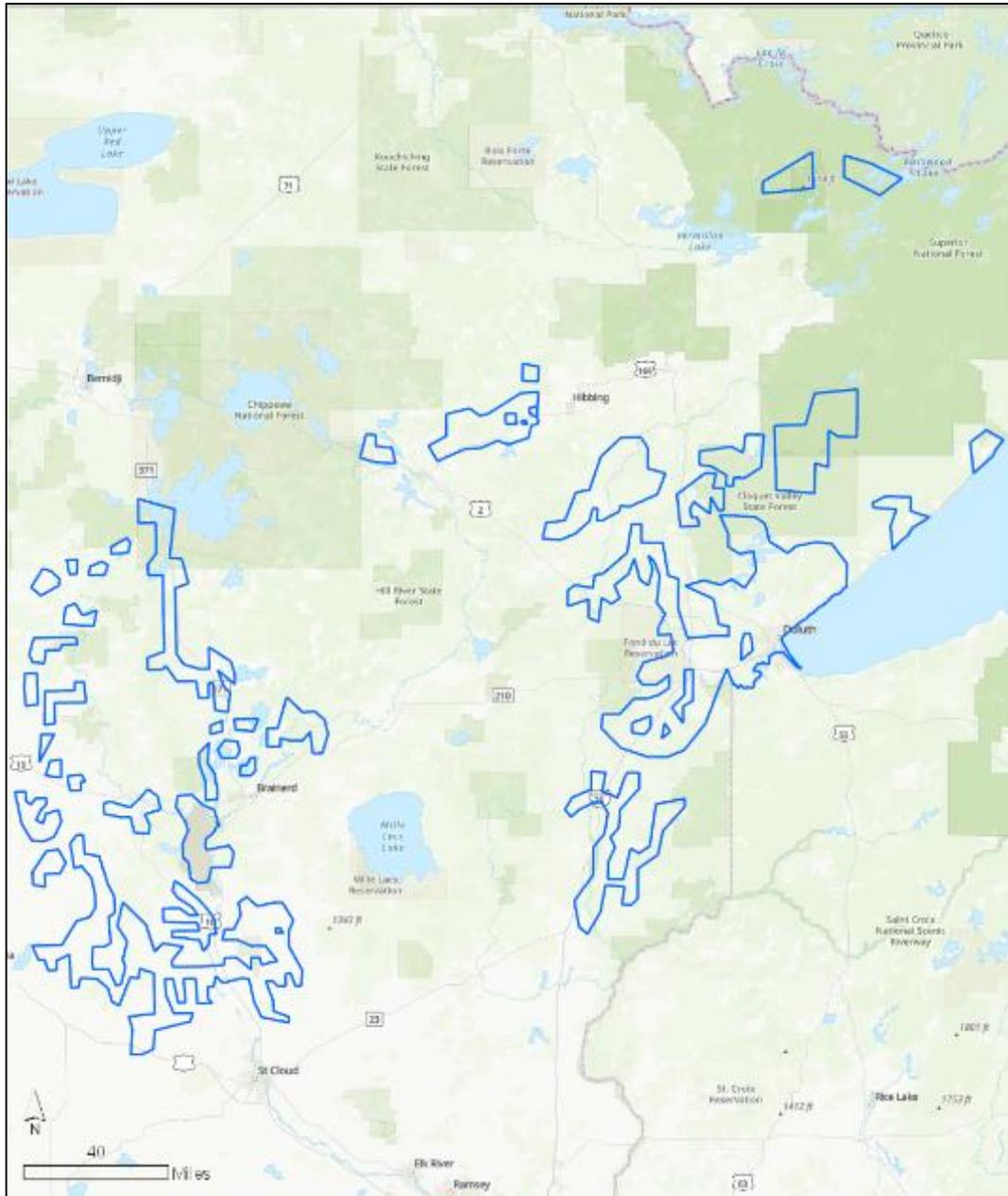
- Congested Urban
- Service Territory

Service Area: 55096.33 sqkm

Congested Area: 1.6 sqkm

Percent Congested: 0.0029%

ALABAMA POWER CO.



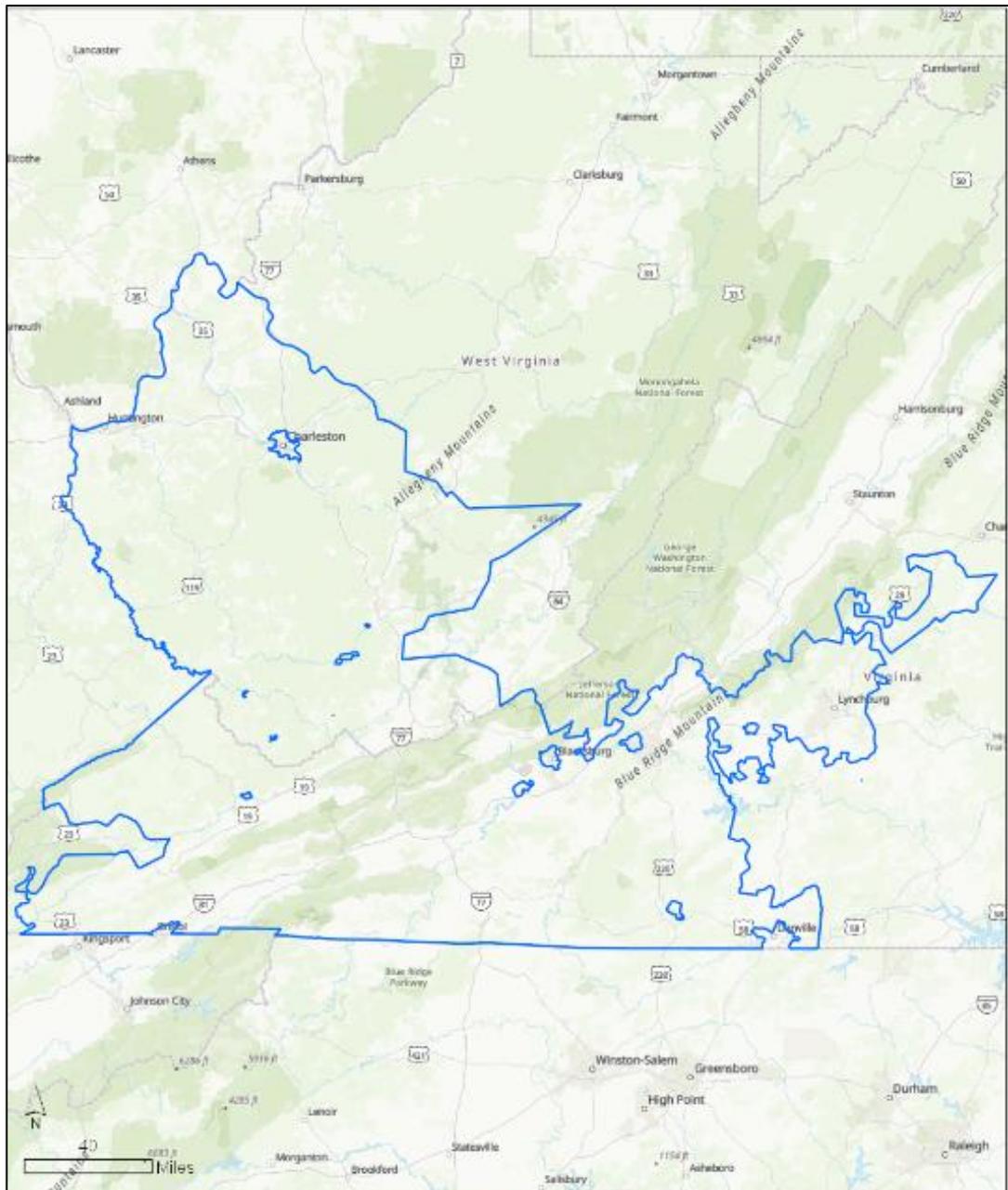
- Congested Urban
- Service Territory

Service Area: 8035.3 sqkm

Congested Area: 0 sqkm

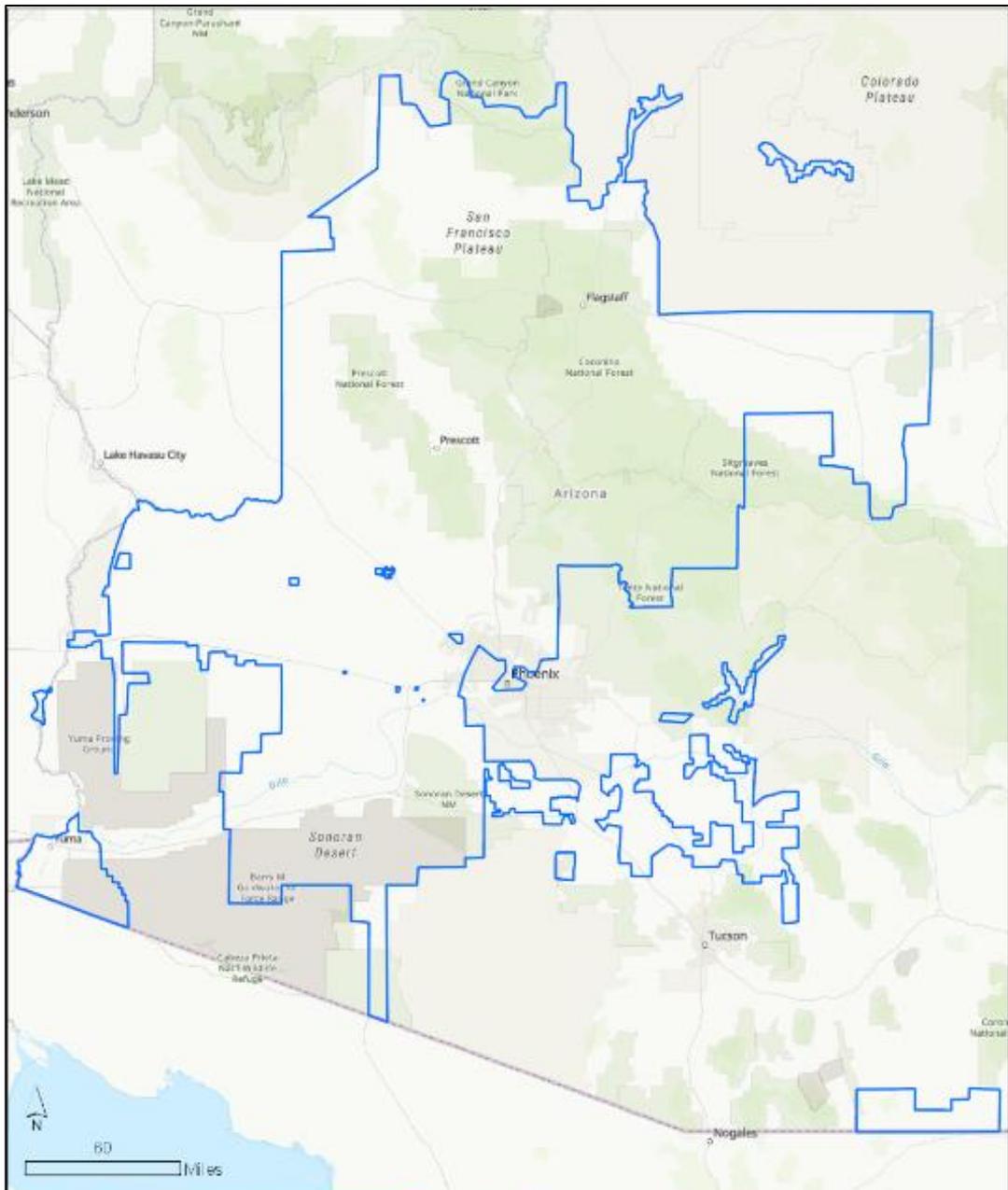
Percent Congested: 0.0000%

MINNESOTA POWER, INC.



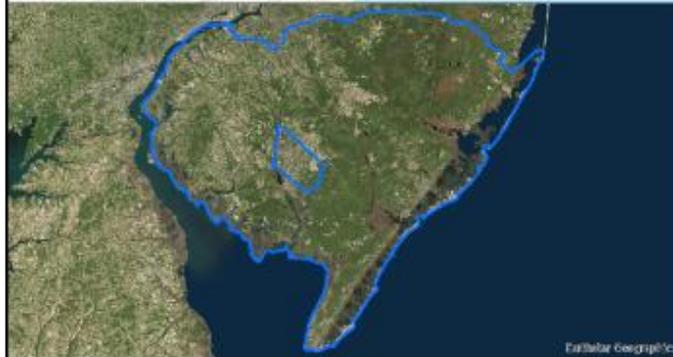
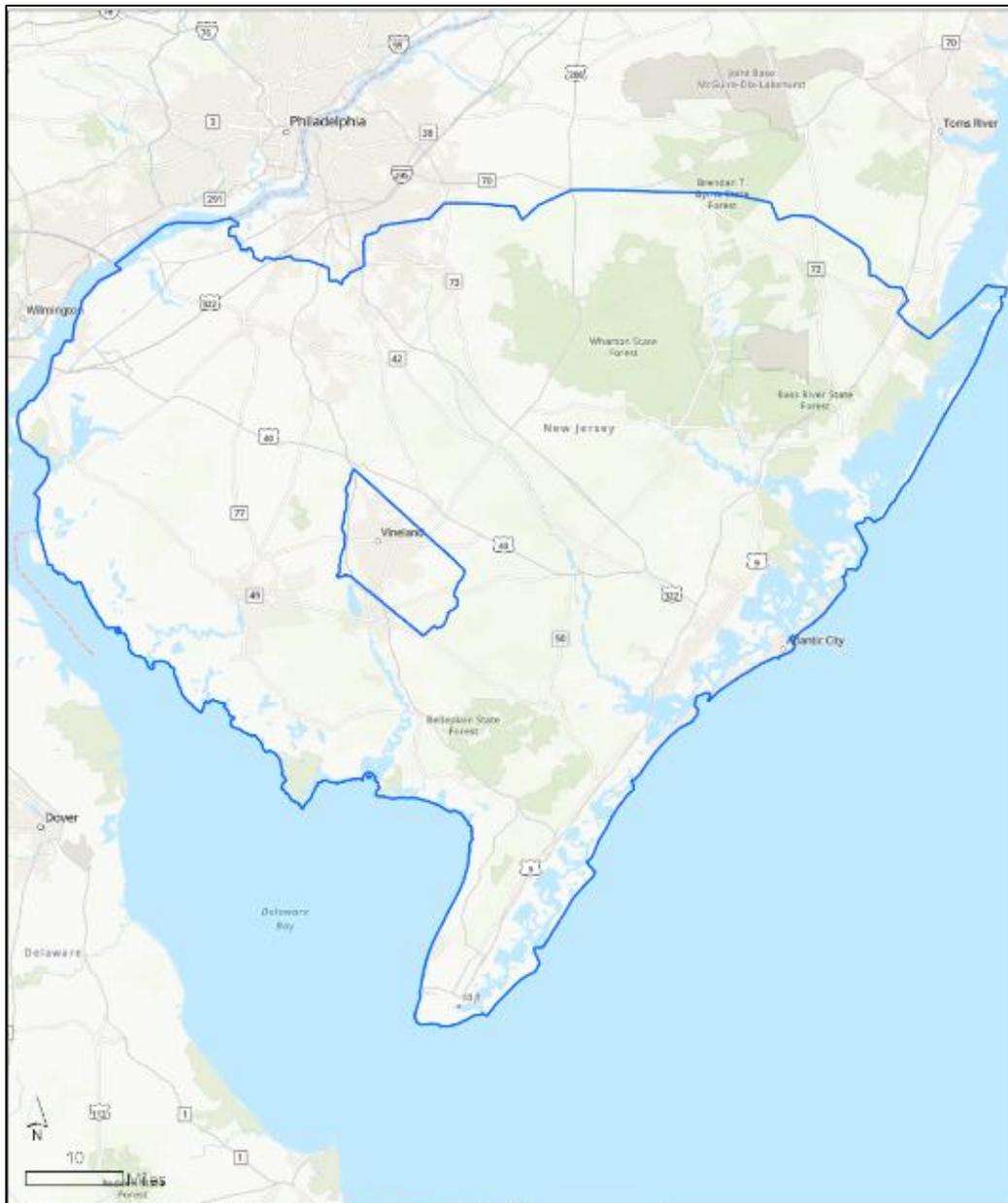
■ Congested Urban
■ Service Territory
 Service Area: 47416.64 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

APPALACHIAN POWER CO.



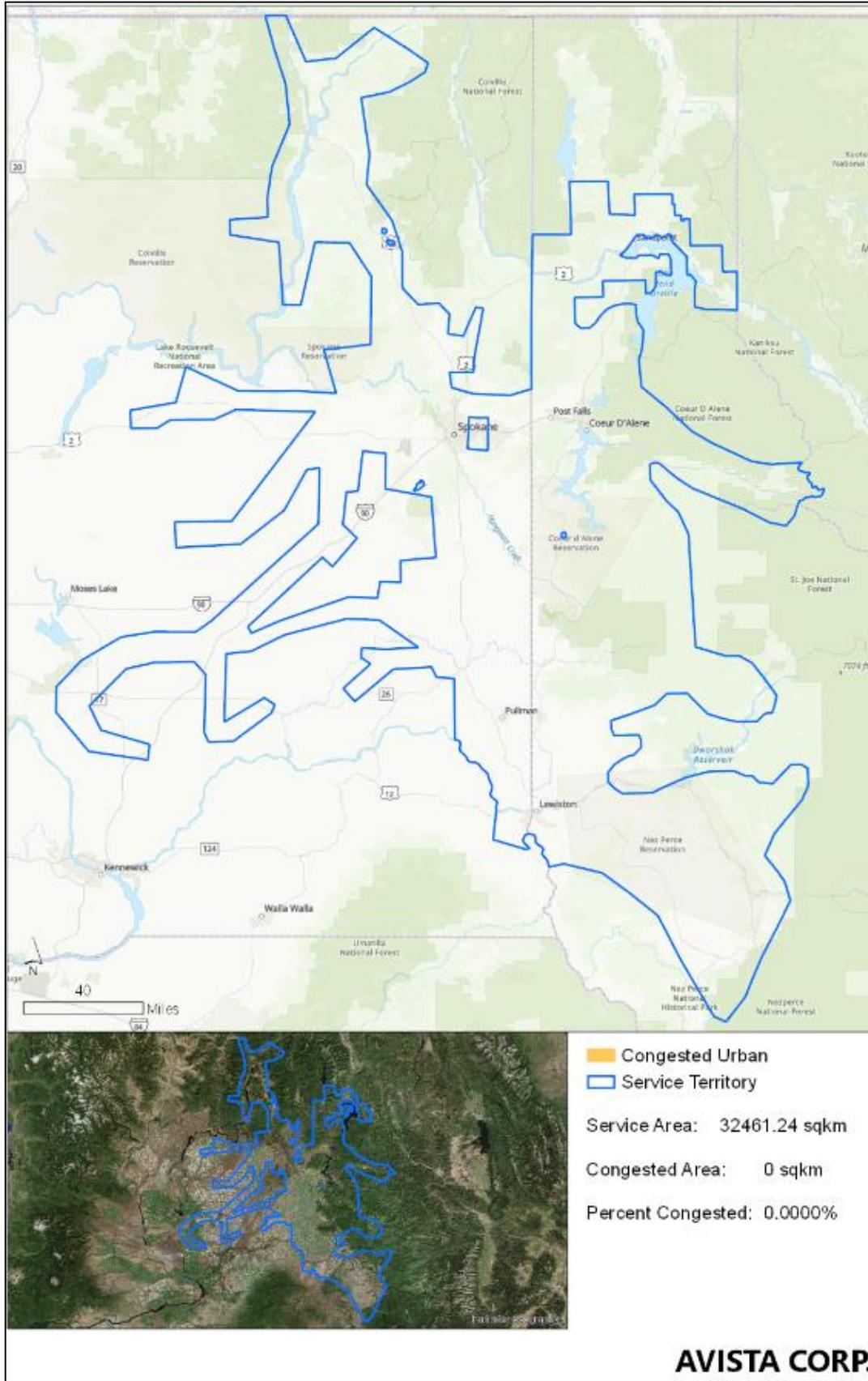
■ Congested Urban
 Service Territory
 Service Area: 90628.57 sqkm
 Congested Area: 2.66 sqkm
 Percent Congested: 0.0029%

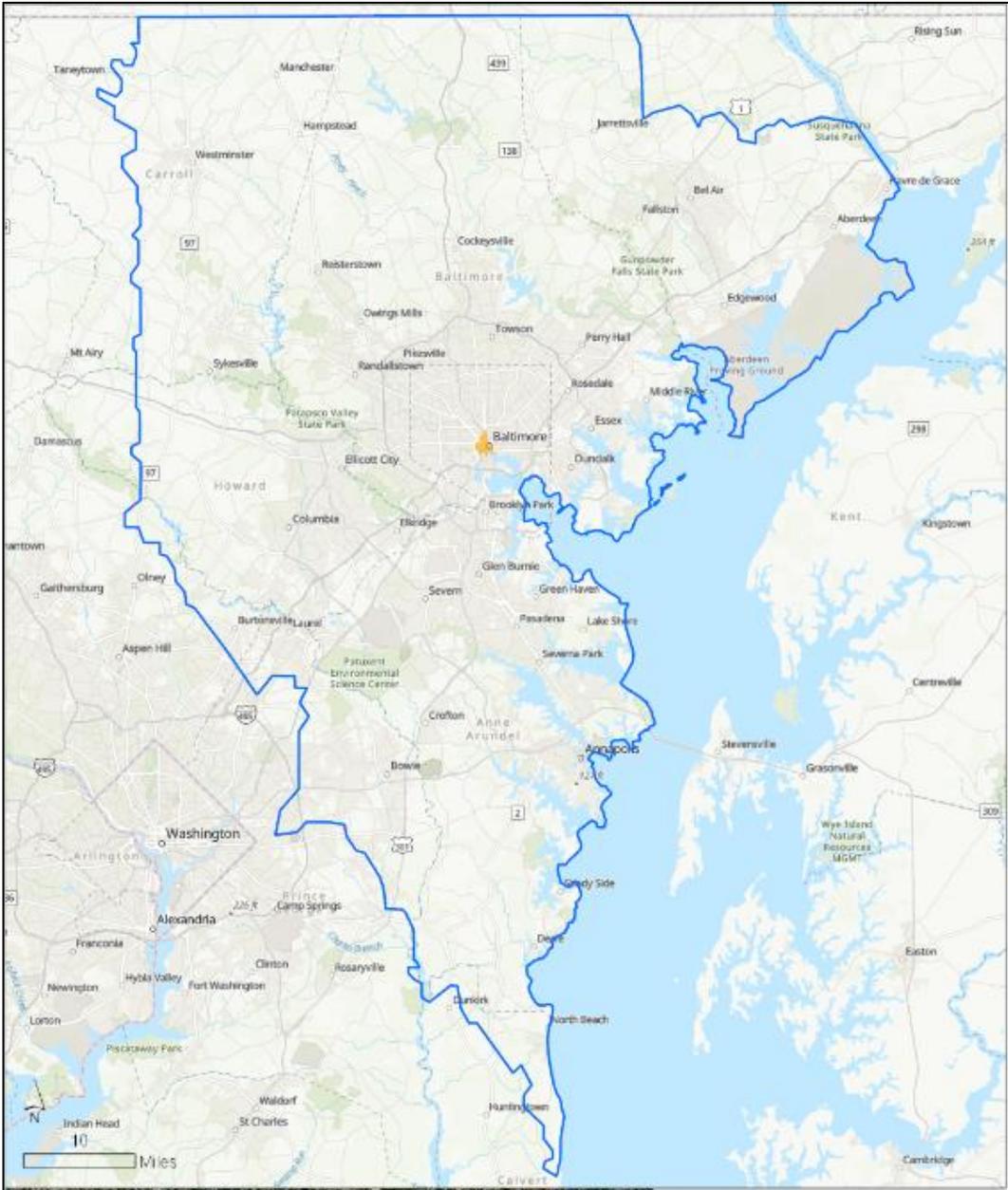
ARIZONA PUBLIC SERVICE CO.



■ Congested Urban
■ Service Territory
 Service Area: 7095.68 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

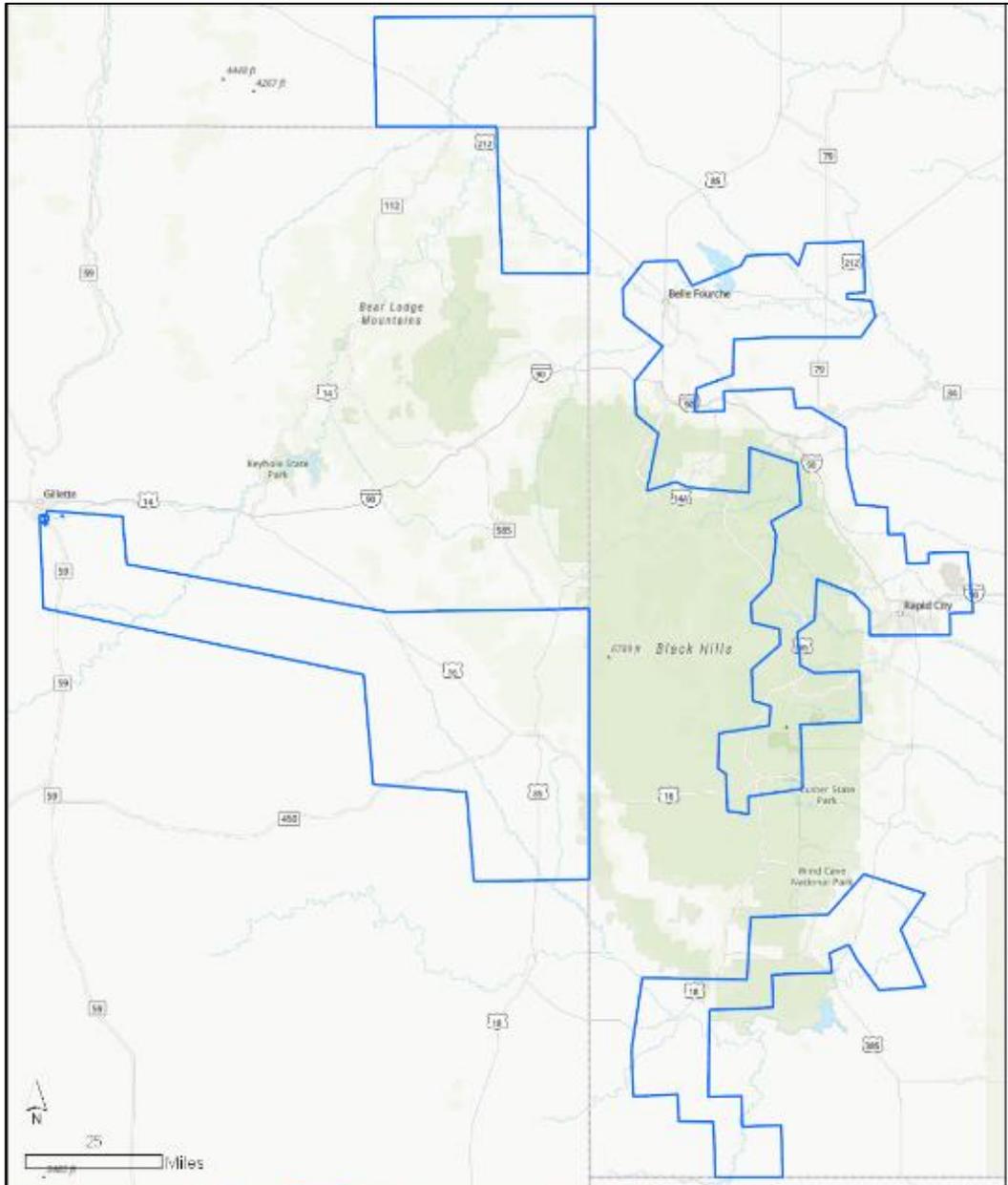
ATLANTIC CITY ELECTRIC CO.





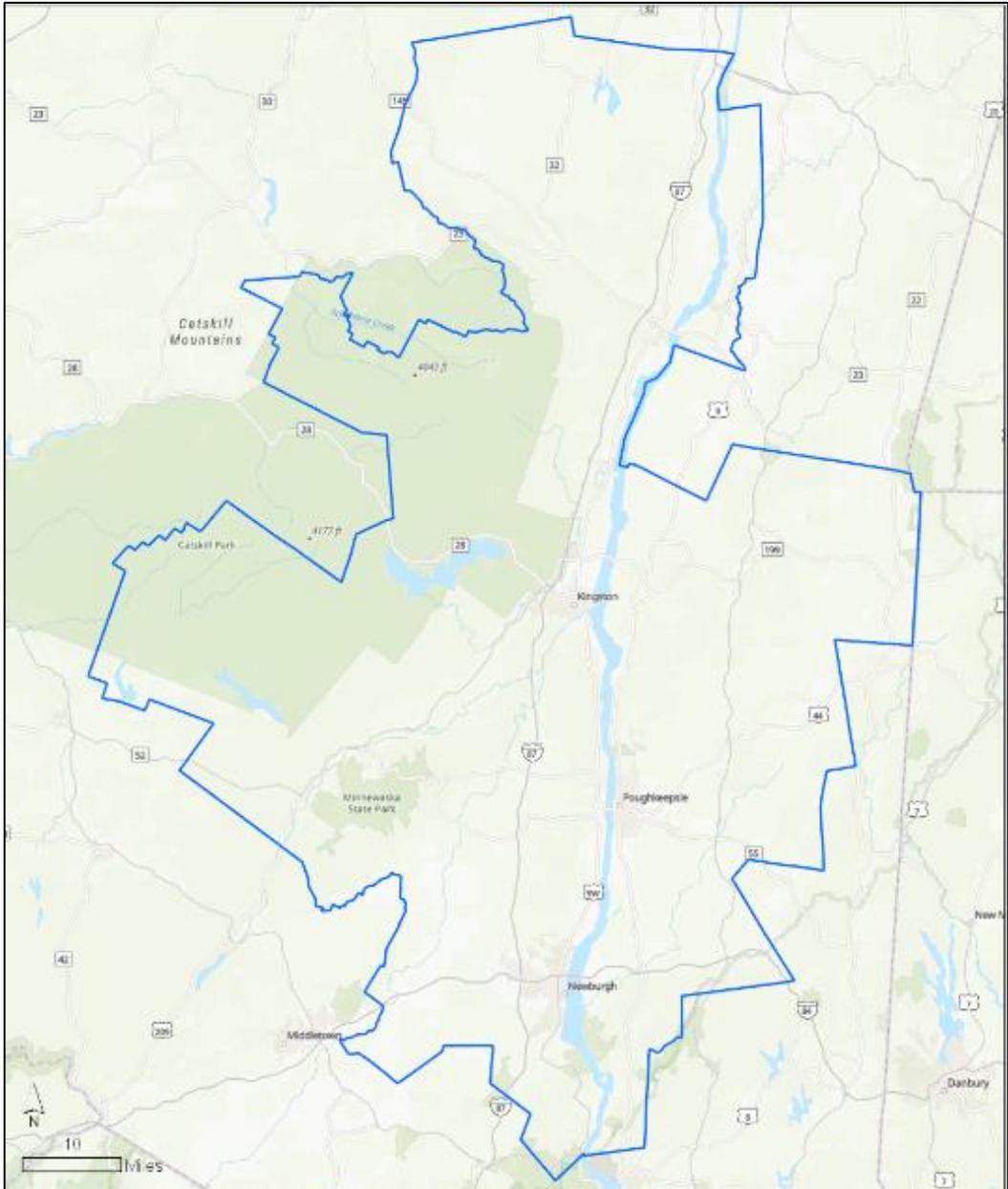
■ Congested Urban
■ Service Territory
 Service Area: 5784.92 sqkm
 Congested Area: 3.45 sqkm
 Percent Congested: 0.0596%

BALTIMORE GAS & ELECTRIC CO.



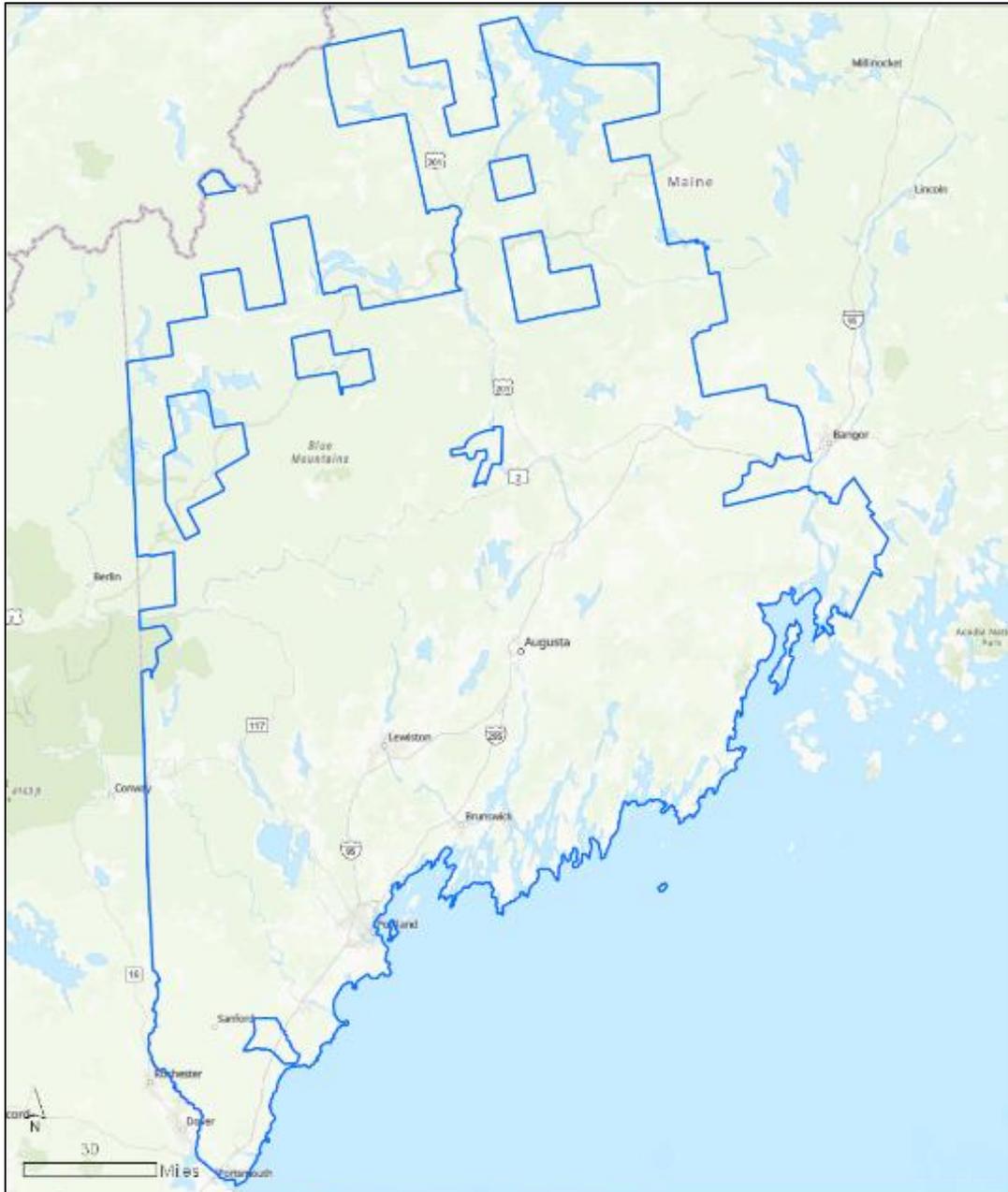
■ Congested Urban
■ Service Territory
 Service Area: 9371.73 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

BLACK HILLS POWER INC.



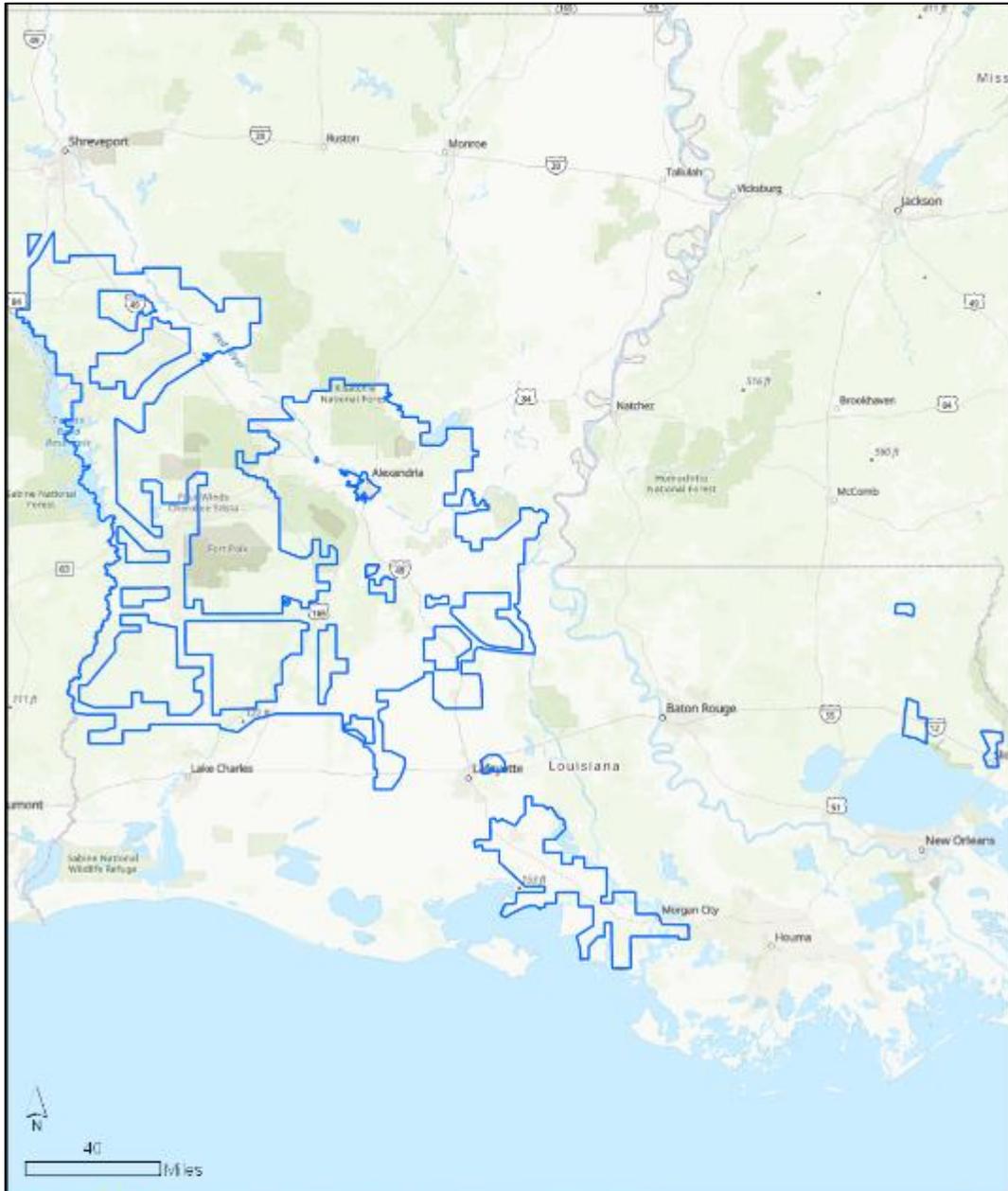
■ Congested Urban
■ Service Territory
 Service Area: 7220.71 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

CENTRAL HUDSON GAS & ELECTRIC CORP.



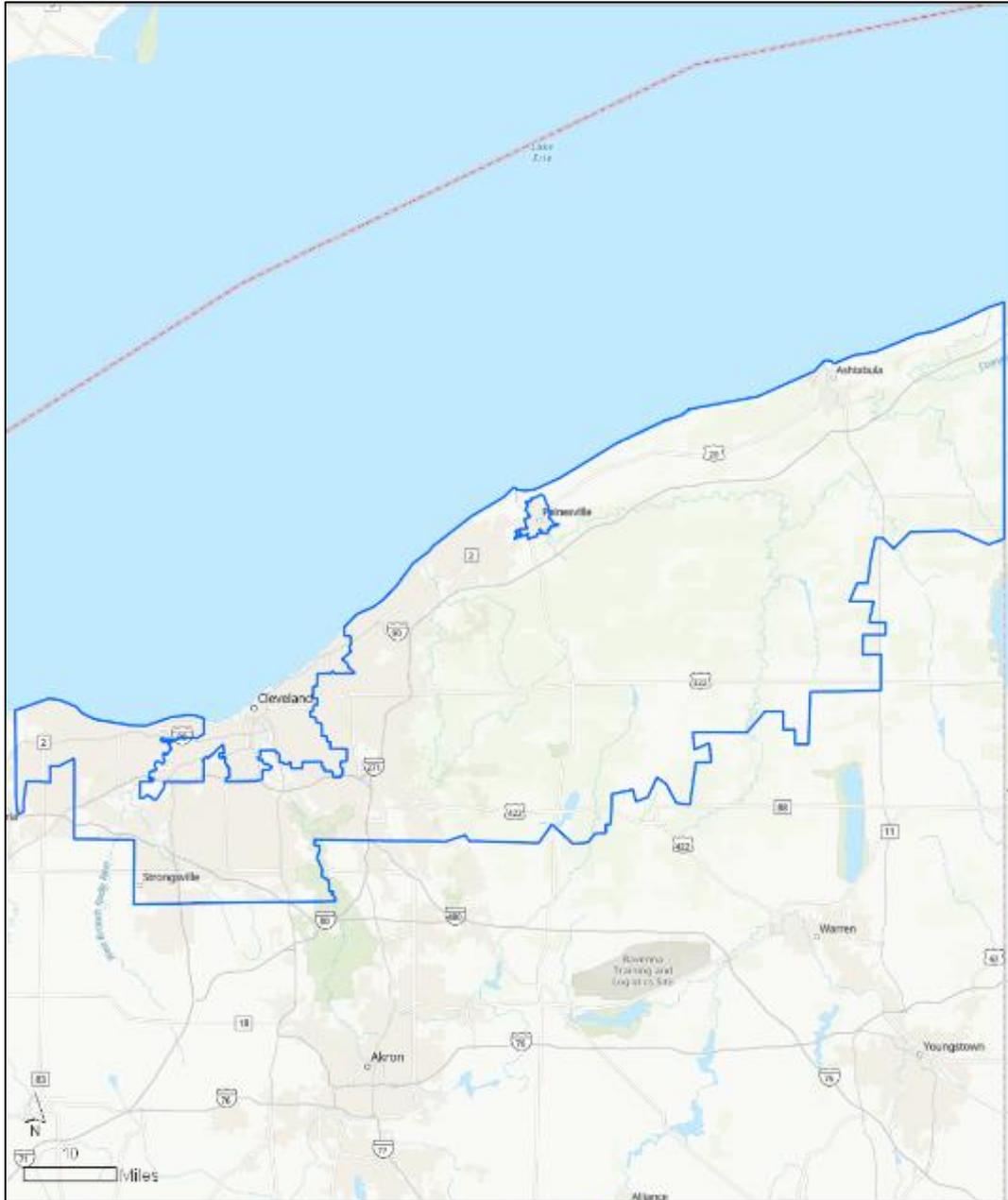
■ Congested Urban
■ Service Territory
 Service Area: 29706.54 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

CENTRAL MAINE POWER CO.



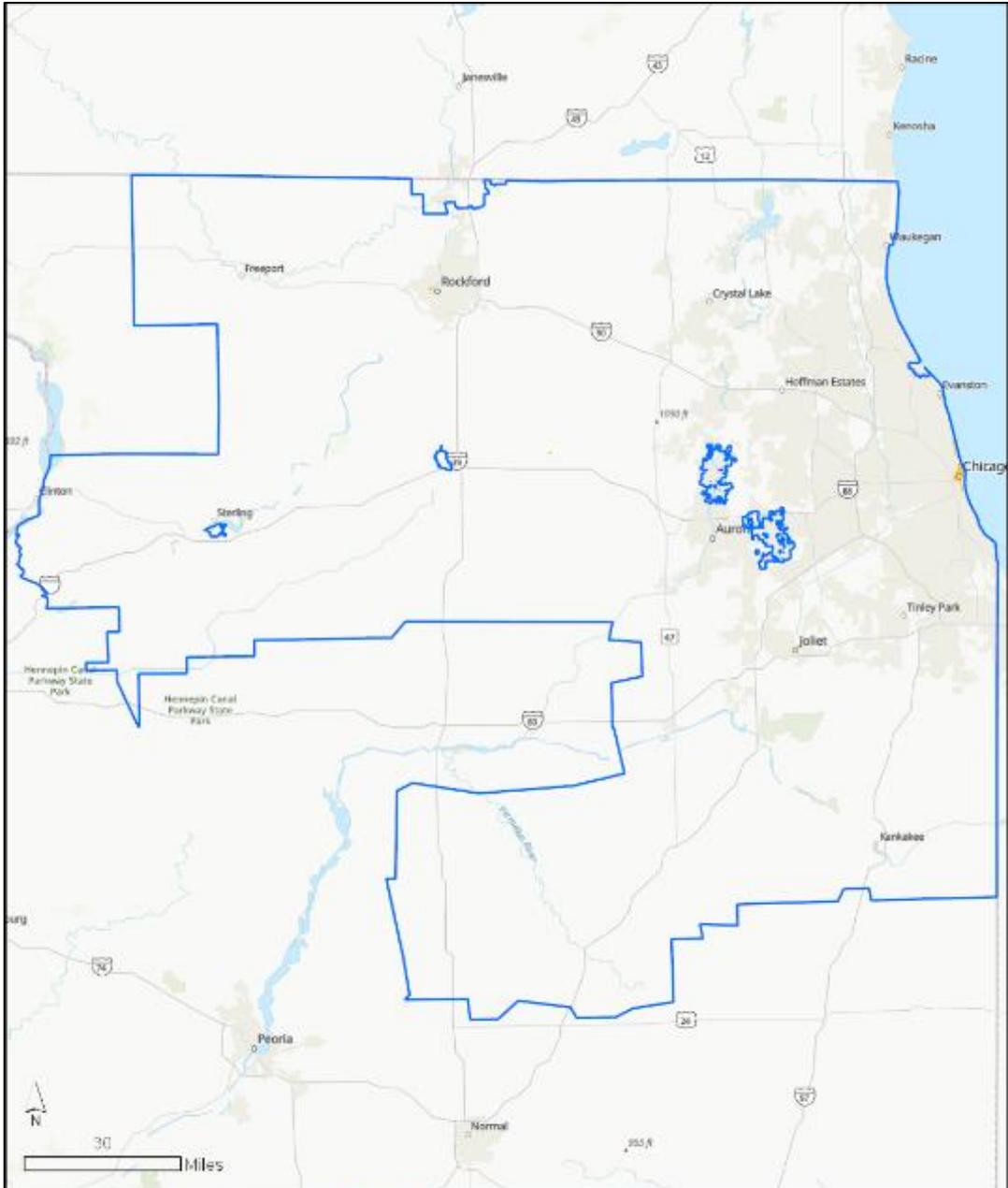
■ Congested Urban
□ Service Territory
 Service Area: 17806.01 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

CLECO POWER LLC



■ Congested Urban
□ Service Territory
 Service Area: 4086.69 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

CLEVELAND ELECTRIC ILLUMINATING CO.



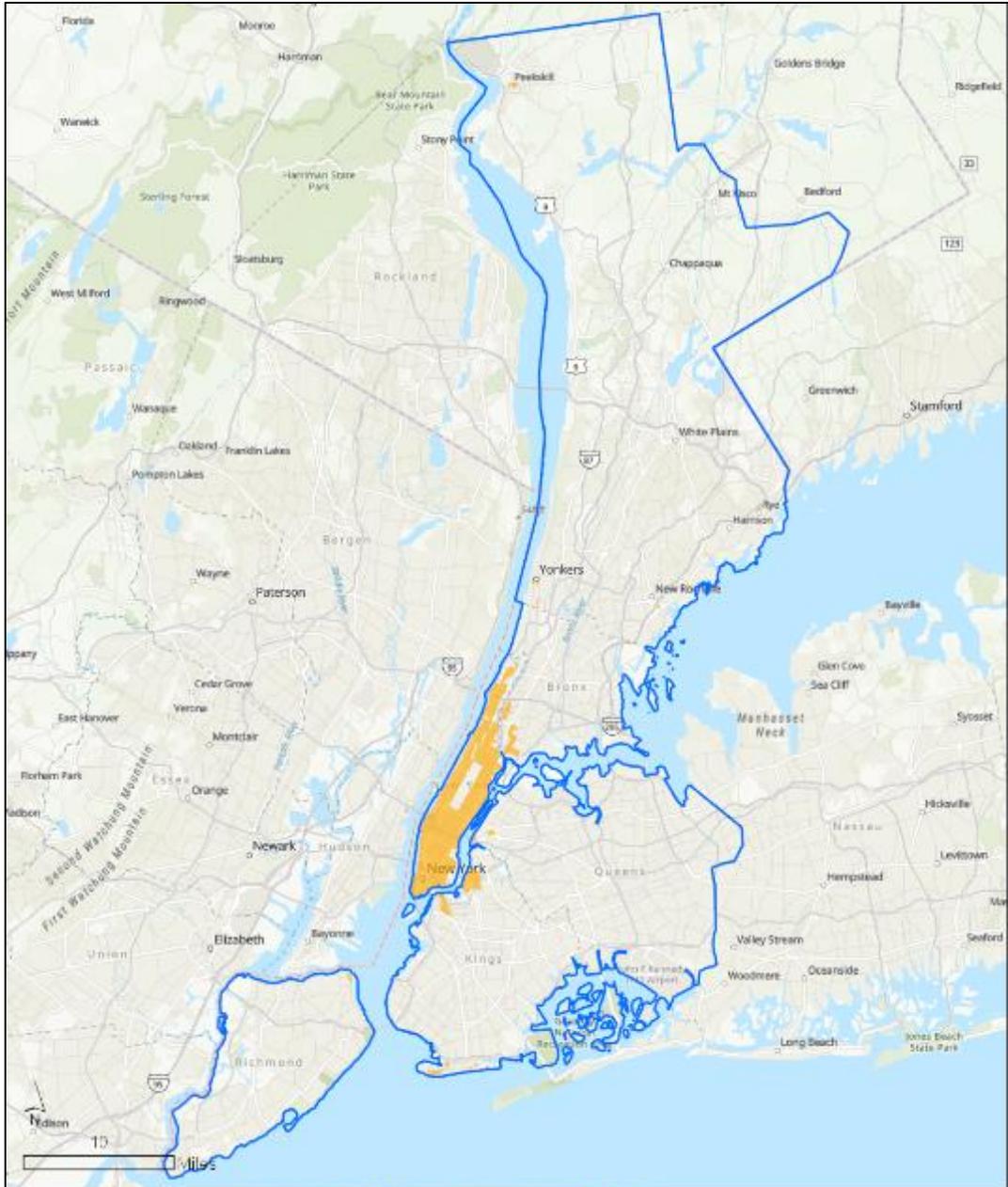
■ Congested Urban
 Service Territory
 Service Area: 27976.66 sqkm
 Congested Area: 12.73 sqkm
 Percent Congested: 0.0455%

COMMONWEALTH EDISON CO.



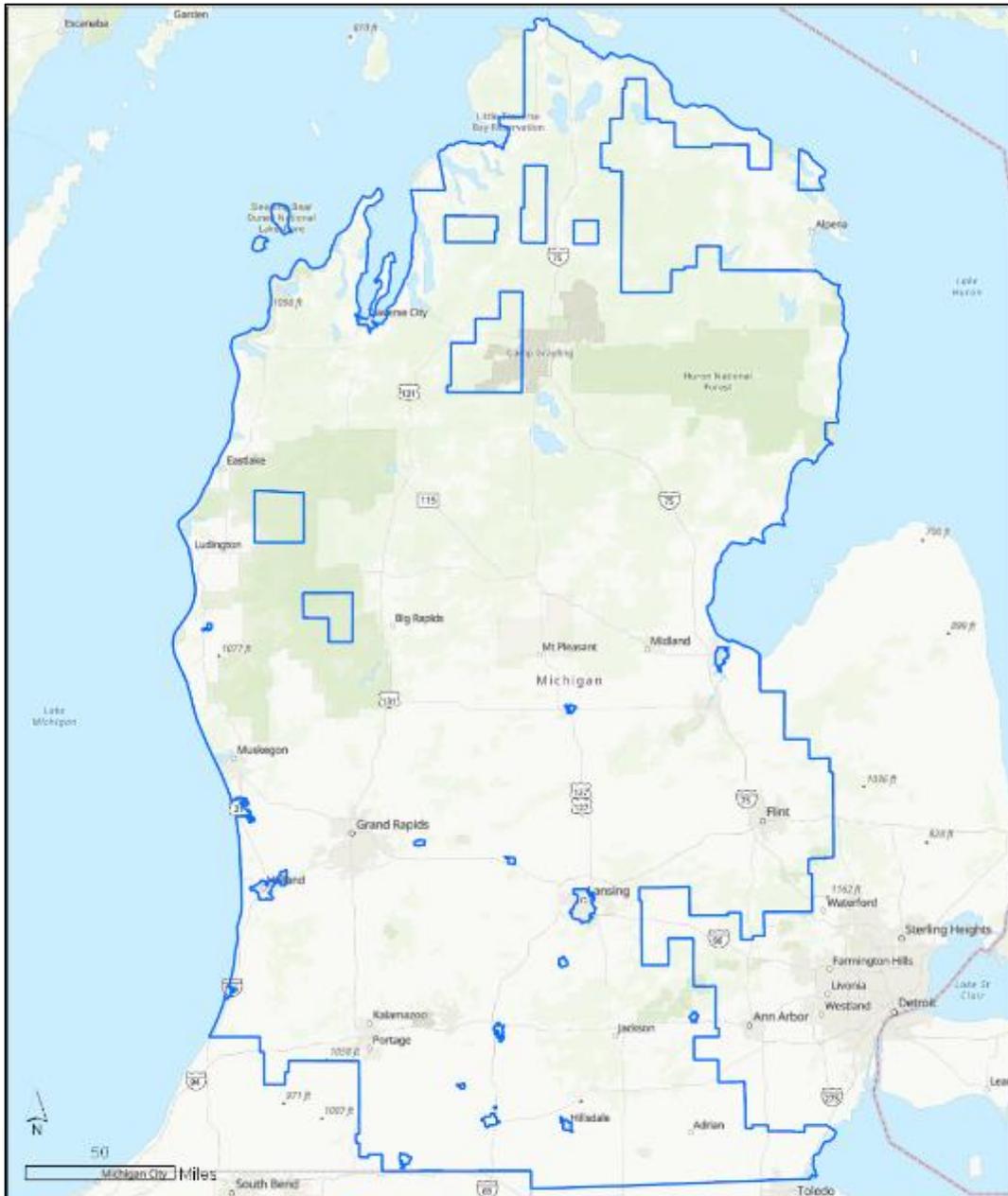
■ Congested Urban
 Service Territory
 Service Area: 11688.17 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

CONNECTICUT LIGHT & POWER CO.



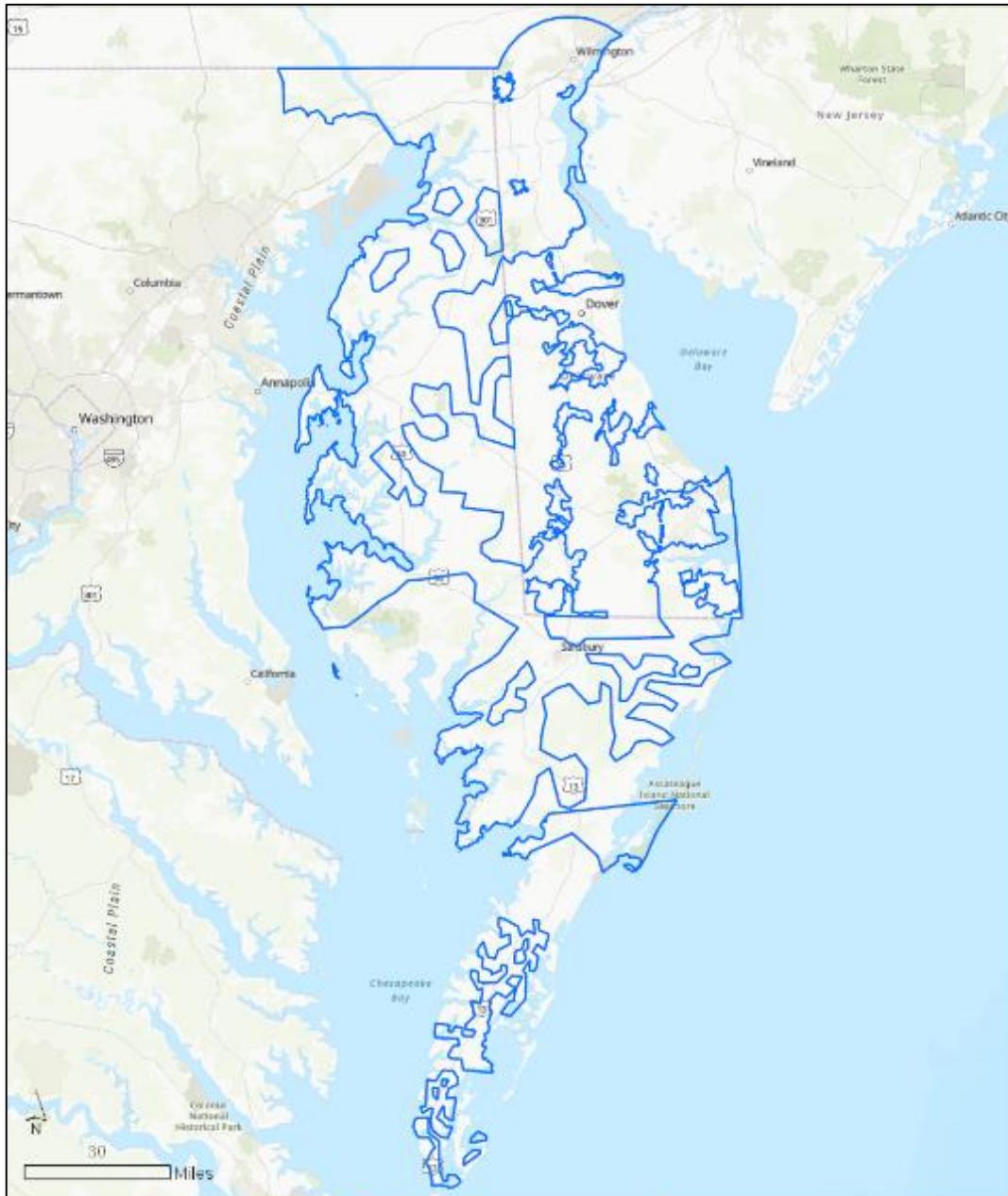
■ Congested Urban
□ Service Territory
 Service Area: 1660.68 sqkm
 Congested Area: 48.92 sqkm
 Percent Congested: 2.9457%

CONSOLIDATED EDISON CO. OF NEW YORK INC.



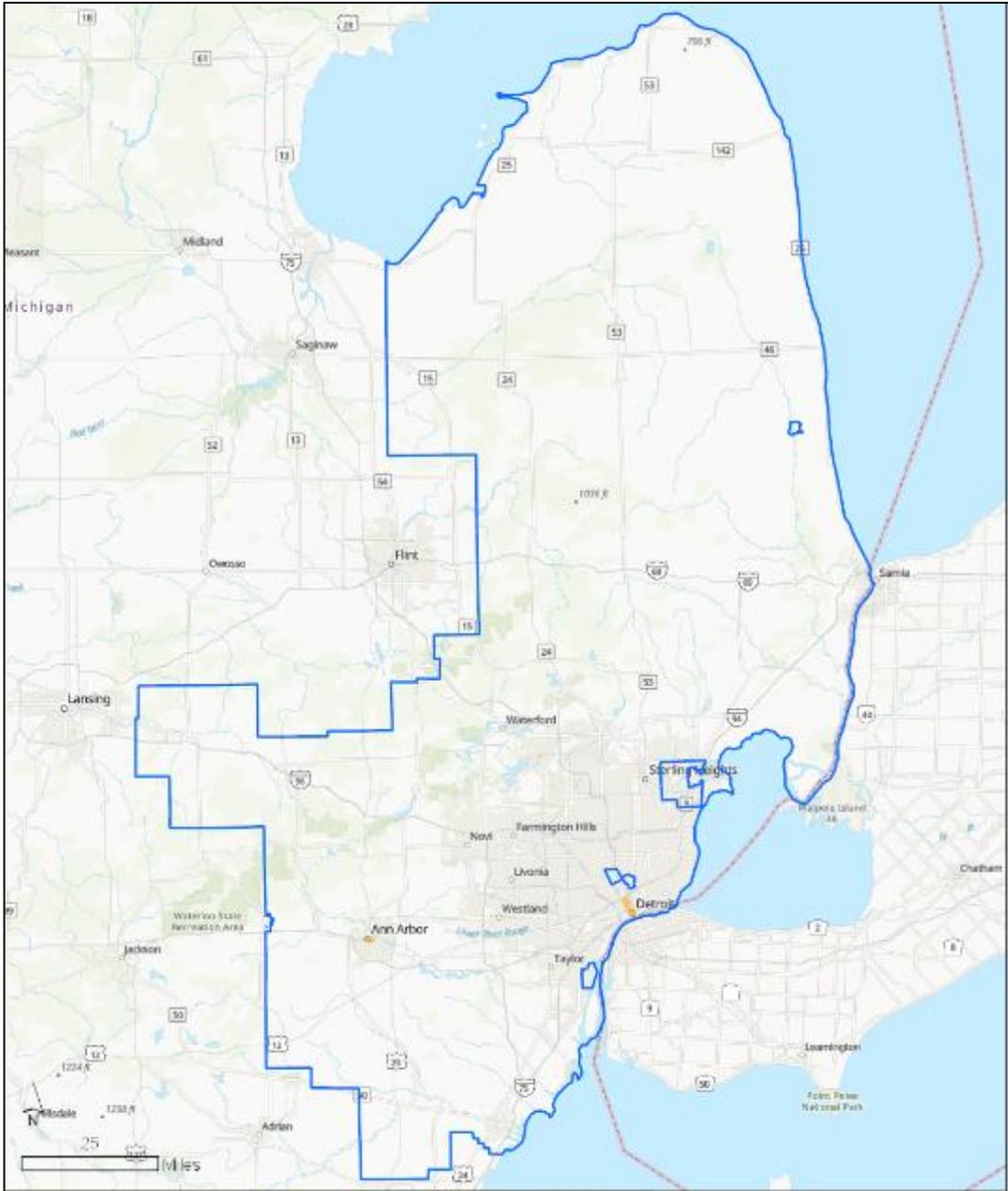
■ Congested Urban
□ Service Territory
 Service Area: 78366.96 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

CONSUMERS ENERGY CO.



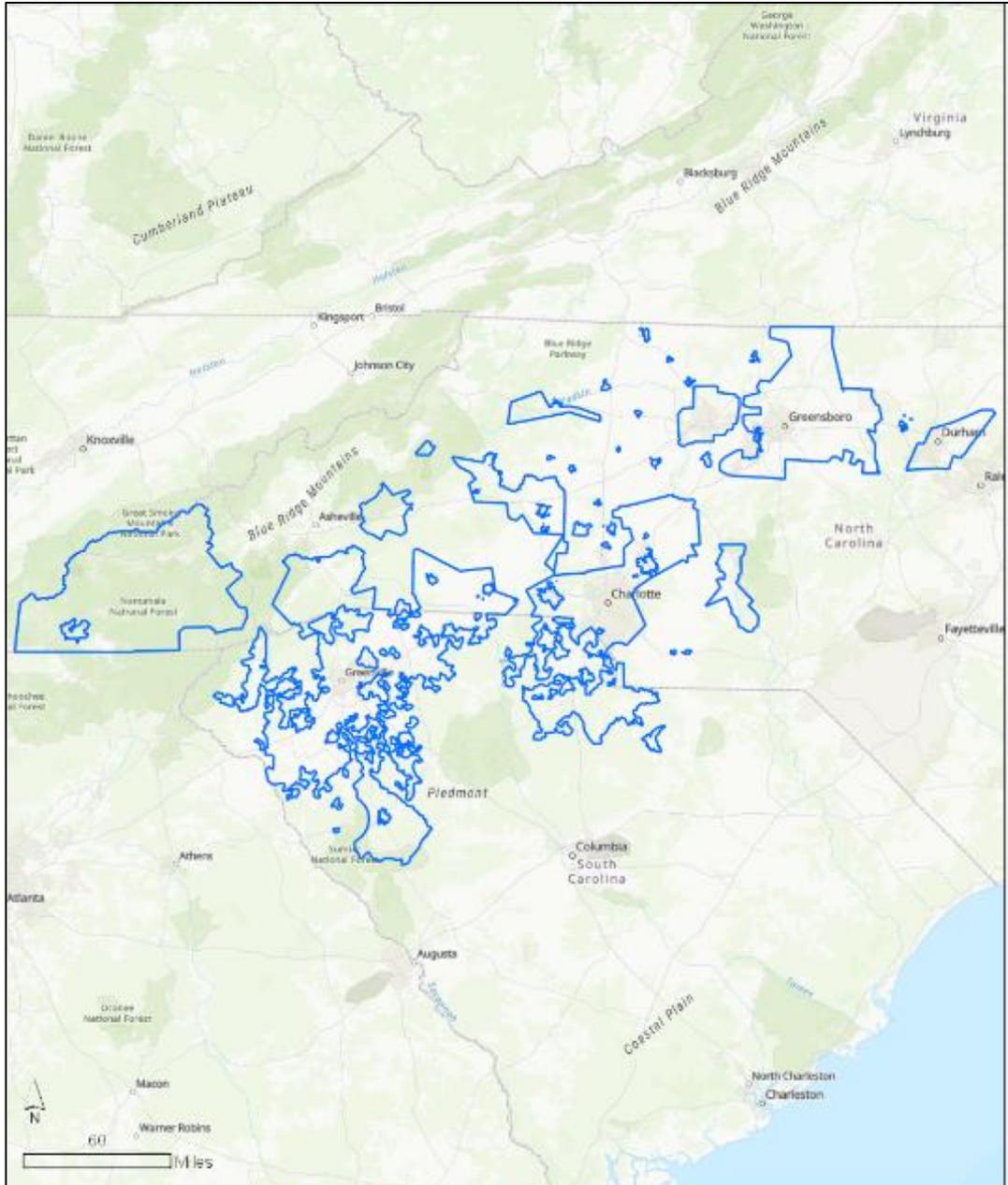
■ Congested Urban
■ Service Territory
 Service Area: 9119.64 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

DELMARVA POWER & LIGHT CO.



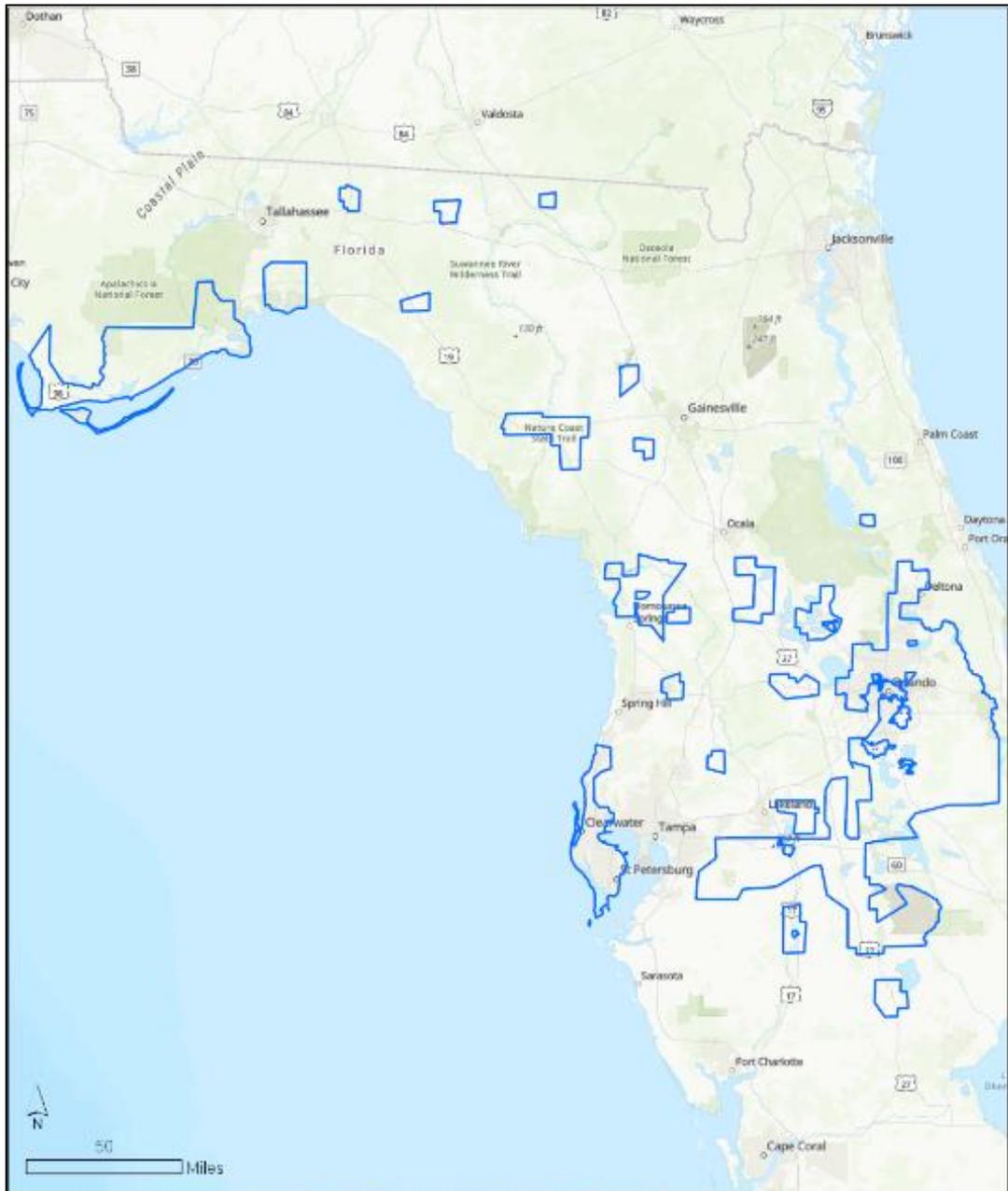
■ Congested Urban
□ Service Territory
 Service Area: 19833.46 sqkm
 Congested Area: 8.52 sqkm
 Percent Congested: 0.0430%

DETROIT EDISON CO.



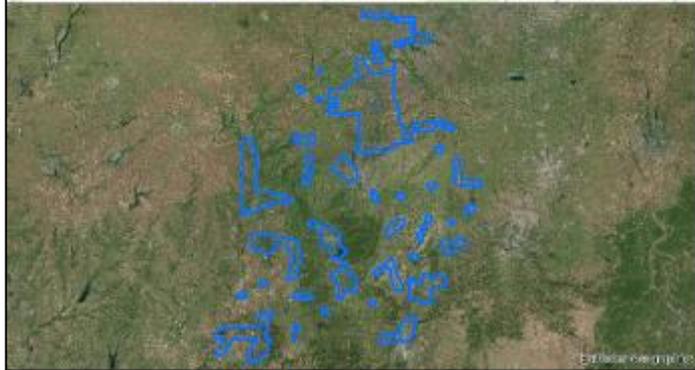
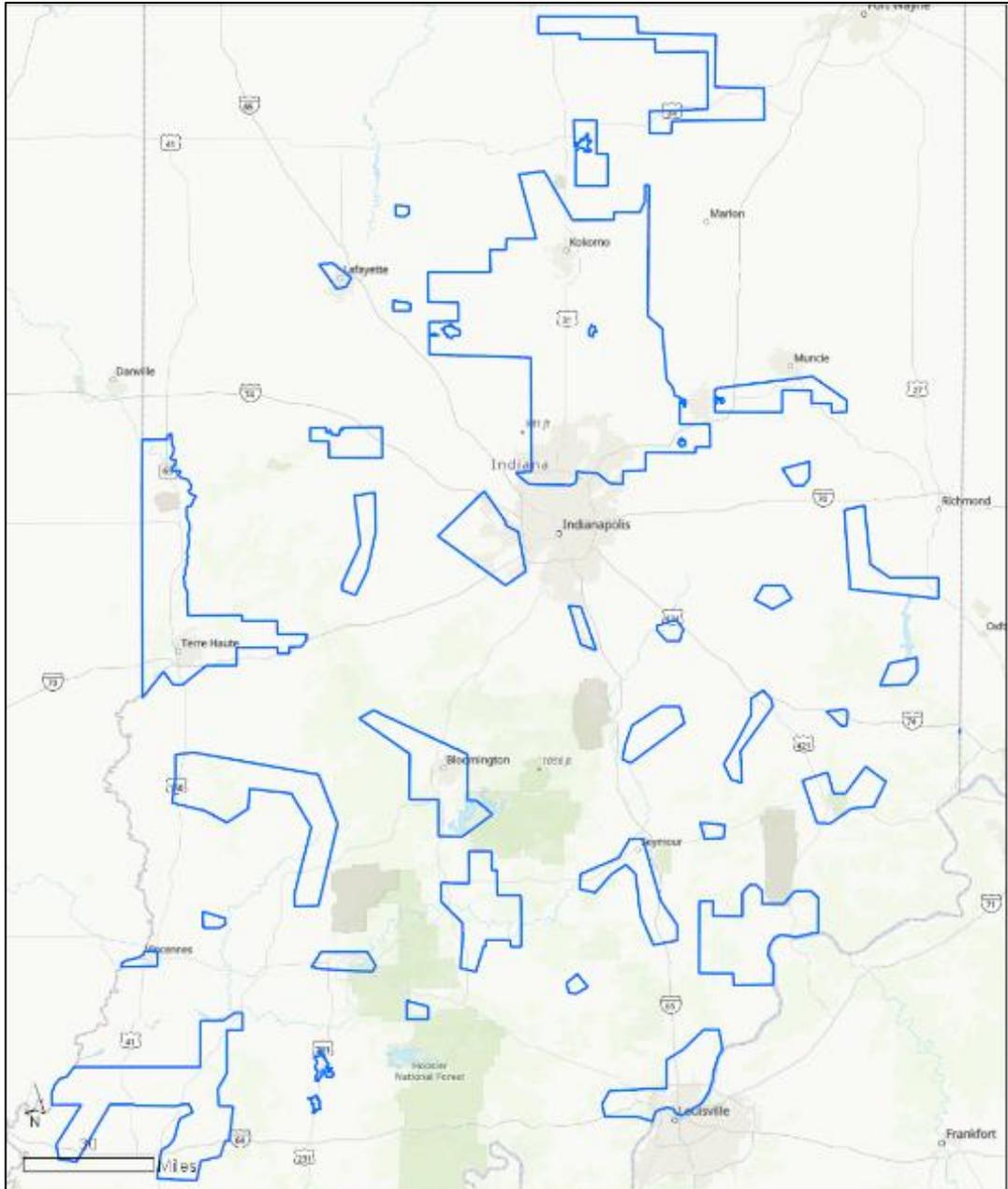
■ Congested Urban
□ Service Territory
 Service Area: 28776.02 sqkm
 Congested Area: 3.87 sqkm
 Percent Congested: 0.0134%

DUKE ENERGY CAROLINAS, LLC



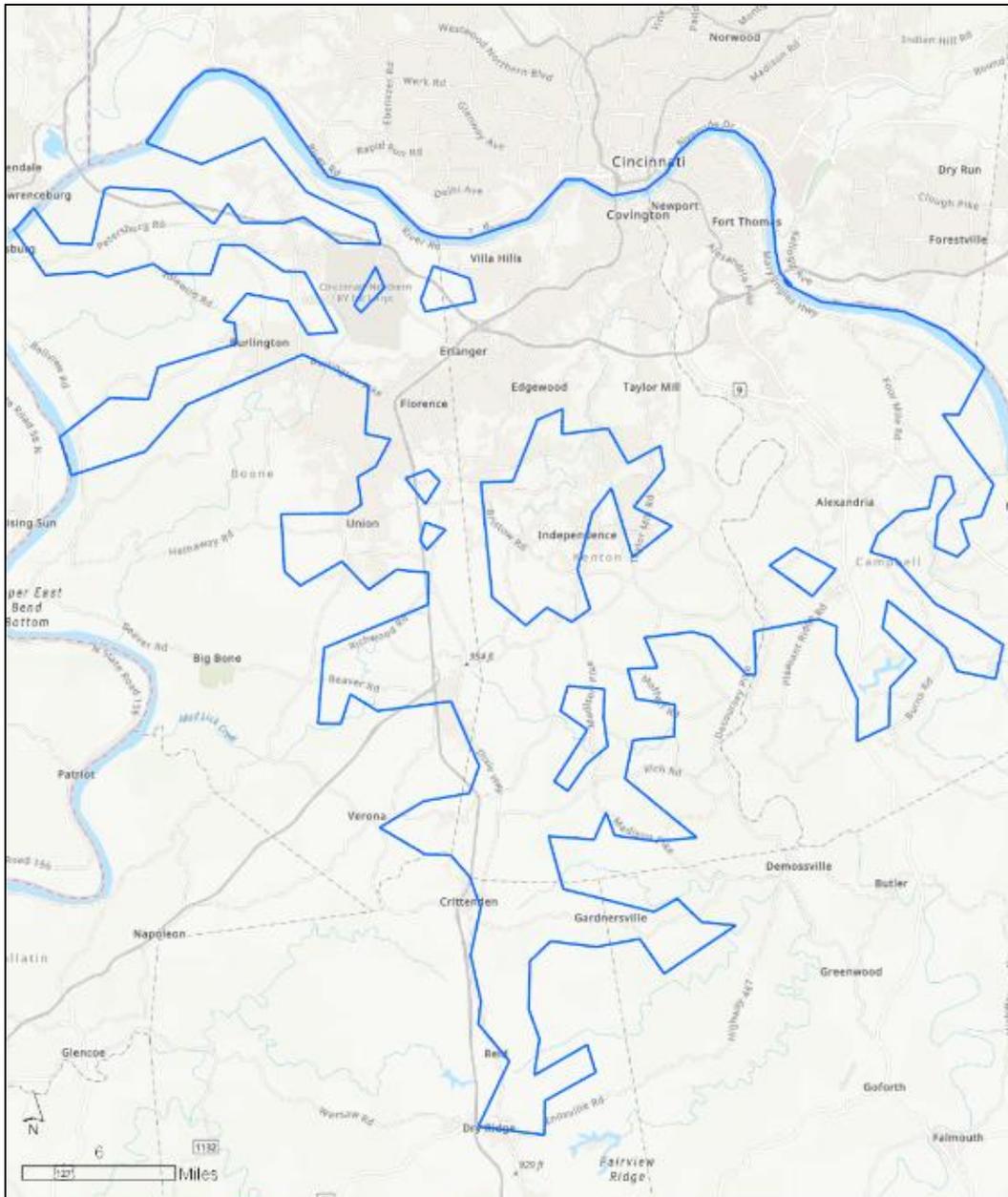
■ Congested Urban
 Service Territory
 Service Area: 14518.8 sqkm
 Congested Area: 1.22 sqkm
 Percent Congested: 0.0084%

FLORIDA POWER CORP.



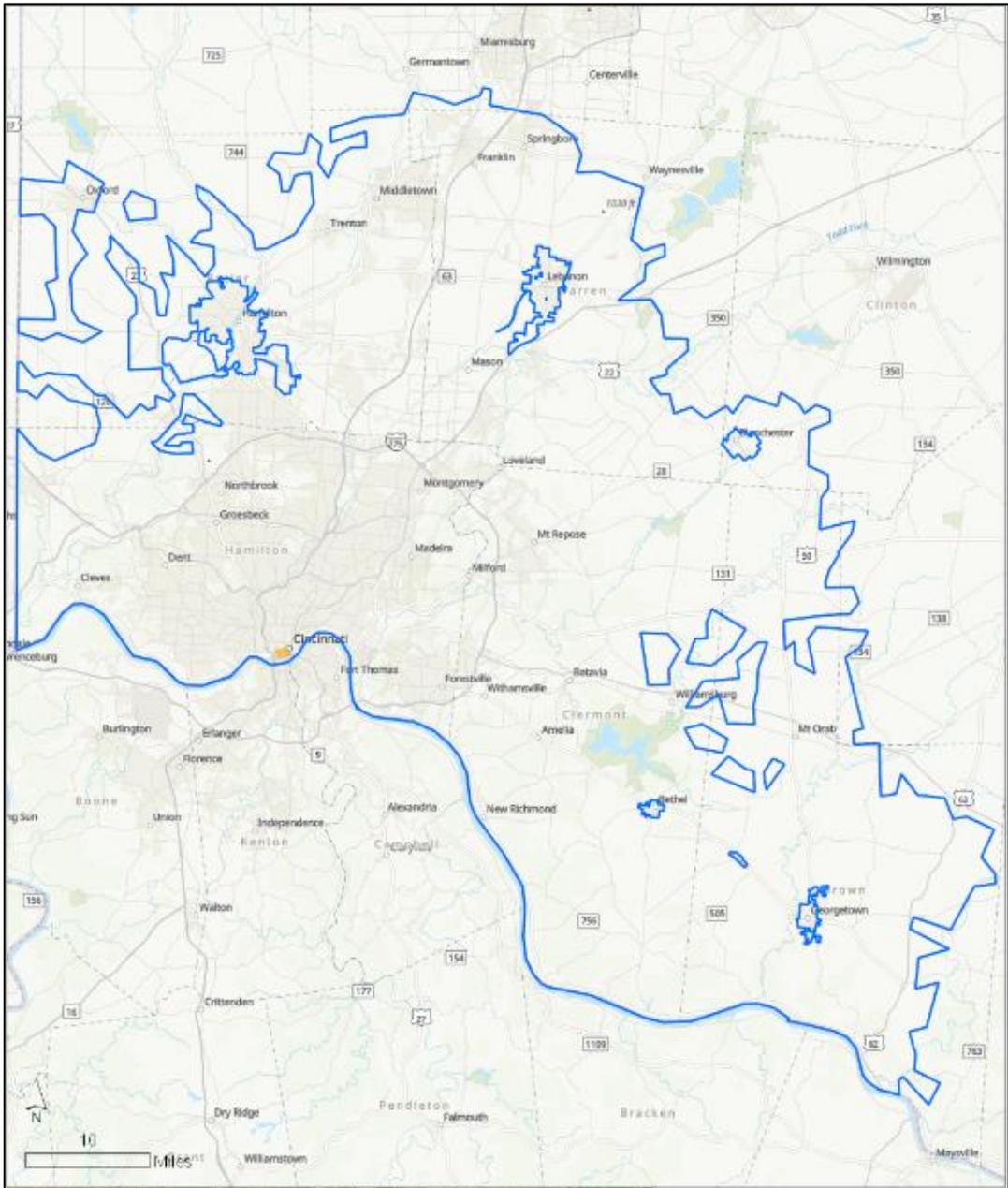
■ Congested Urban
□ Service Territory
 Service Area: 11460.76 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

DUKE ENERGY INDIANA, INC.



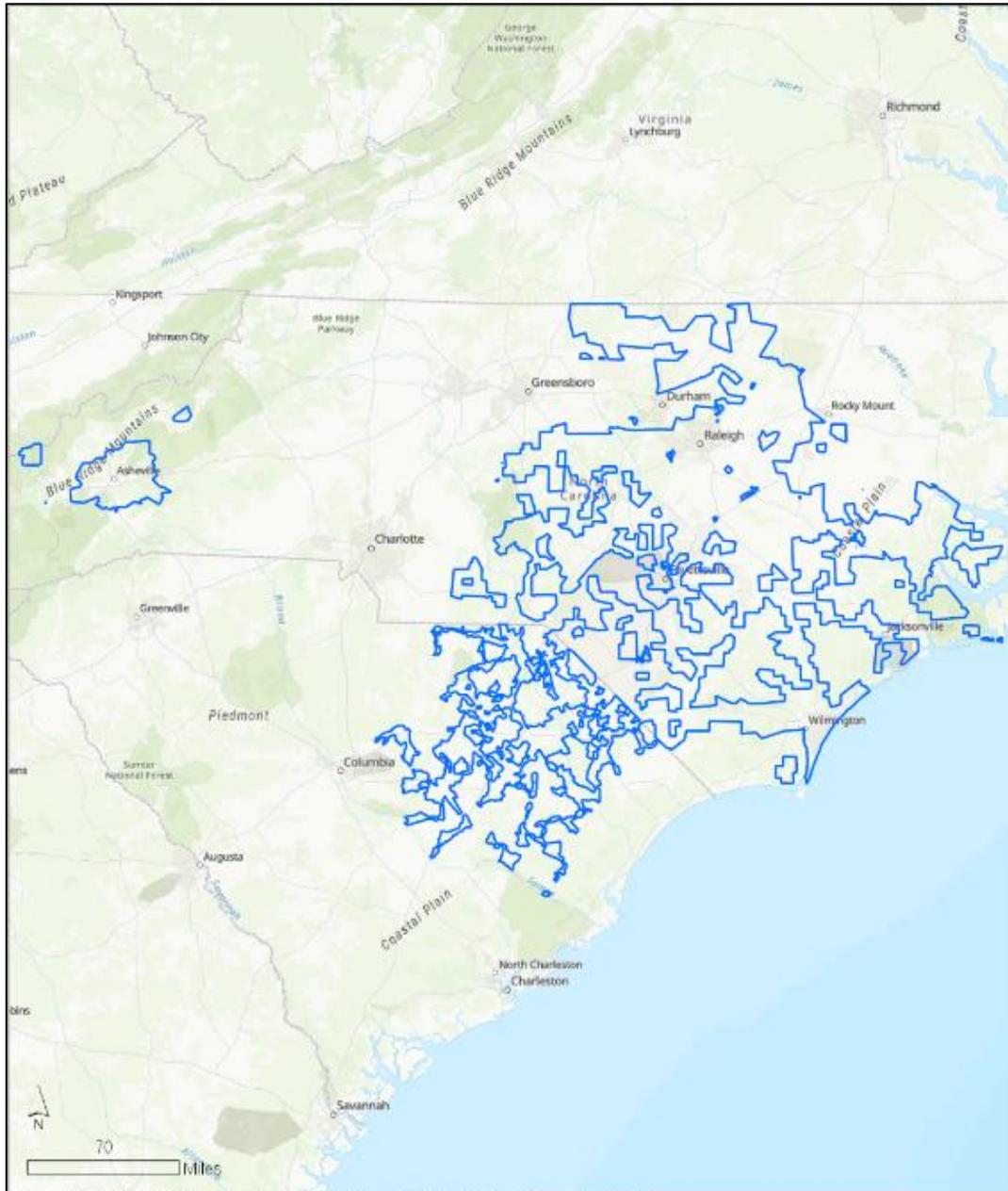
■ Congested Urban
■ Service Territory
 Service Area: 820.02 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

DUKE ENERGY KENTUCKY, INC.



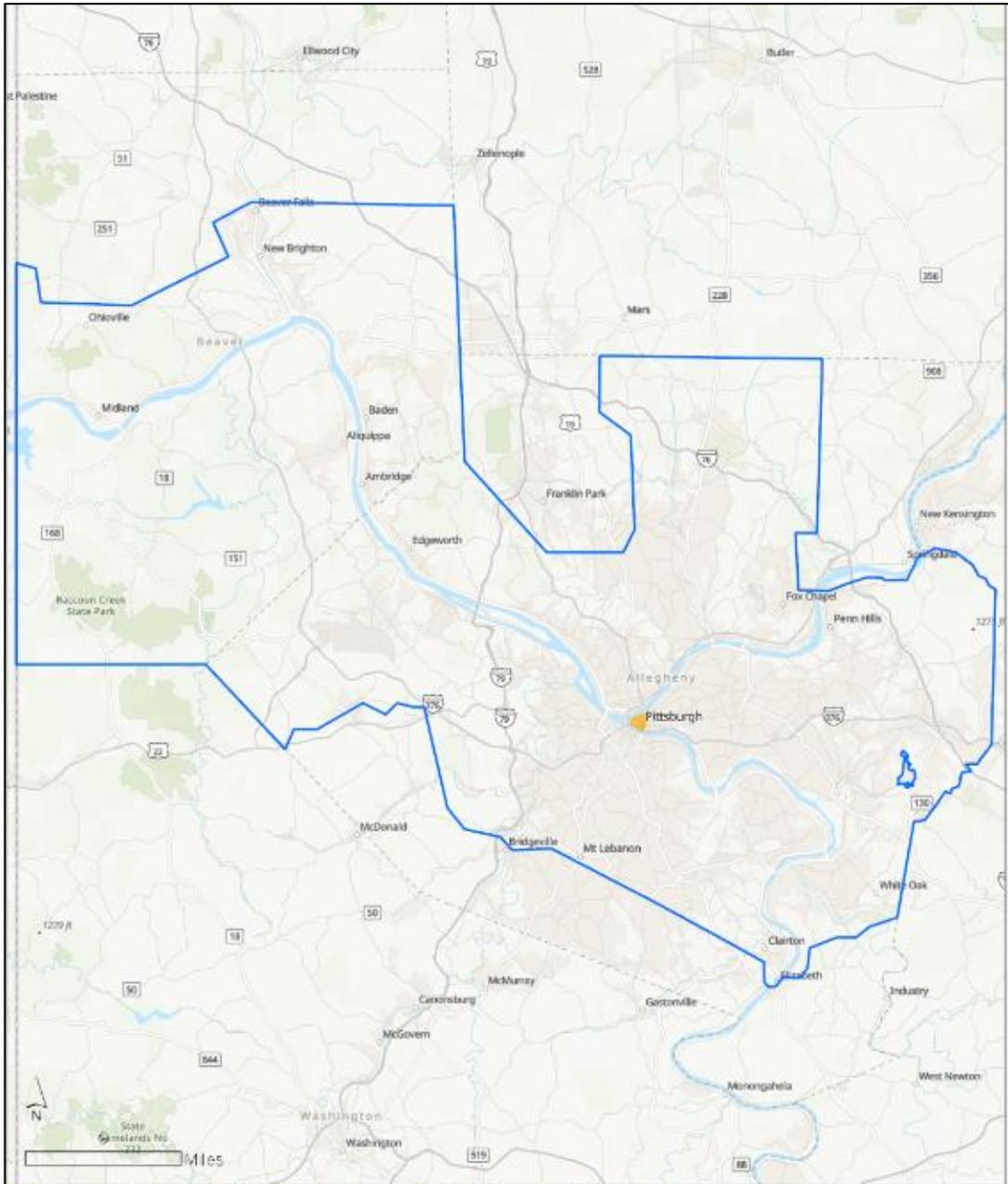
■ Congested Urban
▭ Service Territory
 Service Area: 4710.85 sqkm
 Congested Area: 1.31 sqkm
 Percent Congested: 0.0278%

DUKE ENERGY OHIO, INC.



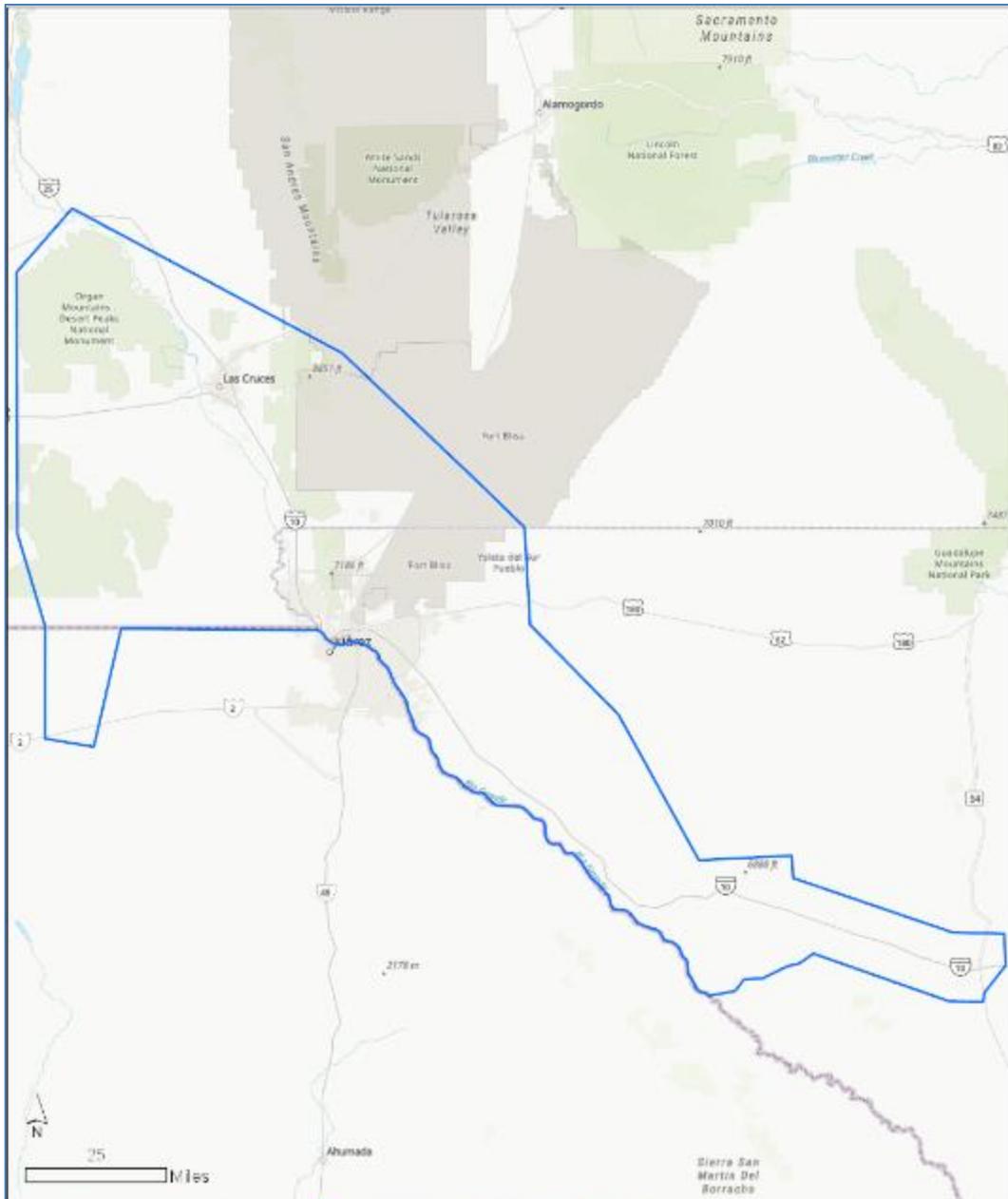
■ Congested Urban
 Service Territory
 Service Area: 38543.85 sqkm
 Congested Area: 1.32 sqkm
 Percent Congested: 0.0034%

CAROLINA POWER & LIGHT CO.



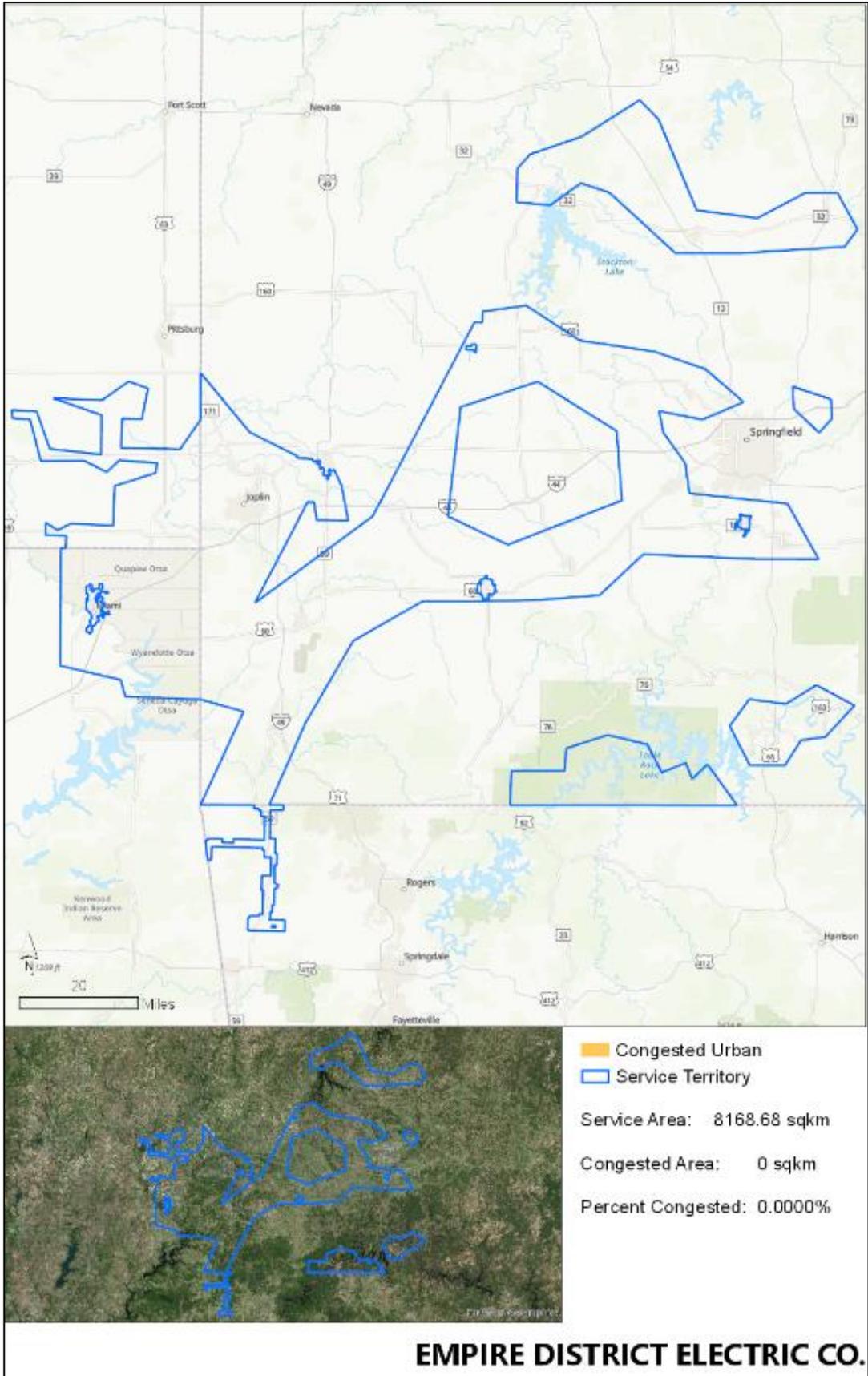
■ Congested Urban
▭ Service Territory
 Service Area: 2078.25 sqkm
 Congested Area: 1.13 sqkm
 Percent Congested: 0.0543%

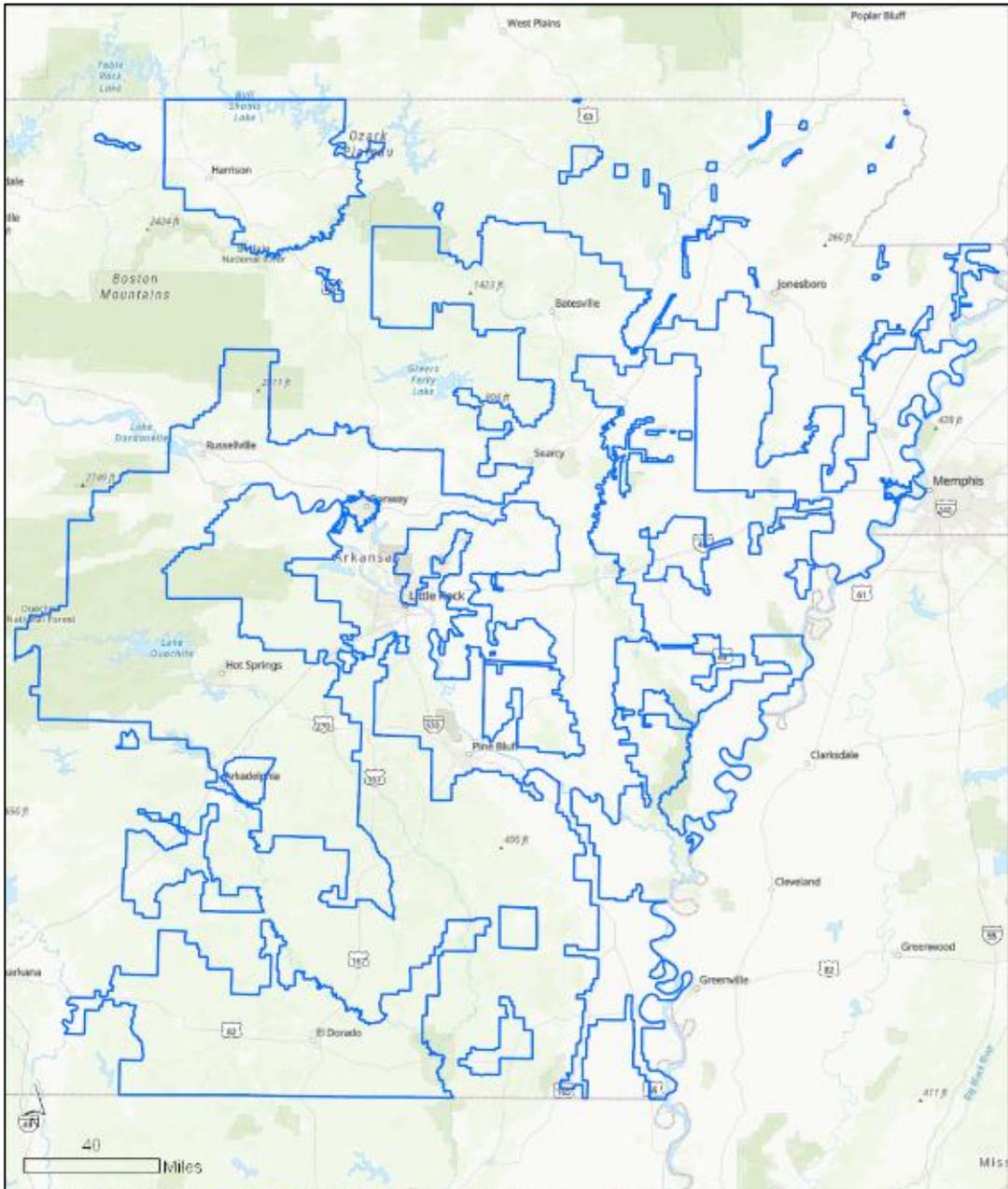
DUQUESNE LIGHT CO.



■ Congested Urban
□ Service Territory
 Service Area: 13572.88 sqkm
 Congested Area: 1.52 sqkm
 Percent Congested: 0.0112%

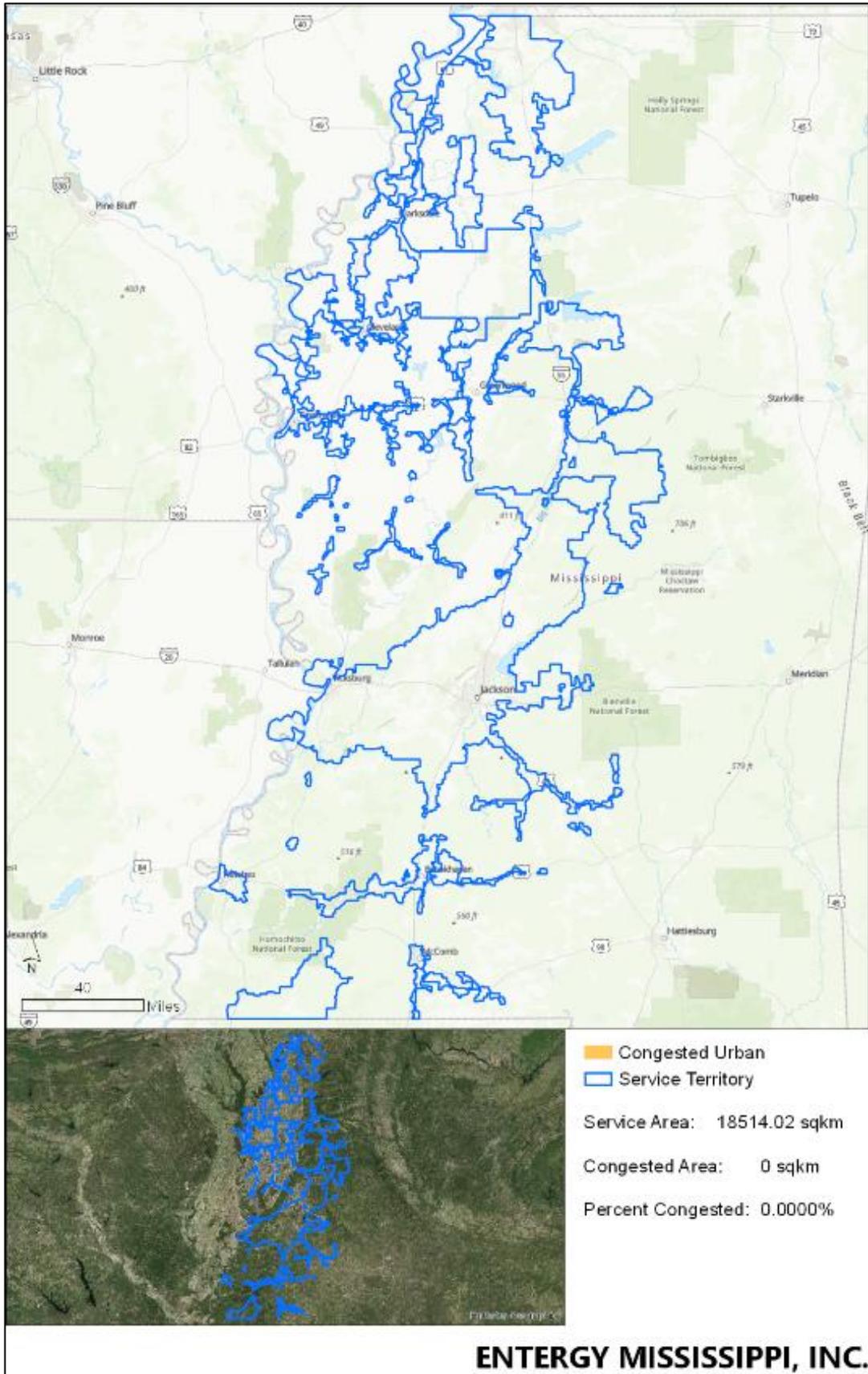
EL PASO ELECTRIC CO.

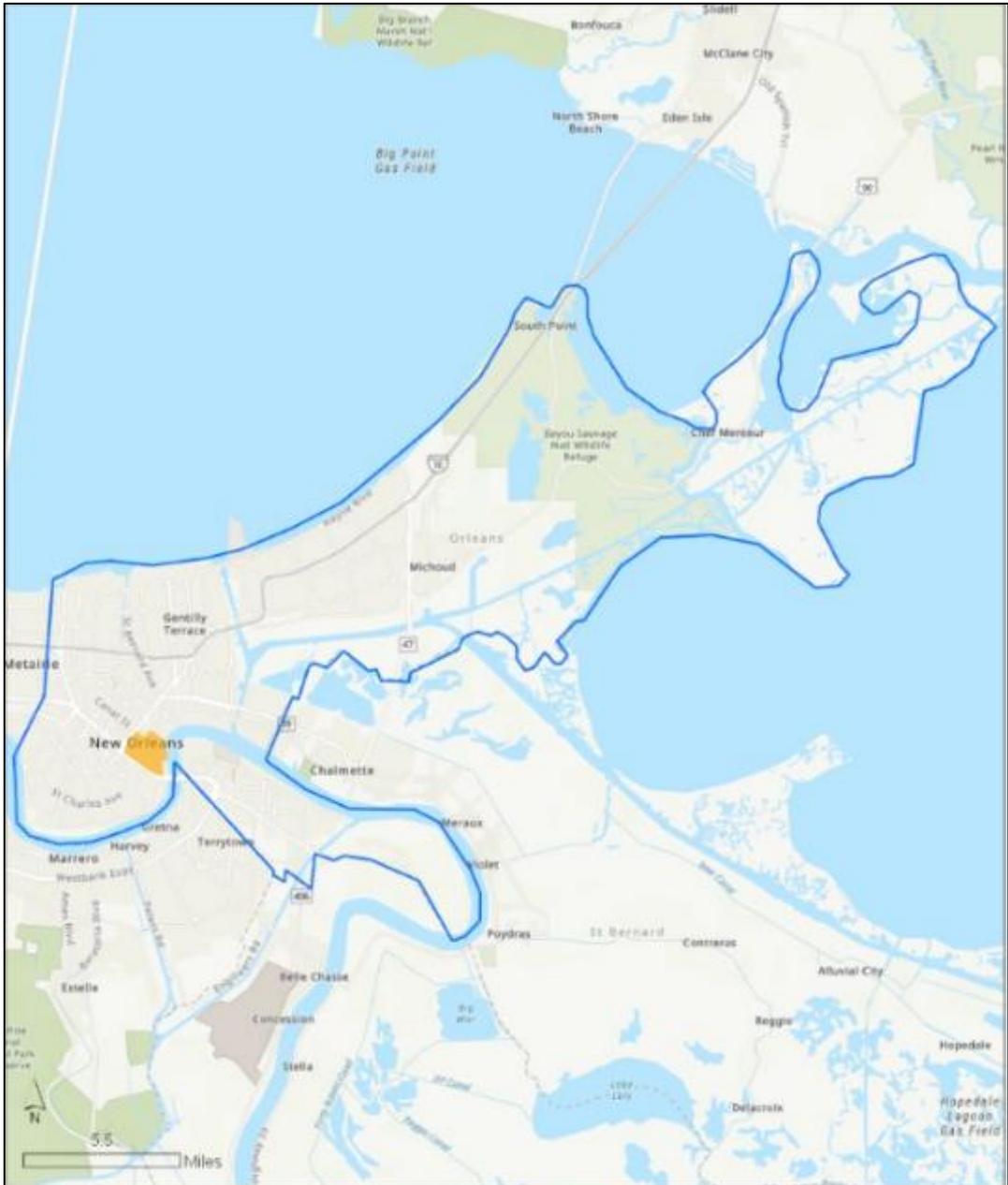




■ Congested Urban
□ Service Territory
 Service Area: 47797.5 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

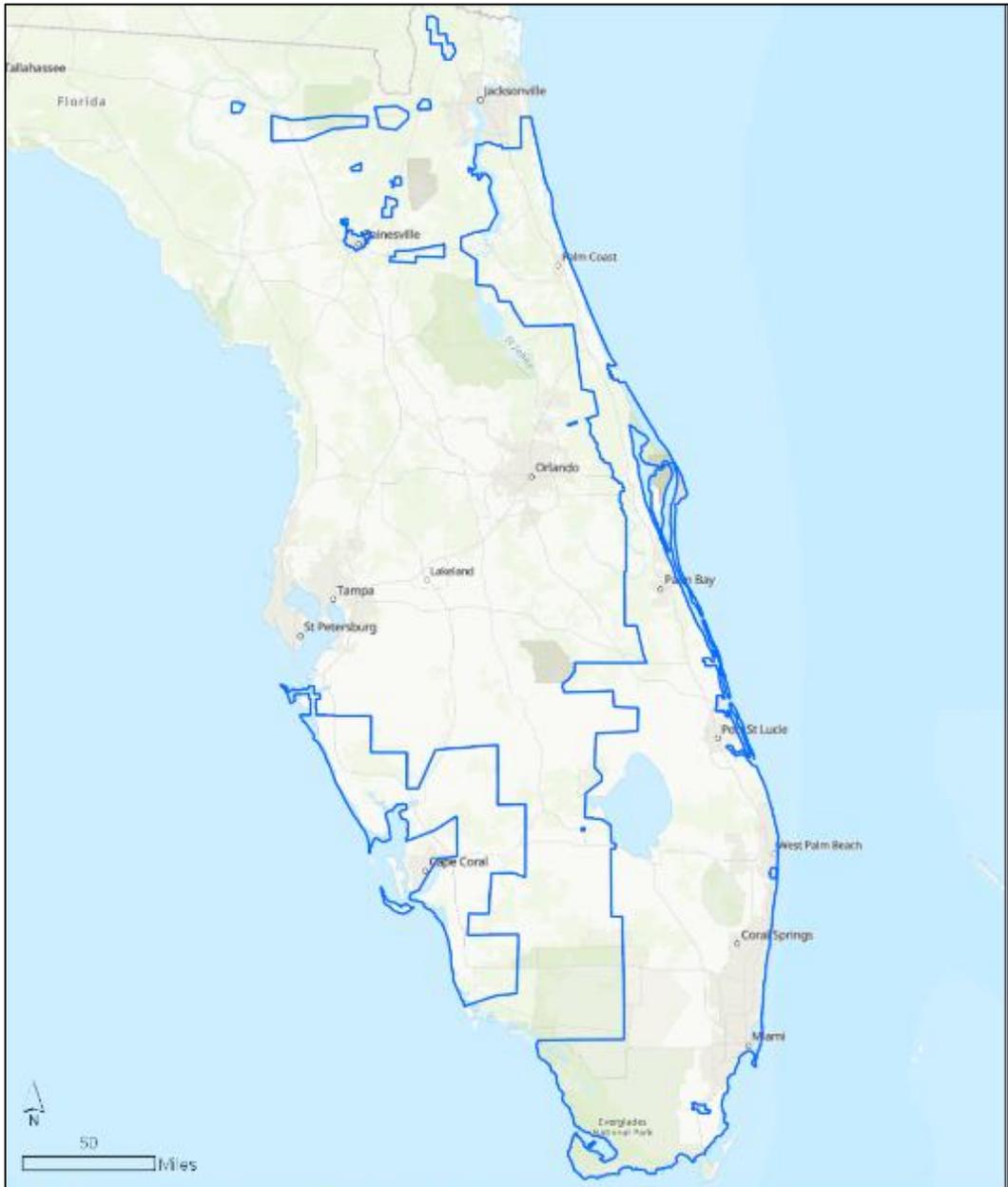
ENTERGY ARKANSAS, INC.





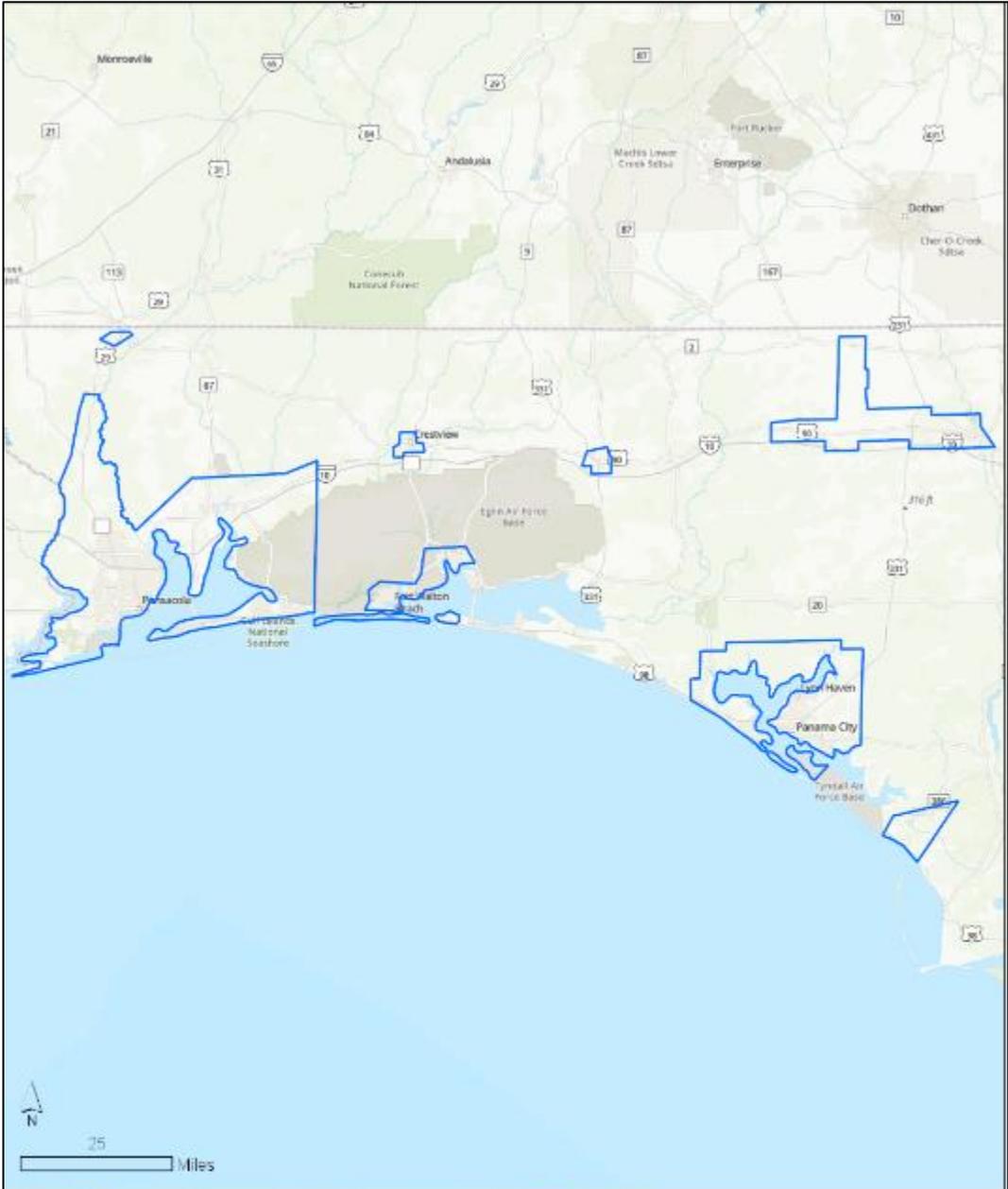
■ Congested Urban
 Service Territory
 Service Area: 523.45 sqkm
 Congested Area: 3.02 sqkm
 Percent Congested: 0.5762%

ENTERGY NEW ORLEANS, INC.



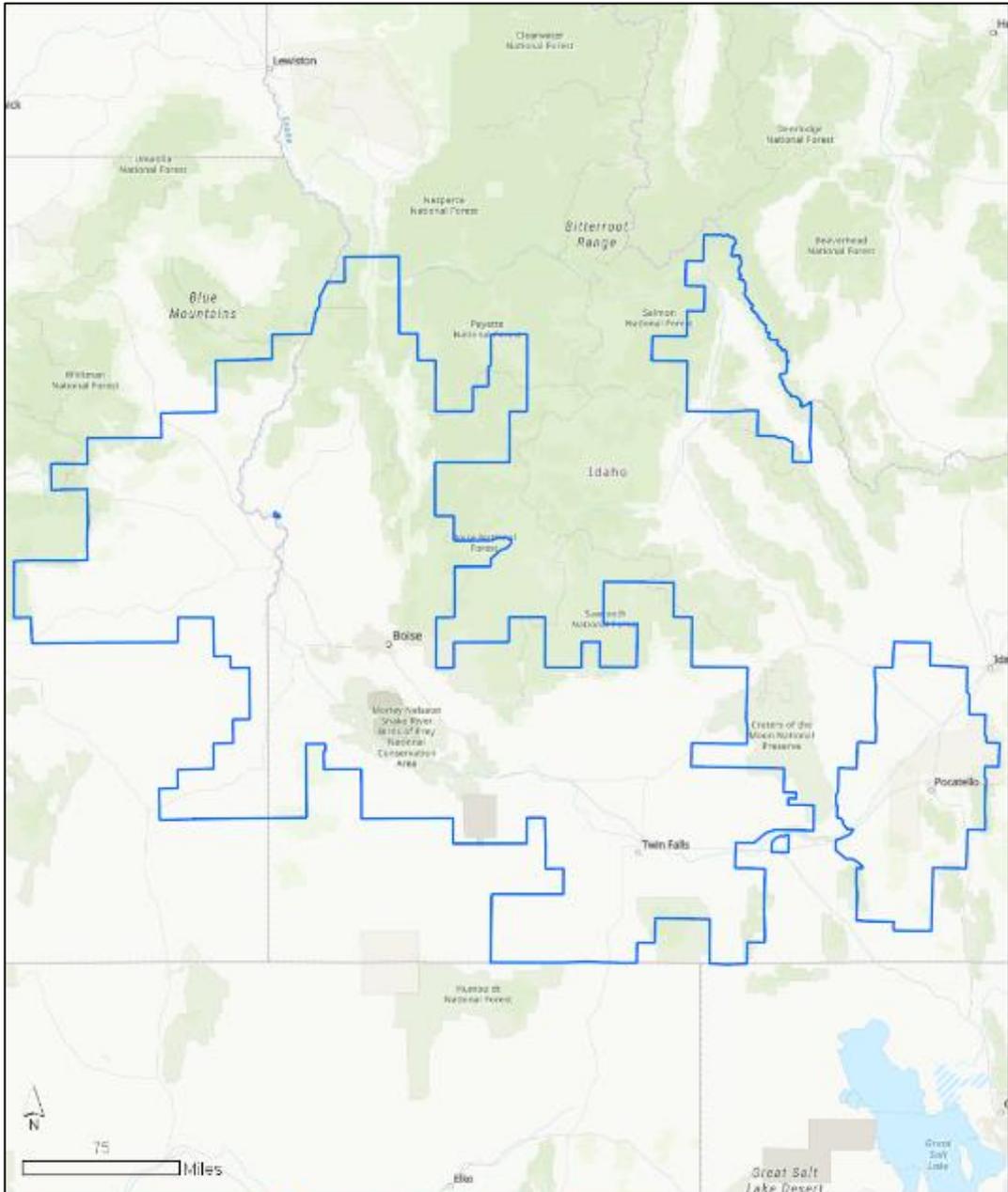
■ Congested Urban
■ Service Territory
 Service Area: 40083.11 sqkm
 Congested Area: 3.67 sqkm
 Percent Congested: 0.0091%

FLORIDA POWER & LIGHT CO.



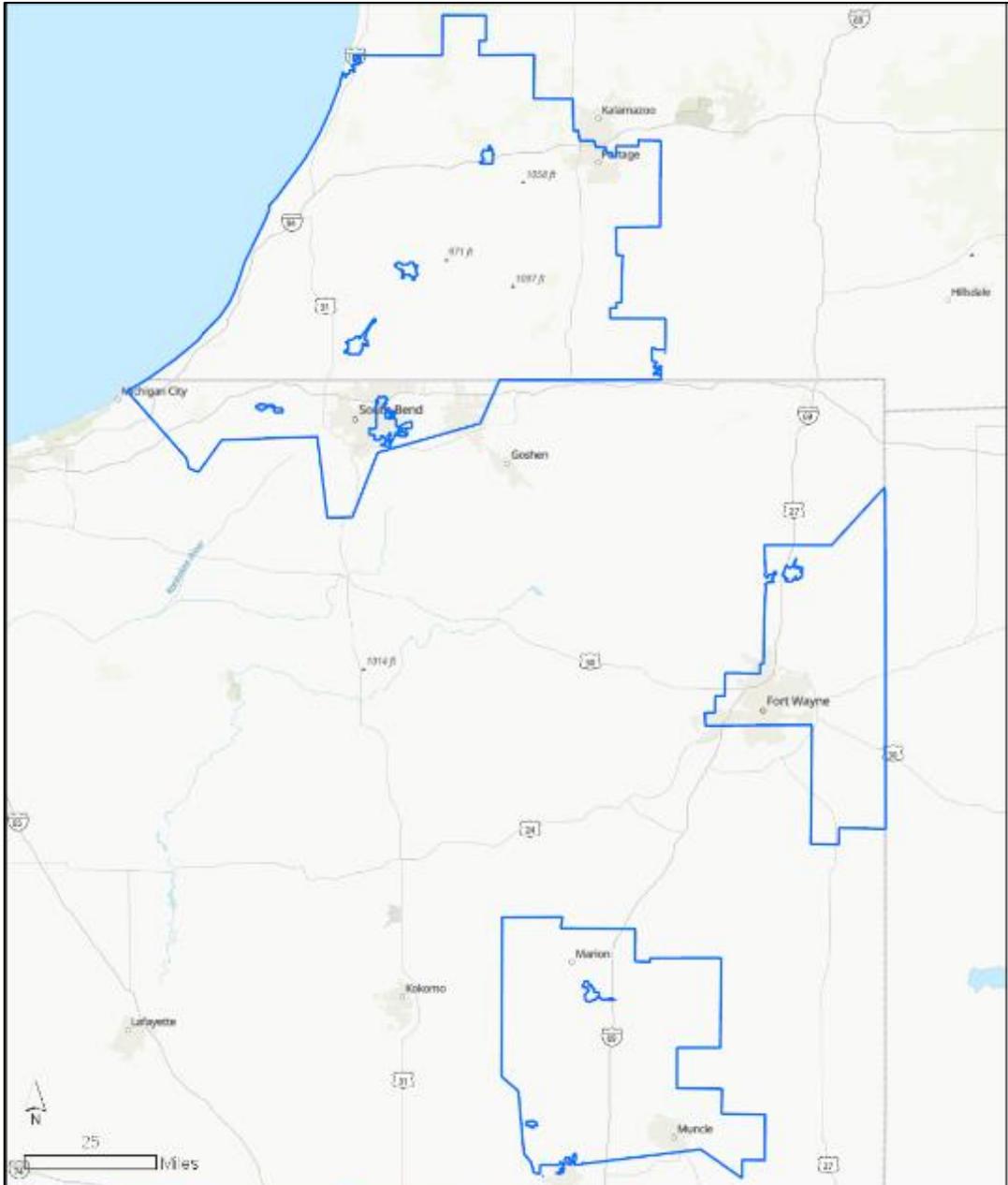
■ Congested Urban
□ Service Territory
 Service Area: 3314.63 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

GULF POWER CO.



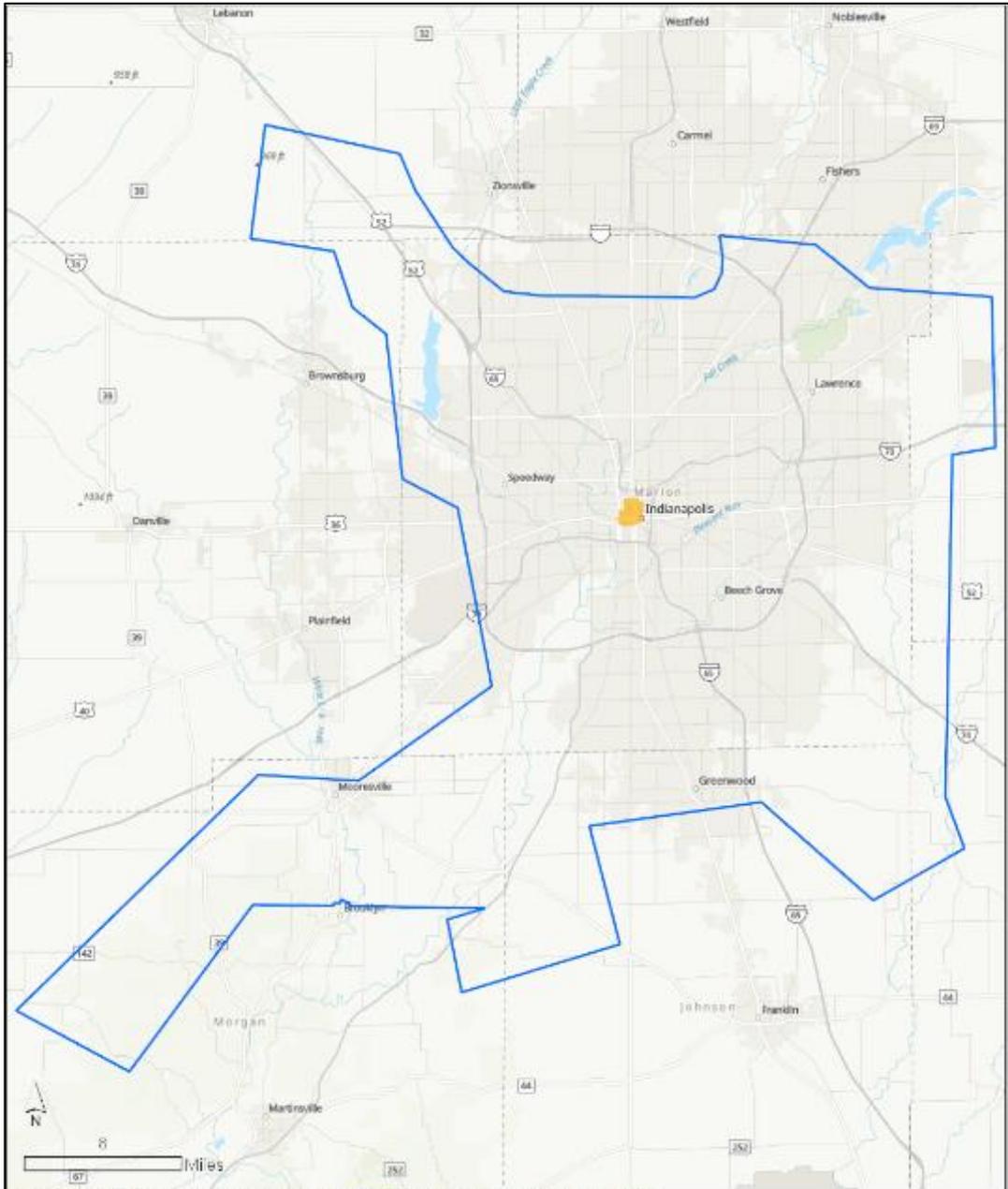
■ Congested Urban
□ Service Territory
 Service Area: 88853.73 sqkm
 Congested Area: 1.21 sqkm
 Percent Congested: 0.0014%

IDAHO POWER CO.



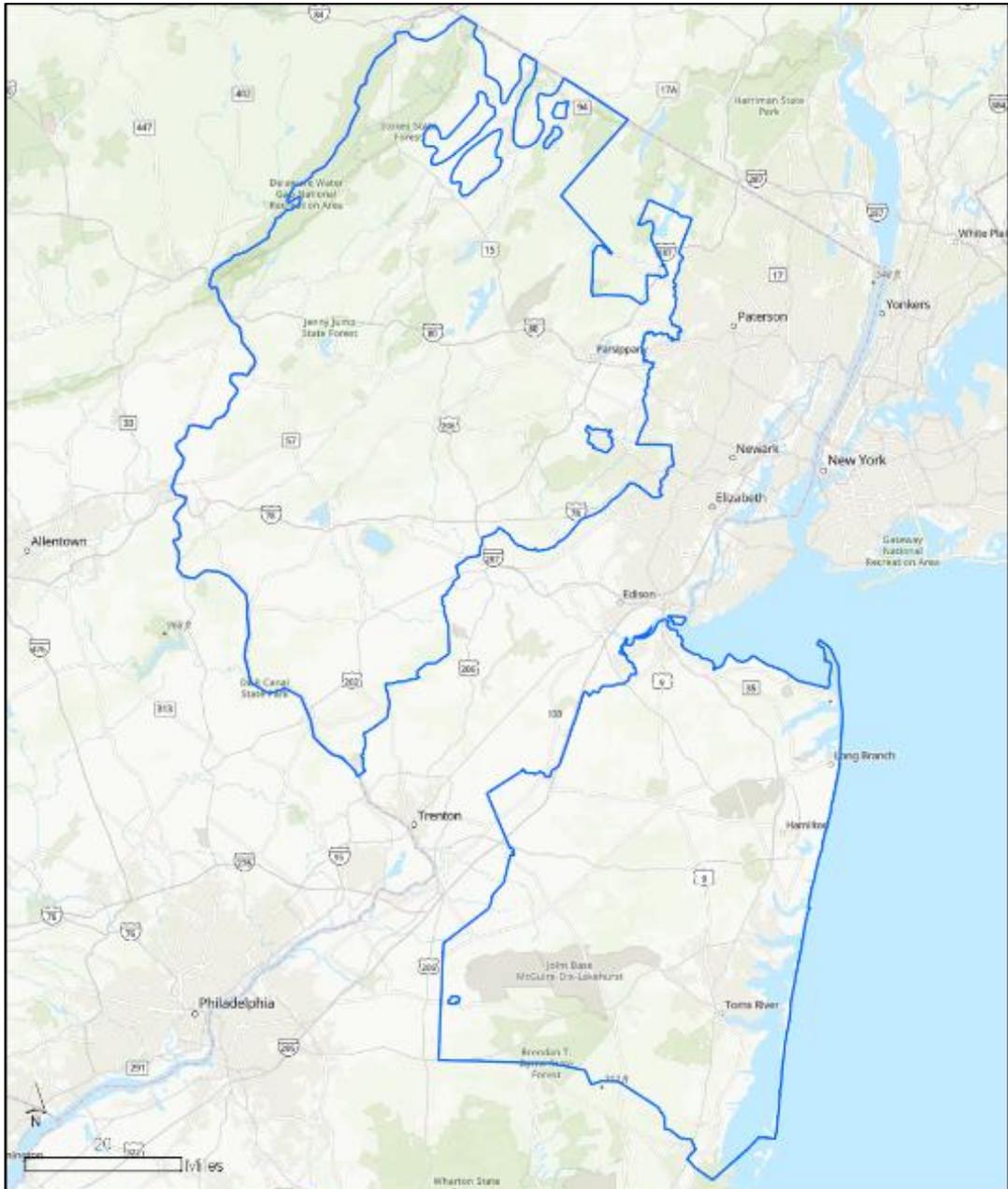
■ Congested Urban
□ Service Territory
 Service Area: 11439.53 sqkm
 Congested Area: 0.7 sqkm
 Percent Congested: 0.0061%

INDIANA MICHIGAN POWER CO.



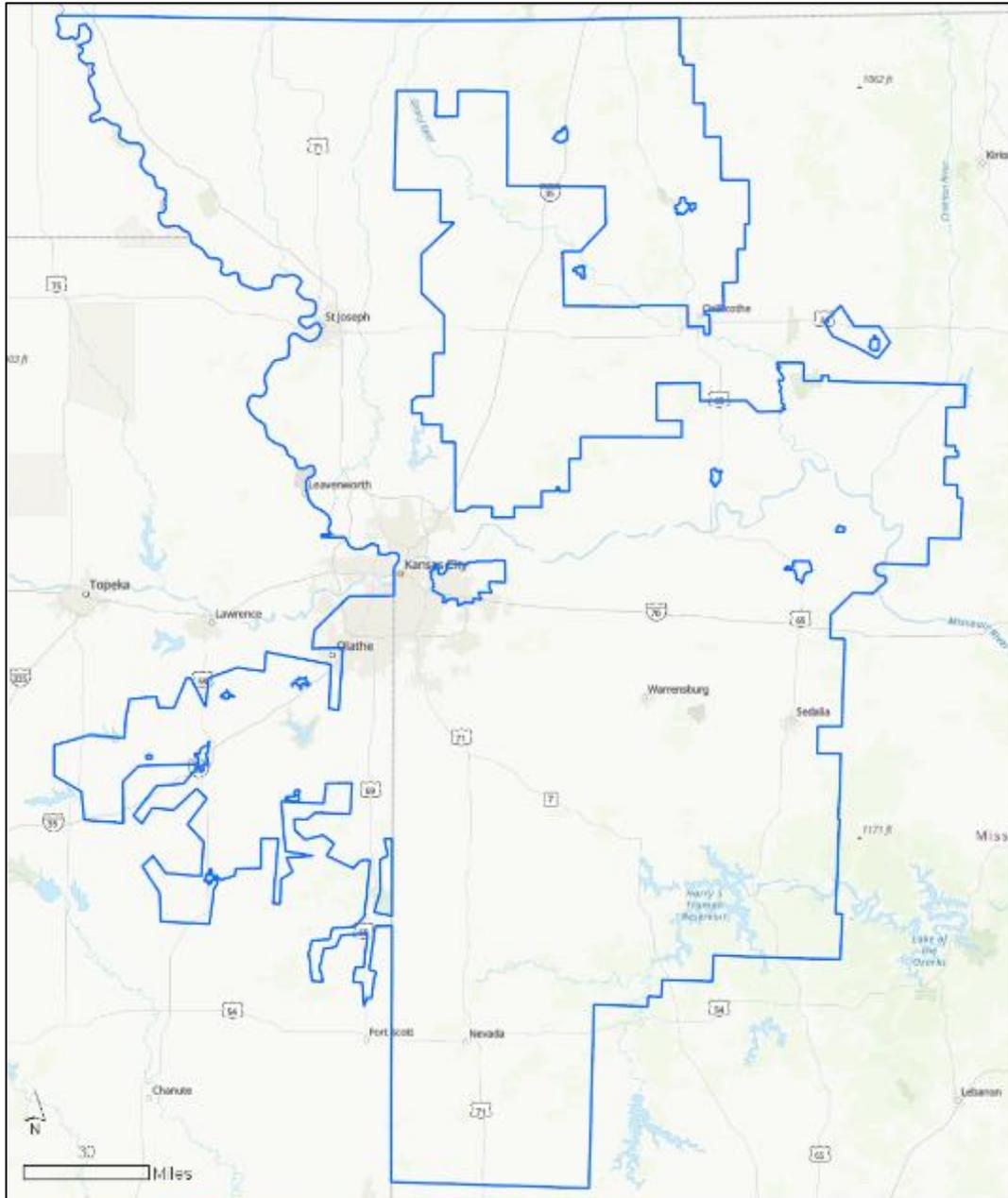
■ Congested Urban
▭ Service Territory
 Service Area: 1557.86 sqkm
 Congested Area: 2.33 sqkm
 Percent Congested: 0.1498%

INDIANAPOLIS POWER & LIGHT CO.



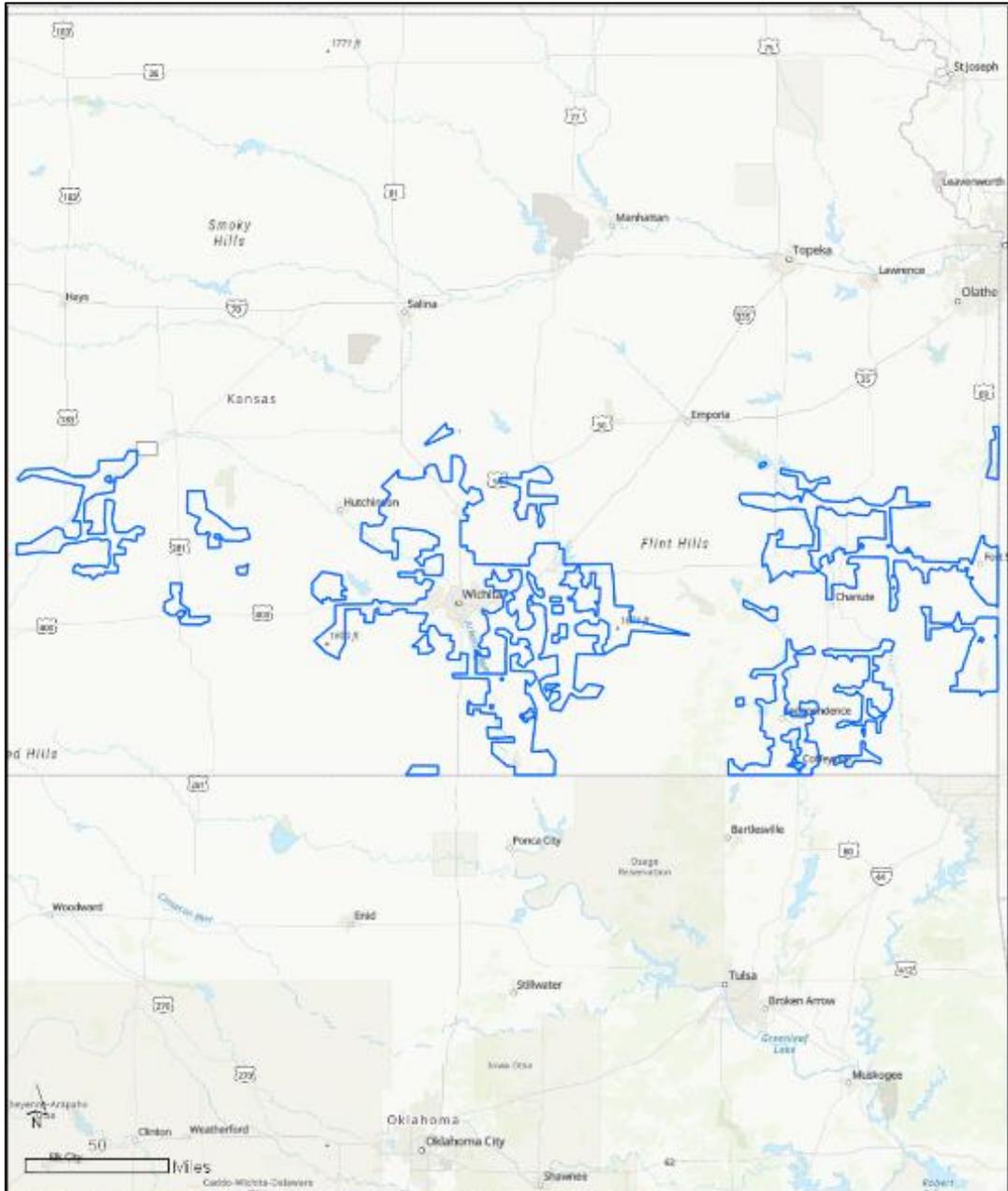
■ Congested Urban
 Service Territory
 Service Area: 8409.93 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

JERSEY CENTRAL POWER & LIGHT CO.



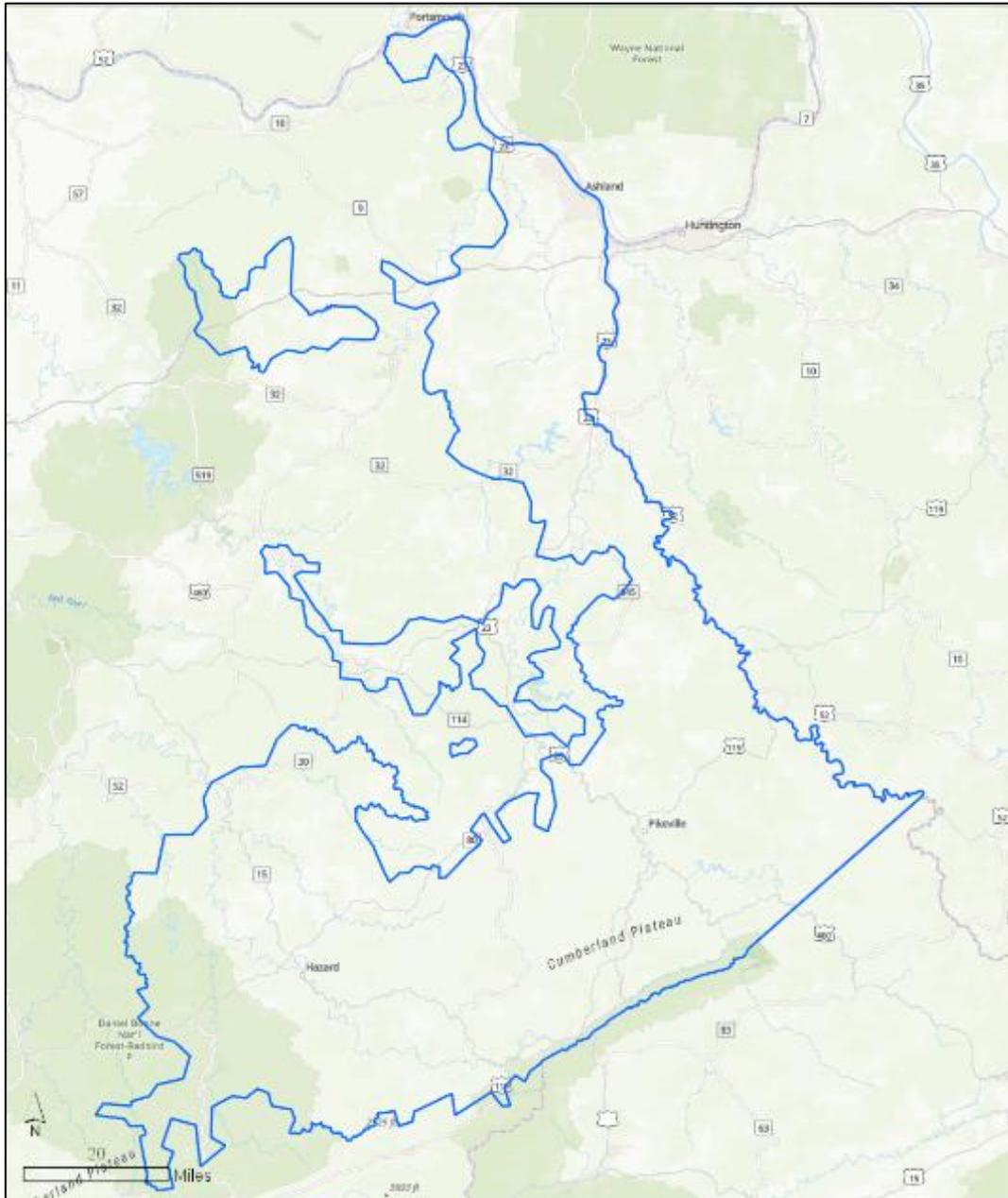
■ Congested Urban
□ Service Territory
 Service Area: 46444.41 sqkm
 Congested Area: 1.91 sqkm
 Percent Congested: 0.0041%

KANSAS CITY POWER & LIGHT CO.



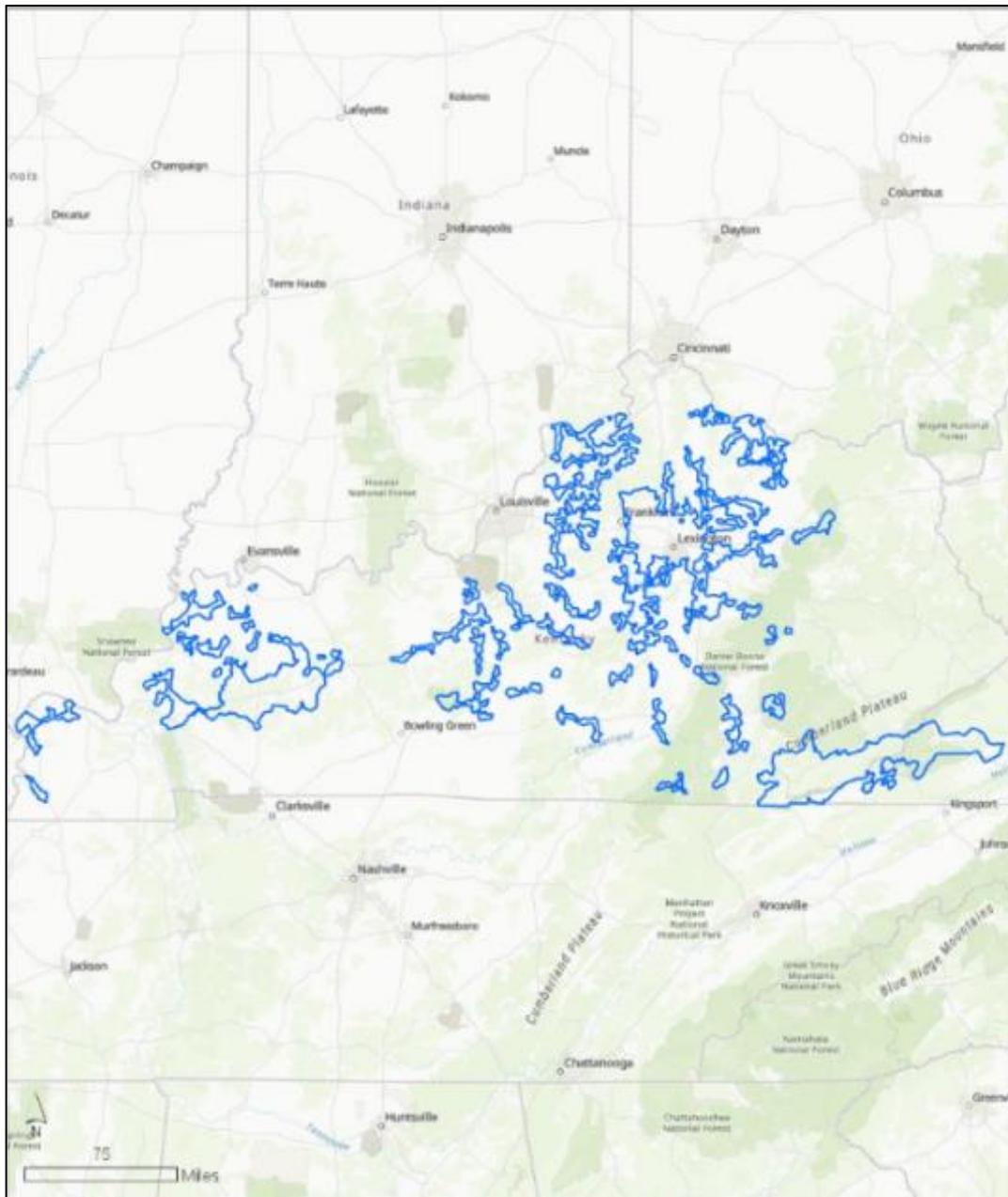
■ Congested Urban
□ Service Territory
 Service Area: 11015.14 sqkm
 Congested Area: 1.17 sqkm
 Percent Congested: 0.0106%

KGE, A WESTAR ENERGY CO.



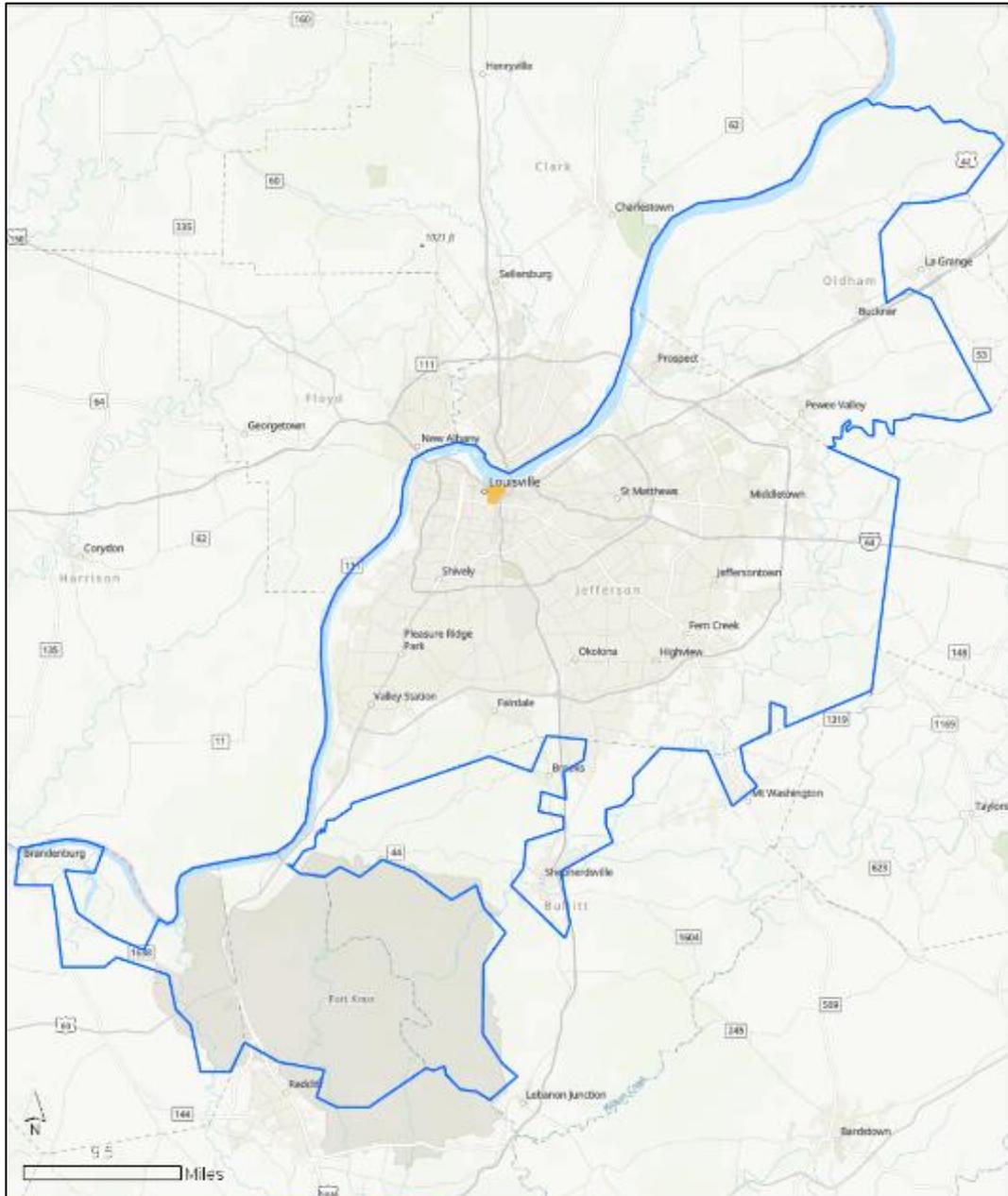
■ Congested Urban
□ Service Territory
 Service Area: 9655.81 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

KENTUCKY POWER CO.



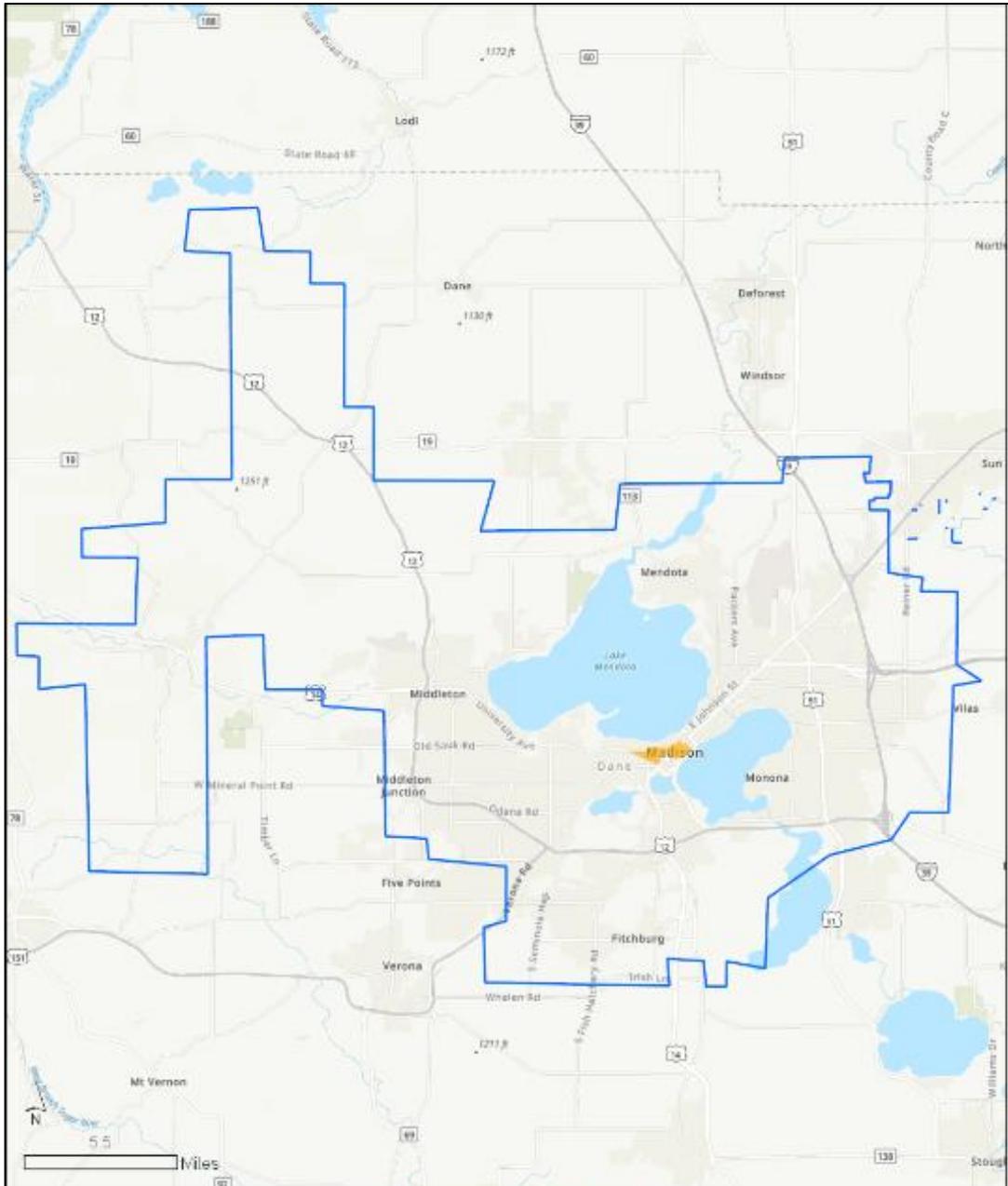
■ Congested Urban
□ Service Territory
 Service Area: 15104.01 sqkm
 Congested Area: 0.4 sqkm
 Percent Congested: 0.0027%

KENTUCKY UTILITIES CO.



■ Congested Urban
□ Service Territory
 Service Area: 1941.62 sqkm
 Congested Area: 1.62 sqkm
 Percent Congested: 0.0834%

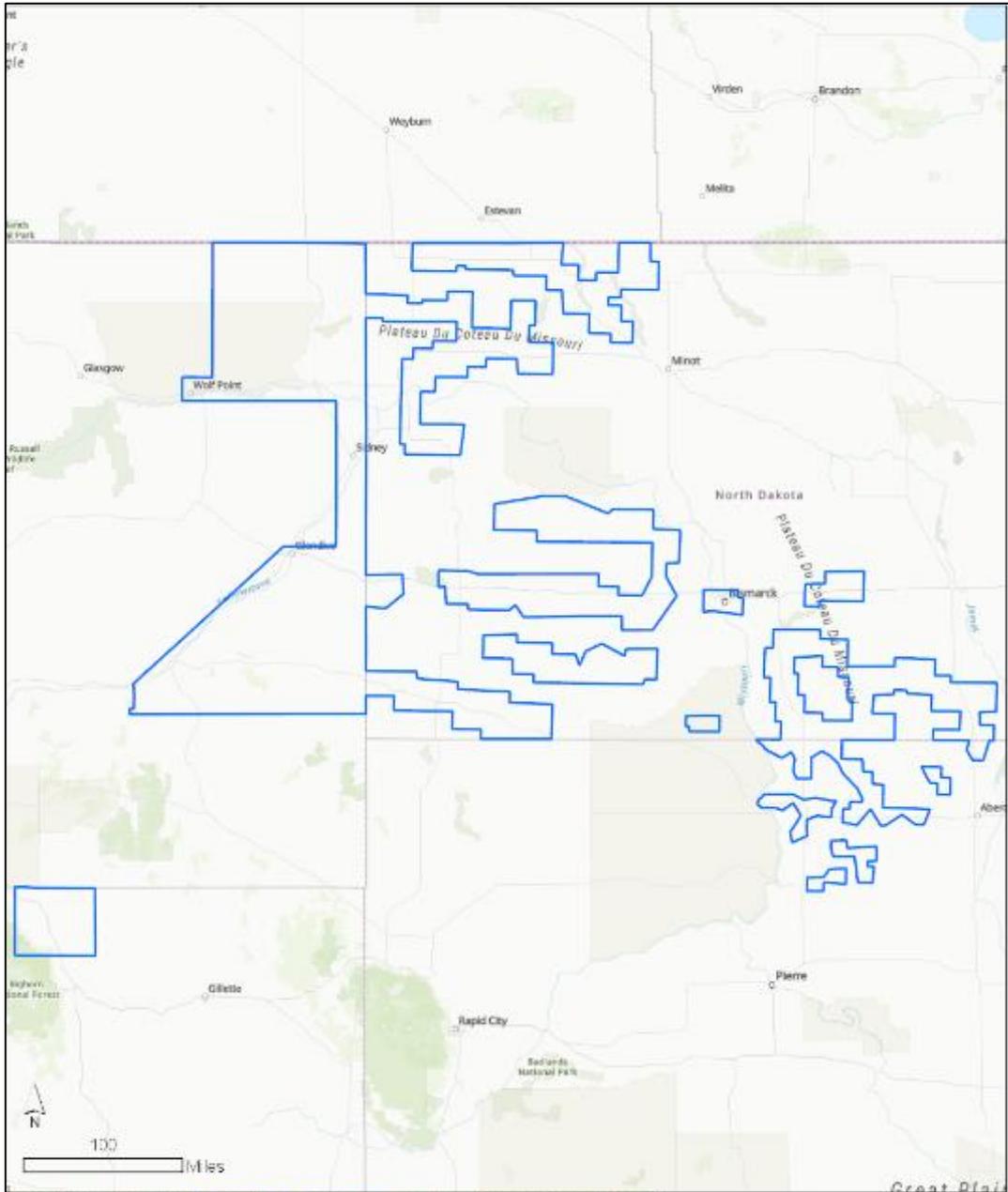
LOUISVILLE GAS & ELECTRIC CO.



- Congested Urban
- Service Territory

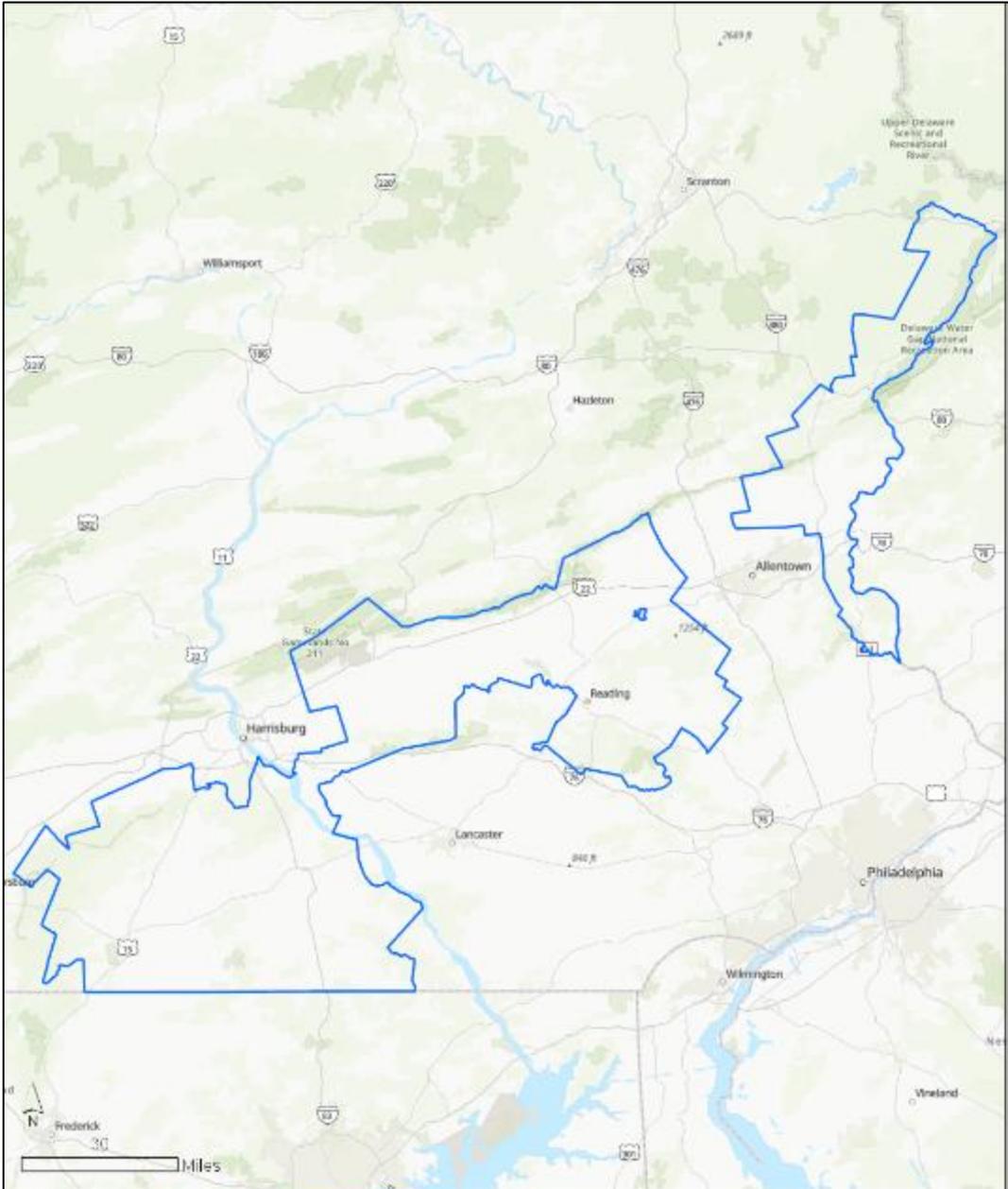
Service Area: 614.89 sqkm
 Congested Area: 1.16 sqkm
 Percent Congested: 0.1884%

MADISON GAS & ELECTRIC CO.



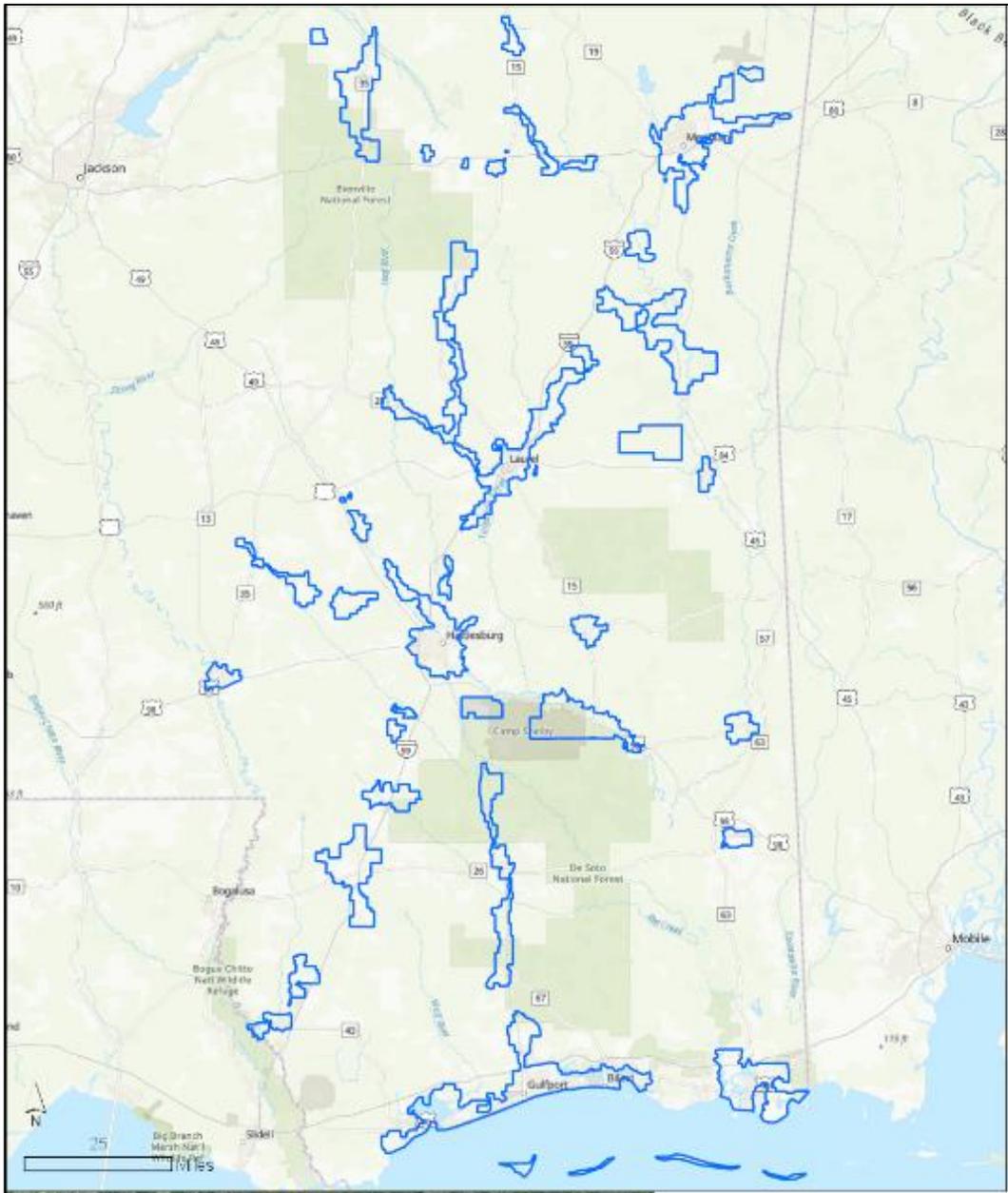
■ Congested Urban
□ Service Territory
 Service Area: 64726.49 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

MONTANA DAKOTA UTILITIES CO.



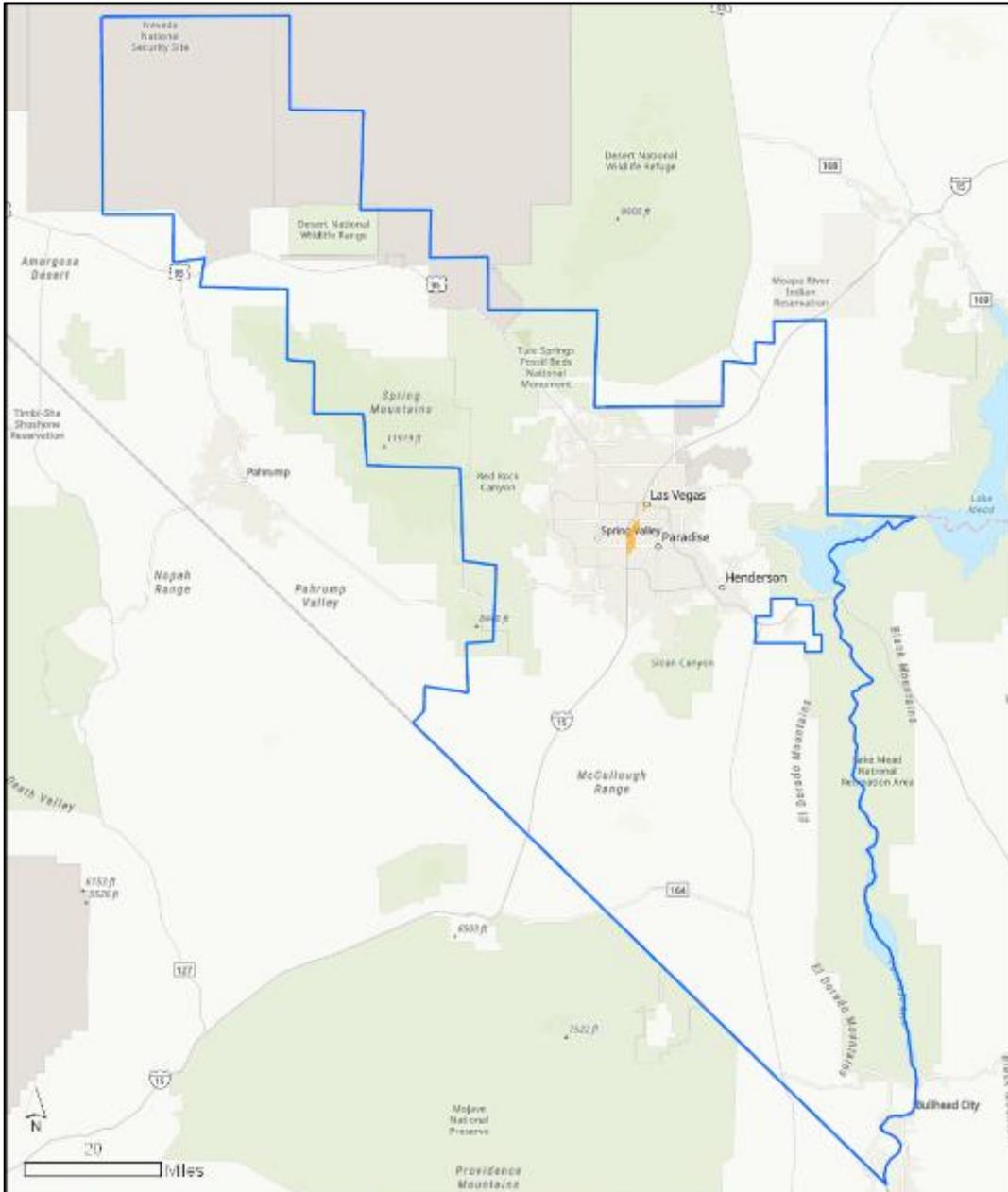
■ Congested Urban
□ Service Territory
 Service Area: 8881.44 sqkm
 Congested Area: 0.7 sqkm
 Percent Congested: 0.0079%

METROPOLITAN EDISON CO.



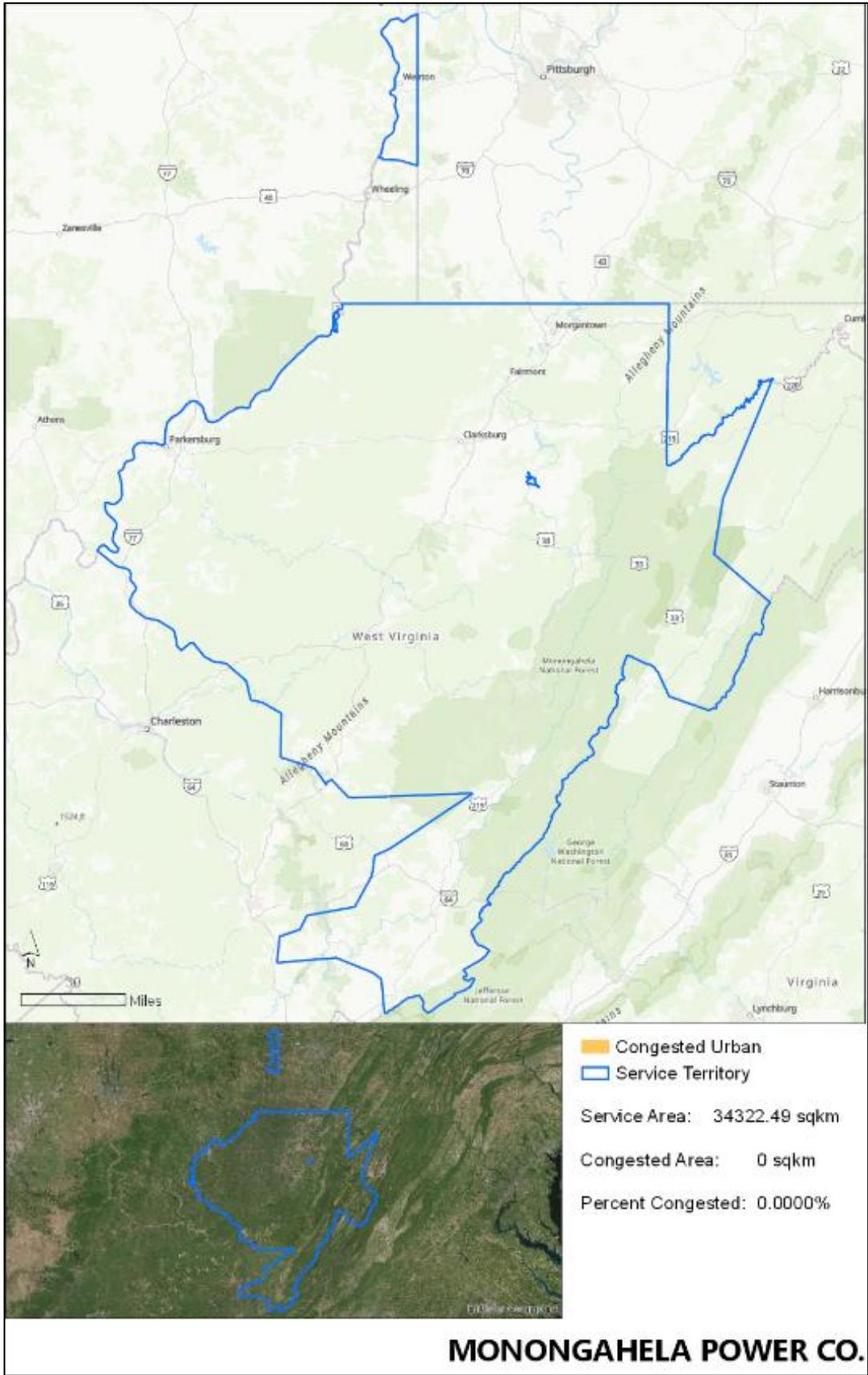
■ Congested Urban
■ Service Territory
 Service Area: 2984.65 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

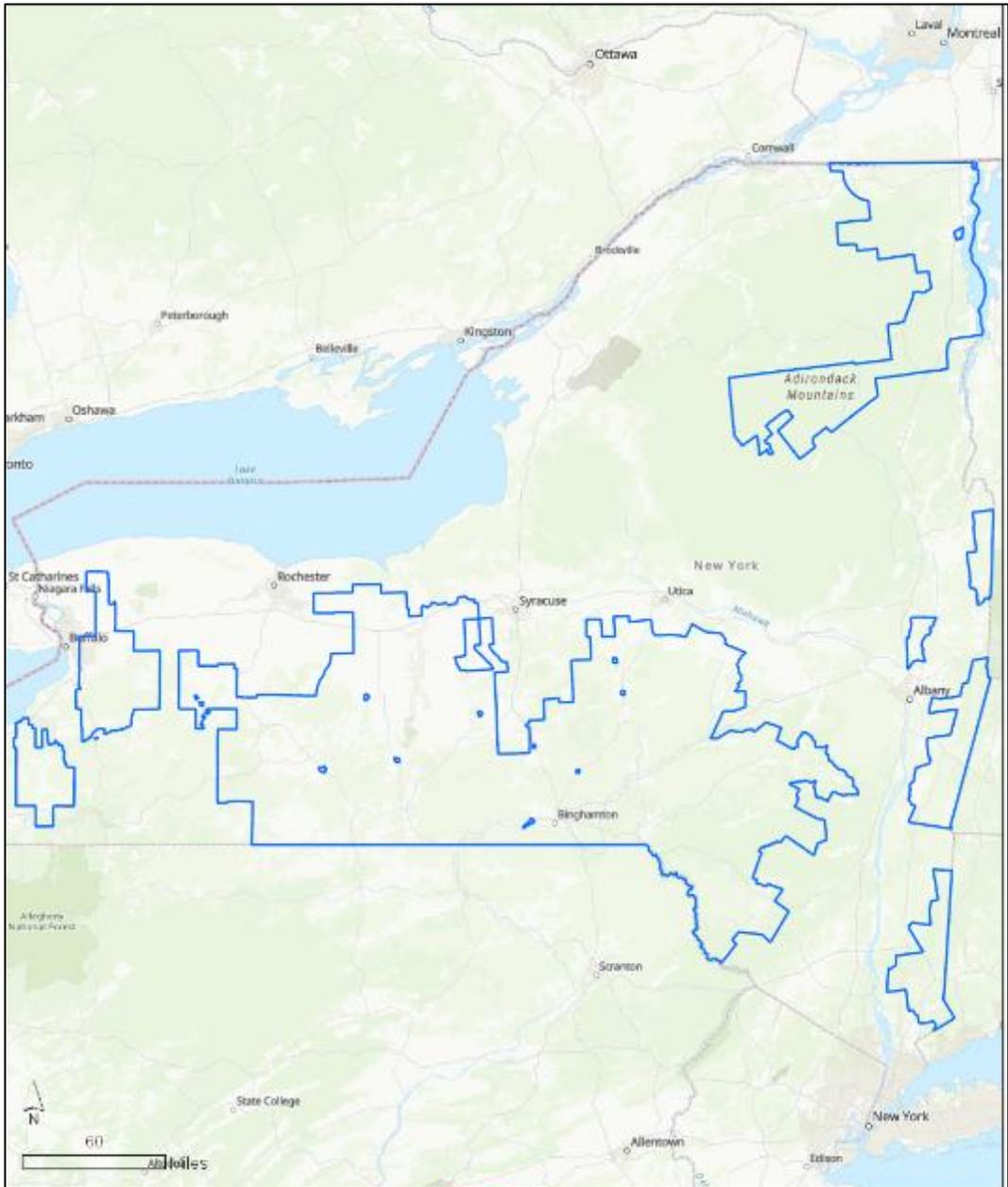
MISSISSIPPI POWER CO.



■ Congested Urban
□ Service Territory
 Service Area: 12130.36 sqkm
 Congested Area: 9.37 sqkm
 Percent Congested: 0.0773%

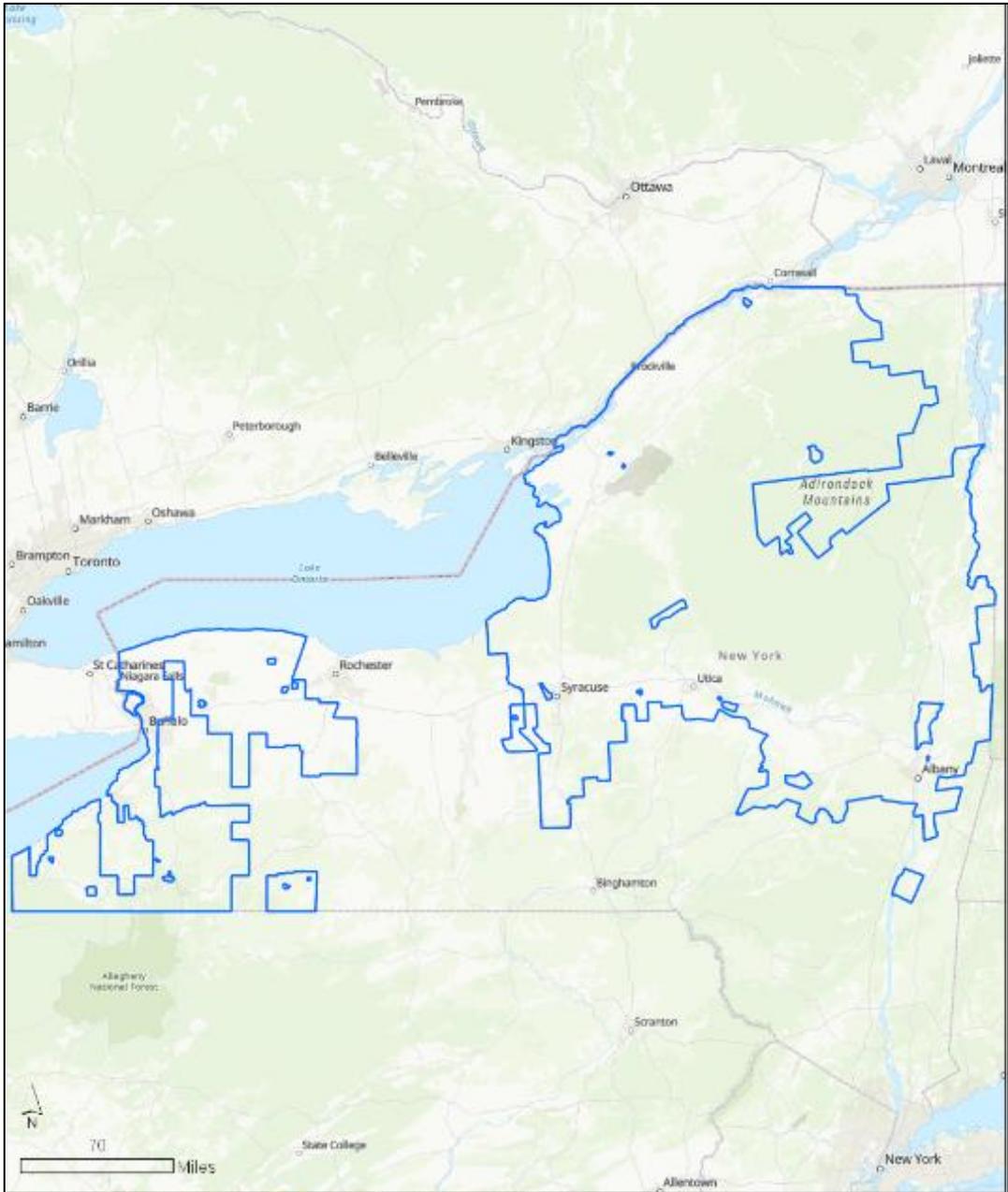
NEVADA POWER CO.





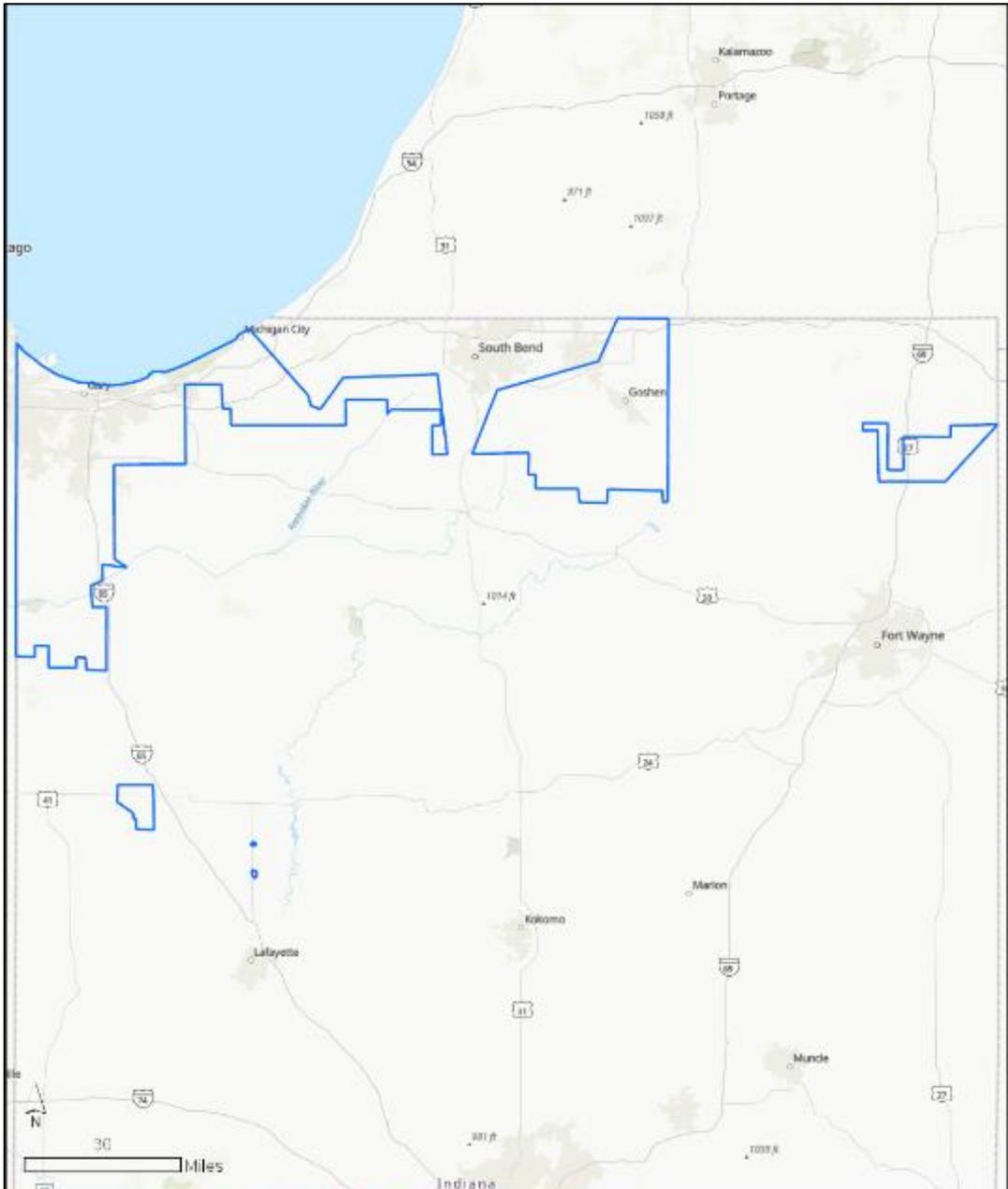
■ Congested Urban
■ Service Territory
 Service Area: 42654.54 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

NEW YORK STATE ELECTRIC & GAS CORP.



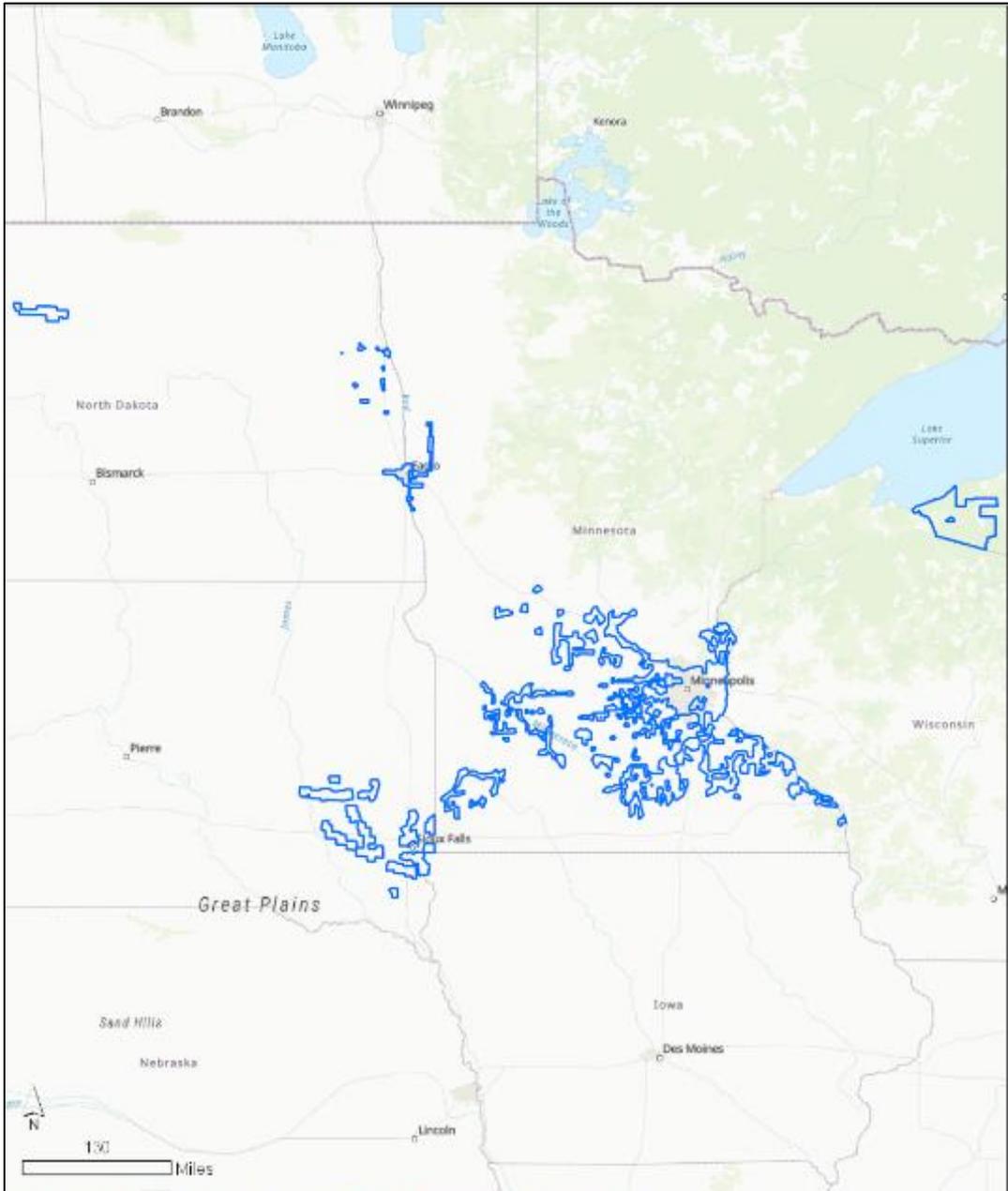
■ Congested Urban
 Service Territory
 Service Area: 62996.24 sqkm
 Congested Area: 1.09 sqkm
 Percent Congested: 0.0017%

NIAGARA MOHAWK, A NATIONAL GRID CO.



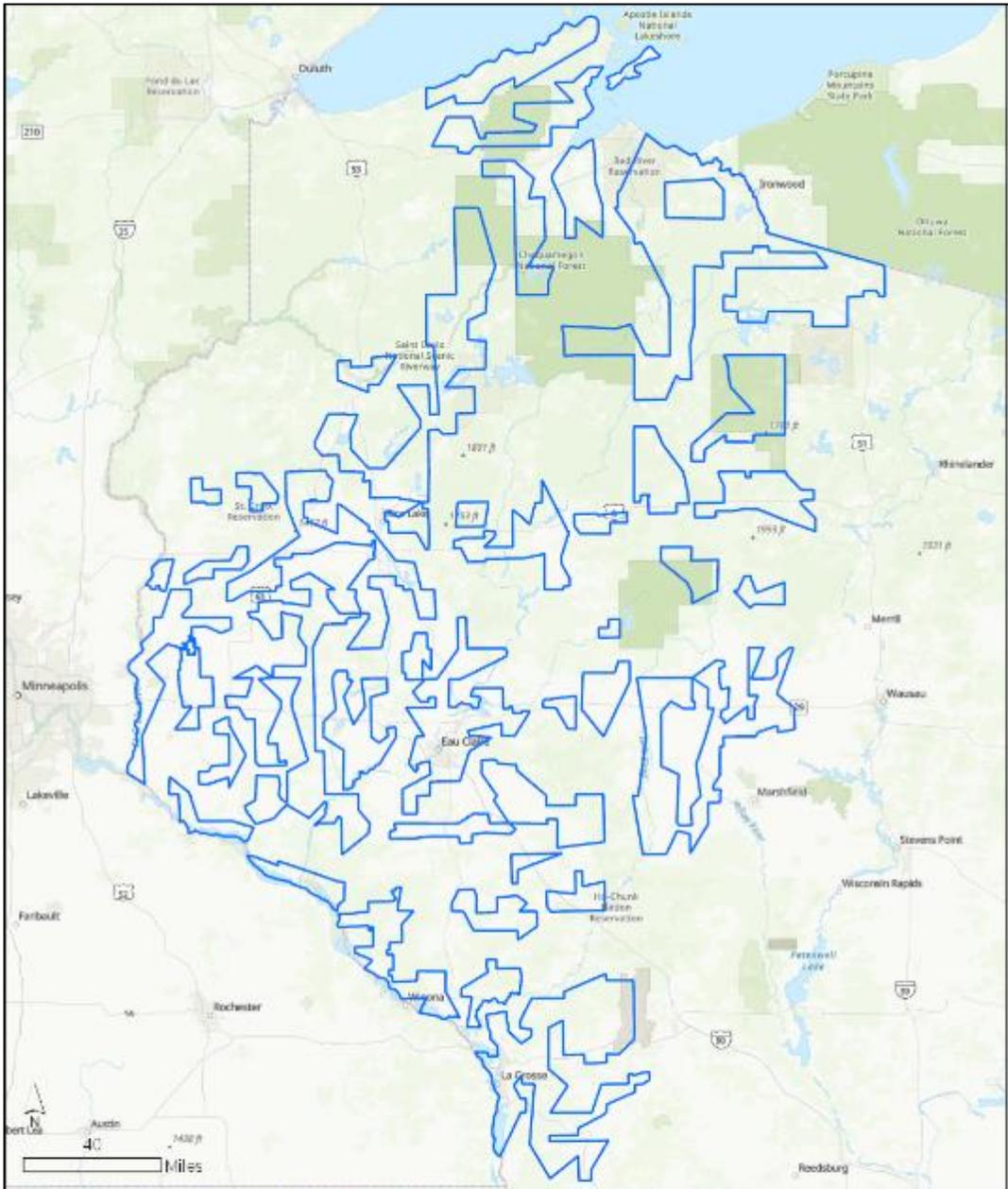
■ Congested Urban
 Service Territory
 Service Area: 3905.1 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

NORTHERN INDIANA PUBLIC SERVICE CO.



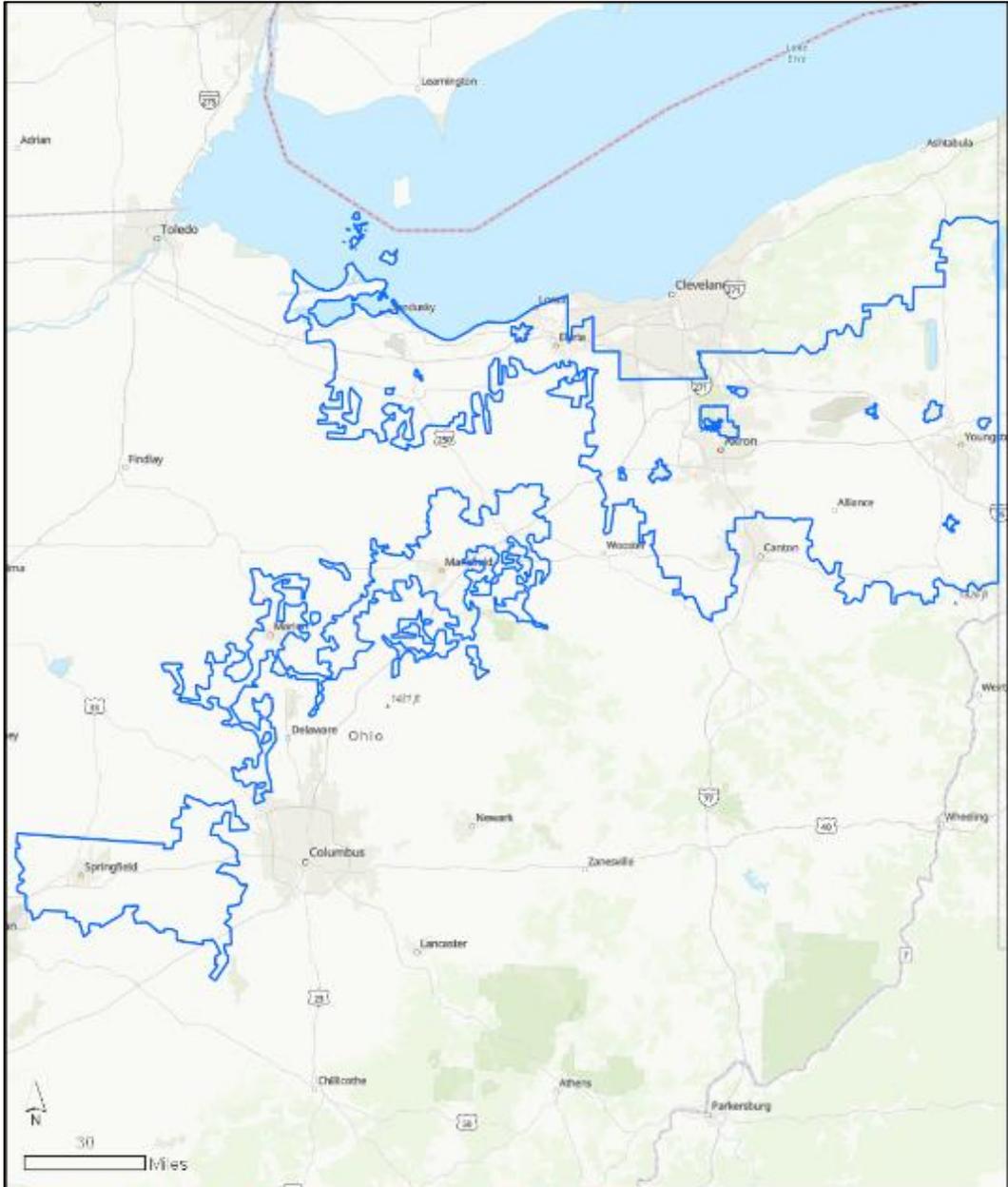
■ Congested Urban
□ Service Territory
 Service Area: 20726.61 sqkm
 Congested Area: 5.44 sqkm
 Percent Congested: 0.0263%

NORTHERN STATES POWER CO.



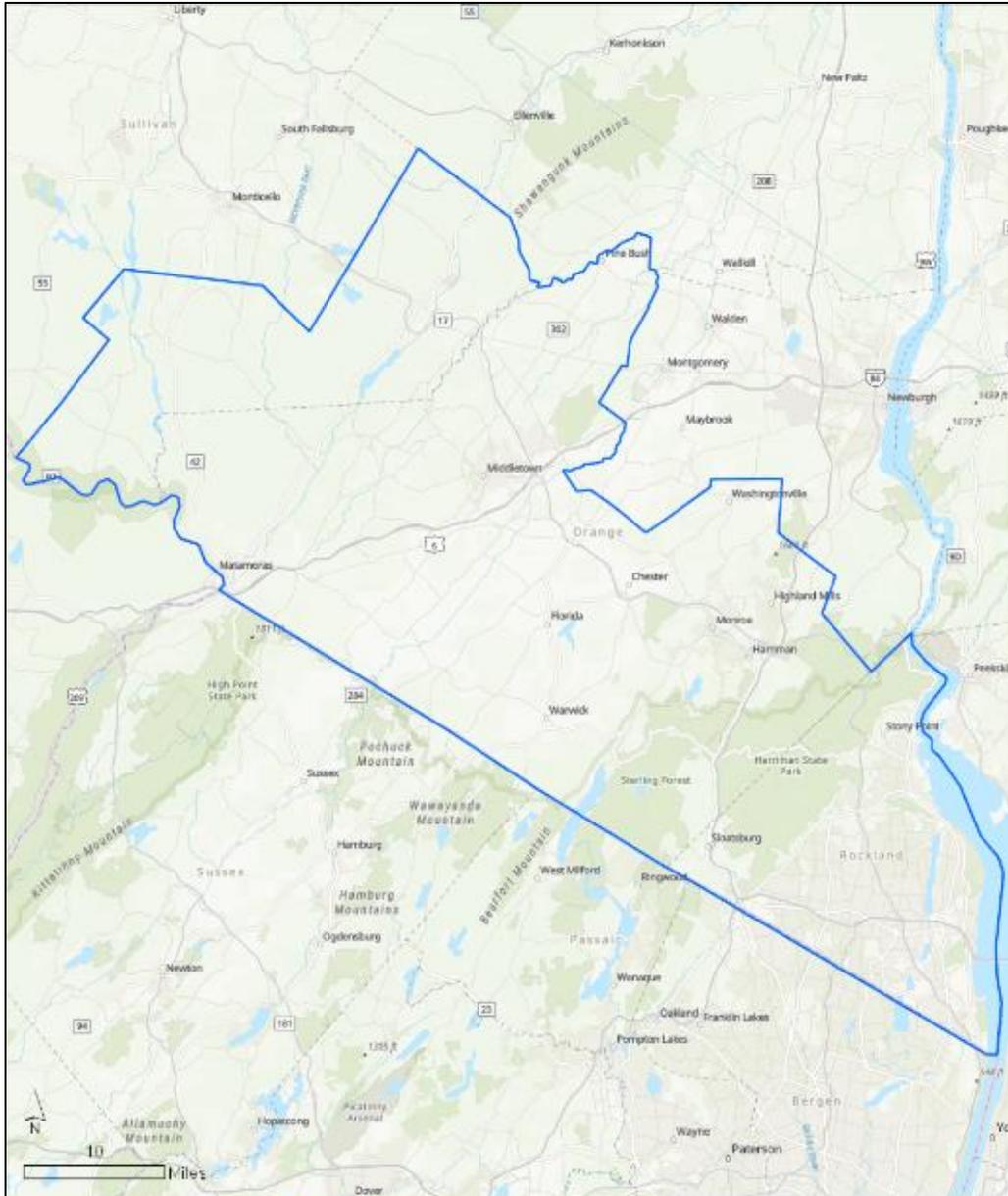
■ Congested Urban
■ Service Territory
 Service Area: 19091.28 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

NORTHERN STATES POWER CO. WISCONSIN



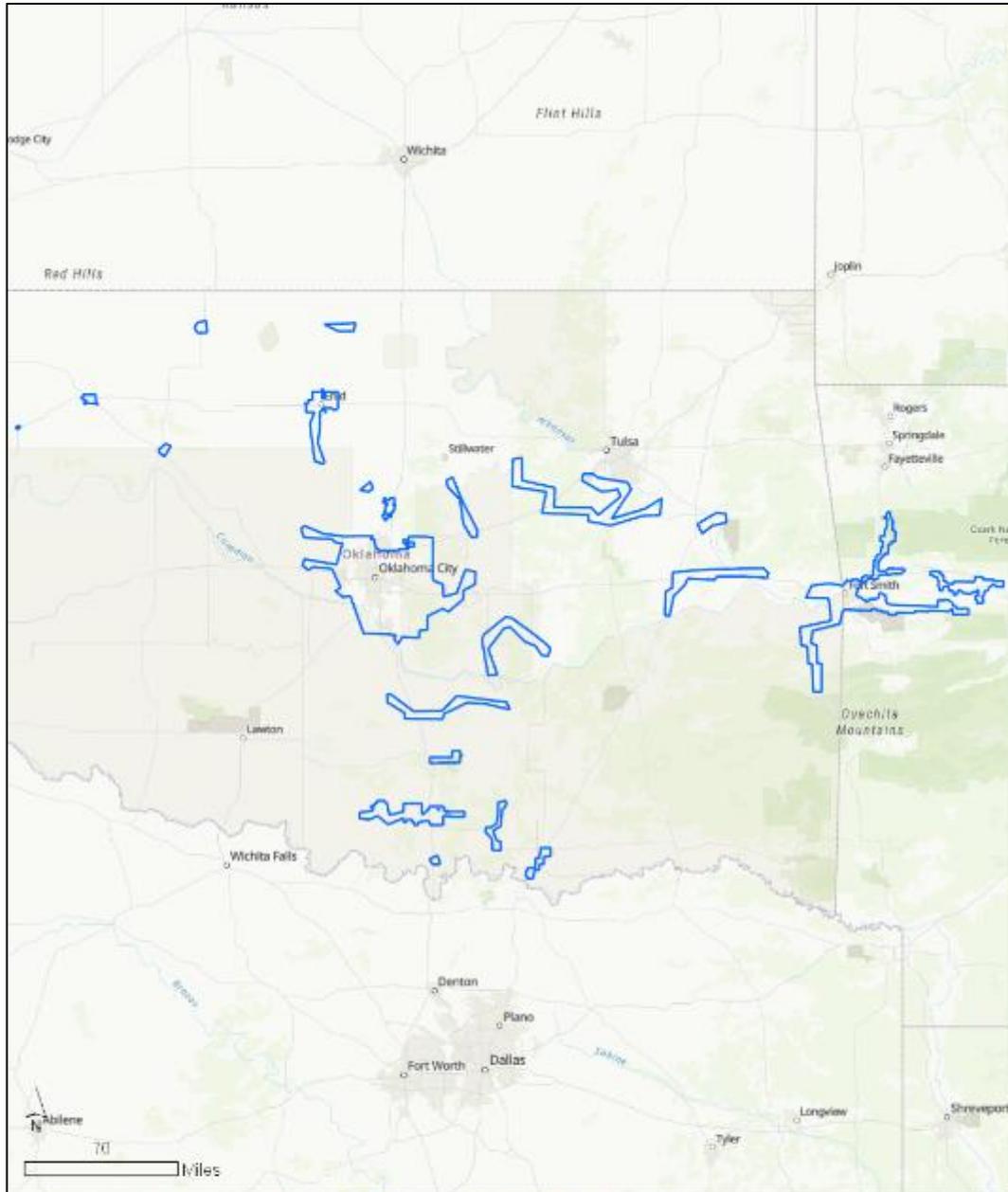
■ Congested Urban
■ Service Territory
 Service Area: 14956.26 sqkm
 Congested Area: 8.88 sqkm
 Percent Congested: 0.0594%

OHIO EDISON CO.



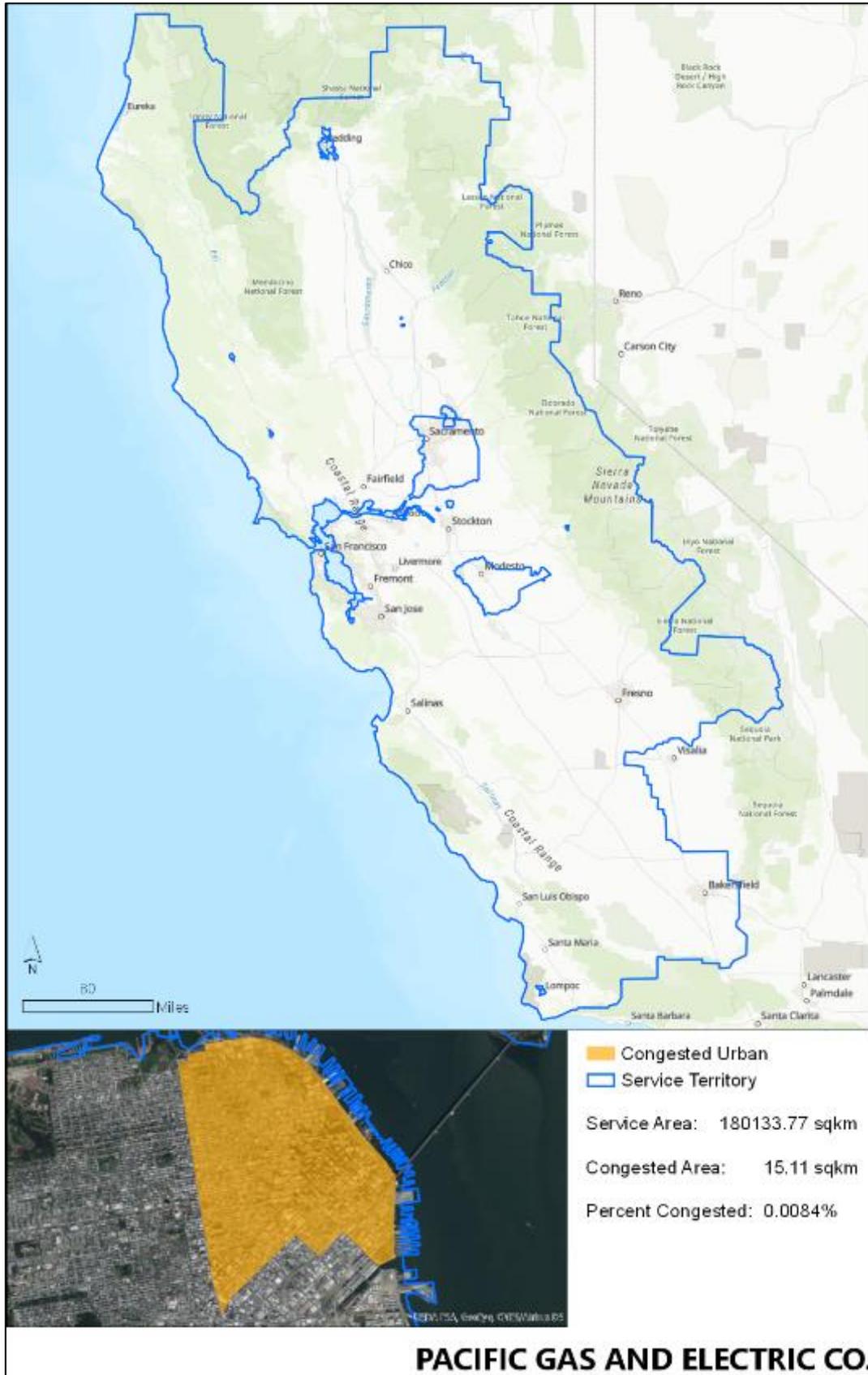
■ Congested Urban
■ Service Territory
 Service Area: 2630.71 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

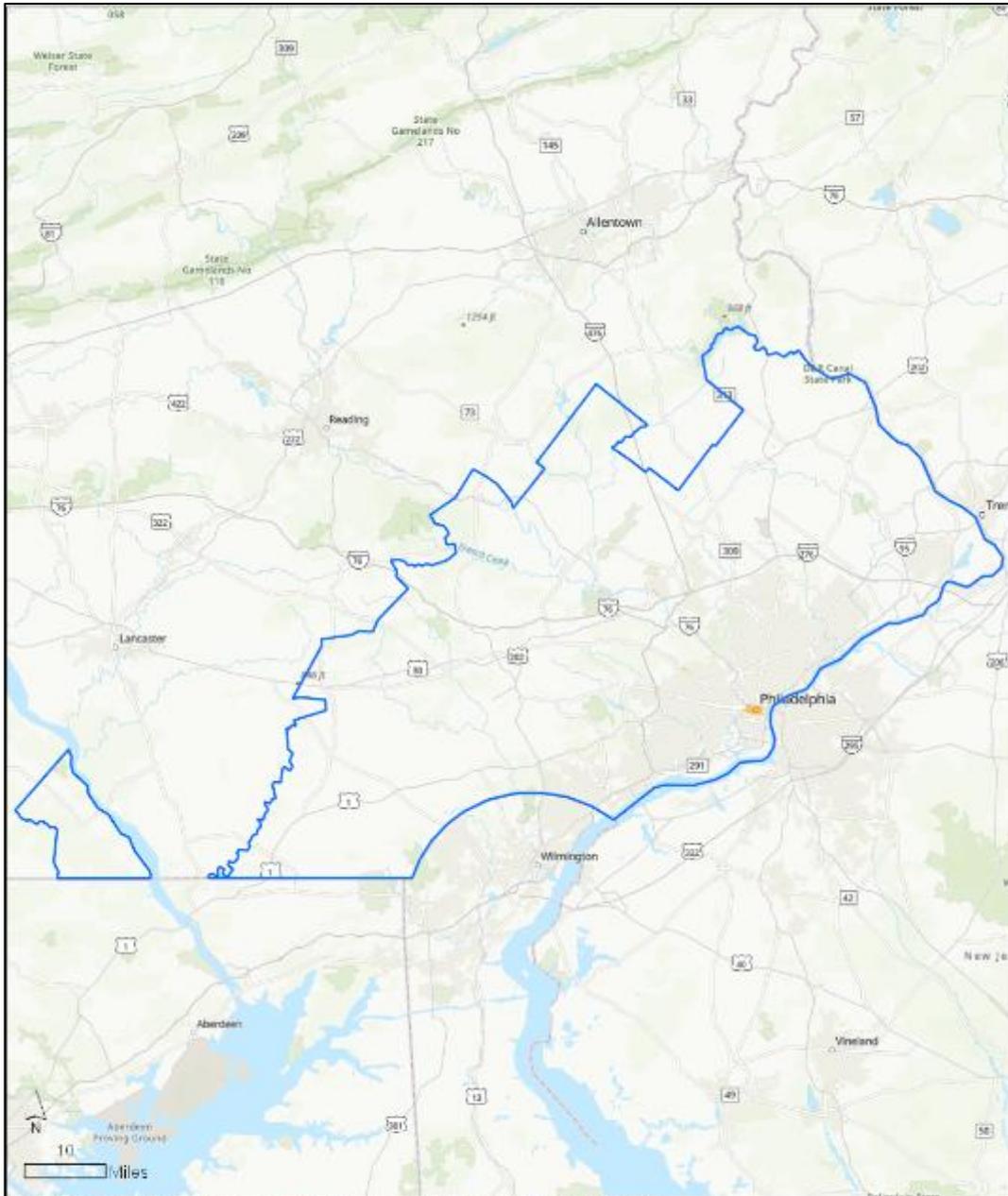
ORANGE & ROCKLAND UTILITIES, INC.



■ Congested Urban
□ Service Territory
 Service Area: 8391.88 sqkm
 Congested Area: 9.16 sqkm
 Percent Congested: 0.1092%

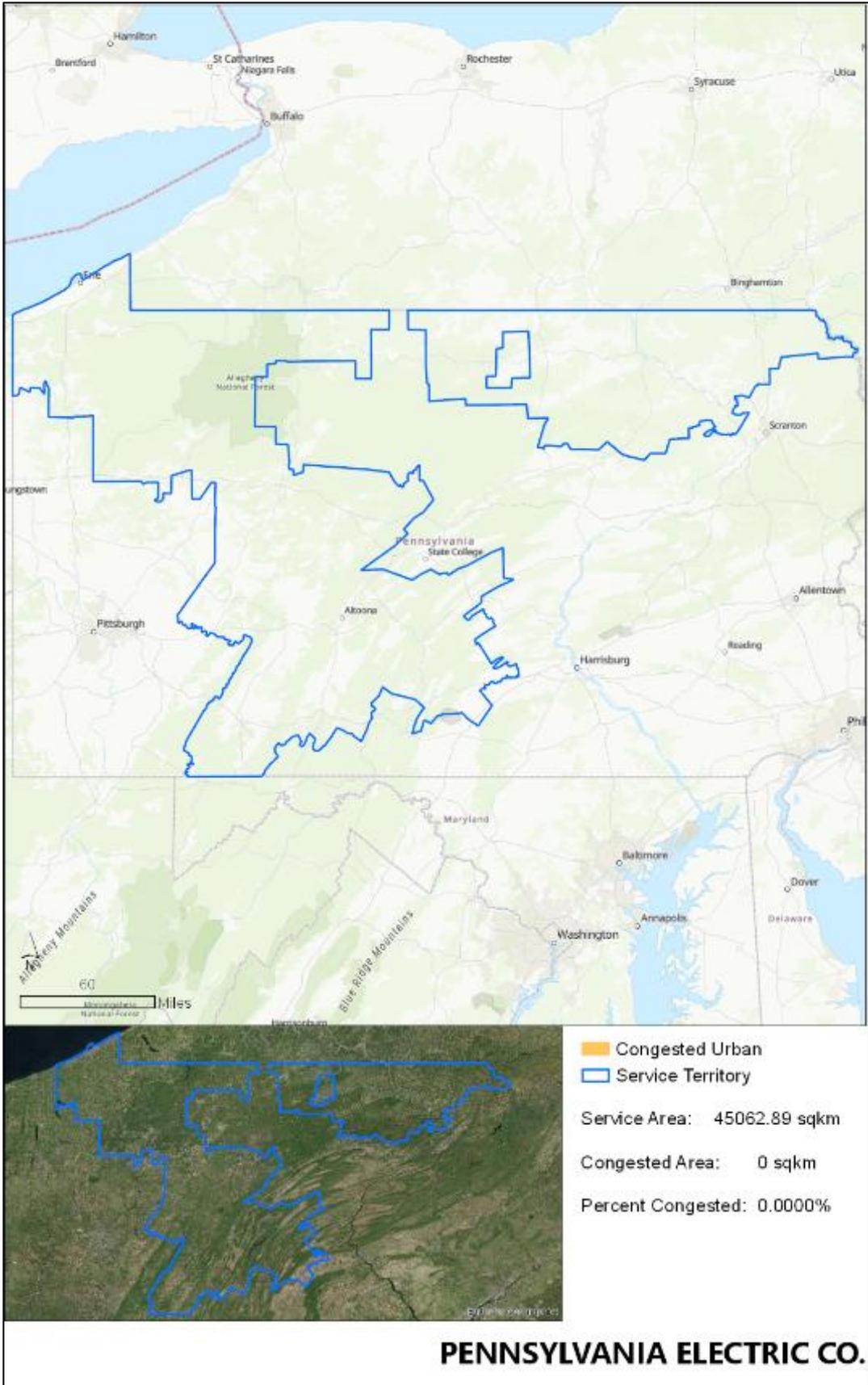
OKLAHOMA GAS & ELECTRIC CO. (OG&E)

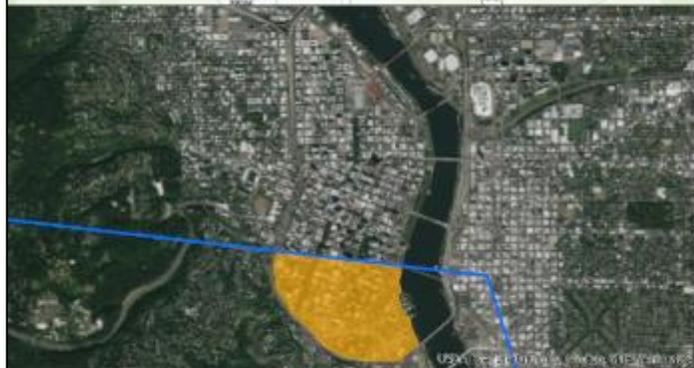
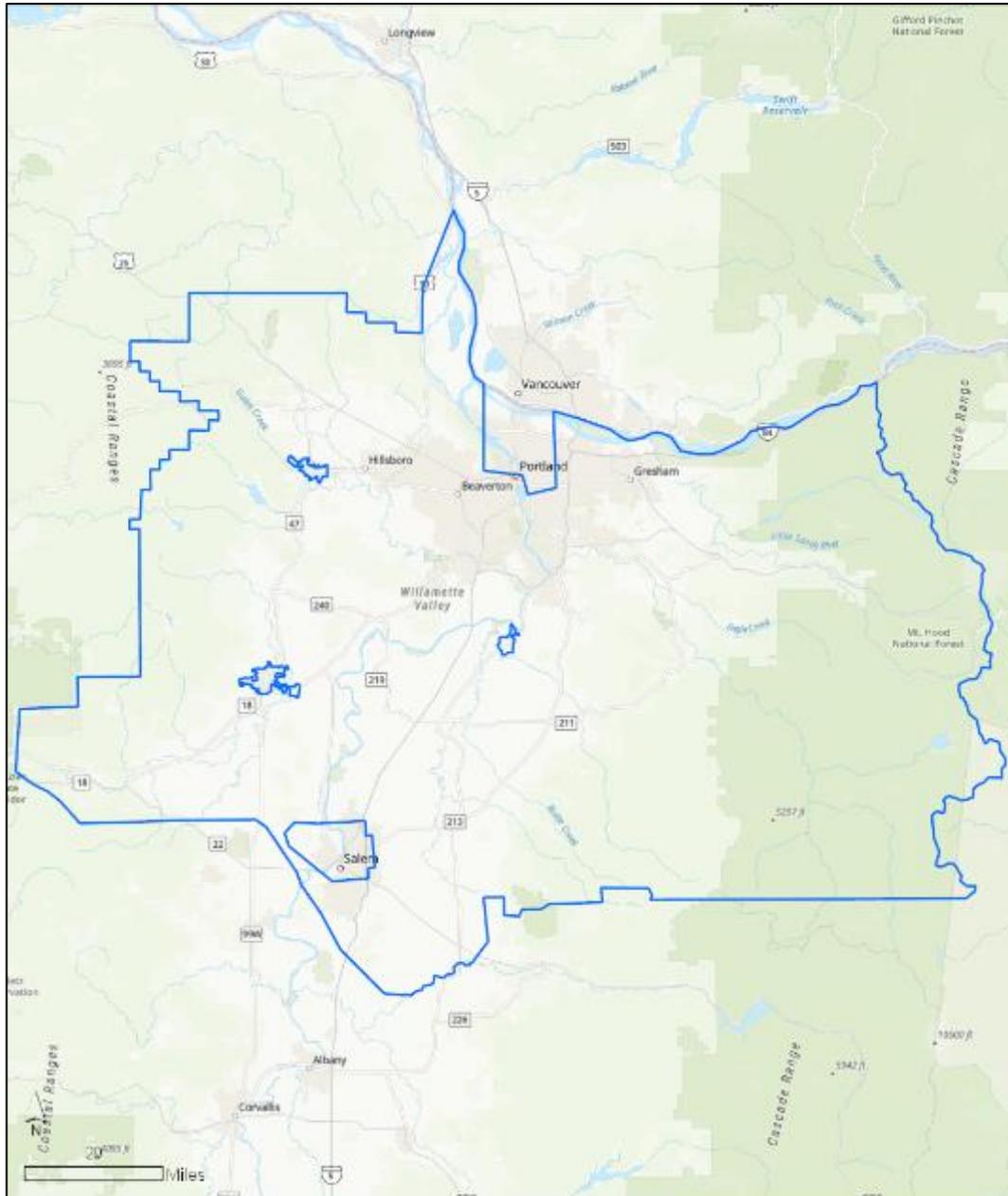




■ Congested Urban
▭ Service Territory
 Service Area: 4879.79 sqkm
 Congested Area: 4.22 sqkm
 Percent Congested: 0.0865%

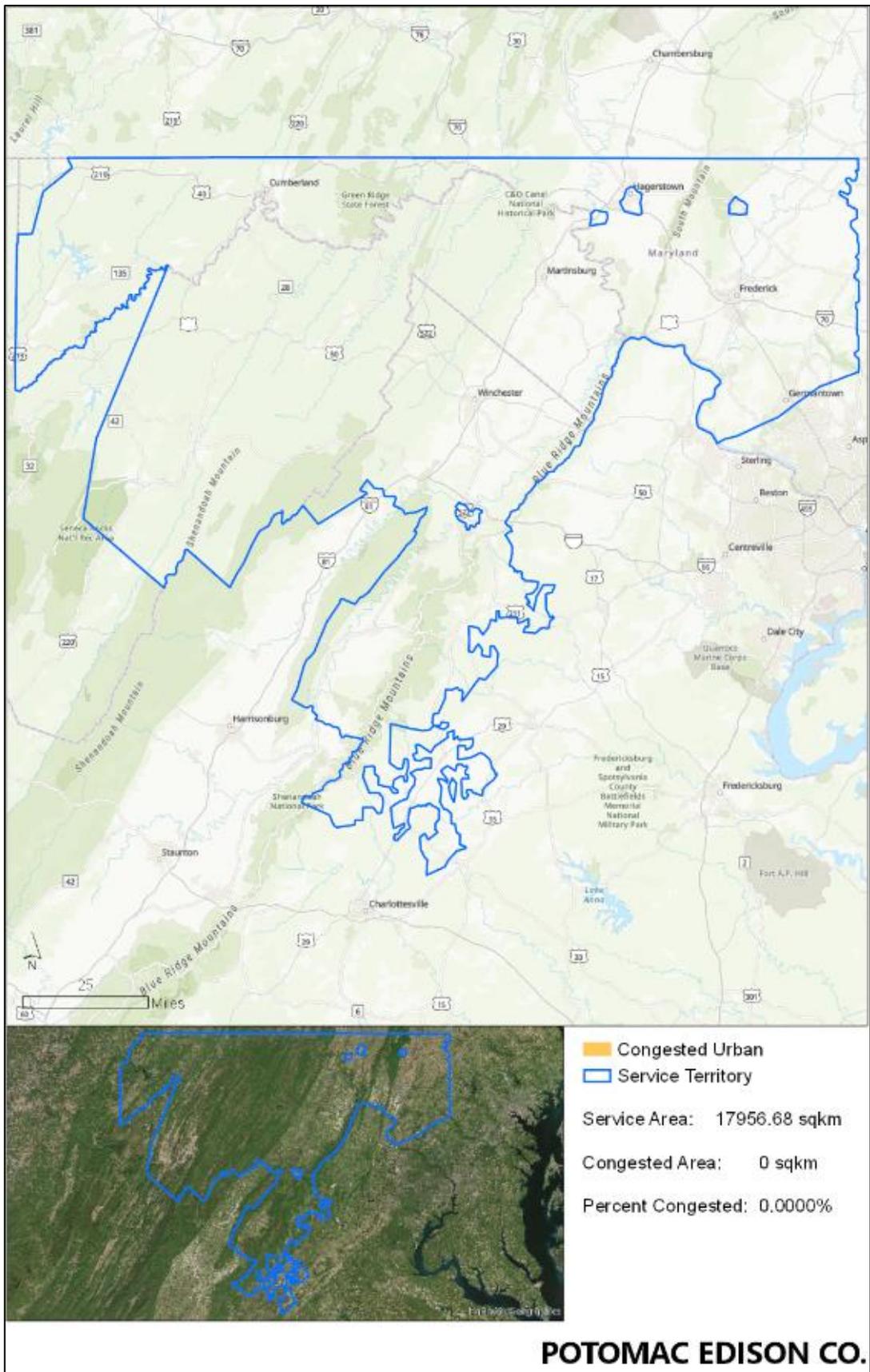
PECO ENERGY CO.

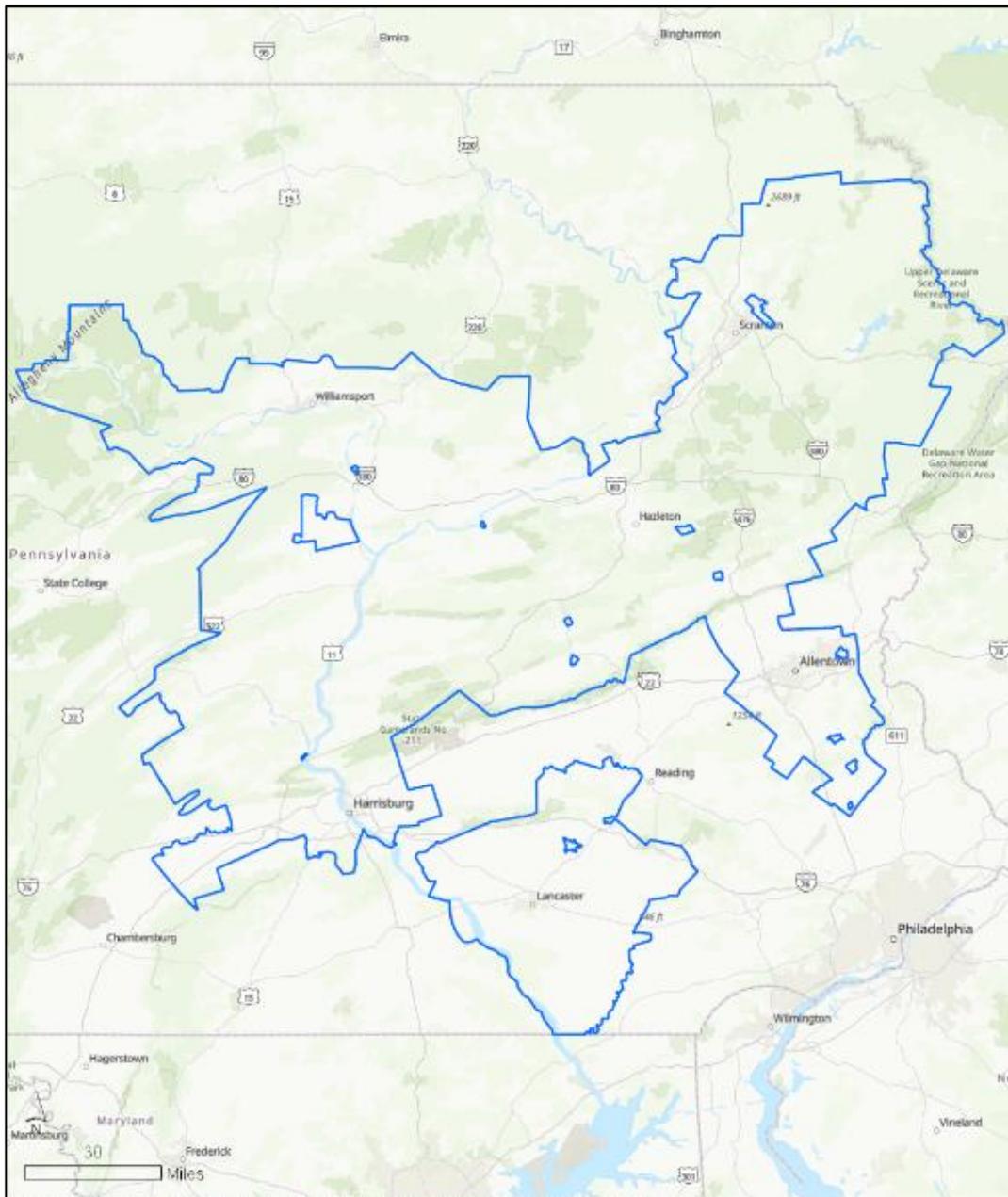




■ Congested Urban
□ Service Territory
 Service Area: 11545.19 sqkm
 Congested Area: 1.06 sqkm
 Percent Congested: 0.0092%

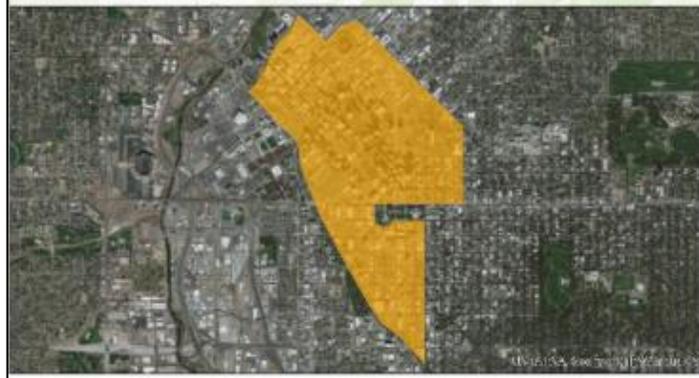
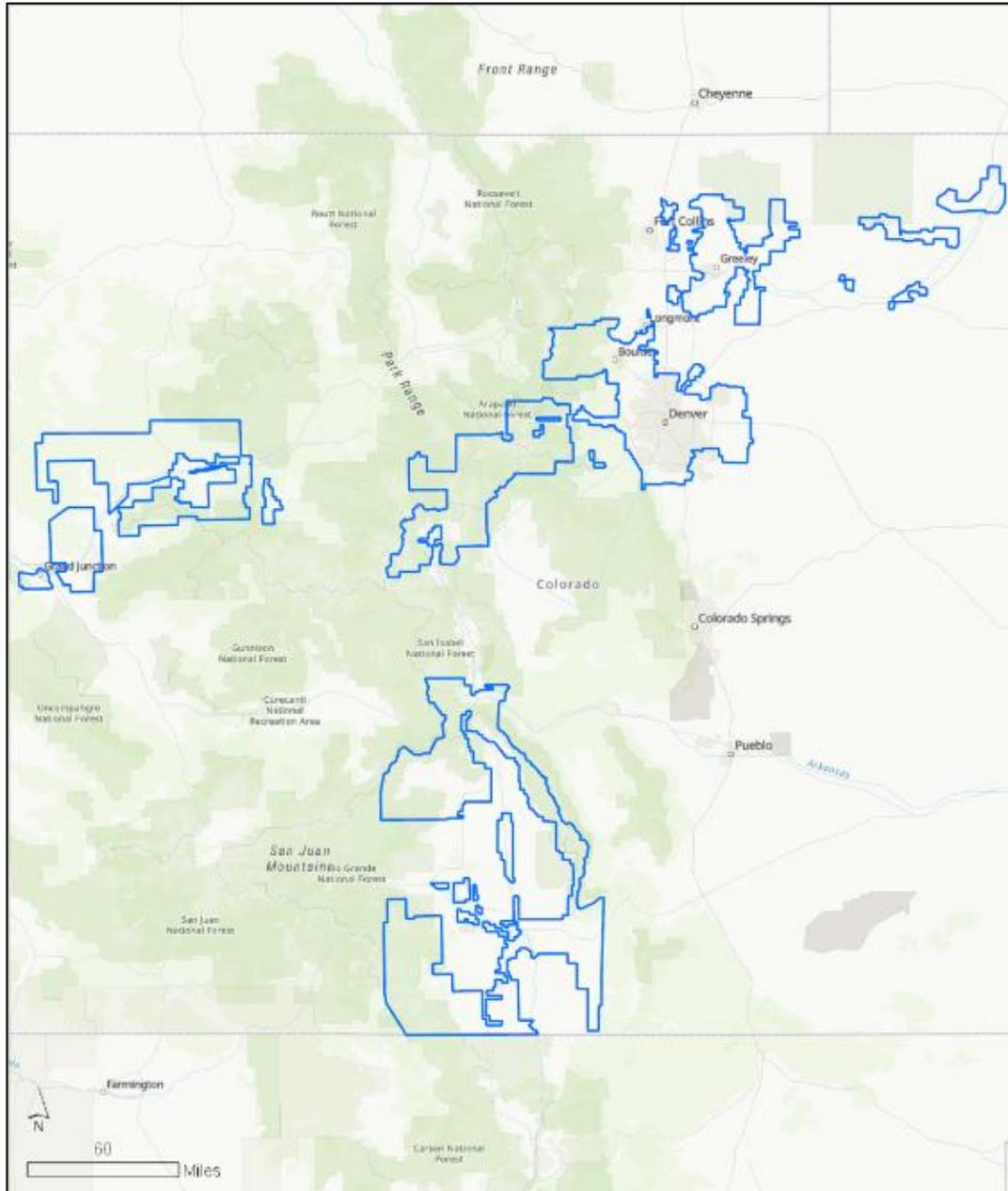
PORTLAND GENERAL ELECTRIC CO.





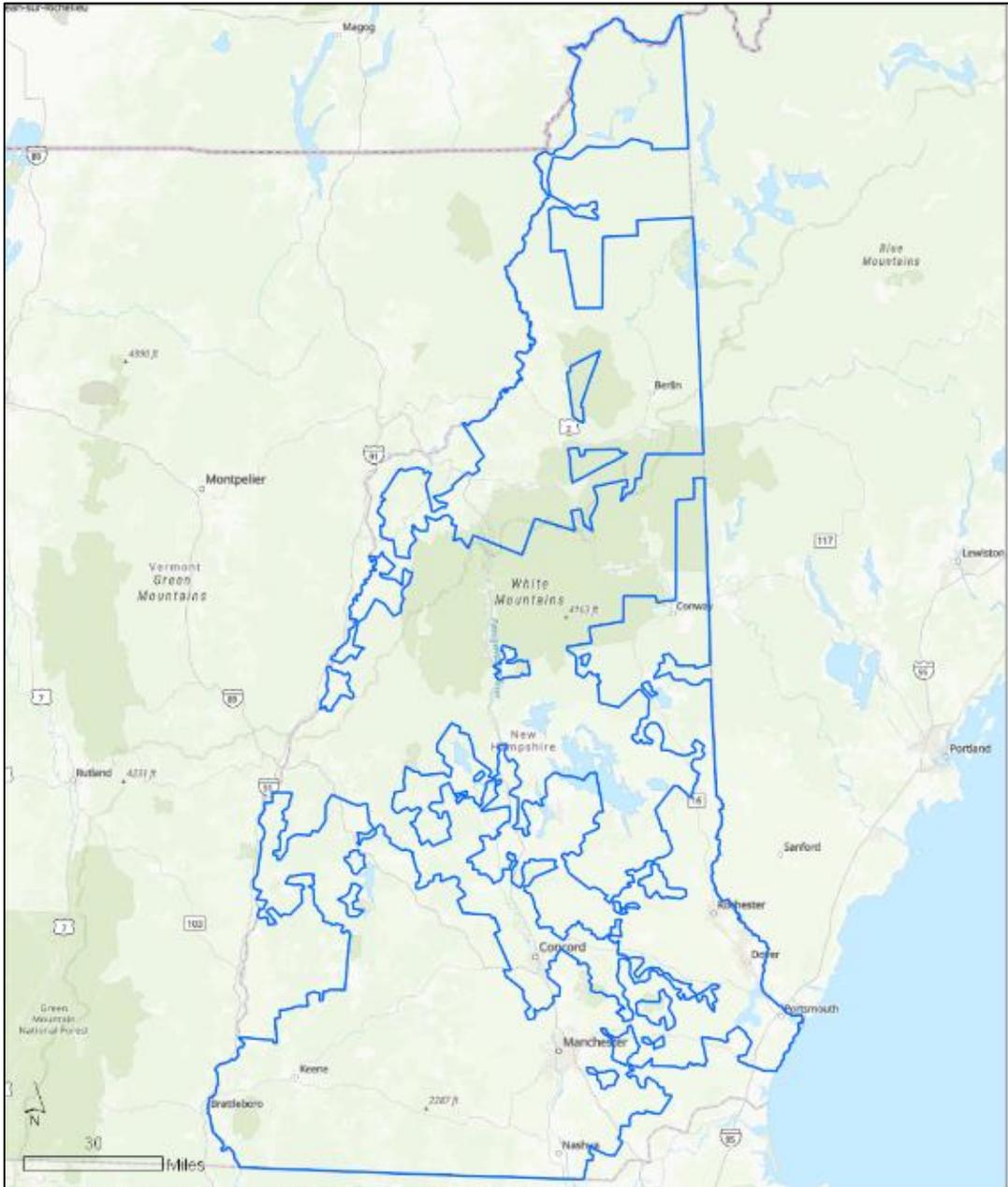
■ Congested Urban
□ Service Territory
 Service Area: 24923.06 sqkm
 Congested Area: 0.34 sqkm
 Percent Congested: 0.0014%

PPL ELECTRIC UTILITIES CORP.



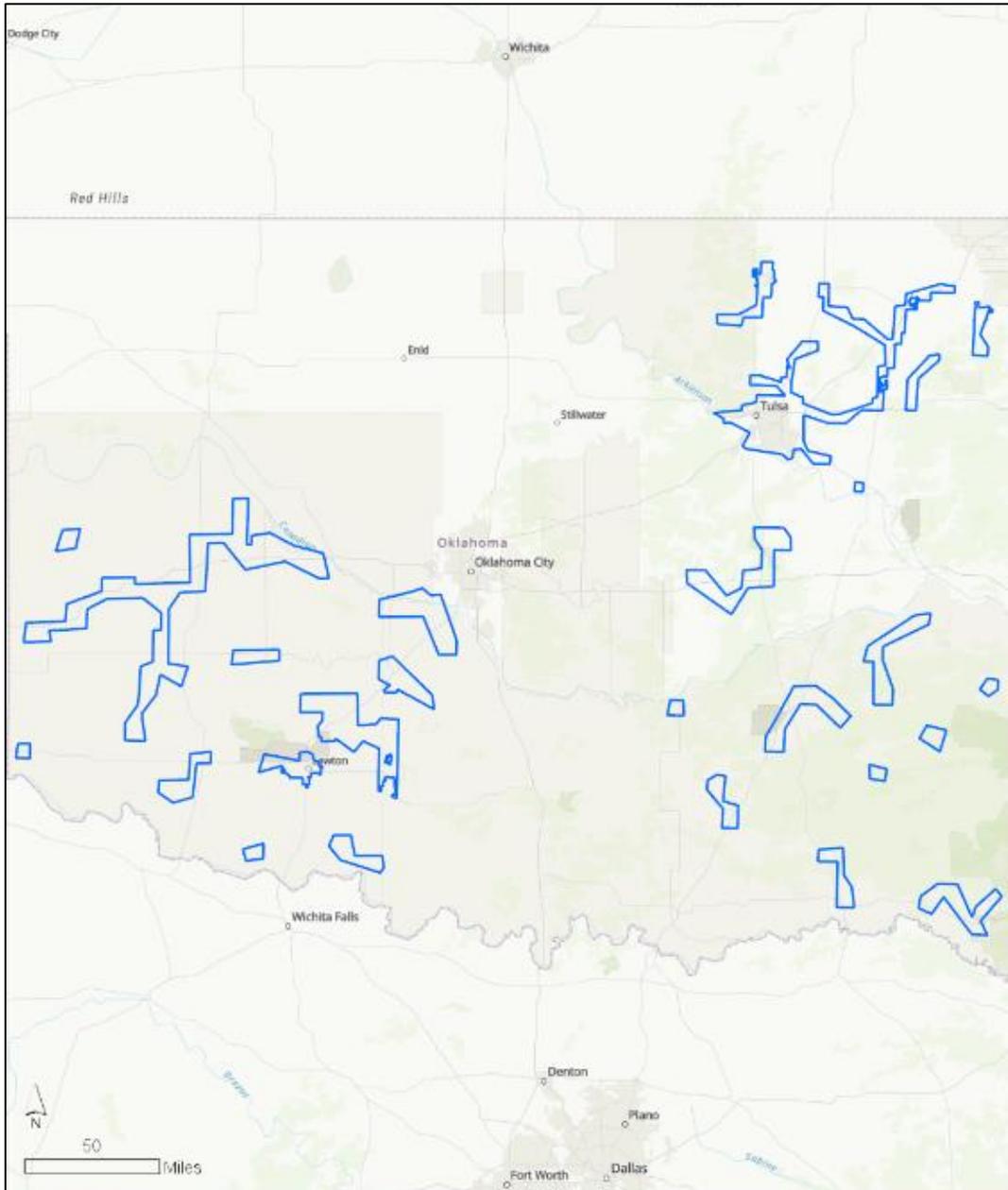
■ Congested Urban
□ Service Territory
 Service Area: 21873.64 sqkm
 Congested Area: 6.6 sqkm
 Percent Congested: 0.0302%

PSC OF COLORADO



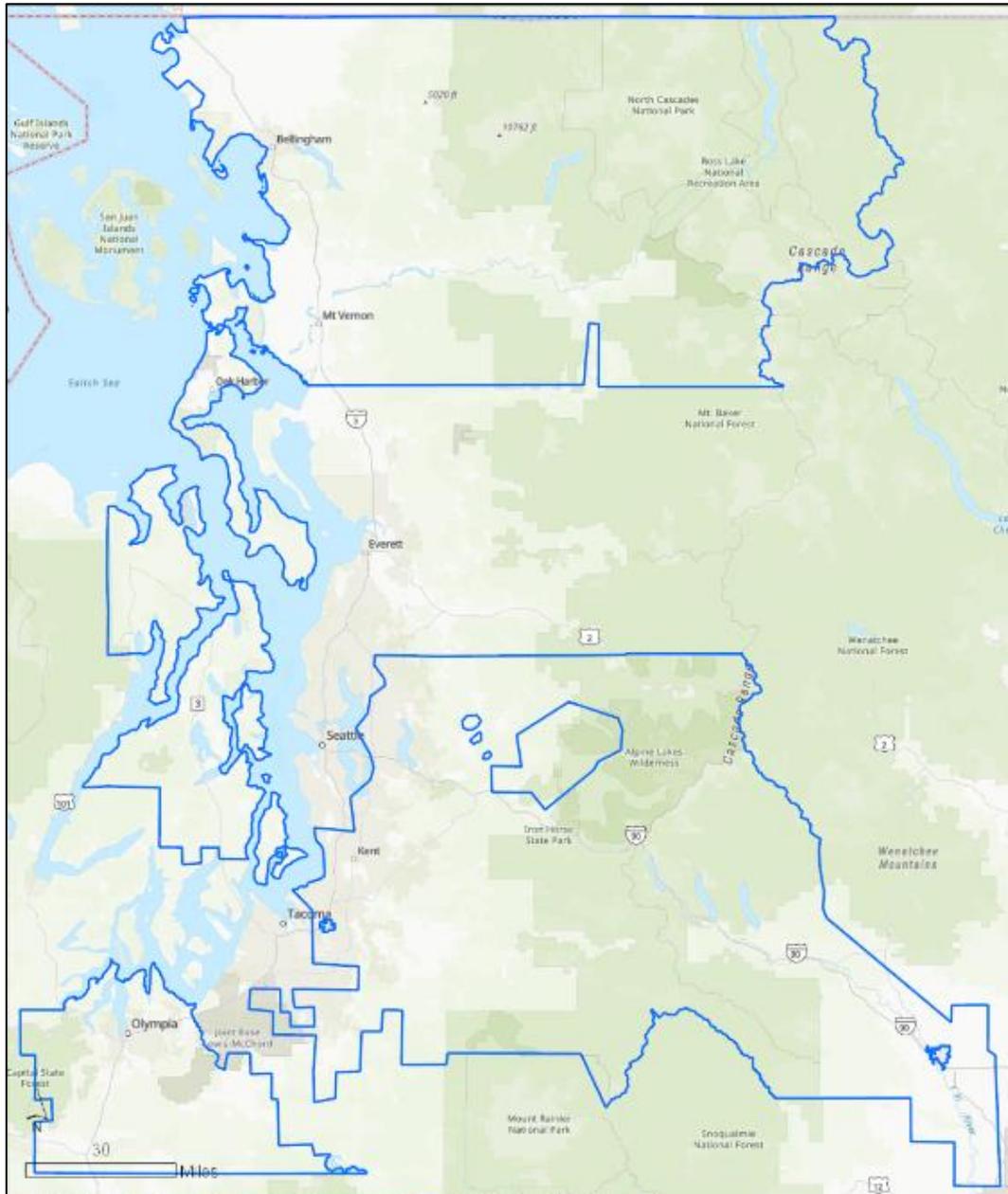
■ Congested Urban
□ Service Territory
 Service Area: 14583.76 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

PSC OF NEW HAMPSHIRE



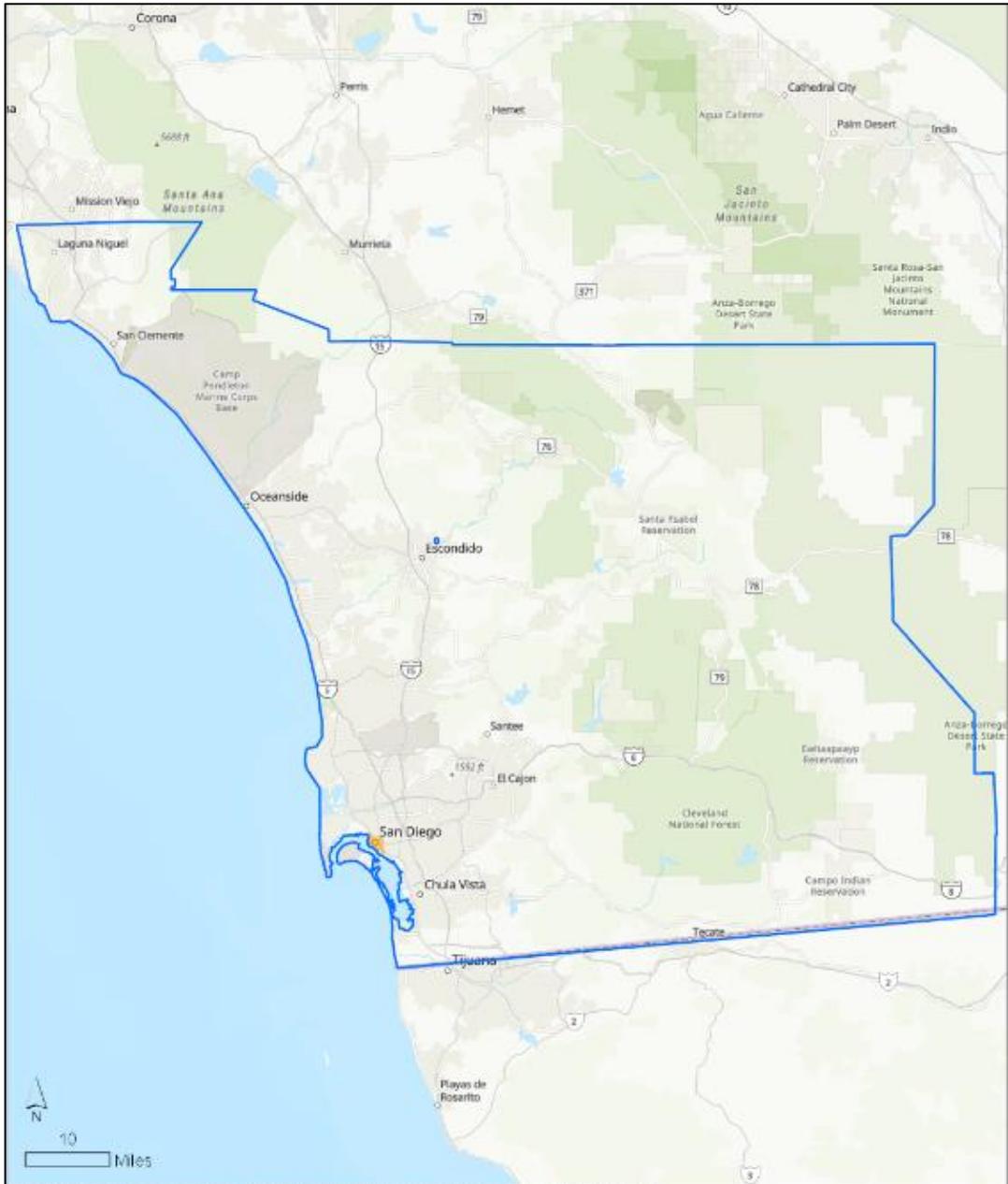
■ Congested Urban
□ Service Territory
 Service Area: 9945.53 sqkm
 Congested Area: 1.16 sqkm
 Percent Congested: 0.0116%

PSC OF OKLAHOMA



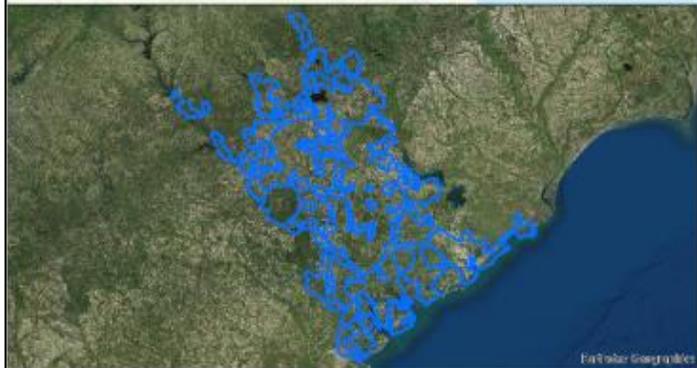
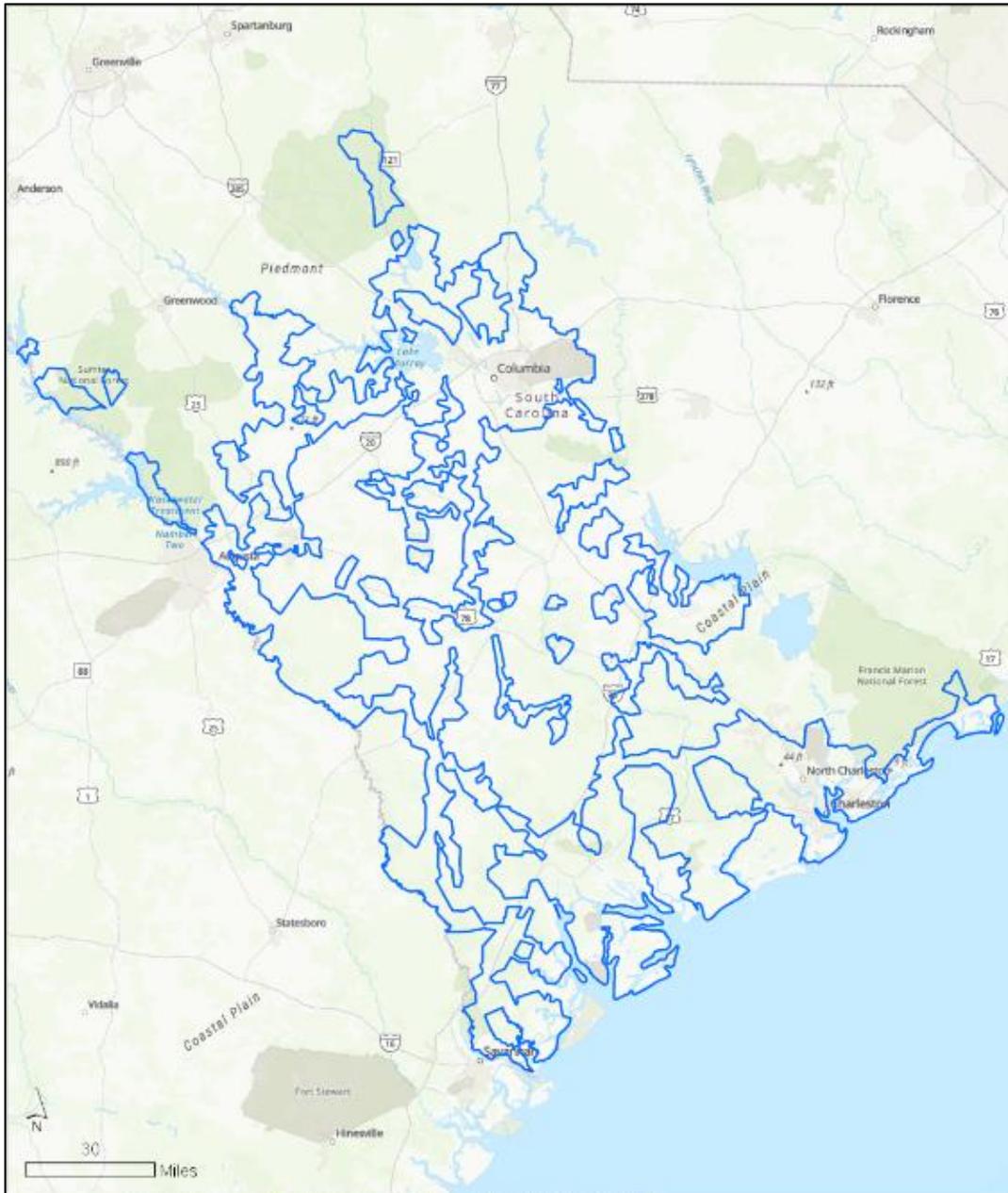
■ Congested Urban
□ Service Territory
 Service Area: 23931.36 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

PUGET SOUND ENERGY, INC.



■ Congested Urban
 Service Territory
 Service Area: 10633.31 sqkm
 Congested Area: 4.9 sqkm
 Percent Congested: 0.0461%

SAN DIEGO GAS & ELECTRIC CO.



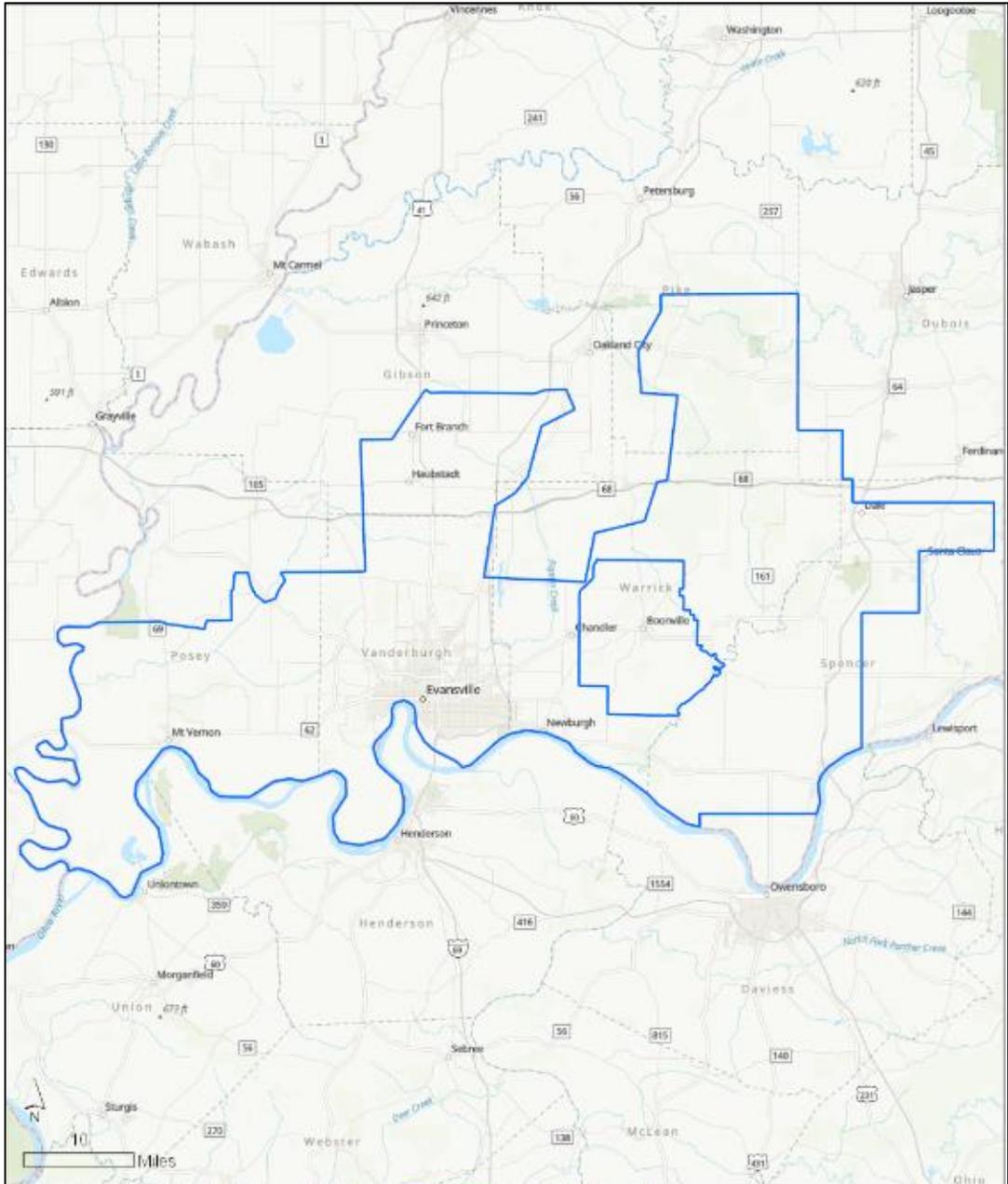
■ Congested Urban
□ Service Territory
 Service Area: 14431.05 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

SOUTH CAROLINA ELECTRIC & GAS CO.



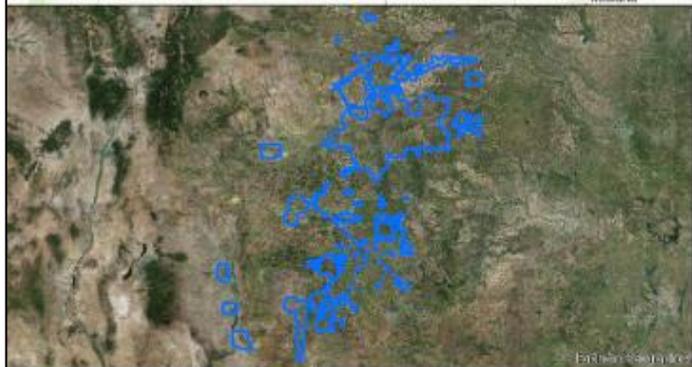
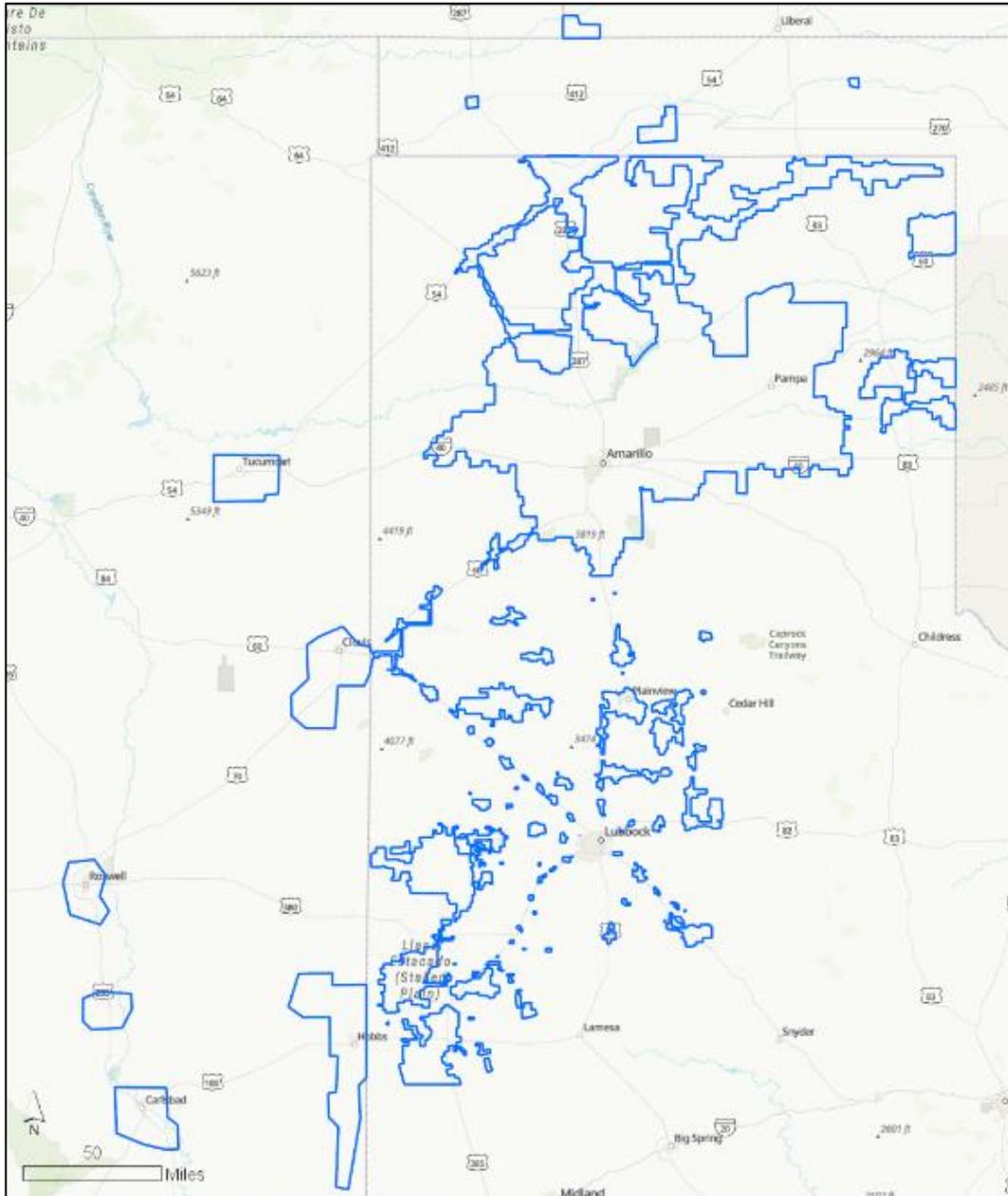
■ Congested Urban
□ Service Territory
 Service Area: 133616.3 sqkm
 Congested Area: 3.36 sqkm
 Percent Congested: 0.0025%

SOUTHERN CALIFORNIA EDISON CO.



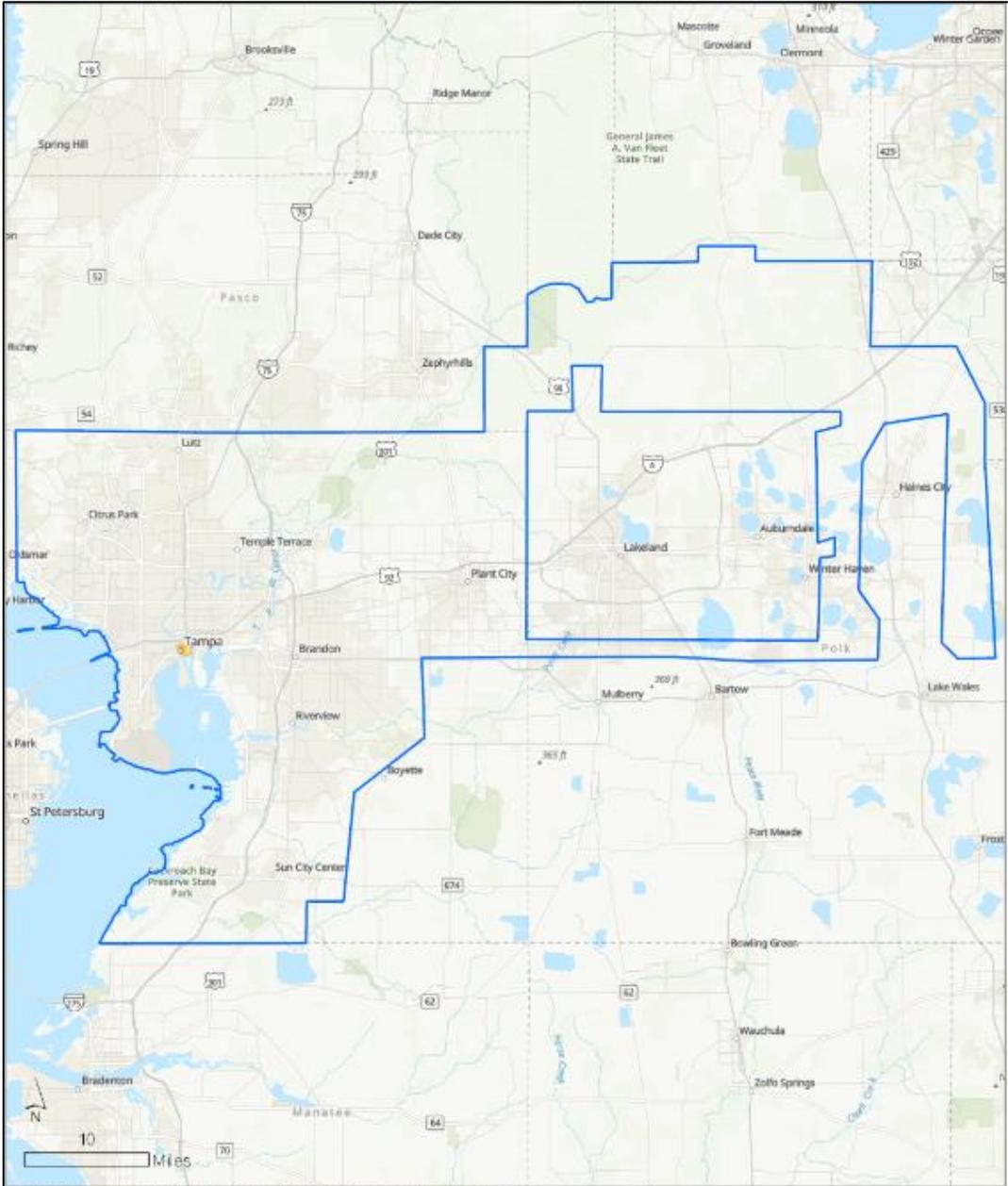
■ Congested Urban
□ Service Territory
 Service Area: 3086.73 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

SOUTHERN INDIANA GAS & ELECTRIC CO.



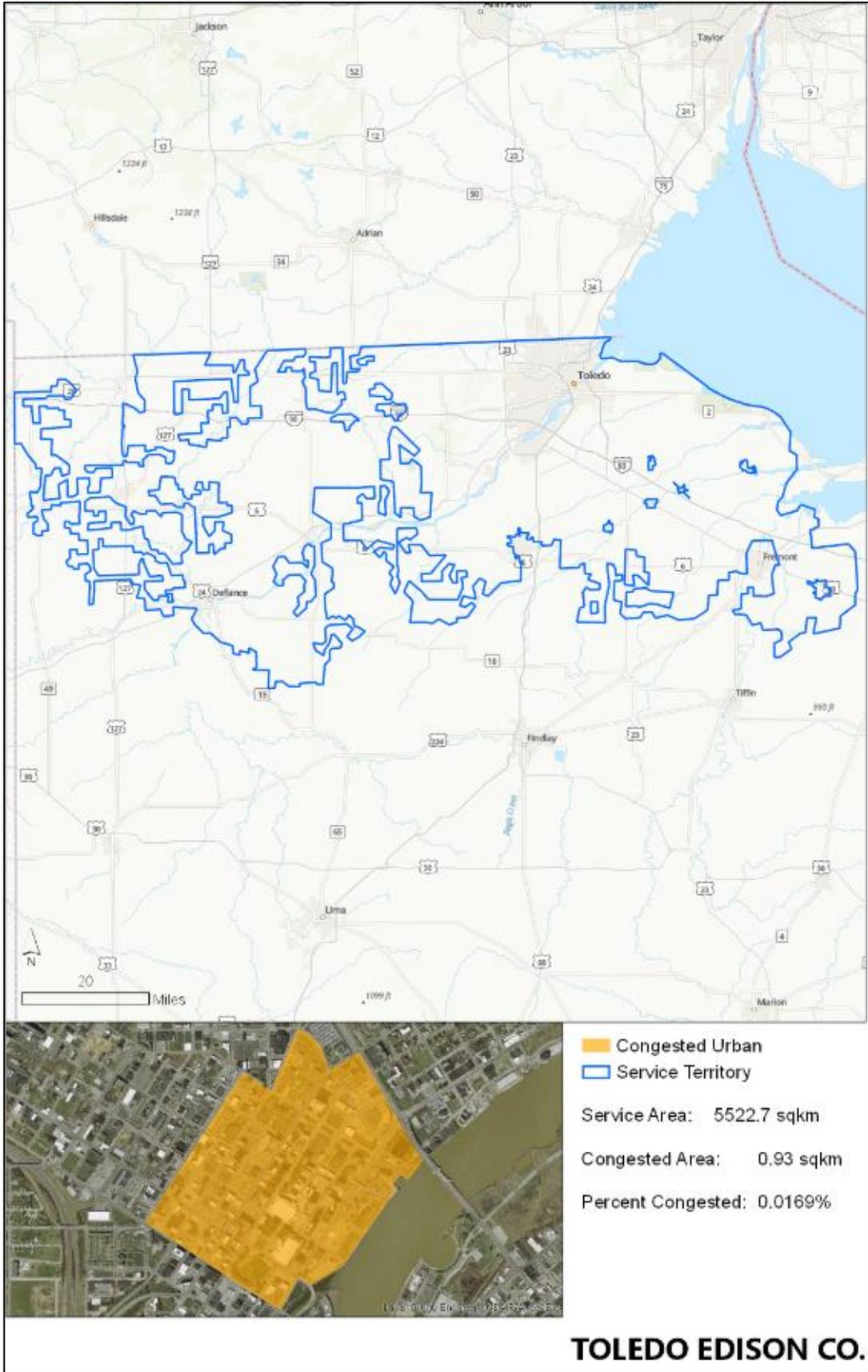
■ Congested Urban
□ Service Territory
 Service Area: 29243.49 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

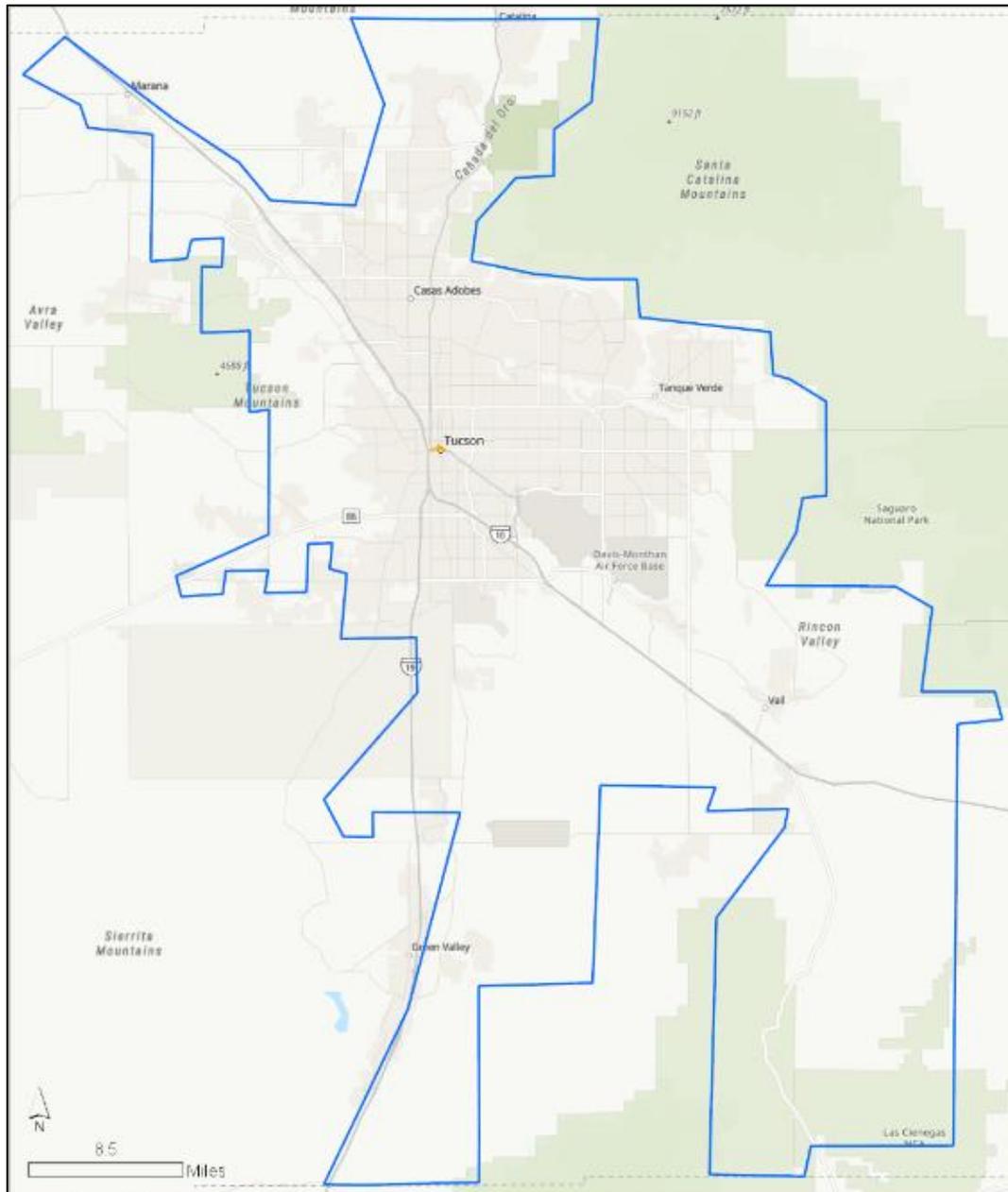
SOUTHWESTERN PUBLIC SERVICE CO.



■ Congested Urban
□ Service Territory
 Service Area: 3428.43 sqkm
 Congested Area: 1.68 sqkm
 Percent Congested: 0.0489%

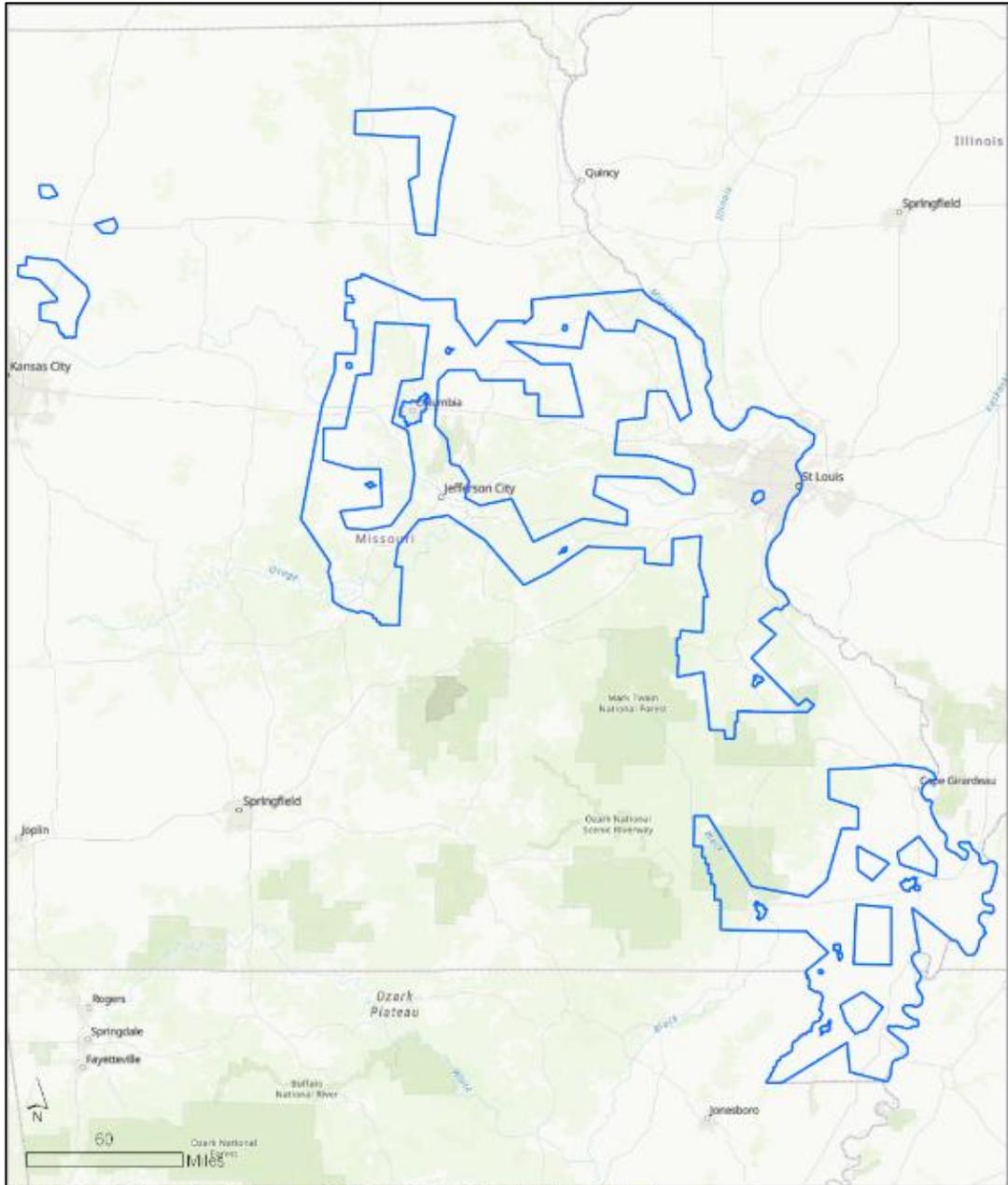
TAMPA ELECTRIC CO.





■ Congested Urban
□ Service Territory
 Service Area: 2746.27 sqkm
 Congested Area: 0.48 sqkm
 Percent Congested: 0.0174%

TUCSON ELECTRIC POWER CO.



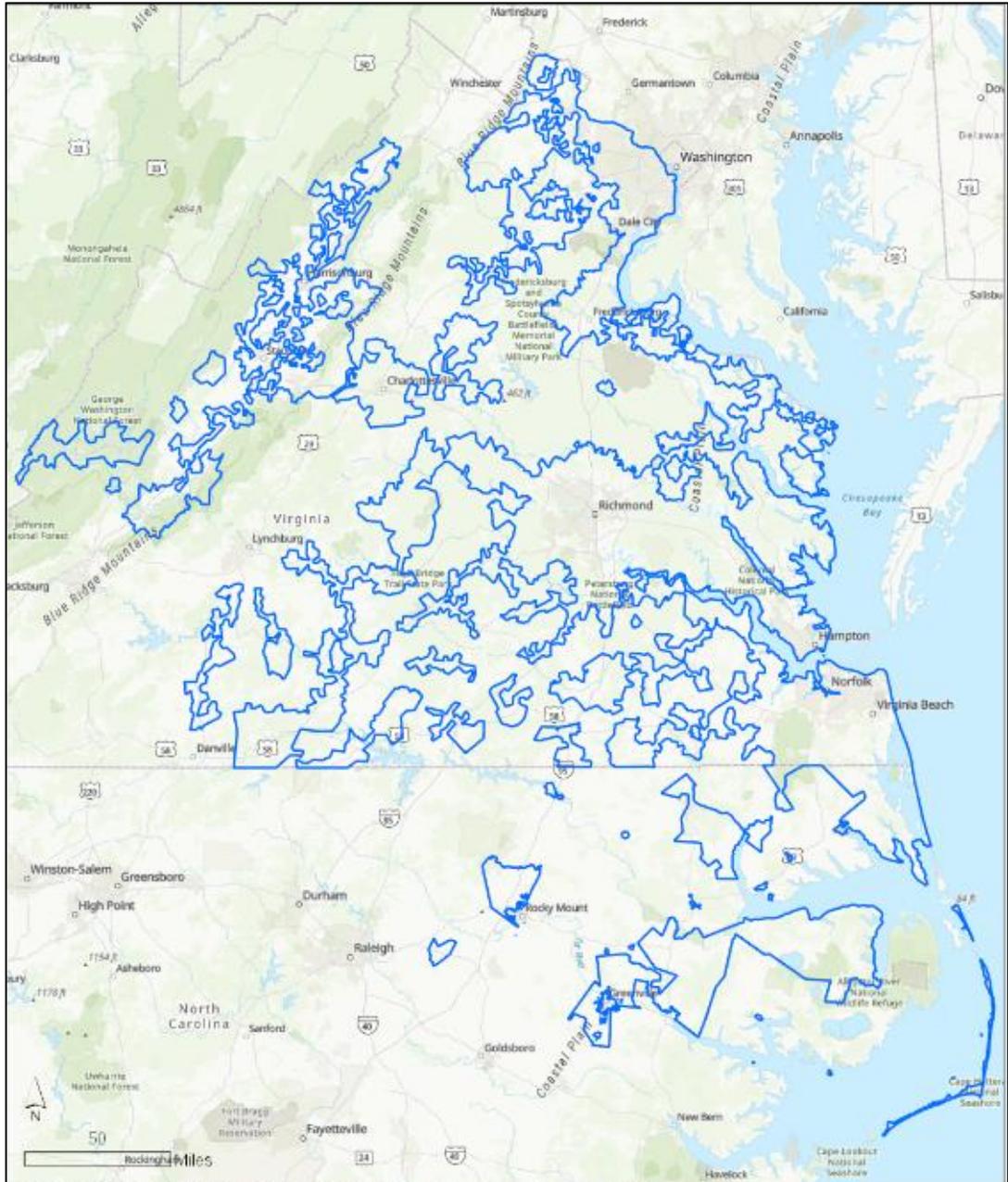
■ Congested Urban
□ Service Territory
 Service Area: 29207.41 sqkm
 Congested Area: 2.6 sqkm
 Percent Congested: 0.0089%

UNION ELECTRIC CO.



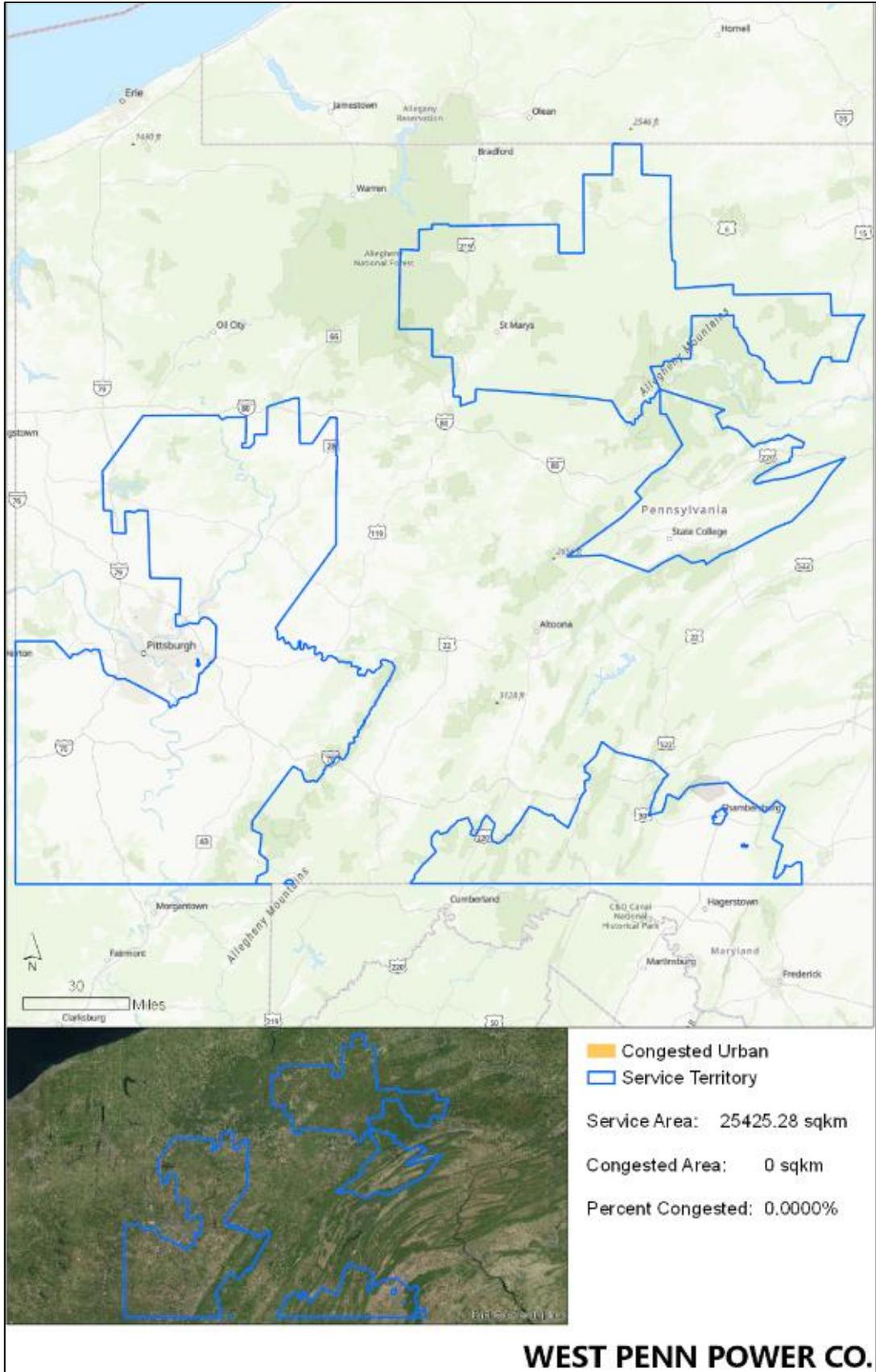
■ Congested Urban
□ Service Territory
 Service Area: 985.49 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

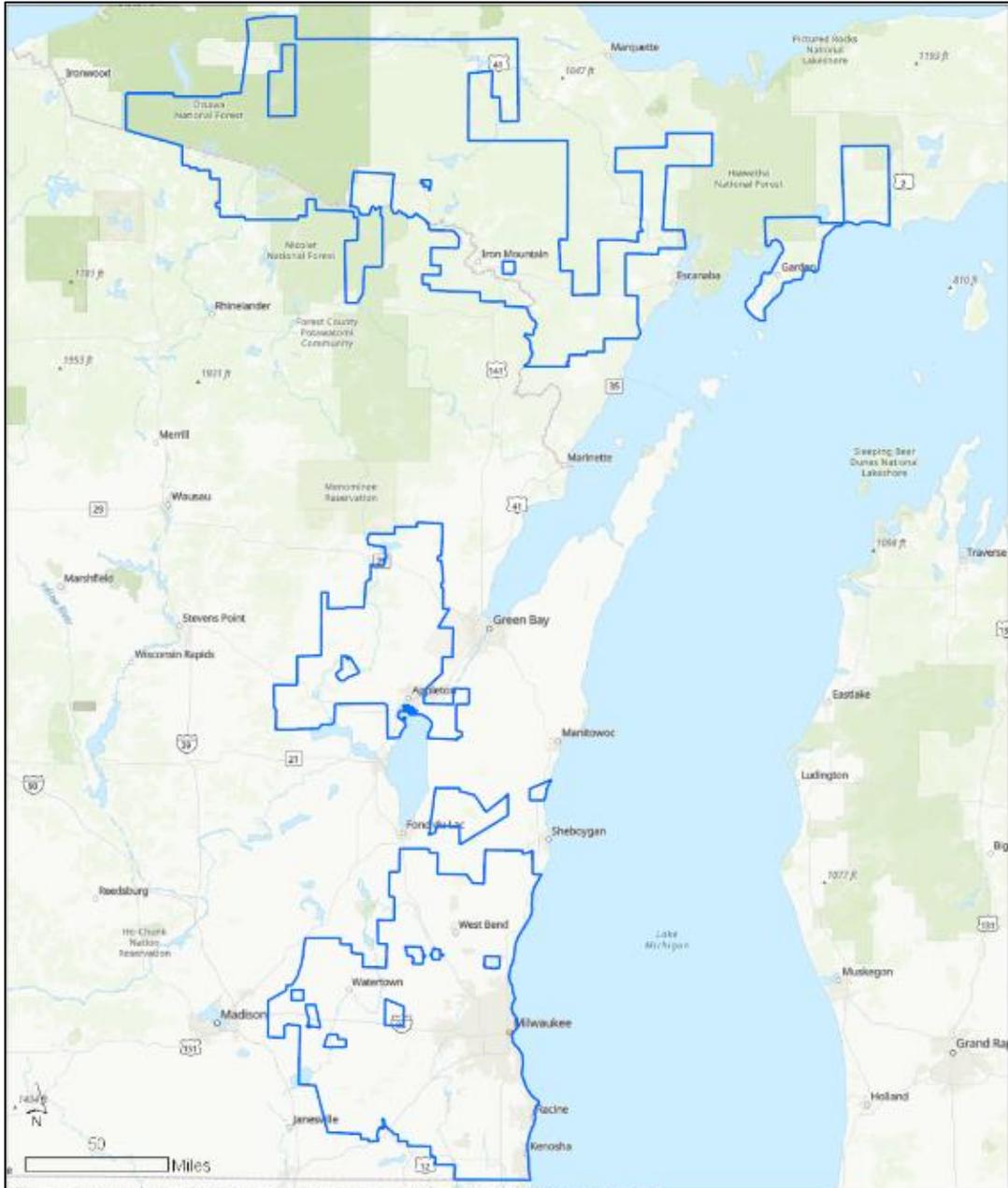
UNITED ILLUMINATING CO.



■ Congested Urban
▭ Service Territory
 Service Area: 35900.78 sqkm
 Congested Area: 2.07 sqkm
 Percent Congested: 0.0058%

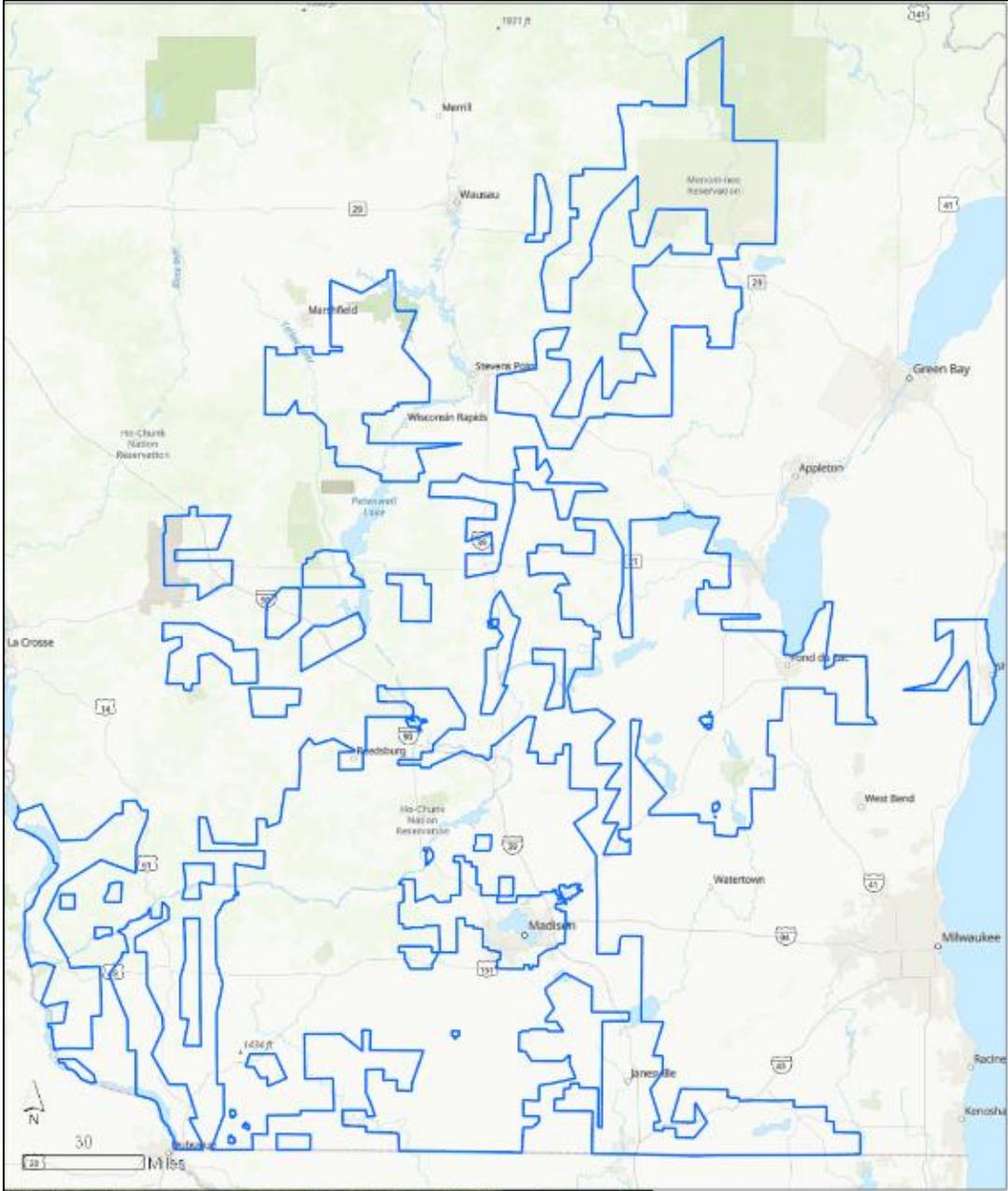
VIRGINIA ELECTRIC & POWER CO.





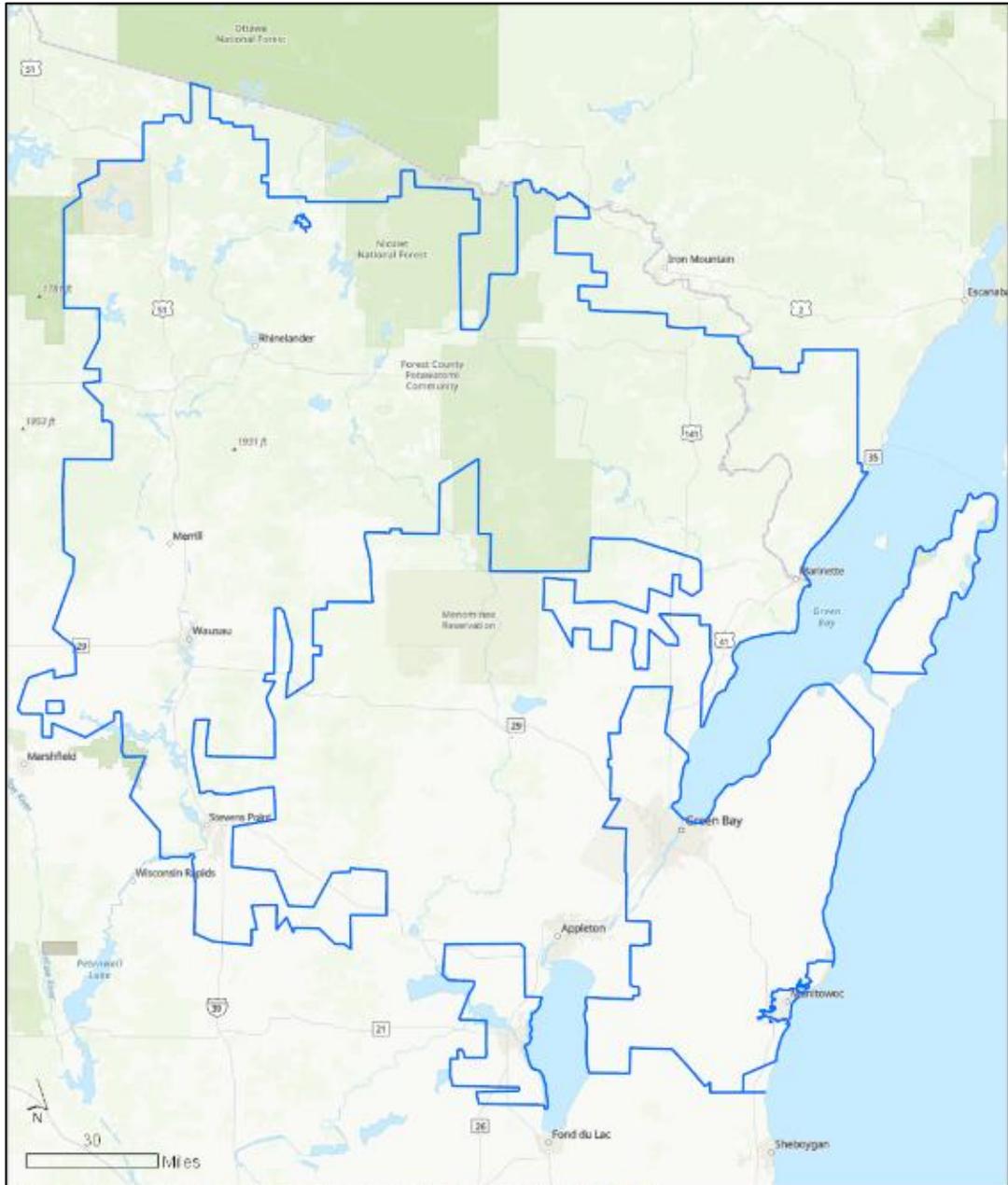
■ Congested Urban
□ Service Territory
 Service Area: 27021.71 sqkm
 Congested Area: 5.71 sqkm
 Percent Congested: 0.0211%

WISCONSIN ELECTRIC POWER CO.



■ Congested Urban
□ Service Territory
 Service Area: 25255.93 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

WISCONSIN POWER & LIGHT CO.



■ Congested Urban
□ Service Territory
 Service Area: 27669.63 sqkm
 Congested Area: 0 sqkm
 Percent Congested: 0.0000%

WISCONSIN PUBLIC SERVICE CORP.

STEVEN A. FENRICK, M.S.

PROFESSIONAL EXPERIENCE

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, 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.

EDUCATION

University of Wisconsin - Madison, WI

Master of Science, Agriculture and Applied Economics

University of Wisconsin - Madison, WI

Bachelor of Science, Economics (Mathematical Emphasis)

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”, 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).

STEVEN A. FENRICK

- “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*.

Expert Witness Experience

- 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.

Recent Conference Presentations

- Moderator at WPUI conference on cost allocation and innovative rate designs, 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.

STEVEN A. FENRICK

- 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.

STEVEN A. FENRICK

- 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.

FORM A

Proceeding: EB-2018-0165

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is Steven A. Fenrick (name). I live at Verona (city), in the Wisconsin (province/state) of United States.
2. I have been engaged by or on behalf of Toronto Hydro (name of party/parties) to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.
3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
 - (a) to provide opinion evidence that is fair, objective and non-partisan;
 - (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and
 - (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.
4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date 9-12-18

St Fenrick
Signature

ERIK S. SONJU, P.E.

PRESIDENT

SUMMARY OF EXPERIENCE AND EXPERTISE

- Consultant in the electric utility sector helping clients analyze and develop strategic decisions around industry best practices, policies, standards, and contracts.
- Principal engineer for electric power studies and design projects.
- Instructor for professional development courses.
- Expert witness in regulatory hearings and civil trials.
- Licensed Professional Engineer in 20 states.

PROFESSIONAL EXPERIENCE

Power System Engineering, Inc. – Madison, WI (2006-present)

President (2018-present)

Active consultant to PSE clients in areas of expertise. Responsible for the day-to-day operations of PSE.

Executive Vice President (2017-2018)

Executive for PSE business operations and active consultant to PSE clients.

Vice President – Power Delivery Planning and Design (2010 - 2017)

Responsible for PSE's efforts in electric transmission and distribution studies and planning, substation design, transmission line design and distribution line design. Other responsibilities include overseeing system protection and coordination studies, system operations and maintenance support, distributed energy resource studies and design, and specialty studies of electric power systems.

Leader of System Planning and Line Design (2008 – 2010)

Senior engineer and leader of system planning and line design. Emphasis included short range and long range system planning studies, distributed generation system impact studies, system protection studies, and expert testimony in regulatory proceedings associated with engineering analysis used for State Commission and FERC filed tariffs. Other responsibilities included distribution and transmission line design.

Leader of System Planning (2006 – 2008)

Senior engineer and leader of distribution system planning projects.

Great Lakes Energy – Boyne City, MI (2001-2006)

System Engineer and Manager of Engineering

Heartland Engineering Services – Rockford, MN (1999-2001)

System Engineer

United Services Group – Elk River, MN (1997-1999)

Planning Engineer

EDUCATION

North Dakota State University, Fargo, ND

Bachelor of Science in Electrical Engineering with Emphasis in Power Systems, 1997

University of Nebraska, Lincoln, NE

NRECA Management Internship Program, 2006

Numerous technical and business continuing education courses focusing on issues and topics within the power industry.

TRAINING SEMINARS AND CONFERENCE PRESENTATIONS

- Instructor for professional development courses in the areas of:
 - Distribution System Planning
 - Distribution System Protection and Sectionalizing
 - Power Quality
 - Electric Power Line Design
 - Post Construction Inspections
- Industry conference presentations on:
 - Distribution Independent System Operators
 - Distributed Energy Resource Interconnection and Integration
 - Aging Electric Utility Infrastructure
 - Economic Conductor Analysis
 - Mechanical Loading of Overhead Electrical Equipment on Wood Poles
 - Application of Series Capacitors on Distribution Systems
 - Application of Shunt Reactors on Distribution Systems
 - Impact of Electric Motors, Drives, and Phase Converters on Distribution Systems
 - Substation Protection Considerations
 - National Electric Safety Code Rules and Requirements Pertaining to Communication Attachments on Power Supply Structures.

STATES LICENSED AS PROFESSIONAL ENGINEER

Arizona	Indiana	Montana	South Dakota
Arkansas	Iowa	Nebraska	Texas
Colorado	Kansas	New Hampshire	Virginia
Florida	Michigan	New Mexico	Wisconsin
Illinois	Minnesota	Ohio	Wyoming

EXPERT WITNESS AND TESTIMONY

<u>Utility / Entity</u>	<u>Jurisdiction Body</u>	<u>Case No.</u>	<u>Description</u>	<u>Year</u>
Chevron Pipe Line Company	United States District Court of Utah, Central Division	2:12-cv-00287	Industry expert on behalf of plaintiff in the matter of electrical damage to an oil pipeline. Included expert report and deposition.	2016-17
Lorain-Medina Rural Electric Cooperative	State of Ohio Median County Common Pleas Court	15CIV0749	Industry expert on behalf of defendant in the matter of the application of an electric rate schedule dispute. Included expert report and deposition.	2014-16
Toronto Hydro-Electric System Limited	Ontario Energy Board	EB-2015-0173	Industry expert on behalf of Toronto Hydro. Developed filed report regarding the variance of forecasted vs. actual expenditures associated with an OEB approved 2012-14 Incremental Capital Module request.	2015-16
Toronto Hydro-Electric System Limited	Ontario Energy Board	EB-2014-0116	Industry expert on behalf of Toronto Hydro. Developed filed report regarding independent review of the cost to serve developed environments including core downtown areas. Followed by oral testimony.	2014-15
Crow Wing Power	State of Minnesota District Court - Cass County	Court File No: 11-CV-12-1670	Testimony on behalf of defendant in the matter of a stray voltage lawsuit. Specific evidence related to conditions of underground distribution cable running adjacent to a dairy farm.	2013-14
MidAmerican Energy Company	State of Iowa District Court - Polk County	Law No. CL 114962	Industry expert on behalf of defendant providing engineering analysis showing the probable cause of failure of a 161kV transmission structure while under construction. Included affidavit of the analysis results and deposition.	2013
Toronto Hydro-Electric System Limited (THESL)	Ontario Energy Board	EB-2012-0064	Written and oral testimony regarding the replacement of aging electric infrastructure in the matter of THESL's application for 2012, 2013, and 2014 IRM Rate Adjustments and ICM Rate Adders	2012

<u>Utility / Entity</u>	<u>Jurisdiction Body</u>	<u>Case No.</u>	<u>Description</u>	<u>Year</u>
Governor Dannel P. Malloy's Two Storm Panel	State of Connecticut	N/A	Expert witness presentation to Governor Malloy's Two Storm Panel regarding distribution system reliability in the aftermath of Tropical Storm Irene and 2011 Halloween nor'easter snow storm.	2011
Mid-Kansas Electric Company	Kansas Corporation Commission	09-MKEE-969-RTS	Written expert rebuttal testimony on certain aspects of transmission and sub-transmission losses applied in proposed open access transmission tariffs and local access charges.	2009

FORM A

Proceeding: EB-2018-0165

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is Erik S. Sonju (name). I live at Madison (city), in the Wisconsin (province/state) of United States.
2. I have been engaged by or on behalf of Toronto Hydro (name of party/parties) to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.
3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
 - (a) to provide opinion evidence that is fair, objective and non-partisan;
 - (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and
 - (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.
4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date 9-12-18

Erik S. Sonju
Signature

Line Reference Number	Row Nur	Account	Forecasted Values										Data Item Number			
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024				
50	5605	47		3,203,104												
51	5610	48	Executive Salaries and Expenses		802											
52	5615	49	Management Salaries and Expenses		54,544,884											
53	5620	50	General Administrative Salaries and Expenses		4,196											
54	5625	51	Office Supplies		14,706											
55	5630	52	Administrative Expense Transferred - Credit		6,419,601											
56	5640	53	Outside Services Employed		1,562,179											
57	5645	54	Injuries and Damages		-											
58	5646	55	OMERS Pensions and Benefits		-											
59	5647	56	Employee Pensions and OPEB		-											
60	5650	57	Employee Sick Leave		-											
61	5655	58	Franchise Requirements		-											
62	5665	59	Regulatory Expenses		5,188,491											
63	5670	60	Miscellaneous General Expenses		37,971											
64	5672	61	Rent (Administrative and General)		-											
65	5675	62	Lease Payment Expense		-											
66	5680	63	Maintenance of General Plant		10,393,074											
67			Electrical Safety Authority Fees		406,037											
68	5635	64	Subtotal: A&G Expenses		81,775,045											
69	6210	65	Property Insurance		1,757,502											
70			Life Insurance		-											
71	5515	46	Subtotal: Insurance		1,757,502											
72			Advertising		-											
73			Subtotal Advertising		-											
74			Total of Above Accounts Used for Benchmarking		232,383,928											
75			Adjustments to OM&A for Benchmarking													
76			5014		-											
77			5015		-											
78			5112		-											
79			Subtotal: HV Adjustment (to subtract from cost)		-											
80			LV Adjustment		-											
81			Total Adjusted OM&A Expense		232,383,928	234,078,558	239,346,726	246,351,802	255,330,919	257,628,897	259,947,557	262,287,085	264,647,669			11
82																
83			Gross Capital Cost Additions Data													
84			Total Gross Capital Additions	617,138,762	548,964,114	680,697,572	482,190,579	568,662,447	553,558,130	662,090,855	640,457,963	813,349,859				1
85			HV Gross Capital Additions	53,844,210	31,583,172	142,355,192	5,579,006	46,229,405	3,979,367	32,939,467	73,666,872	45,686,811				2
86																
87			Output and Other Business Conditions													
88			Number of Customers	761,920	767,946	771,221	777,747	783,944	790,644	797,713	804,782	811,852				3
89			Delivery Volume	24,710,637,614	23,766,238,910	23,548,753,407	23,300,879,954	23,214,583,255	23,002,936,691	22,841,143,128	22,669,336,922	22,592,195,054				4
90			Annual Peak Demand	4,591,559	4,246,688	4,203,979	4,181,918	4,151,730	4,105,891	4,056,364	4,025,571	4,038,725				5
91			Distribution Circuit km	28,605	28,763	28,922	29,082	29,242	29,404	29,566	29,729	29,894				6
92																
93																

Section 2: Actual Cost Calculations

94	Actual Cost															
95																
96	OM&A		232,383,928.44	234,078,557.67	239,346,726.00	246,351,801.90	255,330,918.81	257,628,897.08	259,947,557.15	262,287,085.17	264,647,668.93					
97																
98	Capital															
99		Rate of Return		6.28%	5.67%	6.02%	7.03%	7.17%	7.18%	7.18%	7.18%	7.18%	7.18%			10
100		Depreciation Rate		4.59%	4.59%	4.59%	4.59%	4.59%	4.59%	4.59%	4.59%	4.59%	4.59%			
101		Construction Cost Index	165.10	167.22	170.40	173.46	176.52	179.64	182.83	186.30	189.95					9
102		Capital Price	17.83	17.03	17.89	19.94	20.55	20.91	21.28	21.67	22.09					
103		Gross Plant Additions	617,138,762	548,964,114	680,697,572	482,190,579	568,662,447	553,558,130	662,090,855	640,457,963	813,349,859					1
104		HV Capital Additions	53,844,210	31,583,172	142,355,192	5,579,006	46,229,405	3,979,367	32,939,467	73,666,872	45,686,811					2
105		Quantity of Capital Additions	3,411,879	3,093,923	3,159,315	2,747,695	2,959,610	3,059,381	3,441,242	3,042,414	4,041,482					
106		Quantity of Capital Removed	1,356,026	1,450,389	1,525,828	1,600,805	1,653,447	1,713,400	1,775,180	1,851,653	1,906,309					
107		Capital Quantity	31,598,897	33,242,431	34,875,919	36,022,809	37,328,972	38,674,953	40,341,015	41,531,776	43,666,950					
108		Capital Cost	563,376,872	566,099,179	623,938,282	718,139,208	766,928,128	808,828,049	858,599,450	900,064,089	964,524,704					
109																
110	Total Actual Cost		795,760,801	800,177,736	863,285,008	964,491,010	1,022,259,047	1,066,456,946	1,118,547,007	1,162,351,174	1,229,172,373					

Line Reference Number	Row Nur	Account	Forecasted Values								2023	2024	Data Item Number
			2015	2016	2017	2018	2019	2020	2021	2022			
186													
187													
188													
189			2013 Values Logged and Mean Scaled (where applicable)										
190													
191		Constant		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
192		Capital Price / OM&A Price (WK)		(0.2724)	(0.3357)	(0.3077)	(0.2196)	(0.2096)	(0.2118)	(0.2142)	(0.2169)	(0.2203)	(0.2203)
193		Customers (Y1)		2.4989	2.4989	2.4982	2.5066	2.5145	2.5230	2.5319	2.5408	2.5495	2.5495
194		Capacity (Y2)		2.6769	2.6769	2.6769	2.6769	2.6769	2.6769	2.6769	2.6769	2.6769	2.6769
195		Deliveries (Y3)		2.7185	2.6795	2.6703	2.6597	2.6560	2.6468	2.6398	2.6322	2.6288	2.6288
196		WKWK		0.0371	0.0563	0.0474	0.0241	0.0220	0.0224	0.0229	0.0235	0.0243	0.0243
197		Y1Y1		3.0902	3.1098	3.1204	3.1415	3.1614	3.1828	3.2053	3.2277	3.2500	3.2500
198		Y2Y2		3.5830	3.5830	3.5830	3.5830	3.5830	3.5830	3.5830	3.5830	3.5830	3.5830
199		Y3Y3		3.6950	3.5898	3.5652	3.5370	3.5272	3.5029	3.4842	3.4643	3.4554	3.4554
200		WKY1		(0.6773)	(0.8371)	(0.7688)	(0.5504)	(0.5272)	(0.5344)	(0.5423)	(0.5512)	(0.5617)	(0.5617)
201		WKY2		(0.7293)	(0.8985)	(0.8238)	(0.5878)	(0.5612)	(0.5670)	(0.5734)	(0.5808)	(0.5898)	(0.5898)
202		WKY3		(0.7406)	(0.8994)	(0.8218)	(0.5841)	(0.5568)	(0.5607)	(0.5654)	(0.5711)	(0.5792)	(0.5792)
203		Y1Y2		6.6549	6.6760	6.6874	6.7099	6.7312	6.7540	6.7778	6.8014	6.8248	6.8248
204		Y1Y3		6.7581	6.6824	6.6708	6.6668	6.6786	6.6781	6.6838	6.6879	6.7022	6.7022
205		Y2Y3		7.2771	7.1728	7.1482	7.1198	7.1099	7.0854	7.0665	7.0463	7.0372	7.0372
206		Average Line Length		1.6515	1.7136	1.7660	1.8109	1.8499	1.8842	1.9147	1.9420	1.9667	1.9667
207		Customers Added in last 10 years		96.11%	100.68%	98.97%	99.98%	92.77%	89.15%	85.54%	74.32%	70.63%	70.63%
208		Trend		10.0000	11.0000	12.0000	13.0000	14.0000	15.0000	16.0000	17.0000	18.0000	18.0000
209													
210													
211													
212		Constant		12.802	12.802	12.802	12.802	12.802	12.802	12.802	12.802	12.802	12.802
213		Capital Price / OM&A Price (WK)		(0.172)	(0.212)	(0.195)	(0.139)	(0.133)	(0.134)	(0.135)	(0.137)	(0.139)	(0.139)
214		Customers (Y1)		1.154	1.158	1.160	1.164	1.168	1.172	1.176	1.180	1.184	1.184
215		Capacity (Y2)		0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351	0.351
216		Deliveries (Y3)		0.243	0.240	0.239	0.238	0.238	0.237	0.236	0.235	0.235	0.235
217		WKWK		0.005	0.007	0.006	0.003	0.003	0.003	0.003	0.003	0.003	0.003
218		Y1Y1		(1.101)	(1.108)	(1.112)	(1.120)	(1.127)	(1.134)	(1.142)	(1.150)	(1.158)	(1.158)
219		Y2Y2		0.728	0.728	0.728	0.728	0.728	0.728	0.728	0.728	0.728	0.728
220		Y3Y3		0.541	0.525	0.522	0.518	0.516	0.513	0.510	0.507	0.506	0.506
221		WKY1		(0.036)	(0.045)	(0.041)	(0.029)	(0.028)	(0.029)	(0.029)	(0.030)	(0.030)	(0.030)
222		WKY2		(0.009)	(0.012)	(0.011)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
223		WKY3		(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
224		Y1Y2		0.757	0.759	0.760	0.763	0.765	0.768	0.771	0.773	0.776	0.776
225		Y1Y3		0.566	0.560	0.559	0.558	0.559	0.559	0.560	0.560	0.561	0.561
226		Y2Y3		(1.474)	(1.453)	(1.448)	(1.442)	(1.440)	(1.435)	(1.431)	(1.427)	(1.425)	(1.425)
227		Average Line Length		0.473	0.491	0.506	0.519	0.530	0.539	0.548	0.556	0.563	0.563
228		Customers Added in last 10 years		0.018	0.019	0.019	0.019	0.018	0.017	0.016	0.014	0.013	0.013
229		Trend		0.169	0.186	0.202	0.219	0.236	0.253	0.270	0.287	0.304	0.304
230													
231		Log of Predicted Total Cost / OM&A Price		15.0127	14.9947	15.0466	15.1496	15.1782	15.2018	15.2246	15.2445	15.2653	15.2653
232		Real Predicted Total Cost / OM&A Price		3,310,896	3,251,864	3,424,959	3,773,912	3,906,532	4,000,101	4,092,072	4,174,605	4,262,035	4,262,035
233		OM&A Price		142.41	144.90	148.04	151.04	154.12	157.22	160.39	163.76	167.47	167.47
234		Predicted Total Cost		471,504,404	471,202,505	507,014,192	570,020,142	602,067,400	628,910,589	656,308,484	683,638,448	713,773,966	713,773,966
235													
236													

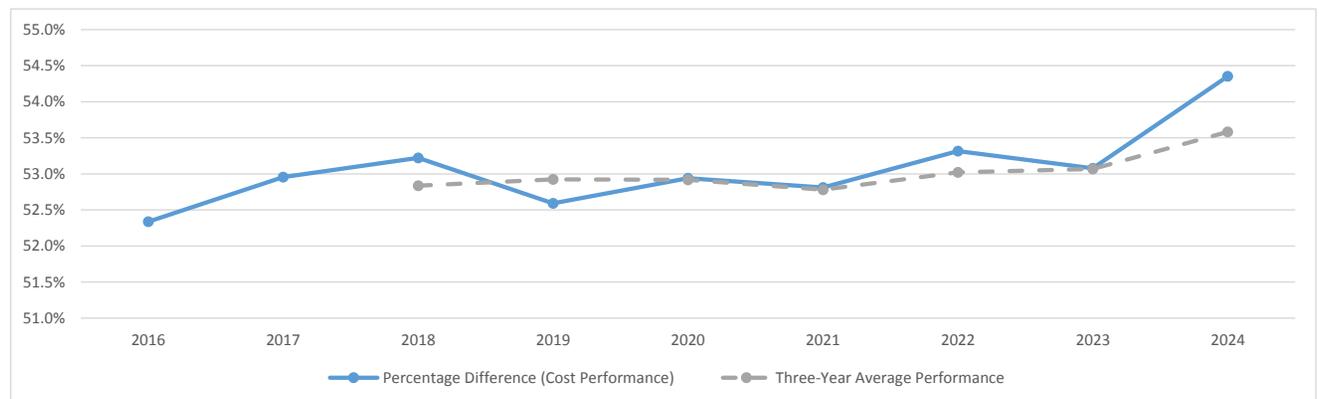
Section 4: Benchmarking Results

237	Actual Cost	795,760,801	800,177,736	863,285,008	964,491,010	1,022,259,047	1,066,456,946	1,118,547,007	1,162,351,174	1,229,172,373
238	Predicted Cost	471,504,404	471,202,505	507,014,192	570,020,142	602,067,400	628,910,589	656,308,484	683,638,448	713,773,966
239	Actual less Predicted Cost	324,256,397	328,975,232	356,270,816	394,470,868	420,191,647	437,546,358	462,238,524	478,712,727	515,398,407
240	Percentage Difference (Arithmetic for Comparison)	68.77%	69.82%	70.27%	69.20%	69.79%	69.57%	70.43%	70.02%	72.21%
241										
242	Percent Difference (Logarithmic)	52.34%	52.95%	53.22%	52.59%	52.94%	52.81%	53.32%	53.08%	54.35%

Summary of Cost Benchmarking Results

Toronto Hydro-Electric System Limited

	2016 (History)	2017 (History)	2018 (Bridge)	2019 (Bridge)	2020 (Test Year)	2021	2022	2023	2024
Cost Benchmarking Summary									
Actual Total Cost	795,760,801	800,177,736	863,285,008	964,491,010	1,022,259,047	1,066,456,946	1,118,547,007	1,162,351,174	1,229,172,373
Predicted Total Cost	471,504,404	471,202,505	507,014,192	570,020,142	602,067,400	628,910,589	656,308,484	683,638,448	713,773,966
Difference	324,256,397	328,975,232	356,270,816	394,470,868	420,191,647	437,546,358	462,238,524	478,712,727	515,398,407
Percentage Difference (Cost Performance)	52.3%	53.0%	53.2%	52.59%	52.94%	52.81%	53.32%	53.08%	54.35%
Three-Year Average Performance			52.8%	52.92%	52.92%	52.78%	53.02%	53.07%	53.58%
Stretch Factor Cohort									
Annual Result	5	5	5	5	5	5	5	5	5
Three Year Average			5	5	5	5	5	5	5



1 **APPLICATION SUMMARY**

2

3 This section provides an overview of Toronto Hydro’s proposals that have a material
 4 impact on its customers, including all changes to rates and charges that may affect
 5 discrete customer groups.¹ Where relevant, specific customers or customer groups that
 6 are impacted by each proposal are identified.

7

8 **1. BILL IMPACTS**

9 On average, for each of the next five years, Toronto Hydro calculates that the bill
 10 impacts associated with this Application will be approximately \$0.56 per month for a
 11 residential customer, or a less than 0.5 percent increase to the overall bill. Table 1,
 12 below, provides a summary of the total bill impacts for typical customers in all classes.²

13

14 **Table 1: Bill Impacts – Change in Monthly Bill**

Customer Class	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

¹ Please refer to Exhibit 1A, Tab 3, Schedule 1 (Administration) for information on Toronto Hydro’s materiality threshold.

² Includes all rate riders.

Customer Class	Change in bill	2020 Proposed	2021 Proposed	2022 Proposed	2023 Proposed	2024 Proposed
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	-2,514.52	4,577.71	3,585.65	6,320.80	6,149.95
	%	-0.9	1.6	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

1

2 **2. REVENUE REQUIREMENT**

3 Toronto Hydro's Service Revenue Requirement, which is comprised of Operating
 4 Expenses, and Cost of Capital and payments in lieu of taxes ("PILs"), for the 2020 test
 5 year is \$844.5 million. Table 2, below, summarizes Toronto Hydro's 2020 Forecast
 6 Revenue Requirement.

7

8 **Table 2: 2020 Forecast Revenue Requirement (\$ Millions)**

Revenue Requirement Component	Total
Operations, Maintenance, and Administration ("OM&A") Expenses ³	277.5
Amortization/Depreciation	268.7
Income Taxes (Grossed up)	34.7
Deemed Interest Expense	100.8
Return on Deemed Equity	162.8
Service Revenue Requirement	844.5
Revenue Offsets	47.7
Base Revenue Requirement	796.8

9

10 The increase/decrease (dollar and percent) from the most recent approved service
 11 revenue requirement (2015) and the main drivers of revenue requirement changes from
 12 the last OEB-approved year are outlined in Table 3, below.

³ Includes property taxes.

1 **Table 3: Comparison of 2015 and 2020 Total Service Revenue Requirement by**
 2 **Component (\$ Millions)**

	Most Recent Approved (2015)	2020 Test Year	Variance \$M	Variance %
OM&A	243.9	277.5	33.6	13.8%
Depreciation	206	268.7	62.7	30.4%
Deemed Interest Expense	79.3	100.8	21.5	27.1%
Return on Equity	120.2	162.8	42.6	35.4%
PILs	25	34.7	9.8	39.2%
Total Service Revenue Requirement	674.5	844.5	170.0	25.2%

3
 4 The main drivers for the increase in revenue requirement for the 2020 test year are the
 5 additions to rate base due to Toronto Hydro’s significant capital program over the 2015-
 6 2019 period, and an increase in OM&A expenses.

7
 8 For more information on Toronto Hydro’s revenue requirement, please see Exhibit 6,
 9 Tab 1.

10
 11 **3. BUDGETING AND ACCOUNTING ASSUMPTIONS**

12 **3.1 Growth and Inflation**

13 An inflation factor of 2.0 percent was applied to the utility’s capital expenditures over
 14 the 2020 to 2024 rate period, consistent with the Statistics Canada Consumer Price
 15 Index for the City of Toronto. The utility applied an additional escalator to some of its
 16 programs to account for forecast construction costs inflation.

17 Toronto Hydro used both general inflation and specific cost assumptions in its 2020
 18 forecast of operating costs. Since collective bargaining was ongoing at the time of
 19 budget planning, labour costs were adjusted to reflect historical annual rate
 20 adjustments that the utility has been required to pay under its collective agreement.

1 The labour cost forecast was also adjusted to reflect market-competitive increases for
2 non-unionized employees. Otherwise, a general inflation factor of 2 percent was
3 applied, consistent with the OEB's current inflation factor.

4 5 **3.2 Accounting Standards**

6 As outlined in Toronto Hydro's 2015-2019 Rate Application,⁴ the utility adopted the
7 International Financial Reporting Standards ("IFRS") accounting standard for financial
8 reporting purposes in the year beginning on January 1, 2015.⁵ For regulatory purposes,
9 for the year beginning on January 1, 2015, the utility adopted modified IFRS, as per the
10 OEB's Accounting Procedures Handbook ("APH"). Since that time, Toronto Hydro has
11 adopted and applied the following three new standards, effective January 1, 2018 as
12 required by the International Accounting Standards Board:

- 13 • **IFRS 9:** IFRS 9 introduces some new classification and measurement categories
14 for financial assets, which impacts the measurement basis of the financial assets.
15 The adoption of IFRS 9 led to a \$0.3 million decrease to opening retained
16 earnings. There is no impact to revenue requirement.
- 17 • **IFRS 15:** IFRS 15 introduces a five-step model that applies to customer contracts
18 and contains new rules on the timing and measurement of revenue recognition.
19 Upon adoption of IFRS 15, the only difference was a reclassification between
20 Energy Sales and Energy Purchases. There is no impact to revenue requirement.
- 21 • **IFRS 16:** IFRS 16 eliminates the previous concepts of operating and finance
22 leases and requires all contracts meeting the definition of a lease to be
23 recognized on the balance sheet as a right-of-use asset and lease liability, with
24 the exception of short-term leases and low-value leases. Upon the adoption of

⁴ EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 6, 2015), Exhibit 1A, Tab 3, Schedule 1.

⁵ *Ibid* at p. 4.

1 IFRS 16 on January 1, 2018, Toronto Hydro recognized \$1.6 million as right-of-
 2 use assets and \$1.6 million as lease liabilities for property leases.

3

4 For a detailed discussion of the utility’s accounting standards, please see Exhibit 1C, Tab
 5 3, Schedules 1 and 2.

6

7 **4. LOAD FORECAST SUMMARY**

8 Toronto Hydro’s load forecast was developed using multivariate regression models by
 9 customer class to derive loads based on input variables for economic activity, weather,
 10 and other drivers of energy consumption. The forecast explicitly accounts for
 11 conservation and demand management (“CDM”) impact on load. The utility’s forecast
 12 of new customers is primarily derived from extrapolation models for each rate class with
 13 the exception of the Competitive Sector Multi-Unit Residential (“CSMUR”) rate class
 14 (implemented on June 1, 2013), whose forecast customer additions are based on
 15 market knowledge of suite metering and multi-unit dwelling construction in Toronto
 16 Hydro’s service area.

17

18 Toronto Hydro’s load and customer growth changes are shown in Table 4, below.

19

20 **Table 4: Customer and Load Growth Changes for 2015-2024**

Year	Customer Count ¹	Customer Count Change (%)	Energy Forecast (kWh) ²	Energy Forecast (kWh) Change (%)	Demand Forecast (kVa) ³	Demand Forecast (kVa) Change (%)
2015	747,811		24,339,499,672		41,320,702	
2016	759,301	1.5%	24,221,254,752	-0.5%	41,335,567	0.0%
2017	765,559	0.9%	23,753,435,105	-1.9%	40,731,257	-1.5%
2018	771,079	0.7%	23,704,588,481	-0.2%	40,924,977	0.5%

Year	Customer Count ¹	Customer Count Change (%)	Energy Forecast (kWh) ²	Energy Forecast (kWh) Change (%)	Demand Forecast (kVa) ³	Demand Forecast (kVa) Change (%)
2019	776,786	0.7%	23,456,901,501	-1.0%	40,761,064	-0.4%
2020	784,330	1.0%	23,371,287,137	-0.4%	40,408,069	-0.9%
2021	790,944	0.8%	23,159,331,182	-0.9%	40,275,495	-0.3%
2022	798,591	1.0%	22,997,724,093	-0.7%	40,200,607	-0.2%
2023	806,238	1.0%	22,826,104,359	-0.7%	40,104,565	-0.2%
2024	813,886	0.9%	22,749,647,312	-0.3%	40,166,624	-0.2%

Notes: 1) Customer count excludes street lighting.
 2) Historical distribution kWh (2015-2017) are normalized for weather.
 3) Total distribution kVa are for customers billed on a demand basis.

1

2 Please see Exhibit 3, Tab 1 for details on Toronto Hydro’s customer and load forecast.

3

4 **5. RATE BASE AND DISTRIBUTION SYSTEM PLAN**

5 **5.1 Distribution System Plan**

6 Toronto Hydro’s Distribution System Plan (“DSP”) reflects a balance between customer
 7 preferences, affordability, and prioritized outcomes (as described in Exhibit 2B, Section
 8 C), with the overriding objective of delivering value for money. As explained in further
 9 detail in the Capital Expenditures Plan,⁶ Toronto Hydro’s 2020-2024 capital expenditure
 10 plan is driven by needs that can be categorized as follows:

- 11 • **Legal and Regulatory:** The need to meet Toronto Hydro’s mandated service
 12 obligations as well as its compliance with regulations for safe operations;
- 13 • **Reliability and Safety:** The need to replace assets to mitigate risks associated
 14 with all, or a combination of, increasing age, poor condition, safety, and
 15 environmental factors;

⁶ See Exhibit 2B, Section E.

- 1 • **Load Capacity and Growth:** The need to ensure load growth, capacity and
2 security of supply;
- 3 • **Resiliency:** The need to improve contingency constraints and operational
4 flexibility in light of risks related to climate change and weather, and the evolving
5 expectations of customers; and
- 6 • **Operational:** The need for Toronto Hydro to make necessary and mandatory
7 day-to-day investments that support the 24/7 operations of Toronto Hydro
8 including non-system physical plant investments associated with Information
9 Technology, Fleet, and Facilities.

10

11 Programs are allocated to investment categories in accordance with their “trigger”
12 drivers. Trigger drivers are the primary reason that a program must be carried out.
13 Each capital program is defined by a single “trigger” driver and a number of secondary
14 drivers. Note that although Safety is not listed as a primary trigger driver, it is a
15 significant secondary driver for many programs. Secondary drivers may be as, or more,
16 consequential than the trigger drivers. The “trigger” investment drivers of Toronto
17 Hydro’s DSP are summarized in Table 5, below.

1 **Table 5: Investment Category Primary Trigger Drivers**

	Driver	Description
System Access	Customer Service Requests	The fulfilment of Toronto Hydro’s obligation to connect a customer to its system. This includes both traditional demand customers and distributed generation (“DG”) customers. The obligation to connect exists as long as there are no safety concerns for the public or employees and there is no adverse effect on the reliability of the distribution system. The utility undertakes expansion or enhancements to the system when a connection cannot be made with existing infrastructure.
	Mandated Service Obligation	Compliance with all legal and regulatory requirements and government directives.
System Renewal	Functional Obsolescence	The asset and/or its installation is no longer aligned to Toronto Hydro’s processes and practices such that it can no longer be maintained (e.g. lack of vendor support) or utilized as intended to support the utility’s operations.
	Failure	Asset or critical component failure has taken place and Toronto Hydro must respond reactively as part of its capital investment activities.
	Failure Risk	There is imminent risk of failure due to age or condition deterioration. The potential failures will result in significant reliability impacts to customers as well as potential safety risks to crew workers or to the public.
System Service	Reliability	Maintain or improve reliability at a local, feeder-wide, or system-wide level.
	Capacity Constraints	Expected changes in load will constrain the ability of the system to provide consistent service delivery and handle demand requirements.
General Plant	Operational Resilience	The ability to mitigate and recover from disruptions to core business functions.
	System Maintenance and Capital Investment Support	Required investments to support day to day business operational activities; sustaining operations by providing its employees with a safer environment to operate in an efficient and reliable manner.

1 Toronto Hydro forecasts \$2,383.5 million in capital expenditures for the 2015-2019
 2 period, which results in an actual Capital-Related Revenue Requirement within the OEB
 3 approved amount for that period. The utility is forecasting total capital expenditures of
 4 \$2,827.4 million over the 2020-2024 plan period,⁷ which is \$443.9 million, or 18.6
 5 percent higher than 2015-2019. Table 6, below, provides the capital expenditure by
 6 investment category for the 2020-2024 period.

7

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

CATEGORY	Forecasted Spend						
	Avg.	2020	2021	2022	2023	2024	Total
System Access	100.3	91.8	93.3	93.9	106.0	116.4	501.4
System Renewal	324.0	306.6	325.7	323.1	339.0	325.5	1,619.9
System Service	47.5	34.2	60.1	71.3	33.6	38.5	237.7
General Plant	84.9	78.8	93.7	89.0	77.7	85.2	424.4
Other	8.8	7.0	9.0	9.8	9.5	8.7	44.0
Total	565.5	518.4	581.8	587.1	565.7	574.4	2,827.4

9

10 The 2020-2024 capital expenditure plan includes measureable objectives that directly or
 11 indirectly connect the proposed level of spending in each program to the utility's
 12 strategic objective of continuous improvement in six outcomes categories: Customer
 13 Service, Reliability, Safety, Public Policy, Environment, and Financial. For a detailed
 14 discussion of the utility's outcome objectives as well as the program drivers underlying
 15 its capital expenditure plan, please see Exhibit 2B, Section E1.

⁷ This includes capital expenditures funded by provincial rate relief for Renewable Enabling Improvements, see Section 5.1.1 in this document.

1 *5.1.1 Renewable Energy Connection Costs*

2 Toronto Hydro has included approximately \$18.6 million for new Renewable Enabling
 3 Improvements (“REI”) projects over the 2020-2024 plan period, see Table 7, below.

4
 5 **Table 7: Renewable Enabling Improvements from 2020-2024 (\$ Millions)⁸**

REI Investment	2020	2021	2022	2023	2024	Total
Generation Protection, Monitoring, and Control (Exhibit 2B, Section E5.5)	3.7	2.3	2.0	2.5	2.7	13.6
Energy Storage Systems (Exhibit 2B, Section E7.2)	1.0	1.0	1.0	1.0	1.0	5.0
Totals	4.7	3.3	3.4	3.5	3.7	13.6

6
 7 The utility has applied the mandated 6 percent direct benefit assumption provided by
 8 the OEB with respect to REI investments to calculate the provincial rate protection
 9 amounts.⁹ The amount proposed for recovery from all provincial ratepayers, which
 10 includes the amount relating to investments approved by the OEB in Toronto Hydro’s
 11 2015-2019 Rate Application, is approximately \$13.6 million over the 2020-2024 plan
 12 period.

13
 14 Please see Exhibit 2A, Tab 6, Schedule 1 for details on Toronto Hydro’s proposed REI
 15 investments. The detailed breakdown is provided in the OEB Appendices 2-FA and 2-FB
 16 at Exhibit 2A, Tab 6, Schedules 2 and 3, respectively.

17
 18 *5.1.2 Smart Grid Costs¹⁰*

19 Table 8, below, contains the programs and segments costs that include smart grid
 20 related investments.

⁸ For additional details on these, please see Exhibit 2A, Tab 6.

⁹ Ontario Energy Board Filing Requirements for Electricity Rate Applications- 2018 Edition for 2019 Rate Applications, Chapter 2 (July 12, 2018) at s. 2.2.2.7.

¹⁰ Toronto Hydro has used the term “grid modernization” as an alternative to “smart grid” throughout its Application.

1 **Table 8: Costs Related to Smart Grid Investments (\$ Millions)**

Program or Segment with Smart Grid Investments	Forecasted Spend					
	2020	2021	2022	2023	2024	Total
Generation Connections (See Exhibit 2B, Section E5.1)	2.9	3.5	3.2	4.1	4.5	18.2
Wholesale Metering Compliance (See Exhibit 2B, Section E5.4)	7.3	1.6	0.0	0.0	0.0	8.9
Revenue Metering Compliance (See Exhibit 2B, Section E5.4)	15.3	13.2	23.6	30.6	39.2	121.9
Generation Protection, Monitoring, and Control (See Exhibit 2B, Section E5.5)	3.7	2.3	2.4	2.5	2.7	13.6
Legacy Network Equipment Renewal (See Exhibit 2B, Section E6.4)	1.9	2.0	1.2	-	-	5.1
Network Unit Renewal (See Exhibit 2B, Section E6.4)	9.5	9.8	10.0	10.1	10.2	49.6
Network Circuit Reconfiguration (See Exhibit 2B, Section E6.4)	1.2	1.4	1.1	1.2	1.7	6.6
Control and Monitoring (See Exhibit 2B, Section E6.6)	2.9	4.3	4.4	4.5	6.0	22.1
Battery and Ancillary Systems (See Exhibit 2B, Section E6.6)	0.9	1.2	1.6	1.7	1.7	7.1
Contingency Enhancement (See Exhibit 2B, Section E7.1)	5.5	5.6	5.1	4.3	4.4	24.9
Grid Performance Energy Storage System (See Exhibit 2B, Section E7.2)	-	2.7	2.8	-	-	5.5
Renewable Enabling Energy Storage System (See Exhibit 2B, Section E7.2)	1.0	1.0	1.0	1.0	1.0	5.0
Customer-Specific Energy Storage System (See Exhibit 2B, Section E7.2)	24.3	12.1	5.9	0.0	0.0	42.3
Network Condition Monitoring and Control (See Exhibit 2B, Section E7.3)	7.6	10.2	12.6	15.3	17.4	63.1
Local Demand Response (See Exhibit 2B, Section E7.4)	-	-	-	1.2	3.4	4.6
Control Operations Reinforcement (See Exhibit 2B, Section 8.1)	3.9	17.4	18.9	-	-	40.2
IT Hardware (See Exhibit 2B, Section E8.4)	11.5	10.3	11.6	14.0	14.5	61.9

Program or Segment with Smart Grid Investments	Forecasted Spend					
	2020	2021	2022	2023	2024	Total
IT Software (See Exhibit 2B, Section E8.4)	41.0	43.0	35.8	40.5	48.2	208.5
Communication Infrastructure (See Exhibit 2B, Section E8.4)	2.2	2.4	2.1	2.1	2.1	10.9
Total	142.6	144.0	143.3	133.1	157.0	720.0

1

2 **5.1.3 Regional Planning Initiatives**

3 Table 9, below, contains the programs and segments costs that include regional
 4 planning investments.¹¹

5

6 **Table 9: Costs Related to Regional Planning Investments (\$ Millions)**

Programs with Regional Planning Investments	Forecasted Spend					
	2020	2021	2022	2023	2024	Total
Generation Protection, Monitoring and Control (See Exhibit 2B, Section E5.5)	3.7	2.3	2.4	2.5	2.7	13.6
Energy Storage Systems (See Exhibit 2B, Section E7.2)	1.0	3.7	3.8	1.0	1.0	9.5
Stations Expansion (See Exhibit 2B, Section E7.4)	19.5	40.0	49.3	12.5	15.2	136.5
Total	24.2	46.0	55.5	16.0	18.9	160.6

7

8 **5.2 Rate Base**

9 Toronto Hydro's requested rate base for the 2020 test year is \$4,615.3 million, which
 10 represents an increase of approximately \$1,383.3 million, or 42.8 percent from the rate
 11 base amount of \$3,232.0 million approved by the OEB in the utility's last rebasing
 12 application in 2015. See Table 10, below, for an overview of the costs.

¹¹ Please note that there is some overlap between these costs and the ones shown in Table 8, costs associated with smart grid investments.

1 The change in rate base is driven by an increase of approximately \$1,388.3 million in the
 2 average net book value (“NBV”) of property, plant, and equipment (“PP&E”), and a
 3 decrease of approximately \$5.0 million in the working capital allowance (“WCA”)
 4 component of rate base due to an updated WCA rate, as per Toronto Hydro’s updated
 5 Lead Lag Study. The growth in PP&E includes continued investment in distribution
 6 assets, as well as the addition of street lighting assets into rate base as of the beginning
 7 of 2015.¹²

8
 9 **Table 10: Rate Base Overview (\$ Millions)¹³**

	OEB	Actual			Bridge		Forecast
	Approved ¹	2015	2016	2017	2018	2019	2020
Opening PP&E NBV	2,849.0	2,843.2	3,085.4	3,462.0	3,744.7	4,120.6	4,270.4
Closing PP&E NBV	3,134.7	3,085.4	3,462.0	3,744.7	4,120.6	4,269.0	4,489.8
Average PP&E NBV	2,991.8	2,964.3	3,273.7	3,603.4	3,932.7	4,194.8	4,380.1
Working Capital Allowance	240.2	247.9	275.8	247.4	273.6	287.2	235.2
Rate Base	3,232.0	3,212.2	3,549.5	3,850.8	4,206.3	4,482.0	4,615.3

10

11 For more information about Toronto Hydro’s rate base, please refer to Exhibit 2A.

12

13 **6. OPERATIONS, MAINTENANCE, AND ADMINISTRATION EXPENSE**

14 Toronto Hydro’s plan aims to efficiently maintain functional requirements such as safe
 15 and reliable grid operations and system performance, service levels, as well as legal and
 16 regulatory compliance. There are no new or materially expanded OM&A activities.

¹² As directed by the OEB in the utility’s last Rate Application (EB-2014-0116), Toronto Hydro has transferred unregulated street lighting in-service capital additions into rate base.

¹³ *Ibid.*

1 Toronto Hydro’s total 2020 forecasted OM&A expenditures are \$277.5 million – 13.8
 2 percent or \$33.6 million above the 2015 expenditures approved by the OEB (\$243.9
 3 million) in Toronto Hydro’s last Rate Application.¹⁴

4
 5 As mentioned in section 3, above, in arriving at its 2020 OM&A forecast Toronto Hydro
 6 used both general and specific cost and economic assumptions. Since collective
 7 bargaining was ongoing at the time of budget planning, labour costs were adjusted to
 8 reflect historical annual rate adjustments that the utility has been required to pay under
 9 its collective agreement. The labour cost forecast was also adjusted to reflect market-
 10 competitive pay increases for non-unionized employees. Otherwise, a general inflation
 11 factor of 2.0 percent was applied, consistent with the OEB’s current inflation factor.

12
 13 For more information on Toronto Hydro’s OM&A Costs, see Exhibit 4A.

14
 15 **6.1 Cost Drivers & Trends**

16 Table 11, below, provides a summary of the overall drivers and cost trends for operating
 17 expenditures.

18

Table 11: OM&A 2020-2024 Cost Drivers (\$ Millions)

OM&A	Last Rebasing Year (2015 Board- Approved)	2016 Actual	2017 Actual	2018 Bridge Year	2019 Bridge Year	2020 Test Year
Reporting Basis	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS
Opening Balance	243.9	244.0	249.8	255.3	261.2	268.2
Distribution Operations	-	10.3	(0.1)	0.5	4.1	(0.6)

¹⁴ EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 6, 2015).

OM&A	Last Rebasing Year (2015 Board- Approved)	2016 Actual	2017 Actual	2018 Bridge Year	2019 Bridge Year	2020 Test Year
Customer Service and Communications	-	(2.7)	1.3	3.4	1.0	5.5
Human Resources and Safety	-	1.0	(0.5)	0.6	0.2	0.5
Information Technology	-	0.7	3.3	3.3	1.8	0.5
Common Corporate Costs	-	(1.2)	1.7	(2.3)	(0.6)	2.1
Facilities Management	-	0.4	(2.5)	(2.1)	0.2	0.6
Other Various	-	(2.7)	2.2	2.5	0.2	0.8
Closing Balance	244.0	249.8	255.3	261.2	268.2	277.5

1

2 For more information on Toronto Hydro's OM&A program cost drivers and trends,
 3 please see Exhibit 4A, Tab 2, Schedules 1-21.

4

5 **6.2 Compensation**

6 Toronto Hydro's forecasted total compensation cost for the 2020 test year is
 7 approximately \$244.2 million, which represents an increase of approximately \$33.1
 8 million or 15.6 percent from 2015 actuals (\$211.1 million). Please refer to Appendix 2K
 9 for more information on employee compensation and benefits.

10

11 **7. COST OF CAPITAL**

12 Toronto Hydro calculated its cost of capital based on the OEB's cost of capital
 13 guidance.¹⁵ Toronto Hydro's debt to equity split for the test years is set at 60:40. The
 14 debt component in each year includes a deemed 4 percent short-term debt component.

¹⁵ EB-2009-0084, Ontario Energy Board Report of the Board on the Cost of Capital for Ontario's Regulated Utilities (December 11, 2009).

1 Toronto Hydro's long-term debt rate component is based on debt issued by its parent
2 company in the public debt market. The weighted average debt rate is used instead of
3 the OEB's deemed long-term debt rate.

4

5 Toronto Hydro's forecasted return on equity ("ROE") for the 2020 Test Year is based on
6 the OEB's formulaic approach as outlined in the OEB's Cost of Capital Report.¹⁶ For
7 2020, the ROE calculation uses the March 2018 bond yield spread¹⁷ and the Ten-Year
8 Government of Canada Bond Yield Forecast.¹⁸

9

10 Toronto Hydro uses the 2020 ROE forecast for the purpose of calculating revenue
11 requirement for the 2020 Test Year (Exhibit 6, Tab 1) and the derivation of the C-factor
12 in the Custom Price Cap Index (Exhibit 1B, Tab 4, Schedule 1). Toronto Hydro will rely on
13 the deemed ROE approved by the OEB in late 2019, as part of the cost of capital
14 parameters update for its 2020 rates, to determine the final revenue requirement for
15 2020 and the updated C-factor.

16

17 Table 12, below, provides the proposed capital structure and cost of capital parameters
18 resulting in the Weighted Average Cost of Capital.

¹⁶ Ibid.

¹⁷ Difference between the average 30-Year A-Rated Canadian Utility bond yield from Bloomberg L.P. and the average 30-Year Government of Canada bond as published by the Bank of Canada.

¹⁸ The average of the forecast Ten-Year Government of Canada bond yield as at December 31, 2019 and September 30, 2020 from Bloomberg L.P.

1

Table 12: Proposed Capital Structure and Cost of Capital Parameters

	Capital Structure		Cost Rate
Debt			
Long-term Debt	56.00%	\$2,584,564,841	3.71%
Short-term Debt	4.00%	\$184,611,774	2.61%
Total Debt	60.0%	\$2,769,176,616	3.64%
Equity			
Common Equity	40.00%	\$1,846,117,744	8.82%
Preferred Shares	0.00%	\$ -	
Total Equity	40.0%	\$1,846,117,744	8.82%
Total / WACC		\$4,615,294,360	5.71%

2

3 For more information on Toronto Hydro's Cost of Capital, see Exhibit 5, Tab 1, Schedule
 4 1.

5

6 **8. COST ALLOCATION AND RATE DESIGN**

7 **8.1 Cost Allocation**

8 The 2020 base revenue requirement has been allocated to the utility's eight rate classes
 9 using the OEB's cost allocation model.¹⁹ Toronto uses the latest version of this model,
 10 which includes the updated policy relating to the cost allocation for the Street Lighting
 11 class.²⁰ The resulting revenue to cost ratios for all classes are within the OEB's guidelines
 12 as established in EB-2010-0219.²¹

¹⁹ EB-2010-0219, Ontario Energy Board Review of Electricity Distribution Cost Allocation Policy (March 31, 2011).

²⁰ EB-2012-0383, Ontario Energy Board Letter, Issuance of New Cost Allocation Policy for Street Lighting Rate Class (June 12, 2015).

²¹ *Supra* note 9.

1 For more information on Toronto Hydro's cost allocation, please see Exhibit 7, Tab 1.

2

3 **8.2 Rate Design**

4 With the exception of Residential and Competitive Sector Multi-Unit Residential
5 ("CSMUR") classes, Toronto Hydro proposes fixed and variable rates for all rate classes
6 based on the current split of revenue generated through each of these components. For
7 the Residential and CSMUR classes, 2020 is the final year of the implementation of the
8 OEB's policy to set distribution rates for these classes on a fully fixed basis.²²

9

10 Total bill impacts for all classes are below the 10 percent threshold, therefore mitigation
11 measures are not required.

12

13 For more information on Toronto Hydro's rate design, please see Exhibit 8, Tab 1.

14

15 **8.3 Specific Service Charges**

16 Toronto Hydro updated some of its Specific Service Charges in its last 2015-2019 Rate
17 Application.²³ In this Application, Toronto Hydro proposes no changes to these rates,
18 subject to the following two exceptions. First, the utility is applying to update the
19 wireline pole attachment rate to reflect OEB guidance in this area.²⁴ Toronto Hydro
20 proposes to update its wireline pole attachment rate to \$44.15 per pole per year
21 effective January 1, 2020. This rate is calculated as the standard recommended rate of
22 \$43.63 provided by the OEB for 2019, and the application of 1.2 percent escalation (the

²² EB-2012-0410, Ontario Energy Board, A New Distribution Rate Design for Residential Electricity Customers (April 2, 2015).

²³ EB-2014-0116, Toronto Hydro-Electric System Limited Application (filed July 31, 2014, corrected February 6, 2015), Exhibit 8, Tab 2, Schedule 1.

²⁴ EB-2015-0304, Ontario Energy Board Report, Wireline Pole Attachment Charges (March 22, 2018).

1 OEB’s current inflation rate) for 2020. Toronto Hydro proposes to update this rate once
2 the final OEB inflation factor for 2020 is determined.

3

4 Second, Toronto Hydro proposes to remove the following charge from its Tariff: Service
5 Call- Customer Owned Equipment.

6

7 For more information on Toronto Hydro’s Specific Service Charges, please see Exhibit 8,
8 Tab 2.

9

10 **9. DEFERRAL AND VARIANCE ACCOUNTS (“DVA”)**

11 Toronto Hydro proposes new rate riders to clear a number of DVA balances. Toronto
12 Hydro also seeks approval to clear amounts relating to gains on sale of properties,
13 accounts receivable credits, and excess expansion deposits.

14

15 The total net DVA balances proposed for clearance are \$78.1 million (credit or refund)
16 to customers beginning January 1, 2020.²⁵ The proposed disposition periods for all
17 accounts is five years in order to smooth the impact of disposition. Toronto Hydro
18 proposes to allocate the DVA balances to the customer classes based on the
19 methodologies described in the OEB’s Deferral and Variance Account Review
20 (“EDDVAR”).²⁶ For accounts where the EDDVAR indicated allocation was to be
21 determined on a case-by-case basis, Toronto Hydro has proposed an allocator.

22

23 The above balances do not include clearance of Retail Settlement Variance Accounts
24 (“RSVA”). Balances in these accounts as of the end of 2017 will be proposed for
25 clearance in Toronto Hydro’s 2019 Rate Application update. Toronto Hydro will update

²⁵ See Table 17 in Exhibit 9, Tab 1, Schedule 1.

²⁶ EB-2008-0046, Ontario Energy Board Deferral and Variance Account Review Initiative.

1 the RSVA balances at the close of 2018, and update its evidence to propose clearance of
2 2018 year-end balances at a later date.

3

4 Toronto Hydro proposes a single fixed rate rider for those classes that are charged a
5 fully fixed distribution rate (Residential and CSMUR), and a single volumetric rate rider
6 for all other classes for the clearance of all DVA amounts, with the exception of
7 Stranded Meters which is to be recovered through a fixed charge for all applicable rate
8 classes, as indicated in the OEB's Smart Meter Funding and Cost Recovery Guidelines.
9 The impacts of all proposed rate riders combined with the distribution rate changes are
10 discussed in Exhibit 8, Tab 1, Schedule 1.

11

12 Toronto Hydro is seeking OEB approval for the following new DVAs:

- 13 • Variance Account for Excess Expansion Deposits: Toronto Hydro requests a
14 variance account to record the excess expansion deposits and to clear the
15 balance to ratepayers through an OEB-approved rate rider in the current
16 Application. The amount proposed for clearance is \$5.5 million credit (refund) to
17 customers; and
- 18 • Variance Accounts for Pension and Other Post-employment Benefits ("OPEB")
19 Forecast Accrual versus Actual Cash Payment Differential Carrying Charges: As
20 directed in the OEB's final report on the Regulatory Treatment of Pension and
21 OPEB Costs,²⁷ Toronto Hydro will establish accounts to track the difference
22 between the forecasted accrual amount in rates and actual cash payments
23 made, with asymmetric carrying charges in favour of ratepayers applied to three
24 differentials. Toronto Hydro will start using the three new accounts effective

²⁷ EB-2015-0040, Ontario Energy Board, Report on Regulatory Treatment of Pension and Other Post-employment Benefit (OPEBs) Costs (September 14, 2017) at p. 21.

1 January 1, 2020, but will not submit a draft accounting order as directed in the
2 OEB report.²⁸ At a later time, Toronto Hydro will apply for disposition of the
3 balance in the Pension & OPEB Forecast Accrual versus Actual Cash Payment
4 Differential Carrying Charges account when the credit (refund) to customers is
5 material.

6

7 Toronto Hydro is not seeking OEB approval to discontinue any DVAs.

8

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

²⁸ *Ibid.*