RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-5

Preamble:

Toronto Hydro indicates that the Energy Transition is already underway and that it needs to get ready for this electrified future now by preparing its grid and operations.

QUESTION (A):

a) What has THESL already done to ready its grid and operations and what is still outstanding?

RESPONSE (A):

Toronto Hydro has been readying its grid and operations through a number of investment programs over the past years. A few examples of what has been done and what needs to be done are provided below. For full details, please refer to Exhibit 2B, Sections D4 and D5.

The utility has been steadily modernizing its Horseshoe distribution system for many years through both its System Renewal efforts and complimentary System Service programs including the Contingency Enhancement segment (Section E7.1). A primary focus of these efforts has been the deployment of SCADA-operated switches which allow control room operators to remotely transfer load and isolate feeder sections under fault conditions or on a planned basis. These existing switches, combined with the switches and reclosers to be installed through 2025 to 2029, will form the physical basis for Toronto Hydro's self-healing grid in 2030 and beyond. Specifically, Toronto Hydro is aiming to have 90 percent of feeders in the Horseshoe system ready for automation by 2030. This will be accomplished in part through the Contingency Enhancement segment, which will install SCADA- controlled switches and reclosers on at least 34 feeders to bring them to the minimum optimal number of switching points per feeder of 2.5, which is required to enable an effective self-healing automation scheme.

Over the last decade, Toronto Hydro has strived to be a leader in Ontario when it comes to exploring and implementing technologies and solutions for facilitating, leveraging, monitoring and forecasting distributed generation ("DG") and distributed energy resources ("DERs") more broadly. Toronto Hydro has been a leader in the procurement of demand response services from customers. The utility's Local Demand Response program ("LDR") was the first utility-driven NWS program in Ontario and has been deployed successfully since the 2015-2019 rate period. In the 2020-2024 period, the utility has been pursuing similar DR services in the areas of Manby TS and Horner TS, and, through the OEB Grid Innovation Fund and Innovation Sandbox program, is working with the IESO, Power Advisory, and Toronto Metropolitan University's Centre for Urban Energy to implement a Benefit Stacking Pilot, which explores the procurement and deployment of DR resources to address overlapping distribution and transmission system level needs. In 2025-2029, Toronto Hydro is planning to expand its Local Demand Response program into a more diverse Flexibility Services program and procure up to 30 MW of demand response capacity at target six stations (Finch TS, Manby TS, and Leslie TS, Cecil TS, Strachan TS, and Copeland TS)." For more details on Toronto Hydro's Non-Wires Solutions programs, refer to Section E7.2.

Further, Toronto Hydro undertook enhanced capacity and connections capability assessments to monitor capacity related risks within its system. The enhancements include the preparation of the System Peak Demand Forecast with additional inputs for electric vehicles ("EVs"), data centers and Municipal Energy Plans, assessment of spare feeder positions, identification of system constraints that impact generation connections, and identification of unique drivers for demand growth. Toronto Hydro also augmented its decision-making process with the results of long-term scenario modelling tool known as Future Energy Scenarios.

QUESTION (B):

b) Does THESL have a long-term roadmap (or equivalent) for Grid modernization out to 2040 or beyond. If yes, please provide a copy.

RESPONSE (B):

Please refer to Toronto Hydro's response to interrogatory 2B-SEC-48.

QUESTION (C):

c) THESL outlines that the Energy Transition will continue to progress over the next few decades. This timeframe exceeds the 2025-2029 rate period. Please provide the analysis and documents THESL has available that show the temporal requirements to make the required grid and operational changes of the next few decades and what portion of these are required to be done over the 2025-2029 period (vs. in future rate periods).

RESPONSE (C):

The specific capabilities that Toronto Hydro will require over the longer duration of the energy transition are highly dependent on when, where and how the transition itself unfolds. In this context of uncertainty, the utility's complimentary growth and modernization strategies stem from a "least regret" planning approach, focusing on investments that will provide the utility with the capacity and flexibility to cost-effectively navigate whatever scenario unfolds in 2030 and beyond, while delivering immediate benefits to customers from those same investments in 2025-2029. For more information, please refer to Exhibit 2B, Sections D4 and D5.

QUESTION (D):

d) Please indicate which Energy Transition demands THESL grid and operations are currently not able to deliver on (e.g. EV charging, embedded generation/storage, etc.) and indicate how THESL identified that its system was not able to meet those needs (e.g. customer complaints, rejecting DER requests, third-party analysis and reports, etc.).

RESPONSE (D):

As noted in response to part (c), the capacity and operational capabilities that Toronto Hydro will require in order to avoid becoming a barrier to a cost-effective energy transition are highly dependent on when, where and how the transition itself unfolds. Toronto Hydro expects that as

the energy transition accelerates, especially in 2030 and beyond, the pressures of electrification and DER proliferation will require greater system capacity and more operational and analytical sophistication. The 2025-2029 investment plan takes appropriate steps toward this future state, without overcommitting to technologies and solutions that may not be necessary or may become obsolete in the long-run (i.e., least regrets investments). Without the investments outlined in Sections D4 and D5 of Exhibit 2B, Toronto Hydro believes it will ultimately find itself reacting in an unsophisticated and inefficient manner to the eventual demands of the energy transition, resulting in potentially higher costs, worse reliability, more significant delays and barriers to connection, and limited ability to leverage DERs at scale as a grid solution.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-6

QUESTION (A)—(B) :

a) Has THESL assessed what portion of the demand increases over the coming decades could be mitigated by CDM (including enhanced efficiency and design for new buildings)? If no, please explain why not. If yes, please provide a copy of the analysis, reports, presentation and other related materials.

b) Please provide details on incremental CDM programs, activities and forecasted results (demand and energy reduction). THESL intends to undertake during the rate term (2025 - 2029). Please indicate which are to be led by THESL and which are supporting others programs (e.g. IESO, OEB, City, etc.).

RESPONSE (A) AND (B):

Toronto Hydro relies on the IESO's assessment of CDM potential and CDM forecasts, which is in-progress in the current cycle of IRRP. The non-wires solutions considered for the 2025-2029 rate period have been outlined in detail in Exhibit 2B Section E7.2. Please refer to Toronto Hydro's responses to 1B-Staff-88 and 1B-Staff-89 for more information about the utility's non-wires strategy, investments and proposed incentives.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-7

Reference: Exhibit 1B, Tab 1, Schedule 1, Section 2.2

"However, market evolution and public policy are changing this trajectory, driving customers to adopt advanced electrified technologies - such as electric vehicles (EVs), solar panels, home energy storage, heat pumps and electric water boilers - which are increasing customer demand and expectations for outcomes." [Investment Plan Section 2.2]

QUESTION (A) AND (B):

a) Please explain why the following require increasing system demand capacity, rather than enabling system peak demand to be decreased.
   - electric vehicles (EVs) with bi-directional charger
   - solar panels and/or related on-site battery storage
   - home energy storage
   - heat pumps (particularly in mitigating AC load)

b) Please explain what THESL would need in place to leverage DERs (including those above) to reduce system peak demand and related traditional poles-and-wires investments.

RESPONSE (A) AND (B):

Toronto Hydro's System Peak Demand Forecast is a gross forecast which means that behind-the meter-energy distributed energy resources (DER) are not considered as negative energy load or energy generation to reduce peak. In order for these resources to be able to be relied upon to reduce the peak demand forecast they would have to be reliability aggregated and dispatched through demand response as non-wires solutions. Toronto Hydro has considered non-wires solution for the 2025-2029 rate period as outlined in Exhibit 2B Section E7.2. Please refer to

Toronto Hydro's responses to 1B-Staff-88 and 1B-Staff-89 for more information about the utility's non-wires strategy, investments and proposed incentives.

QUESTION (C):

c) Please provide the scorecard metrics and results related to DER (including CDM) that THESL is committing to over the 2025-2029 rate period.

RESPONSE (C):

Please see Exhibit 1B, Tab 3, Schedule 1 at sections 2.2.1 (New Services Connected on Time), 2.2.2 (Customer Satisfaction) and 2.4.3 (System Capacity Non-Wires).

QUESTION (D):

d) Please indicate how THESL has included decentralization of electricity supply (including storage) and distribution into its planning for the future and what those changes mean compared to the historical centralized generation and distribution of electricity.

RESPONSE (D):

As described in Exhibit 2B, Section E7.2, Toronto Hydro has been actively pursuing and deploying non-wires solutions since 2018 (at Cecil TS) and continues to build on this experience with the Etobicoke program. Toronto Hydro is also pursuing a target to procure 30 MW of NWSs in 2025-2029 – triple the target of past rate periods. The history of this work, as well as the future plans are outlined in detail in the referenced evidence. Please also refer to interrogatory responses 1B-Staff-88 and 1B-Staff-89 for more information about the utility's non-wires strategy, investments and proposed incentives.

Regarding the longer-term, as Toronto Hydro's Future Energy Scenarios demonstrate (Exhibit 2B, Section D4, Appendix A and B), it is yet to be determined how quickly and to what extent the electricity system within the City of Toronto will decentralize. Rates of adoption of distributed energy resources are highly dependent on policy, economic conditions, technology advancements,

physical constraints, and consumer behaviour. The Grid Modernization Strategy (Section D5), and the *Grid Readiness* portfolio in particular, speaks to the "least regrets" capability-building investments Toronto Hydro is making in the 2025-2029 period to prepare itself for increases in electrification and decentralization over the longer-term.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-8

QUESTIONS (A) – (C) :

a) Please explain what role (if any) THESL has to proactively plan the Energy Transition and to inform, incent and enable customers (and related enabling stakeholders) to execute in line with that plan as opposed to THESL reacting to the Energy Transition drivers and demands.

b) Please explain what actions and outcomes THESL has undertaken already plus will undertake over the 2025-2029 rate term to proactively define Energy Transition pathways in its service territory and lead customers/stakeholders to adopt those pathways via communications, programs, incentives, etc.

c) Please explain what initiatives and activities THESL intends to undertake to provide net zero or low carbon energy solutions as required to support the Energy Transition, while acknowledging that the proposed IESO grid mix estimate is indicating higher carbon emissions for electricity generation.

RESPONSE (A) – (C):

Toronto Hydro believes that its role is to ensure that the distribution grid and utility operations are ready and equipped to safely, reliably and efficiently support the realization of an energy transition via electrification in alignment with customer needs, requirements and public policy objectives. Fulfilling this role is an important consideration that underlies the 2025-2029 Investment Plan and related requests for approval which are set out in this application. To that end, the application includes numerous investments, initiatives and proposals (which are summarized in the table below) that inform, incent and enable the utility, customers and stakeholders to pursue energy transition goals via electrification. In addition to these specific areas of investment, Toronto Hydro notes that maintaining the foundation of a safe and reliable grid, effective processes, systems and operations, and a highly-skilled, engaged and productive workforce are also critical objectives for success in enabling an orderly energy transition.

1 **Table 1 – Initiatives Enabling Energy Transition via Electrification**

Initiative	Enabling Energy Transition via Electrification
Grid Modernization Strategy	Toronto Hydro is accelerating strategic investments in specific field and information technologies to improve the grid's ability to integrate customer loads and resources, and serve the increasingly complex demands on the utility's system assets and operations. Toronto Hydro's central concern is to not act as a barrier to the adoption of electrification technologies (e.g. EV and heat pumps) by being able to connect customers on time and continue to maintain system reliability of an increasingly dynamic distribution system by equipping the grid with the necessary tools and processes to do so. For a complete list of Grid Modernization investments, please see Exhibit 2B, Section D5.
Future Energy Scenarios Modelling	Toronto Hydro engaged UK consultant Element Energy to develop a bottom-up modelling tool (FES) to understand the range of possible changes to future peak demand based on the interplay of different policy, technology and consumer behaviour assumptions. This tool provides a range of peak demand scenarios that could materialize depending on how different drivers unfold but does not attach probability to the scenarios. This tool helps Toronto Hydro understand the different possible capacity requirements of its system to help inform capacity planning by ensuring that investments are designed to prepare for a multitude of energy transition scenarios. This means that system planning can be done on a "least regrets" basis where sufficient grid capacity is planned to support growth of electrification technologies without over-building, while having the flexibility to respond to changing grid needs in the face increasing uncertainty. For more information on Future Energy Scenarios, please refer to Exhibit 2B, Section D4.
Hosting Capacity Map	Over the 2025 to 2029 period, Toronto Hydro intends to develop and implement a Hosting Capacity Analysis with a customer-facing interface such as a map. This is intended to provide customers with visibility into where there is available capacity to support new or upgraded connections on the distribution system. In addition to streamlining the connection and upgrade process for customers adopting electrification technologies, this tool will provide Toronto Hydro with information to enable more granular system analysis and improve capacity planning to

	ensure the system can support customers' electrification needs. More information on the Hosting Capacity Analysis is provided in the Grid Modernization Strategy referenced above.
Renewable Enabling Investments	Toronto Hydro is making necessary investments (i.e. Renewable Enabling Investments) to ensure that the distribution system can support renewable energy connections, which are forecast to grow over the rate period. The REI are meant to address three different constraints that act as barriers to renewable connections – short circuit capacity, anti-islanding, and system thermal limits and load transfer capability. For more information, please see Exhibit 2B, Section E3 and Exhibit 2A, Tab 5, Schedule 1.
Local Demand Response	Toronto Hydro plans to expand its Local Demand Response program to procure 30 MW of flexible non-wires system capacity from customer and/or third-party owned DERs. For more information on the LDR program, please refer to the Non-Wires Solutions evidence at Exhibit 2B, Section E7.2 and please see Toronto Hydro's response to 1B-Staff-88.
AMI 2.0	Toronto Hydro was among the first utilities in Ontario to implement smart meters (AMI 1.0), having deployed them between 2006-2008. By 2025, approximately 70% of Toronto Hydro's residential and small commercial meters will have surpassed their expected useful life. As a result, the utility plans to replace approximately 680,000 meters, with next generation AMI 2.0 meters between 2023-2028. These meters, once paired with IT infrastructure, will act as a network of sensors improving observability and insight into system operation, energy consumption patterns, and grid performance. By having improved asset and outage management capabilities and possessing more granular visibility and monitoring capability over the secondary network will enable Toronto Hydro to better manage the needs of the energy transition in terms of connections and grid operations.
System Capacity Investments	Toronto Hydro has identified the electrification of transit, electric vehicles, hyperscale data centers, and Municipal Energy Plans as key drivers within the System Peak Demand forecast. This forecast informs demand-related capacity investments made through the Station Expansion, Load Demand and Non-Wires Solutions programs. For more

	information on Capacity Planning and Electrification, please refer to Exhibit 2B, Section D4.
System Standardization	Legacy 4kV stations and feeder equipment present challenges to connecting large loads and accommodating DERs. These assets must be converted to contemporary standards not only to improve safety, reliability outcomes but also importantly to keep pace with growing and changing customer demand due to electrification.
Innovation Fund	Toronto Hydro proposed an approximately $16 million Innovation Fund to support the design and execution of pilot projects that test new distribution capabilities, which includes capabilities that are needed to adapt to the changing energy landscape (e.g. supporting customers' electrification objectives). For the 2025-2029 rate period, the Innovation Fund proposal includes four pilot project concepts. Specifically, the Flexible Connections and EV Demand Response/Commercial Fleet Charging pilot project concepts are intended to support the connection and management of DERs. Flexible Connections will explore operational arrangement for connecting DERs in constrained areas that would otherwise require capital investments. EV-focused pilots will explore the role of the utility in managing EV charging to optimize grid operations. For more information on the Innovation Fund proposal, please refer to Exhibit 2B, Tab 4, Schedule 2.
System Planning	Please see Toronto Hydro's response to interrogatory 4-Staff-309 for a detailed discussion about how System Planning functions support and enable energy transition objectives.
Control Center	Since 2019, Toronto Hydro has been developing an Energy Centre (also known as DERMS) and gaining experience with managing DERs on the distribution system. This initiative is driven by a recognition that DER growth necessitates a shift in the way that distribution systems are operated. Rather than being geared primarily towards energy delivery, distributors must also consider the importance of energy management as it relates to safety and reliability. This requires more active management of short circuit levels, system voltages, and advanced protection schemes. Toronto Hydro has been exploring emerging functions such as

	scheduling, dispatching, aggregation, and settlement. For example, the DERMS platform is currently used to directly operate Toronto Hydro-owned battery energy storage systems and to monitor and manage grid-level impacts of customer DERs. As Toronto Hydro improves its capabilities to actively manage DERs on its system, it will be able to support an increased customer demand for DER connections. For more information see Exhibit 4, Tab 2, Schedule 7.
Customer Operations	Toronto Hydro is making investments in key areas of its customer operations. The customer connection teams are being expanded to support the increasing volume and complexity of both low and high voltage connections. These investments in headcount are being undertaken to support the increased growth and electrification in the City of Toronto. Additionally, the Key Account team is expanding to provide direct and tailored service to critical load customers, many of which are embedded into the economic and social fabric of the city. Many of these customers consider Toronto Hydro a trusted advisor in their efforts to achieve ESG targets through actions such as adopting BTM energy solutions and other peak and demand management measures. Toronto Hydro is investing in ensuring it has sufficient capacity and expertise to support its customers through the energy transition. For more information see Exhibit 4, Tab 2, Schedule 8.
Customer Care	Toronto Hydro is investing in its customer care teams to ensure sufficient capacity and knowledge to provide timely, effective, and efficient customer services. This includes being able to respond to and adequately address evolving customer needs and preferences affected by broad societal developments and industry trends such as new public policies, electrification, and increased adoption of EVs and DERs. Toronto Hydro is preparing for numerous changes in customer expectations, including demands for greater information on and control over electricity usage and expenditures, greater choice to purchase renewable power or self-generate for sale back to the grid, and ESG goals in energy use. In turn, Toronto Hydro is undertaking initiatives such as automation in customer self-service, upskilling in workforce, and acquiring additional specialized resources. For more information see Exhibit 4, Tab 2, Schedule 14.

Public Legal & Regulatory Affairs (PLRA)	Through this program Toronto Hydro ensures that there is sufficient organizational capacity to provide expert legal, regulatory, communications, policy and government relations, and public affairs services to respond to the changes in the energy sector driven by public policy, technological advancement and customer driven evolutions. This includes legal and regulatory support for offers to connect, arrangements with developers and operating agreements, as well as new policy changes. As well as communications with customers who have questions about electrification and new technologies. The PLRA program has been closely tied to and significantly driven by the nature – including volume and complexity – of the capital program. Given the focus of the capital plan on growth and electrification in the city, the PLRA program must reflect a workforce with a multidisciplinary skillset. For more information see Exhibit 4, Tab 2, Schedule 18

Through non-rate regulated business activities, which do not form part of this application, Toronto Hydro is also playing a proactive role in supporting the realization of the City's Net Zero Strategy by facilitating and stimulating the growth of emerging local cleantech markets. For more information, please see the latest Climate Action Plan status report.[1]

[1]Toronto Hydro, *Climate Action Plan 2023 Status Report*

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-9

References: Exhibit 1B, Tab 1, Schedule 1, Section 2.3.1

Preamble: Approximately a quarter of the utility's grid equipment continues to operate past useful life. [Investment Plan Section 2.3.1]

QUESTION (A):

a) Please provide how THESL defines "useful life".

RESPONSE (A):

In the context of this reference, Toronto Hydro refers to the useful life as the mean service life of the asset. Please see Toronto Hydro's response to interrogatory 2B-Staff-131, part (a) for the basis of the useful lives used.

QUESTION (B):

b) Please provide a summary by major category of the equipment that THESL has defined as 'beyond its useful life' and include for each category what percentage and value the portion is that THESL indicates is 'beyond its useful life'.

RESPONSE (B):

Please see the requested breakdown by category of Assets Past Useful Life in Table 1 below.

Table 1: Asset Count for Assets Past Useful Life

System	Non-Linear Assets (Units)	Percentage of Non-Linear Assets	Linear Assets (km)	Percentage of Linear Assets
Overhead	46,928	9.9%	1,301	29.7%
Underground	20,454	4.3%	3,082	70.3%
Network	846	0.2%	Not Applicable	Not Applicable

System	Non-Linear Assets (Units)	Percentage of Non-Linear Assets	Linear Assets (km)	Percentage of Linear Assets
Stations	1,219	0.3%	Not Applicable	Not Applicable
Civil	10,698	2.3%	Not Applicable	Not Applicable
Meters	393,024	83.1%	Not Applicable	Not Applicable
Total	**473,169**		**4,383**	

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-10

Reference: Table 1: Ontario Cities Population Density [Investment Plan] THESL indicates that the population density in Toronto is higher than the comparator municipalities listed.

QUESTION (A-B) :

a) Please explain how increased density would enable more capital and O&M efficiency compared to more disperse municipalities and related systems. If THESL does not believe this is correct, please explain why.

b) Has THESL done analysis of the Capital and/or O&M cost per customer correlated to population density (per km) compared to other utilities. If not, why not. If yes, please provide a copy of the analysis, reports, presentations or other materials pertaining to this analysis and its conclusions.

RESPONSE (A-B):

Toronto Hydro does not believe increased density to the degrees seen in the City of Toronto enables more capital and O&M efficiency relative to less dense, non-urban service areas. Please see the response to 2B-Staff-121, the pre-filed evidence in Exhibit 1B, Tab 3, Schedule 3 at pages 2 through 9, and the expert empirical evidence in Exhibit 1B, Tab 3, Schedule 3, Appendix A, which explicitly includes a congested urban variable to account for the impacts of highly dense urban environments on capital and operating costs.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-11

Reference: **"In this process, Toronto Hydro employed the principle of least regrets investment. Through the use of a new tool - the Future Energy Scenarios model - the utility modelled the grid impacts of a range of possible future peak demand scenarios based on the interaction between different policy, technology and consumer behaviour assumptions."**

QUESTION (A):

a) Please provide the definition of "least regret" as defined by THESL and the methodology/criteria/weighting used to determine which options result in a higher or lower regret. If the process uses THESL human decisions rather than an imperial approach, please explain.

RESPONSE (A):

The Investment Plan makes the minimum investments necessary (the "least regrets" investments) to maintain key outcomes in the near term while also making paced and deliberate progress in readying the grid and utility operations for the future, irrespective of the path the energy transition takes. The term "least regrets" refers to a strategic planning approach anchored in the decision-making theory of anticipating and minimizing regretful choices/outcomes when faced with uncertainty. This enables the utility to meet emerging challenges without having to wait for future variables with high levels of uncertainty to stabilize.

For example, Exhibit 2B Section D4.2 (Capacity Planning and the Energy Transition) identifies "least regret" investments by including additional drivers, augmenting its decision-making process with the results of a Future Energy Scenarios model, and using the Future Energy Scenarios to stress-test the utility's capacity plan. This meant Toronto Hydro acted with a higher degree of caution in terms of building new capacity to prepare the distribution grid for wide-scale building electrification in

the next two decades, as the policy and consumer behaviour drivers of this type of demand remain uncertain, and technology advancement could offer more cost-effective solutions in the future. Practically, this meant that Toronto Hydro decided to take a "wait and see approach" to investments in new capacity for accommodating wide-scale building electrification in the mid-2030s and beyond.

QUESTION (B):

b) Please provide the guide, user manual or equivalent for the Future Energy Model. If such documents do not exist, please explain how the model and its intended use is documented.

RESPONSE (B):

Future Energy Scenarios user training is provided as Appendix A to this response. Please refer to Exhibit 2B, Section D4, Appendix B for additional information on the FES model, including all assumptions, methods, and outputs.

QUESTION (C):

c) Is the Future Energy Model a Monte Carlo simulator or an NPV model? If neither, please explain.

RESPONSE (C):

The FES model is neither a Monte Carlo simulator nor an NPV model. See Section 2 and 3 of Exhibit 2B, Section D4, Appendix B for a description of the FES model.

QUESTION (D):

d) Please confirm how the inputs to the Future Energy Model are determined, e.g. THESL employee judgement, external data source, etc.

RESPONSE (D):

Please refer to Section 4 of Exhibit 2B, Section D4, Appendix B.

QUESTION (E):

e) Where does THESL get the cost estimates for each scenario in the Future Energy Model.

RESPONSE (E):

The Future Energy Scenario model does not associate costs with any of the scenarios.










FES Model Documentation

User Training Session

Toronto Hydro

29 June 2023

elementenergy
an ERM Group company

Madhushan Perera
Ivan Antonov
Ian Walker

Context

- Ontario's energy system is set to become increasingly **decarbonized**, **decentralized**, and **digitized.** Toronto Hydro must ensure the distribution system enables decarbonization but remains reliable & resilient, and that rates remain affordable. **Long-term, scenarios-based geospatial forecasts** will play an increasingly significant role as different areas within Toronto decarbonize at different rates, allowing us to plan efficiently and **strategically deploy targeted solutions.**

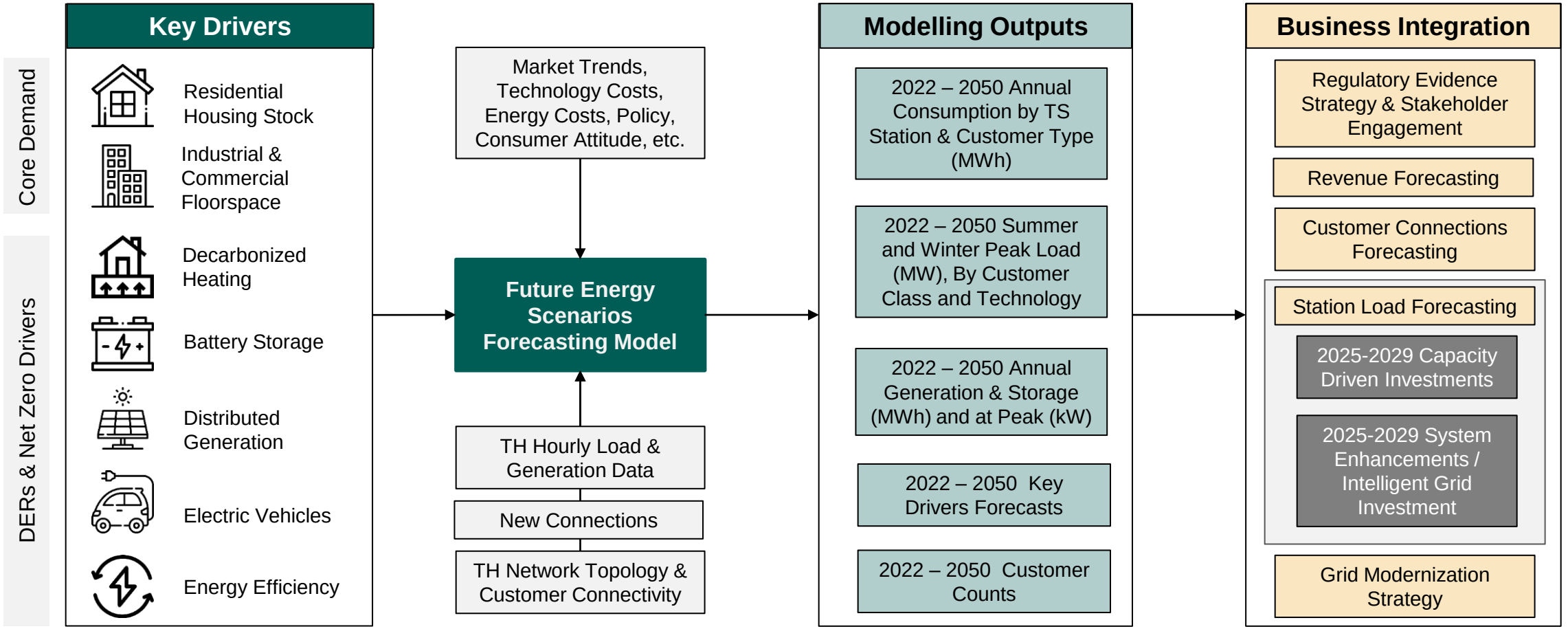


TARGETTED BENEFITS OF THE FUTURE ENERGY SENARIOS

- Efficient Growth-related Investment Plans
- Aligned and Strategic Decision Making
- Single TH Vision on the Future Energy System
- Support Utility of the Future Planning
- Enhance Customer Engagement

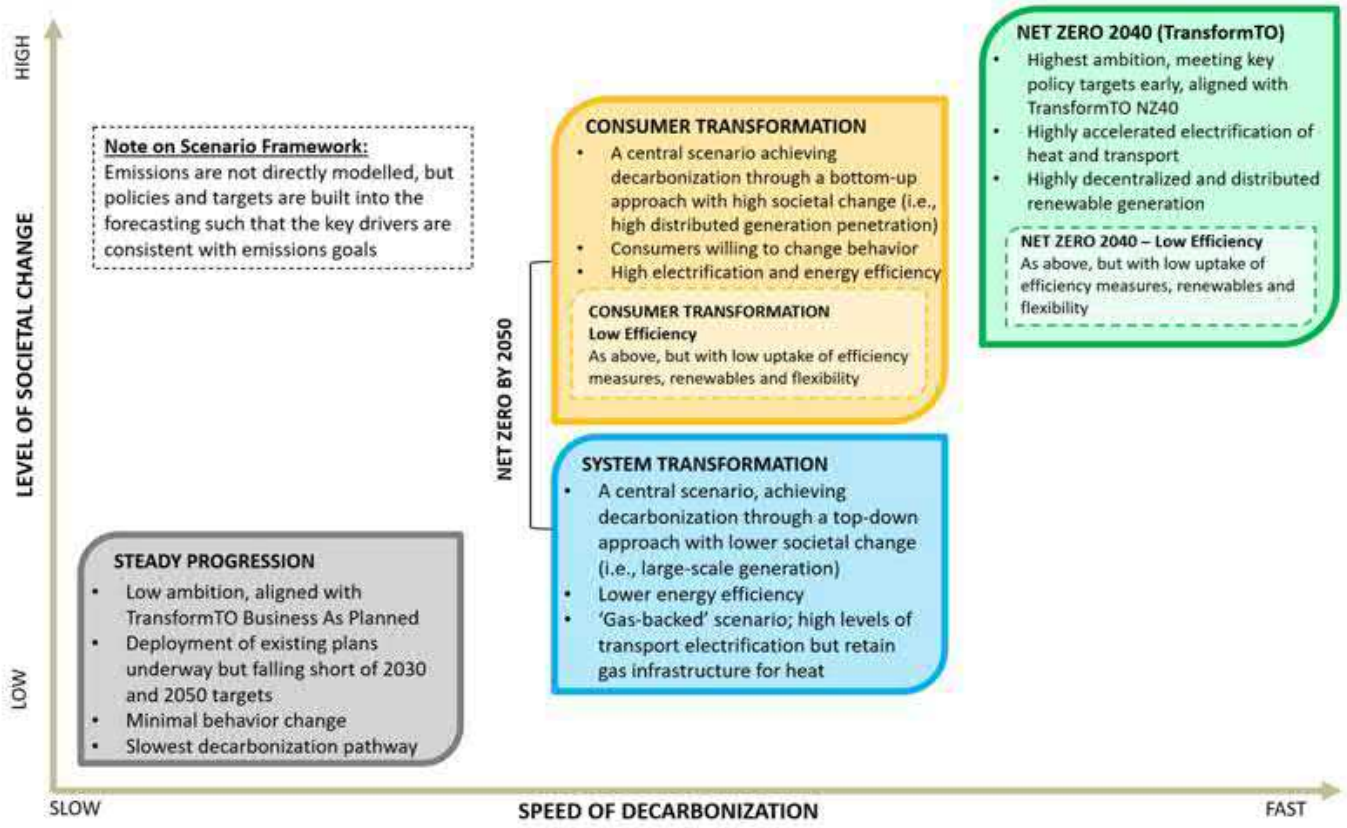
Project Scope

- The key difference vs. other public studies is that FES forecasts plausible pathways to Net Zero 2050 based on **bottom-up consumer choice modelling,** informed by current and future industry and policy developments, **not based on top down change required to achieve GHG reductions**.



Scenario Worlds Mapping

- The FES outlines **four different future 'worlds'** (and **two sensitivities**) with different assumptions around degree of decarbonization and societal change and how that translates to the uptake of low carbon technologies.
- To build these worlds, individual scenarios (i.e. low/medium/high) have been created to describe the evolution of drivers of demand/generation (incl. building stock, electrification of transport, decarbonized heating, etc.).



Parameter	Steady Progression	System Transformation	Consumer Transformation		Net Zero 2040	
			Standard	Low	Standard	Low
Net zero by 2050?	No	Yes	Yes		Yes (by 2040)	
Core Demand						
Electrical efficiency	Low	Medium	High	Low	High	Low
Building stock growth	Single Projection					
Low-Carbon Transport						
Cars and light trucks	Low	Medium	Medium		High	
Medium/heavy trucks and Buses	Low	Medium	Medium		High	
Rail	Single Projection					
Smart charging / V2G	Low	Medium	High	Low	High	Low
Decarbonized Heating						
Heat pumps	Low	Medium plus hybrid HPs	High		Early High	
Thermal Efficiency	Low	Medium	High	Low	Very High	Low
Gas heating in 2050	High	Medium due to hybrid HPs	Zero		Zero	
Gas grid availability	Remains at current availability	Reduced utilization	Decommissioned by 2050		Decommissioned by 2040	
Gas grid composition	Mainly natural gas, with potential for biogas, SNG, or other renewable natural gas	Shift to biogas, SNG, or other renewable natural gas	Mainly natural gas, with potential for biogas, SNG, or other renewable natural gas until 2050		Mainly natural gas, with potential for biogas, SNG, or other renewable natural gas until 2040	
Distributed Generation						
Solar PV	Low	Medium	High	Low	Very High	Low
Onshore wind	Low	Medium	High	Low	High	Low
Biogas	Low	Medium	High	Low	High	Low
Other non-renewable generation	High	Medium	Medium	High	Low	High
Battery Storage						
Domestic battery storage	Low	Medium	High	Low	Very High	Low
I&C behind-the-meter battery storage	Low	Medium	High	Low	High	Low

Note: each driver is modelled separately on a Low / Medium / High basis and then mapped onto the scenario worlds that represent a single coherent view of a potential future world.

Overview

FES Model Overview

Accessing the FES Model

Model Functionality

Online Platform

- Landing Page
- Scenario worlds
- Single Asset Analysis

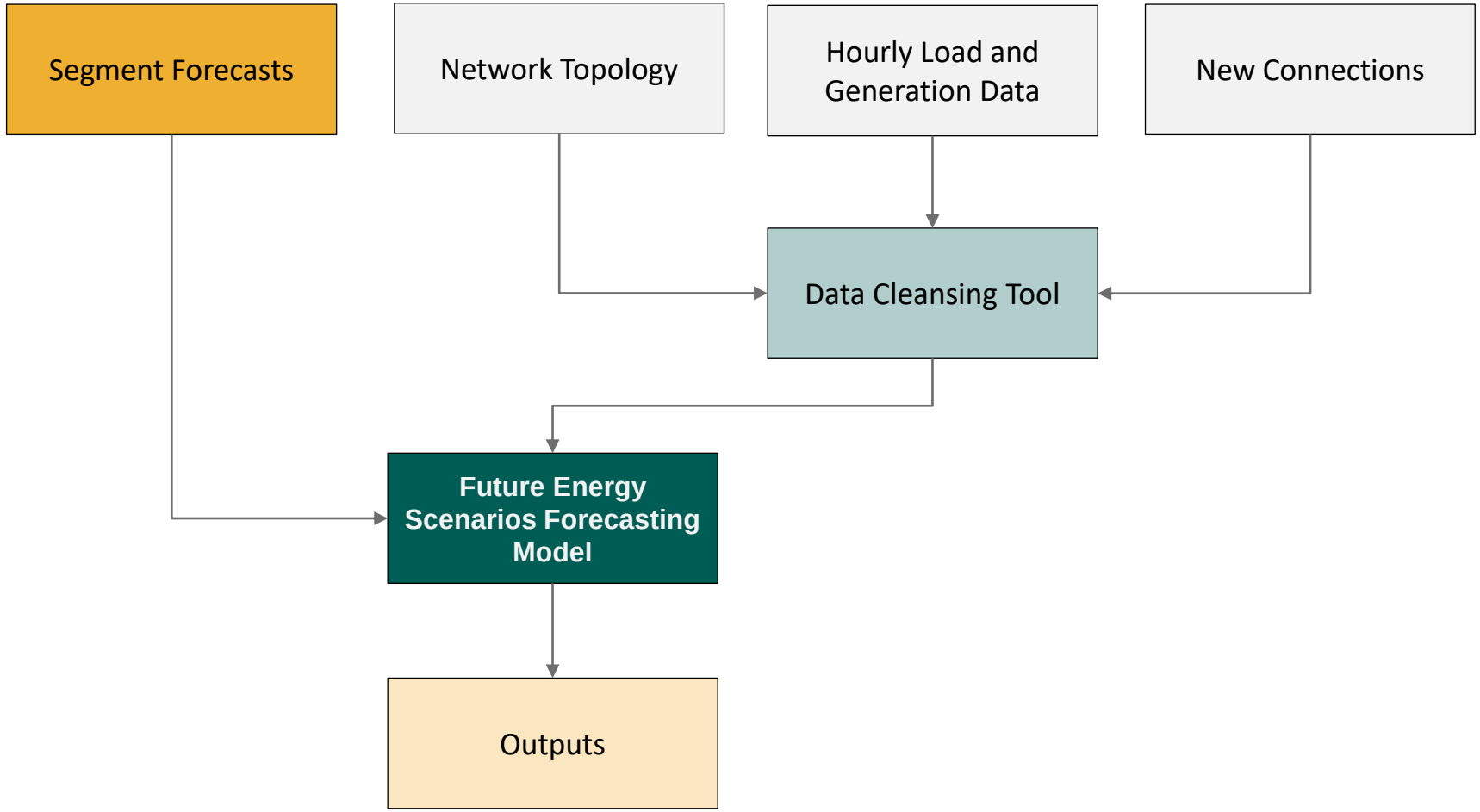
Review of functionality

Business problem statement – Future Energy Scenarios Model

- This project has been undertaken in response to the ***increasing complexity*** of distribution system load forecasting in Ontario and globally, due to factors such as decarbonization, decentralization, digitization, changing customer behaviours and evolving economic and policy conditions.
- New demands emerging from the ***electrification of heat and transport***, growing levels of ***distributed generation*** including variable renewable generation, and new sources of ***load flexibility*** (including energy storage) mean that local electricity distribution companies, such as Toronto Hydro, are facing increasing levels of ***uncertainty***.
- In this context, Toronto Hydro is looking to develop a more detailed understanding of how these various drivers will change and interact over time in order to plan investment in an efficient and timely manner and ***act as a key enabling organisation for the transition to a net zero energy system***. In particular this will feed into Toronto Hydro's ***grid modernization plan*** to enable increasing uptake of low carbon technologies in an efficient manner while maintaining system ***reliability*** and ***resilience***.
- As a result Element Energy are working with Toronto Hydro to generate the ***Future Energy Scenarios*** which provides scenario-based forecasts out to 2050 for peak load (MW), generation (MW), and energy consumption (MWh), generated from Element Energy's network load forecasting ***Future Energy Scenarios model*** and ***suite of bottom-up consumer-choice models*** for predicting uptake of low carbon technologies.

Future Energy Scenarios (FES) Model Overview

The FES Model is being delivered by Element Energy onto Toronto Hydro's on-premises systems.

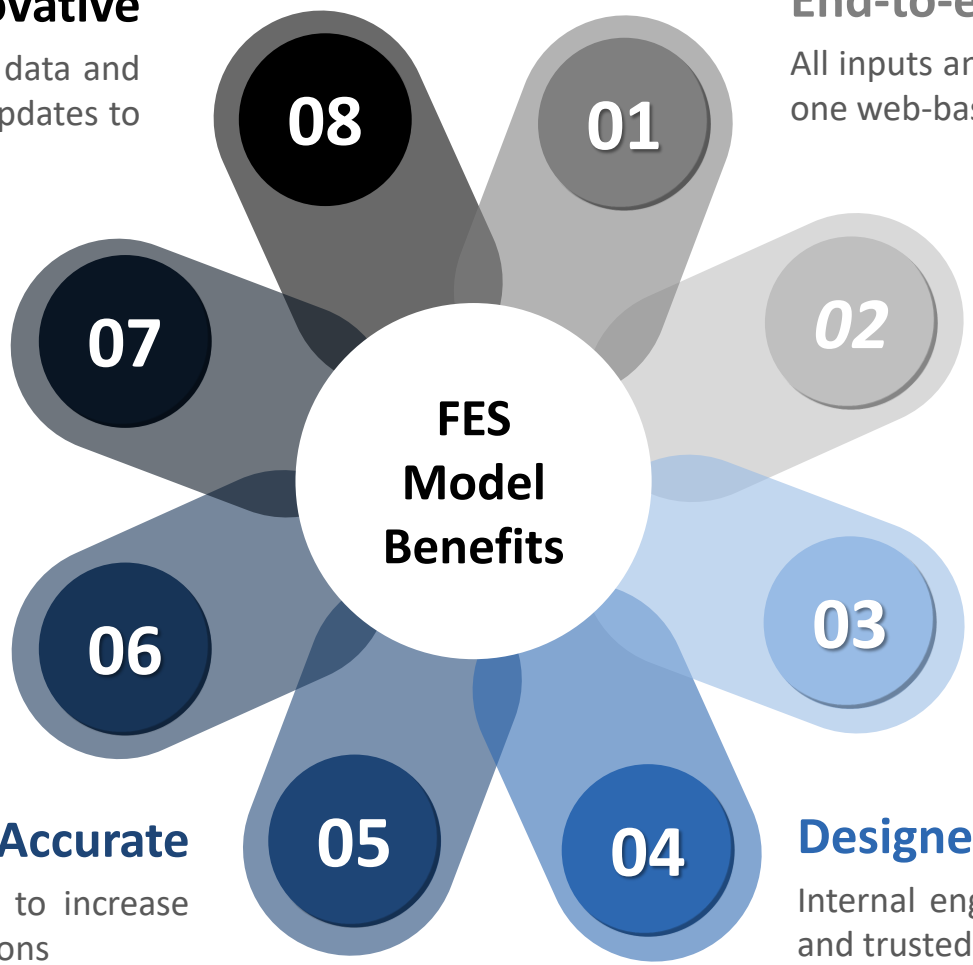


Core platform functionality is being hosted on TH internal servers.

Legend

- FES model input data
- Phase 1: Segment forecasts
- **Phase 2: FES model**
- Separate tool
- Outputs

FES Model Benefits



End-to-end system

All inputs and outputs accessed through one web-based user interface

Python-based

Enables quick run time

Modular

To allow competition, driving innovation & low cost

Designed for users by users

Internal engagement to develop robust and trusted outputs.

Accurate

High data granularity aims to increase accuracy of load on substations

Scenario based

Enables uncertainty of forecasts to be understood, and risk based planning of interventions

Validated & tested

To gain trust in model and direct continuous improvement

Flexible & innovative

Allows for periodic updates of data and additional innovative feature updates to increase capabilities

Overview

FES Model Overview

Accessing the FES Model

Model Functionality

Online Platform

- Landing Page
- Scenario worlds
- Single Asset Analysis

Review of functionality

Accessing the FES Model

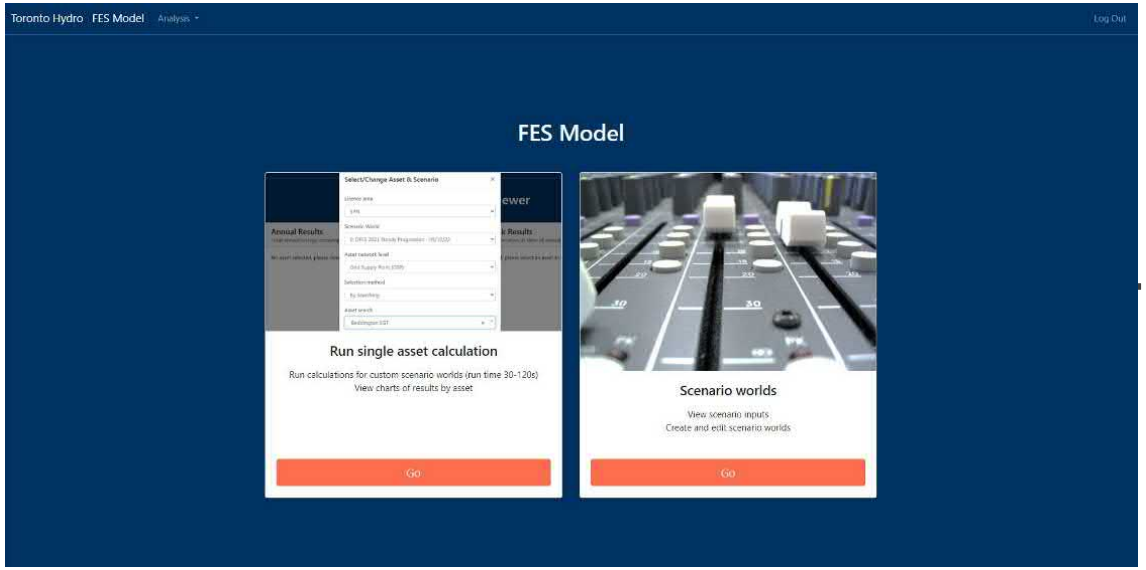
- You will be able to access the Toronto Hydro FES Model through the url: redacted
- You will be able to automatically sign-in to the system via your existing Toronto Hydro Microsoft credentials – i.e. if you are already signed into Microsoft (e.g. a different Microsoft app), you should not need to re-enter your password.
- You will then be redirected to the home page *(see right image).*

Access via the provided URL using your TH Microsoft credentials

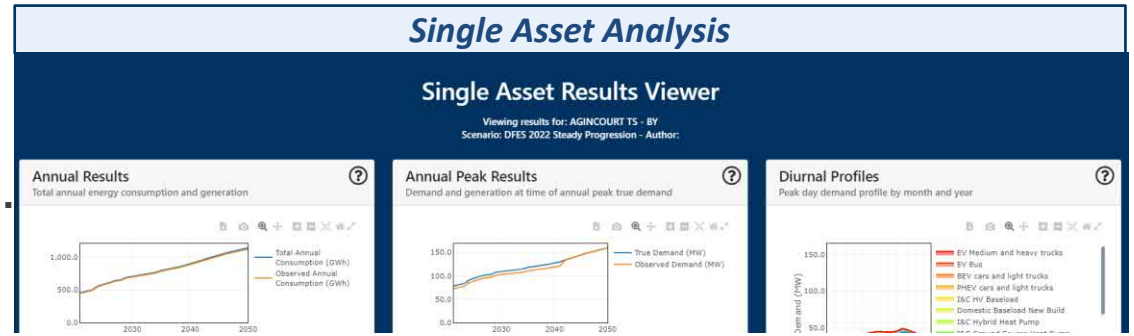


By the end of this training session, FES Model users should understand how to configure scenarios and run single asset calculations.

As part of the FES Model Go-Live, users will be able to access and utilise the online platform to configure scenarios (Scenario worlds) and run load forecasts for a single assets (Single Asset Analysis).







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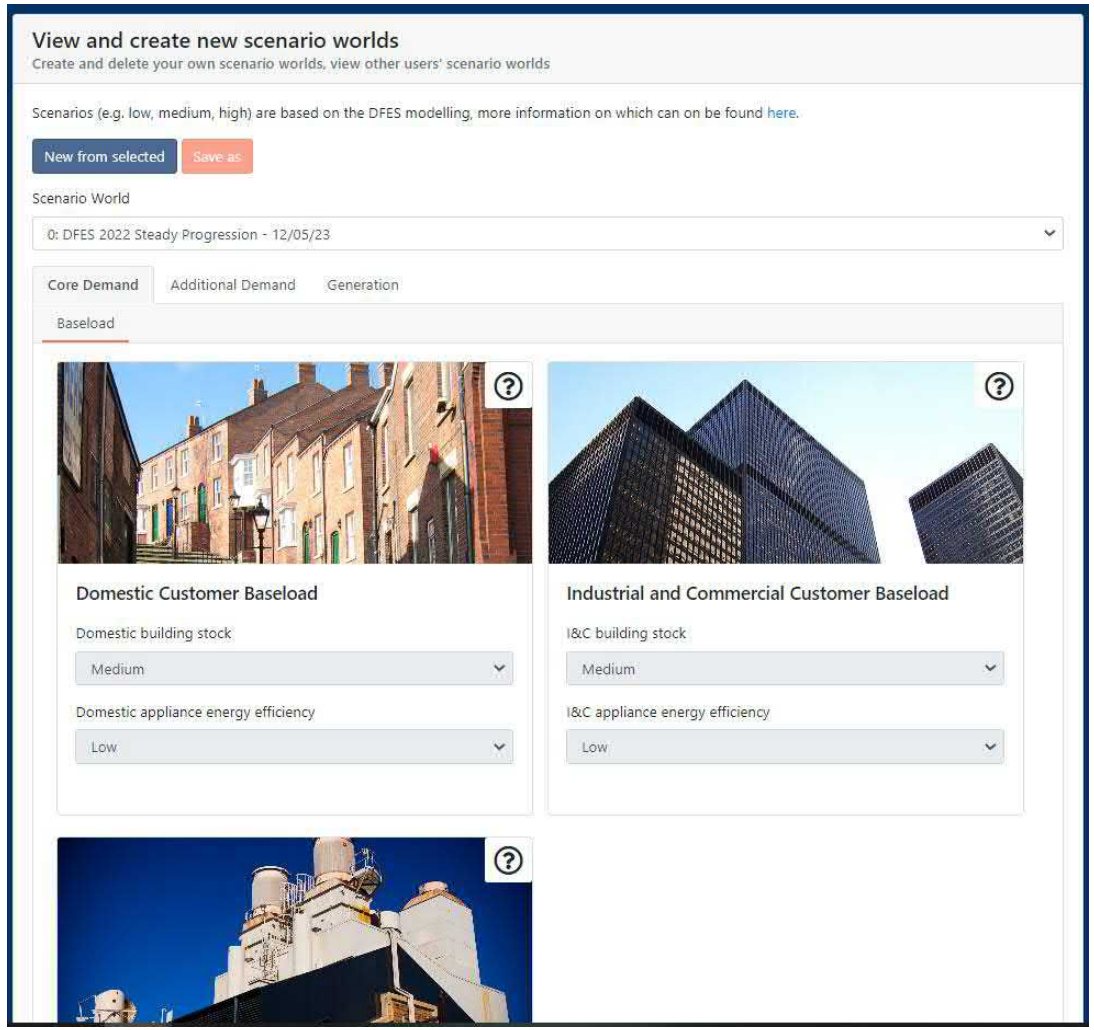
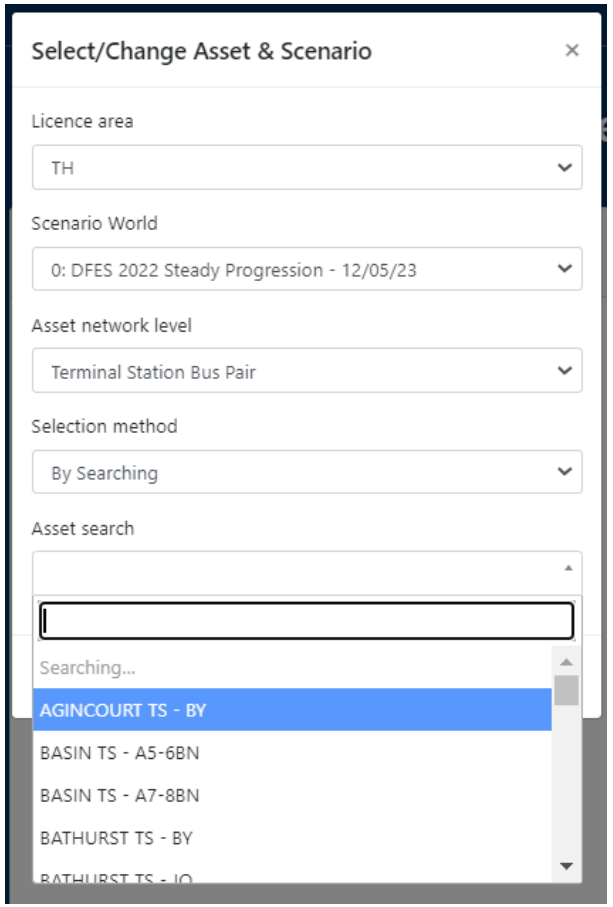
The model includes demand forecasting with scenario configuration and single asset model runs at the network level or TSBP level.

Configure and save new scenarios



Run demand forecasts with new scenarios

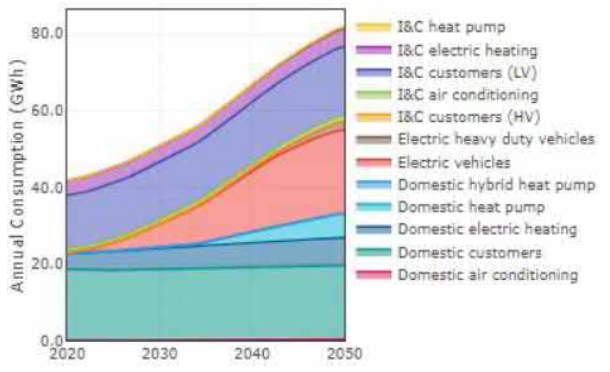


Can run for a chosen scenario and single asset (network or TSBP) by selecting from the list or searching.

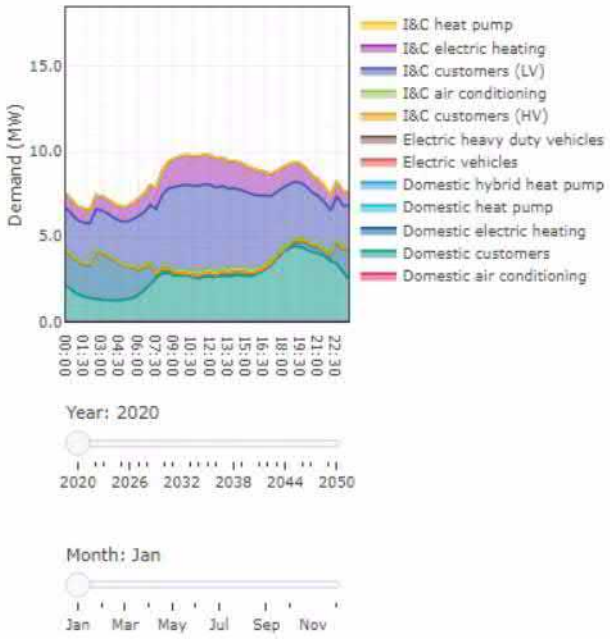
The model includes demand forecasting with scenario configuration and single asset model runs at the network level or TSBP level.

View single substation results in interactive graphs

Annual consumption and annual peak true demand forecast

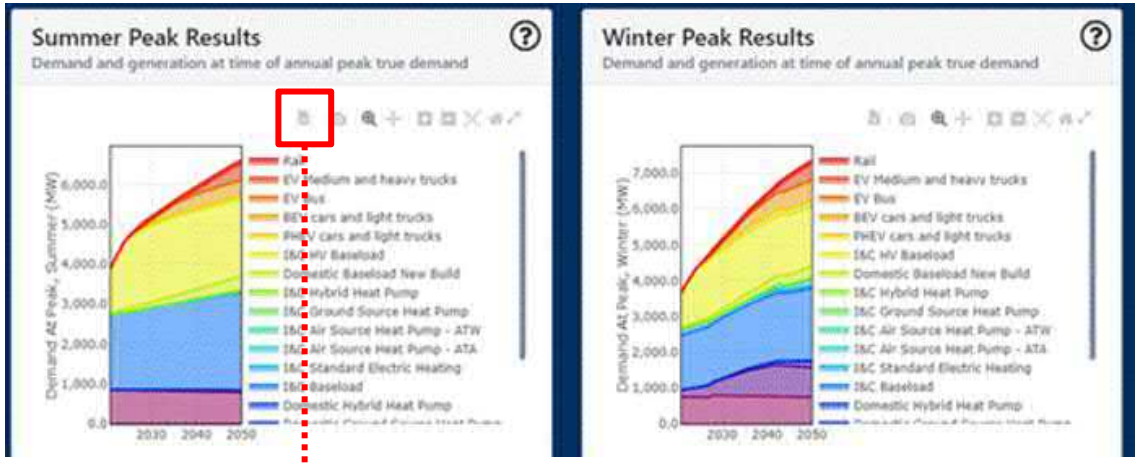


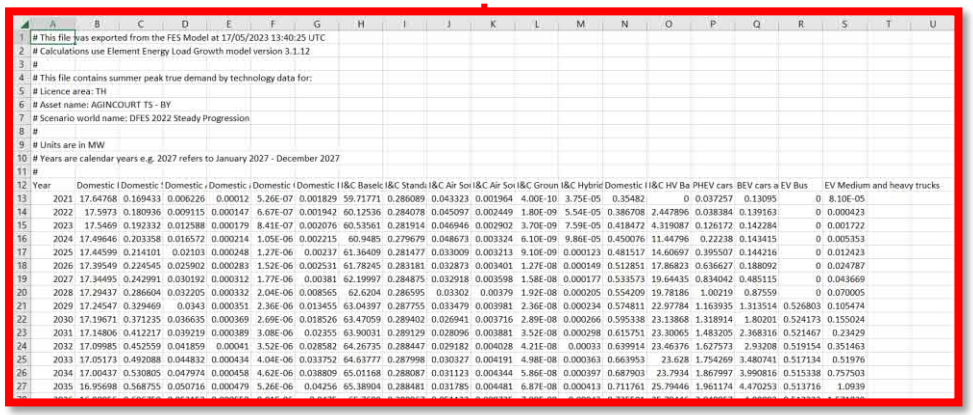
Peak day diurnal profiles



Download results to CSV files

Can download results to CSV files for single asset model runs.





	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	# This file was exported from the FES Model at 17/05/2023 13:40:25 UTC																				
2	# Calculations use Element Energy Load Growth model version 3.1.12																				
3	#																				
4	# This file contains summer peak true demand by technology data for:																				
5	# Licence area: TH																				
6	# Asset name: AGINCOURT TS - BY																				
7	# Scenario world name: DFES 2022 Steady Progression																				
8	#																				
9	# Units are in MW																				
10	# Years are calendar years e.g. 2027 refers to January 2027 - December 2027																				
11	#																				
12	Year	Domestic I	Domestic !	Domestic ,	Domestic .	Domestic /	Domestic I	I&C Baseli	I&C Standi	I&C Air Sou	I&C Air Sou	I&C Groun	I&C Hybrid	Domestic I	I&C HV Ba	PHEV cars	BEV cars a	EV Bus	EV Medium and heavy trucks			
13	2021	17.64768	0.169433	0.006226	0.00012	5.26E-07	0.001829	59.71771	0.286089	0.043323	0.001964	4.00E-10	3.75E-05	0.35482	0	0.037257	0.13095	0	8.10E-05			
14	2022	17.5973	0.180936	0.009115	0.000147	6.67E-07	0.001942	60.12536	0.284078	0.045097	0.002449	1.80E-09	5.54E-05	0.386708	2.447896	0.038384	0.139163	0	0.000423			
15	2023	17.5469	0.192332	0.012588	0.000179	8.41E-07	0.002076	60.53561	0.281914	0.046946	0.002902	3.70E-09	7.59E-05	0.418472	4.319087	0.126172	0.142284	0	0.001722			
16	2024	17.49646	0.203358	0.016572	0.000214	1.05E-06	0.002215	60.9485	0.279679	0.048673	0.003324	6.10E-09	9.86E-05	0.450076	11.44796	0.22238	0.143415	0	0.005353			
17	2025	17.44599	0.214101	0.02103	0.000248	1.27E-06	0.00237	61.36409	0.281477	0.033009	0.003213	9.10E-09	0.000123	0.481517	14.60697	0.395507	0.144216	0	0.012423			
18	2026	17.39549	0.224545	0.025902	0.000283	1.52E-06	0.002531	61.78245	0.283181	0.032873	0.003401	1.27E-08	0.000149	0.512851	17.86823	0.636627	0.188092	0	0.024787			
19	2027	17.34495	0.242991	0.030192	0.000312	1.77E-06	0.00381	62.19997	0.284875	0.032918	0.003598	1.58E-08	0.000177	0.533573	19.64435	0.834042	0.485115	0	0.043669			
20	2028	17.29437	0.286604	0.032205	0.000332	2.04E-06	0.008565	62.6204	0.286595	0.03302	0.00379	1.92E-08	0.000205	0.554209	19.78186	1.00219	0.87559	0	0.070005			
21	2029	17.24547	0.329469	0.0343	0.000351	2.36E-06	0.013455	63.04397	0.287755	0.033479	0.003981	2.36E-08	0.000234	0.574811	22.97784	1.163935	1.313514	0.526803	0.105474			
22	2030	17.19671	0.371235	0.036635	0.000369	2.69E-06	0.018526	63.47059	0.289402	0.026941	0.003716	2.89E-08	0.000266	0.595338	23.13868	1.318914	1.80201	0.524173	0.155024			
23	2031	17.14806	0.412217	0.039219	0.000389	3.08E-06	0.02355	63.90031	0.289129	0.028096	0.003881	3.52E-08	0.000298	0.615751	23.30065	1.483205	2.368316	0.521467	0.23429			
24	2032	17.09985	0.452559	0.041859	0.00041	3.52E-06	0.028582	64.26735	0.288447	0.029182	0.004028	4.21E-08	0.00033	0.639914	23.46376	1.627573	2.93208	0.519154	0.351463			
25	2033	17.05173	0.492088	0.044832	0.000434	4.04E-06	0.033752	64.63777	0.287998	0.030327	0.004191	4.98E-08	0.000363	0.663953	23.628	1.754269	3.480741	0.517134	0.51976			
26	2034	17.00437	0.530805	0.047974	0.000458	4.62E-06	0.038809	65.01168	0.288087	0.031123	0.004344	5.86E-08	0.000397	0.687903	23.7934	1.867997	3.990816	0.515338	0.757503			
27	2035	16.95698	0.568755	0.050716	0.000479	5.26E-06	0.04256	65.38904	0.288481	0.031785	0.004481	6.87E-08	0.000413	0.711761	25.79446	1.961174	4.470253	0.513716	1.0939			

Overview

FES Model Overview

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Model Functionality

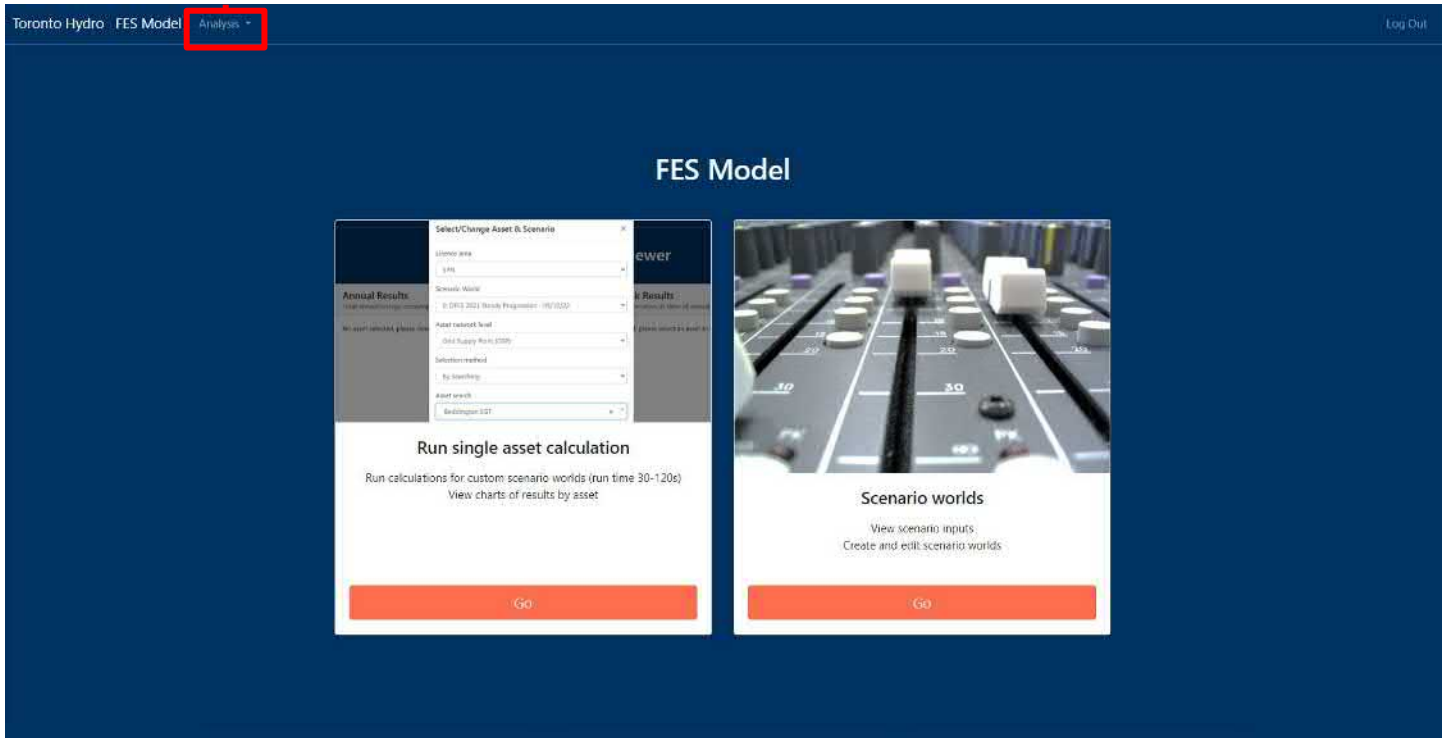
Online Platform

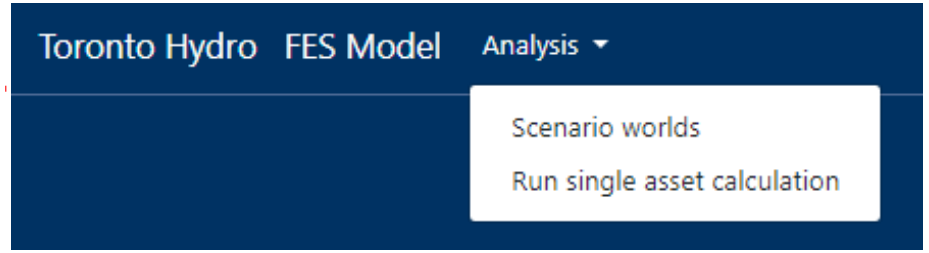
- **Landing Page**
- Scenario worlds
- Single Asset Analysis

Review of functionality

Online Platform – Landing page

The main FES model landing page has two primary options (Run single asset calculation, Scenario worlds). Additionally, users may navigate the landing platform through the use of the “Analysis” tab at the top left of the page.





Under the “Analysis” tab, users may select the same two load forecasting options.

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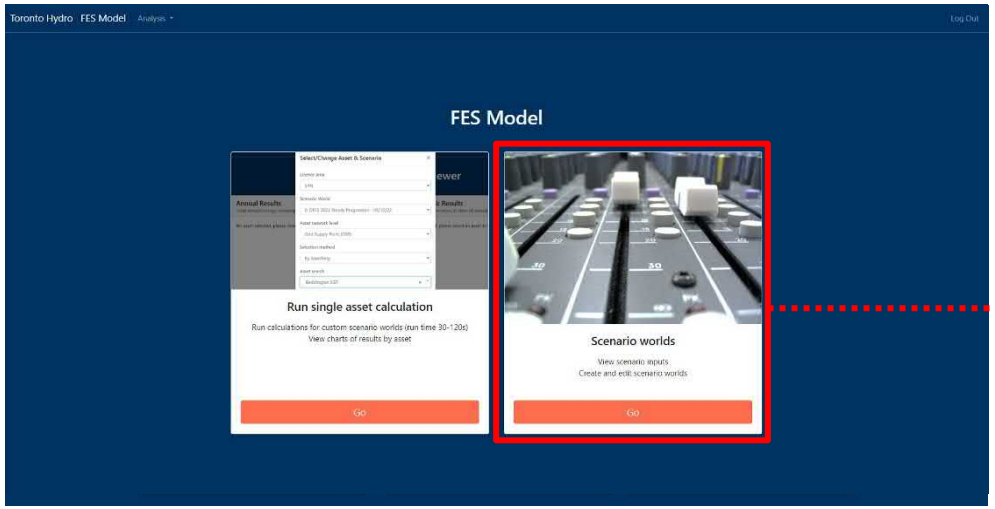
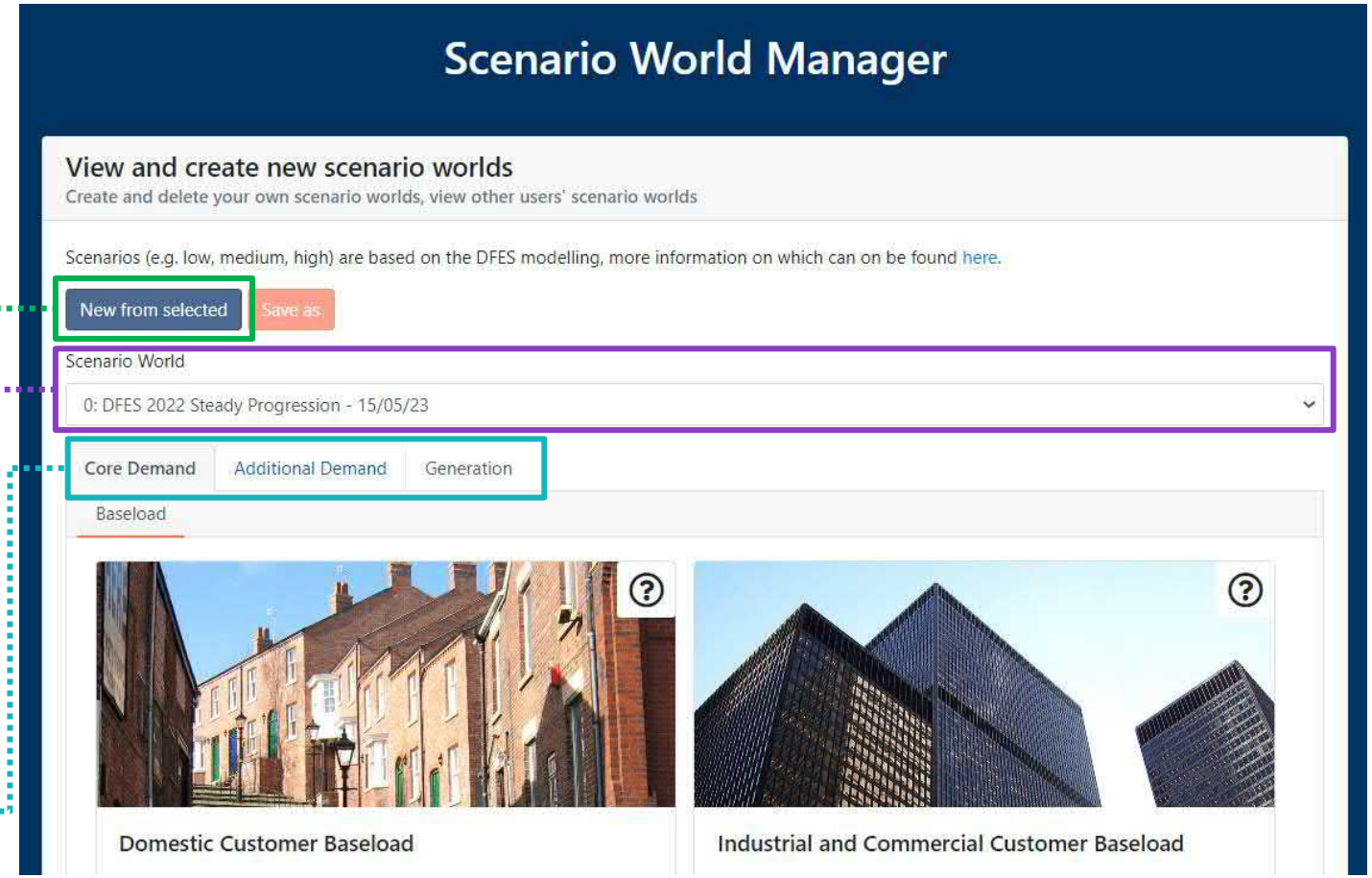
Online Platform – Scenario worlds

From the main landing page, select the Scenario worlds option (or via the “Analysis” tab).



The Scenario worlds page allows users to view scenarios (e.g. the four DFES scenarios) and create new custom scenarios by varying core demand (e.g. domestic load) or low carbon technologies (e.g. electric vehicles).

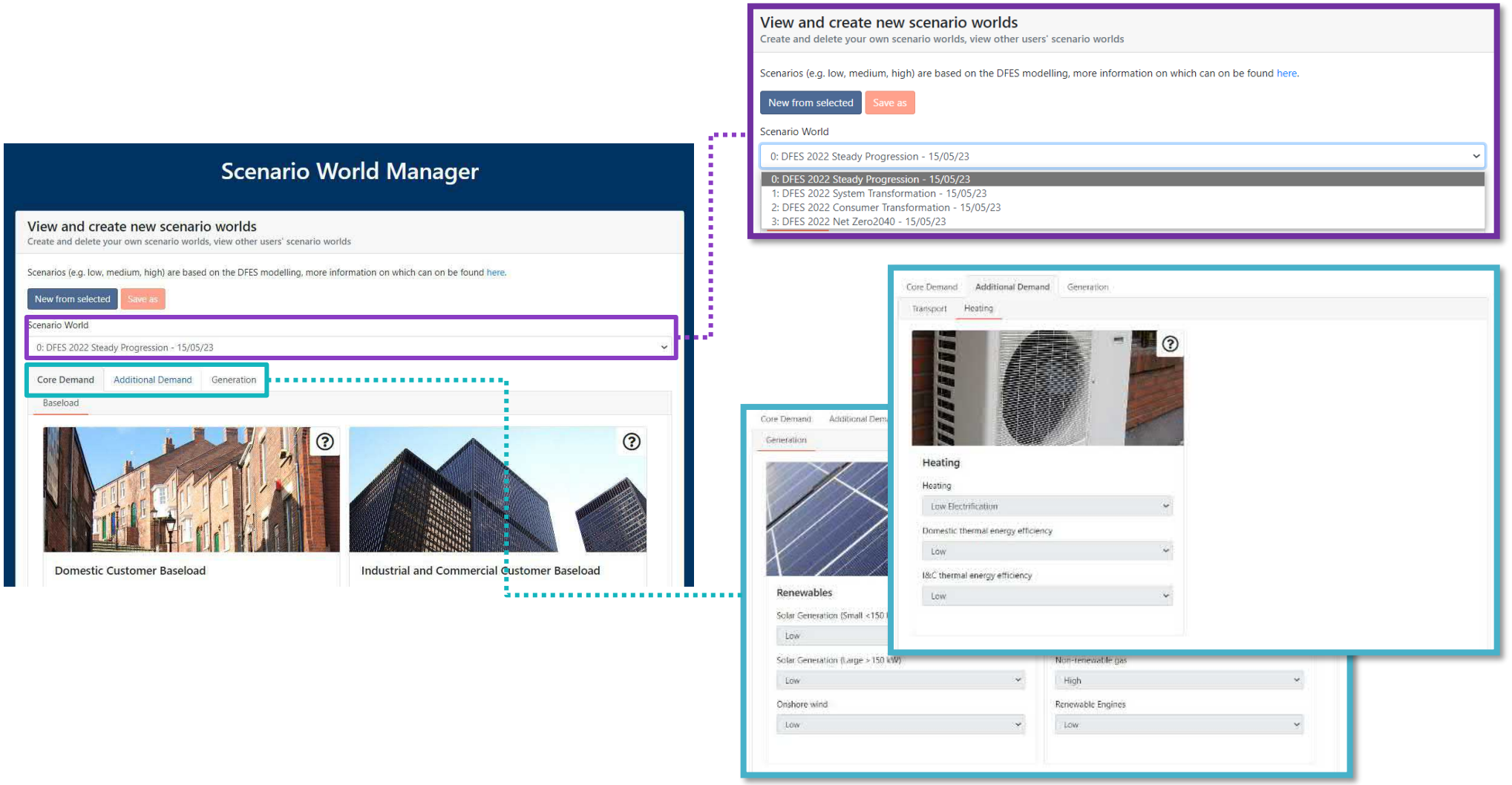


Users use an previously saved scenario as a base for a new custom scenario.

Saved scenarios can selected in this drop-down.

Assumptions for core and additional demands can be controlled via these three tabs.

Online Platform – Scenario worlds



Saved global scenarios can be viewed in the drop down.

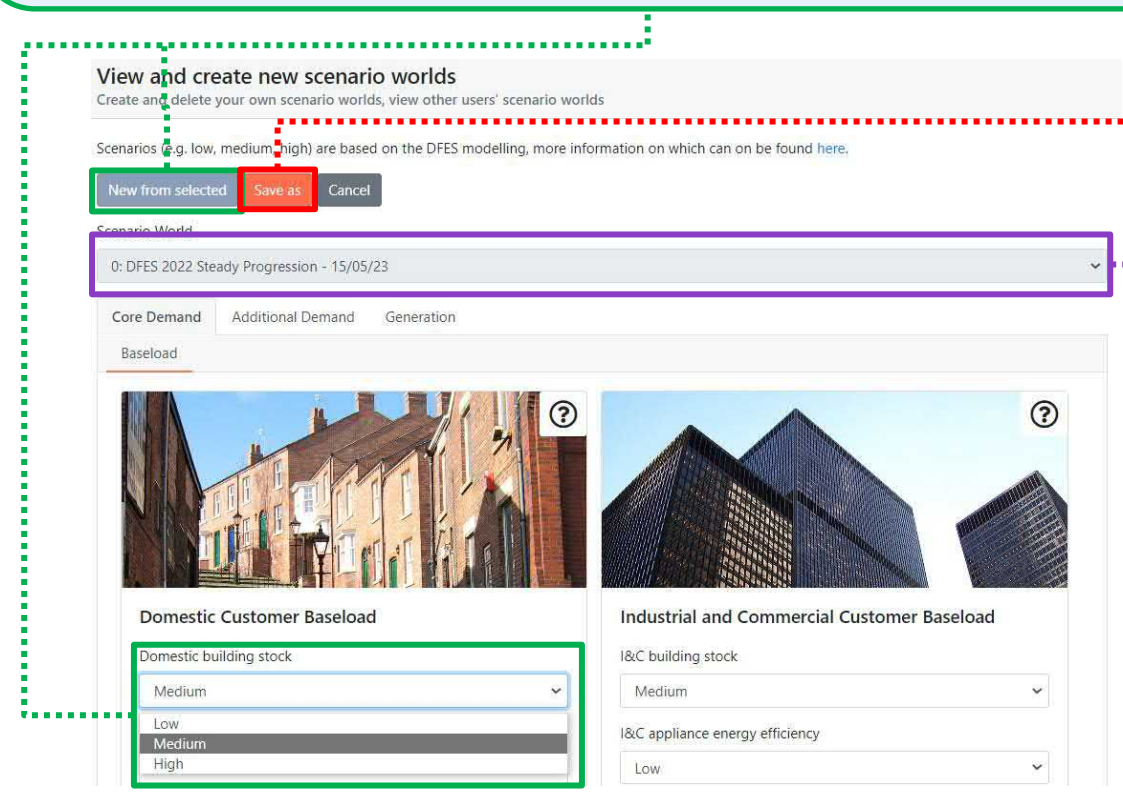
For the selected scenario, users can view the input driver-level assumptions (e.g. medium domestic building stock growth, high EV uptake) across core and additional demands.

Online Platform – Scenario worlds

2

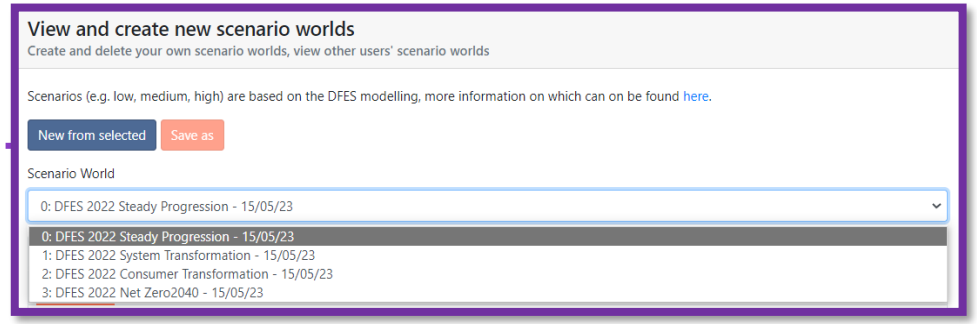
(i) To begin the setup of a new scenario, click “New from selected”. Select an existing scenario to view the scenario’s input assumptions across the core and additional demand tabs.

(ii) To modify the input assumptions, go through each of the drop-down menus and select from the available options (e.g. Low, Medium, High).



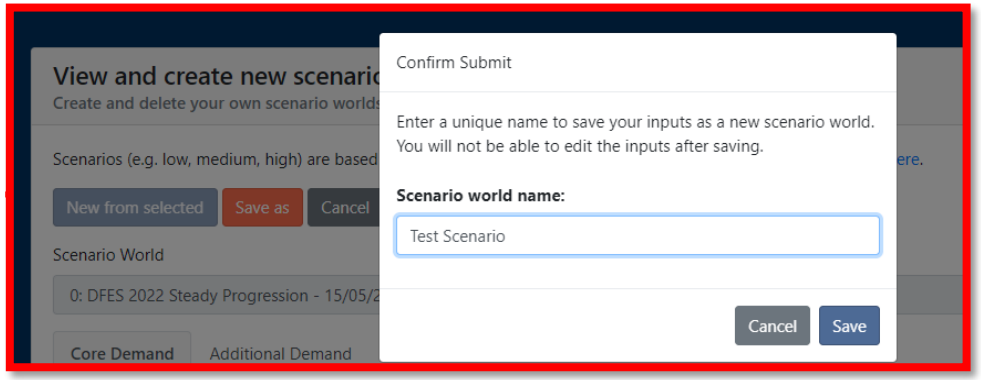
1

To create a new scenario, select the “---” to start fresh or a saved scenario to start from its settings.



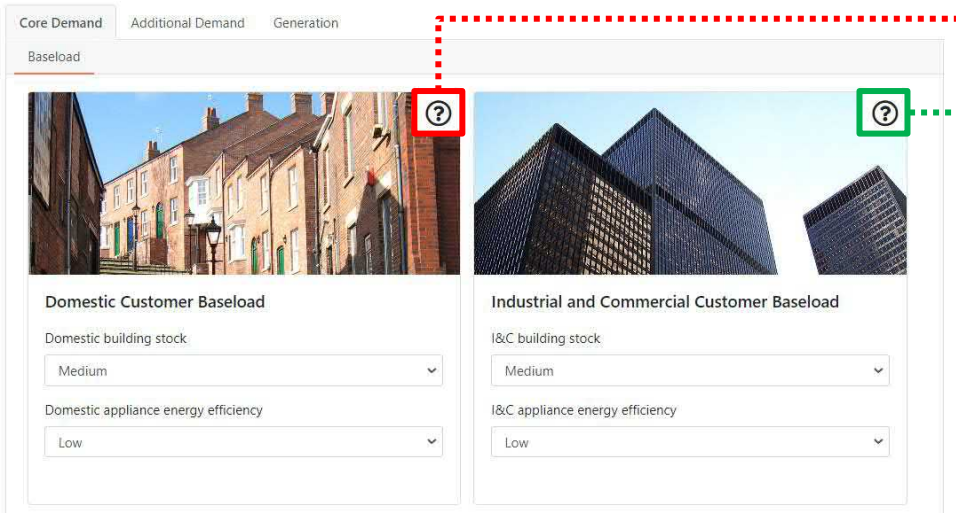
3

To save a scenario, click “Save as” and name the global scenario in the window that pops up. Then click “Save” on the pop-up to confirm.

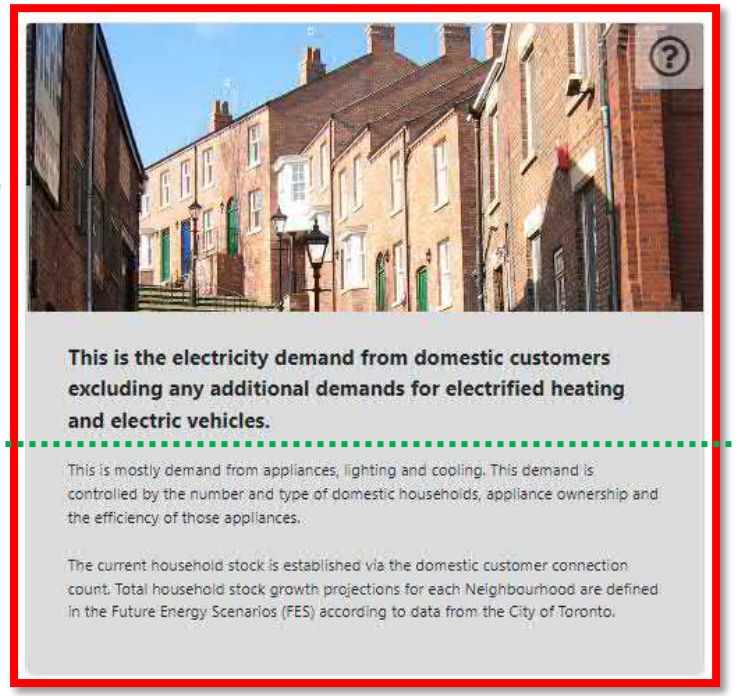


Online Platform – ? symbol – to learn more

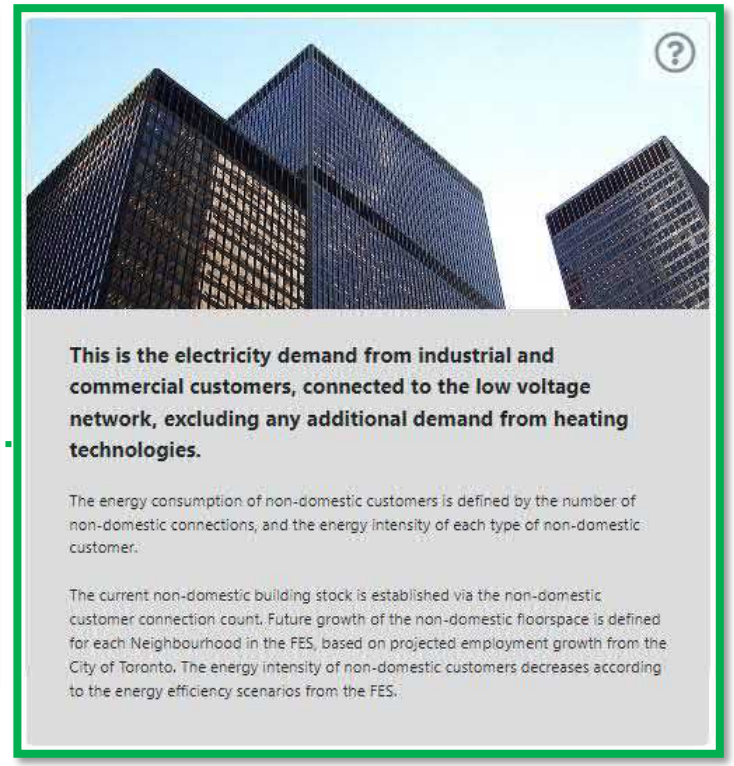
Throughout the FES model, the ? symbol is placed where there is an opportunity to learn more information about something. Users can simply hover their mouse over the symbol and explanatory text will come up.



For example, hovering over the "Domestic Customer Baseload" brings up the below text.



For example, hovering over the "Industrial and Commercial Customer Baseload" brings up the below text.



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Review of functionality

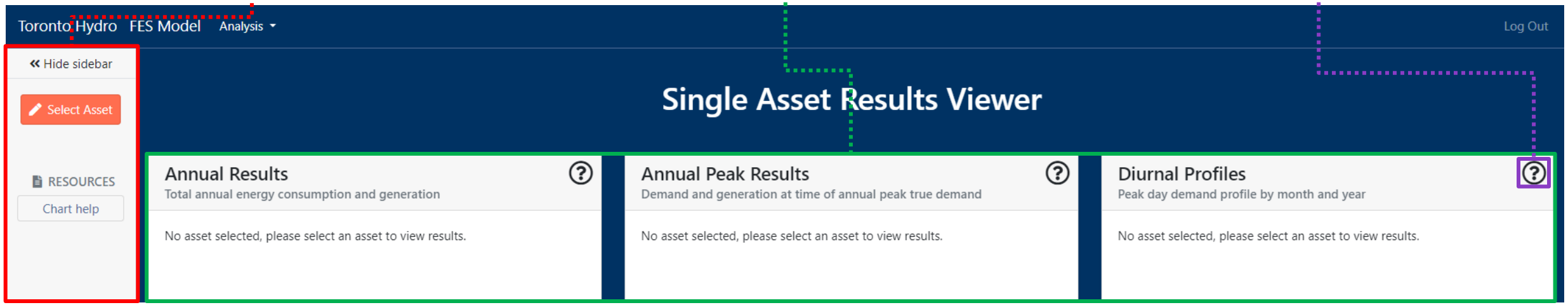
Online Platform – Single asset analysis

Via single asset analysis, users can run the FES model to get a load forecast for a specific asset for a given (custom) scenario. This asset can be a TSBP or the whole network. Results are broken down by technology and can be easily downloaded to CSV files.

The sidebar allows users select an asset (via search or selection) and scenario as well as view supporting information (e.g. chart explanation, category definitions).

The results viewer displays interactive plots including the annual consumption forecast, peak forecast, and demand profiles, all broken down by technology.

Like other pages, the ⓘ symbol is placed where there is an opportunity to learn more information about something. Users can simply hover their mouse over the symbol and explanatory text will come up.



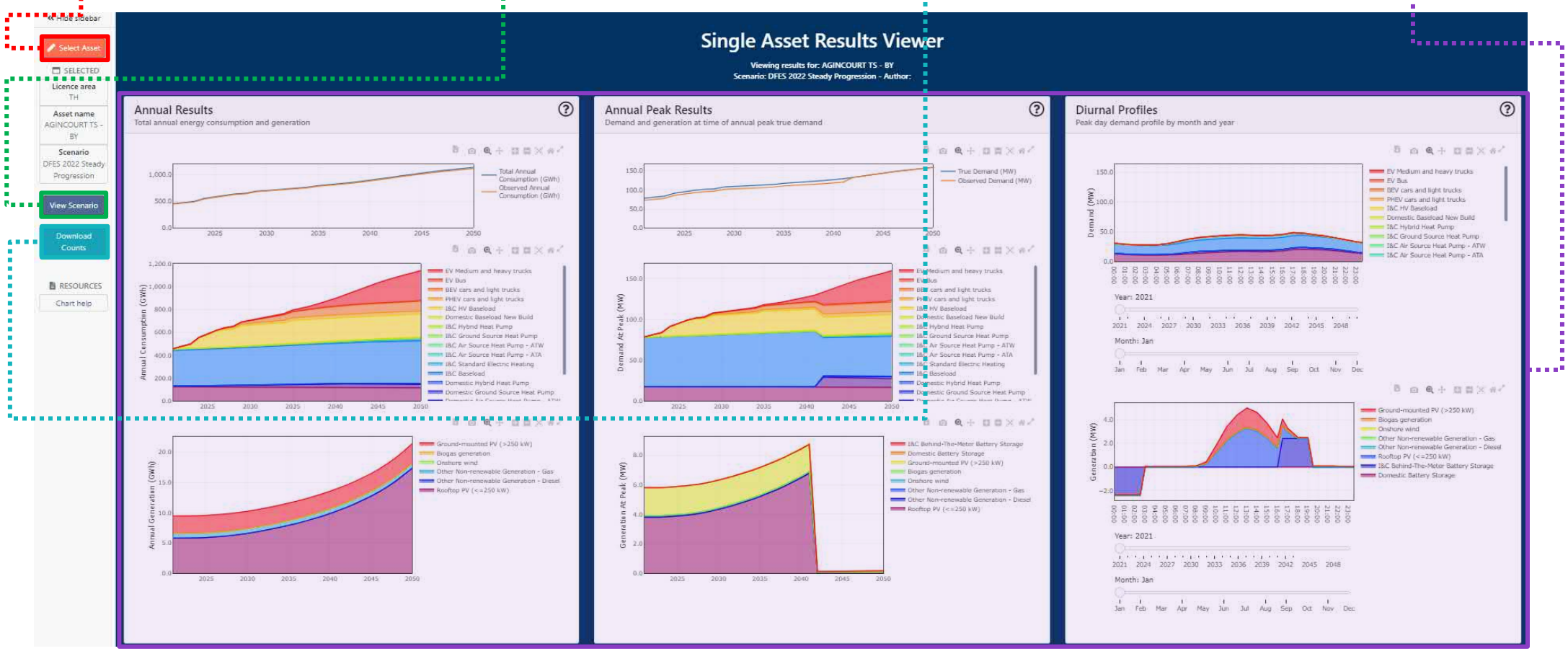
Online Platform – PLE Viewer

Select a substation and scenario to view

View scenario assumptions

Download connection counts by technology

Plots of annual consumption, peak demand, and peak day demand profiles; additional seasonal peak graphs are also available.

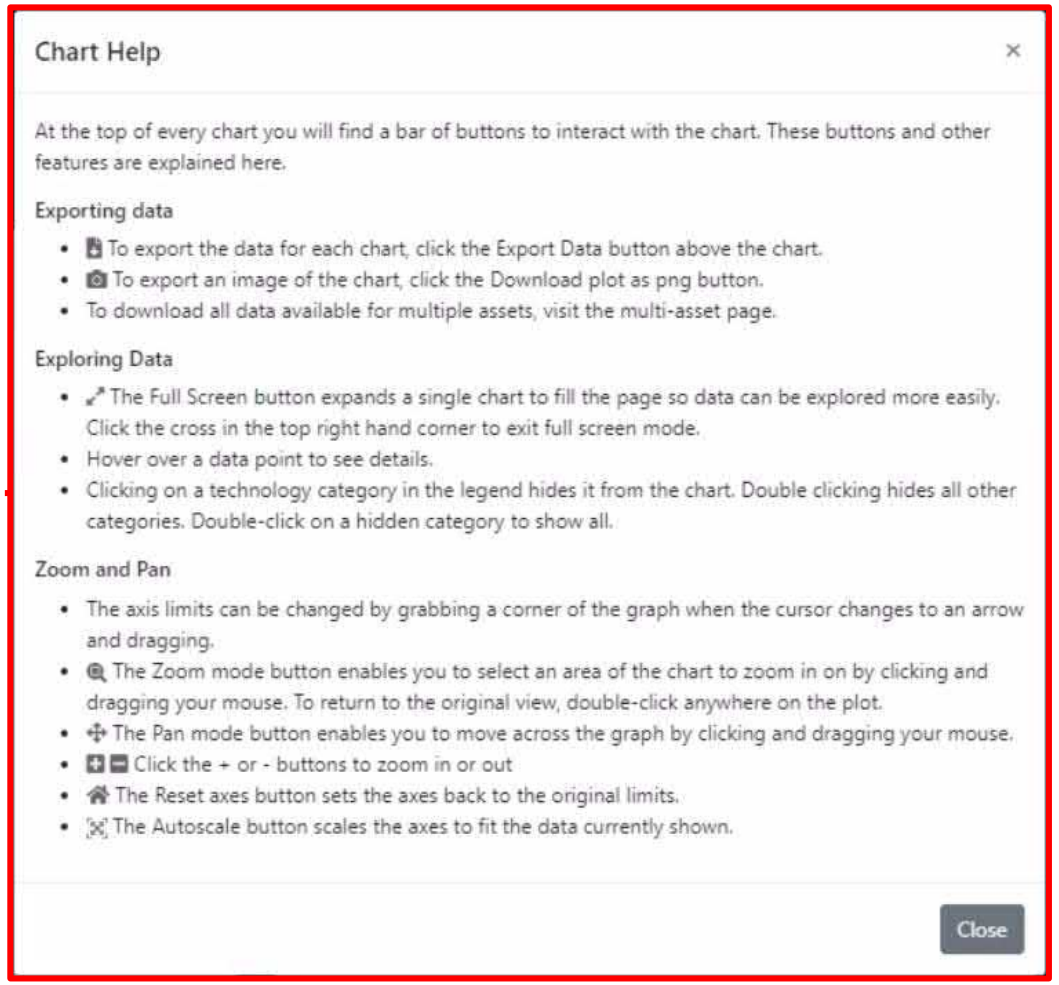


Online Platform – Resources

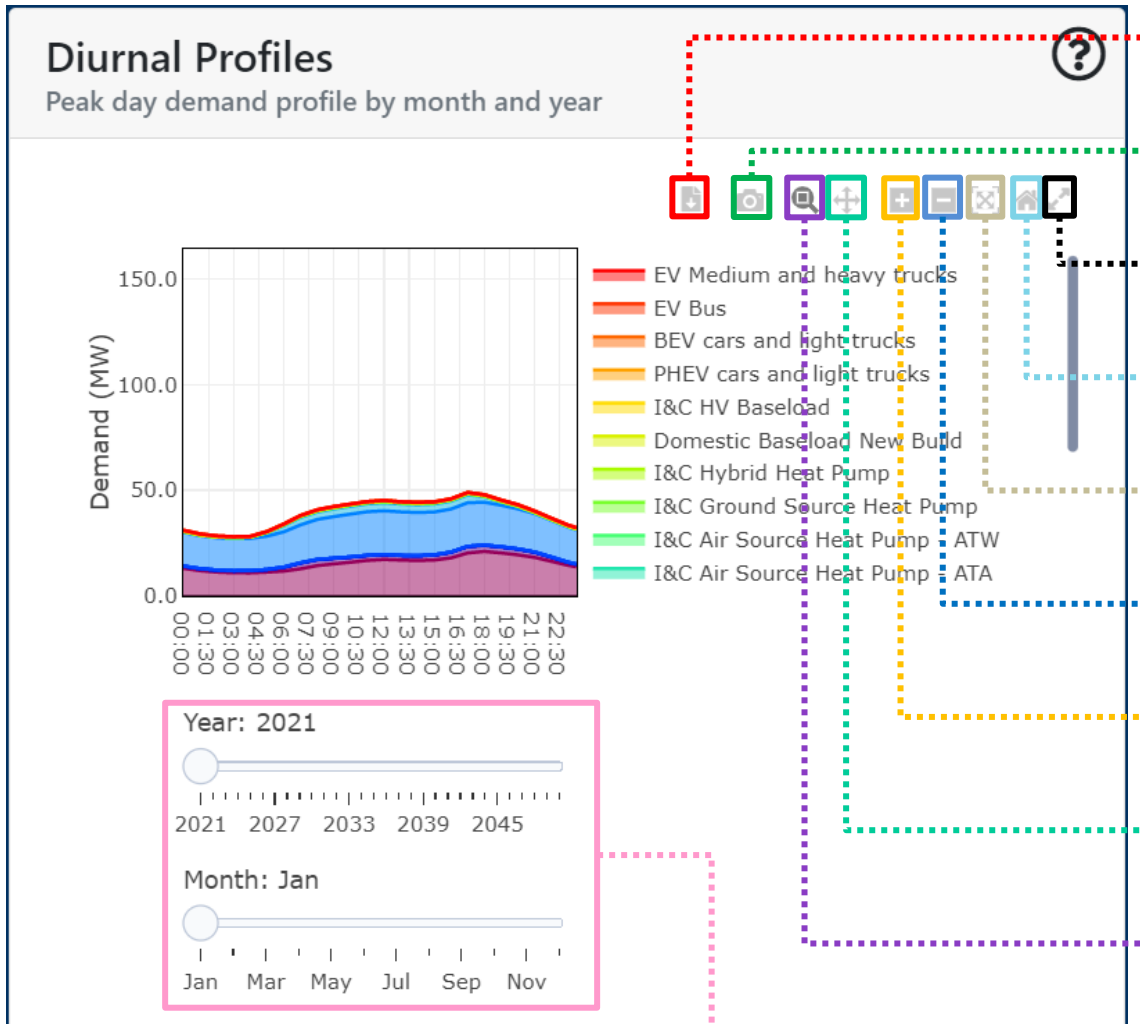
Users can use the sidebar resources as a source of reference when interpreting results.



The “Chart help” describes how to export data, explore the results data in the viewer once produced, and how to manipulate the page via zooming or panning.



Online Platform – Graph options



"Export data" – download data to CSV

"Download plot as png image" – save graph image

"Full screen" – extend the graph to the full screen

"Reset axes" – set axes back to original scale

"Autoscale" – scale axes based on data in graph

"Zoom out" – increase axes scale to show larger range

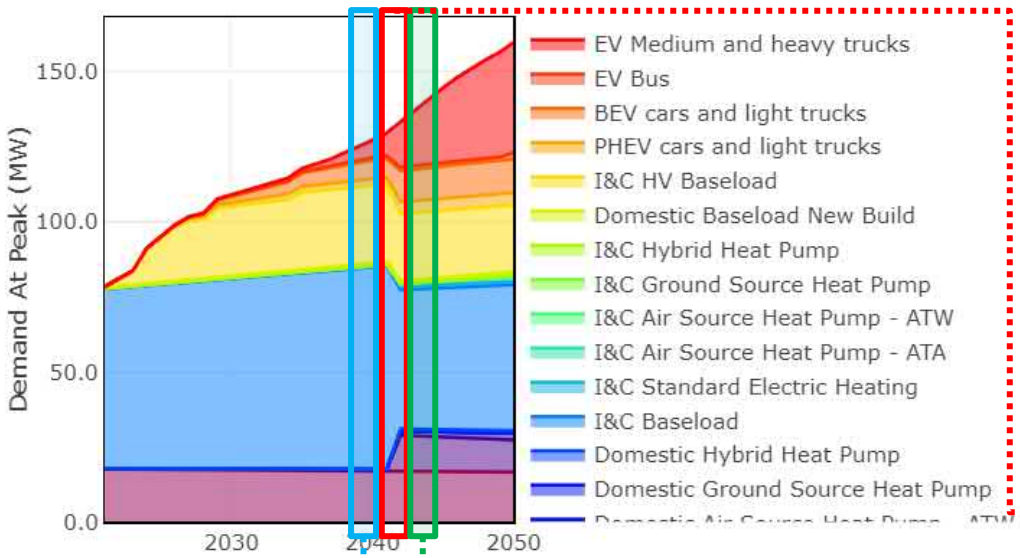
"Zoom in" – decrease axes scale to show smaller range

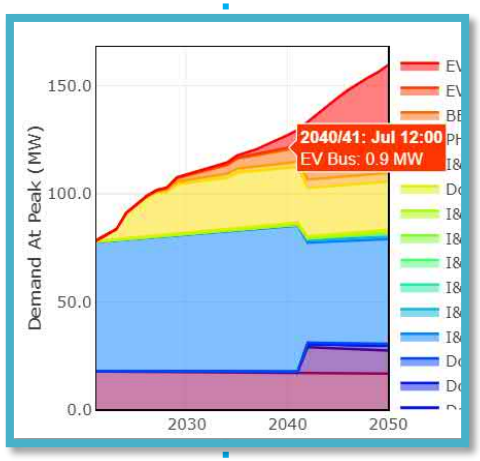
"Pan" – change mouse tool to scroll through graph

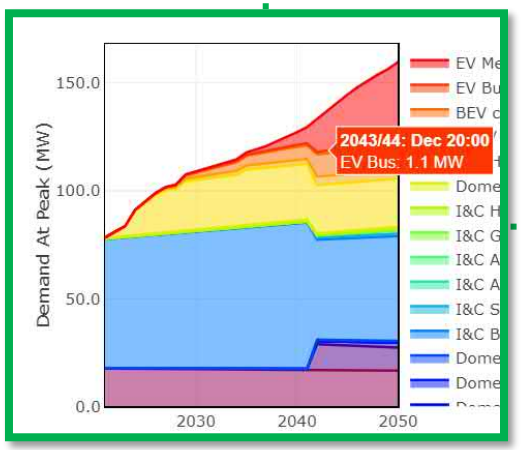
"Zoom" – change mouse tool to highlight to zoom

"Year" and "Month" sliders – slide to show data at different times

Online Platform – Time of peak changes







Users may sometimes see a step-change in certain loads within the annual peak results. These step-changes are due to change in the time of day and/or month of peak demand, and differing contributions of each load type at those different times.

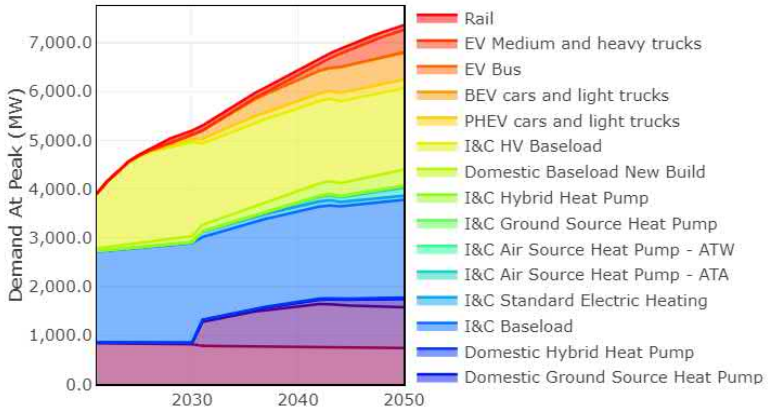
Users can see the step-change in certain load types here.

As an example, hovering over the EV Bus segment, to the **right** of the step-down shows that the peak is in **December at 20:00**.

In contrast, hovering over the EV Bus segment, to the **left** of the step-down, shows that the peak is in **July at 12:00**.

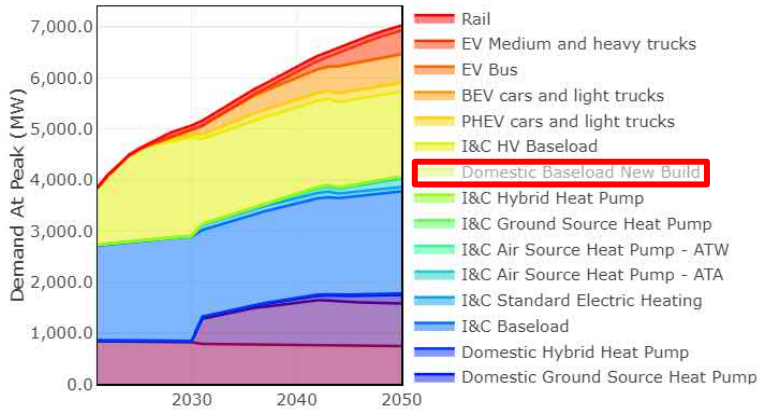
Online Platform – Graphical single- & double-click functions

Standard graphical output



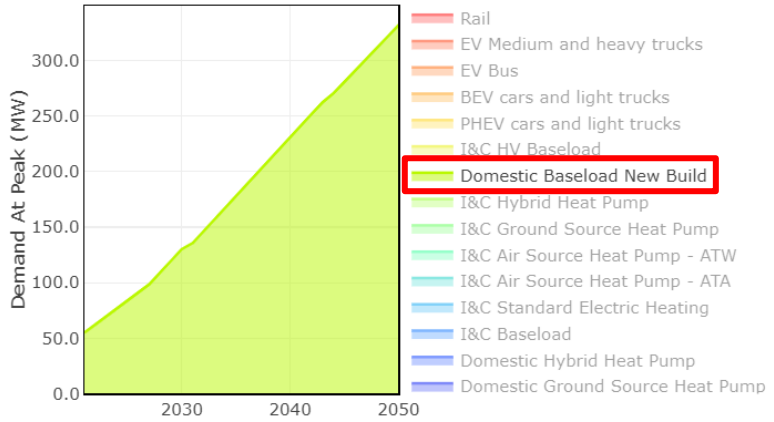
The standard graphical output displays interactive plots broken down by technology.

After a single-click on "Domestic Baseload New Build"



A single-click on one of the technologies displayed in the legend removes that technology from the plot.

After a double-click on "Domestic Baseload New Build"



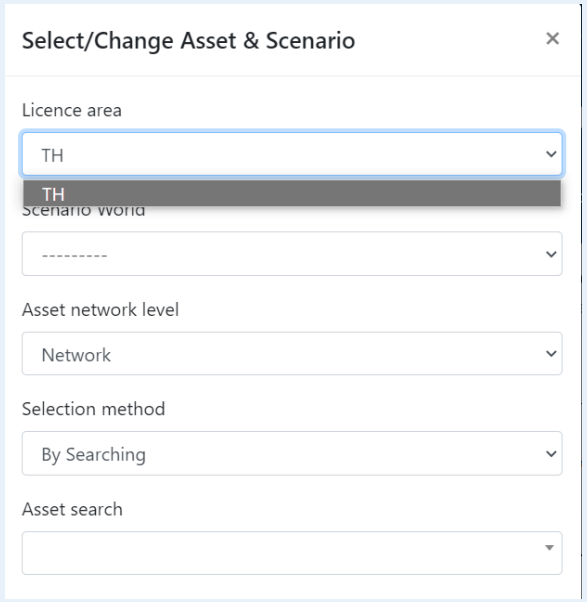
A double-click on one of the technologies displayed in the legend removes all other technologies, focusing on the chosen technology.

Online Platform – Asset Selection

Users can select/change the asset to view in the Single Asset Analysis by going through a list of dropdowns to narrow down to the desired asset for a selected scenario.

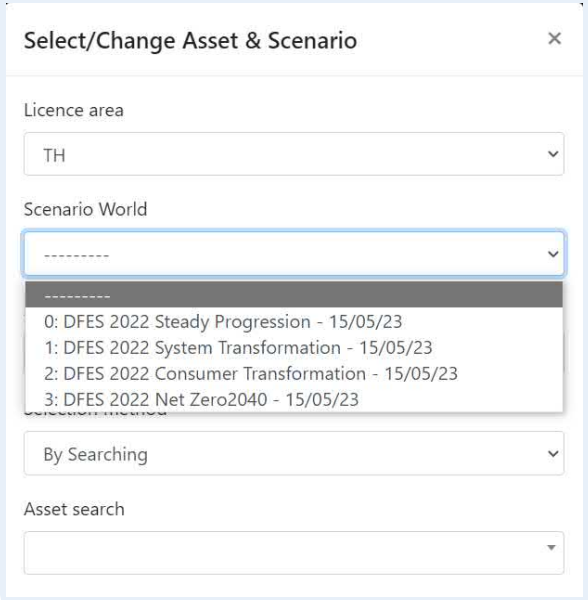
1

Select the licence area (Only TH in this case).



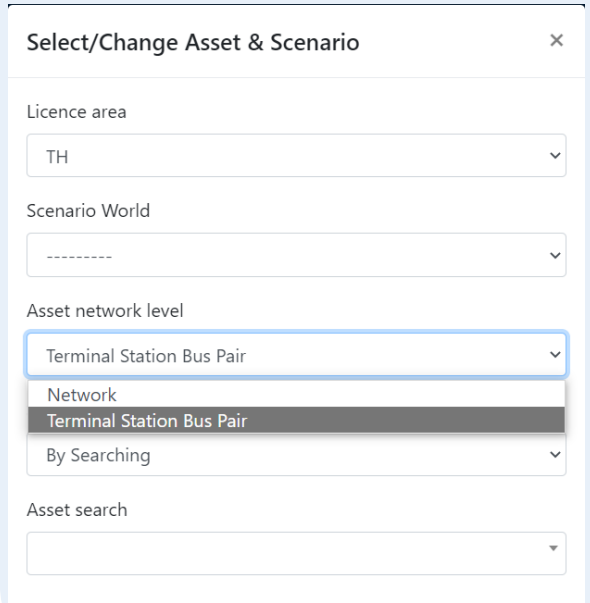
2

Select the scenario world (e.g. one of the DFES scenarios).



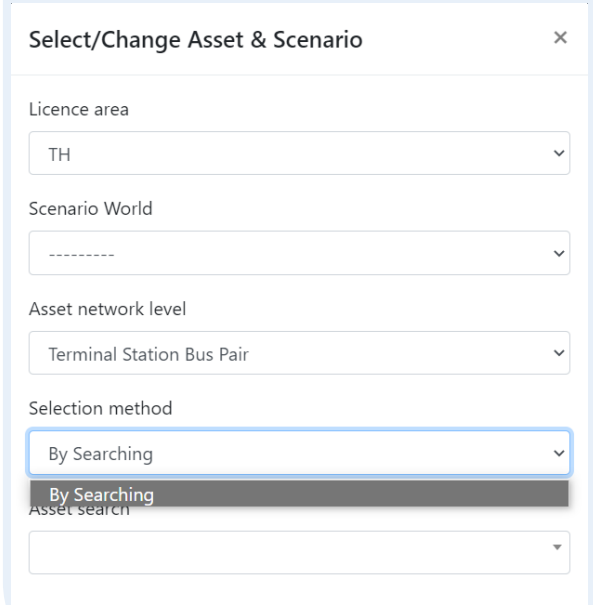
3

Select the asset network level.



4

Select the asset selection method (In this case only by searching).



Overview

FES Model Overview

Accessing the FES Model

Model Functionality

Online Platform

- Landing Page
- Scenario worlds
- Single Asset Analysis

Review of functionality

By now, FES model users should understand how to configure scenarios and run single asset calculations.

Functionality	Details
Scenario configuration	– Ability to load FES model parameters and modify them to create new custom scenarios. – Ability to view user-saved scenarios.
Single asset calculation	– Ability to run the load model for a specific asset for a given (custom) scenario. This asset can be a TS Bus Pair or the TH network. – Ability to display and manipulate interactive plots, including annual consumption forecast, peak forecast, and profiles forecast, with some broken down by technology. – Ability to download a CSV with technology counts/capacities via button.

General Information and System Availability

General Information

- TH users can access the FES model platform on **Google Chrome** or **Microsoft Explorer**.
- TH users can access the FES model via sign-in using their existing Toronto Hydro Microsoft credentials.

System Availability

- The FES model will operate continuously rather than on a start up/shut down schedule.

Contact

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RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-12

Reference: "the majority of Key Account customers surveyed have goals to reduce their net GHG emissions to zero, and expect Toronto Hydro to support them in meeting their climate objectives by ensuring that the system has capacity for growth and by providing them advisory services to support their decarbonization-through-electrification journey" [Investment Plan Section 3.1] Please provide any references that support this observation (e.g. THESL key account interactions, survey questions, etc.).

RESPONSE – PREPARED BY IRG:

Customers were asked "Does your organization have a carbon reduction program in place? Page 31 of Exhibit 1B, Tab 5, Schedule 1, Appendix A, - Customer Engagement Report, Appendix.06 – Key Accounts shows that a majority (64%) of Toronto Hydro's key account customers had "net zero" targets or carbon reduction initiatives in place at the time of the Phase I Needs and Preferences Survey consisting of:

- 38% reporting carbon reduction targets currently in place, and
- 26% reporting "net zero" targets.

Additionally, page 28 of Appendix.01 – Qualitative Research documents that many key account participants interviewed in Phase I "shared their hopes that Toronto Hydro would increase their support in helping them transition to lower or non-emitting carbon energy sources, building out more distributed energy resources (including battery storage), and enabling grid modernization, such as microgrids technologies".

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-13

Reference: Table 4 Summary Of 2025-2029 Proposed Distribution Rate Change.

QUESTION:

Please confirm that the amounts in each column of the table are incremental, i.e. incremental to previous amount changes and not a cumulative amount.

RESPONSE:

Toronto Hydro confirms the amounts in each column of the table are incremental.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-14

Reference(s): Ontario has announced plans to build 1.5 million additional homes.

PollutionProbe_IR_AppendixA_CanmetReport (Table 1, Page 10)

QUESTION (A):

a) What portion of the 1.5 million homes Ontario announced are expected to be in the THESL service territory?

RESPONSE (A):

Toronto Hydro is unable to provide a response as it cannot speculate the portion of homes to be within its service territory.

QUESTION (B) AND (C):

b) Does THESL encourage new buildings to be self-sufficient (i.e. not connect to the grid), Net Zero or net exporters to the grid? If yes, please provide the information/incentives that THESL uses to encourage this. If not, please explain why not given that it would reduce future system demand.

c) Best available information for Toronto from the Canmet ENERGY Report noted above indicate that new energy efficient home design required 78% less energy (2.6kW compared to older homes at 11.6kW). Please outline what THESL is doing to ensure that new homes align with energy efficient design and technologies.

RESPONSE (B) AND (C):

Through non-rate regulated business activities, which do not form part of this application, Toronto Hydro is playing a proactive role in supporting the realization of the City's Net Zero Strategy by

facilitating and stimulating the growth of emerging local cleantech markets. For more information, please see the latest Climate Action Plan status report.[1]

QUESTION (D):

d) Please provide an estimate of the additional demand that would occur on the THESL system if traditional design and technologies are used for new homes and buildings instead of best practice energy efficiency design and technologies.

RESPONSE (D):

Toronto Hydro is unable to undertake the detailed hypothetical analysis that is required to answer this question within the discovery timelines in this proceeding. Furthermore, Toronto Hydro notes that this analysis is not relevant and does not provide probative value to deciding the issues in this proceeding.

[1] https://www.torontohydro.com/documents/20143/193303016/climate-action-plan-2023-status-report.pdf

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-15

Reference: Investment Plan Section 4.4

"Toronto Hydro is committed to reducing its direct GHG emissions (referred to as Scope 1 emissions) in order to mitigate the impacts of climate change and reach "net zero" by 2040"

QUESTION (A):

a) Has THESL committed to a Net Zero target? If no, please provide a copy of the actual commitment and related plan. If yes, please provide a copy of the commitment and related plan.

RESPONSE (A):

Yes, Toronto Hydro has committed to achieving Net Zero by 2040. Please refer to the Net Zero 2040 Strategy in Exhibit 2B, Section D7 and information on the Emissions Reduction measure proposed for the utility's 2025-2029 custom scorecard in Exhibit 1B, Tab 3, Schedule 1.

QUESTION (B):

b) Please explain why THESL is only counting Scope 1 emissions, particularly when Scope 2 emissions are also directly related to THESL operations.

RESPONSE (B):

Toronto Hydro's Net Zero 2040 Strategy only counts Scope 1 emissions because the variability of Scope 2 emissions is influenced by factors outside of Toronto Hydro's control, such as the greenhouse gas ("GHG") emissions associated with electricity generation. For example, although Toronto Hydro reduced the amount of electricity lost from its system during distribution in 2023, net Scope 2 emissions nonetheless increased as more emissions were released during the generation of electricity in Ontario than the previous year.

Nevertheless, Toronto Hydro quantifies, reports on, and actively implements mitigation measures to reduce the portion of Scope 2 emissions the utility can influence. For example, Toronto Hydro is reducing the Scope 2 emissions associated with distribution losses by making the system more efficient through the replacement of legacy outlets and construction standards, including 4 kV distribution assets. Toronto Hydro has also implemented energy efficiency measures such as LED lighting and building automation upgrades in its work centres to minimize Scope 2 emissions associated with electricity consumption.

QUESTION (C):

c) Does THESL use lifecycle carbon (GHG) emission to analyses any of its decisions or operations? If yes, please specify.

RESPONSE (C):

Please refer to subpart (d).

QUESTION (D):

d) Please explain what specific criteria are included in the THESL procurement policies, processes and templates to consider supplier Net Zero commitment and product carbon intensity.

RESPONSE (D):

As part of competitive bidding, Toronto Hydro requires suppliers to provide information related to the efficient use of resources and energy throughout the life cycle of the goods being procured, as well as any energy, water, or fuel-saving features. Additionally, Toronto Hydro assesses new products prior to use with a view to the product's impact on the environment, identification of environmentally preferable alternatives, and end-of-life treatment. The environmental impacts to be compared across the product/service lifecycle include:

i. Waste to landfill
ii. Greenhouse gas emissions

iii. Natural resource use (i.e. if product is made of recycled materials or sustainably harvested resources)

iv. Hazardous waste generation

v. Energy use

vi. Water consumption

vii. Biodiversity (i.e. does the product/service have a negative impact on plants and animals).

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-16

Reference: Figure 6: FTE per GWh of Load Served [Investment Plan]

QUESTION:

Please provide a version of Figure 6 that also includes 2023 through 2029 forecasted data. Please also provide the input data (via Excel or other format used)

RESPONSE:

Please see below an analysis of Toronto Hydro FTE per GWh from 2015 through 2029. The data inputs relied on for FTE can be found in Toronto Hydro's Appendix 2-K, while weather normalized GWh inputs can be found on page 1 of Exhibit 3, Tab 1, Schedule 1. Toronto Hydro cannot provide a version of Figure 6 which goes beyond 2022 because this figure relies on historical RRR data for the peer group. Toronto Hydro does not have a forecast of FTE or GWh for the members of the utility peer group.

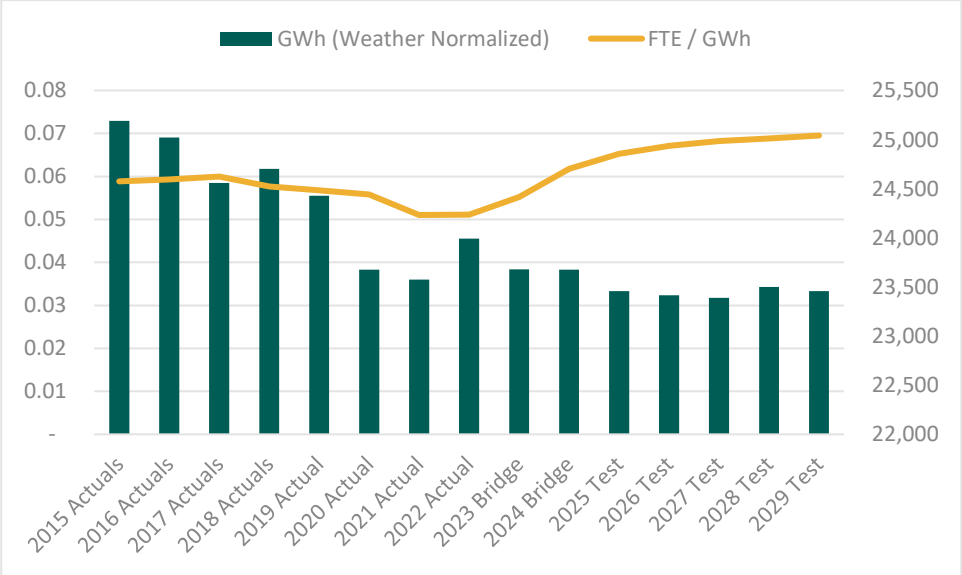

Figure 1: FTE per GWh 2015 to 2029

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-17

QUESTION:

Please explain how the proposed Advanced Distribution Management System is different than the Toronto Hydro Asset and Program Management function which are already supported and budgeted separately. Also, please provide a comparative list of the function, tasks and outcome related to each identifying which are the same or different.

RESPONSE:

The Advanced Distribution Management System ("ADMS") is a software solution that integrates and consolidates functionalities from several systems, such as Toronto Hydro's Outage Management System ("OMS") and Distribution Management System ("DMS"), which handle a wide array of mission-critical outage management and system management functions; Supervisory Control and Data Acquisition ("SCADA"), which enables real-time distribution system monitoring and control; and the Distributed Energy Resources ("DER") Management System or DERMS, which monitors and controls DERs. The primary role of ADMS is to provide power system controllers a platform to efficiently operate the distribution system and to provide the utility with a comprehensive and unified view of the state of the distribution system at any given time by acting as a central hub which pulls data from, and interacts with, this constellation of software and systems. Additional details regarding Toronto Hydro's plans for a ADMS platform are provided in Exhibit 2B, Section D5.2.1.2, and Section E8.4.

In contrast, Asset and Program Management are organizational functions that are primarily focused on strategic sustainment and development of Toronto Hydro's electricity distribution system, and oversight of work program delivery. Additional details regarding Toronto Hydro's Asset Management system are provided in Exhibit 2B, Section D1 and the OM&A expenditures to deliver on this function are discussed in Exhibit 4, Tab 2, Schedule 9.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-18

Reference: Exhibit 1B, Tab 1, Schedule 3, Page 5, Table 5

THESL has indicated that it expects significant growth due to decarbonization, the Energy Transition and related changes. However, Table 5 indicates decreasing load out to 2029. Please reconcile.

RESPONSE:

As outlined in Executive Summary, Exhibit 1, Tab 1, Schedule 1, Toronto Hydro stated that the application is being filed during a time of unprecedented change and transformation, as customers, communities and governments at all levels are actively embarking on an energy transition to mitigate the existential and economic impacts of climate change. This, by definition, requires the utility to invest ahead of load materializing.

Since 2006, Toronto Hydro has experienced a significant decrease in total consumption, including due to conservation activities – both program-driven and naturally occurring. In the early stages of the energy transition, electricity consumption is forecasted to continue to decline, then plateau, and then rise.

To protect both ratepayers and the utility from structural unknowns in forecasted costs and revenues related to demand growth in a time of unprecedented change in the economy and energy system, Toronto Hydro proposes to reconcile the demand-related program and revenue variances as part of the DRVA. As the question and Toronto Hydro both anticipate, the energy transition is more likely to lead to greater revenues, and through the DRVA, those incremental revenues will be tracked and cleared to the benefit of customers.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-19

Reference: **ScottMadden management consultant report, page 6. The report indicates that the UK and New York have created separate cost recovery mechanisms for utilities to fund innovation.**

QUESTION (A):

a) Please provide a copy of the exemplar mechanism summary/documentation links, reports or other information for the UK and New York examples referenced.

RESPONSE (A) - PREPARED BY SCOTTMADDEN:

Please refer to the links below for the UK.

1. RIIO-2 Framework Decision:

https://www.ofgem.gov.uk/sites/default/files/docs/2018/07/riio2_july_decision_document_final_300718.pdf

2. RIIO-ED2 Final Determinations :

https://www.ofgem.gov.uk/publications/riio-ed2-final-determinations

Please refer to the link below for New York.

https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BF3E72300-3F69-442A-A86D-02EB3C3E2890%7D

QUESTION (B):

b) Please provide a table comparing the main similarities and differences between the proposed THESL Innovation Fund and those of the comparator utilities mentioned in the report.

RESPONSE (B) - PREPARED BY SCOTTMADDEN:

Please refer to the table below.

Innovation Fund	Objectives	Characteristics	Cost Recovery Mechanism
THESL Innovation Fund	Facilitate innovation in the electricity sector	Innovative pilot projects over the 2025-2029 rate period that test new technologies, advanced capabilities and alternative strategies that enable electrification grid readiness and are responsive to the OEB's expectations with respect to facilitating DER integration, as expressed in the Framework for Energy Innovation (FEI) report.	Rate Rider
UK RIIO	Deliver a sustainable energy sector. Deliver value for money over the long-term for existing and future customers	**Strategic Innovation Fund**: Ambitious and Innovative projects that help shape the future of the energy networks and accelerate the transition to net zero, at lowest cost to consumers **Network Innovation Allowance**: Innovative projects that facilitate energy system transition and/or benefit customers in vulnerable situations	Included in allowed revenues in RIIO ED-2 price control period
New York REV	Test new business models and partnerships with third parties. Harness the utility platform, expertise, and brand to reduce clean energy costs and barriers while potentially providing new utility value streams	Demonstration Projects that include partnerships between utilities and third-party service providers; deploying advanced distribution systems and explore opportunities to work with various types of customers.	Rate Rider
Nova Scotia	Allow for testing to provide valuable data and learnings, or aid in the development of business cases, prior to full-scale deployment	Projects that provide customer value in some or all of the following areas: 1) Reduce upward pressure on revenue requirement; 2) Provide reliability and grid stability; 3) Support environmental and other government policy compliance; 4) Improve customer experience	Rate Rider
California EPIC	Fund public investments in research to create and advance new energy solutions, foster regional innovation, and bring ideas from the lab to the marketplace	Projects that support one or more of the following goals: 1) Transportation electrification; 2) Distributed energy resource integration; 3) Building decarbonization; 4) Achievement of 100% net-zero carbon emissions and coordination of the role of natural gas; 5) Climate Adaptation	Rate Rider

Toronto Hydro's proposed Innovation Fund is similar to the electric utilities referenced in the report, including the objectives, characteristics, and cost recovery mechanisms.

QUESTION (C):

c) Please confirm that there are no Ontario or Canadian utilities examples that the consultant has identified for comparison. If there are, please provide details.

RESPONSE (C) - PREPARED BY SCOTTMADDEN:

The report includes Nova Scotia. Please refer to Exhibit 1B, Tab 2, Schedule 1, Appendix B, p. 41.

QUESTION (D):

d) Have the example jurisdictions/utilities noted above been used for any of the other benchmarking reports THESL filed in this application? If yes, please indicate which ones.

RESPONSE (D) - PREPARED BY SCOTTMADDEN:

ScottMadden did not review the other benchmarking reports THESL filed in this application.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-20

Reference: Exhibit 1B, Tab 3, Schedule 1, Page 7, Table 1: 2025 - 2029 Performance 1 Incentive Scorecard Measures

QUESTIONS (A) – (B):

a) Please provide a copy of Table 1 noted above and include extra columns to indicate:

- Is the metric existing or new.
- If it is an existing metric, please provide the previous target and actual.
- If it is a new metric, please indicate the average actual based on the current term (2020-2024) data.
- The total $ payout per item if THESL hits the target
- The total net benefit ($) per item if the target is achieved (i.e. the total net benefit before the THESL payout)

b) Please confirm if the proposed payout per metric is 'all or nothing' based on hitting the target or some sort of sliding scale.

RESPONSE (A) – (B):

Please see the responses to 1B-Staff-46, 1B-Staff-52 and 1B-Staff-54.

QUESTION (C):

Will THESL commit to a third-party audit of results prior to any scorecard payout? If not, why not?

RESPONSE (C):

Toronto Hydro does not believe that a third-party audit of results is necessary because (1) the utility has mature processes for reporting performance as part of RRR and the EDS and (2) OEB Staff and

interested parties will be able to test the results through the discovery process in the utility's next rebasing application.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-21

Reference: Exhibit 1B, Tab 3, Schedule 1

Preamble:

For the benefits that can be quantified however, the Investment Plan and Custom Scorecard that underpin the PIM, yields nominal customers benefits that range from approximately $90 million and $216 million over the 2025 to 2029 period, and lifetime benefits in the range of $890 million to over $1.23 billion, as detailed in section 3 below.

QUESTION:

Please provide the breakdown of values and math used to calculate the customer benefit ranges of:

- $90 million
- $216 million
- $890 million to $1.23 billion

RESPONSE:

Please see Table 21 at page 57 of Exhibit 1B, Tab 3, Schedule 1.

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-22

Reference: Exhibit 1B, Tab 3, Schedule 3, Appendix C

QUESTION (A):

a) Please provide a copy of the following graphs with the specific utilities labelled for each bar on the x-axis (i.e. only Toronto Hydro is noted and not the specific utilities being compared in the graphs)

i. Figure II-1: Customer Density

ii. Figure II-2: IBEW Average Annual Wage

RESPONSE (A) PROVIDED BY UMS GROUP:

Acknowledging that this information was not used as normalizers in the quantitative benchmark, the following charts are provided (See Figure 1 and 2 below). In consideration of our commitment to anonymity to the study participants (as a condition of participation), we must adhere to the alphabetical designations used throughout the study.

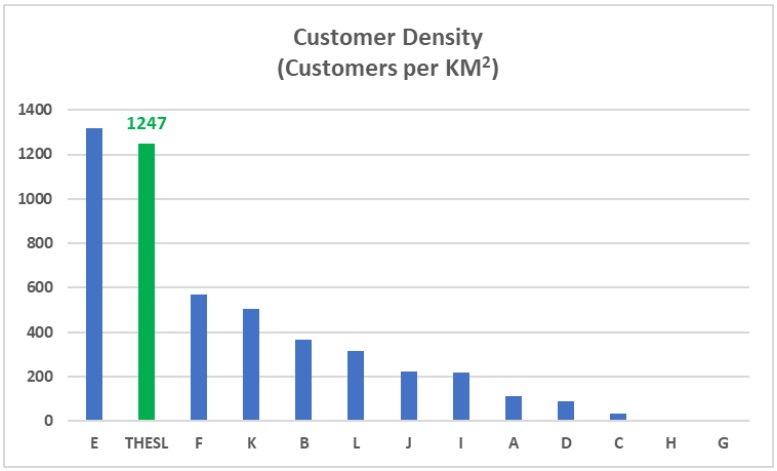

Figure II-1: Customer Density

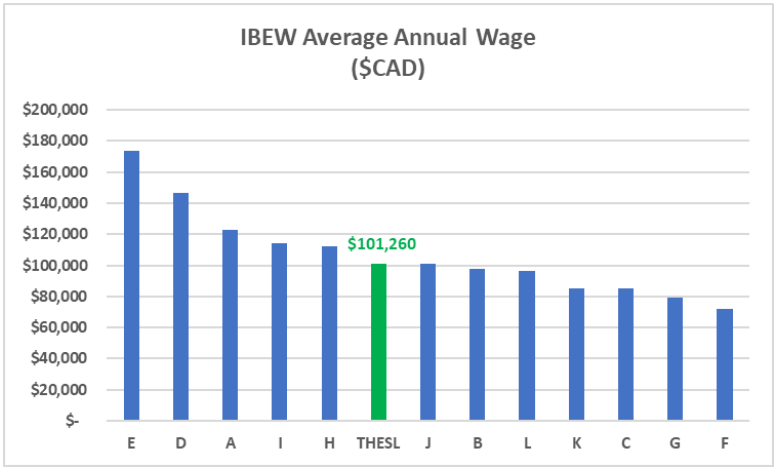

Figure II-2: IBEW Average Annual Wage

QUESTION (B):

b) Please explain how the Peer Group Panel was selected and what characteristics (e.g. population size, rate base, capital envelope, number of assets, etc.) the Peer Group shares with Toronto Hydro.

RESPONSE (B) PROVIDED BY UMS GROUP:

As stated in the Section III – Project Approach (Peer Group Panel) of the referenced UMS Group Benchmarking Study, UMS Group sought to provide comparisons that would be relevant to THESL's operating environment:

- Focusing first on other Province of Ontario electric distribution systems / organizations, we narrowed our consideration to those serving more than 75,000 customers, thus providing nine candidates for further review. UMS Group then compared these utilities relative to 10 data sets presented in the Ontario Energy Board ("OEB") data provided as part of the Activity and Program-based Benchmarking Initiative. (Refer to Appendix B, Figure B-3, and prefacing discussion for a listing of the 10 data sets and a summarization of the analysis). In so doing, we identified Alectra Utilities, Hydro Ottawa, Elexicon Energy, and London Hydro as possible comparators. All four were invited to participate, with Elexicon Energy and London Hydro providing input.

- In parallel, UMS Group reached out to the utilities that had participated in the previous application (EB-2018-0165) and was successful in enlisting the participation of eight (the remaining balance of nine cited varying more pressing priorities amidst constrained resources as their reason for declining participation). Two additional utilities that had been invited but declined last time accepted this time around: Avista Utilities and a Canadian utility that requested anonymity as a precondition to participation. As stated in the Executive Summary of the referenced benchmarking study, these utilities were deemed as valid comparators 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).

To substantiate the appropriateness of the resulting Peer Group Panel, Table III-1 in Section III – Project Approach of the referenced benchmarking study shows that THESL aligns with most members of the Peer Group across four of five external factors that our experience deems most impactful to worker productivity.

QUESTION (C):

c) UMS indicates that Hydro One was excluded because it is not a representative peer for Toronto Hydro. Please confirm and explain why London Hydro is a more appropriate peer than Hydro One for Toronto Hydro.

RESPONSE (C) PROVIDED BY UMS GROUP:

With respect to electric distribution, Hydro One is viewed as predominantly rural, not subject to issues of utility, building, and population congestion, nor the same types of ordinances that can affect productivity. However, we wanted to include other Ontario Utilities, so solicited participation from others deemed as better comparators, notably Alectra, Elexicon, London Hydro, and Hydro Ottawa. Neither Alectra nor Hydro Ottawa were able to support the effort, citing resource constraints due to other overriding priorities.

QUESTION (D):

d) Please explain why Ontario peer utilities (most comparable to Toronto Hydro like Alectra) were not included in the study.

RESPONSE (D) PROVIDED BY UMS GROUP:

Please see the response to part c above. Other Ontario Utilities were solicited, but two (including Alectra) opted out, citing resource constraints due to other overriding priorities.

QUESTION (E):

e) Please explain why UMS included one Anonymous peer in the study analysis rather than excluding that utility, given that there would be no ability to ensure an Anonymous utility is an appropriate benchmark.

RESPONSE (E) PROVIDED BY UMS GROUP:

Though one step further than the norm in maintaining confidentiality (utilities typically accept the notion of an alphabetic designation as sufficient), we did not view the Anonymous Utility as an invalid data point for the task at hand. In fact, it corresponded quite well to the criteria described above and provided us with another Canadian Utility.

QUESTION (F):

f) Please confirm how the study finding would be impacted if the Anonymous utility peer is excluded.

RESPONSE (F) BY UMS GROUP:

While we consider it appropriate to include the anonymous utility, we have assessed the impact of excluding it, as requested. As changes are noted within each Asset Category and Maintenance Program, the general theme underlying Table II-1 in Section II – Executive Summary of the referenced benchmarking study remains intact with the following highlighted (underlined in italic) adjustments:

Generally, THESL is positioned within each of the categories and programs between approximately *2.3% above (previously 1.9% above)*, the Median (barely third quartile) to negative 12.2% below the Median (well-embedded in the second quartile) when combining both benchmarking perspectives.

Table II-1: Benchmark Comparisons ($CAD)

Applying Conversion and Accounting Adjustments Only (Less Anonymous Utility)

			Median	Percent from Median
Asset Categories				
Wood Pole	Each	$8,317	8,134	2.3%
UG Cable (XLPE)	Per Meter	$131	128	2.0%
Pole Top Transformer	Each	$18,691	18,691	0.0%
Pad mount / UG Transformer	Each	$37.373	36,643	2.0%
Network Transformer / Protector	Each	$127,649	129,169	-1.2%
Breaker	Each	$37,983	40,722	-6.7%
Cable Chambers / Manholes	Each	$136,409	135,579	0.6%
Maintenance Programs				
Vegetation Management	Per Line KM	$2,175	2,175	0.0%
Pole Test and Treat	Each	$17	18	-2.0%
Overhead Line Patrol	Per Line KM	$23	26	-12.2%
Substation Maintenance	MVA	$1,712	1,681	1.9%
Building Vault Inspection	Each	$258	268	-3.9%

RESPONSES TO POLLUTION PROBE INTERROGATORIES

INTERROGATORY 1B-PP-23

Reference: Exhibit 1B, Tab 3, Schedule 3, Appendix C, Table D-1

QUESTION (A):

a) Does the list of utilities in Table D-1 represent the full list of current utility data sets UMS has available? If not, please provide the full list.

RESPONSE (A) PROVIDED BY UMS GROUP:

UMS Group does not maintain datasets for unit costs, and those from previous studies are outdated and not reflective of the new market realities resulting from inflation, supply chain challenges, and COVID-related restrictions (only recently being lifted across the industry). Therefore, in embarking on "one-off" studies like that performed for THESL, UMS Group leverages (1) existing relationships (formed over the past 34 years since its inception) to recruit a Peer Group Panel, and (2) the tested and industry accepted comparative modeling and supporting methodologies.

QUESTION (A):

b) Please explain why ATCO Electric was not included as a Peer utility.

RESPONSE (B) PROVIDED BY UMS GROUP:

We contacted ATCO Electric to no avail. We understand that resource constraints amidst other more urgent priorities precluded their participation.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-01

Reference: Exhibit 1B

Please update the following to include 2023 actuals:

a. Ex.2A-1, p.2, Table 1 and 2
b. Appendix 2-AA
c. Appendix 2-AB
d. Ex.2A-1-1, Appendix A
e. Appendix 2-BA
f. Appendix 2-H
g. Appendix 2-IB
h. Appendix 2-JC

RESPONSE:

a) Please see Table 1 for updated 2023 actuals and 2024 forecast. Toronto Hydro intends to file an update to 2025-2029 forecasts for Table 2 prior to the Technical Conference.

Table 1: 2020-2024 Rate Base Summary ($ Millions)

	OEB Approved	Actuals				Bridge
	2020	2020	2021	2022	2023[1]	2024
Opening PP&E NBV	4,229.4	4,233.2	4,419.2	4,628.1	4,893.9	5,227.4
In-Service Additions[2]	527.4	447.9	485.2	554.4	594.7	619.8

[1] Includes a preliminary estimate of Working Capital Allowance. The finalized amount will be filed for the 2023 reporting year on April 30, 2023 per RRR Filing Guide
[2] Includes disposal of properties

Depreciation	(265.4)	(262.0)	(276.2)	(288.7)	(261.2)	(277.8)
Closing PP&E NBV	4,491.3	4,419.2	4,628.1	4,893.9	5,227.4	5,569.4
Monthly Avg PP&E NBV	**4,298.6**	**4,284.3**	**4,457.7**	**4,686.3**	**4,960.0**	**5,327.0**
Working Capital Allowance	216.2	249.8	217.2	220.7	216.8	230.3
Rate Base	**4,514.8**	**4,534.1**	**4,674.9**	**4,907.0**	**5,176.8**	**5,557.3**

b) Please see Toronto Hydro's response to interrogatory 2A-Staff-104, Appendix A, for updates for 2023 actuals and updated 2024 forecast in Appendix 2-AA.

c) Please see Toronto Hydro's response to interrogatory 2A-Staff-104, Appendix B, for updates for 2023 actuals and updated 2024 forecast to Appendix 2-AB.

d) Please see Appendix A to this response for updates to Exhibit 2A, Tab 1, Schedule 1, Appendix A for 2023 actuals and 2024 forecast update

e) Please see Appendix B to this response for updates to Appendix 2-BA for 2023 actuals and updated 2024 forecast.

f) Please see Appendix C to this response for updates to Appendix 2-H for 2023 actuals.

g) The request entails complex modelling to update the load forecast to include 2023 as a historical actual year and the regression equations to forecast 2024 to 2029. Toronto Hydro is unable to undertake the detailed modelling required to update the OEB model within the interrogatory timelines. However, as noted in the letter filed with its Evidence Update on January 29th, Toronto Hydro intends to update this model to reflect 2023 actuals and the updated 2025-2029 forecast on April 2nd prior to the Technical Conference.

h) Please refer to Toronto Hydro's response to interrogatory 4-SEC-89, subpart (c).

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-2

Reference: Exhibit 1B

QUESTION:

Please provide a copy of Toronto Hydro's most recent business plan.

RESPONSE:

The requested information is provided as part of the response to 1A-CCC-04.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-3

Reference: Exhibit 1B

QUESTION:

Please provide a copy of Toronto Hydro's corporate scorecard for each year between 2020 and 2024 and provide the year-end result for each measure.

RESPONSE:

Please see Tables 1-4 below. Please note that Toronto Hydro's performance metric definitions and scope may differ from those outlined in regulatory and/legislative reporting. Furthermore, the scorecard for 2024 has not been provided as the year end results are not yet available.

Table 1: 2020 Corporate Scorecard

Key Performance Indicator	2020 Target	2020 Result
New Services Connected on Time	97.7%	99.7%
Estimated Time of Restoration	60%	89%
First Contact Resolution	86%	92%
Total Recordable Injury Frequency (TRIF)	1.3	0.58
Employee Engagement	5.5	9.0
SAIFI (number)	0.50	0.40
SAIDI (minutes)	26.47	21.82
In-Service Assets ($M)	423.1	438.0
Consolidated Net Income ($M)	146.9	156.0
Cash Flow Management ($M)	1,000.0	360.0

Table 2: 2021 Corporate Scorecard

Key Performance Indicator	2021 Target	2021 Result
New Services Connected on Time	98.0%	99.9%
Estimated Time of Restoration	75%	90%
First Contact Resolution	86%	91%
Total Recordable Injury Frequency (TRIF)	1.15	0.56
Employee Engagement	7.0	9.4
SAIFI (number)	0.50	0.46
SAIDI (minutes)	26.47	21.35
In-Service Assets ($M)	420.8	452.3
Consolidated Net Income ($M)	140.2	156.8
Cash Flow Management ($M)	469.0	325.0

Table 3: 2022 Corporate Scorecard

Key Performance Indicator	2022 Target	2022 Result
New Services Connected on Time	98.0%	99.9%
Estimated Time of Restoration	85%	94%
First Contact Resolution	86%	92%
Total Recordable Injury Frequency (TRIF)	1.1	0.47
Employee Engagement	7.5	10.9
SAIFI (number)	0.50	0.46
SAIDI (minutes)	26.47	20.38
In-Service Assets ($M)	460.0	450.5
Consolidated Net Income ($M)	156.0	165.7
Cash Flow Management ($M)	532.0	655.0
Fleet Electrification	5%	9%
Building Emissions Reduction	2213.6	2001.2

1 **Table 4: 2023 Corporate Scorecard**

Key Performance Indicator	2023 Target	2023 Result
New Services Connected on Time	98.0%	99.9%
Estimated Time of Restoration	85%	96%
First Contact Resolution	86%	92%
Total Recordable Injury Frequency (TRIF)	1.00	0.30
Employee Engagement	8.0	10.5
SAIFI (number)	0.50	0.33
SAIDI (minutes)	26.47	15.07
In-Service Assets ($M)	499.7	507.1
Consolidated Net Income ($M)	133.0	139.9
Fleet Electrification	13%	20%
Building Emissions Reduction	2191.5	1657.2

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-4

Reference: Exhibit 1B

Please provide a copy of all materials provided to the Toronto Hydro's Board of Directors' in seeking approval of the application and the underlying budgets.

RESPONSE:

Please see the Toronto Hydro's response to 1A-CCC-01.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-5

Reference: Exhibit 1B

QUESTION:

Please provide a copy of all third-party benchmarking analyses, studies, reports, and/or similar documents, undertaken for, by, or that include Toronto Hydro, since 2020, that are not already included in this application, regarding any aspect that directly or indirectly relates to a material aspect of Toronto Hydro's budget or aspect of its business.

RESPONSE:

Please see the table below for a list and description of the requested information. Toronto Hydro is filing the following reports as appendices to this response.

Third-Party Benchmarking	Description	Appendix
THESL Fleet Benchmarking Findings and Recommendations	METSCO performed an industry research scan to help THESL determine how its indicators compared to other electric utilities across North America as well as determine if there are any additional metrics it should be tracking.	A
THESL Fleet EV Benchmark Addendum	June 2023 Addendum completed by METSCO of THESL's fleet benchmarking.	B
Toronto Hydro - Executive Compensation Review Summary Results	Mercer (Canada) Limited assessed the competitiveness of Toronto Hydro's executive compensation.	C

Third-Party Benchmarking	Description	Appendix
SGIN-Utility-Scorecard-Results_2023-12-19	Smart Grid Innovation Network (SGIN) smart energy bookmarking initiative benchmarked 12 electric utilities' current state (baseline year 2021) in the clean energy transition.	D

Toronto Hydro is in the process of obtaining disclosure consent from the third parties that authored the reports referenced below, and will file the reports as appendices to this response as soon as reasonably possible.

Third-Party Benchmarking	Description
2021 Utility Grid Modernization Benchmark Study	Accenture developed a benchmarking study for another utility to understand the current grid modernization maturity landscape. As a participant in the benchmarking study, Toronto Hydro received a copy of the report.
Grid Modernization Benchmarking Results	Accenture developed a benchmarking study for another utility to understand the current grid modernization maturity landscape. As a participant in the benchmarking study, Toronto Hydro received a copy of the report and Toronto Hydro's responses to the survey.
Final Report May 2022 Toronto Hydro Fleet Vehicle Key Metric Benchmarking Study	Fleet Challenge Canada Inc. completed a fleet vehicle key metric benchmarking study to explore new and additional key metrics to accelerate, expand and build on Toronto Hydro's capacity to measure the performance of its fleet.
THESL Auto FLISR Assessment – Presentation	TRC Companies, Inc. completed an assessment to identify key aspects, risks and mitigations for fault location, isolation, and service restoration (FLISR), with a final report and presentation.
THELS Auto FLISR High-Level Assessment	TRC Companies, Inc. completed an assessment to identify key aspects, risks and mitigations

Third-Party Benchmarking	Description
	for fault location, isolation, and service restoration (FLISR), with a final report and presentation.
Toronto Hydro ESG Disclosure Maturity Assessment	PwC Canada conducted a review to help Toronto Hydro understand its overall ESG disclosure maturity, including a current state assessment and comparative analysis of disclosed leading practices.

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Toronto Hydro-Electric System Limited
EB-2023-0195
Interrogatory Responses
1B-SEC-5
Appendix A
FILED: March 11, 2024
(37 Pages)

THESL Fleet Benchmarking

April 2023



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AGENDA

- Executive Summary
- Ontario Peer Fleet Benchmark
- North America Benchmark

DRAFT

Summary

Need: THESL relies on its vehicle fleet to perform electricity distribution activities safely and efficiently. The Fleet & Facilities team justifies the prudency of the program, with the aim of ensuring reliable vehicle operation and managing assets at the lowest overall lifecycle costs.

Analysis: METSCO performed an industry research scan to help THESL determine how its indicators compared to other electric utilities across North America as well as determine if there are any additional metrics it should be tracking.

Output: The output of the analysis was structured within four categories: utility service metrics, fleet maintenance/utilization metrics, fleet expenditure metrics and additional supporting metrics. METSCO's conducted research was unable to conclusively determine whether THESL's fleet program is suitable for its intended purpose. However, the research suggests that THESL's fleet size may be insufficient to efficiently serve its entire circuit line compared to other similar companies.

Next Steps: THESL's fleet management team can consider the analysis and output of the benchmark into its upcoming CIR narrative in order to justify the prudency of its overall fleet program.

DRAFT

Project Approach

- In collaboration with THESL, utility characteristics were identified for THESL to inform selection of peer utilities.

- The count of peer utilities and grouping was established at the beginning of the project. Peer utilities were separated into two regions:
  - **Ontario region**: Hydro Ottawa, Hydro One, Alectra, and Elexicon.
  - **North America region** (excluding Ontario): Three anonymized utilities (two from Canada and one from the United States).

- METSCO categorized its analysis to the following KPI categories:
  - **Utility Service Metrics:** such as number of customers, number of fleet vehicles, customer growth projections and general service characteristics such as size of service territory, customer density, vehicle density, and length of underground cables.
  - **Fleet Maintenance / Utilization Metrics:** such as maintenance and repair timelines, average lifecycle per vehicle type, optimal lifecycle per vehicle type, and average kilometers driven per vehicle type.
  - **Fleet Expenditure Metrics:** such as annual fleet OM&A expenditure, OM&A per vehicle, annual CAPEX, CAPEX per vehicle, and forecast comparisons.
  - **Additional Support Metrics:** additional support metrics identified through the research that did not fit with the above categories. These KPIs are utilized by other peers that THESL may consider as part of its Fleet Management program.

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Benchmark Limitations

- There were challenges encountered while attempting to find fleet management programs to compare with THESL's fleet:
  - Limited standardization of disclosed metrics across utilities. This was more evident across North American peers versus Ontario peers.
    - The evidence presented in the last DSPs of HONI and Hydro Ottawa indicates that there are variable fleet benchmarks, and the metrics favor their own performance.
  - Ontario DSPs are filed at different time periods so fleet programs are captured at different time snapshots
  - Utility methodologies are not standardized or publicly available.
  - Little information available with respect to fleet metrics across North American utilities, which limited selection of peers to those who had statistics available.
  - Limited information available in terms of annual OM&A expenditures.
  - Large range of benchmark statistics a result of limited analytical capacity outside the utilities selected.

- The benchmark limits additional factors in the analysis, though they can be inferred through the presented information:
  - Climate/weather impacts on vehicles.
  - Road conditions and the associated impacts on vehicle wear and tear.

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Utility Service Metrics

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Taking into consideration THESL's fleet size, customer count, service area and underground line:

- THESL's fleet serves the most customers per vehicle compared to peers.
  - This may indicate THESL's fleet size is undersized for the customer count.
- THESL's fleet has the highest vehicle density among its peers.
  - It is possible that the fleet size of THESL is larger than necessary for the area covered by the fleet program.
- THESL's fleet serves the highest underground cable (and total circuit length) per vehicle compared to the average of peers.
  - This may indicate THESL's fleet size is undersized for servicing it's system.

Grouping	Customers per Vehicle	Sq. KM per Vehicle	UG Cable (KM) per Vehicle	Total Circuit Length (KM) per vehicle
THESL	2,030.1	1.6	35.4	75.2
Ontario Peer Average (excluding HONI)	1,519.4	42.4	31.3	48.5
Ontario Peer Average (including HONI)	1,183.3	32.6	23.8	40.2
Select North American Peers	1,041.2	142.0	5.2	-

Note: values include all vehicle types

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Maintenance/Utilization Metrics

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The following observations are made for THESL's maintenance metrics:

- Peers use a 'Medium Duty' class whereas THESL does not and is absent from the table.
- Peers outside Ontario disclose only year values versus kilometer.
- THESL's light and heavy vehicle class has a high year-low kilometer pairing whereas its peers exhibit the reciprocal.
    - No evidence was found to indicate which pairing is optimal for managing a fleet program or identifying if a fleet program is right-sized for its intended system.

Grouping	Light Duty		Heavy Duty	
	Yrs	KM	Yrs	KM
THESL	8.6	136,000	12.5	200,000
Ontario Peer Average (excluding HONI)	7.3	183,000	11.8	300,000
Ontario Peer Average (including HONI)	7.5	182,500	11.8	312,500
Select North American Peers	8.2	-	10.8	-

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Fleet Expenditure Metrics

Taking into consideration THESL's annual CAPEX program for its fleet:

- THESL has the highest CAPEX intensity among its peers, excluding HONI, and this CAPEX has the most significant impact on its customers.
- Compared to utilities outside of Ontario, THESL has a lower CAPEX impact on its customers. However, the annual CAPEX programs of these peers are almost three times higher than THESL's due to the larger customer and service area they serve.
  - It is uncertain whether THESL's fleet CAPEX is excessive or insufficient, but the presented averages suggest that THESL's program may be somewhat higher than that of its Ontario counterparts.

Grouping	Annual CAPEX	CAPEX per Customer (Forecast)	CAPEX per Vehicle (Forecast)
THESL	$8,900,000	$11.33	$22,998
Ontario Peer Average (excluding HONI)	$4,131,000	$7.93	$12,222
Ontario Peer Average (including HONI)	$9,658,000	$10.50	$9,963
Select North American Peers	$25,504,500	$19.25	$7,029

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Additional Support Metrics

- METSCO's research revealed various fleet metrics and KPIs, but it is unclear whether all of them are reported or utilized to inform fleet management programs.
- METSCO has suggested a set of KPIs for THESL to consider incorporating, but it may not be feasible to compare THESL's performance against its peers using these KPIs.

	Cost	Safety	Environmental	Service
Peer Identified	- Annual OM&A	- Route Adherence (comparing routes driven with optimal routes) - Mean Km Between Defect - Preventative Maintenance Compliance	- Avg. Fuel Efficiency per Vehicle Type (L/ 100km) - Avg. Energy Efficiency (kWh/km)	- Duty Cycle – average daily mileage and maximum daily mileage of existing fleet - Total Charging Energy Requirement - Summer vs. Winter kWh/km - Vehicle Equivalency: Weighting factor based on expected labour hour requirements

DRAFT

Recommendations

Based on the aforementioned metrics, it is inconclusive with the available information that THESL's current fleet program is fit-for-purpose. The following has informed this opinion:

- However, the research suggests that THESL's fleet size may be insufficient to efficiently serve its entire circuit line compared to other similar companies.
- Although THESL has a high density of customers and customer count per vehicle, their service territory is relatively small and contiguous, which suggests that their vehicles may accumulate less mileage. This is supported by the fact that they have a lower number of square kilometers per fleet vehicle compared to other utilities.
- When compared to North American peer utilities, THESL's capital expenditure per fleet vehicle is relatively high, which is likely due to necessary fleet replacement, upgrading, and procurement from the varying traffic patterns THESL is exposed to versus its peers.

At the same time, our analysis suggests THESL can consider the following:

- Some peers have different lifecycles for their vehicles compared to THESL. THESL's optimal lifecycle configurations may need revision or re-examination through annual equivalent cost metrics considering their fleet replacement strategy.
- To improve their fleet asset lifecycles, it may be beneficial for THESL to reevaluate their fleet maintenance and replacement schedules, as they currently have longer timelines than most of their Ontario peers. Shortening these timelines could potentially have a positive impact.
- It may be beneficial for THESL to explore the feasibility of incorporating additional KPIs in order to enhance and optimize their fleet management program to better serve their unique operating area.

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Ontario Peer Fleet Benchmark

Ontario Utility Baseline Analysis

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	# of Vehicles	# of Customers
THESL	387	785,667
Hydro Ottawa	277	353,315
Hydro One	8,227	1,439,974
Alectra	560	1,069,683
Elexicon	125	171,564

- Note: Hydro One stats cover both distribution and transmission.
- THESL's fleet count is 30% lower than the highest distribution-only utility - Alectra.
- THESL's customer count is third lowest of the Ontario peers.

Source: **2021 Electric Utility Yearbooks / DSP Submissions**
Ontario Energy Board. (2023). *Natural gas and electricity yearbooks* [Data]. https://www.oeb.ca/ontarios-energy-sector/performance-assessment/natural-gas-and-electricity-utility-yearbooks

Ontario Utility Service Analysis

	Service Area (Sq. KM)	Urban Service Area (%)	Customers per Sq. KM	Customers per Vehicle	Sq. KM per Vehicle
THESL	630	100%	1247.09	2030.1	1.63
Hydro Ottawa	1,116	40.7%	316.59	1275.5	4.03
Hydro One	961,154	0.1%	1.50	175	3.4
Alectra	1,923	42.8%	556.26	1,910.1	6.3
Elexicon	788	79.6%	217.72	1,372.5	116.8

- THESL has the highest density of customers (2.25 x higher than Alectra, almost 4x higher than HOL)
- THESL is only utility with a 100% urban service area – Elexicon is second with urban service area of 79.6%
  - One could argue that stop-and-go traffic occurs more frequently in urban areas than in rural areas.
  - The performance of a vehicle is more affected by stop-and-go traffic.
  - Higher maintenance costs can result from the impact of stop-and-go traffic on vehicles.
- THESL has the highest customers per vehicle - 71% more than the average of peers, 34% higher if Hydro One is excluded.
- THESL has lowest service area per vehicle (excluding Hydro One, outperforms peer average by 57%)

DRAFT

Source: **2021 Electric Utility Yearbooks**
Ontario Energy Board. (2023). *Natural gas and electricity yearbooks* [Data]. https://www.oeb.ca/ontarios-energy-sector/performance-assessment/natural-gas-and-electricity-utility-yearbooks

Ontario Utility Service Analysis

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- THESL's underground cable circuit length is second highest (2.6x more on average than peers).
  - Second highest length of underground cable per vehicle
- A similar observation can be made with the total circuit length per vehicle – THESL is on the higher end of the spectrum which may indicate its fleet is undersized to meet the requirements of the system.

	UG Cable Circuit Length (KM)	Total Circuit Length (KM)	Underground Line (KM) per Vehicle	Total Circuit Length (KM) per Vehicle	Underground / Total Line (%)
THESL	13,681	29,087	35.4	75.2	47%
Hydro Ottawa	3,234	6,000	11.7	21.7	54%
Alectra	37,104	51,872	66.3	92.6	72%
Elexicon	1,970	3,919	15.8	31.4	50%
Hydro One	10,432	124,556	1.3	15.1	8%

Source: **2021 Electric Utility Yearbooks**
Ontario Energy Board. (2023). *Natural gas and electricity yearbooks* [Data]. https://www.oeb.ca/ontarios-energy-sector/performance-assessment/natural-gas-and-electricity-utility-yearbooks

Ontario Utility Service Analysis

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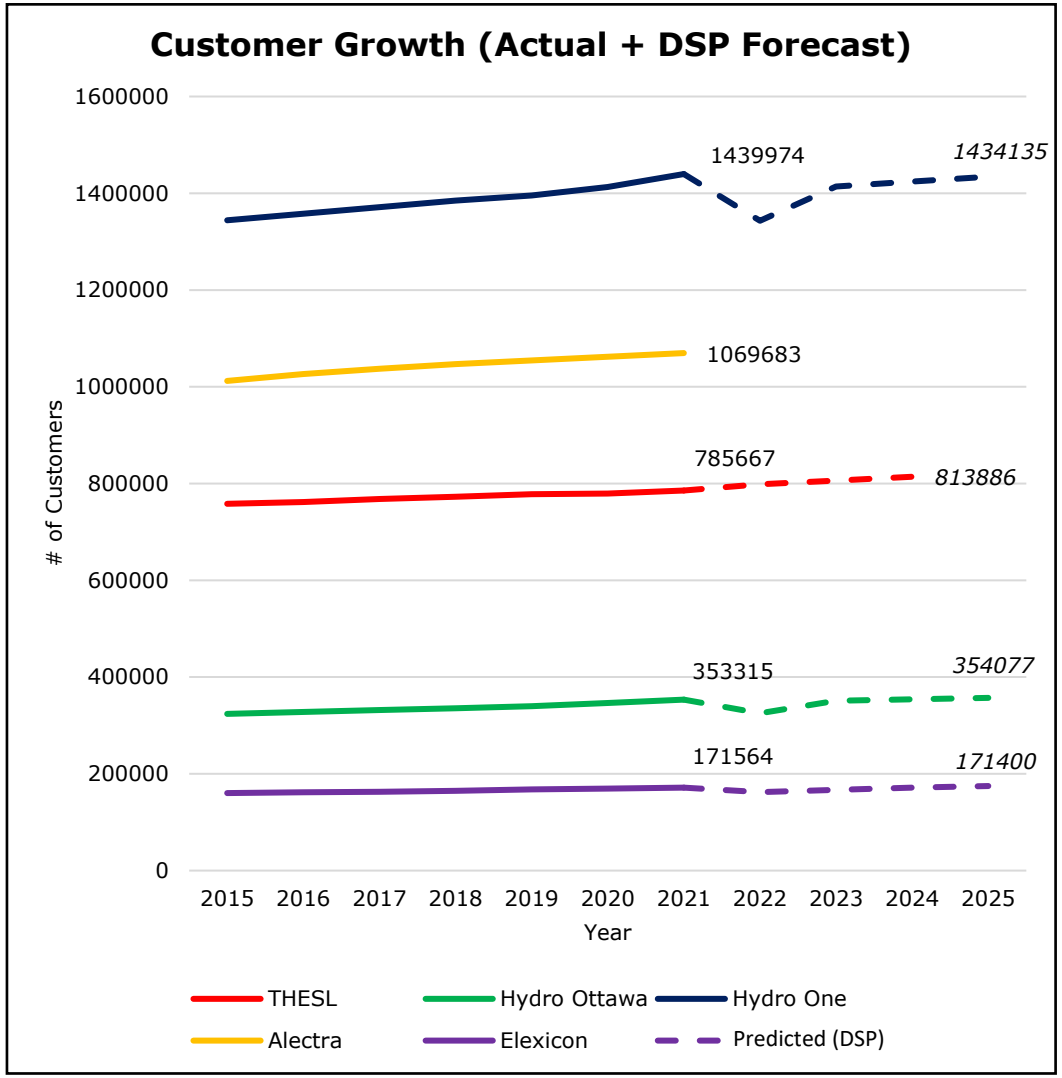
- THESL had lowest average annual growth of all peer utilities
- Based on DSP forecasts, THESL's customer per vehicle ratio would increase to 2103 without the addition of extra vehicles
  - THESL vehicle count would need to rise to 400 (+13) to maintain current customer per vehicle ratio.



	Bridge Year	Yearly Average Growth (Actual)	Forecasted Customer per Vehicle (2024)
THESL	2018-2019	0.59%	2103
Hydro Ottawa	2020	1.46%	1278
Alectra	2019	0.93%	N/A
Elexicon	2021	1.14%	1371
Hydro One	2022	1.15%	173

Source: **2021 Electric Utility Yearbooks / DSP Submissions**

Ontario Energy Board. (2023). *Natural gas and electricity yearbooks* [Data]. https://www.oeb.ca/ontarios-energy-sector/performance-assessment/natural-gas-and-electricity-utility-yearbooks

Ontario Fleet Maintenance Analysis

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- THESL fleet incorporates 15 types of vehicles and trailers
  - 6 light vehicle types and 9 heavy vehicle types
  - Unlike other peer utilities, THESL does not identify any vehicles as "medium-class"
- Light vehicles are assessed at 8.6 years and 136,000km, on average.
- Heavy vehicles are assessed at 12.5 years and 200,000km, on average
  - Midpoint is used to determine average for vehicle categories with a range of values.
- Vehicles considered "medium" at other utilities include step vans, walk-through body trucks, dump trucks and flatbed trucks.

THESL Maintenance Characteristics (LCA/DSP)	Vehicle Class (DSP)	Life Cycle (Years)	Life Cycle (KM)
Car	Light	9	120,000
Cargo Minivan	Light	7	140,000
Passenger Minivan	Light	9	120,000
Full Size Van	Light	10	135,000
Pick-Up	Light	9	180,000
SUV	Light	8	120,000
Cube Van	Heavy	12-15	180,000
Single-Bucket Van Mount Aerial Device	Heavy	11	210,000
Cable Truck	Heavy	11-14	240,000
Crane Truck	Heavy	10-14	210,000 or 240,000
Dump Truck	Heavy	8-12	210,000
Line Truck	Heavy	13	195,000
Double Bucket Aerial Device	Heavy	14	210,000
Digger-Derrick	Heavy	13	195,000 or 210,000
Trailers	Heavy	20	N/A

Source: THESL **- LCA Report** / THESL **- DSP**

Ontario Fleet Maintenance Analysis

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Utility	Light-Duty	Medium-Duty	Heavy-Duty	Trailers	Other
THESL*	8.6 yr/ 136,000 km	Not Available	12.5 yr./ 200,000 km	20 yr.	Not Available
Hydro Ottawa	10 yr./ 150,000 km	12 yr./ 150,000 km	12-15 yr./ 200,000 km	Not Available	15 yr.
Hydro One**	8 yr./ 180,000 km	Not Available	11.5 yr./ 350,000 km	Not Available	Not Available
Alectra	7 yr./ 250,000 km	10 yr./ 250,000 km	12 yr./ 500,000 km	15 yr.	Not Available
Elexicon	5 yr./ 150,000 km	Not Available	10 yr./ 200,000 km	12 yr.	15 yr.

- THESL can be seen as maintaining their fleet more frequently/sooner than its Ontario peers.
- THESL's light and heavy vehicle class has a high year-low kilometer pairing whereas its peers exhibit the reciprocal.
  - This may be contributed by the various operating conditions the fleet is in (for example THESL is in a 100% urban-based that can experience more wear and tear on vehicles versus other peer service areas).
  - No evidence was found to indicate which pairing is optimal for managing a fleet program or identifying if a fleet program is right-sized for its intended system.
- Unlike other peer utilities, THESL does not identify any vehicles as "medium-duty". This can present an opportunity to THESL to introduce a new class to their fleet with supporting maintenance programs.

*Averages based on Vehicle Classes presented in Section E8.3 of 2018 DSP
** THESL Vehicle Classes applied to HONI Vehicles

Source: OEB.ca – **Utility DSPs**

Ontario Fleet CAPEX Analysis

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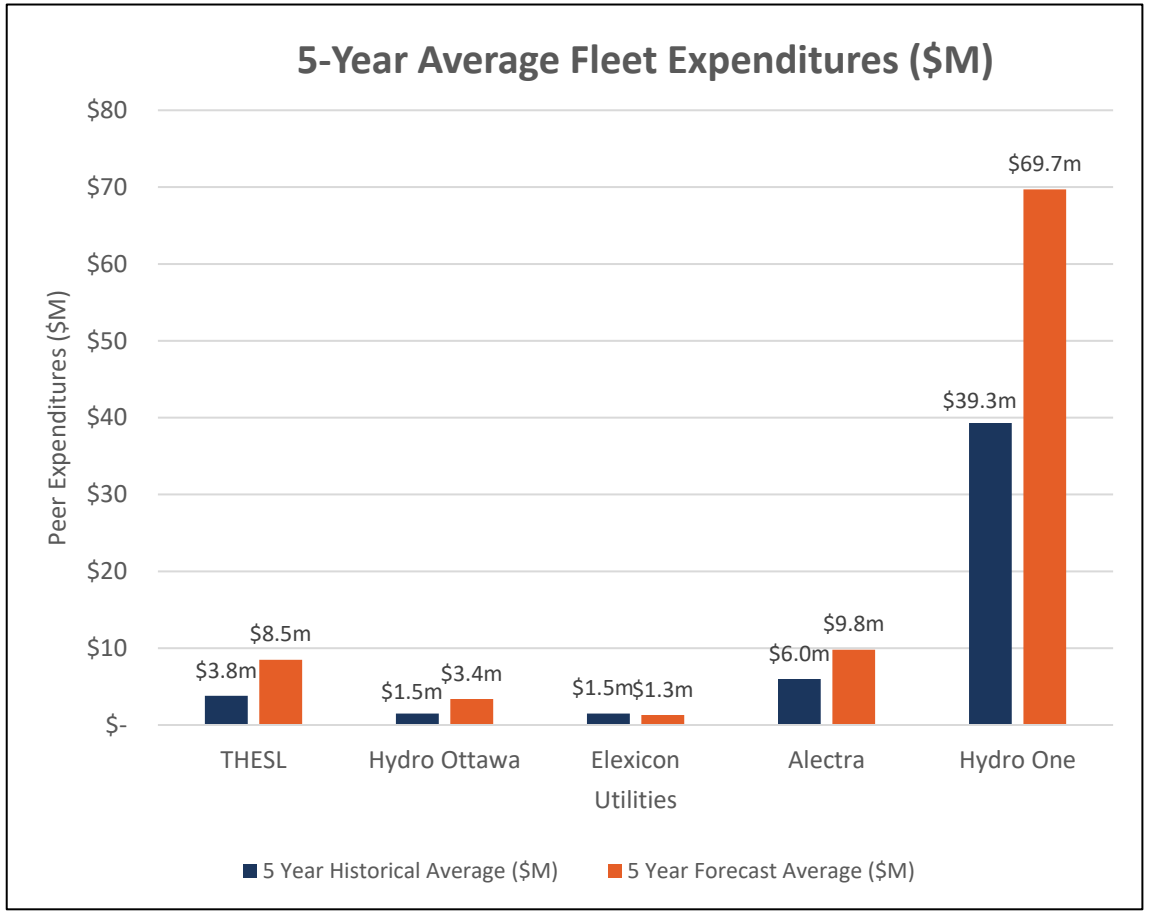
Grouping	Average 5-Year Historical Expenditure	Average 5-Year Forecast Expenditure
THESL + Peers	$ 10.42 million per year	$ 18.54 million per year
THESL + Peers (Excluding HONI)	$ 3.2 million per year	$ 5.75 million per year
THESL Average Differential (Excluding HONI)	19% above average	47% above average

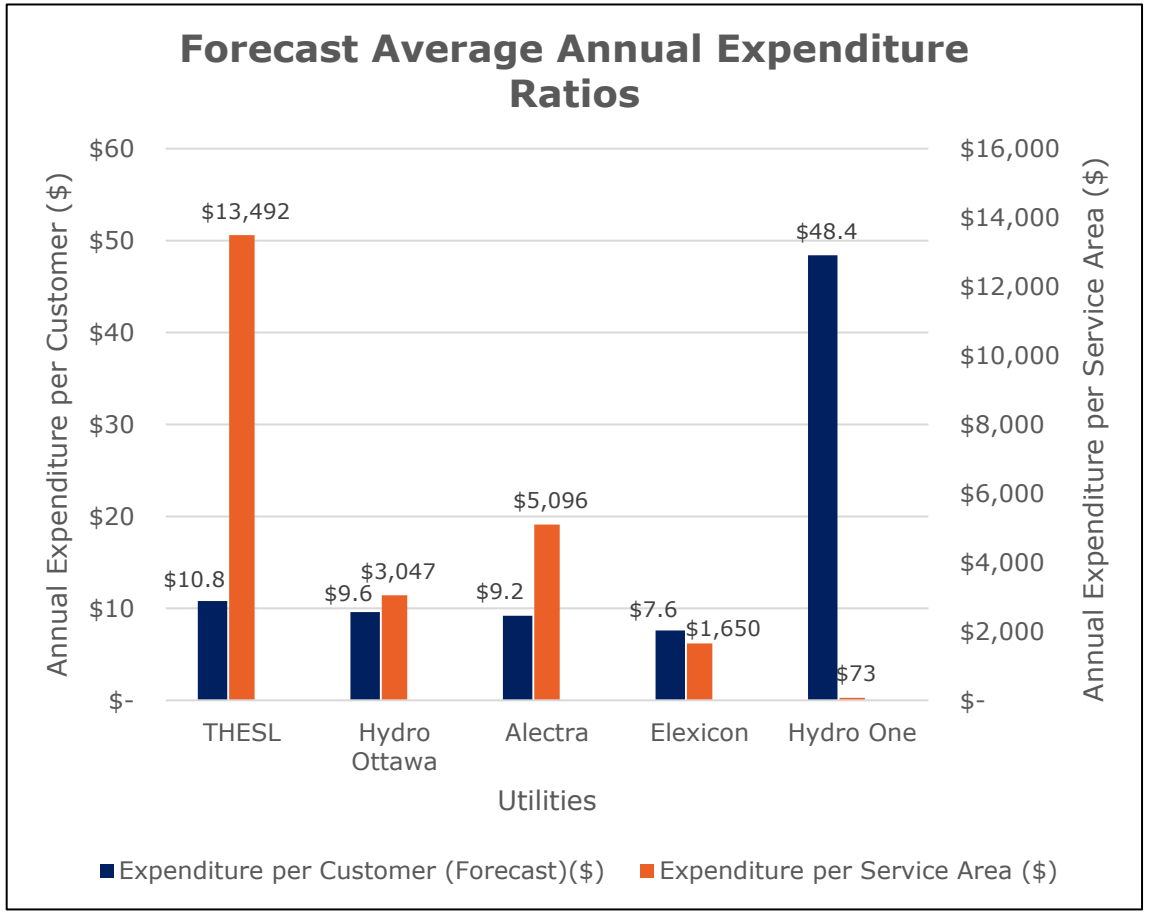


Source: OEB.ca – **Utility DSPs**

Ontario Fleet CAPEX Analysis

DRAFT

Grouping	Forecast Average Annual Expenditure Per Customer	Forecast Average Annual Expenditure per Service Area
THESL + Peers	$17.20 per year	$4,671 per year
THESL + Peers (Excluding HONI)	$9.30 per year	$5,821 per year
THESL Average Differential (Excluding HONI)	16% more than average	132% more than average

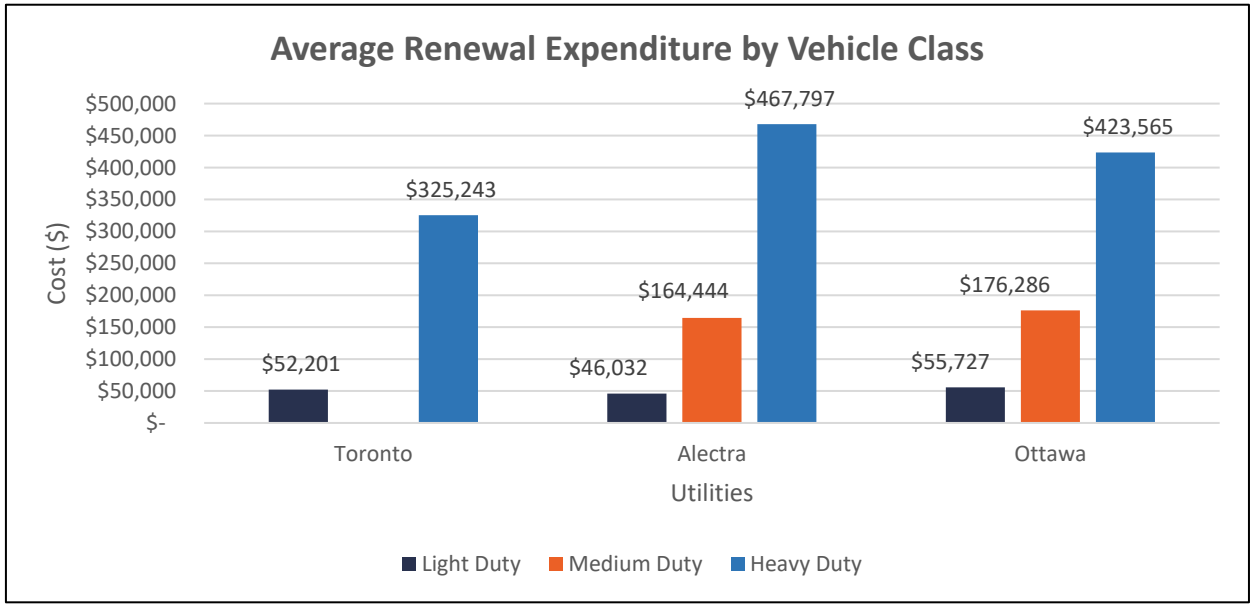


Source: OEB.ca – **Utility DSPs**

Ontario Fleet Expenditure Analysis

- Light Duty Average Procurement Price
  - $51,320 average across three Ontario utilities with available procurement data
    - THESL, Alectra, Hydro Ottawa
- Heavy Duty Average Procurement Price
  - $405,535 average across three Ontario utilities with available procurement data
    - THESL, Alectra, Hydro Ottawa
- Note: THESL CAPEX includes "all up-fitting necessary for the job, such as storage bins, partitions, racking, lighting, additional power supply; and any other aftermarket additions required in a particular vehicle"

	Bridge Year	Light	Med.	Heavy	Other	Total	CAPEX ($000)
THESL	2018-2019	159	N/A	103	N/A	262	$41,800
Hydro Ottawa	2020	77	14	23	2	116	$16,780
Alectra	2019	189	45	59	65	358	$48,800
Hydro One	2022	Breakdown Unavailable				3277	$112,438
Elexicon	2021	Unavailable					



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Source: OEB.ca – **Utility DSPs**

Ontario Additional Support Metrics

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- THESL is at parity with other Ontario peers for most important fleet management KPIs
  - Age, Mileage, Fuel Efficiency, Utilization Rate, and Cost Metrics
- THESL has opportunity to incorporate more advanced metrics
  - Vehicle Equivalency as a measure of efficiency
    - Enables more powerful comparisons between disparate vehicle types and fleet compositions

	THESL	Hydro Ottawa	Hydro One	Alectra	Elexicon

Common KPIs	• Customer Ratio – Customers per Vehicle
	• Service Area Ratio – KM per Vehicle
	• Age
	• Mileage - Average KM travelled per year
	• Fuel Efficiency - Average Fuel Cost
			• Utilization Rate
			  • Availability
			  • Average Downtime
			• Repair and Maintenance Costs
			  • Per Vehicle Class
			  • Per KM
			  • Preventive Maintenance Costs / Reactive Maintenance Costs
			  • Idle Time
			  • Vehicle Condition: Graded A, B, C		

Unique KPIs	• At-Fault Accident Rate • GHG Intensity: (GHG in tonnes / KM travelled) • Cost Recovery: (Billable Hours / Actual Operating Expenses)	None discovered through research	• Vehicle Equivalency: Weighting factor based on expected labour hour requirements	None discovered through research	• # of Vehicle Trips

Source: THESL- **LCA Report** / THESL- **Fleeting Benchmarking** / OEB.ca – **Utility DSPs**

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North America Peer Fleet Benchmark

North American Utility Baseline Analysis

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	# of Vehicles	# of Customers
THESL	387	785,667
Utility A (Man)	3,675	608,554
Utility B (BC)	3,600	5,000,000
Utility C (SMUD)	927	1,500,000

- THESL's fleet count is in the lowest of the North American peers studied (41% the fleet of Utility C, which is the closest comparator of the utilities shown).
- THESL's customer count is lowest of the NA peers studied (52% the population of Utility C.

North American Utility Service Analysis

	Service Area (Sq. KM)	Urban Service Area (%)	Customers per Sq. KM	Customers per Vehicle	Sq. KM per Vehicle
THESL	630	100%	1247.09	2030.1	1.63
Utility A	650,000	N/A	0.94	116.59	176.87
Utility B	888,000	N/A	5.63	1,388.89	246.67
Utility C	2,331	37.9%	643.50	1,618.12	2.51

- Utility C remains is the closest comparable utility to THESL.
- THESL is the only utility with 100% urban service area (while no statistics available for Utility A and Utility B, METSCO can confirm they service both rural and urban areas).
- From analysis, the following characteristics are attributable to THESL:
  - Smallest service area (approx. 27% the service area of Utility C).
  - Largest density of customers per square km of service area (approx. 194% higher than Utility C).
  - Largest density of customers per vehicle (approx. 20% higher than Utility C).
  - Lowest area per vehicle (approximately 65% of average area per vehicle of Utility C).
- In short, THESL is operating within a unique service area that cannot be fairly compared to other municipal-owned utilities and that have publicly available information.

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North American Utility Service Analysis

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- THESL's **underground cable circuit length** is highest (1.4x more on average than peers).
- THESL has, by far, the highest length of underground cable per vehicle (4x higher on average than peers)
- THESL has the second highest % of total underground cable

	UG Cable Circuit Length (KM)	Total Circuit Length (KM)	Underground Line (KM) per Vehicle	Total Circuit Length (KM) per Vehicle	Underground / Total Line (%)
THESL	13,681	29,087	35.4	75.2	47%
Utility A	10,000	82,000	2.7	22.3	12%
Utility B	9,040	55,000	2.5	15.3	16%
Utility C	9,521	15,800	10.3	17	60%

North American Municipal Utilities Utility Service Analysis

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Utility	Service Area km²	Total Customers	Customers per km²
Seattle City Light	340.1	447,578	1316.02
L.A. Department of Water and Power	1225.06	1,547,815	1263.46
THESL	630	785,667	1247.09
Glendale Water and Power	80.29	90,079	1121.92
Saskatoon Light and Power	69	60,875	638.25
Burlington Electric Department	33.67	21,490	638.25
Alameda Municipal Power	59.05	34,979	592.36
ENMAX Power (AB)	1089	510,000	468.32
Austin Energy	1131.82	520,727	460.08
Kissimmee Utility Authority	220.15	90,000	408.81
Long Island Power Authority	3185	1,100,000	345.37
Sacramento Municipal Utility District	2331	644,723	276.59
Cedar Falls Utilities	74.46	18,000	241.74
Nashville Electric Service	1812.99	430,000	237.18
CPS Energy	4060	907,526	223.53
Memphis Light, Gas and Water	2848.99	439,828	154.38
Brownsville Public Utilities Board	344.47	51,406	149.23
Salt River Project	7510.97	1,112,683	148.14
City Utilities of Springfield	826.8	117,075	141.60

- Analysis shows a range of service area sizes and total customers.
- THESL scores relatively high in terms of density of customers, when compared to the other North American municipally-owned utilities, analyzed.

DRAFT

North American Municipal Utilities Utility Service Analysis

Utility	Total Service Area (km²)	Total Customers	Customers per km²	Vehicle Fleet Size	Customers per vehicle
THESL	630	785,667	1247.09	387	2030.15
ENMAX Power (Alberta)	1089	510,000	468.32	348	1465.52
Sacramento Municipal Utility District	2331	644,723	276.59	927	695.49
Seattle City Light	340.1	447,578	1316.02	1000	447.58
Los Angeles Department of Water and Power	1225.06	1,547,815	1263.46	8000	193.48

- When analyzing for customer density per fleet vehicle, we narrowed our search to municipalities that had a comparable customer population and relatively comparable service area.
- In this case, while THESL has a similar customer density per sq. km to Seattle City Light and L.A. Department of Water and Power, but a much higher density of customers per vehicle.
- Overall, THESL has the highest density of customers per vehicle out of all NA utilities studied (inclusive of Utility A, Utility B, and Utility C).

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North American Peers – Utility A Fleet Utilization

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THESL

	Car	Bucket Truck	Crane Truck	Cube Van	Derrick Truck	Dump Truck	Line Truck	Pickup Truck	SUV	Van
# of Utilized Units	10	79	10	30	7	4	5	74	27	100
KMs travelled	3238.08	19,834.48	1,100.66	7,844.10	1,427.29	212.59	1,274.04	35,526.61	8,077.99	30,390.20
KMs/ vehicle	323.81	251.07	110.07	261.47	203.90	53.15	254.81	480.09	299.18	303.90

Utility A

*Utility A does not publicly provide the number of KMs traveled per vehicle, but they do provide a breakdown of fleet vehicle type and volume. It should also be noted that vehicle categories by volume are different than vehicle types by depreciation.

	Cars/ SUVs	Light Fleet	Aerial	Trailer	Digger	Line Truck	Off-Road	Forklift/ Manlifts
# of Utilized Units	106	1090	147	918	52	229	561	162

- Utility A's utilization results are inconsequential without access to statistics like kilometers travelled as the number of a certain type of vehicle is not indicative of how many kilometers it drives each year
- THESL utilizes their pick-up trucks the most (as they have the highest average kilometers travelled per vehicle)
- THESL is more granular in terms of vehicle categorization

North American Peers – Utility C Fleet Utilization

DRAFT

THESL

	Car	Bucket Truck	Crane Truck	Cube Van	Derrick Truck	Dump Truck	Line Truck	Pickup Truck	SUV	Van
# of Utilized Units	10	79	10	30	7	4	5	74	27	100
KMs travelled	3238.08	19,834.48	1,100.66	7,844.10	1,427.29	212.59	1,274.04	35,526.61	8,077.99	30,390.20
KMs/ vehicle	323.81	251.07	110.07	261.47	203.90	53.15	254.81	480.09	299.18	303.90

Utility C

	Light-Duty	Bucket Trucks	Pickup Trucks & Vans	Heavy-Duty	Service Trucks	Construction Equip.
# of Utilized Units	106	93	294	68	141	225
KMs travelled	65,522.11	133,186.2	327,065.60	43,949.98	153,381.90	1,328.58
KMs/ vehicle	618.13	1,432.11	1,112.47	646.32	1,087.81	5.90

- It should be noted that Utility C is a urban-based utility.
- Utility C's most utilized vehicle is its bucket truck (a medium-duty vehicle). THESL's most utilized vehicle is a pickup truck (a light-duty vehicle), while their bucket trucks are somewhere in the middle.
- Utility C uses approx. 3x the vehicle that THESL uses and has a service area that is 3.7x larger. Their average kms travelled per vehicle are also approx. 2.3 x higher than THESL. Utility C has fewer vehicle categories than THESL (6 compared to 10)

*No statistics were available for Utility B

North American Peers – Utility A Lifecycle Planning

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THESL

*AEC = Annual Equivalent Cost

	Car	Cargo Van	Passenger Minivan	Full Size Van	Pickup	SUV	Cube Van	Single Bucket	Single Bucket VM	Cable Truck	Crave Truck	Dump Truck	Line Truck	Double Bucket	Digger Truck	Trailer	Avg.
Planned Life (yrs)	6	7	6	9	6	12	12	14	8	16	14/ 16	14	13	14	13-14	20	**11.59**
Optimal AEC* (yrs)	9	7	9	10	9	8	12-15	12-16	11	11-14	10-14	8-12	13	14	13	20	**11.56**

Utility A

	Passenger Vehicles	Light Trucks	Heavy Trucks	Construction Equipment	Large-Soft-Track-Equip.	Trailers	Misc. Vehicles	Average
Service Life (yrs)	10	11	17	20	25	30	10	**17.57**

- While there are no statistics available for Utility A's optimal lifecycle for fleet efforts, they have a higher average service life than THESL
- On average, THESL's light-duty vehicles have an average life of 9.2 years (compared to Utility A's 10 years), while THESL's heavy-duty vehicles have an average life of 13.95 years (compared to Utility A's 18.83 years)

*No statistics were available for Utility B

North American Peers – Utility C Lifecycle Planning

DRAFT

THESL

*AEC = Annual Equivalent Cost

	Car	Cargo Van	Passenger Minivan	Full Size Van	Pickup	SUV	Cube Van	Single Bucket	Single Bucket VM	Cable Truck	Crave Truck	Dump Truck	Line Truck	Double Bucket	Digger Truck	Trailer	Avg.
Planned Life (yrs)	6	7	6	9	6	12	12	14	8	16	14/ 16	14	13	14	13-14	20	**11.59**
Optimal AEC* (yrs)	9	7	9	10	9	8	12-15	12-16	11	11-14	10-14	8-12	13	14	13	20	**11.56**

Utility C

	Light-Duty	Bucket Trucks	Pickup Trucks & Vans	Heavy-Duty	Service Trucks	Construction Equip.	Average
Current Economic Lifecycle (yrs)	3-6	10-15	3-6	10-15	10-15	10-15	**9.83**
Future (Optimal) Economic Lifecycle (yrs)	3-6	12-18	3-6	12-15	12-18	12-18	**11.25**

- THESL scores well against Utility C in terms of the currently planned lifecycle of their vehicle fleet as well as optimal lifecycle (which, for the purposes of this study, we are comparing against Utility C's "Future Economic Lifecycle" projections) with higher actual and optimal lifecycles for each.
- THESL scores higher in every vehicle category (i.e. has a higher average lifespan).
- While Utility C uses the same categories for utilization and life-cycle planning, THESL has added more categories for their life-cycle planning than in utilization). Utility C also has far fewer categories (7 compared to 26).

*No statistics were available for Utility B

North American Fleet Maintenance Analysis

Utility	Light-Duty	Medium-Duty	Heavy-Duty	Trailers	Other
THESL	8.6 yr/ 136,000 km	Not Available	12.5 yr./ 200,000 km	20 yr.	Not Available
Utility A	10 yr./ 250,000 km	10 yr./ 250,000 km	10 yr./ 10,000 engine hours	30 yr.	As Necessary
Utility B	10 yr.	10 yr.	10 yr.	10 yr.	10 yr.
Utility C	3-6 yr.	10-15 yr.	10-15 yr.	Not Available	Not Available

- THESL's fleet maintenance and repair timelines are on par if not slightly ahead of the peers studied.
- Based on the information available, the following conclusions can be drawn with respect to THESL:
  - THESL lies in on the middle-to-high-end of the spectrum in terms of vehicle maintenance timelines
  - Light-Duty maintenance is performed more frequently than Utility B (by approx. 1.4 years), but much less frequently than Utility C (by approx. 4.1 years)
  - Trailer maintenance is performed more frequently than Utility A (by 10 years) and less frequently than Utility B (by 10 years)
  - There could be room for improvement in terms of heavy-duty maintenance, as both Utility A and B tend to maintain these vehicles more frequently (by approx. 2.5 years each)

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North American Fleet Expenditure Analysis

Utility	Annual OM&A	OM&A/ Vehicle	Annual CAPEX	CAPEX/ Vehicle	Owned Vehicles
THESL	Not Available	Not Available	$8,900,000/ $11.33 per cust.	$22,997.42	100%
Utility A	$30,104,000/ $49.47 per cust.	$8,191.56	$19,609,000/ $32.22 per cust	$5,335.78	99%
Utility B	$45,300,000/ $9.06 per cust	$12,583.33	$31,400,000/ $6.28 per cust.	$8,722.22	Not available

- Despite not having OM&A statistics available for THESL, there is a broad range in terms of OM&A per customer (Utility A is nearly 5.5x more than THESL) and OM&A per vehicle (with utility has 65% the CAPEX per vehicle in relation to Utility B)
- THESL's annual CAPEX per customer lies in the middle (considerably lower than Utility A, but considerably higher than Utility B), while THESL's annual CAPEX per vehicle is by far the highest (more than double that of Utility B, and more than 4x that of Utility A)
- THESL owns 100% of their fleet, while Utility A leases around 1% of their fleet.
- While there were no statistics available in terms of Utility's B owned vehicle fleet, they did note that they outsource maintenance and repair of approximately 46% of their fleet vehicles, which represents all of their light-duty vehicles

*No statistics were available for Utility C

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North American Additional Support Metrics

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	Cost	Safety	Environmental	Service
THESL Identified	• Fuel Usage/ Total Cost of Fuel (L/ 100km) • Operating Expenses per Vehicle • Downtime Cost per Day/ Period • Cost per KM	• At-Fault Accident Rate • Current Planned Life	• Tailpipe GHG emissions • Fleet Net-Zero Goal Year • % of Vehicles with Electric/ Hybrid Application • Idling Hours • GHG intensity	• Total Kms Travelled • Avg. Lifetime Kms/ unit • Driving Range/ Driving Time • Percentage - Utilization • Charging Rate (driving range/ time for full charge) • Battery Size/ Capacity per Unit • Return-to-Base Battery Levels • Vehicle Availability (%) • Average Time Outside of Homezone • Service area ratio • Downtime (days) • Unit Age • Vehicle Life Expectancy
Peer Identified	• Annual OM&A	• Route Adherence (comparing routes driven with optimal routes) • Mean Km Between Defect • Preventative Maintenance Compliance	• Avg. Fuel Efficiency per Vehicle Type (L/ 100km) • Avg. Energy Efficiency (kWh/km)	• Duty Cycle – average daily mileage and maximum daily mileage of existing fleet • Total Charging Energy Requirement • Summer vs. Winter kWh/km

*No statistics were available for Utility C

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Appendix

Electric Vehicle Management

Appendix: Ontario Electric Vehicle Management

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	THESL	Hydro Ottawa	Hydro One	Alectra	Elexicon
Philosophy	• Prioritize replacement of ICE units with BEV that would maximize return on investment • Pause purchases of new ICE vehicles in short term • Conduct pilot projects to assess capabilities of different types of EVs	• Hydro Ottawa is committed to the acquisition of vehicles with hybrid technology where there is an operational and financial business case for doing so.	• Committed to transforming a portion of its fleet to plugin electric or hybrid vehicles by 2030, devoting 5% of its capital budget for EV purchases in 2021 and 50% by 2030 • 50% of sedans and SUVs to electric or hyrbrids by 2025	• Contributes to Alectra Utilities' environmental performance by reducing GHG emissions associated with fleet fuel consumption by utilizing hybrid and electric vehicles where possible	• Unavailable
Fleet	• 8 2018 Chevy Bolts • 5 2021 Chevy Bolts • 1 2010 Diesel/Electric Single Bucket Truck	• 2 Chevy Volts • 2 hybrid cars • 1 hybrid bucket truck • 17-20 devices with battery technology, • 14 flex-fuel vehicles • 10 aerial devices converted to biopure, biodegradable oil	Unavailable		

Source: THESL - **EV Phase-In Plan (2021)** / OEB.ca – **Utility DSPs**

Appendix: North American Electric Vehicle Management

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While all three North American peers studied mention the need to electrify their fleet, all except for Utility C are in the very earliest stages of fleet electrification (awareness of the need to electrify, but lacking in an electrification strategy). THESL has begun to establish their Fleet Electrification Strategy, which puts them ahead of Utility A and Utility B.

North American peer EV philosophies are as follows:

Utility A
- Mentions 24 % of their emissions come from fleet vehicles
- They have plans to implement electrification of their fleet – no further details given in this regard

Utility B:
- Vehicle fleet contributes to 1.3% of utility's GHG emissions
- 93 % of Utility B's light-duty and sedan vehicles are either zero-emissions or hybrid electric
- 70% of GHGs emitted from fleet come from non-light-duty vehicles
- Utility has a GHG reduction program

Utility C:
- Utility C has a detailed fleet electrification plan; goal is to be 100% electrified by 2030, which puts them slightly ahead of THESL, who has a 100% electrification goal of mid to late 2030s)
- 13 % of Utility C's vehicle fleet was electrified as of 2020

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Toronto Hydro-Electric System Limited
EB-2023-0195
Interrogatory Responses
1B-SEC-5
Appendix B
FILED: March 11, 2024
(4 Pages)

THESL Fleet Benchmarking

Electric Vehicle Addendum – June 2023

Hydro Ottawa

Finding	Source
"[Hydro Ottawa]'s immediate focus will be on minimizing our own footprint to the lowest feasible level [and] moving as much of our vehicle fleet as possible to zero-emissions technology."	2021-2025 Strategic Direction
"Hydro Ottawa also continues to invest in green fleet vehicles and technology, where it is available for commercial fleets, and to replace vehicles, as per the established fleet replacement schedule with…hybrid or more energy efficient vehicles, where available	Updated 2021-2025 DSP Attachments
"There is currently low market availability of hybrid vehicles. However, Hydro Ottawa keeps up to date on possible hybrid options for lighter vehicles such as pick-up trucks."	
“To date, Hydro Ottawa has converted more than 40 per cent of its fleet to flex-fuel, battery and hybrid technology, and lowered energy use at 52 of its 91 substations through the installation of building automation systems to control lighting and heating.”	Cision News Article (Source is Hydro Ottawa) dated April 2023

Hydro One

Finding	Source
"Hydro One is proceeding with an electric fleet strategy to help reduce fuel and maintenance costs, as well as its environmental footprint... Hydro One will continue replacing current internal combustion engine vehicles with electric vehicles or plug-in hybrid electric vehicles equivalent to electrify its fleet.“ "Investment will be channeled to expand EVs in multiple categories. The methodology is to track productivity saving in fuel spend for full EV conversion and hybrid conversion.”	Undertaking JT-5.01 - Filed: 2022-01-05
"[Goal to] convert 50% of sedan and SUV fleet to EVs by 2025." "14% of fleet converted from 2018 baseline as of 2021."	Sustainability Report 2021
"Fleet Management Services has begun a gradual adoption of EVs, devoting 5% of its capital budget for EV purchases in 2021 and 50% by 2030.” “As a member of the Edison Electric Institute, HONI has committed to transforming a portion of its fleet to EV or hybrid vehicles by 2030.”	2021 GSP
“Hydro One is committed to achieving net-zero GHG emissions by 2050. We have established a target to achieve a 30% GHG reduction by 2030.” “We Plan to convert 50% of out fleet of sedans and SUVs to electric vehicles or hybrids by 2025 and 100% by 2030.”	Notice of 2023 Annual Meeting of Shareholders

Alectra

Finding	Source
"Fleet management is developing a long-term vehicle electrification strategy plan. The potential for cost and GHG savings is significant, and fleets that plan proactively for electrification can maximize benefits to all stakeholders.	2021 Sustainability Report
"Global supply chain issues, higher costs and inflation have slowed Alectra's efforts, causing a delay in the company's plans to electrify its fleet."	2022 ESG Report
"[Fleet Electrification] contributes to Alectra Utilities' environmental performance by reducing GHG emissions associated with fleet fuel consumption by utilizing hybrid and electric vehicles where possible	2020-2024 DSP

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2021 Executive Compensation Review – Summary Results

TORONTO HYDRO

DRAFT

29 November 2021

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Introduction

- Mercer (Canada) Limited (“Mercer”) has been asked by Toronto Hydro Corporation (“Toronto Hydro” or “THC”) to assess the competitiveness of Toronto Hydro’s executive compensation
- Mercer has provided **total direct compensation** (base salary + short-term incentives + long-term incentives) survey data and publicly disclosed peer group data for the following Toronto’s Hydro positions:

Toronto Hydro Position Title	
• **President and Chief Executive Officer**	• **EVP Customer Care and Chief Information Officer**
• **EVP and Chief Financial Officer**	• **EVP Planning and Chief Engineering and Modernization Officer**
• **EVP, Public and Regulatory Affairs and Chief Legal Officer (Privacy Officer)**	• **EVP and Chief Distribution Officer**
• **EVP and Chief Human Resources and Safety Officer (Code of Ethics Officer)**	• **EVP Capital Construction and Chief Transit Officer**

- Throughout this report, Toronto Hydro’s compensation reflects go-forward 2021 target short-term incentives for newly appointed EVPs
- Mercer has used compensation data from the 2020 Mercer Benchmark Database (“MBD”) and the 2020 Mercer Total Compensation Survey for the Energy Sector (“MTCS”) in addition to publicly available data from a peer group of publicly traded and non-publicly traded companies
  - Mercer considers **+/-10% of market median** to be market competitive
  - When making compensation decisions, Toronto Hydro should take into account each executive’s performance, contributions, job proficiency, retention risks, and succession planning considerations, as well as internal equity

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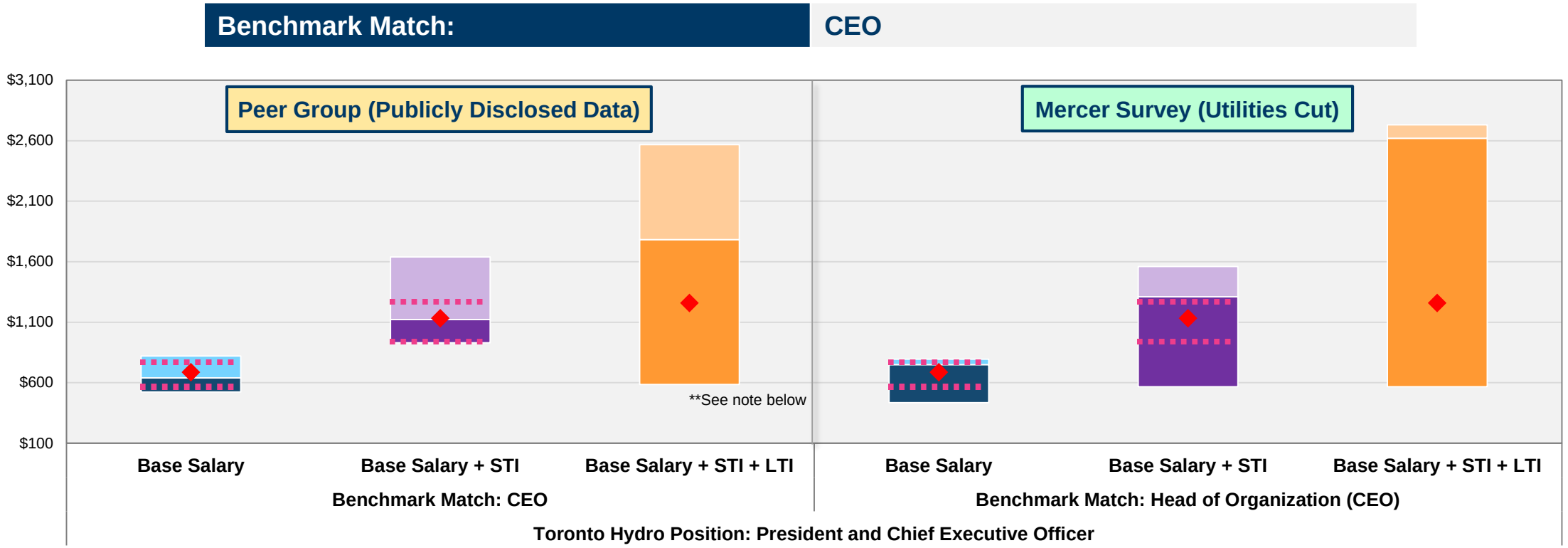
Summary of Findings

Summary of Findings
President and Chief Executive Officer

- The following summarizes Toronto Hydro's base salary, target total cash (base salary + short-term incentives), and target total direct (base salary + short-term incentives + long-term incentives) competitive positioning for the CEO



Note: *P25 target total direct compensation is lower than the P25 target total cash compensation because companies that only disclose total compensation are captured in target total direct compensation only.*

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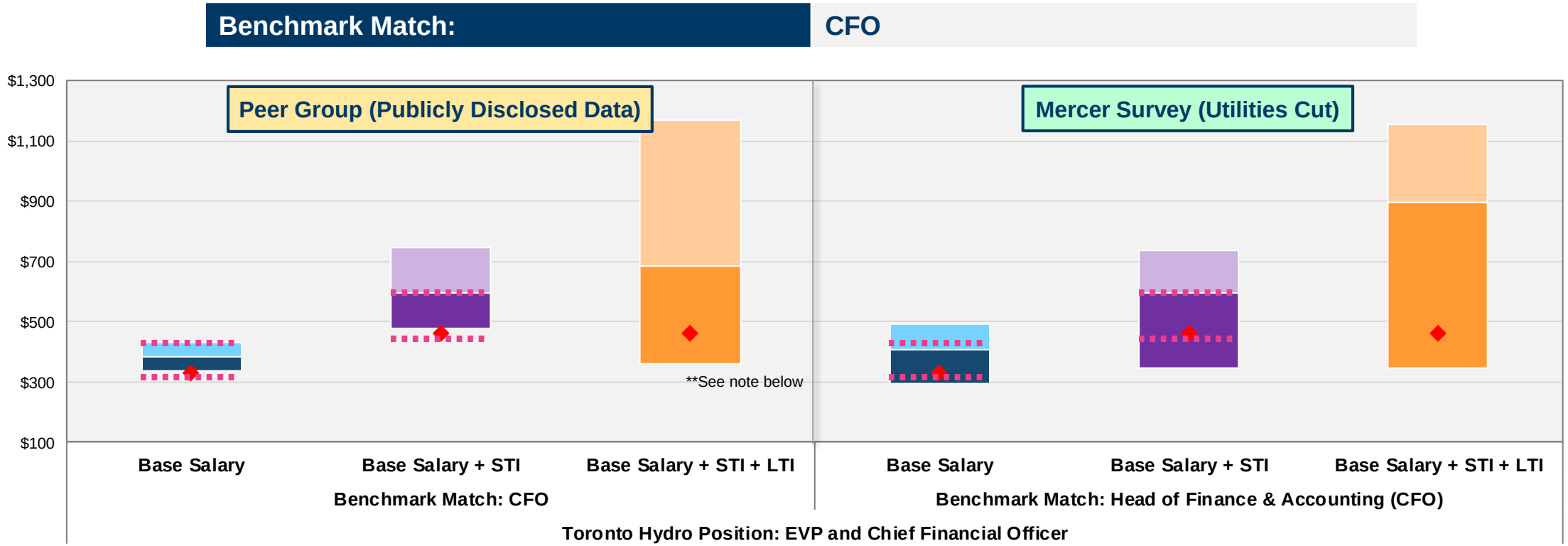
Summary of Findings
EVP and Chief Financial Officer

- The following summarizes Toronto Hydro's base salary, target total cash (base salary + short-term incentives), and target total direct (base salary + short-term incentives + long-term incentives) competitive positioning for the CFO



Note: *P25 target total direct compensation is lower than the P25 target total cash compensation because companies that only disclose total compensation are captured in target total direct compensation only.*

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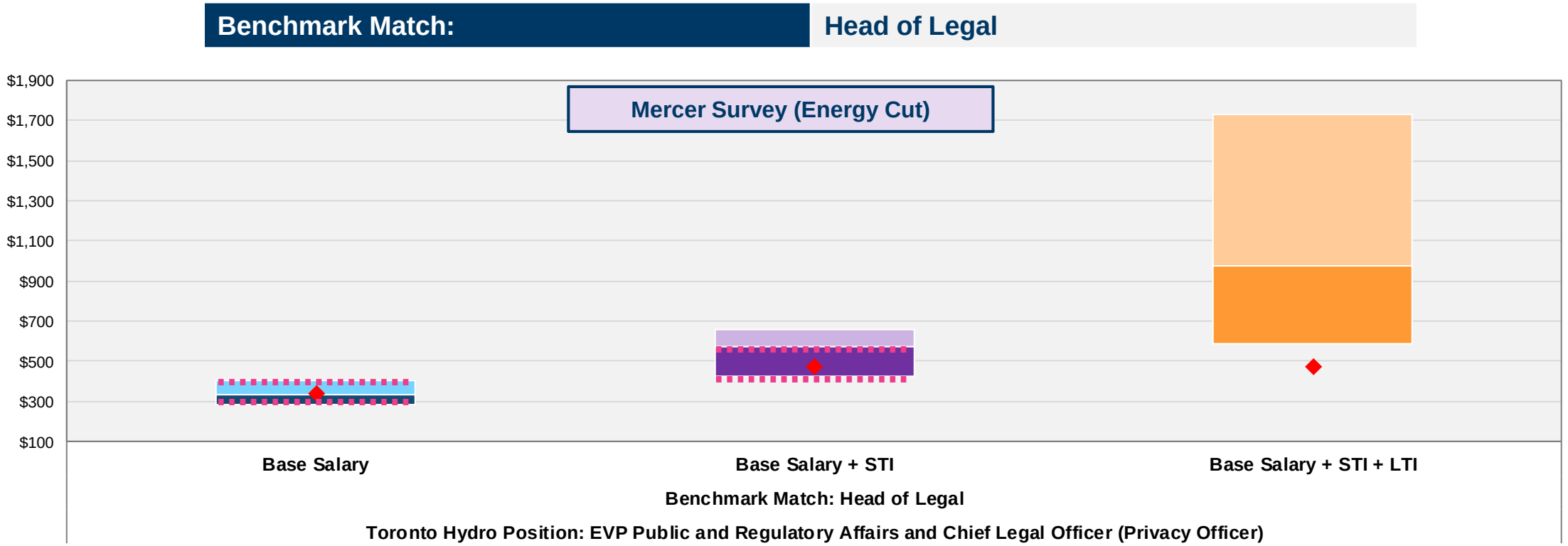
Summary of Findings

EVP Public and Regulatory Affairs and Chief Legal Officer

- The following summarizes Toronto Hydro's base salary, target total cash (base salary + short-term incentives), and target total direct (base salary + short-term incentives + long-term incentives) competitive positioning for the EVP Public and Regulatory Affairs and Chief Legal Officer (Privacy Officer)



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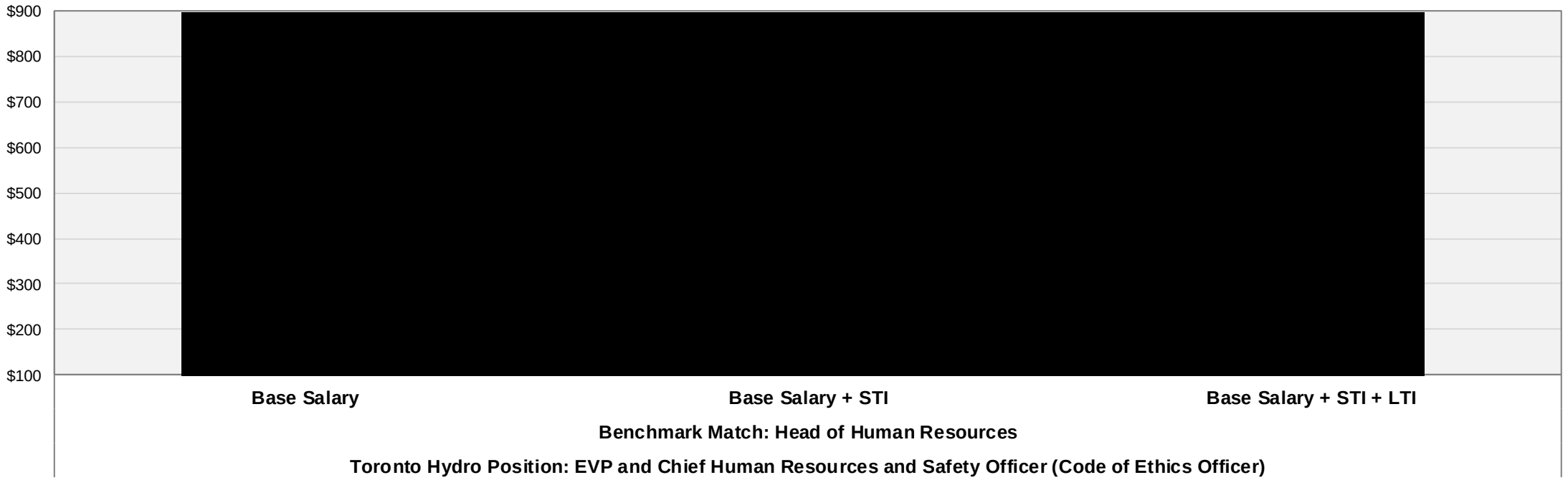
Summary of Findings

EVP and Chief Human Resources and Safety Officer

- The following summarizes Toronto Hydro's base salary, target total cash (base salary + short-term incentives), and target total direct (base salary + short-term incentives + long-term incentives) competitive positioning for the EVP and Chief Human Resources and Safety Officer (Code of Ethics Officer)

Legend:
- 75th Percentile
- Median
- 25th Percentile
- THC Actual Salary + Target Incentives
- THC Salary Range

Benchmark Match: Head of Human Resources



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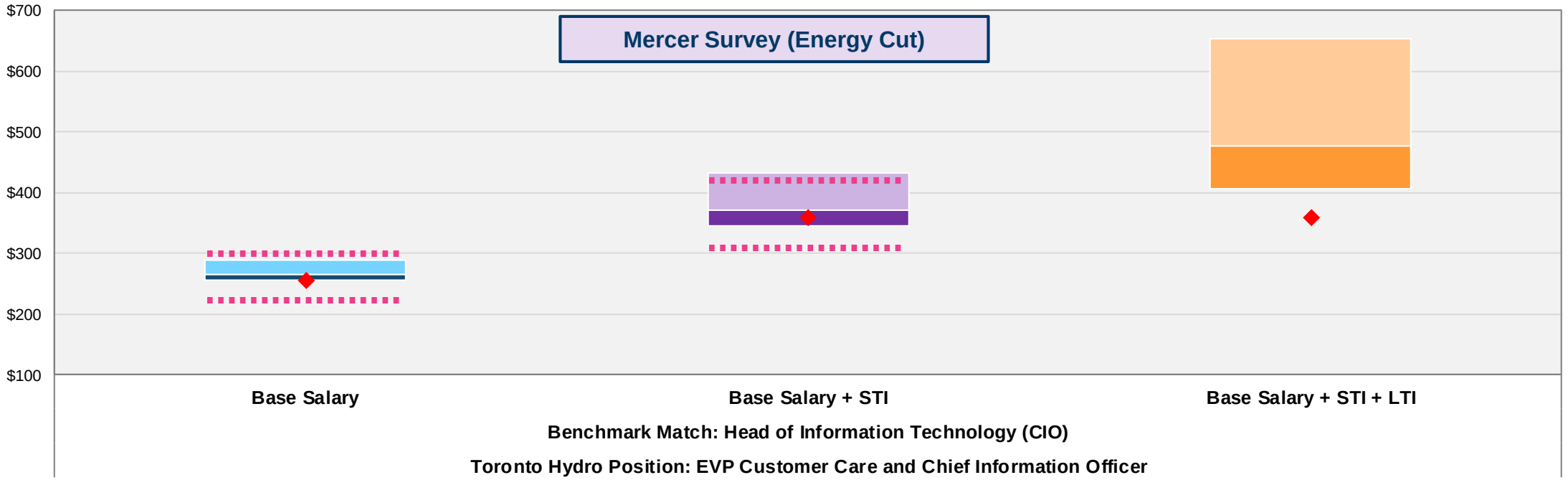
Summary of Findings

EVP Customer Care and Chief Information Officer

- The following summarizes Toronto Hydro's base salary, target total cash (base salary + short-term incentives), and target total direct (base salary + short-term incentives + long-term incentives) competitive positioning for the EVP Customer Care and Chief Information Officer

Legend:
- 75th Percentile
- Median
- 25th Percentile
- THC Actual Salary + Target Incentives
- THC Salary Range

Benchmark Match: Head of Information Technology (CIO)



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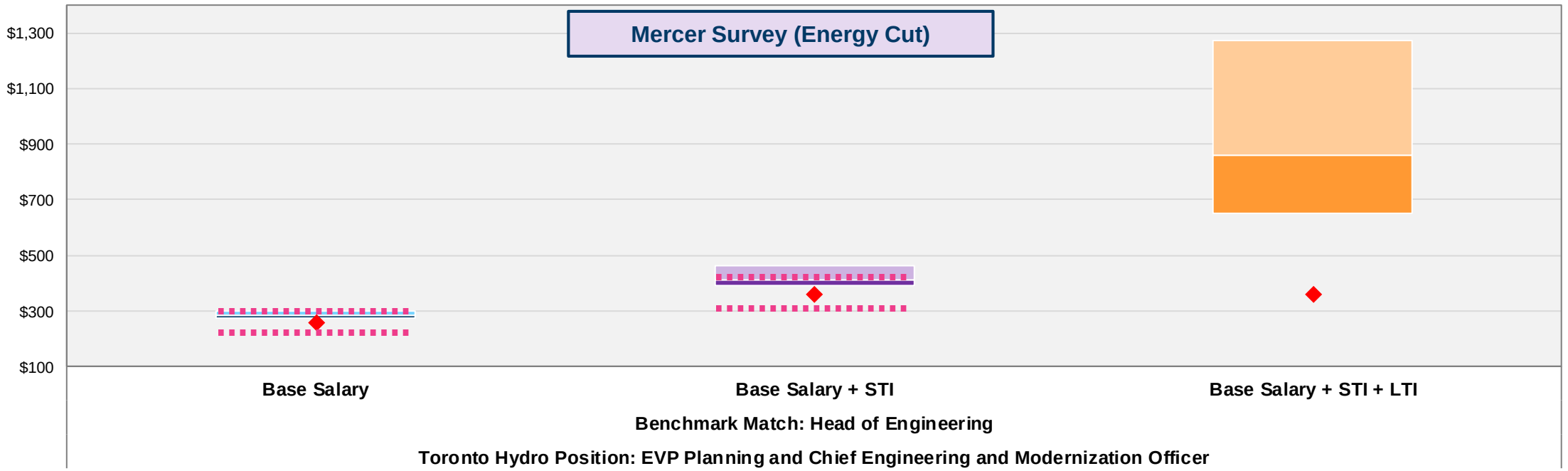
Summary of Findings

EVP Planning and Chief Engineering and Modernization Officer

- The following summarizes Toronto Hydro's base salary, target total cash (base salary + short-term incentives), and target total direct (base salary + short-term incentives + long-term incentives) competitive positioning for the EVP Planning and Chief Engineering and Modernization Officer

Legend:
- 75th Percentile
- Median
- 25th Percentile
- THC Actual Salary + Target Incentives
- THC Salary Range

Benchmark Match: Head of Engineering



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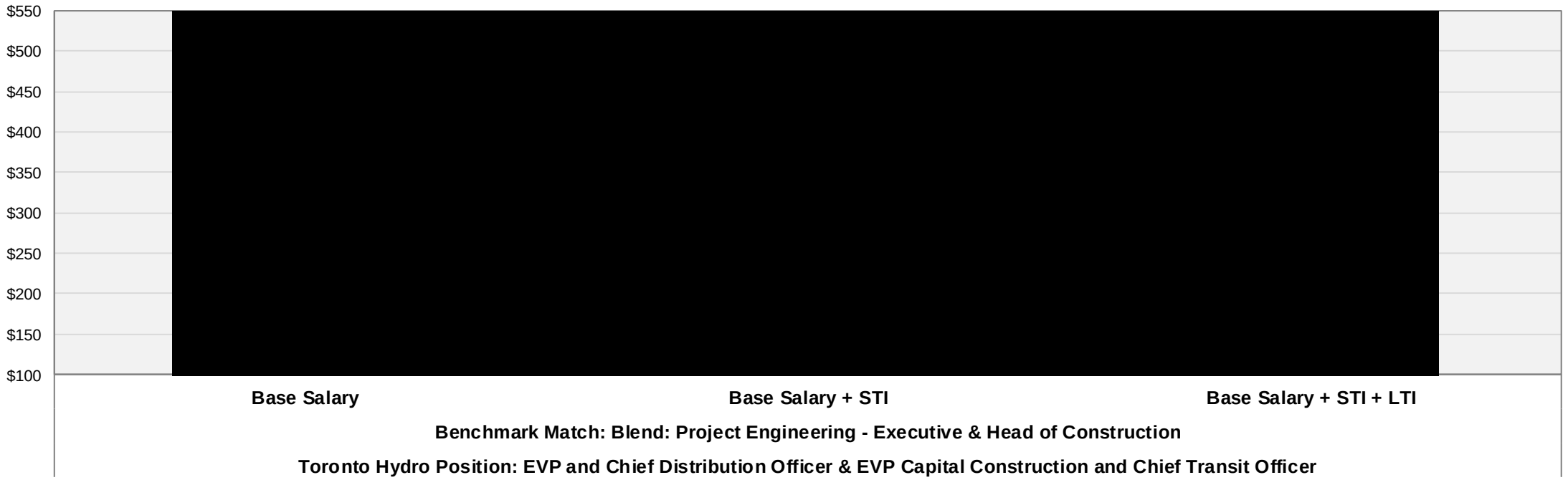
Summary of Findings

EVP and Chief Distribution Officer
EVP Capital Construction and Chief Transit Officer

- The following summarizes Toronto Hydro's base salary, target total cash (base salary + short-term incentives), and target total direct (base salary + short-term incentives + long-term incentives) competitive positioning for the EVP and Chief Distribution Officer and the EVP Capital Construction and Chief Transit Officer

Legend:
- 75th Percentile
- Median
- 25th Percentile
- THC Actual Salary + Target Incentives
- THC Salary Range

Benchmark Match: **Blend: Project Engineering Executive and Head of Construction**



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Summary of Findings
THC's Competitive Positioning

- This following table illustrates THC's current competitive positioning against market compensation levels:

THC Title	Benchmark Scope	Base Salary		Total Cash Comp[1]		Total Direct Comp[2]	
		THC (Current)	Competitive Position	THC (Current)	Competitive Position	THC (Current)	Competitive Position
President and Chief Executive Officer	**Peer Group (Publicly Disclosed Data)**	$687	P55	$1,134	P51	$1,259	P38
EVP and Chief Financial Officer	**Peer Group (Publicly Disclosed Data)**	$329	P24	$460	P23	$460	P28
EVP Public and Regulatory Affairs and Chief Legal Officer (Privacy Officer)	**Survey Data (CA MTCS): Energy Sector Orgs, Comparable Size**	$339	P52	$474	P32	$474	P19
EVP and Chief Human Resources and Safety Officer (Code of Ethics Officer)	**Survey Data (CA MTCS): Energy Sector Orgs, Comparable Size**	[redacted]					
EVP Customer Care and Chief Information Officer	**Survey Data (CA MTCS): Energy Sector Orgs, Comparable Size**	$255	Min	$357	P34	$357	P30
EVP Planning and Chief Engineering and Modernization Officer	**Survey Data (CA MTCS): Energy Sector Orgs, Comparable Size**	$255	Min	$357	Min	$357	Min
EVP and Chief Distribution Officer	**Survey Data (CA MTCS): Energy Sector Orgs, Comparable Size**	[redacted]					
EVP Capital Construction and Chief Transit Officer	**Survey Data (CA MTCS): Energy Sector Orgs, Comparable Size**	[redacted]					
Average Aggregate Positioning (excl. CEO)			**P30**		**P39**		**P23**
Average Aggregate Positioning (incl. CEO)			**P34**		**P40**		**P25**

1 Total cash compensation represents base salary plus the target short-term incentive opportunity
2 Total direct compensation represents target total cash plus the target long-term incentive opportunity, if any (for THC's CEO, this includes a retirement allowance)
***Note:** For the CFO, positioning increases slightly on total direct compensation because companies that only disclose total compensation are captured in target total direct compensation only*

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Appendix A – Peer Group Details

Appendix A – Peer Group Details
Proposed Peer Group

Revised Peer Group (N=18)

All values in CAD millions

Company Name	Total Assets [1]	Revenue [1]	GICS Description	Home Office
Publicly Traded Companies				
Hydro One Limited	$30,294	$7,290	Electric Utilities	ON, Canada
ATCO Ltd.	$22,200	$3,944	Multi-Utilities	AB, Canada
Algonquin Power & Utilities Corp.	$13,224	$1,677	Multi-Utilities	ON, Canada
Northland Power Inc.	$11,399	$2,061	Renewable Electricity	ON, Canada
TransAlta Corporation	$9,747	$2,101	Independent Power Producers and Energy Traders	AB, Canada
Capital Power Corporation	$8,911	$1,791	Independent Power Producers and Energy Traders	AB, Canada
Non-Publicly Traded Companies				
Ontario Power Generation Inc.	$62,073	$7,240	Electric Utilities	ON, Canada
British Columbia Hydro and Power Authority	$39,068	$6,269	Electric Utilities	BC, Canada
Manitoba Hydro-Electric Board	$29,306	$2,629	Electric Utilities	MB, Canada
Saskatchewan Power Corporation	$12,203	$2,762	Electric Utilities	SK, Canada
EPCOR Utilities Inc.	$12,180	$1,988	Electric Utilities	AB, Canada
ENMAX Corporation	$8,187	$2,601	Electric Utilities	AB, Canada
New Brunswick Power Corporation	$7,517	$1,902	Electric Utilities	NB, Canada
Nova Scotia Power Inc.	$5,493	$1,494	Electric Utilities	NS, Canada
Alectra Inc.	$5,350	$4,150	Electric Utilities	ON, Canada
FortisAlberta Inc.	$5,084	$652	Electric Utilities	AB, Canada
FortisBC Inc.	$2,437	$412	Electric Utilities	BC, Canada
Hydro Ottawa Holding Inc.	$2,291	$1,259	Electric Utilities	ON, Canada
75th %ile	$23,977	$3,996		
50th %ile	**$10,573**	**$2,081**		
25th %ile	$5,457	$1,631		
Average	$15,942	$2,901		
Toronto Hydro Corporation	**$6,069**	**$3,901**	**Electric Utilities**	**ON, Canada**
Percentile Rank	*28%*	*73%*		
As a % of P50	*57%*	*187%*		

(1) Most recent fiscal year data per Capital IQ

Removals

Above or below Toronto Hydro's total assets and revenue:

- Hydro-Québec
- Capstone Infrastructure Corporation

Additions

Key competitors for talent in the local market:

- Hydro One Limited
- Ontario Power Generation Inc.

Comments

- In the previous compensation study conducted by Mercer in 2017, Toronto Hydro's assets were positioned at 56% of peer group median and revenue was positioned at 197% of median

Peer of Peers (companies that have disclosed Toronto Hydro as a comparator)

- Hydro One
- ATCO
- EPCOR
- Enmax
- Nova Scotia Power

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Appendix B – Detailed Methodology

Appendix B – Detailed Methodology
Data Scoping Detailed Methodology

- The table below outlines the methodology used for scoping the market data:

Funnel	Rationale	*Resulting Selection Criteria*
Geography	✓ The region or country where Toronto Hydro primarily conducts business and competes for talent ✓ As Toronto Hydro is an electric utility that operates the electricity distribution system for the city of Toronto, we continue to believe the Canadian market is relevant	1) Where possible, Mercer used a data scope of **1/3-3x of Toronto Hydro's revenue** and the **Utilities industry**, expanded to the broader Energy sector if necessary 2) If data was insufficient, Mercer expanded the scope to include the **broader market** beyond Utilities and Energy 3) For positions with limited market data, data was expanded to **all revenues** within the Energy sector or all revenues within the broader market
Size & Scope	✓ Company size is a strong indicator of organizational complexity, which drives scope of accountability and, ultimately, executive pay levels ✓ We have used revenue as indicator of size	
Industry	✓ Where possible, we focused primarily on the Utilities or Energy industries as these sectors represent the main customer, labour, and capital markets in which Toronto Hydro competes	

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Appendix B – Detailed Methodology
Benchmark Matches & Data Scopes *(1/2)*

Legend:
Primary Match

- The table below outlines the benchmark matches and scoping used for each Toronto Hydro executive position
  - Benchmark matches highlighted in green are "primary matches" as they most closely align with Toronto Hydro's positions

Toronto Hydro	Benchmark Matches	Data Scope *(scope expanded for some positions due to data availability)*
President and Chief Executive Officer	Head of Organization (CEO)	Publicly Disclosed Data
		1/3-3x Revenue, Utilities
		1/3-3x Revenue, Energy
EVP and Chief Financial Officer	Head of Finance & Accounting (CFO)	Publicly Disclosed Data
		1/3-3x Revenue, Utilities
		1/3-3x Revenue, Energy
EVP Public and Regulatory Affairs and Chief Legal Officer (Privacy Officer)	Head of Legal	1/3-3x Revenue, Energy
		Publicly Disclosed Data
	General Regulatory Affairs – Executive	1/3-3x Revenue, All Industries
	General Communications & Corporate Affairs - Executive	1/3-3x Revenue, All Industries
	Government & Public Relations - Executive	1/3-3x Revenue, All Industries
EVP and Chief Human Resources and Safety Officer (Code of Ethics Officer)	Head of Human Resources	1/3-3x Revenue, Energy
	Head of Environmental and Employee Health & Safety	All Data
EVP Customer Care and Chief Information Officer	Head of Information Technology (CIO)	1/3-3x Revenue, Energy
	Head of Customer Service	All Revenue, Energy All Data (Supplementary)

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Appendix B – Detailed Methodology
Benchmark Matches & Data Scopes *(2/2)*

Legend:
Primary Match

Toronto Hydro	Benchmark Matches	Data Scope *(scope expanded for some positions due to data availability)*
EVP Planning and Chief Engineering and Modernization Officer	Head of Engineering	1/3-3x Revenue, Energy
EVP and Chief Distribution Officer **+** **EVP Capital Construction and Chief Transit Officer**	Blend: Project Engineering – Executive & Head of Construction	Project Engineering Executive: All Revenue, Energy Head of Construction: All Data

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Appendix B – Detailed Methodology
Compensation Analysis

- The table below summarizes how we benchmarked Toronto Hydro's target compensation levels:

Component	Toronto Hydro	Peer Group Public Disclosure[1]	Survey Data
Base Salary	• 2021 base salary	• 2020 base salary[2]	• 2020 base salary
Target Total Cash	• Base salary + 2021 target STI	• Base salary + 2020 target STI[3]	• Base salary + 2020 target STI
Target Total Direct	• Same as target total cash as Toronto Hydro does not grant LTI	• Target total cash + 2020 target LTI[3]	• N/A

1) Some peers only disclosed a single total compensation figure. In these cases, the most recent total compensation amount was taken as the total direct compensation
2) If a salary range was disclosed, the midpoint of the range was used
3) If target STI or LTI were not available, 3-year average actual STI and LTI were used

- All market data has been aged to 2021 using an aging factor of 2.5%

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Toronto Hydro-Electric System Limited
EB-2023-0195
Interrogatory Responses
1B-SEC-5
Appendix D
FILED: March 11, 2024
(65 Pages)

SMART GRID
INNOVATION NETWORK

Smart Energy Benchmarking

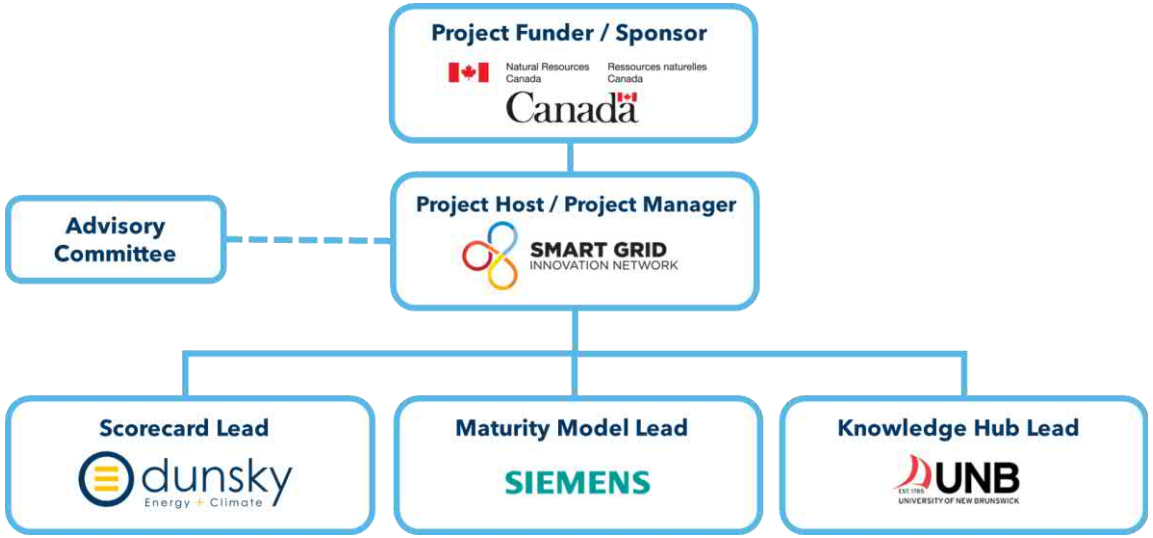
UTILITY SCORECARD RESULTS

June 2023

About the Project Team

The Smart Grid Innovation Network (SGIN) supports Canada's clean energy transition by advocating for the smart energy sector. SGIN promotes, identifies, and helps drive smart energy solutions in Canada. Our mission is to foster Canada's transition to a clean energy future.

The Smart Energy Benchmarking initiative project team includes SGIN, Dunsky Energy + Climate Advisors, Siemens Canada Ltd, & University of New Brunswick (UNB). The project is guided by an Advisory Committee that includes representatives from government, utilities, academia and subject matter experts.



About the Authors

Dunsky Energy + Climate Advisors supports leading governments, utilities, corporations and others across North America in their efforts to accelerate the clean energy transition, effectively and responsibly.

With deep expertise across the Buildings, Mobility, Industry and Energy sectors, we support our clients in two ways: through rigorous Analysis (of technical, economic and market opportunities) and by designing or assessing Strategies (plans, programs and policies) to achieve success.

Dunsky is proudly Canadian, with offices and staff in Montreal, Toronto, Vancouver, Ottawa and Halifax. Visit **www.dunsky.com** for more information.

List of acronyms

AB	Alberta
ADMS	Advanced Distribution Management System
AMI	Advanced Metering Infrastructure
BC	British Columbia
BIPOC	Black, Indigenous and People of Color
CCAB	Canadian Council of Aboriginal Business
DEI	Diversity, Equity, Inclusion
DERs	Distributed Energy Resource
DERMS	Distributed Energy Resource Management System
DSM	Demand-Side Management
DSO	Distribution System Operator
DR	Demand Response
EDTI	EPCOR Distribution & Transmission Inc.
EE	Energy Efficiency
ESG	Environmental, Social, Governance
EV	Electric Vehicle
FLISR	Fault Location Isolation and Service Restoration
GIS	Geographic Information Systems
GWh	Gigawatt-hours
IESO	Independent Energy System Operator (Ontario)
kW / kWh	Kilowatt / Kilowatt-hour
2SLGBTQI+	Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, and additional sexual orientations and gender identities
MW	Megawatt
NB	New Brunswick
NRCan	Natural Resources Canada
NWAs	Non-Wires Alternatives
ON	Ontario
PAR	Progressive Aboriginal Relations
QC	Quebec
SCADA	Supervisory Control and Data Acquisition
SGIN	Smart Grid Innovation Network
SK	Saskatchewan
SREP	Smart Renewables and Electrification Pathways
TCFD	Task-Force on Climate-Related Financial Disclosures
T&D	Transmission & Distribution
UNB	University of New Brunswick



Executive Summary

Introduction

A clean, electrified economy is central to achieving Canada's net zero emissions goals by 2050. The accelerated rate to decarbonize the last 20% of our electricity grid and expand electricity energy use places us in uncharted territory creating significant challenges, as well as new opportunities.

Electric utilities play a pivotal role in the clean energy transition across three broad categories:

1. **Clean Energy Supply.** Shifting away from fossil fuel-based generation to clean or non-emitting sources such as solar, wind, hydro, geothermal and nuclear. This requires clear targets, comprehensive strategies and bold leadership that is mission driven, willing to take risks and determined in their actions.
2. **Modern Grid.** Building a modern, dynamic and resilient grid to optimize the integration of clean energy sources, manage greater electrification and prepare for a changing climate while maintaining a reliable and stable electricity supply.
3. **Customers and Society.** Taking a customer-centric, equitable approach in all decisions related to products, services and experiences that will enable all customers to participate in, and benefit from the energy transition.

The Smart Energy Benchmarking Initiative aims to help Canadian electric utilities acquire the knowledge, skills and tools to incorporate renewable energy, modernize the grid, and support equity, diversity and inclusion activities.

The project is divided into three phases:



Smart Energy Scorecard



Capability Model



Knowledge Hub

The scorecard benchmarks 12 electric utilities' current state (baseline year 2021) in the clean energy transition – the starting line. The scorecard will help utilities understand their baseline, work to their strengths, identify solutions in areas that are still developing and set standards against which they can measure progress.

The project is non-judgmental focused on fostering utility collaboration, building capabilities, celebrating successes and finding solutions. Each utility and the environment in which they operate is unique. The goals are the same, and we can learn from one another, but the path each utility takes will be their own.

"Your present circumstances don't determine where you can go, they merely determine where you start."

- Nido Qubein

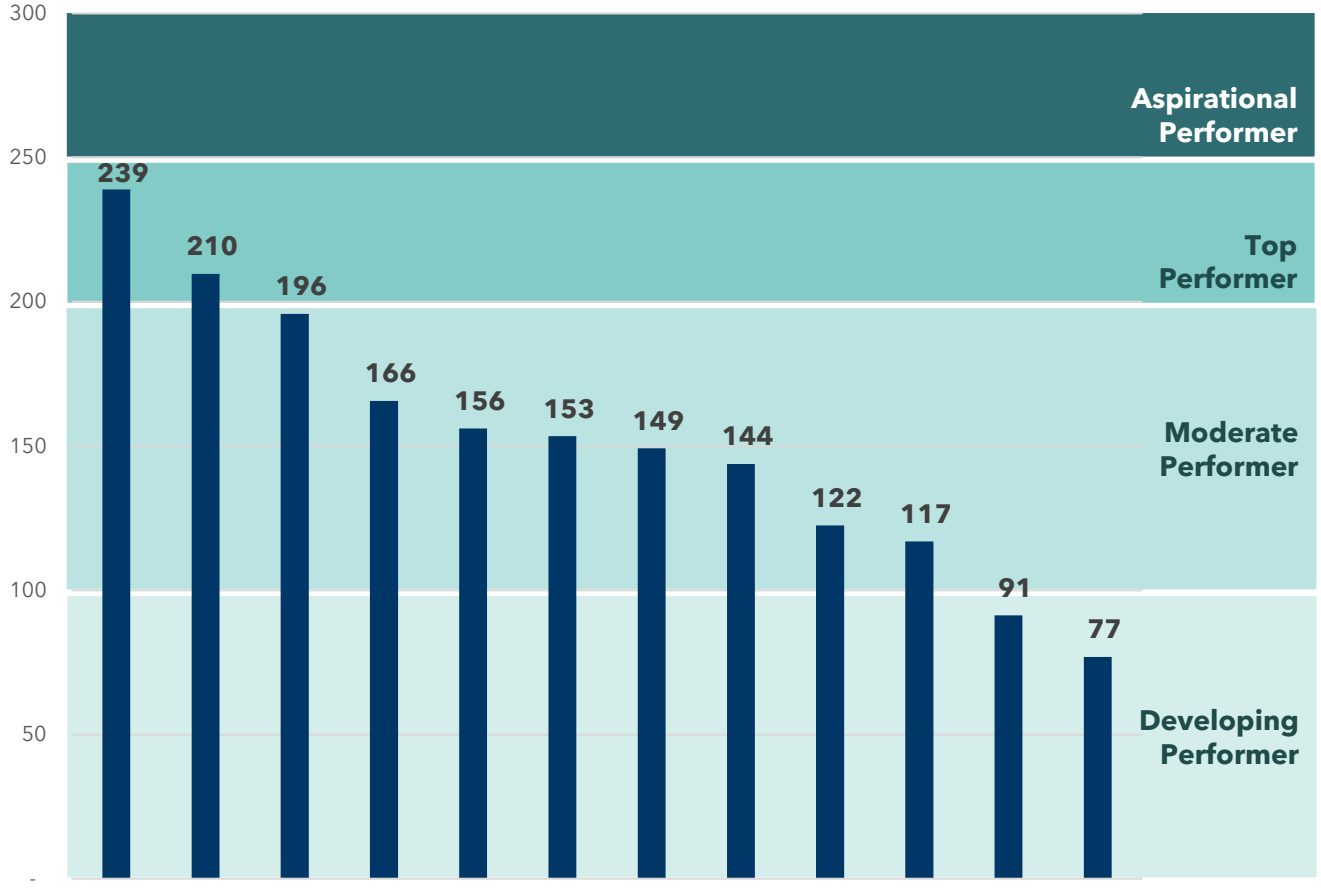
2021 Scorecard Results: The Baseline

Canadian electric utilities are at varying stages of preparedness for the energy transition.

While no utility achieved aspirational performance, three utilities are recognized as top performers and are showing leadership across all three categories (Clean Energy Supply, Modern Grid and Customers & Society).

Most utilities fall within the middle of the band. In many cases, utilities' actions are constrained by the boundaries of their regulatory and/or policy environment.

While the overall score is important, understanding how utilities scored across indicators that contributed to the total score tells a more complete story.



Clean Energy Supply: Key Findings

1 Clean Energy Supply

1.1 Planning & Designing to Decarbonize the Grid	1.2 Clean Energy Procurement & Deployment	1.3 Integration of Clean Energy Supply	1.4 Corporate Leadership

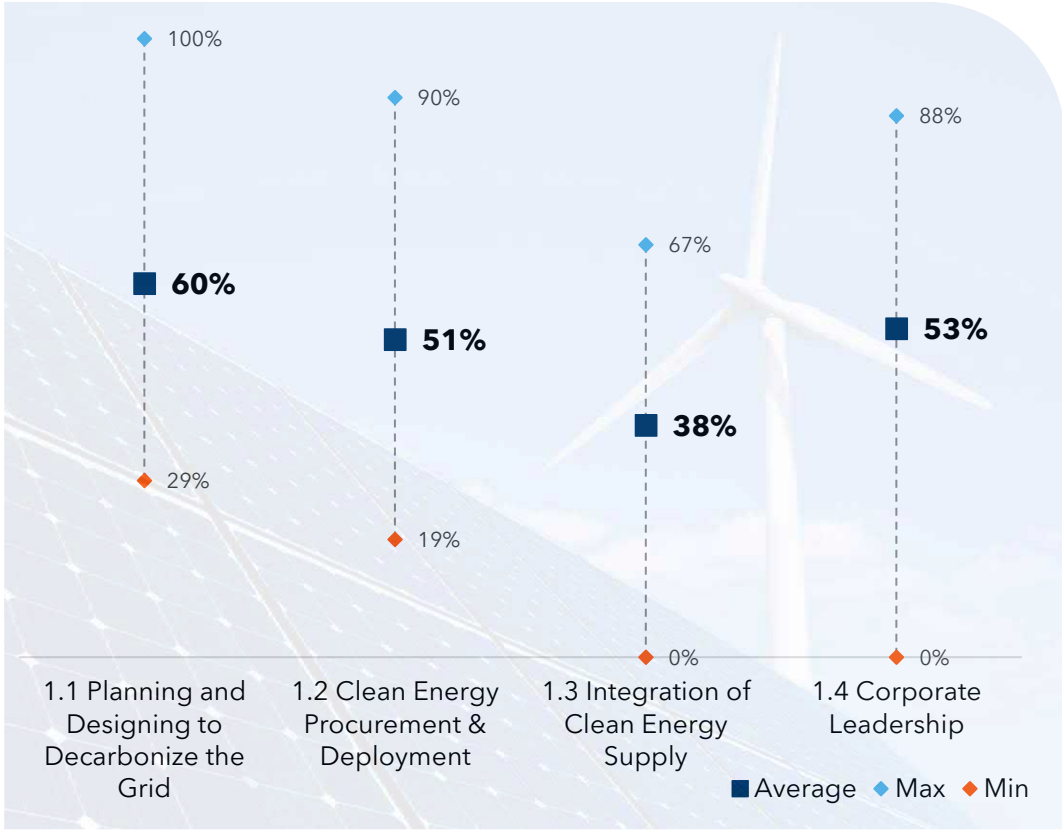
Benchmarked utilities were at different stages of their decarbonization journeys, levels of commitment, degree of control over their supply and experience integrating clean resources at scale. While some benefited from existing non-emitting resources, others had only begun the transition. Without bold leadership and accountability, utilities may be challenged to meet their corporate and community goals.

1.1 Goals & Plans: While most of the country was covered by varying clean grid goals, few jurisdictions had comprehensive (costed, timed) plans to achieve these. Ontario, the largest Canadian province, stood out for not having a defined clean grid goal.

1.2 Clean procurement: Two thirds of utilities and jurisdictions actively procured renewable generation and removed barriers to deployment, with the remaining third taking a passive approach and in some cases adding more fossil-fuel based electricity generation.

1.3 Clean resource integration: Most utilities had limited experience with large-scale renewable projects (> 5MW), or with enabling/valuing ancillary services for distributed resources.

1.4 Corporate leadership: Most utilities had sustainability initiatives and commitments to decarbonize their operations, but the depth of those commitments and the quality of reporting varies. Few utilities tied executive compensation to the achievement of decarbonization targets.



Modern Grid: Key Findings

2 Modern Grid

2.1 Enhanced Grid Planning & Management	2.2 DER Enablement & Integration	2.3 Visibility & Control Capabilities	2.4 Innovation & Emerging Technologies	2.5 Climate Resiliency

Canadian electric utilities were in the process of upgrading their grids and grid capabilities. Most followed incremental pathways, with only a few pursuing transformational visions. Overall, there was a gap between roadmaps, pilots, and control system investments, and limited amount of Distributed Energy Resources (DER) enablement and integration.

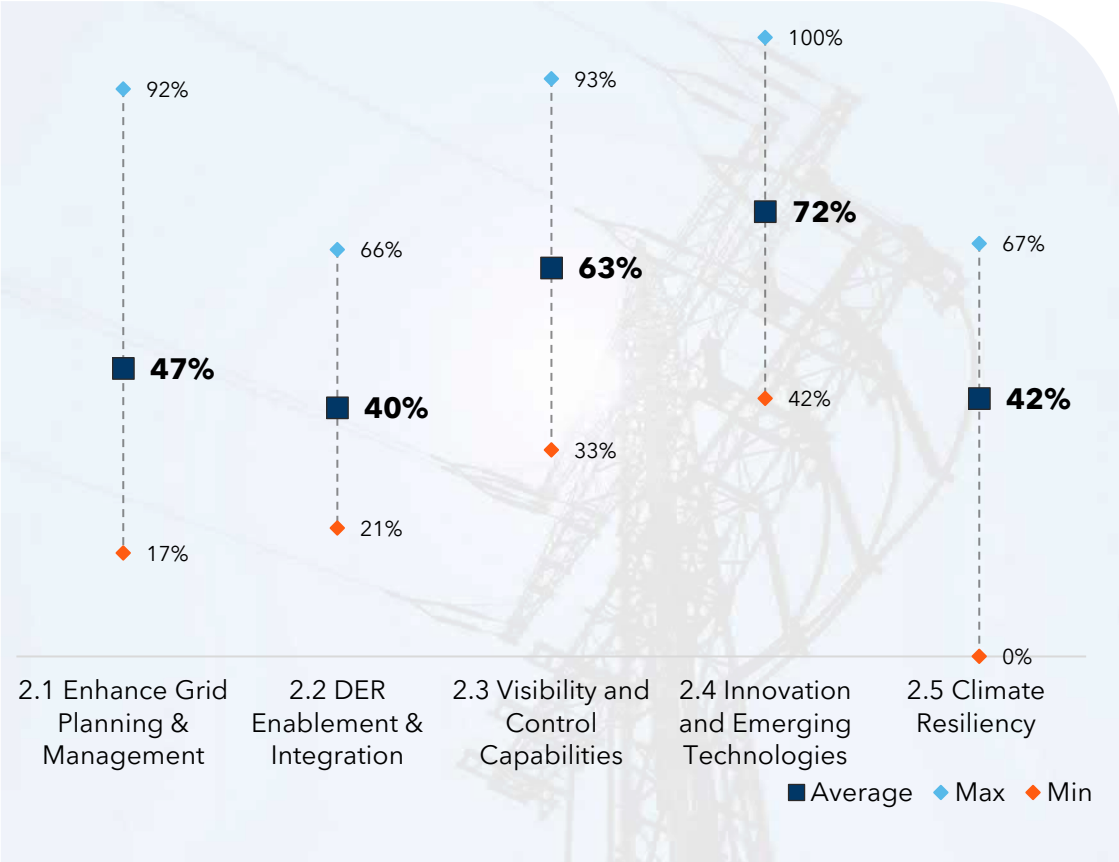
2.1 Grid planning: Most utilities were actively working to modernize their load forecasting and DER management processes. Capabilities varied in terms of data availability, model sophistication (top-down vs. bottom-up) and specificity (system-level annual vs. localized hourly forecasts).

2.2 DER enablement & integration: Most utilities had a DER strategy or roadmap, but DER's potential remained underutilized in 2021 (e.g., for ancillary services, non-wires alternatives, demand response, etc.). This was principally due to regulatory or market-based constraints.

2.3 Visibility & control: By 2021 utilities had invested significantly in visibility and control capabilities, with Advanced Metering Infrastructure (AMI), Advanced Distribution Management Systems (ADMS) and Supervisory Control and Data Acquisition (SCADA) deployed in most cases. DER Management Systems (DERMS) deployment remained nascent but was growing.

2.4 Innovation & technologies: Most utilities had innovation funds, resources, and pilot projects, often supported by government funding. Most were testing operational or technological upgrades, and a few utilities were planning for fundamental business model transformations.

2.5 Climate resiliency: Most utilities were upgrading their grid infrastructure and operations to face more adverse climate events, but few had systematically incorporated climate change scenario analysis into their planning processes.



Customers & Society: Key Findings

3 Customers & Society

3.1 Changing Customer Preferences	3.2 Enabling Transportation, Building and Industrial Electrification	3.3 Being Intentional about Diversity, Equity and Inclusion	3.4 Aligning Actions and Engagement

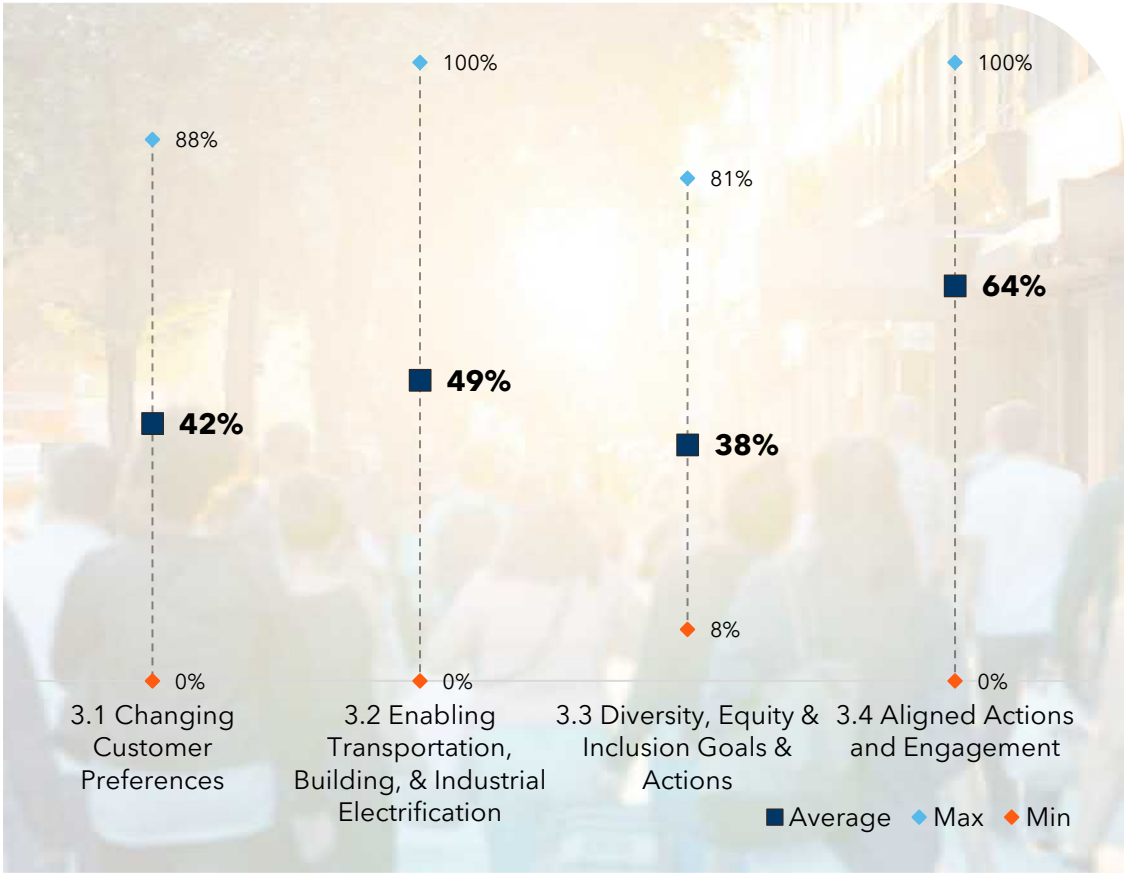
Utilities were increasingly engaging with multiple stakeholder groups to transform the electricity system. While few had developed comprehensive electrification strategies, many considered it for specific sectors. Utilities considered equity to varying degrees; vulnerable community groups will need to be prioritized to ensure an equitable transition.

3.1 Customer preferences: Most utilities offered services and solutions to encourage efficiency, decarbonization and/or electrification, such as incentives for DERs, Electric Vehicles (EVs), charging infrastructure, energy storage, efficient technologies, and, in some cases, rate-based solutions. Digital platforms to engage customers were common, although the level of sophistication varied.

3.2 Electrification: Few utilities had comprehensive electrification strategies, with most focused on a single sector (e.g., transportation) versus economy-wide solutions or perspectives.

3.3 Diversity & Equity: Many utilities had internal Diversity, Equity and Inclusion (DEI) strategies and/or initiatives for their organization and workforce. Community-oriented DEI strategies were less common, and principally addressed through income-eligible and First Nations programs. Benchmarked utilities were spending less than leading US-based jurisdictions on such programs.

3.4 Alignment & Engagement: Several utilities were completely or partially aligned with government climate goals, while some were constrained by a lack of such goals. Utilities were increasingly proactive in collaborating with governments, efficiency organizations, electricity systems operators and regulators to advocate for, and/or advance the energy transition.

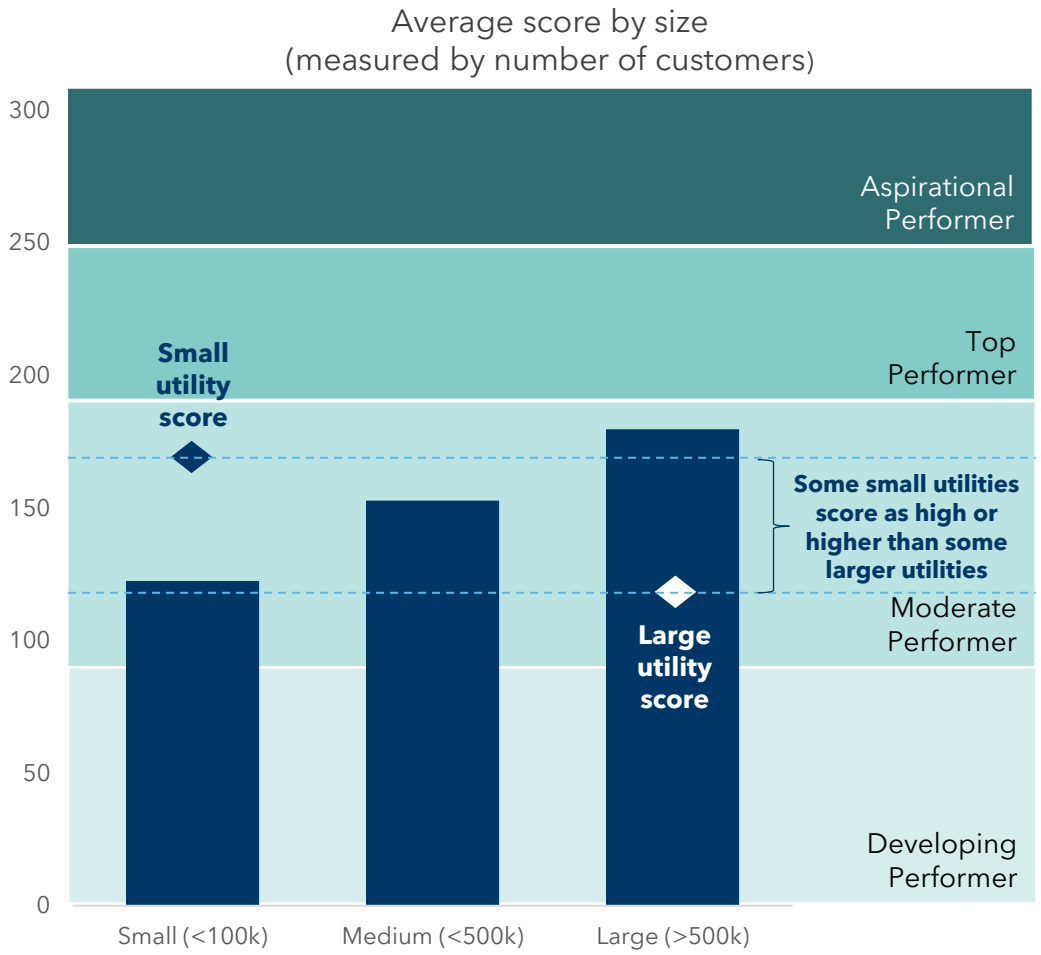


Scorecard Results by Utility Size

Utilities' average scores can be influenced by size, how clean the grid is, and ownership structure; however, these variables are not always indicators of success. Each utility is demonstrating leadership in various metrics and across the three main categories.

Size: Larger utilities tend to score more points, as they have more financial and non-financial resources to plan, execute, innovate and adopt best practices. However, some small utilities outperform their larger peers due to a combination of local innovation, jurisdictional opportunities and leveraging external funding sources. For example, one of the four small utilities achieves the fourth-best overall score.

Other factors that can influence scores are the **grid** and **ownership**. Those with already clean grids have a natural advantage in the "Clean Energy Supply" category. In turn, crown corporations and municipally owned utilities are organically aligned with government and community objectives in the "Customers & Society" category.

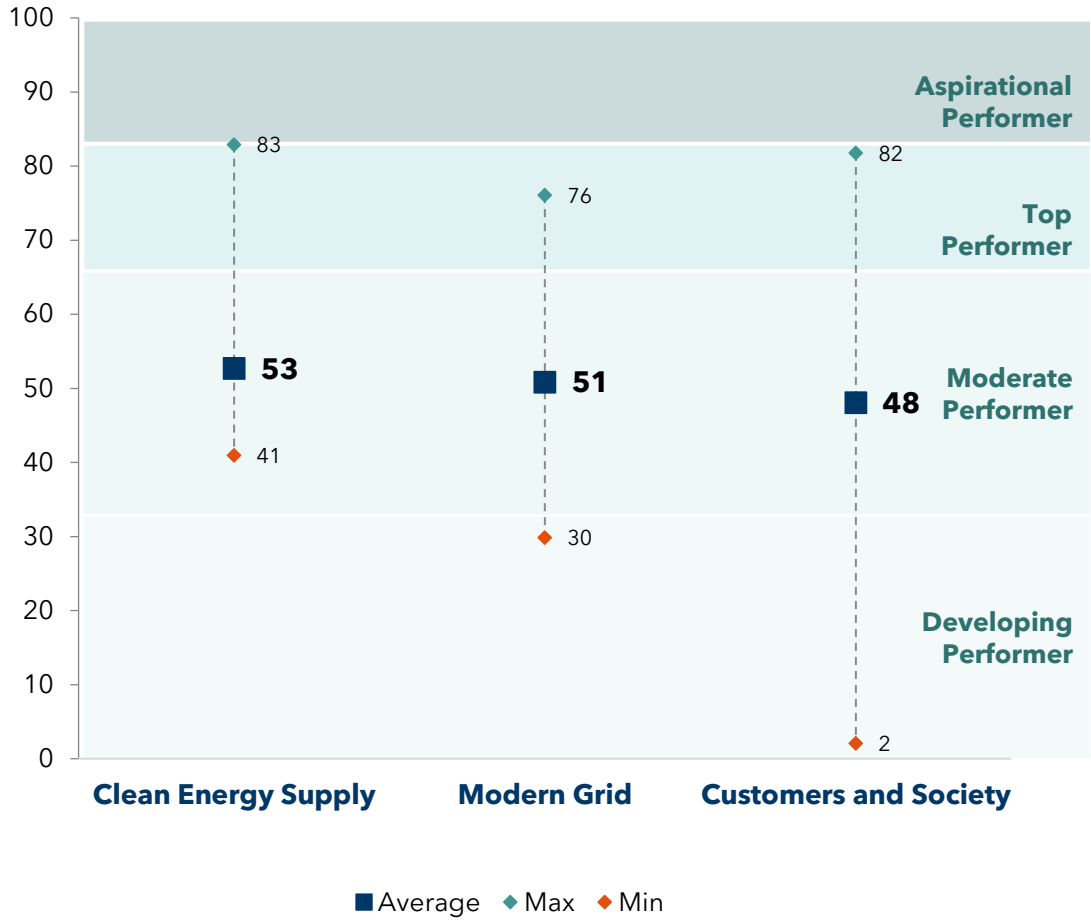


Note: given the limited number of participating utilities, no statistically significant conclusions can be drawn about correlations or causations between performance and any utility characteristics.

Scorecard Results Across Three Major Categories

On average, electric utilities performed **moderately** across the three dimensions crucial to a net zero pathway.

Average, low and high scores across the three major scorecard categories



Ten Key Insights from the Results

INSIGHT 1	**Canadian utilities have embarked on the energy transition journey**. They recognize the climate emergency and have established plans to reduce emissions. While utilities are at various stages in the transition, every benchmarked utility demonstrated leadership in certain areas.
INSIGHT 2	**More effort is needed.** The pace and scale required to meet our net zero goals by 2050 and avoid the worst climate change impacts, requires greater leadership and ambition, comprehensive decarbonization and electrification strategies, detailed inclusive roadmaps, and the tools and resources to act. The clock is ticking; without accelerated action, several actors will be challenged to achieve their targets.
INSIGHT 3	**Utilities are a diverse group, which must be considered when comparing scorecard results, opportunities and solutions.** Utilities vary in terms of size, structure, services, context, and control over their environment. We must recognize this diversity when interpreting the results and crafting policy and/or regulations that will affect utilities. Where possible, utilities and others can leverage diversity of thought and approaches to adapt innovative solutions to their unique context. Jurisdictions with less clean grids will require substantial and coordinated support to quickly live up to their own goals, and in some cases, even more ambitious federal targets.
INSIGHT 4	**Utilities are facing a massive transformation**. An already complex electricity system is under greater pressure to continue to deliver safe, affordable and reliable electricity along with being clean, resilient and equitable. If not managed carefully, this transformation could leave some groups – including some utilities and their communities – behind.
INSIGHT 5	**Utilities can't do it alone and current government commitments and regulatory structures have constrained some utilities**. Government and regulators must give utilities concrete climate targets, direction and support to guide their net-zero pathways. Utilities need latitude to implement needed action and support to make significant investments to balance DER integration, facilitate greater electrification and resiliency, and enable customers to contribute to, and benefit from, the transition. In many cases, legislation and regulation needs to evolve to enable utilities and financial support is needed to complement utility investment.

Ten Key Insights from the Results

INSIGHT 6	**Utilities need a comprehensive strategy that covers all three dimensions of this transition**. All the scanned utilities are making progress and demonstrating leadership in certain areas, but more work is needed to effectively address and coordinate actions across all elements of the clean energy transition.
INSIGHT 7	**Distribution-oriented utilities have historically not been the main drivers of grid innovation but will become increasingly important as gateways for the integration of DERs into the grid**. As such, utilities will require considerable support (policy, regulatory, financial, technological) to increase deployment of, and leverage, DERs, including valuing DERs in ancillary services. Canada lags American and European jurisdictions in enabling and leveraging distributed grid flexibility.
INSIGHT 8	**Utilities are anchored in their communities and are thus valuable partners to relay information both ways**. It will be important for utilities to communicate messaging related to the energy transition to partners and customers and provide diverse services and solutions to help customers participate in, and contribute to, the transformation. Vice-versa, utilities can communicate customer needs, expectations and reactions to policy-makers to inform future policy.
INSIGHT 9	**More attention needs to be paid to equity implications of the transition**. Utilities are actively considering equity in the workplace to ensure that it is diverse and inclusive, but internal action has not yet translated to community-wide equity impacts and strategies (e.g., several utilities have set internal diversity targets and implemented actions, but most have yet to study community needs and establish comprehensive strategies to measure and mitigate the transition's impact on those most vulnerable).
INSIGHT 10	**Ultimately, the clean energy transition presents a significant opportunity for electric utilities and society**. Utilities' core service – deliver clean, safe, reliable and affordable electricity – is at the heart of the energy transition and set for significant growth. By becoming more sustainable, resilient, and efficient, electric utilities can contribute to communities' as well as to their own prosperity.

Considerations

"If you're walking down the right path and you're willing to keep walking, you will eventually make progress"
- Barack Obama

The clean energy transformation requires collaboration and cooperation across stakeholders. Each has a unique role to play in promoting the adoption of cleaner energy sources and transitioning towards a sustainable energy future. We outline key considerations for utilities, SGIN, and government, regulators and system operators.

Utilities	• Participating utilities can use their scorecard results to **inform internal discussion**, diagnosis, planning and prioritization, as well as to **engage external partners** whose support is needed for progress, including regulators, governments, and others. They can also draw on the **community of practice** created by this initiative to share insights, good practices and lessons learned. • Other utilities in Canada can **review this scorecard to situate themselves,** obtain guidance for their own transition and consider participating in future scorecards.
SGIN	• SGIN should **publicize the scorecard** to promote its takeaways and raise awareness of the smart utility concept. • Phase B of this initiative – the Maturity Model – will **support select participating utilities** to build on their scorecard results and improve their specific capabilities. • Phase C of this initiative – the Knowledge Hub – will make smart energy benchmarking trends, and good practices **available to a broader audience**, such as other utilities across Canada as well as policy makers, regulators, system operators, and service providers. • SGIN intends to **repeat the scorecard** to monitor progress from existing utilities and include additional utilities. Future scorecards should include indigenous and northern utilities, and may consider other relevant metrics (e.g., cybersecurity).
Government, Regulators, and System Operators	• **Governments** can use this scorecard to help inform energy- and climate-policies, regulations and goals. They must guide, support, and as needed aid utilities in undertaking necessary actions, as well as support research and public engagement. • **Regulators** ensure that utilities comply with government policies and regulations. They can use the scorecard to set regulatory frameworks and observe the impact on utilities' abilities to accelerate the energy transition. Regulatory innovations are needed to enable required investments, accelerate the adoption of new technologies, processes, tariffs and programs, and ensure that no one is left behind. • **System operators** can use this scorecard to pinpoint barriers to the integration of DERs and intermittent generation assets into the grid and wholesale markets. They play key roles in outlining clear standards and pathways for decarbonization, and in some cases, in implementing demand response and demand side management programs.



Main Report

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1. Introduction

Context

To avoid the worst climate change impacts and benefit from the economic opportunity climate action presents, Canada has set a target to achieve net-zero emissions by 2050. To ensure Canada delivers on its targets, this commitment was enshrined in legislation under the Canadian Net-Zero Emissions Accountability Act.[1]

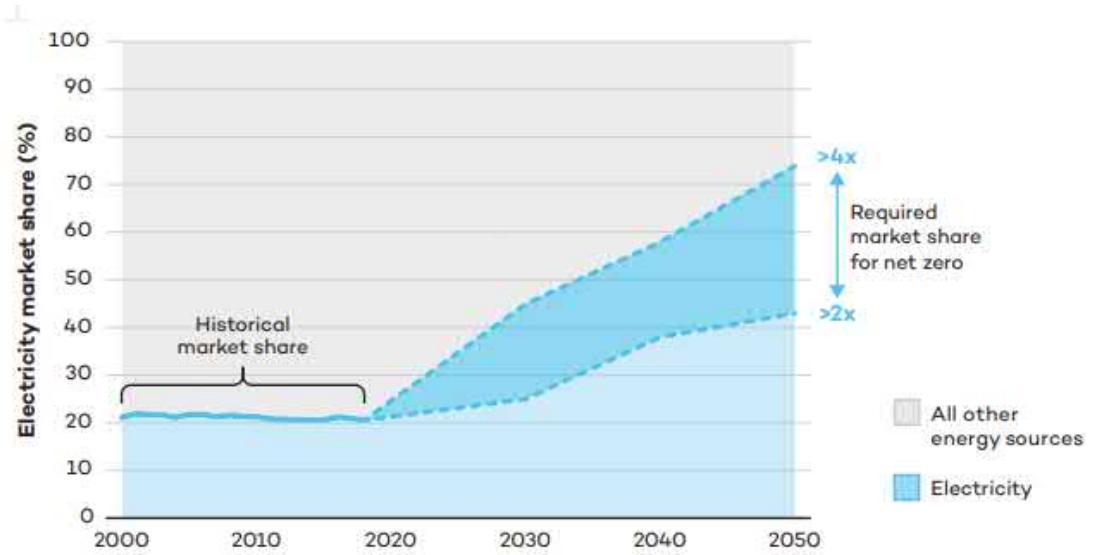
Substituting fossil fuels with clean, non-emitting electricity and electrifying our economy is vital to achieving net-zero emissions in Canada. To lay the groundwork, Canada has committed to net-zero electricity by 2035 through the Clean Electricity Regulation.[2]

Canada is fortunate where over 80% of our electricity is currently non-emitting; however, electricity only accounts for approximately 20% of energy demand. To achieve net-zero by 2050, Canada must increase the supply of clean, non-emitting electricity and ensure more parts of the economy are connected to the electricity system. This will require that Canada produce 2-3 times as much clean power as it does today.[3]

Utilities are at the center of climate targets and action plans. They have a key role in meeting clean electricity commitments by generating, procuring and integrating electricity from clean and non-emitting sources, and enabling, supporting and delivering on initiatives that will optimize the grid and help all customers electrify, including those most vulnerable.

THE CLEAN ELECTRIFICATION CHALLENGE

To achieve net-zero by 2050, Canada must increase the supply of non-emitting electricity and ensure more parts of the economy are electrified. Growing building, transportation, and industry electrification could increase Canada's electricity share by up to four times within the next 30 years.



Source: Produced by Dunsky Energy + Climate Advisors for Electrifying Canada, 2022

1. Canadian Net-Zero Emissions Accountability Act S.C. 2021, c. 22. Accessed at https://laws-lois.justice.gc.ca/eng/acts/c-19.3/fulltext.html
2. Government of Canada Clean Electricity Regulations. Accessed at https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/clean-electricity-regulation.html
3. 2030 Emissions Reduction Plan: Clean Air, Strong Economy. Accessed at https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030.html

Project Overview

In 2022, Smart Grid Innovation Network (SGIN) launched the Smart Energy Benchmarking Initiative to help Canadian electric utilities prepare for the clean energy transition. The initiative is funded by Natural Resources Canada's (NRCan) Smart Renewables and Electrification Pathways (SREP) Capacity Building stream. SREP supports projects that can transform our electricity sector to the 2050 net-zero economy, and help organizations acquire the knowledge, skills, and tools to incorporate renewable energy, modernize the grid, and support equity, diversity, and inclusion activities.

WHAT IS A SMART ENERGY SYSTEM?

A smart energy system is one that supports decarbonization in an affordable, safe, sustainable, resilient, and equitable way. It includes the whole energy system (gas, thermal, and electricity grids) that integrates clean energy, through a smart, dynamic, and customer-centric approach.

The Smart Energy Benchmarking initiative focuses on the role of electric utilities within the broader smart energy system.

The Smart Energy Benchmarking initiative has six objectives:

1. Stimulate the development of clean energy and grid modernization projects.
2. Increase Canadian utilities' capacities to meet emerging customer needs, modernize their grids, prepare for greater electrification and renewables integration.
3. Celebrate utility leadership in the energy transition and nudge those getting started through healthy competition.
4. Develop a body of knowledge that serves as a resource for utilities and others across Canada as they work to decarbonize.
5. Create a healthy ecosystem for collaboration between stakeholders.
6. Be intentional about equity, diversity, and inclusion goals and impacts

Smart Energy Benchmarking: A Phased Approach

This report summarizes results of Phase A: Smart Energy Scorecard.

Phase A



Scorecard

Benchmark **12 electric utilities'** current smart energy development and identity performance relative to peers and best-in-class practices

June 2022 – April 2023

Phase B



Maturity Model

Work with **a subset of utilities** to build on their strengths and develop their capabilities to improve preparedness and performance

April 2023 – September 2023

Phase C



Knowledge Hub

Share findings, trends, and best practices to a **broader audience** to support industry capacity-building

September 2023 – December 2023

Phase A: Smart Energy Scorecard

Electric utilities are responsible for generating, transmitting and distributing electricity to end users. In the context of the clean energy transition, the scorecard assesses utilities across three main functions:



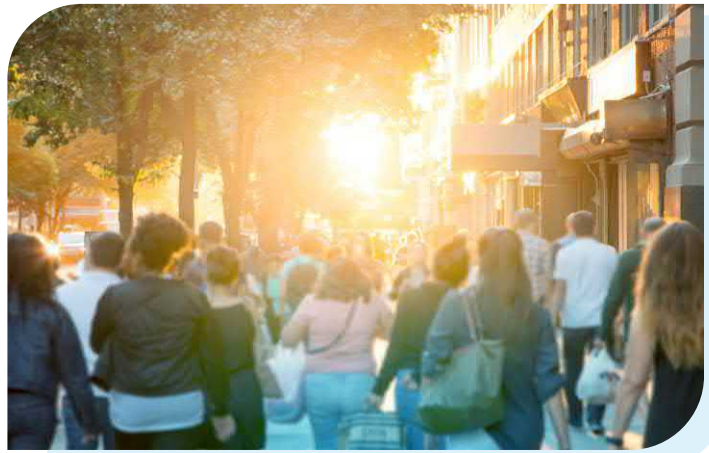
1 Clean Energy Supply

To reduce greenhouse gas emissions and meet renewable energy targets, electric utilities must shift away from fossil fuel-based generation to clean or non-emitting sources such as solar, wind, hydro, geothermal, and nuclear.



2 Modern Grid

The electricity grid is complex system of generating stations, transmission lines, substations, and distribution networks that deliver electricity to end users. The grid must be managed to ensure a reliable and stable supply of electricity, and to optimize the integration of more variable clean energy sources.



3 Customers & Society

Utilities can offer programs and services to encourage and enable customers to electrify their buildings, transportation and industries and adopt clean energy technologies. Utilities must also consider impacts to those most vulnerable so that all customers can benefit from the transition.

The Smart Energy Scorecard

The Smart Energy Scorecard assesses participating Canadian electric utilities' efforts and progress in the clean energy transition across 3 categories, 13 metrics and 140+ indicators (baseline year 2021).

Electric utilities play a critical role in enabling the transition to a clean energy future by ensuring a reliable and sustainable supply of electricity from renewable sources while also meeting the needs of end users. Utilities plans, actions and abilities were benchmarked across 140+ indicators that are deemed crucial to facilitate a clean energy system that continues to be safe, affordable, and reliable, as well as **clean, resilient, and equitable**.

The following four guiding principles influenced the final scorecard metrics:

1. Align with NRCan's SREP objectives and the net zero emissions goal
2. Measure performance against best-in-class practices within Canada and abroad
3. Be relevant, measurable, and flexible, and focus on what utilities can control & influence
4. Develop in collaboration with utilities and other relevant industry stakeholders

1 Clean Energy Supply

- 1.1 Planning & Designing to Decarbonize the Grid
- 1.2 Clean Energy Procurement & Deployment
- 1.3 Integration of Clean Energy Supply
- 1.4 Corporate Leadership

2 Modern Grid

- 2.1 Enhanced Grid Planning & Management
- 2.2 DER Enablement & Integration
- 2.3 Visibility & Control Capabilities
- 2.4 Innovation & Emerging Technologies
- 2.5 Climate Resiliency

3 Customers & Society

- 3.1 Changing Customer Preferences
- 3.2 Enabling Transport, Building & Industry Electrification
- 3.3 Being Intentional About Diversity, Equity & Inclusion
- 3.4 Aligning Actions & Engagement



2. Approach

Project Approach and Timeline

Developing the smart energy scorecard was an iterative, collaborative approach that involved the project team, an advisory group and participating utilities.

Develop Preliminary Scorecard	Form & Engage Advisory Group	Recruit Utilities	Consult Utilities	Create Roadmap & Collect Data	Refine Data	Present Results
• Develop preliminary scorecard and metrics	• Form advisory group and gather input on project and approach	• Host information webinar • Invite electric utilities across Canada • 18 utilities enrolled	• Gather input to refine scorecard • Consult on data collection process • (2 utility workshops)	• Create utility roadmap • Collect scorecard inputs & supporting documents • 12 final utilities	• Address data questions • Refine scorecard inputs • Generate utility scores	• Present preliminary results • Create summary report & custom utility reports
Jul – Sep 2022	**Sep 2022**	**Oct 2022**	**Nov 2022 – Jan 2023**		**Feb – Mar 2023**	**April 2023**

Data for each indicator was provided by the utilities through a standardized data request form. Dunsky reviewed utility inputs for quality and consistency and assigned a score for each indicator against a pre-determined scoring grid. All 144 indicators are outlined in the appendix, along with scores and weights.

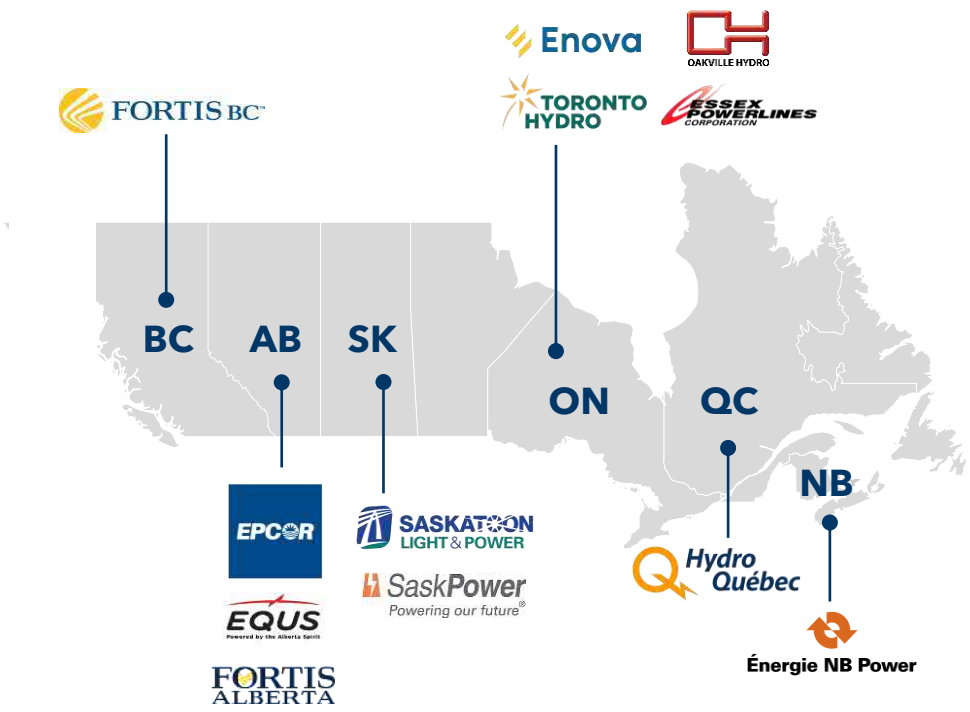
Overview of benchmarked utilities

The project team aimed to attract up to 20 utilities that represented the diversity across Canada in terms of utility size, type, ownership, and geography, clean vs not-so-clean grids and regulatory/policy environments. We summarize the targets set out at the beginning of the project and what was achieved. Additional comparisons are made on the following page.

Target	Achieved
Up to 20 electric utilities	• 18 utilities expressed interest • 12 electric utilities completed the scorecard
Focus on small, but include a range of utility sizes	• 4 small (<100K customers) • 4 medium (100K – 500K) • 4 large (>500K)
A range of utility types	• 4 vertically integrated utilites • 1 Transmission & Distribution (T&D) utility • 7 distribution-only utilities
A range of ownership structures, including indigenous owned	• 3 crown corporations • 6 municipally owned • 3 privately owned • 0 indigenous owned (one initially enrolled but could not complete the process due to resource constraints)
Geographic spread	• West (1 BC) • Prairie (3 AB, 2 SK) • Central (4 ON, 1 QC) • Atlantic (1 NB)

Overview of benchmarked utilities

Six provinces



Twelve utilities serving close to 7.5 million customers (presented West to East)

Utility	Type	Ownership	Nb. of customers	Provincial Electricity Market: Retail	Clean grid	¢/kWh[1]
Fortis BC	Generation, Transmission, Distribution	Private	< 100k	Regulated retail	>90% clean	11.4
FortisAlberta	Distribution	Private	≥ 100K to ≤ 500k	Competitive	<50% clean	19.9
EPCOR (EDTI)	Transmission, Distribution	Municipal	< 100k	Competitive	<50% clean	19.9
EQUS REA	Distribution	Coop	< 100k	Competitive	<50% clean	19.9
Sask. Light & P.	Distribution	Municipal	< 100k	Regulated retail	<50% clean	16.5
SaskPower	Generation, Transmission, Distribution	Crown corp.	≥ 100K to ≤ 500k	Regulated retail	<50% clean	16.5
Enova Power	Distribution	Municipal	< 100k	Hybrid	>90% clean	13.9
Essex Powerl.	Distribution	Municipal	< 100k	Hybrid	>90% clean	13.9
Oakville Hydro	Distribution	Municipal, Private	< 100k	Hybrid	>90% clean	13.9
Toronto Hydro	Distribution	Municipal	≥ 100K to ≤ 500k	Hybrid	>90% clean	13.9
Hydro-Québec	Generation, Transmission, Distribution	Crown corp.	≥ 100K to ≤ 500k	Regulated retail	>90% clean	7.6
NB Power	Generation, Transmission, Distribution	Crown corp.	< 100k	Regulated retail	>50% clean	13.9

Generation · Transmission · Distribution · Crown corp. · Municipal · Private · Coop

>90% clean · >50% clean · <50% clean · < 100k · ≥ 100K to ≤ 500k · > 500k

1 Electricity rates. Source for pricing data: Hydro-Québec, Comparison of Electricity Prices in Major North American Cities 2022 (2021 data for average residential prices in Vancouver, Edmonton, Regina, Toronto, Montréal, Moncton). Data is indicative only and may not represent the actual prices charged by the benchmarked utilities or others to consumers in their specific service areas in 2021.

This scorecard comes with several caveats



It is not a complete picture of Canadian utilities. While it covers 12 utilities from 6 jurisdictions of various sizes and ownership types, which collectively serve around 7.5 million customer accounts, it was not designed to be a representative sample.

Scores represent 2021 data, to the best of utilities' and SGIN's abilities. Utility plans, actions and contexts may have evolved since then, and will be captured in future scorecards.

Data was reviewed with care, but some limitations apply. Data for certain indicators or utilities was difficult to obtain, due to its confidential nature, or to varying definitions across organizations and jurisdictions. Dunsky exercised judgement to assign scores and, in some cases, modified utilities' self-ratings to ensure consistent scoring across all entities.

Utilities face different contexts and cannot be compared one-to-one, given differences in sizes, jurisdictions, ownership type, etc. Several utilities do not control their own generation assets or other factors that may influence their score. The scorecard is most useful when used as a tool to support utilities' own engagement and learning with their internal and external stakeholders and does not purely measure 'performance'.



3. Scorecard Results

Aggregate Results

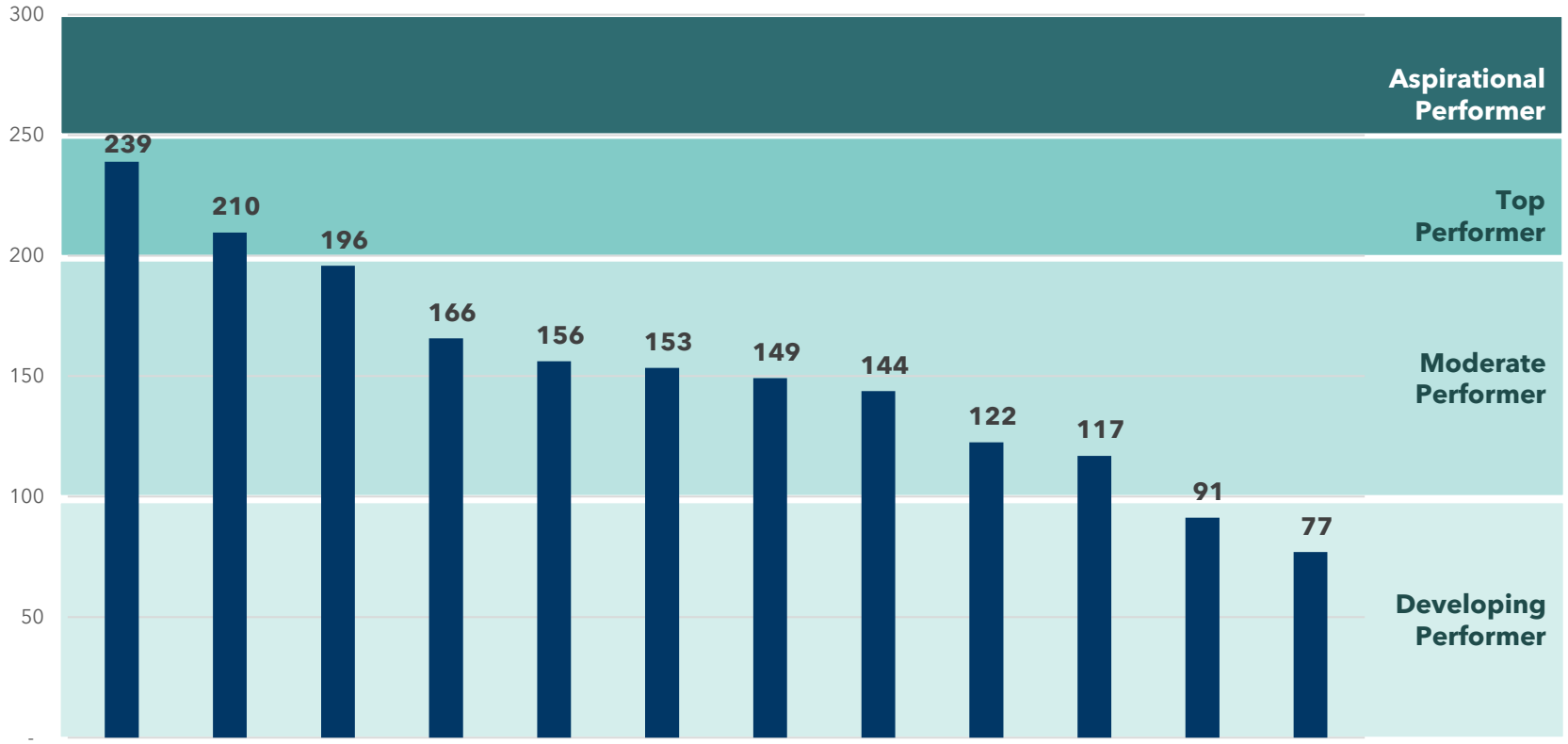
Canadian electric utilities are at varying stages of preparedness for the energy transition.

While no utility achieves aspirational performance, three utilities are recognized as top performers demonstrating leadership across all three categories (Clean Energy Supply, Modern Grid and Customers & Society).

Most utilities fall within the middle of the band.

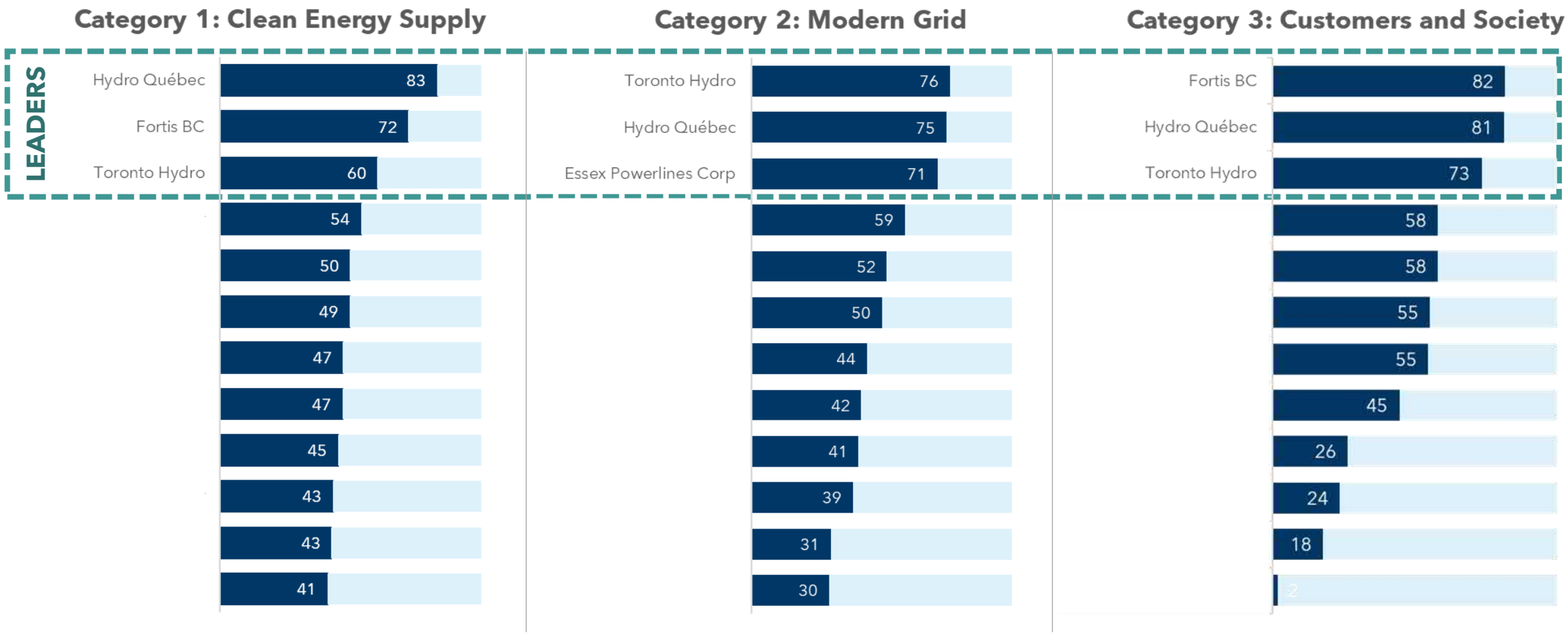
In many cases, utilities' actions are constrained by the boundaries of their regulatory and/or policy environment.

While the overall score is important, understanding how utilities scored across indicators that contributed to the total score tells a more complete story. We discuss this in more detail next.



Results by Category

There are 100 total possible points in each category and a different utility takes the top spot across each of the three major categories.



Clean Energy Supply: Overview

1 Clean Energy Supply

1.1 Planning & Designing to Decarbonize the Grid	1.2 Clean Energy Procurement & Deployment	1.3 Integration of Clean Energy Supply	1.4 Corporate Leadership

Planning, procuring and deploying clean energy is key to the clean energy transition. The current share of clean energy, the pace and approach to further decarbonize and corporate leadership is critical to transform our electricity sector to net zero by 2050.

Under Clean Energy Supply, we assess utilities on the following:

1.1. Planning & Designing to Decarbonize the Grid. Explicit clean energy commitments, the depth of those commitments, the timeframe to achieve them, and if utilities have a comprehensive plan to do it.

1.2 Clean Energy Procurement & Deployment. Utilities' current share of non-emitting supply and procurements for clean energy

1.3 Integration of Clean Energy Supply. Where ancillary markets exist, do clean energy resources have access to ancillary services payments and what are utility DER interconnection times and processes.

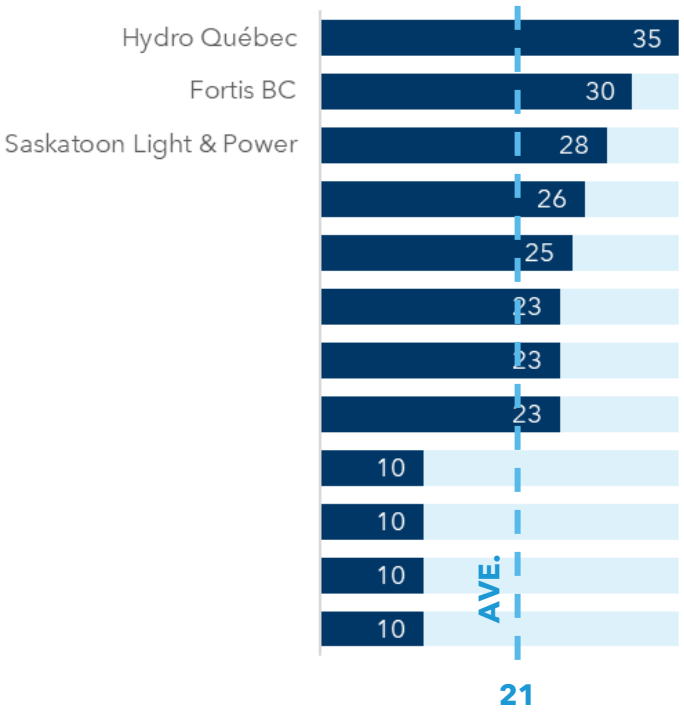
1.4 Corporate Leadership. Leadership, transparency, and accountability needed to facilitate the transition.



1 Clean Energy Supply

1.1 PLANNING & DESIGNING TO DECARBONIZE THE GRID

POINTS AVAILABLE **35**



Utilities and their partners (e.g., system operators, provincial government) have a key role in developing robust and actionable visions for a decarbonized grid. To achieve our net zero goals we need provinces, territories and regulators to set clear direction and for utilities to align their plans with net-zero pathways.

- **Clean grid goals are more often set provincially than at the utility level**. Three out of four provinces with carbon emitting generation resources have established decarbonization goals. Ontario is the exception: despite having a relatively clean grid, it is the only province that has not committed to maintaining existing and/or further decreasing its grid carbon intensity in the coming years. Ontario is now soliciting bids for new gas-fired power plants when several nuclear stations will be refurbished. If it proceeds, this will be Ontario's biggest increase in gas-fired generation in over a decade.[1]

- **Declared clean grid goals vary substantially.** Alberta aims for 30% by 2030, Saskatchewan 40% by 2030, and New Brunswick 100% by 2035. The federal Clean Electricity Regulation requiring 100% non-emitting generation by 2035 thus represents a considerable acceleration for some provinces. BC's and Québec's grids are already 99% clean, with plans to decarbonize remaining remote generation. While remote microgrids make up a small amount of production, they can be challenging to decarbonize.

- **As of 2021, several participating utilities had undertaken preliminary assessments of net-zero pathways, but most had yet to put together comprehensive plans (budgeted and timed) to achieve their targets.** In at least one case, a plan was in development (expected 2023), and in other cases plans existed for initial steps without covering the whole transition. Two of the three provinces with clean grid goals were on or above track towards meeting them (Alberta and New Brunswick). Only Saskatchewan was slightly short of its target, due to construction delays resulting from the covid-19 pandemic.

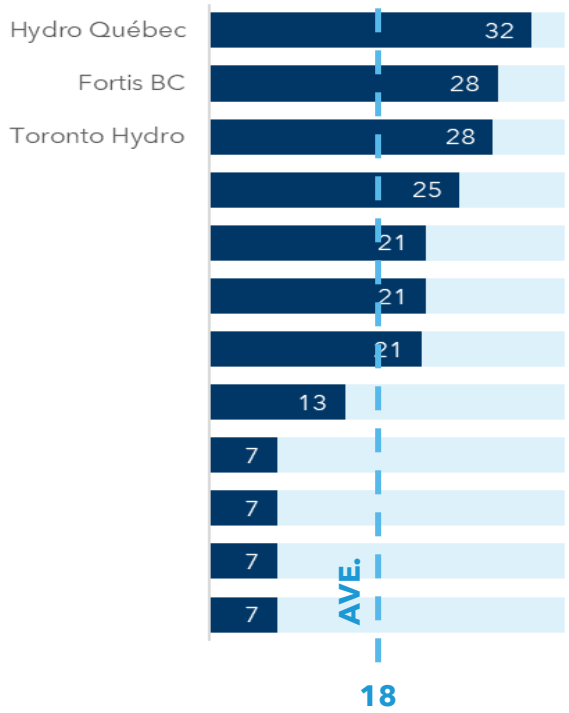
1. Source: IESO accessed at https://www.ieso.ca/en/Sector-Participants/Resource-Acquisition-and-Contracts/Long-Term-RFP-and-Expedited-Process In 2017, gas- and oil-fired generation was 4% of Ontario's electricity supply. By 2022, that figure reached 10.4%. Nuclear declined from 63% to 53.7% while Hydro Wind and Solar only increased from 33% to 36.3%. Source: IESO accessed at https://www.ieso.ca/en/Power-Data/Supply-Overview/Transmission-Connected-Generation..

SASKATOON LIGHT & POWER: Despite having limited control over provincial generation, the City of Saskatoon, which owns Saskatoon Light & Power, has developed a comprehensive implementation plan, *Alternative Currents*, for a low-emission energy transition, with specific actions and timelines to promote local baseload and distributed generation, storage, energy efficiency, and other measures.

1 Clean Energy Supply

1.2 CLEAN ENERGY PROCUREMENT & DEPLOYMENT

POINTS AVAILABLE **35**



A clean energy future requires the transformation of a utility's total retail energy supply, changes to energy procurements and actions to reduce barriers to clean energy technology deployment.

- **Most sampled utilities do not directly control generation and are thus dependent on the state of the provincial grid.** Large, vertically integrated crown corporations like Hydro-Québec, New Brunswick Power and SaskPower constitute the exception.
- **The share of non-emitting generation varied widely across Canada**, from 99% in BC and Québec, to 80-90% in New Brunswick and Ontario, and 15-25% in Saskatchewan and Alberta. The associated grid emission intensities accordingly also varied greatly. Utilities with significant share of non-emitting resources from legacy hydro and nuclear power had a natural advantage.
- **Procurement strategies for renewable energy generation varied from targeted to agnostic.** Half the reviewed jurisdictions (BC, NB and QC) exclusively procured renewable generation capacity, while two others (ON, SK) had released some dedicated renewable procurements. Only AB had not posted dedicated renewable procurements, though several projects were nonetheless under way.
- **As of 2021, a small majority of utilities were proactively undertaking actions that reduce or remove barriers to the deployment of clean technologies.** This includes seven of 12 utilities of various types, sizes, and regions. Actions include forms of information-sharing (e.g., feeder lists, developer manuals, hosting capacity maps, customer costing frameworks), integrated approaches to interconnections (such as a 'Power Generation Partners Program' to accompany clients through the journey), and transmission investments to increase the interconnection potential. The remaining five utilities reported no facilitating actions, beyond minimal regulatory requirements.

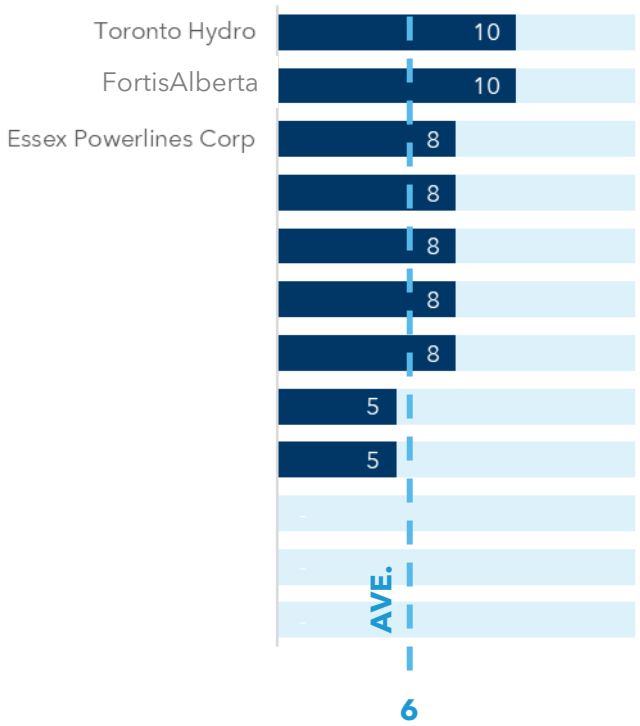
HYDRO-QUÉBEC: Hydro-Québec's own generation projects and procurement opportunities are exclusively for renewable energy – some exclusively for wind power, other for any type of renewable generation. Moreover, it has laid out a plan to decarbonize 80% of remote, diesel-powered microgrids by 2030, through a combination of transmission lines and distributed generation and storage.[1]

[1] See http://news.hydroquebec.com/en/press-releases/1815/hydro-quebec-reaches-a-major-milestone-in-the-decarbonization-of-its-off-grid-systems/.

1 Clean Energy Supply

1.3 INTEGRATION OF CLEAN ENERGY SUPPLY

POINTS AVAILABLE 15



As the penetration of intermittent renewables increase, procurement mechanisms and ancillary services market designs and rules may need to be modified. Additionally, streamlining and improving interconnection procedures will increase efficiencies and allow utilities to process more large-scale renewable interconnection requests, and accommodate newer and more complex systems.

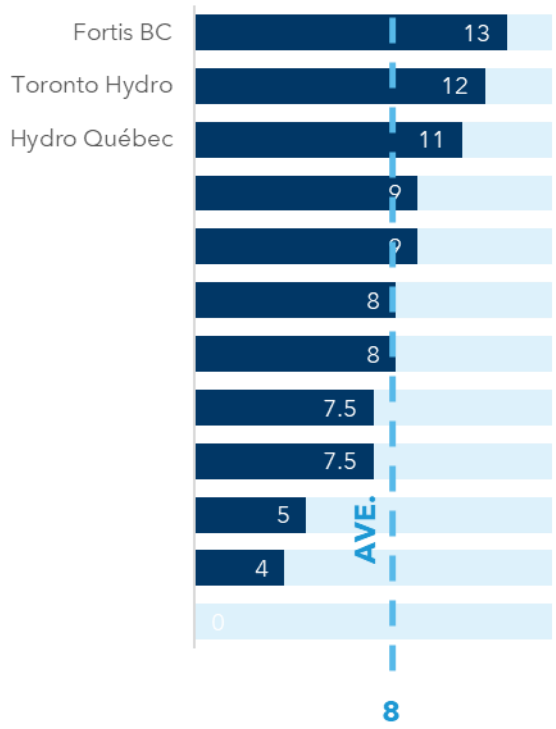
- **Canada is still "behind" in general with only one utility obtaining more than 50% of the points** in this metric.
- **Access to ancillary services payments for distributed energy resources (DERs) is limited**. As of 2021, no utility reported full access to ancillary services payments for clean and distributed energy resources. Such access was under consideration in the deregulated electricity markets (Alberta, Ontario), but its future remained unclear in other jurisdictions, which mostly do not operate through market mechanisms and include ancillary services on an ad hoc basis, if at all.
- **The typical time to *approve* interconnection requests for large-scale renewable projects (>5 MW) was half a year or less**, once correct documentation is submitted, and payment received. This period covers the part of the process within utilities' control (e.g., conducting a connection impact assessment) and usually varies depending on project size and regional requirements. Time to *commission* a project may be substantially longer, influenced by parties other than the utility. Of note, half of the reviewed utilities had not yet experienced any or enough large-scale renewable project requests to determine a 'typical time'.
- **As of 2021, only a third of utilities were undertaking or planning steps to improve/streamline large-scale interconnection processes**. Steps include undertaking customer journey mapping exercises, sharing documentation (e.g., hosting capacity maps, interconnection requirements), and engaging with developers. The remaining utilities were not undertaking or facilitating steps, mostly because they were not expecting large-scale interconnections in their service territory.

ONTARIO: Clean distributed energy resources (e.g., storage, distributed generation, demand response) have partial access to some IESO markets for ancillary services, such as operating reserves. The IESO is working with stakeholders to further enable DER participation in its' markets.

1 Clean Energy Supply

1.4 CORPORATE LEADERSHIP

POINTS AVAILABLE **15**



In addition to decarbonizing the grid and supporting customers, utilities will need to make the clean energy transition a core mandate within their organization and culture. This includes leading by example to decarbonize corporate buildings and operations, linking executive compensation to carbon-reduction goals, and being accountable through transparent tracking and reporting.

- **Corporate emission reduction targets and plans have become an industry standard. As of 2021, all but one utility had a corporate sustainability plan and/or initiatives**, **but the nature of the plans vary widely**. Several plans – mostly of smaller utilities - focused on isolated initiatives, such as employee days, safety training, local outreach, headquarter efficiency measures, etc. Some larger utilities had comprehensive environmental, governance and social (ESG) objectives related to their environmental impact, human resources practices, etc. Of note, some medium-sized utilities had comprehensive plans due to their links to a larger parent entity (e.g., municipality or large corporation).

- **As of 2021, two thirds of utilities had targets in place related to the decarbonization of their own operations (e.g., buildings, fleet), but the target years and depths vary**. The most ambitious utility aimed to be net zero by 2030, while another targeted 2040, three targeted 2050, and another three had interim decarbonization targets without any net zero commitment. Finally, four utilities (mostly small) had not declared their decarbonization ambitions, though some have pursued isolated initiatives to reduce their carbon footprint.

- **Three quarters of utilities had a public sustainability report to track their progress and accountability**. However, as with plans, the quality of reporting varied widely, ranging from general brochures about sustainability initiatives to consistent and comprehensive tracking and reporting on the indicators laid out in the corporate sustainability plan. Few utilities resorted to independent verification and reporting of their progress.

- **Only two utilities have tied executive performance and compensation to the achievement of corporate decarbonization objectives**, and none to grid decarbonization. See leader spotlight for an example.

FORTIS BC: At FortisBC, sustainability performance measures for annual incentive purposes focus on climate, people, and reliability. In 2022, the weighting of climate will increase to 40% from 30%, and long-term incentive plans will include a measure associated with reducing corporate carbon emissions for all executives.

Clean Energy Supply: Additional Spotlights

FORTIS BC: Fortis BC's 2021 Long Term Electric Resource Plan (LTERP) aligns with BC's environmental goals and ensures consistency with provincial energy policies and objectives.

1 Clean Energy Supply

- 1.1 Planning & Designing to Decarbonize the Grid
- 1.2 Clean Energy Procurement & Deployment
- 1.3 Integration of Clean Energy Supply
- 1.4 Corporate Leadership

TORONTO HYDRO: Toronto Hydro executives are eligible for performance-based compensation tied to corporate objectives. Two of these objectives aim at managing climate related risks and opportunities: Building Emissions Reduction and Fleet Electrification.

Modern Grid: Overview

2 Modern Grid

2.1 Enhanced Grid Planning & Management	2.2 DER Enablement & Integration	2.3 Visibility & Control Capabilities	2.4 Innovation & Emerging Technologies	2.5 Climate Resiliency

A modern, smart, and dynamic grid is crucial to enable utilities to decarbonize the grid, enable greater electrification, prepare for climate impacts, and respond to shifting customer needs and preferences. This will require advanced grid capabilities, planning and operations, greater visibility and control, and a willingness to innovate.

Under Modern Grid, we assess utilities on the following:

2.1 Enhanced Grid Planning & Management. Efforts to modernize or enhance load forecasting tools and planning processes.

2.2 DER Enablement & Integration. The portion of peak demand/system capacity represented by Demand Response (DR), share of energy savings from energy efficiency, how utilities are valuing Non-Wires Alternatives (NWAs), and whether utilities have a formalized DER strategy and/or roadmap.

2.3 Visibility & Control Capabilities. Current AMI coverage and capabilities, deployment of DERMS, SCADA, and ADMS.

2.4 Innovation & Emerging Technologies. Funding and/or spending on innovation, research and innovative pilots.

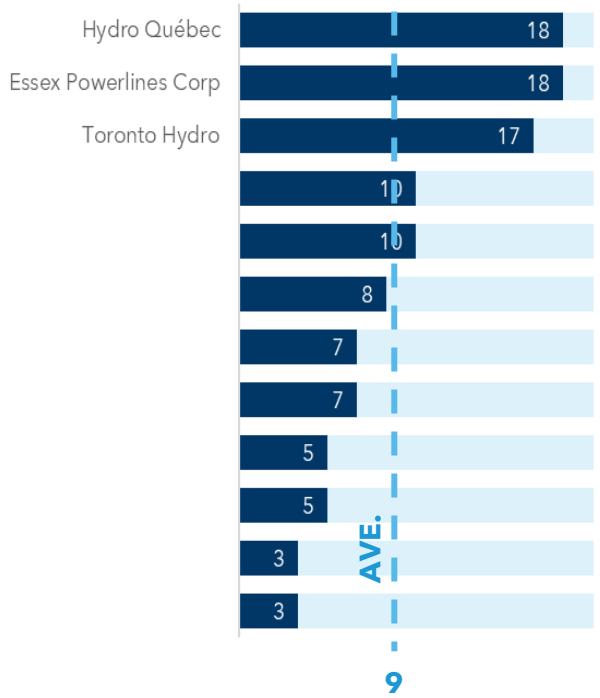
2.5 Climate Resiliency. Actions taken to fortify the grid to protect critical infrastructure and/or services during extreme climate events.



1 Modern Grid

2.1 ENHANCED GRID PLANNING & MANAGEMENT

POINTS AVAILABLE **20**



Grid planning must evolve to manage a complex mix of diverse, distributed and intermittent resources, and address increasingly localized grid challenges. This includes updating load forecasting practices to enhance their granularity and ultimately may require reframing utilities' roles, from one-directional to bidirectional operators.

- **As of 2021, all but one utility were modernizing or enhancing their load forecasting tools and processes to account for renewable growth, climate change, and/or vehicle electrification.** Several utilities were working with consultants and specialized service providers. Some utilities reported facing challenges calibrating existing studies and tools to their local contexts and customers.
- **Three quarters of utilities had DER forecasting capabilities**. Of these, two thirds relied on basic, top-down forecasts, with only three utilities – including at least one small utility – using bottom-up or advanced modelling to forecast DER adoption.
- **Most load forecasts were at the system level and on an annual or seasonal basis**, but two utilities – including at least one small utility – generated load forecasts that are both localized (at the bus level) and on a year-round, hourly basis ("8760", for the number of hours in a year) to capture the increased pressure on their distribution systems.
- **Half of assessed utilities were actively updating their operational model in the context of the energy transition**, for instance by developing a "Grid Transformation Roadmap". The other half had not laid out a comprehensive plan as of 2021.[1] Moreover, only two utilities were explicitly planning changes to their business model, such as transitioning to a Distribution System Operator (DSO) model – see leader spotlight for an example.

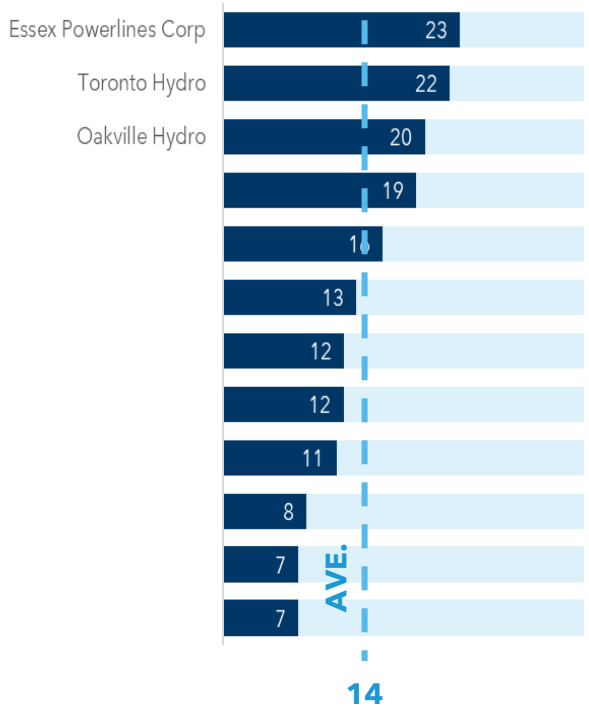
ESSEX POWERLINES CORP.: Essex implemented advanced temporal and spatial forecasting capabilities providing year-round hourly load forecasts. Moreover, their *SmartMAP* application, connected to their main dashboard, detects EV's and DER enhancing visibility of localized network impacts. Essex's 2021 application to the IESO Grid Innovation Fund outlines a roadmap to transform into a DSO.

[1] Some Ontario utilities pointed to the IESO's 2019 report about "Structural Options for Ontario's Electricity System in a High-DER Future", see https://ieso.ca/Sector-Participants/IESO-News/2019/06/ETNO-releases-report-on-system-options-in-a-high-DER-future.

2 Modern Grid

2.2 DER ENABLEMENT & INTEGRATION

POINTS AVAILABLE **35**



To support the transition, utilities will need to integrate more DERs, consider non-wires alternatives (NWAs), address peak demand and system capacity, incorporate energy efficiency (EE) and demand response (DR) initiatives, streamline and improve DER interconnection processes, and manage the distribution system.

- **Few utilities – principally vertically integrated crown corporations – had a mandate for delivering EE and DR programs and savings**. In several provinces, public agencies or system operators administer programs, if any. Scores here are thus based on provincial savings as a percentage of domestic electricity sales (GWh) or annual peak demand (MW). Savings were highest in ON (0.75% of sales, 7.5% of peak) and QC (0.75% of sales, 4.5% of peak), followed by SK for peak savings (2%) and by AB, NB and BC for energy savings (0.5-0.6% of sales). By contrast, leading American states achieve over 2% of sales in savings.[1]
- **As of 2021, no utility had developed a comprehensive process for valuing DERs as NWAs**. Half had conducted preliminary research, for instance developed an "NWA staff toolkit" or "DER Value Registry", or reviewed approaches in other jurisdictions. The other half had not yet undertaken any steps.
- **No utility used DERs for ancillary services**. Two utilities in deregulated markets (AB, ON) were awaiting regulatory enablement to do so, while one large utility was running pilots (black start, frequency regulation).
- **Two thirds of utilities had a DER strategy or roadmap**, **though the level of detail varied** from basic documents to comprehensive, costed plans. Some DER strategies were integrated into a wider transformation vision (e.g., a grid modernization roadmap). The remaining third of utilities – of various sizes – had no formal plan or strategy related to DERs.
- **Interconnection processes and timings for small-to-medium renewable projects varied across and within jurisdictions, with no harmonized steps.** Timelines range from 14 days to 3 years (avg of 150 days) for medium-scale projects of 10 kW to 5 MW, and from 1 day (automatic approval) to 365 days (avg 61 days) for small projects below 10 kW. Two thirds of utilities were actively working to reduce these times. Measures include distributed generation maps, customer journey maps, restricted feeder lists, developer manuals and outreach.

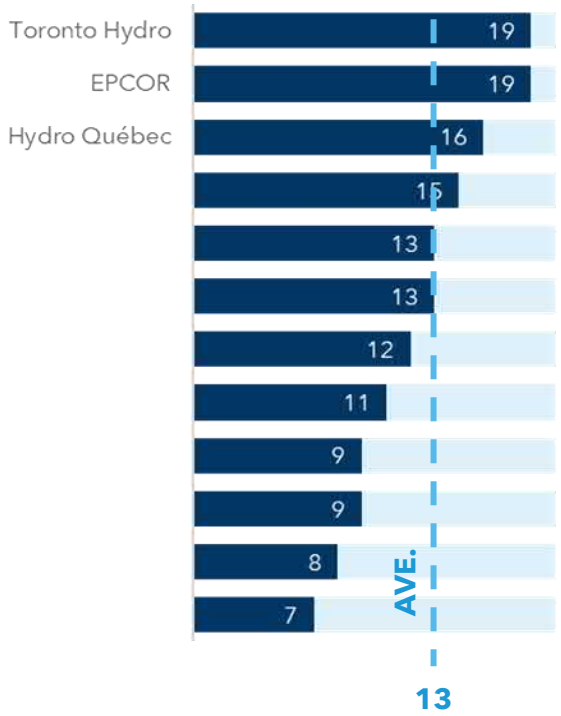
OAKVILLE HYDRO: Oakville Hydro's distribution plan was reviewed by third party consultants to assess DER/NWA opportunities as alternatives to planned grid investments. Additionally, all 12 micro-embedded generation facilities added to the local grid in 2021 were connected within planned timelines.

[1] Data for Canada from Efficiency Canada's 2022 Canadian Energy Efficiency Scorecard (data for 2021), and for the United States from the ACEEE State Energy Efficiency Scorecard: 2021 Progress Report, p.17 (data for 2020).

2 Modern Grid

2.3 VISIBILITY & CONTROL CAPABILITIES

POINTS AVAILABLE **20**



To effectively and safely operate increasingly diversified grids, utilities need an advanced understanding of assets' locations and capabilities. This requires enhanced visibility and control capabilities, using software solutions (e.g., AMI, ADMS, SCADA), and distribution automation.

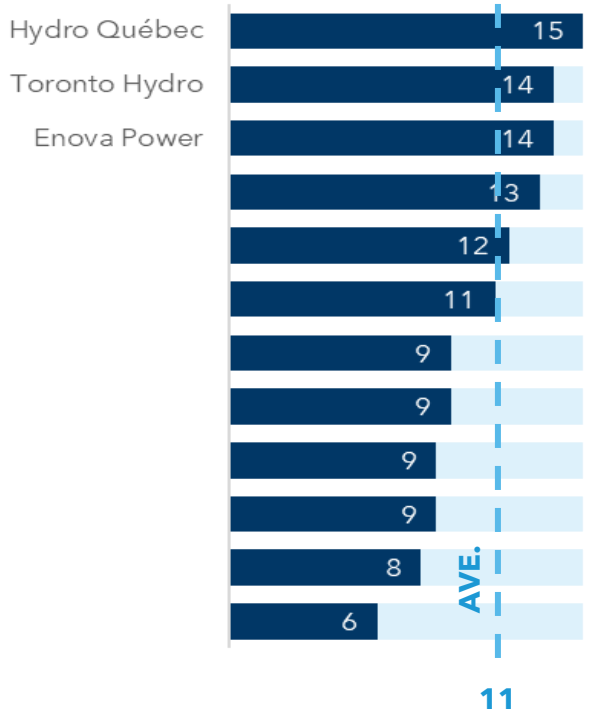
- **AMI deployment is very advanced across Canada**. As of 2021, all but two utilities had deployed AMIs to 90+% of customers. Both remaining utilities were planning mass deployment, although a global microchips shortage slowed plans in one case.
- **Just over half of utilities leverage AMI capabilities beyond basic metering**, such as two-way control (e.g., remote disconnection), outage detection, power quality analysis, energy theft detection, etc. The remainder of utilities had either metering-only capabilities or did not have AMIs.
- **Only two utilities had deployed DER Management Systems (DERMS)**, with two other utilities in advanced planning stages. Utilities using or considering DERMS were more likely to be large. Utilities were primarily drawing on DERMS from external service providers, with some using funding from Natural Resources Canada (NRCan) to support DERMS deployment.
- **All except one (small) utility had deployed a Supervisory Control and Data Acquisition (SCADA) system as of 2021 or were about to do so**. Some utilities had deployed SCADA for their transmission system only and were only about to deploy it at the distribution level.
- **Three quarters of utilities had deployed an Advanced Distribution Management System (ADMS)** as of 2021 or were about to do so. Only three utilities had no ADMS or short-term plans to deploy one, ranging across different provinces and size categories. Moreover, several utilities of various sizes have recently deployed Fault Location Isolation and Service Restoration (FLISR) technology.

EPCOR: Over 99.9% of customers have AMI, and EPCOR has deployed ADMS, SCADA, and DERMS. The DERMS was supported by NRCan funding in 2018 and was being tested with the integration of E.L. Smith solar farm and a Battery Energy Storage System (BESS).

2 Modern Grid

2.4 INNOVATION & EMERGING TECHNOLOGIES

POINTS AVAILABLE **15**



Innovation, deployment of new technologies, strategic investments and collaboration with external partners will be needed to overcome today's challenges and achieve net zero by 2050.

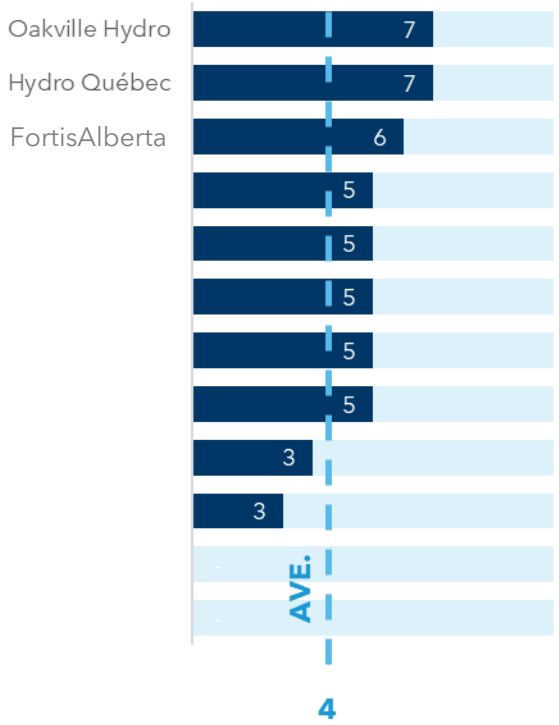
- **Two thirds of utilities had dedicated envelopes for innovation and research in 2021**, with a third spending more than 1% of revenue, another third less than 1%, and the final third unable to provide a figure as costs were distributed across multiple budget lines and not earmarked for "innovation" specifically.
- **Large utilities are more likely to afford dedicated research and innovation budgets** (e.g., Hydro Québec's research division), but one medium and one small utility also had large innovation budgets. Several are leveraging innovation funding, such as the IESO's Smart Innovation Fund, or NRCan's smart grid funding.
- **All but two utilities had a dedicated innovation resource team or staff member**. Innovation is sometimes, but not always, explicitly part of the role description, with one utility for instance describing its Grid Transformation Team as its innovation lead. The two remaining utilities noted they pursue innovation in a cross-cutting way, without a designated resource.
- **All but two utilities demonstrated practical applications of their investments into visibility and control capabilities**, such as improved geographic information systems (GIS), data and enterprise analytics, system interoperability (GIS, ADMS, SCADA, AMI), DER mapping, or outage management (see leader spotlights). However, the value of these applications could rarely be quantified.
- **All but one utility were running innovative pilots/projects as of 2021**, with innovation defined relative to their context. Initiatives include process innovations (robotic process automation, data visualization tools), program innovations (EV demand response pilot, smart water heater pilots), organizational innovations (transitioning towards an integrated distribution system operator role), and asset-based innovations (mobile battery energy storage system, use of optical ground wire as both transmission neutral wire and internet cable).

ENOVA POWER: Enova established an Innovation and Business Transformation department and created a Manager of Innovation position. A formal innovation strategy is under development and an additional resource is planned to assist advance innovation and new technologies. Already, the implementation of a Fault Location Isolation and Service Restoration (FLISR) technology led to a 33 percent decrease in Customer Minutes of Interruption in 2021 for residents in Waterloo, Woolwich and Wellesley.

2 Modern Grid

2.5 CLIMATE RESILIENCY

POINTS AVAILABLE **10**



As our climate changes, utilities will need to anticipate, plan for and mitigate impacts to critical infrastructure that can affect their ability to deliver safe and reliable service. Utilities' must also consider their exposure to climate risk, which could impact their financial risk rating.

- **As of 2021, three quarters of utilities were pursuing several actions to protect critical infrastructure and services during extreme climate events**. Actions include developing a climate adaptation and management plan, setting up a storm operations center, reducing vegetation risk, modifying pole design to withstand more extreme or frequent weather events (ice storm, fires, floods), modifying materials (composite poles, stainless steel transformers), oversizing equipment, funding battery storage in remote areas, etc. One (large) utility cited its ISO 14001:2015 certification in this regard, as well as using the Public Infrastructure Engineering Vulnerability Committee Protocol developed by Engineers Canada.
- **However, initiatives are rarely part of an integrated plan**. Only a few utilities have developed a comprehensive plan, such as the "Climate Adaptation and Management Plan" or the "Climate Change Adaptation Roadmap" developed by one medium and one large utility, respectively.
- **Moreover, only a third of utilities explicitly consider climate change scenarios in their planning processes**. While several utilities report on climate change risks and some consider climate change in weather forecasts (wind, rain), only four utilities (one small, one medium, two large) have incorporated scenario analysis into their planning. The most elaborate analyses were undertaken by utilities which have made an organizational commitment to analyse and report risks against global standards, for instance Fortis BC and FortisAlberta (see leader spotlight).

FORTISALBERTA: A Task-Force on Climate-Related Financial Disclosures (TCFD) report was completed in 2021. The TCFD analyzed four climate scenarios and their possible impacts (transition, physical climate risks). FortisAlberta has since developed asset management programs to build grid resiliency (e.g., Wildfire Risk Mitigation Plan with specific actions).

Modern Grid: Additional Spotlights

EQUS REA: Since 2018, EQUS REA has deployed a next generation Ultra-Rural Radio Frequency mesh network of advanced metering infrastructure to automate meter readings, and support the increased penetration of renewable energy sources, EV charging stations, and storage systems. The project aims to address challenges associated with serving rural customers while improving response times and repairs to outages. Separately, EQUS inaugurated a new near net-zero facility in Innisfail in 2020, which incorporates a solar array and a 15-kilowatt battery.

2 Modern Grid

2.1 Enhanced Grid Planning & Management	2.2 DER Enablement & Integration	2.3 Visibility & Control Capabilities	2.4 Innovation & Emerging Technologies	2.5 Climate Resiliency

NB POWER: NB Power is taking several climate resiliency actions to protect critical infrastructure and/or services. For example, both transmission and distribution have right of way line widening programs to reduce vegetation risks, transmission line designs consider expected weather events, and distribution line standards ensure structure designs do not exceed 75% of structure strength (to provide buffer for ice loading, etc.). Salt contamination zones due to potential flooding are defined, and special design considerations and materials are used in these areas.

Composite poles are being implemented through pilots in 2023.

Customers & Society: Overview

3 Customers & Society

3.1 Changing Customer Preferences	3.2 Enabling Transport, Building & Industry Electrification	3.3 Being Intentional About Diversity, Equity & Inclusion	3.4 Aligning Actions & Engagement

Electrification presents a significant economic opportunity for Canada's electric utilities. New technologies and platforms are increasing customers ability to participate in the energy transition and utilities can play an important role to educate, engage and enable customers to electrify their buildings, transportation and industry. Comprehensive and meaningful stakeholder engagement must be part of the process to inform all decisions, empower customers, obtain support and buy-in and ensure a just and equitable transition.

Under Customers & Society, we assess utilities on the following:

3.1 Changing Customer Preferences. Digital platforms, rate-based solutions, and awareness, education and energy services.

3.2 Enabling Transportation, Building & Industrial Electrification. Comprehensive electrification strategies and initiatives to catalyze transportation, buildings and industrial electrification.

3.3 Being Intentional About Diversity, Equity & Inclusion. Diversity, equity and inclusion goals and actions to ensure a diverse and inclusive workforce and mitigate impacts to vulnerable populations.

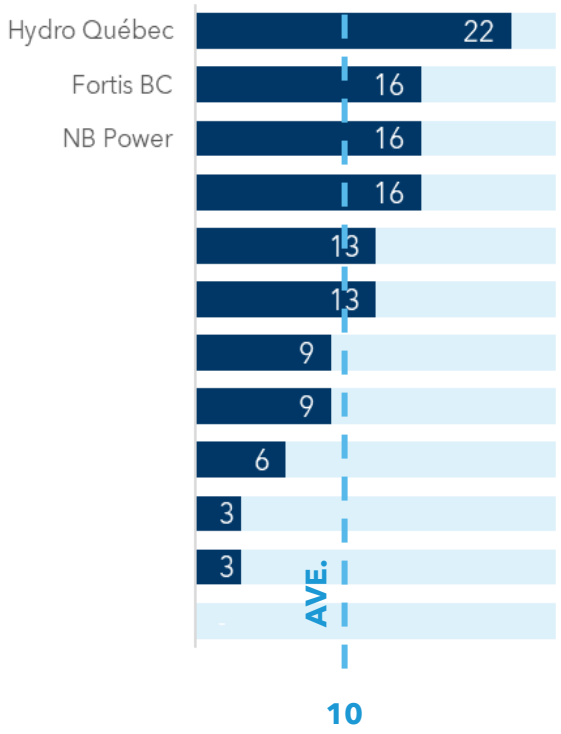
3.4 Aligning Actions & Engagement. Alignment, strategic partnerships and collaboration to facilitate the transformation



3 Customers & Society

3.1 CHANGING CUSTOMER PREFERENCES

POINTS AVAILABLE **25**



Utilities have an important role to play in raising awareness and empowering their customers to participate in the clean energy transition. This includes offering tailored products and services that enhance customer experience.

- **As of 2021, most utilities offered portals that allowed customers to view their consumption, but less than half offered additional support to help customers to act on the data**. Only four utilities offered digital engagement tools to support energy efficiency and building energy benchmarking, such as Home Energy Reports, Energy Star Portfolio Manager, Green Button,[1] or an online rebate marketplace.
- **Canada was split in terms of dynamic pricing, with half the reviewed jurisdictions/utilities offering it**. All Ontario utilities as well as two other utilities offered dynamic pricing. The other six utilities had yet to introduce rate-based solutions or investigate cost-drivers that could influence consumer behavior.
- **All utilities worked to build awareness and educate customers on the clean energy transition**. All offered basic education to engage customers, such as dedicated webpages for EVs, DERs and/or energy saving tips, media campaigns, bill inserts and tools/resources (e.g., developer manuals). One leading utility offered information in multiple languages and established an Indigenous customer care center. In one jurisdiction, utilities flagged that they had filed regulatory requests to support education initiatives but were denied.
- **Half the utilities were delivering services and solutions to remove barriers to increased electrification and efficiency**. Solutions included incentive programs for EVs and building efficiency, investments in charging infrastructure, renewable subscription services for commercial and industrial customers to buy renewable energy certificates to support their own carbon reduction targets, heat pump and smart thermostat programs. Some utilities were working with clean tech companies and seeking external funding to explore, pilot and/or design new initiatives (e.g., renewable generators, energy storage systems).

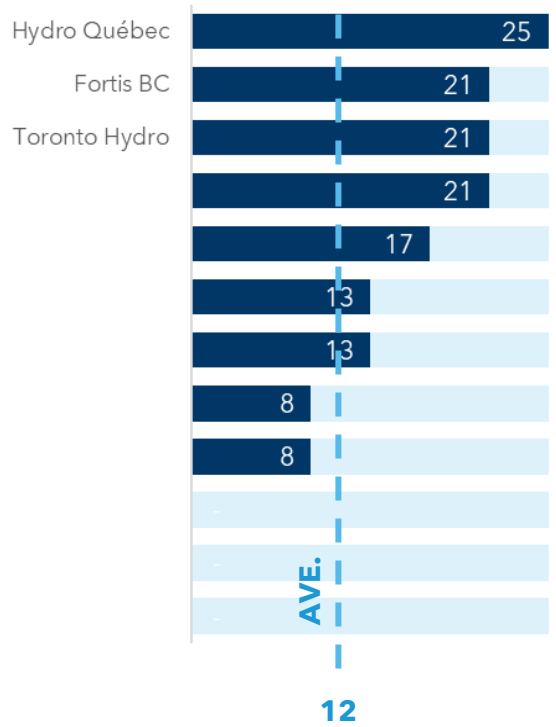
NB POWER: NB Power offers personalized energy management and peer-to-peer comparisons (e.g., Home Energy Reports and Energy Start Portfolio Manager). NB Power also launched new initiatives (e.g., Beat the Peak campaign and EV charging rebates) and is developing others, including a clean energy rate.

[1] The Green Button initiative is an industry-led effort that aims to provide utility customers with easy and secure access to their energy usage information in a consumer-friendly format for electricity, natural gas, and water usage.

3 Customers & Society

3.2 ENABLING TRANSPORT, BUILDING AND INDUSTRY ELECTRIFICATION

POINTS AVAILABLE **15**



As the grid decarbonizes, utilities should help to enable transportation, buildings and industrial electrification. To do so effectively requires careful planning and thoughtful discussion to identify and maximize opportunities.

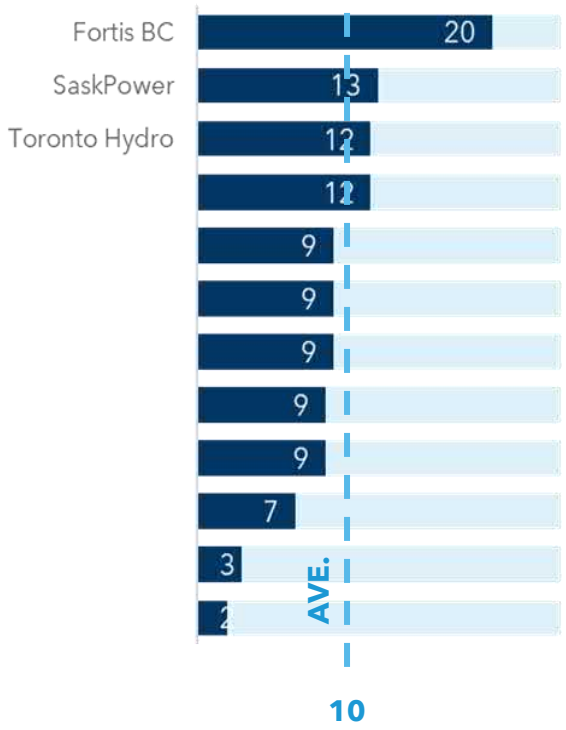
- **Only half the utilities had developed electrification strategies, and only two had done so in a comprehensive multi-sector way.** One utility had centered its strategic plan on enabling the electrification of the local economy, while another had developed a climate action plan that considers the role of the utility in supporting actions, like electrification, that combat climate change and spur equitable economic growth. Four other utilities had draft electrification strategies and the remaining six utilities had no plan as of 2021.
- **Most utilities were undertaking actions to enable electrification, but often in a siloed or *ad hoc* manner.** Nine utilities offered programs or services to catalyze electrification, for instance dedicated account managers supporting large customers with building or transport electrification, or pilot projects related to EV smart charging or tariffs. Of the nine utilities with services, four focused on electrification in only one sector (e.g., transportation or buildings), rather than across multiple.
- **Electrification in certain sectors is challenging, and several utilities are pursuing hybrid approaches**. One utility is partnering with a gas utility to encourage a dual-fuel approach for peak demand management along with a dual-energy rate. Another is investigating hybrid systems while focusing on decarbonizing the gas supply for thermal applications.

HYDRO-QUÉBEC: A key pillar in Hydro Québec's 2020-2024 Strategic Plan is to Electrify Quebec. Hydro Quebec subsidiaries (EVLO, Hilo, Cléo) offer energy storage, smart energy management and transportation electrification solutions that help reduce GHG emissions, while generating economic spin-offs and collective wealth across the company and society.

3 Customers & Society

3.3 BEING INTENTIONAL ABOUT DIVERSITY, EQUITY & INCLUSION

POINTS AVAILABLE **25**



The energy transition could disproportionately impact vulnerable communities unless utilities actively assess and consider the community impacts and prioritize and entrench equity in all decisions. Currently, Canada's electricity workforce has lower representation of women, BIPOC (black, indigenous and people of color), persons with disabilities, 2SLGBTQI+, and newcomers than what is reflected in the general population.[1] Establishing diversity, equity and inclusion (DEI) goals and actions, setting targets and tracking progress are necessary to create a diverse and inclusive workforce and to ensure a fair, just and equitable transition for all.

- **As of 2021, all but one utility had some kind of workplace DEI policy or strategy – but only five were comprehensive**, with baselines, representation targets, training, and dedicated DEI communications. Four utilities were signatories to the Leadership Accord on Diversity, Equity and Inclusion developed by Electricity Human Resources Canada, making a public commitment to advance, integrate and prioritize DEI. Others have achieved or are pursuing the Canadian Council of Aboriginal Business (CCAB) Progressive Aboriginal Relations (PAR) certification. The remaining half of utilities had only draft/basic plans, or no plan at all.
- **Community-wide DEI strategies, goals and targets were less common or clear, and there were few mechanisms to track progress and impacts.** Only one utility had a comprehensive strategy. Eight utilities offered underserved community programs (e.g., low-income, First Nations, multifamily, small business), with programs ranging from self-install energy saving kits to comprehensive turnkey solutions at zero upfront costs. Several utilities did not offer programs, but not always for lack of desire: one utility's regulatory application for a "Low Income Energy Efficiency Initiative" was rejected.
- **None of the benchmarked utilities or provinces spent 20+% of their Demand-Side Management (DSM) portfolio budgets on programs for vulnerable sectors in 2021.** Leading utilities in other jurisdictions have committed or been mandated to allocate 20% of DSM portfolio spend towards low-income programs.[3] This recognizes that different levels of investment and types of services and supports are needed to achieve the same outcomes for those most vulnerable.

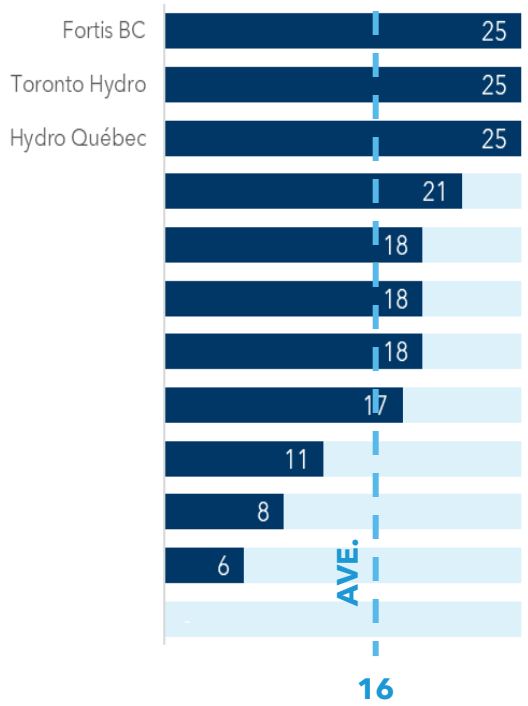
1 See https://electricityhr.ca/
2 The state of New York requires that 20% of any energy efficiency investments through the utilities be directed to the LMI market segment. For the 2017–21 District of Columbia program cycle, low-income spending requirement was 20% of expenditures. See Subramanian, S., W. Berg, E. Cooper, M. Waite, B. Jennings, A. Hoffmeister, and B. Fadie. 2022 State Energy Efficiency Scorecard. Washington, DC: ACEEE. www.aceee.org/research-report/u2206.

SASKPOWER: SaskPower has a robust Diversity & Inclusion Strategy, which outlines numerous initiatives, such as Advancing Women in Leadership and Trades, Indigenous Employees Network, Pride Employee Resource Group, Employees with Disabilities Network, Cultural Diversity Group, Women's Resource Group; and PowerGen (leadership development network) It also outlines a communications and tracking plan.

3 Customers & Society

3.4 ALIGNING ACTIONS AND ENGAGEMENT

POINTS AVAILABLE **25**



Aligning goals and conducting comprehensive engagement with a wide range of stakeholder groups is needed to ensure success. Engagement must be proactive, iterative and inclusive around key topics (e.g., clean energy, modern grid, electrification). This will help utilities to understand stakeholder needs and motivations; identify challenges, innovative solutions, and potential partnership opportunities; support decisions, and obtain buy-in for new investments and approaches required to meet net zero goals.

- **Only three utilities completely aligned with government climate ambition, while seven were partially or indirectly aligned.** There is large alignment by nature at utilities owned by provincial and municipal governments in Canada. In most cases, a municipality is the sole shareholder, and three utilities are crown corporations. Utilities that received lower scores in this metric are in jurisdictions that have noticeably lower GHG emissions objectives and no regulator and utility mandates. Utilities need clear direction from governments, regulators and system operators to focus planning and investments on net-zero pathways and expand their efforts beyond maintaining and decarbonizing the grid to increasing clean-electricity economy-wide energy use.
- **Utilities are increasingly proactive in collaborating with other stakeholders**, such as local and provincial governments, energy efficiency organizations, electricity systems operators and regulators to advocate for and advance clean energy, grid modernization and electrification. While all utilities had integrated resource planning engagement processes, only four had comprehensive engagement plans specific to the energy transition. Leading utilities had robust public relations/engagement and policy teams to proactively and deliberately engage on climate, regional planning and electrification. Five utilities only had a draft or basic engagement plan, while two had no plan.

TORONTO HYDRO: Toronto Hydro is working with the IESO on pilots and participates in numerous stakeholder sessions about the energy transition, DERs, NWAs, and regional planning process with other utilities. Toronto Hydro also works closely with the City of Toronto; Toronto Hydro's Climate Action Plan that details how they can support the City's Net Zero Strategy.

Customers & Society: Additional Spotlights

ONTARIO: All Ontario utilities offered time-of-use and tiered pricing. Price signals charge higher rates during peak periods and lower rates at off-peak hours to encourage customers to reduce their consumption and lower electricity costs by shifting their usage to lower price periods. Tiered pricing charges customers higher prices when consuming more.

A new ultra-low overnight rate was introduced in Ontario in 2023 for customers that use more electricity at night, including shift workers, those that heat their home or charge their electric vehicles at night to save money when peak demand is lower.

3 Customers & Society

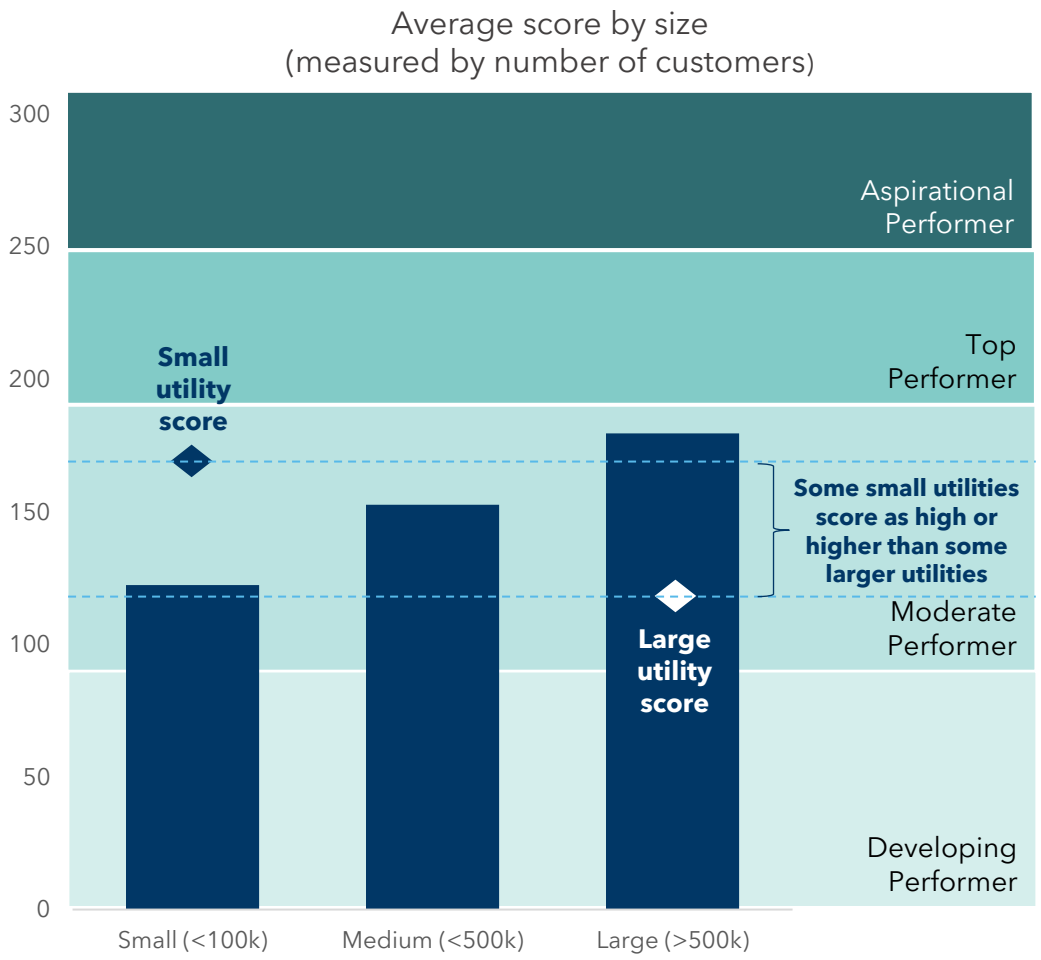
- **1.1 Changing Customer Preferences**
- **1.2 Enabling Transport, Building & Industry Electrification**
- **1.3 Being Intentional About Diversity, Equity & Inclusion**
- **1.4 Aligning Actions & Engagement**

EPCOR: EPCOR's 2021 comprehensive Environmental, Sustainability and Governance (ESG) Plan has established workplace DEI commitments and reports on the organization's progress. EPCOR has set targets at all levels across the organization and achieved or came close to achieving them in 2021. For example, the plan sets a Board Gender Diversity Target (at least 40% board are women), as well as an Employee Ethics Training Target (100% of eligible employees trained every second year).

Although no targets were set in 2021, EPCOR also reports on Diverse and Representative Workforce metrics (e.g., percentage of women, visible minorities, and women in senior leadership).

Utilities' average scores can be influenced by size, how clean the grid is, and ownership structure; however, these variables are not always indicators of success. Each utility is demonstrating leadership in various metrics and across the three main categories

- **SIZE:** Larger utilities tend to score more points, as they likely have more financial and non-financial resources to plan, execute, innovate and adopt best practices. However, some small utilities do well due to a combination of local innovation, jurisdictional opportunities and leveraging external funding sources. For example, one of the four small utilities achieves the fourth-best overall score.
- **GRID:** Utilities in jurisdictions with cleaner grids score higher on average. Those with already clean grids have a natural advantage in the clean energy supply category; however, this trend also applied to the two other dimensions (modern grid and customers & society). This may be because utilities with already-clean grids are able to devote attention elsewhere.
- **OWNERSHIP:** Crown corporations score highest on average, partly driven by their size, followed by municipally owned utilities, some of which are small. These utilities are organically aligned with government and community objectives.



Note: given the limited number of participating utilities, no statistically significant conclusions can be drawn about correlations or causations between performance and any utility characteristics.



4. Key Takeaways & Considerations

Ten Key Insights from the Results

INSIGHT 1	**Canadian utilities have embarked on the energy transition journey**. They recognize the climate emergency and have established plans to reduce emissions. While utilities are at various stages in the transition, every benchmarked utility demonstrated leadership in certain areas.
INSIGHT 2	**More effort is needed.** The pace and scale required to meet our net zero goals by 2050 and avoid the worst climate change impacts, requires greater leadership and ambition, comprehensive decarbonization and electrification strategies, detailed inclusive roadmaps, and the tools and resources to act. The clock is ticking; without accelerated action, several actors will be challenged to achieve their targets.
INSIGHT 3	**Utilities are a diverse group, which must be considered when comparing scorecard results, opportunities and solutions.** Utilities vary in terms of size, structure, services, context, and control over their environment. We must recognize this diversity when interpreting the results and crafting policy and/or regulations that will affect utilities. Where possible, utilities and others can leverage diversity of thought and approaches to adapt innovative solutions to their unique context. Jurisdictions with less clean grids will require substantial and coordinated support to quickly live up to their own goals, and in some cases, even more ambitious federal targets.
INSIGHT 4	**Utilities are facing a massive transformation**. An already complex electricity system is under greater pressure to continue to deliver safe, affordable and reliable electricity along with being clean, resilient and equitable. If not managed carefully, this transformation could leave some groups – including some utilities and their communities – behind.
INSIGHT 5	**Utilities can't do it alone and current government commitments and regulatory structures have constrained some utilities**. Government and regulators must give utilities concrete climate targets, direction and support to guide their net-zero pathways. Utilities need latitude to implement needed action and support to make significant investments to balance DER integration, facilitate greater electrification and resiliency, and enable customers to contribute to, and benefit from, the transition. In many cases, legislation and regulation needs to evolve to enable utilities and financial support is needed to complement utility investment.

Ten Key Insights from the Results

INSIGHT 6	**Utilities need a comprehensive strategy that covers all three dimensions of this transition**. All the scanned utilities are making progress and demonstrating leadership in certain areas, but more work is needed to effectively address and coordinate actions across all elements of the clean energy transition.
INSIGHT 7	**Distribution-oriented utilities have historically not been the main drivers of grid innovation but will become increasingly important as gateways for the integration of DERs into the grid**. As such, utilities will require considerable support (policy, regulatory, financial, technological) to increase deployment of, and leverage, DERs, including valuing DERs in ancillary services. Canada lags American and European jurisdictions in enabling and leveraging distributed grid flexibility.
INSIGHT 8	**Utilities are anchored in their communities and are thus valuable partners to relay information both ways**. It will be important for utilities to communicate messaging related to the energy transition to partners and customers and provide diverse services and solutions to help customers participate in, and contribute to, the transformation. Vice-versa, utilities can communicate customer needs, expectations and reactions to policy-makers to inform future policy.
INSIGHT 9	**More attention needs to be paid to equity implications of the transition**. Utilities are actively considering equity in the workplace to ensure that it is diverse and inclusive, but internal action has not yet translated to community-wide equity impacts and strategies (e.g., several utilities have set internal diversity targets and implemented actions, but most have yet to study community needs and establish comprehensive strategies to measure and mitigate the transition's impact on those most vulnerable).
INSIGHT 10	**Ultimately, the clean energy transition presents a significant opportunity for electric utilities and society**. Utilities' core service – deliver clean, safe, reliable and affordable electricity – is at the heart of the energy transition and set for significant growth. By becoming more sustainable, resilient, and efficient, electric utilities can contribute to communities' as well as to their own prosperity.

1 Clean Energy Supply

53/100

AVERAGE SCORE | High (80%+) | Mid (50-80%) | Low (>50%)

Reviewed utilities are at different stages of their decarbonization journeys, levels of commitment, degree of control over their supply and experience integrating variable clean resources at scale. While some benefit from existing non-emitting resources, others have only just begun the transition. Without bold leadership and accountability, utilities may be challenged to meet their corporate and community goals.

1.1 Planning & Designing to Decarbonize the Grid — 21/35

- Most jurisdictions had varying clean grid goals and timelines to achieve. These are often set provincially versus by utilities.
- Without commitment and accelerated action, several utilities will be challenged to meet federal clean energy regulations by 2035. Ontario demonstrates that procurements of fossil-based resources will continue in the absence of clean grid targets.
- As of 2021, almost all participating utilities have undertaken preliminary net-zero pathway assessments; however, few with clean grid goals had outlined a comprehensive plan to achieve these.

1.2 Clean Energy Procurement & Deployment — 18/35

- The share of provincial non-emitting generation varies widely, ranging from 15% to 99%. Jurisdictions with existing hydro and nuclear power have a natural advantage.
- Renewable energy procurement varies. While half of provinces studied procured renewable generation exclusively, 2 had some dedicated renewable procurements, and 1 (AB) did not earmark any.
- Distribution utilities rely on the state of the provincial grid with little control over the pace or scale of grid decarbonization, which affects scores (positively or negatively). However, they are expected to play an increasingly important role as a DER gateway into the grid.
- Several utilities were pursuing initiatives to reduce clean technology deployment barriers like information-sharing, integrated interconnection approaches, and transmission investments.

1.3 Integration of Clean Energy Supply — 6/15

- Canada appears “behind” in this metric, with a low average score.
- Most benchmarked utilities had limited to no experience with large-scale renewable projects (> 5MW). For those that did, approval times varied; thus, no ‘typical time’ could be established. Utilities explored opportunities to improve/streamline processes, for instance through customer journey mapping exercises.
- DER access to ancillary services payments remained limited across all utilities in 2021. While some were exploring how to integrate DERs into ancillary services markets, regulatory or market barriers remain.

1.4 Corporate Leadership — 8/15

- Corporate emission reduction targets and plans have become the standard, but the nature of plans vary. Smaller utilities tended to focus on isolated initiatives, while larger utilities had more comprehensive environmental, social and governance (ESG) plans and objectives. However, the level of accountability and quality of reporting varied widely.
- Most utilities had corporate decarbonization targets for their own buildings and fleet, but the target depths and timeframe differs (e.g., net zero by 2030, 2040 or 2050). Three have interim decarbonization targets without a net zero commitment and four (mostly small) have none.
- Tying executive performance and compensation to clean grid goals is limited across most utilities.

2 Modern Grid

51/100

AVERAGE SCORE High (80%+) | Mid (50-80%) | Low (>50%)

Canadian utilities are in the process of upgrading their grids and grid capabilities. Most are following incremental pathways, with only a few pursuing transformational visions. Overall, there remains a gap between the roadmaps, innovative pilots, and control system investments, and the limited amount of actual DER enabled and integrated.

2.1 Enhanced Grid Planning & Management — 9/20

- Modernizing load forecasting to account for DERs, climate change, and electrification was common. External service providers, tools and studies are useful, but must be calibrated to local contexts.
- Most utilities took a basic, top-down approach to DER forecasting, while leading utilities used bottom-up or advanced modelling to forecast adoption.
- Most load forecasts were at the system level and seasonal; leading load forecasts were localized (at the bus level) and on a year-round, hourly basis to better capture distribution system impacts.
- Many utilities focused on changing operational models in the context of the energy transition; however fewer are explicitly planning changes to their business models.

2.2 DER Enablement & Integration — 14/35

- Demand side management (DSM) responsibilities vary. Vertically integrated Crown Corporations are typically responsible for DSM. Conversely, DSM was non-existent in some provinces.
- No utility had a comprehensive process for valuing DERs as NWAs.
- DER access to ancillary services markets was limited. A few utilities were awaiting regulatory approvals or in an exploratory pilot phase.
- Interconnection processes and approval times for small-to-medium renewable projects varied widely across jurisdictions. There are opportunities to improve and/or streamline.

2.3 Visibility & Control Capabilities — 13/20

- Visibility and control capabilities were advancing and expected to continue to grow.
- All but two utilities had deployed AMIs to 90+% of customers. Most utilities had access to AMI capabilities beyond basic metering, such as power quality analysis.
- Similarly, most utilities had deployed an Advanced Distribution Management System (ADMS) and Supervisory Control and Data Acquisition (SCADA) as of 2021.
- Other systems like DER Management Systems (DERMS) and Fault Location Isolation and Service Restoration (FLISR) technology were less common but growing.

2.4 Innovation & Emerging Technologies — 11/15

- Most utilities had dedicated research and innovation envelopes in 2021, and a dedicated innovation team or staff. A third were unable to provide a figure as innovation resources are distributed across multiple budget lines.
- Large utilities are more likely to afford dedicated research and innovation budgets, with some allocating over 1% of overall revenue to research and development.
- Running innovative pilots/ projects related to process, automation, programs, organization, and/or technology was common in 2021, with innovation defined relative to their context (i.e., what is innovative to one utility may not be innovative to another).

2.5 Climate Resiliency — 4/10

- Most utilities were pursuing actions to protect critical infrastructure and services during extreme climate events (e.g., Storm Operations Center, funding battery storage in remote areas, adding remote sensing and control devices).
- However, initiatives were in many cases siloed. Only some utilities had comprehensive Climate Adaptation and Management Plans.
- While several utilities report on climate change risks and/or consider climate change in weather forecasts, few considered explicit climate change scenarios in their planning processes, potentially exposing them to greater climate, operational and financial risk

3 Customers & Society

48/100

AVERAGE SCORE | **High (80%+)** | **Mid (50-80%)** | **Low (>50%)**

Utilities are increasingly engaging with key stakeholders to transform the electricity system. While few had developed comprehensive electrification strategies, many had focused on electrification in specific sectors. Many utilities considered equity within their organizations to varying degrees; vulnerable community groups will need to be prioritized to ensure an equitable transition.

3.1 Changing Customer Preferences

10/25

- While basic digital platforms with consumption and billing data are commonplace, tailored customer reports that support action, such as Home/Business Energy Reports, are offered by only a few utilities.
- There is partial penetration of dynamic pricing (e.g., time of use, tiered pricing) to encourage customers to reduce their consumption and lower electricity costs.
- All utilities delivered basic education and awareness campaigns through traditional channels, while leading utilities worked to communicate more equitably (e.g., information in multiple languages, Indigenous customer care centers, hands-on customer support).
- Half of utilities delivered solutions to remove barriers, enable electrification and enhance efficiency (e.g., incentives, charging infrastructure investments, emerging technology pilots). Several utilities' efforts to offer programs were stymied by regulators.

3.2 Enabling Transportation, Building and Industrial Electrification

12/25

- Comprehensive multi-sector electrification strategies are rare. Only one utility has developed and implemented a comprehensive electrification strategy, and another had a climate action plan.
- Most utilities are helping to enable electrification in various ways, but often taking a siloed approach. Only one had a coordinated, wholistic approach that considers all sectors.
- While greater electrification is needed to meet our climate goals, there are certain economic sectors where electrification will be challenging (at least in the near-term), requiring a diverse portfolio of solutions. A few utilities are implementing and/or exploring dual fuel approaches, dual-energy rates, and hybrid systems in parallel with decarbonizing the gas supply.

3.3 Being Intentional About Diversity, Equity and Inclusion

10/25

- Canada's electricity workforce has lower representation of women, BIPOC (black, indigenous and people of colour), persons with disabilities, 2SLGBTQI+, and newcomers. While some utilities had comprehensive workplace DEI strategies and initiatives, more work is needed to breakdown systemic barriers and create a diverse, inclusive workforce.
- Community-wide DEI strategies, goals and targets were less common or unclear. Accountability mechanisms to track progress and impacts were limited or non-existent.
- Spending on programs for vulnerable and underrepresented communities varied and was below other leading North American jurisdictions that mandate minimum budget allocations for lower-income communities.

3.4 Aligning Actions and Engagement

16/25

- There is large alignment by nature with utilities owned by provincial and municipal governments.
- Utilities that received lower scores in this metric are in jurisdictions that have noticeably lower GHG emissions objectives and no regulator or utility mandates.
- Utilities are increasingly proactive in collaborating with key stakeholders to advocate for, and/or advance the clean energy transition; however, many do not have comprehensive engagement plans to guide the process.
- Leading utilities had robust public relations/engagement and policy teams to proactively and deliberately engage on clean energy and electrification.

Considerations

The clean energy transformation requires collaboration and cooperation across stakeholders. Each has a unique role to play in promoting the adoption of cleaner energy sources and transitioning towards a sustainable energy future. We outline key considerations for utilities, SGIN, and government, regulators and system operators.

Utilities	• Participating utilities can use their scorecard results to **inform internal discussion**, diagnosis, planning and prioritization, as well as to **engage external partners** whose support is needed for progress, including regulators, governments, and others. They can also draw on the **community of practice** created by this initiative to share insights, good practices and lessons learned. • Other utilities in Canada can **review this scorecard to situate themselves,** obtain guidance for their own transition and consider participating in future scorecards.
SGIN	• SGIN should **publicize the scorecard to promote its takeaways as well as awareness of the smart utility concept**. • Phase B of this initiative – the Maturity Model – will **support select participating utilities** to build on their scorecard results and improve their specific capabilities. • Phase C of this initiative – the Knowledge Hub – will make smart energy benchmarking trends, and good practices **available to a broader audience**, such as other utilities across Canada as well as policy makers, regulators, system operators, and service providers. • SGIN intends to **repeat the scorecard** to monitor progress from existing utilities and include additional utilities. Future scorecards should include indigenous and northern utilities, and may consider other relevant metrics (e.g., cybersecurity).
Government, Regulators, and System Operators	• **Governments** can use this scorecard to help inform energy- and climate-policies, regulations and goals. They must guide, support, and as needed aid utilities in undertaking necessary actions, as well as support research and public engagement. • **Regulators** ensure that utilities comply with government policies and regulations. They can use the scorecard to set regulatory frameworks and observe the impact on utilities' abilities to accelerate the energy transition. Regulatory innovations are needed to enable required investments, accelerate the adoption of new technologies, processes, tariffs and programs, and ensure that no one is left behind. • **System operators** can use this scorecard to pinpoint barriers to the integration of DERs and intermittent generation assets into the grid and wholesale markets. They play key roles in outlining clear standards and pathways for decarbonization, and in some cases, in implementing demand response and demand side management programs.



5. Appendix –
Individual Utility Scorecard Results

Category 1: Clean Energy Supply

ID	Sub Metric	Total Points[1]
Metric 1.1: Planning and Designing to Decarbonize the Grid		
1.1.1	Does the utility or their partners have clean grid goals (e.g., the Clean Energy Standard or similar clean energy penetration targets)?	5.0
1.1.2	What is the depth of the clean energy supply target (as % of MWh energy delivered)?	5.0
1.1.3	What is the timeframe to reach their clean energy supply target?	5.0
1.1.4	Does the utility have a clear roadmap to achieve its targets?	10.0
1.1.5	Has the utility followed through with their clean energy supply plan and commitments?	10.0
Metric 1.2: Clean Energy Procurement & Deployment		
1.2.1	What is the current share of clean energy (in % of MWh energy delivered) on the grid?	7.5
1.2.2	What is the current grid emission intensity (for MWh energy delivered)?	7.5
1.2.3	Has the utility or their partners released procurement opportunities and/or developed projects (if the utility builds its own generation) exclusively for non-emitting resources?	10.0
1.2.4	Has the utility demonstrated actions that reduce or remove barriers to the deployment of clean technologies (e.g., energy storage or distributed energy resources)?	10.0

1. Total points may not add up due to rounding.

Category 1: Clean Energy Supply

ID	Sub Metric	Total Points[1]
Metric 1.3: Integration of Clean Energy Supply		
1.3.1	Do clean resources have access to ancillary services payment to promote their use across all grid services such as through the utility, parent company, market, etc.?	5.0
1.3.2	What is the typical time for interconnection approval of large-scale renewable projects (5>MW)?	5.0
1.3.3	Is the utility taking steps to improve/streamline its interconnection process of large-scale renewable projects (5>MW)?	5.0
Metric 1.4: Corporate Leadership		
1.4.1	Does the utility have a corporate sustainability plan and/or initiatives (e.g., ESG plan)?	3.8
1.4.2	Does the utility have a corporate commitment to become carbon neutral in its own operations?	3.8
1.4.3	Are executives' compensation tied to a reduction in carbon emissions of clean energy supply and/or corporate operations?	3.8
1.4.4	Does the utility have a public corporate sustainability report to track progress and accountability?	3.8

1. Total points may not add up due to rounding.

Category 2: Modern Grid

ID	Sub Metric	Total Points[1]
Metric 2.1: Enhance Grid Planning & Management		
2.1.1	Is the utility modernizing or enhancing load forecasting tools and planning processes (e.g., IRPs, IDPs)?	5.0
2.1.2	Does the utility have DER forecasting capabilities?	5.0
2.1.3	At what level of granularity does the utility load forecast/planning consider the impacts of electrification/ decarbonization on load growth?	5.0
2.1.4	Does the utility have a plan, feasibility study, or assessment to consider whether changes to its business and operation model is warranted (e.g., DSO)?	5.0
Metric 2.2: DER Enablement & Integration		
2.2.1	What portion of peak demand/system capacity is represented by DR?	7.0
2.2.2	What was the average share of annual energy savings provided by energy efficiency initiatives in the utility's service area?	7.0
2.2.3	Has the utility determined the value or a process for valuing DERs as NWAs?	6.0
2.2.4	Is the utility considering DERs for ancillary services?	2.0
2.2.5	Does the utility have a formalized DER strategy and/or roadmap?	4.0
2.2.6	What is the typical time for interconnection approval for medium-scale renewable projects (10kW to 5MW)?	3.0
2.2.7	What is the typical time for interconnection approval for small-scale renewable projects (<10kW)?	3.0
2.2.8	Is the utility taking steps to improve/streamline its interconnection process for small-scale (<10kW) and/or medium-scale (10kW to 5MW) renewable projects?	3.0

1. Total points may not add up due to rounding.

Category 2: Modern Grid

ID	Sub Metric	Total Points[1]
Metric 2.3: Visibility and Control Capabilities		
2.3.1	What is the current coverage of AMIs (% of total costumer coverage)?	4.0
2.3.2	What capability does the utility have access using AMIs? (ex:, remote reading, connect/disconnect, outage detection, system voltage monitoring, IoT, etc.)	4.0
2.3.3	Has the utility deployed DERMS?	4.0
2.3.4	Has the utility deployed SCADA?	4.0
2.3.5	Has the utility deployed ADMS?	4.0
Metric 2.4: Innovation and Emerging Technologies		
2.4.1	How much is the utility funding and/or spending on innovation and research (as % of overall revenue)? (innovation is defined as outside of BAU)	3.8
2.4.2	Has the utility demonstrated applications of their investment under Visibility and Control Capabilities (AMIs, DERMs, ADMs, etc.)?	3.8
2.4.3	Is the utility running innovative pilots/projects?	3.8
2.4.4	Does the utility have an innovation resource (team or person)?	3.8
Metric 2.5: Climate Resiliency		
2.5.1	What actions are being taken to harden the grid to protect critical infrastructure and/or services during extreme climate events?	5.0
2.5.2	Is climate change included in the forecasts for the utility's planning process?	5.0

1. Total points may not add up due to rounding.

Category 3: Customers and Society

ID	Sub Metric	Total Points[1]
Metric 3.1: Changing Customer Preferences		
3.1.1	Is the utility leveraging digital platforms to engage customers?	6.3
3.1.2	Is the utility offering rate-based solutions to encourage and influence electrification and/or behaviour?	6.3
3.1.3	Is the utility providing energy services and solutions to customers?	6.3
3.1.4	Is the utility building awareness and educating its customers on clean energy issues/energy transition?	6.3
Metric 3.2: Enabling Transportation, Building, & Industrial Electrification		
3.2.1	Has the utility or their partners developed and implemented comprehensive electrification strategies that sends a clear signal to investors on the increasing need for decarbonization?	12.5
3.2.2	Is the utility or their partners catalyzing building (C&I and/or residential), transportation, and/or industrial process electrification?	12.5

1. Total points may not add up due to rounding.

Category 3: Customers and Society

ID	Sub Metric	Total Points[1]
Metric 3.3: Diversity, Equity & Inclusion Goals & Actions		
3.3.1	Does the utility have a diversity, equity & inclusion (DEI) plan or is DEI considered during the planning/decision-making process?	6.3
3.3.2	Is the utility actively engaging indigenous, low-income, or other under-served communities to ensure their voices are considered in the decision-making process for a clean energy transition?	6.3
3.3.3	How much (as a share of total revenue) is the utility investing in electrification and/or distributed energy resources (DER) programs targeting indigenous, low-income, or other under-served communities?	6.3
3.3.4	Does the utility promote diversity and inclusion in the workplace (reducing barriers and challenges for women, minorities groups, etc.)?	6.3
Metric 3.4: Aligned Actions and Engagement		
3.4.1	Does the utility have a stakeholder engagement plan that addresses related topics (i.e., clean energy, grid modernization, IRP and IDP, electrification, regulatory requirements, etc.)?	8.3
3.4.2	Is the utility undertaking proactive efforts and/or supporting initiatives within or across jurisdictions to realize the clean energy transition?	8.3
3.4.3	Has the utility aligned its planning and investment decisions with governmental (provincial/municipal) climate ambitions?	8.3

1. Total points may not add up due to rounding.



“NO DISCLAIMERS” POLICY

This report was prepared by Dunsky Energy + Climate Advisors, an independent firm focused on the clean energy transition and committed to quality, integrity and unbiased analysis and counsel. Our findings and recommendations are based on the best information available at the time the work was conducted as well as our experts' professional judgment. **Dunsky is proud to stand by our work.**

Toronto Hydro-Electric System Limited
EB-2023-0195
Interrogatory Responses
1B-SEC-5
Appendix E
UPDATED: March 21, 2024
(20 Pages)



Toronto Hydro Sustainability Review: Data Report

Discussion Purposes Only - Confidential and Proprietary

Updated: October 28, 2021

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1 Background and Context





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Introduction and context

Toronto Hydro has an opportunity to elevate its ESG disclosure practices, taking into consideration leading peer and stakeholder practices trends.

To inform its approach, a review has been conducted to help Toronto Hydro better understand its overall ESG disclosure maturity, which included a current state assessment and comparative analysis of disclosed leading practices, including Toronto Hydro's. Based on the assessment, a report has been prepared to outline the results.

The objective of the assessment report is to:

- Summarize the assessment approach and ESG disclosure positioning within Toronto Hydro; and,
- Understand Toronto Hydro's overall disclosure maturity compared against peers.



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How is Toronto Hydro currently positioned on ESG?

Purpose: We're committed to delivering excellent customer service, providing a safe and reliable supply of electricity, and delivering long-term value to the City of Toronto.

Talent management and diversity	• Diversity and inclusion • Talent development and training	• Attraction, retention and engagement • Health and safety
Accountable and transparent leadership	• Data and systems driven • Personalized, transparent interactions with members and employees	• Board composition for good governance • Ethics and integrity
Customer satisfaction	• Customer engagement • Continuous improvements	• Product/service offerings innovation • Affordability programs
Community impact	• Fundraising • Community partnerships	• Employee volunteering • Education and sponsorships
Innovation and digital transformation	• Robust, secure products and services • Innovation in energy systems	• Risk management and data security • New technology investments

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2 Report Approach



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Data report approach

To conduct the analysis, a four-step process was undertaken as described in the table below:

Step 1

Identified current state of Toronto Hydro along with peer benchmarking

Toronto Hydro was assessed through document review and interviews with its the sustainability group as well as key staff within Facilities and fleet, Customer services, Conservation programs, Organizational effectiveness, Talent development, Including:

- Joe Bile, Manager, Business Development
- Dave Clark, Director, Organizational Effectiveness
- Bryan Desouza, Manager, Supply Chain Services
- Phil Genoway, Director, E, H & S
- Jen Grado, Manager, Large Customer and Key Accounts
- Kees Homsma, Director, Facilities & Fleet
- Jen Stulberg, Director, Talent Management

Additionally, 11 sector peers and core stakeholders (see page 14) were assessed through a desktop comparative review to understand leading practices and priority areas of focus.

Step 2

Assessed ESG disclosure program maturity and priority topics areas of Toronto Hydro and peers

ESG disclosure program maturity areas included:

1. Corporate culture and policies
2. Accountability
3. Strategy
4. Programs
5. Performance and review
6. Reporting

ESG topics of focus included:

1. Equity, diversity and inclusion
2. Health and wellbeing
3. Community and partnerships
4. Talent and training
5. Indiginous relations
6. GHG emissions (including energy)
7. Climate change
8. Resource management (including land and biodiversity)
9. Waste
10. Environmental compliance
11. Affordability and accessibility
12. Service reliability
13. Customer service
14. Risk management
15. Ethics and integrity
16. Profitability

Step 3

Assessed Toronto Hydro's disclosure program maturity against peers and core stakeholders

Assessed Toronto Hydro and peers' and stakeholders' disclosed data against the following scoring criteria:

Score	Maturity	Initiatives
0-1	Informal	[redacted]
1.1-2	Emerging	
2.1-3	Structured	
3.1-4	Leading	
4.1-5	Strategic	

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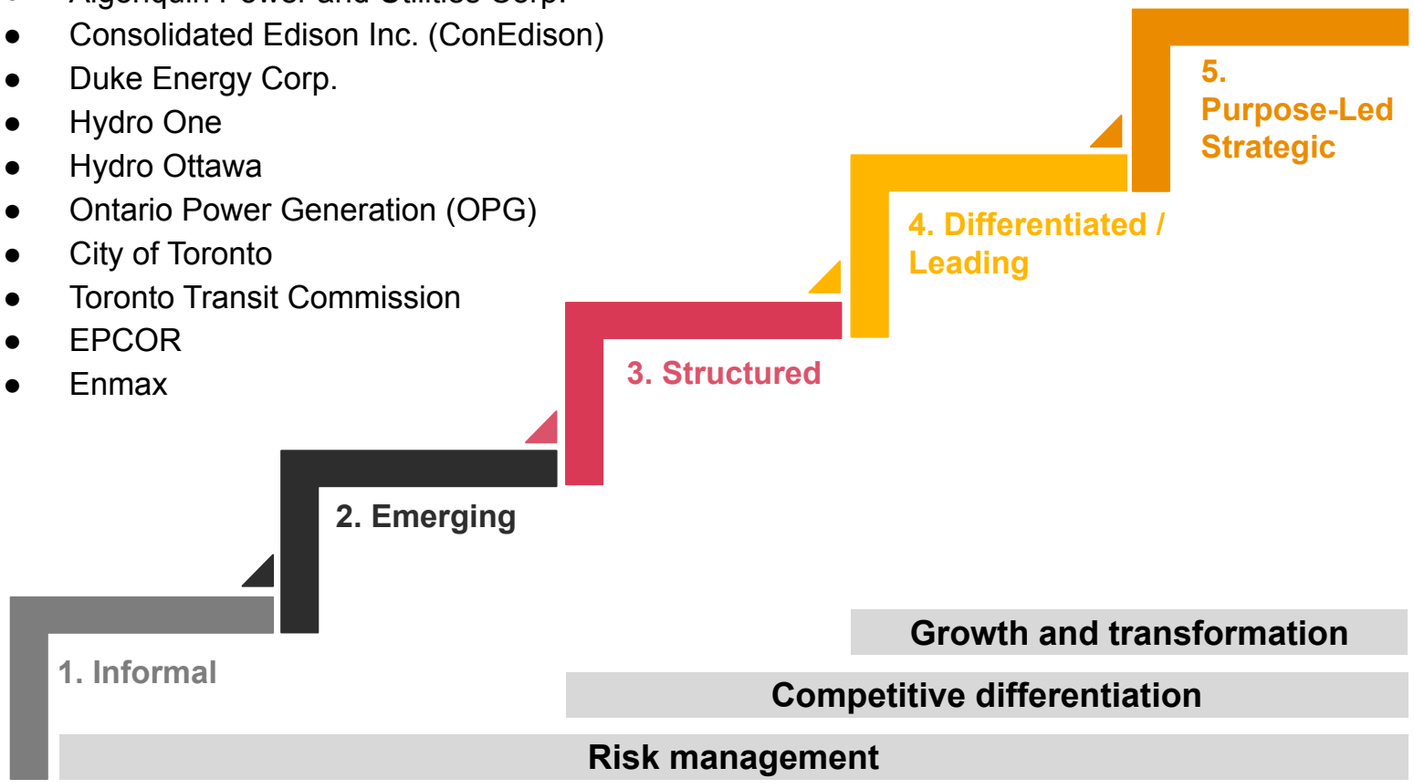
Disclosure maturity analysis

We defined the key elements of the ESG maturity journey on a scale from 1 to 5 and assessed Toronto Hydro's performance against its competitive landscape to provide a reference point for performance.

- Alectra Inc.
- Algonquin Power and Utilities Corp.
- Consolidated Edison Inc. (ConEdison)
- Duke Energy Corp.
- Hydro One
- Hydro Ottawa
- Ontario Power Generation (OPG)
- City of Toronto
- Toronto Transit Commission
- EPCOR
- Enmax



Overall disclosure maturity framework on ESG management

A. **Corporate culture and policies:** [redacted]

B. **Accountability:** T[redacted]

C. **Strategy:** [redacted]

D. **Programs:** [redacted]

E. **Performance monitoring and review:** [redacted]

F. **Reporting:** [redacted]

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3 Maturity Results





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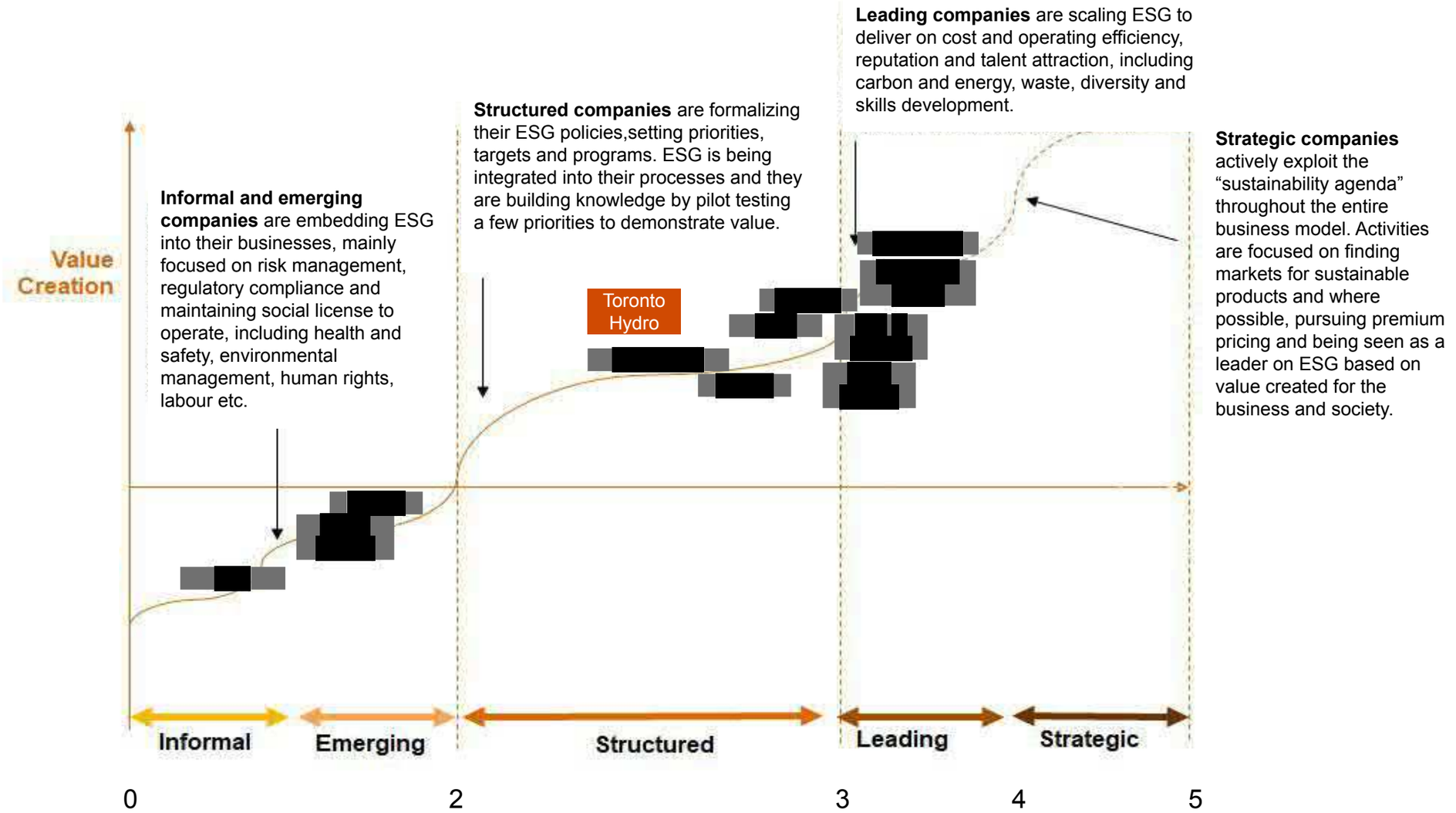
Overall ESG maturity

For illustrative purposes only

Toronto Hydro's overall disclosure ESG maturity demonstrates it is at a "structured" level of maturity. Many of its direct peers, on average, are in similar states of maturity.

[redacted] are on the leading edge of ESG program maturity and offer lessons learned for Toronto Hydro as it advances to a leading program.



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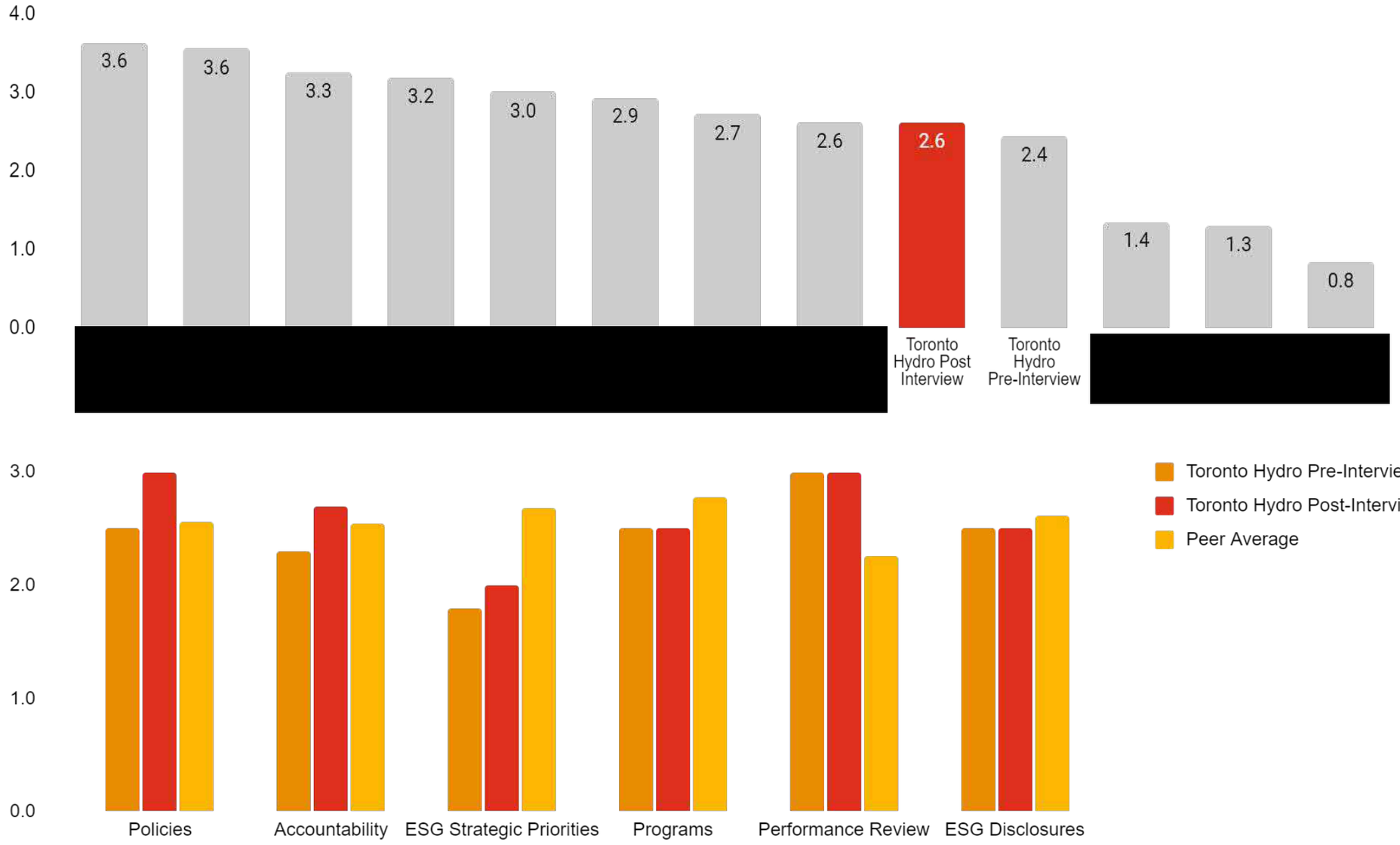
Overall ESG maturity

The graph shows a breakdown of the maturity score of Toronto Hydro's overall disclosure ESG program as compared to its peers.

Note that Toronto Hydro performed above the average on policies, accountability and performance review.

However, it fell behind the peer group on ESG strategy and programs.

With disclosing more information , the program maturity would increase.



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ESG disclosure program maturity: Peer best practices

ConEdison's sustainability strategy has oversight from the board and there is an ESG committee at the executive level. Executive compensation is tied to key ESG KPIs (i.e., D&I)

Operational Excellence

Accountability

Our company made Newsweek's list of America's most responsible companies. Newsweek honors companies that are "good citizens and give back to the communities they operate in."

EPCOR has established and disclosed an ESG scorecard with key performance measures, data and targets aligned to its most material ESG factors and incentive-based pay.

SOCIAL		2017	2018	2019	2020	TARGETS AND COMMENTARY
Health and Safety						
S1	TOTAL RECORDABLE INJURY FREQUENCY Continuous reduction in total incidents (TRIF) *SASB Code: IF-EU-320a.1(1)* *GRI 403-9(a)(ii)*[E]	1.12	2.35	1.44	1.03	A safety-first culture, driving to zero incidents.
S2	LOST-TIME INJURY FREQUENCY Continuous reduction in lost-time incidents (LTIF)	0.16	0.35	0.13	0.06	A safety-first culture, driving to zero incidents.

Algonquin Power discloses its approach to stakeholder engagement, including how they engage, frequency, key concerns raised, and how concerns are addressed.

Stakeholder engagement

GRI: 102-21, 102-40, 102-42, 102-43

Stakeholder dialogue not only guides our reporting process and informs our report content selection, but is an essential element of our core business practices. Our key stakeholder groups include our customers, employees, investors, communities, and government and regulatory bodies. An overview of these stakeholder groups, our engagement methods, and priority concerns can be found below.

Stakeholder group	How we engage	Frequency of engagement	Key concerns raised	How we address those concerns
Customers	• Annual J.D. Power Customer Satisfaction Survey • Call centers • Community education programs • Conservation and outreach programs • Regular email communications • Focus groups • Local customer walk-in centers • Local media outlets • Participation in and sponsorship of local events, teams, and charitable foundations • Social media	Annual and ongoing	• Customer service improvements • Rates and pricing • Digital billing and payments • Communications (i.e., outage alerts) • Increased community involvement • Low-income household needs	• Customer First program • eCustomer project: new MyAccount customer experience improvement • Updated Outage Management system • Continuous communications through email, social media, and bill inserts on local community engagement • Customer Savings Program (expected savings of approximately $300 million over 30 years)

Duke Energy discloses an annual ESG report aligned to international standards, reports to various ESG raters, and identifies links between disclosures and corporate strategy.

Global Reporting Initiative (GRI) Index

Duke Energy uses the GRI Sustainability Reporting Standards to help guide our reporting. This index is based on the most recent versions of the Standards available as of May 2020 and includes the Electric Utility Sector Supplement. For most indicators, we refer users to information on our website or other public documents. For some indicators, we provide brief narrative responses. Most data in this index address calendar year 2020, in coordination with our most recent Sustainability Report.

General Disclosures

Number	Topic	Response
Organizational Profile		
102-1	Report the name of the organization	Duke Energy Corporation
102-2	Activities, brands, products and services	The Businesses We're In Duke Energy at a Glance

Hydro One has established comprehensive ESG pillars and priority areas, including accompanying goals.

People

Priorities

- Set broader diversity and inclusion hiring goals
- Identify, eliminate and prevent systemic barriers in the workplace

Goals

- Hydro One signed the BlackNorth Initiative Pledge and is commited to achieving 3.5% Black executives and board directors, and 5% Black student hires by 2025.
- As a signatory to the Catalyst Accord, Hydro One is commited to achieving at least 30% female executives and board members

Planet

Priorities

- Achieve established targets for GHG reductions
- Continue to include climate change considerations into decisions and plans to ensure grid resiliency

Goals

- Hydro One is committed to achieving net-zero GHG emissions by 2050
- We have established a target to achieve a 30% reduction of GHG emissions by 2030

Community

Priorities

- Continue to support the Ontario economy through partnerships
- Build safe communities by supporting youth initiatives that promote safety training and safe play

Goals

- Hydro One is committed to increasing our Indigenous procurement spend to 5% of the company's purchases of materials and services by 2026
- As part of our community investment program, we are committed to ensuring that 20% of our corporate donations and sponsorships support Indigenous communities

The City of Toronto has established goals, targets and programs to achieve its priority areas, outlined in its strategy documents.

- Net Zero Strategy +
- Toronto's Greenhouse Gas Emissions +
- Toronto's 2017 Greenhouse Gas Emissions Inventory +
- TransformTO Targets +
- TransformTO Goals +
- Reports & Updates +
- Community Engagement +
- Technical Scenario Modelling +
- CityInSight Visualization Tool +

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Peer ESG priority topics being disclosed

	Importance to Sector (% of peers)	Toronto Hydro Approach
1 Human Capital (People)	**69%**	
Equity, Diversity and Inclusion	78%	Diversity and Inclusion Plan, Recruitment and Selection policy
Health and Wellbeing	100%	Occupational Health and Safety Policy
Community and Partnerships	56%	Code of Conduct
Talent and Training	78%	The Sustainability and Training Annual Plan
Indigenous Relations	33%	none
2 Environmental Stewardship (Planet)	**55%**	
GHG emissions (including Energy Management/Innovation)	78%	Environmental Policy
Climate Change (Resilience/Adaptation)	78%	Environmental Policy
Resource Management (Land and Biodiversity)	33%	Environmental Policy, Vegetation Management Program
Waste	44%	Code of Conduct, EHS Annual Plan
Environmental Compliance	44%	Strong environmental compliance program, ie. ERP, ISO
3 Responsible Business (Prosperity)	**78%**	
Affordability and Accessibility	89%	Accessibility Policy
Service Reliability	89%	Disaster Preparedness Management Program Policy; Rate Application
Customer Service	78%	Customer Engagement Summary
Risk Management	78%	Enterprise Risk Management Policy
Ethics and Integrity	56%	Code of Conduct
Profitability	78%	Code of Conduct

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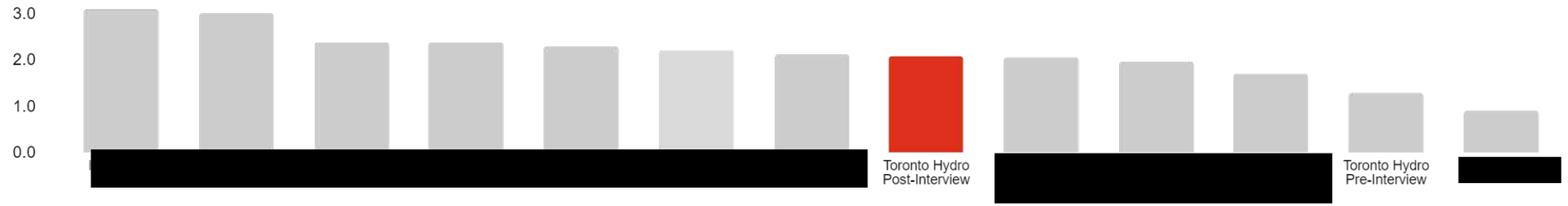
ESG pillars performance

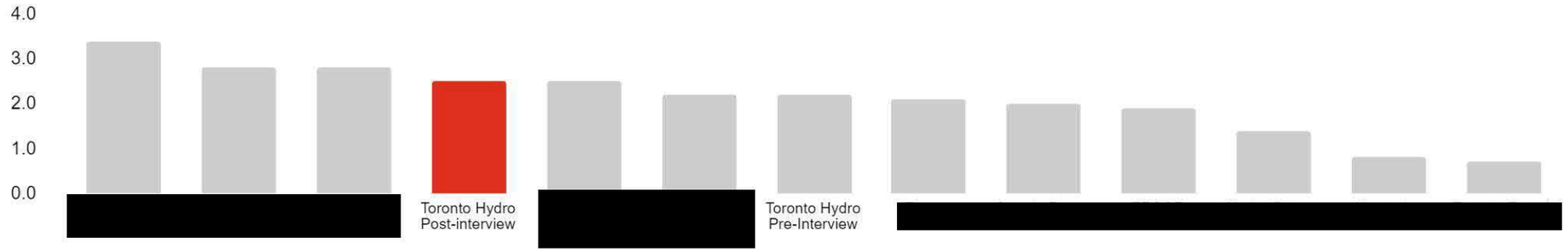
Toronto Hydro achieved a structured level of overall disclosure maturity in each ESG pillar, which is at average-levels amongst its peers.

In review of ESG the pillar areas as a whole, [redacted] and [redacted] scored at a leading or differentiated level (see page 13 and 14 for definitions and detail) amongst the peer and stakeholder group.

Human Capital



Environmental Stewardship



Responsible Business



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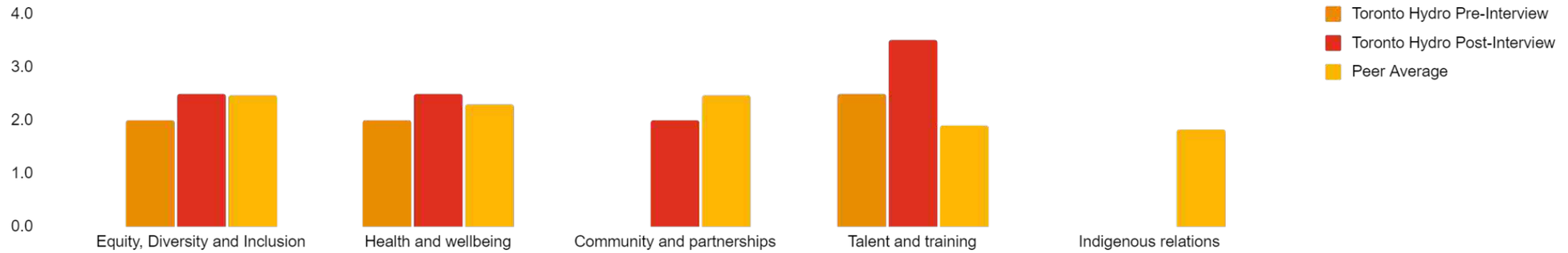
ESG focus area performance

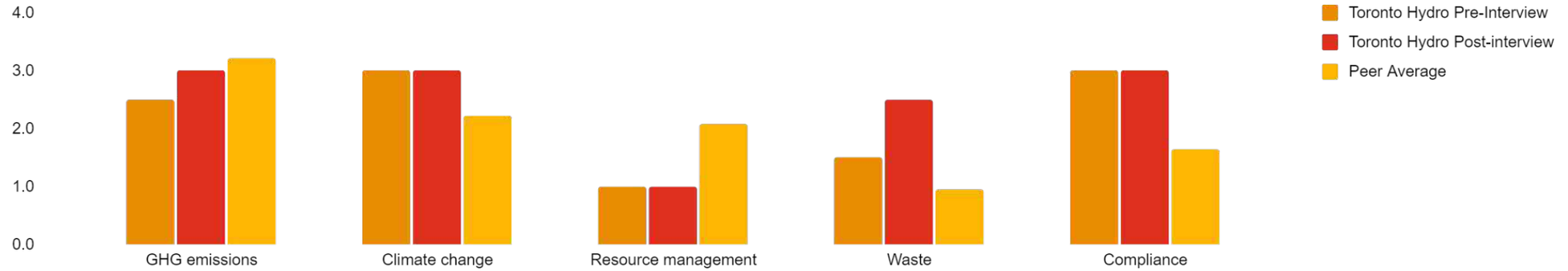
Toronto Hydro's strongest areas, in terms of information disclosure, are in talent and training and equity, environmental compliance, service reliability, customer service and risk management.

Opportunities relate to community and partnerships, Indigenous relations, and affordability and accessibility, where a higher level of effort and peer focus exists.

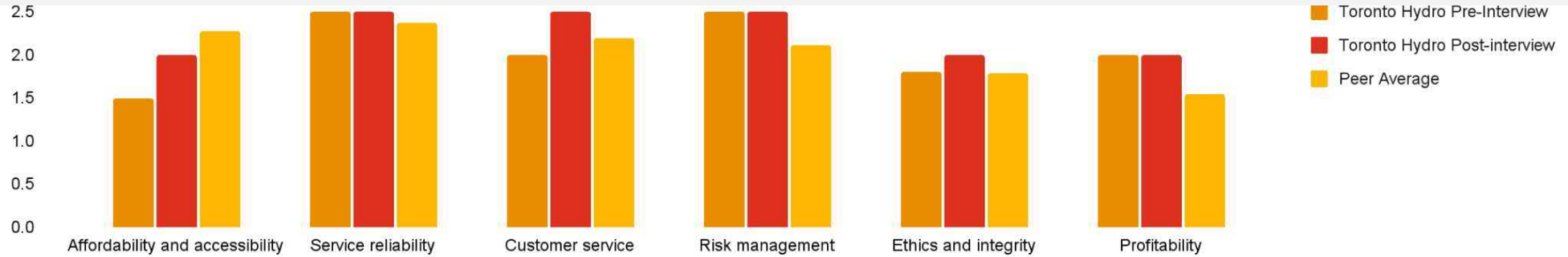
Human Capital



Environmental Stewardship



Responsible Business



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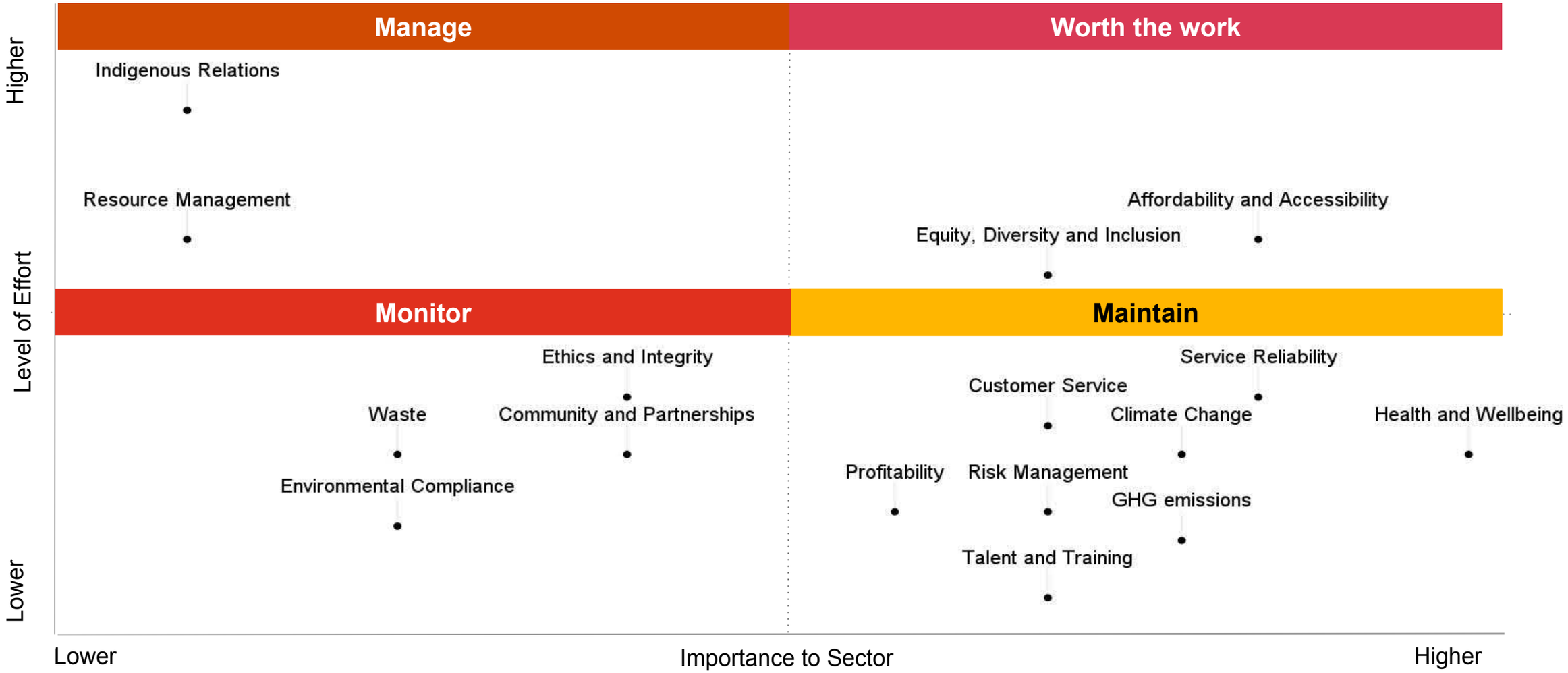
Results

ESG topics are ranked based on importance to sector and level of effort for Toronto Hydro, informed from peer's prioritization of topics and Toronto Hydro's rating in each of these areas.



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ESG focus areas: Peer best reporting practices

HydroOne tracks spend on Indigenous businesses and set targets for 20% of community investment to support Indigenous communities and 3% to promote investment in Black communities.

We are committed to increasing our Indigenous procurement spend to 5% of the company's purchases of materials and services by 2026.

While several Indigenous communities closed their borders to visitors in order to limit exposure to COVID-19, Hydro One respectfully adapted to these realities and hosted numerous public community engagement sessions and meetings online. Post-COVID-19, we will review opportunities to enhance our online engagement which has, in some cases, made communication more efficient. However, we still plan to continue to focus on reconnecting with Indigenous communities through in-person meetings.



We fast-tracked $32.9M in payments to 124 Indigenous and small business suppliers in Ontario.

Algonquin Power provides education grants to eligible employees and offers work flexibility programs.

Talent attraction and retention

Talent attraction and retention are the pillars upon which we build our employee lifecycle. We know that the competition for talent is real, and an organization is only as good as their workforce. At Algonquin and Liberty, our workforce is our family, and we pride ourselves in the way we grow our family.

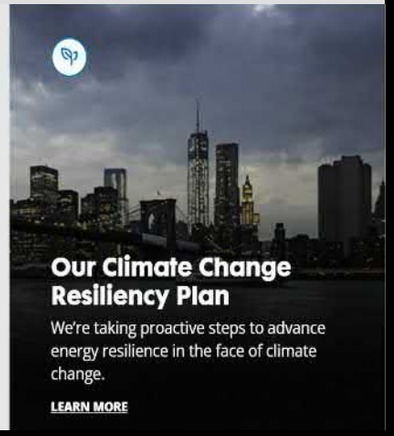


Duke Energy has disclosed a net zero by 2050 ambition and an interim target of reducing CO_2 emissions from electricity generation by 50% by 2030 through its 2020 Climate Report.



ConEdison discloses against the TCFD recommendations and has published its climate change and climate resilience and adaptation implementation plans.





Enmax is conducting pilot projects to test programs to remove barriers to energy access and affordability, delivering energy saving kits to select households.

Our approach

Our energy affordability efforts will be geared towards supporting customers at each stage of the affordability lifecycle (noted below), incorporating efforts from across business units in Alberta and Maine, informing community investment strategies and laying the groundwork for advocacy with policymakers and regulators in an effort to advance broader strategies in the years ahead.

SUPPORTING CUSTOMERS IN THESE STAGES

1. Affordability
   Provide sustainable energy solutions, including tools, education and awareness
2. Prevention
   Invest in programming to reduce barriers to affordable-energy access across all our operating communities
3. Crisis Management
   Provide relief to customers in energy-need crisis through agency partnerships

City of Toronto incorporates ESG and climate change into its new ERM framework and has implemented a climate change risk management policy.

The City's risk factors identified through the ERM process



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Appendix A: Reviewed Disclosures



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Reviewed peer disclosures

Toronto Hydro

- 2020 Annual Report
- 2020 ESG Report
- 2020 ESG Metrics
- 2020 Environmental Performance Report
- Internal documents

Alectra Inc

- 2020 Sustainability Report
- News release: Alectra establishes an Equity, Diversity and Inclusion Scholarship with The Directors College
- Diversity & Inclusion webpage
- Sustainability Initiatives, News, Awards & Sponsorship webpage
- Customer Service & Support webpage

Algonquin Power and Utilities Group

- 2020 Sustainability Report
- 2019 Sustainability Report
- Net Zero Fact Sheet
- 2020 Climate Change Assessment in alignment with TCFD guidelines

Consolidated Edison Inc

- 2020 Sustainability Report
- Diversity, Equity & Inclusion Report
- 2020 Annual Report

Duke Energy Corp

- 2020 Sustainability Report
- News release: Native American employees talk diversity

Hydro One

- 2020 Sustainability Report
- 5 year investment plan

Hydro Ottawa

- Employee Volunteerism webpage
- Environmental Commitment webpage
- 2020 Annual Report
- Diversity & Inclusion webpage
- News release: Inclusion has become a part of the everyday at Hydro Ottawa
- COVID-19 webpage
- Health, Safety & Wellness webpage
- Strategic Direction 2016-2020 report
- AffordAbility Fund webpage
- Save on Energy - Energy Affordability Program webpage
- Key Governance and Control webpage
- KPI scorecard

Ontario Power Generation

- Climate Change Plan
- Sustainability reporting

EPCOR

- Sustainability reporting

City of Toronto

- TransformTO Short-term Strategies
- 2020 ESG Performance Report
- Resilience Strategy webpage

Toronto Transit Commission

- Strategic Objectives webpage
- 2021 Ride Guide
- Honouring Toronto's rich Indigenous history webpage
- 2018-2040 Green Bus Technology Plan
- City of Toronto's Fair Pass Discount Program webpage
- Development of the 5-Year Fare Policy and 10-Year Fare Collection Outlook
- Daily Customer Service Report

Enmax

- Sustainability webpage
- 2020 ESG Report

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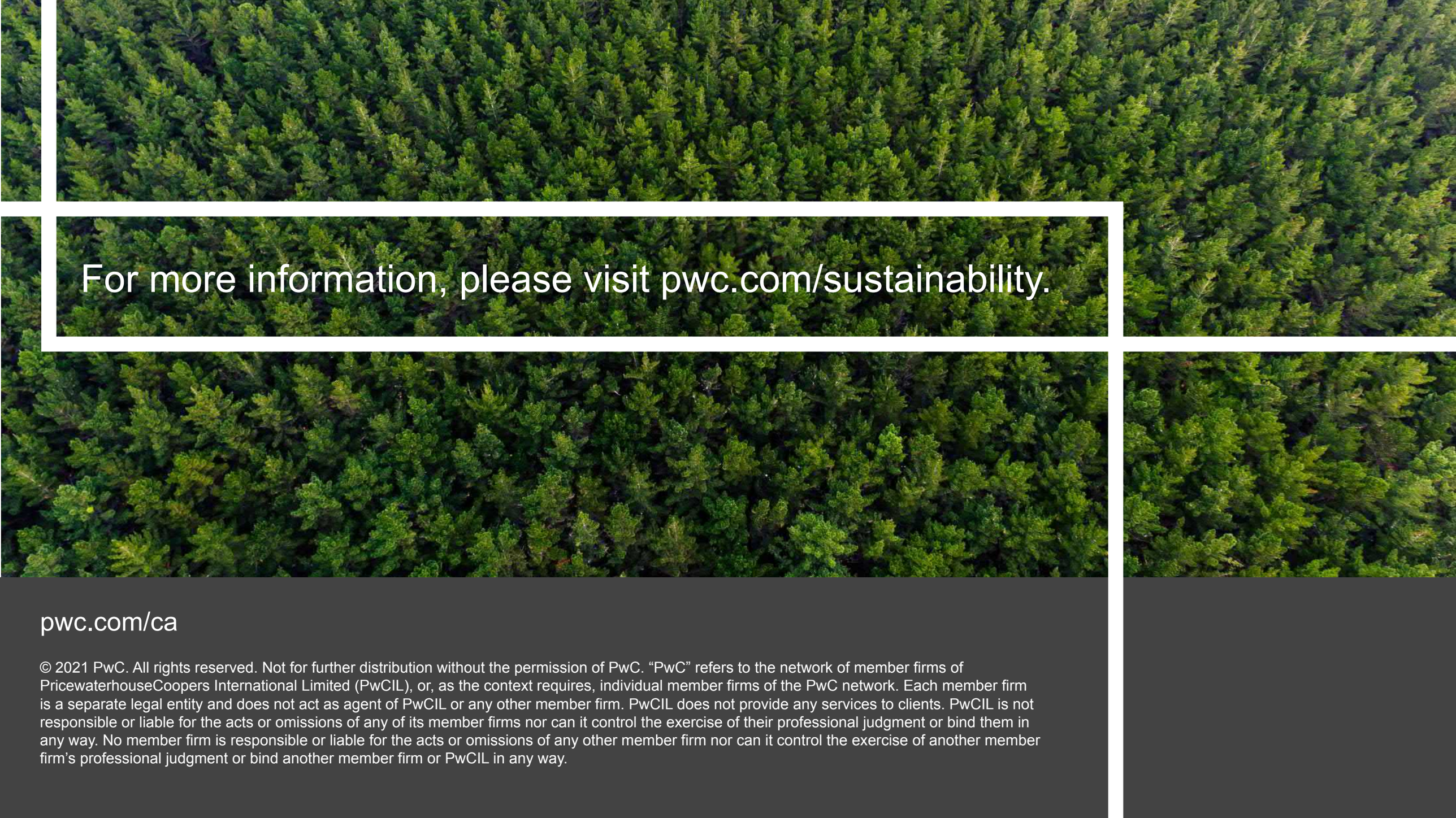

For more information, please visit pwc.com/sustainability.

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Toronto Hydro-Electric System Limited
EB-2023-0195
Interrogatory Responses
1B-SEC-5
Appendix G
UPDATED: March 21, 2024
(18 Pages)

Auto-FLISR Assessment Executive Report

18 August 2023

Col Smart, Hongyu Wu, Bill Conn
TRC Companies

The information in these materials is based on information currently available to Toronto Hydro Corporation and its affiliates (together hereinafter referred to as "Toronto Hydro"), and is provided for information purposes only. Toronto Hydro does not warrant the accuracy, reliability, completeness or timeliness of the information and undertakes no obligation to revise or update these materials. By receiving these materials, you hereby waive any and all liability of Toronto Hydro (including its directors, officers, employees, agents and subcontractors) for damages of whatever kind and nature which may occur or be suffered by you or your representatives as a result of the use of these materials or reliance on the information therein.

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AGENDA

1. Executive Summary
2. Project Overview
3. Project Methodology
4. Utility Interviews
5. Oracle Interview
6. Risk Assessment
7. FLISR Operation Readiness Strategy
8. Potential Timeline
9. Items for Consideration



Project
Executive Summary



THESL is currently progressing the use of Fault Location, Isolation, and Service Restoration (**FLISR**) and seeks to move the deployment of automated FLISR, aka Auto-FLISR.

A six-week assessment was conducted to identify key aspects, risks and mitigations for the journey to Auto-FLISR. The assessment also considered aspects of a high-level timeline for Auto-FLISR.

Key Conclusions

1. The deployment of Auto-FLISR will be a multi-year, multi-stakeholder undertaking and will require participation by system operations, engineering and IT.
2. The planned manual FLISR evaluation pilot will serve to provide valuable insight and deployment risk mitigation for Auto-FLISR.
3. Successful Auto-FLISR implementation will ensure continued safety of operation.
4. Auto-FLISR has delivered operational benefit to utilities using the technology.
5. Auto-FLISR performance objective of resolution in under one minute (the momentary criterion), is a stretch goal impacted by various factors including circuit topology, communication latency, number of switching plans to be run, and solution duration.

Project Overview



TRC Companies (TRC) started a *six-week project* on 22 May 2023, and completed 30 June 2023.

The intent of the assessment was to conduct a series of activities which would result in the development of *a report as an information and decision support tool*.

The assessment was designed to allow for the following **key areas of consideration**:

- Potential timeline for the deployment of Auto-FLISR
- Risks relevant to the deployment of Auto-FLISR
- How risks may be mitigated
- Insights as to high-level cost impacts

The assessment process involved activities to provide insight to THESL's internal approach, consideration of the key enabling technology (Oracle NMS), and lessons learned from other utilities who have progressed with Auto-FLISR deployments.

TRC added to this its own expertise with Auto-FLISR and other utility solution deployments.

Project Methodology



TRC undertook the following activities:

- THESL data review
- THESL discovery meetings
- Utility benchmarking interviews
- Oracle interview

TRC identified various *items which may impact the deployment of Auto-FLISR* at THESL and grouped these into **10 categories** which were then tracked to impact in the areas of **Safety, Performance, Schedule, and Cost**.

TRC produced a detailed report of their findings and this project briefing deck.

Utility Interviews



The following utilities were either interviewed or investigated as part of the utility benchmarking, with the following main themes:

- **The deployment of Auto-FLISR will be a multi-year, multi-stakeholder undertaking and will require participation by system operations, engineering and IT.**
- **Data quality remains one of the most important dependencies to enable Auto-FLISR operation.**
- **Change management was highlighted as key to Auto-FLISR acceptance.**

[redacted]

- OSI ADMS Platform
- Data quality, particularly for SCADA keys, was considered critical
- Consistency of procedure approach was key.
- Established a test laboratory (8 devices) before deploying further.
- Testing needs to cover failure modes and be very deliberate around how Auto-FLISR fails.

[redacted]

- OSI ADMS Platform
- [redacted]s Auto-FLISR objective is to improve SAIFI / SAIDI but safety is another a priority
- Focus on configurable functionality not customization.
- SCADA data preparation is a key factor.
- Established a specific Change Manager role for ADMS and then Auto-FLISR acceptance.

[redacted]

- [redacted] has Oracle NMS but is not using it for any FLISR operations at this time
- [redacted] engineering staff participated in an initial qualifying conversation

[redacted]

- Schneider Electric ADMS Platform
- Auto-FLISR was taken offline in March 2023 due to an operational fault.
- A five stage validation criteria on model fine tuning (Analysis Ready – AR) was set for critical review of a feeder for Auto-FLISR enablement.

[redacted]

- Survalent ADMS Platform
- Alectra has had FLISR experience but has not transitioned to Auto-FLISR
- No interview scheduled at this time

[redacted]

- Oracle has advised that [redacted] has manual FLISR in production on 200+ feeders but does not have Auto-FLISR
- No interview scheduled at this time

Utility
Interviews



[redacted]

- Currently on Oracle NMS 2.5
- Auto-FLISR ran for one year during which there were 30 Auto-FLISR events which generally successfully operated.
- The original benefits [redacted] hoped to gain from Auto-FLISR was Auto-FLISR was disabled for several reasons:
    - SCADA issues giving either false positives on device outages or RTU communications issues.
    - Oracle upgrade from NMS 2.3 to 2.5 caused issues. Oracle NMS 2.5 has many different elements to Oracle NMS 2.3 including a different power flow engine, with algorithm changes, and different processes for ingesting data such as weather.
    - SCADA system change from ACS to OSI
    - Network areas re-defined to more identified as high fire risk and so Auto-FLISR is not able to be used in these areas

[redacted]

- Currently on Oracle NMS 2.5
- [redacted] has been guided by the principle that Auto-FLISR should be quicker while adhering to the controllers' established practices.
- On average, there were 1-2 SCADA controlled devices, excluding the tie switch for early auto-FLISR adoption, and currently 2-3 SCADA controlled devices per feeder.
- The introduction of Auto-FLISR has notably improved reliability, reducing fault response time from 10-30 minutes (manual) to less than 1 minute. Though [redacted] has adjusted their momentary criteria to 3 minutes recently, their aim remains a 1-minute operational time. On average, the entire process took around 45 seconds, with approximately 15-20 seconds allocated for fault detection, demand scanning from NMS, and resolution time, along with an additional 20-40 seconds for command issuance.
- Efforts have been dedicated to enhancing communications, including upgrading device firmware and standardizing configuration settings.
- [redacted] opted for a comprehensive deployment of auto-FLISR, enabling its activation circuit-wide once the confidence period had been successfully navigated.
- Scenarios warranting the disabling of auto-FLISR encompass live Line work, bush fire days, and sensitive earth faults.
- The average turn around time for updating GIS model is 2 days.
- Auto-FLISR has been turned on even during “grey-sky” conditions due to the outweighing benefits over associated risks.

Oracle Interview



Oracle provided for interview a team of subject matter expertise with knowledge of the THESL NMS deployment.
Below are the key points:

- NMS 2.3 is nearing end of life and will move to **limited support mode** as of December 2024.
- THESL's upgrade to NMS 2.6 is seen as more complex than the norm due to the **high amount of customization** of the platform. Oracle has assessed that the level of effort necessary for the NMS 2.3 upgrade resembles that of a comprehensive re-implementation. As a result, both Oracle and TRC have collaboratively reached a consensus on the projected upgrade timeframe, which now spans from **24 to 36 months**.
- In NMS versions 2.3 and 2.5, the system experiences slowdowns or diverts additional resources to carry out computations within a single thread. The assumption is that NMS 2.6, designed with **multi-threading capabilities**, is more efficient and capable of simultaneous multitasking with less impact. It is important to emphasize that there exists a definite computational capacity, and the system must be tailored to meet specific performance benchmarks.
- The objective of **1-minute Auto-FLISR solutioning is a stretch objective** and can be impacted by various factors:
  - Circuit topology (# of feeders and devices),
  - Device status validation time,
  - Adjacency to and leveraging of other circuits as part of the solution,
  - Post switching plan protection validation,
  - Number of switching plans to be run,
  - Forward forecasting time for which the switching plan is to solve
- Oracle recommends expanded testing of use cases during the planned FLISR pilot to be able to learn and solve for various potential issues.

Auto-FLISR
Risk Items



TRC identified various *items which may impact the deployment of Auto-FLISR* at THESL and grouped these into **10 categories** which were then tracked to impact in the areas of **Safety, Performance, Schedule, and Cost**.

These items are all expected to be encountered to some extent during the Auto-FLISR journey.

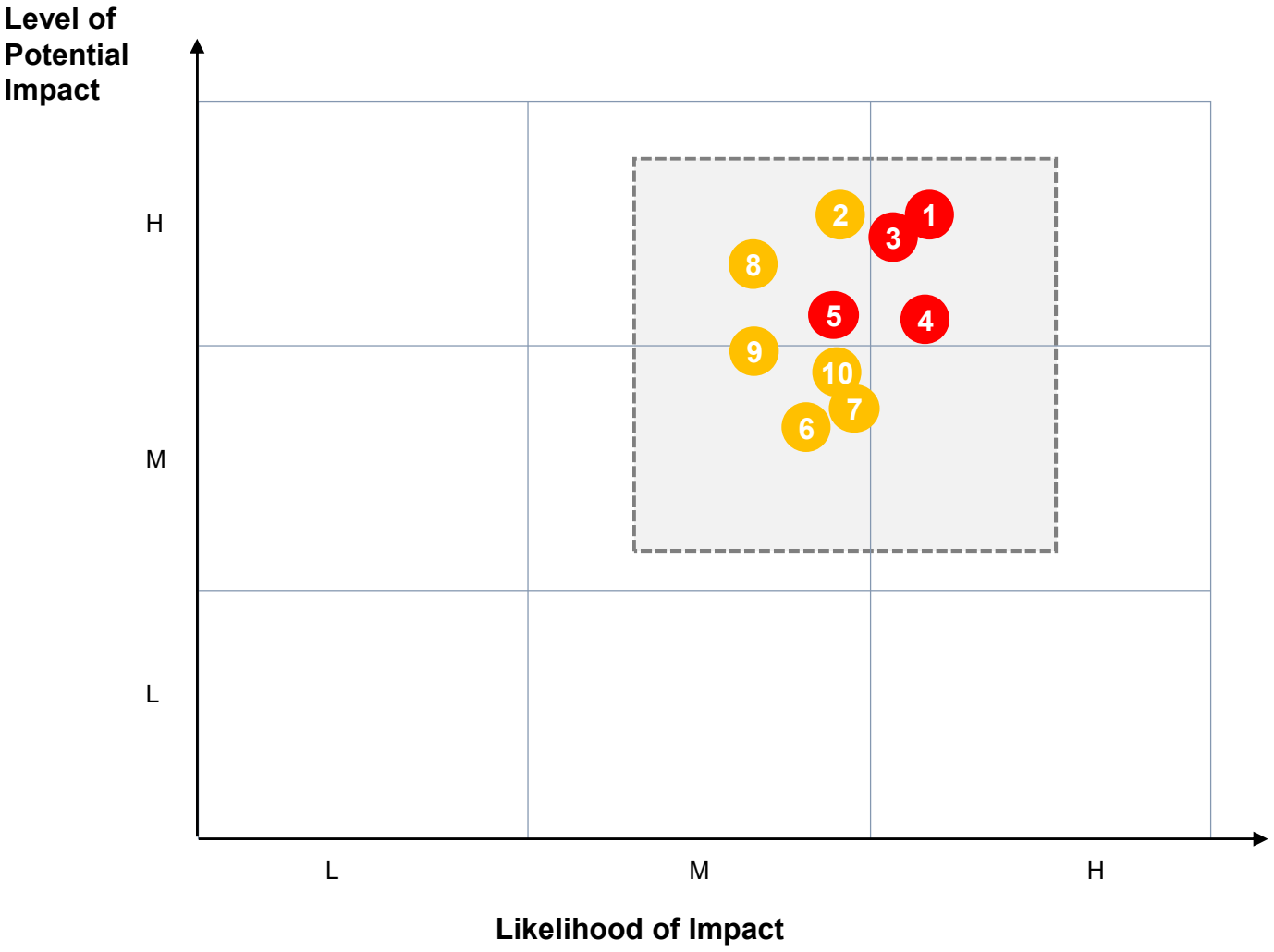
The 10 items of risk are as follows:

1. **Auto-FLISR Performance** – Solution expectations and how different factors impact the performance of Auto-FLISR
2. **Dependency on NMS Upgrade** – How NMS upgrade impacts the deployment of the Auto-FLISR (Operations and IT)
3. **Data Quality** – How data quality impacts Auto-FLISR performance and the ability to maintain the required data standard
4. **NMS Product Gap** – How well the core software does what THESL needs and extent to which additional unique coding is needed
5. **Auto-FLISR Testing** – Validating the FLISR switching models for each circuit and equipment operation
6. **Standard Approaches to Work** – How work process are aligned and simplified to allow for improved automation
7. **Change Management / Acceptance** – How will staff be impacted by Auto-FLISR and communication of benefits of automation
8. **Operational Safety** – How system operators and field crews safely work with automated controls
9. **Cyber Security** – Security of the technologies executing the automated control
10. **Auto-FLISR Deployment Strategy** – How will Auto-FLISR be rolled out to various circuits at different times and how will this be coordinated

The following slide provides a high-level view of their impact.

Auto-FLISR
Risk Assessment





#	Risk Item	Difficulty of Mitigation	Impact			
			Performance	Schedule	Cost	Safety
1	Auto-FLISR Performance	High				
2	Dependency on NMS Upgrade	Medium				
3	Data Quality	High				
4	NMS Product Gap	High				
5	Auto-FLISR Testing	High				
6	Standard Approaches to Work	Medium				
7	Change Management & Acceptance	Medium				
8	Operational Safety	Medium				
9	Cyber Security	Medium				
10	Auto-FLISR Deployment Strategy	Medium				

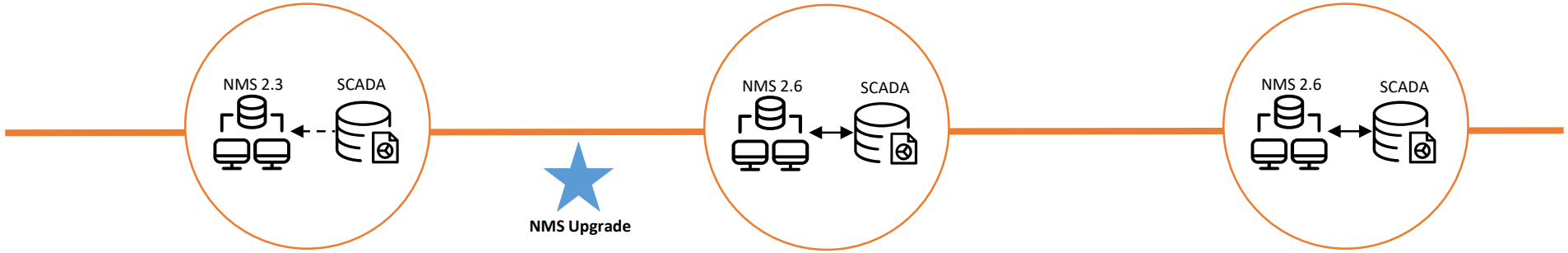
FLISR
Operation Readiness Strategy



STAGE 1:
MANUAL FLISR 2.3 - EVALUATION

STAGE 2:
MANUAL FLISR 2.6 - EVALUATION

STAGE 3:
AUTO-FLISR



- NMS 2.3 FLISR module
- THESL team validates FLISR switching plan periodically, but does not use it during system operation
- Confidence period

- NMS 2.6 FLISR module
- THESL team validates FLISR switching plan periodically, but does not use it during system operation
- Confidence period

- NMS 2.6 FLISR module in automatic mode
- NMS FLISR executes the switching steps automatically with manual intervention only when required

IMPORTANT NOTES

- These stages are those used by various utilities. Not all stages need to be taken and are provided as reference only
- An entry/exit criteria should be set to move between FLISR stages
- System circuits may be in different FLISR stages
- Procedures should be established for operating in various FLISR stages

Auto-FLISR
Timeline



The following three slides provide a view of various timeline aspects:

Related Timeline

- This slide serves to provide a high-level context of when aspects relevant to Auto-FLISR enablement may be expected to occur and therefore establish context for scheduling.

High-Level Timeline

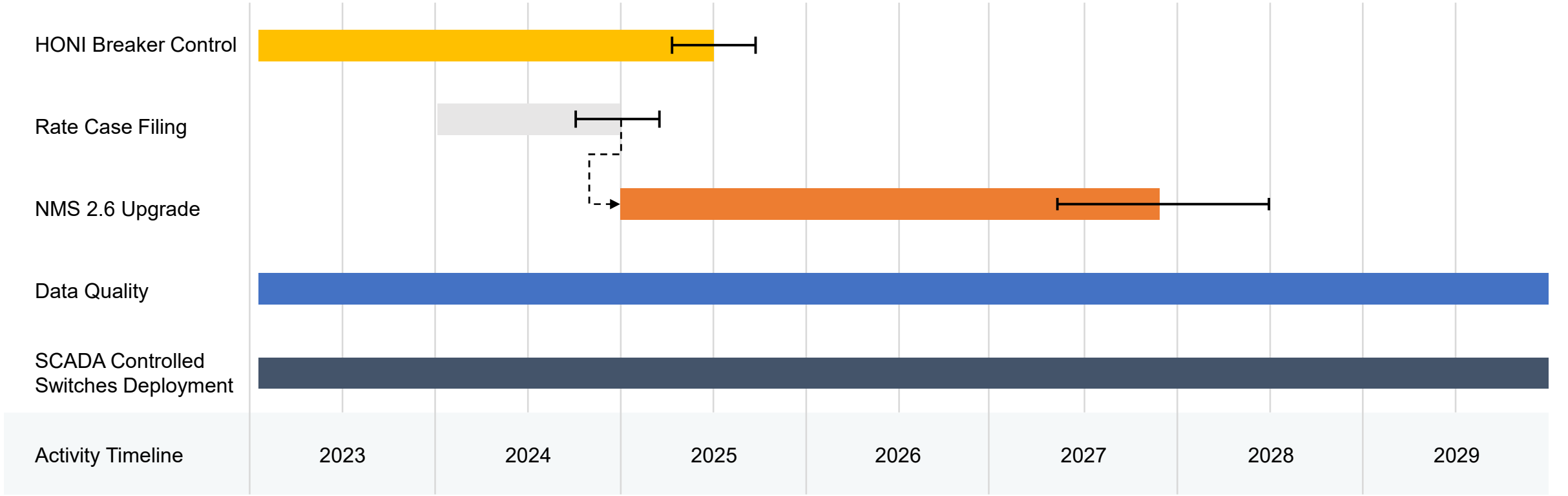
- This slide provides a view of the high-level Auto-FLISR specific activities, their relationship and representative timing for these activities.

Indicative Activities

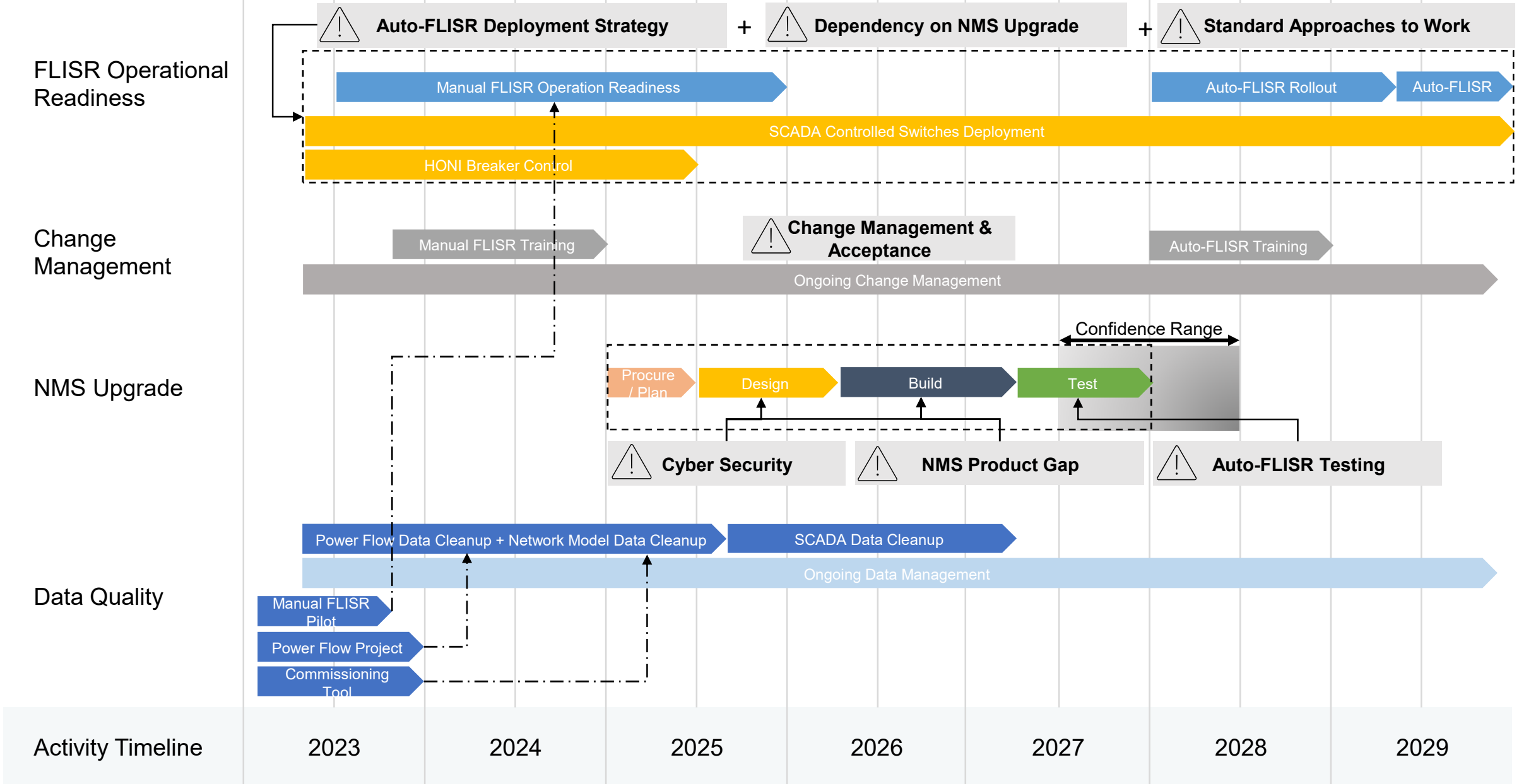
- This slide provides a view of activities that may be expected to be conducted within the specific focus of the technology deployment, their sequencing and potential timing.

Auto-FLISR
Related Timeline





Auto-FLISR High-Level Timeline



NMS Upgrade

Indicative Activities



Timeline	2025 Q1	2025 Q2	2025 Q3	2025 Q4	2026 Q1	2026 Q2	2026 Q3	2026 Q4	2027 Q1	2027 Q2	2027 Q3	2027 Q4
Planning & Initiation	Procurement	Implementation Plan										
Discovery & Blueprinting			Process Design	Requirement Documentation	Functional & Technical Design							
Build						Infrastructure / Environment Build	NMS 2.6 Build	R1 System Configuration	R2 System Configuration			
QA								R1 Unit / Functional / SIT	R2 Unit / Functional / SIT			
								R1 Point to Point Testing				
								R1 Non-functional / Regression / Performance Testing		R2 Non-functional / Regression / Performance Testing		
										NMS 2.6 R1 UAT	NMS 2.6 R2 UAT	
Training & Change Management									R1 Training		R2 Training	
			Change Management							NMS 2.6 R1 Go-Live		NMS 2.6 R2 Go-Live

Auto-FLISR
Items for Consideration



The following items will potentially impact the Auto-FLISR deployment and warrant further review. These items have not formed part of the assessment.

Hydro One – Switch Ownership and Control

- A large population of circuit breakers on the THESL system are owned and controlled by Hydro One.
- This is potentially a significant complexity for the deployment of Auto-FLISR at THESL.
- Note – An interview is scheduled with Hydro One for June 30, 2023, to gain more insight.

Procedure Governance

- THESL's current operational performance has not been reviewed to establish a performance baseline for the Auto-FLISR assessment.

Staffing and Skills

- The aptitude and training of the existing THESL staff in the context of a transition from a manual to an automated operating environment have not been assessed.



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Toronto Hydro-Electric System Limited (THESL) Auto-FLISR Assessment

Presented on:

August 18, 2023
Final Draft

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Document Control

Revision Number	Date of Issue	Author(s)	Brief Description of Change
.01	June 28, 2023	H. Wu and C. Smart	Draft release.
Final Draft	June 30, 2023	H. Wu and C. Smart	Final draft
.03	July 14, 2023	H. Wu and C. Smart	Final – redline update
.04	July 26, 2023	H. Wu and W. Conn	Final – redline update
.05	August 3, 2023	H. Wu, C. Smart, W. Conn	Final – redline update
.06	August 18, 2023	H.Wu	Final – United Energy Interview Notes Added

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1 Executive Summary

Toronto Hydro-Electric System Limited (THESL) owns and operates an electricity distribution system for the city of Toronto. Its priority is delivering safe and reliable electrical power to about 787,000 customers in the largest city in Canada. THESL's distribution represents approximately 18 percent of the electricity consumed in the province of Ontario servicing residential, commercial, and industrial customers.

THESL is currently progressing the use of Fault Location, Isolation, and Service Restoration (FLISR) and seeks to move the deployment of automated FLISR, aka Auto-FLISR.

THESL hired TRC Company (TRC) to conduct a six-week high level assessment of THESL's journey to Auto-FLISR with a focus on learnings from other utilities, expected benefits, potential timeline, and the significant risks and potential mitigation of the risks.

During the course of the six weeks TRC conducted discovery interviews with THESL staff, benchmarked Auto-FLISR experience with other utilities and interviewed THESL's key Auto-FLISR technology platform provider, Oracle.

TRCs key findings fall into categories of impact: Safety, Performance, Schedule, and Cost.

Safety

Safety is key for utility operations. The key potential aspect of safety was identified as being the ability to ensure that field crews and operators follow clear procedures to ensure that automated control is turned off to switches associated with faults to which field crews are deployed. Utilities using Auto-FLISR see this as controllable in the normal course of business practice, augmented by clear control status on the Auto-FLISR system.

Performance

An important aspiration for THESL, and other Canadian utilities, is for Auto-FLISR to operate in under one minute to meet the standard for an outage to be considered a momentary outage. Oracle noted this as a challenging goal, with various factors that may impact this performance goal. Most of the Auto-FLISR deployments benchmarked for performance are in US utilities where the standard for a momentary outage is less than five minutes.

TRC has been unable to interview any utilities currently operating to the Auto-FLISR momentary objective of one minute. Oracle has identified [redacted] in [redacted] meeting this objective. Initial information and interview suggest that [redacted] have achieved this goal in a limited fashion.

The performance of Auto-FLISR is influenced by various factors, some of which a utility has control while others have more potential for variability. Factors such as the number of communicating controllable devices on the electric network and the quality of data provided to the automated system are within the utility's control. The number and extent of outage events occurring due to, for example, extreme weather events at any one time are out of the control of the utility. It is likely that achieving this timing goal will require a simple switching plan which may result in fewer customers being returned to service overall and THESL will likely have to make trade offs in performance preferences.

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Schedule

The deployment of Auto-FLISR at THESL will be a complex undertaking with many aspects contributing to the final outcome. Foundational to the operation of Auto-FLISR will be the upgrade of the Oracle NMS platform and moving this platform into the higher security operating environment. The platform will also be upgraded to a high availability architecture to supply 5 x 9 reliability (system to be available 99.999% of the time). Complicating this work is that THESL's NMS is highly customized, meaning specific code has been added for THESL rather than native system configuration being leveraged. If extensive customization is to be applied to the upgrade, the already complex project can expect to be delayed beyond what may be considered typical. Given what is mentioned above, the NMS upgrade should be acknowledged as a multifaceted project with an estimated minimum duration of two years, with many dependencies on both business operations and IT staff.

Integrating Auto-FLISR function testing and enablement as a separate work stream contributes to the complexity of the NMS upgrade schedule. Notably, changes in power flow algorithms in NMS 2.6 might necessitate further efforts in model tuning and data gathering. Additionally, achieving the desired 1-minute target for Auto-FLISR function in NMS 2.6 will involve an iterative process of configuration work. Establishing practical yet effective test exit criteria for Auto-FLISR function in the NMS 2.6 upgrade will be crucial in managing these aspects.

The outcomes of the manual FLISR pilot project conducted in 2023 have the potential to inform the overall schedule. The insights gained from the pilot, such as assessing data readiness, configuring FLISR settings in NMS, and building operational confidence, will inform the design of the NMS 2.6 upgrade and the test strategy for the Auto-FLISR module. These learnings will play a crucial role in shaping the subsequent stages of development and deployment of the FLISR system, potentially leading to adjustments in the overall timeline and implementation approach. Once the NMS platform upgrade is complete the transition to Auto-FLISR for various substations can commence as soon as operator and field training, supported by appropriate operating procedures are in place. It is common to deploy Auto-FLISR to select circuits to develop operational confidence before wider deployment. Deployment will also be enhanced by further deployment of communicating controllable field devices in support of switching optionality. THESL is currently in the process of implementing an average of 2.5 SCADA controllable sectionalizing devices per feeder, which will enable an initial level of FLISR performance. To mitigate impact to the rollout schedule of Auto-FLISR these aspects should be planned well in advance of Auto-FLISR software platform go-live.

Cost

Feedback from other utilities has confirmed that the cost of the field equipment and communications is by far the costliest aspect of an Auto-FLISR deployment, especially if a key objective is to have increased switching optionality for effective fault mitigation. THESL's deployment of the NMS platform to the high security and high availability environment can be expected to considerably increase cost to a typical software upgrade.

Impactful Items

In this report we have also noted other potentially impactful items that could impact the Auto-FLISR deployment, and which warrant further review. These are:

- Operation of Hydro One owned breakers.
- Procedure Control.
- Staffing and skills.

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Impactful Opportunity

While there is no specific industry roadmap for an Auto-FLISR deployment, TRC believes that THESL's planned initial step of piloting a manual use of FLISR output from the existing NMS platform is an important opportunity and should be conducted at depth including a wide set of potential use cases in the pilot. This pilot, if conducted comprehensively with broad stakeholder engagement, has the potential to provide insight which will either serve to mitigate or manage expectations for the overall Auto-FLISR deployment.

TRC recommends that the FLISR pilot be recognized as the most important initial step for the THESL Auto-FLISR journey and that it is approached with suitable rigor, support, and transparency.

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2 Project Description

2.1 Scope Overview

The services of TRC were retained to conduct a six-week assessment of THESL's journey to the deployment of Auto-FLISR. The intent of this assessment was to conduct a series of activities which would result in the development of this report as an information and decision support tool for THESL leadership when considering Auto-FLISR.

The assessment was designed to allow for the following key areas of consideration: the potential timeline for the deployment of Auto-FLISR, risk relevant to the deployment of Auto-FLISR, and how risks may be mitigated. TRC has also provided insights as to high-level cost impacts from the deployment of Auto-FLISR, which are provided in the appendix of this document.

The assessment process involved activities to provide insight to THESL's internal approach, consideration of the key enabling technology (Oracle NMS), and lessons learned from other utilities who have progressed with Auto-FLISR deployments. TRC added to this its own expertise with Auto-FLISR and other utility solution deployments.

2.2 Auto-FLISR Principles

As a level set and to provide context for the rest of the conversation in this document it is important to provide a definition of Auto-FLISR and what may be considered reasonable expectations from the tool.

The central purpose of FLISR operations is to reduce the magnitude and time of any system outages experienced by customers. This is done by identifying the location of a specific system fault, determining how devices such as breakers, reclosers and tie-lines may be leveraged (switched) to isolate the impacted fault area to the minimum number of customers, and to then execute a switching plan to return all other customers to service as quickly as possible.

FLISR can be a broad term that encompasses various approaches and technologies used for fault management and power restoration in distribution networks. Generally decentralized and centralized FLISR.

- Decentralized FLISR: FLISR systems leveraging intelligent electronic devices which have pre-defined trigger rules to allow them to operate autonomously, and quickly. These devices are relatively simple to configure and can be quickly to deploy. These systems typically operate in seconds and re-route power and shed non-essential load under multi-contingency situations. These are not centrally coordinated for optimized outcomes.
- Centralized FLISR: Centralized FLISR systems use SCADA-enabled switches and sensors located at key points in the distribution system to detect an outage, locate the faulted area, isolate the fault, and restore service to unfaulted areas. Some switching operations can be performed automatically depending on the capabilities of the IEDs and sectionalizing devices, and the speed of SCADA system communication.

While the decentralized FLISR can be said to be automated, the discussion of manual or automated operations tends to focus on the centralized FLISR. In this context the manual and automated FLISR, aka Auto-FLISR, are as follows:

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- Manual FLISR: This approach involves manual intervention by utility operators to execute switching instructions determined by FLISR system to detect faults, locate their exact positions, isolate affected sections, and restore power to customers. It involves the use of either SCADA controlled devices.
- Automatic FLISR: This approach involves a FLISR software system connected to the SCADA control automatically locating the fault, solutioning to isolate the fault, executing switching actions to isolate the faulted part of the feeder, and restoring power to healthy elements of the feeder without operator intervention. This Auto-FLISR solution is generally able to execute with greater speed than the manual FLISR approach.

It is assumed that THESL will seek to deploy a centralized automated FLISR solution.

Generally, the objectives of FLISR relate to electric utility service performance metrics such as System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI). Additionally, effective FLISR, automatic or manual, operations improve the efficiency of field trips in that crews are directed to a narrowed potential location of the fault to be resolved and the opportunity to dispatch crews with the correct equipment is increased.

There is also generally a particular focus on momentary versus sustained interruptions of supply. A momentary interruption is the brief loss of power delivery caused by the opening and closing operation of an interrupting device. In many jurisdictions a momentary interruption is defined as being less than five minutes in duration. A sustained interruption is any interruption lasting longer than a momentary interruption.

It should be noted that THESL and other Ontario utilities use the more rigorous one minute (60 seconds) as the defined time period for a momentary interruption.

A momentary interruption is quite often able to be resolved with the operation of a recloser which is a switch that automatically opens when a specific voltage change is detected and then tests the electrical line to determine whether the trouble has been removed. If the problem was only temporary, say a brief tree contact, then the recloser automatically resets itself (closes) and restores electrical power.

In the case of the recloser operation it is normally the case that the recloser is operating in isolation of other components on the powerline (feeder) or circuit as a whole. The device may try multiple attempts, generally two to three times, to reclose without any external control and only when it fails to be able to close does it move to an open condition, or lock out, and send notification to the Supervisory Control and Data Acquisition (SCADA) system of a sustained outage. Depending on the number of recloser attempts, the time to the lock out stage can be up to 10 to 15 seconds based on peer utility interview results. Currently THESL is utilizing one reclose attempt scheme with lock out stage under 1 sec but will be soon evaluating a multi-reclose scheme (2 recloses instead of 1), with a projected lock out stage to be 4-5 seconds.

Once the lock out condition is received by the SCADA system it will need to be parsed to the Auto-FLISR system, Oracle NMS in the case of THESL, and a FLISR solution determined. The speed at which the solution can be impacted by many factors:

- The number of devices on the feeder which can potentially be operated.
- Whether device(s) are communicating as expected
    - Communication can be impacted by various issues. Potential contributors include network or connectivity latency, faulty hardware or equipment, power supply issues, incorrect configuration or settings, software or firmware issues, and environmental factors.

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- The forward-looking duration of the switching solution (for example is the switching solving for 4 hours, or 8 hours, or 12 hours).
- The quality of the data available to feed the solution calculation.
    - Data quality includes the accuracy, completeness, and consistency of the data, across diverse data sources. Data may include engineering data such as equipment capacity and ratings, relay trip settings, customer energy use data; and operational data such as fault target, breaker lockout status, and bus voltage.
- The compute capacity of the FLISR system and whether that compute capacity is under constraint at the time
    - Compute capacity constraints can be generated from such as a high demand for FLISR/SCADA transactions due to multiple events occurring in parallel.
- The latency between any device communication and system pass-throughs such as security gateways.
    - Compared to SCADA, the system response in NMS will be slower as it does not talk directly to RTUs.
    - [redacted] breaker control may require signals to transit via more gateways which could result in latency.

There are specific instances where Auto-FLISR will be restricted from running. Generally, these are instances where field crews are preparing to work on the feeder and breaker protection is in place for the safety of the field workers. There may also be different protocols applied during significant storm days.

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3 Methodology And Observations

3.1 Data Discovery

TRC provided THESL with an initial data discovery request which was designed to provide material from which TRC could gain a foundational insight into THESL Auto-FLISR plans and current situation. THESL was able to provide various data in the context of this data request from which TRC was able to gain a view of THESL operations and technology approach to Auto-FLISR.

The initial data set, while high level, provided a view of how the control room is currently organized, how switching is currently conducted, and the potential future switching approach. Also provided were swim lane diagrams with representation of various technology projects relevant to the journey to Auto-FLISR, including power flow related data cleansing, a manual FLISR pilot, alignment with Hydro One for breaker control, and the Oracle NMS upgrade and testing.

This data set was augmented by the discovery meetings discussed in the next step.

3.2 THESL Discovery Meetings

In the initial project plan, it was intended that project workshops would be conducted with a broad population of THESL staff, representing both operational and technology responsibilities. Potential participants were identified during the kick-off phase of the project and a formal project kick-off briefing was conducted for these participants.

In discussion with the project team, it was determined that the initial workshop would be conducted as a discovery meeting with a key business operations lead, Ali Syed (Senior Manager – System Operations), and a key technology lead, Frank Ning (NMS Solution Architect). Both were able to provide knowledge of the current operational and technology aspects for switching operations and insight into the planned approach for moving to Auto-FLISR at THESL.

In total three discovery calls were conducted with Ali and Frank, supported by members of the project team, over a two-week period. Ali and Frank were able to provide clarity and context for the data discovery material and insight as to the FLISR operations, objectives, and technology dependencies.

During the discovery calls the swim lane diagrams were advised to be initial, dates to be developed/confirmed, and no formal project plans or regulatory filing documents in support of the approach has been developed. It did become clear from the material and discussions that there are three anticipated foundational aspects for THESL Auto-FLISR journey, the upgrade of the Oracle NMS 2.3 platform, the initial target service area for Auto-FLISR is the area known as “the horseshoe,” and the field deployment target is for an average of 2.5 Auto-FLISR capable switches per feeder.

3.2.1 Oracle NMS

The Oracle NMS 2.3 platform is currently staged in the corporate IT environment but accessible from corporate environment. NMS 2.3 has control capability that THESL does not utilize due to security concern. The intended upgraded is to Oracle NMS 2.6 combined with a re-build of the NMS platform in the secure corporate environment to allow for SCADA control, and to deploy on a high availability architecture.

The objective of the high availability deployment is for the upgraded NMS platform to perform with three nines reliability. According to THESL's latest design, this reliability criterion means that the system in

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question will be available 99.96 percent of the time, which allows for less than 3 hours of downtime a year. This is a substantial improvement compared to the previous downtime of approximately 56 hours per year. The complexity of this system design requires the elimination of any single points of failure, the establishment of reliable crossover to redundant systems, and the implementation of rigorous failure detection measures. These approaches are typical for critical systems. It was identified that this performance criterion is to be established for the NMS platform and not to other non-operational input systems.

The target date is to have the upgrade to NMS 2.6 complete by late 2026.

The drivers for the NMS 2.6 upgrade include improving system's operational standard (including high availability, one operator GUI and better NMS patching experience, etc.), enabling the SCADA control in support of Auto-FLISR operations, and gaining synergies from undertaking these activities as an aligned and coordinated project.

3.2.2 Auto-FLISR Service Area

The targeted service area for the Auto-FLISR deployment, the service area known as the horseshoe, is a 27.6 kV supply in the northeast and northwest of the THESL service territory. The intention is to have deployed the minimum average of 2.5 switches to all feeders on the horseshoe service territory by 2029. Currently there are approximately 196 feeders that meet this criteria, 99 feeders with less than 2 sectionalizers and 36 feeders with no SCADA ties.

Two substations have been identified as the initial pilot locations.

A manual FLISR pilot is to commence at the two targeted substations as of August 2023. In this pilot the existing instance of NMS will be used to run FLISR switch sheets in real-time and these switch sheets will be compared bi-weekly with the actual switching approach that was conducted. This will create the opportunity to educate operators as to the FLISR output and to identify opportunities to improve the NMS output. NMS FLISR timestamps will be recorded and tracked to identify performance criteria for key elements of the NMS FLISR output. These two substations have also been used for a recent power flow study.

[redacted]

During the course of discovery conversations, it was identified that there is a significant amount of system control coordination with [redacted] Approximately thirty percent of circuit breakers are owned and operated by [redacted]. Parallel discussions are underway between THESL and [redacted] leadership as to how future control of [redacted] breakers by THESL may be enabled in the future. THESL provided in their technical project swim lanes representation of the potential to resolve the issues of [redacted] breaker control, including implementation and testing of a technical solution, prior to the commencement of the Oracle NMS upgrade project.

This is an aspect which may provide potential complexity to the deployment of Auto-FLISR at THESL. Due to the nature of the project being a high-level review of issues there has not been an opportunity for insight as to the potential scope and resolution of this aspect of THESL operations. However, it does warrant further review.

THESL is aware that HONI has also made some progress with Auto-FLISR and asked that TRC interview [redacted] in this context. The summary of TRC's interview findings can be found in section 3.3.3. Below is a summary of THESL's latest engagement status:

- THESL started discussion with [redacted] in 2022. A working level agreement with was reached with a Memorandum of Understanding (MOU) circulated (still needs to be signed) to form a technical and

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operational working group between the two utilities to define the operational parameter and a scope of work.

- Working group sessions were initiated in April 2023. The two teams meet bi-weekly and are aiming to have requirements drafted by Sept 2023 and a Scope of Work (SOW) developed in October/November.
- THESL has historically had supervisory control of [redacted] assets. This was a legacy setup, that [redacted] continuous to retire.
- The working level agreement between the two companies, revolves around the following:
    - [redacted] will provide operating control for the FLISR application only. TH will continue to contact HONI for controller driven switching and planned work.
    - The breaker controls will be done for outage restoration only, and not a return to normal i.e., THESL will not be making any parallels between feeders without [redacted] consent.
    - The utilities will rely on ICCP for controls, similar to the existing setup with Hold-off requests.
- In parallel with the technical and operating discussion, legal/regulatory teams on both organizations are working on the regulatory arrangement and legal agreements.
- THESL expects a Scope of Work to be signed off by the end of 2023, with implementation in 2024.

3.2.4 Distributed Energy Resources (DERs) Integration

DERs are a new complexity likely to expand in presence and impact on the operations of electric systems. In the context of grid switching operations the potential for DERs such as solar, wind, storage, and electric vehicles (EV) to create power flow changes and to impact switching decisions, and protection schemes, is significant. DERs are an emerging area of consideration for Auto-FLISR operation and are an area which THESL is investigating.

The potential impact of DERs have not been investigated as a specific control aspect have not been considered in this high-level assessment. In general, utilities are considering both the risks and opportunities that will arise from expanded DER deployment in the context of grid operations, and the use of FLISR:

- Increased Complexity: High DER penetration potentially introduces bi-directional power flows. This increased complexity can pose challenges for FLISR implementation as the system needs to accurately identify fault locations, isolate affected areas, and restore power while considering the presence and behavior of DER related power flows.
- Communication and Coordination: With DERs integrated into the distribution grid, effective communication and coordination between FLISR systems and DER control systems becomes crucial. FLISR must be able to receive real-time information on DER operation and adjust its responses accordingly to ensure safe and efficient fault management.
- Enhanced Situational Awareness: DERs can provide additional data points and enhance situational awareness for FLISR systems. With the ability to monitor DER generation, voltages, and power flows at different points on the distribution grid, FLISR can make more informed decisions during fault detection, isolation, and service restoration processes.
- Improved Resilience: When properly integrated, DERs can enhance grid resilience by providing localized generation and storage capabilities. FLISR can leverage these DER assets to support quicker service

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restoration by utilizing their power sources to re-energize isolated sections of the grid during fault events.

3.3 Utility Benchmarking

TRC identified utilities that would likely serve to provide useful insight and lessons learned for THESL's Auto-FLISR journey. The initial utilities targeted were [redacted]. During the course of conversations with THESL staff [redacted] and [redacted] were added to this group. TRC was also asked to provide insight to the Auto-FLISR operations at [redacted].

Key themes from the peer utilities benchmarking call included:

- Auto-FLISR Maturity: Auto-FLISR implementation has been perceived as an ongoing journey rather than a one-time endeavor for each utility. Note that there are no specific performance results over an extended period of time, however, all of the utilities remain committed to the journey. The maturity level of Auto-FLISR varied across different utilities and regions. The implementation and adoption of Auto-FLISR technology have been progressing steadily, but the maturity level can differ based on several factors such as Utility Size and Resources and Technological Advancements. The prevailing consensus is that Auto-FLISR will realize its intended benefits once it reaches a state of full maturity in its implementation.
- Data Accuracy and Quality: Auto-FLISR heavily relies on accurate and high-quality data from monitoring devices for fault detection and decision-making. Ensuring the accuracy and reliability of the data is essential to avoid false alarms or incorrect actions during fault events.
- Operational Training and Operation Confidence: Auto-FLISR implementation requires proper training for utility personnel to effectively operate and manage the system. Skilled operators must understand the high-level automation logic, data analysis, and coordination processes to ensure smooth operations. Apart from providing operational training, operation confidence can be built by involving operators during User Acceptance Testing (UAT), drawing insights from well-planned pilot projects, and addressing and resolving unique scenarios encountered during day-to-day FLISR operations.

3.3.1 [redacted]

[redacted] have advanced experience with the deployment of Auto-FLISR and while [redacted] uses the OSI platform rather than Oracle NMS, the insights from [redacted] are transferable across operations and technologies. OGE was generous with their time in making a key project lead available for interview and in providing briefing material to provide broad insight. This cooperation from OGE was augmented by TRC subject matter experts (SMEs) who have worked with [redacted] on various stages of their Auto-FLISR journey, both in the context of operational technology (OT) strategy and for key operational aspects.

Key take aways from the [redacted] benchmarking call included:

- Data quality, particularly for SCADA keys, very important.
  - OGE conducted a $30 million system data validation project.
- Consistency of procedure approach was key.
- Established a test laboratory (8 devices) before deploying further.

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- Testing needs to cover failure modes and be very deliberate around how Auto-FLISR fails.
- Auto-FLISR creates new challenges to old rules, for example operators have automation steps in their processes and confirmation of automation override/shut off steps when appropriate.
- Change management is an important point of focus for solution acceptance.
- Training of operators, field and IT staff needs to be planned and budgeted (O&M).
- ADMS and other system upgrades results in continual cost generation, both capital and O&M, to maintain a system which is heavily integrated and dependent on other systems for source data.
- Auto-FLISR software module cost was not large compared to recloser costs.
- FLISR overall "dramatically" improved performance.

3.3.2 [redacted]

PGE, who also use the OSI platform, was responsive to the request for a benchmarking interview and made several SMEs available who were able to provide a broad range of insight. Similar to [redacted] was able to discuss technology and operational aspects which are pertinent to any Auto-FLISR progression, including important lessons learned which have impacted the deployment of Auto-FLISR at [redacted].

Key take aways from the [redacted] benchmarking call included:

- [redacted] objective to improve SAIFI / SAIDI but safety a priority.
- System integrations are challenging.
- Focus on configurable functionality not customization.
- SCADA data preparation is a key factor.
- Split ADMS and OMS teams, and TSO and DSO teams.
- Transitioning from radios for device communication to Verizon VPN to omni-cellular (multiple carrier solution).
- Established a specific Change Manager role for ADMS and then Auto-FLISR acceptance.
- Conducted Just-in-Time training then experienced an unplanned deployment delay.
- Clear language key for communication between operators and field crew.
- Confidence in Auto-FLISR being disabled during field work is key – supported by operator training and system indicators.
- Load forecast is an 8-hour look ahead, objective to get to 24-hours but this slows solution execution.
    - The forecast look ahead is the duration for which the FLISR solution must solve, considering the expected load fluctuations over the period in question. A longer the duration to be solved the more complex the analysis and the longer it is expected to take the FLISR system to respond.
- Allow for additional recloser deployment and substation relay work, beyond simple upgrades.
- PGE established a FLISR laboratory test site and conducted field testing to gain confidence.
- Issues around functionality delayed the project.

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3.3.3 [redacted]

As noted in the prior section, [redacted] was identified during the THESL discovery discussions as a key relationship for THESL in the context of the Auto-FLISR journey. It was identified that there is considerable device switching coordination required between THESL and [redacted] with as many as 30 percent of substation breakers owned and operated by Hydro One.

HONI was contacted and responded to an interview request by making several subject matter experts available for an interview. As requested by THESL the issue of THESL operating [redacted] devices was not covered in the interview.

- HONI currently has Auto-FLISR scheme developed on eight 27.6 kV sub-transmission feeders out of two different substations. The eight feeders are modeled in SCADA and were migrated to DMS with FLISR profiles.
- HONI moved through two stages with the initial stage being the FLISR solution being provided to the operator to execute and stage two being Auto-FLISR.
- Intended to initiate Auto-FLISR from August 2022 but delayed due to operator concerns and need to conduct additional operator training. Additional operator training over a three-month period resolved issues in January 2023 and Auto-FLISR ran until March 2023.
- A five stage validation criteria on model fine tuning (Analysis Ready – AR) was set for critical review of a feeder for Auto-FLISR enablement.
- Auto-FLISR was taken offline in March 2023 due to an operational fault. FLISR correctly executed but it was determined that field devices were not correctly tagged in SCADA (devices set as switches not reclosers).
- The scheme is working as intended but [redacted] is having issues fine tuning data. The main issue is that the operators identified that the state estimation convergence criteria, which is required to perform within a 10 percent range, is not performing within range.
    - State estimation is the basis for building the real-time system model and is a static mathematical representation of the current conditions in an interconnected power network.
- The operators have a high sense of ownership for switching and are risk adverse, improving communication has been important to gain operator engagement.
- [redacted] does not have a significant history of automation and so change management / communication has been important to overcome resistance.
- [redacted] has not received resistance from field crews as yet, but communication needs to grow so field crews have a good understanding.
- Maintenance of automated devices has been an issue with twenty percent of automated devices not available at any one time due to maintenance issues, which puts the automated grid at risk.
- Field crews need to be trained to conduct different types of maintenance and to be scheduled in support of automated system operations.
- [redacted] is focused on improving SAIFI and SAIDI but also see Auto-FLISR as important to demonstrate capability to the regulator for [redacted] to be the Distribution System Operator (DSO). [redacted] is also focused on supporting DER growth.

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- [redacted] currently attempts to auto-reclose three times but may add an additional reclose attempt to reduce the number of sustained outages.
- Auto-FLISR is seen as component of overall grid modernization effort and is what drives the value from foundational investments such as the DMS and SCADA enabled devices.
- [redacted] has moved from grid modernization discovery of a range of technologies to deployment of individual technologies with their own cost / benefit justification.
- [redacted] uses the Schneider Electric FLISR application as part of the Schneider v3.7 DMS platform.
- Significant costs have been SCADA enablement of devices and the DMS deployment. Other notable costs have included system upgrades, licensing, system studies and establishing FLISR profiles.

3.3.4 [redacted]

[redacted], which was also identified by Oracle as a good customer example of use of the Oracle NMS platform for Auto-FLISR, advised their openness to participate in an information session for Auto-FLISR. [redacted] has advised that they went to Auto-FLISR but then returned to manual FLISR mode due to data related issues. This has the potential to be valuable insight for THESL. Key take aways from the [redacted] benchmarking call included:

- Auto-FLISR ran for one year during which there were 30 Auto-FLISR events which generally successfully operated. The original benefits SDGE hoped to gain from Auto-FLISR was to improve SAIDI scores and to allow operators to focus on other matters while Auto-FLISR took care of more easily automated switching.
- Prior leadership was aggressive in deploying Auto-FLISR to networks on which it was not originally intended to operate.
- Auto-FLISR has been turned off for 5 years. [redacted] currently runs FLISR in manual mode, in that FLISR generates a result which the operator checks and then either executes their own switching solution or they can execute the FLISR recommended switching, both via NMS. Now operators are manually checking NMS FLISR outputs it is, in some cases, taking longer than it would without FLISR.
- Auto-FLISR was disabled for several reasons:
  - SCADA issues giving either false positives on device outages or RTU communications issues.
  - Oracle upgrade from NMS 2.3 to 2.5 caused issues. Oracle NMS 2.5 has many different elements to Oracle NMS 2.3 including a different power flow engine, with algorithm changes, and different processes for ingesting data such as weather.
  - SCADA system change from ACS to OSI
  - Network areas re-defined to more identified as high fire risk and so Auto-FLISR is not able to be used in these areas
- A heartbeat of RTU check process was put in place to better recognize RTU communication issues.
- The upgrade to Oracle NMS 2.5 has been a challenge and Auto-FLISR has been put on the backburner while this is resolved.
- Operators are not confident (“suspicious”) in the FLISR outcomes as a consequence of all of the issues.

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- The NMS 2.3 power flow engine is based on the original OpenDSS system which was designed for offline study and not for real-time outcomes. This results in long-solution time as many iterations are run. While these are run other NMS services tend to slow down.
- NMS 2.5 is based on the single threaded architecture. [redacted] has heard Oracle 2.6 is multi-thread (TRC team were able to confirm this is what Oracle has told).
- [redacted] uses the NMS Fault Location Analysis (FLA) as a separate function from FLISR. FLA focuses on the most accurate location for the fault so crews patrol time can be reduced, very important to SDG&E for fire areas.
- [redacted] note that FLISR only identifies location in the context of the nearest switching device to operate, not to the specificity of FLA.
- Prior to originally deploying Auto-FLISR, [redacted] ran 1,700 test cases to test switching recommendations. They did not create a test laboratory environment. They assumed devices would work as expected.
- [redacted] is aware that utilities like Louisville and [redacted] (Australia) run during storms but noted that both have fewer SCADA devices and not as many set points.
- Cost – [redacted] highlighted that investment in communication infrastructure/bandwidth is an area of focus they recommend as SCADA device communication has been an issue.
- Costs – [redacted] highlighted the need to budget for staff to create, test and check models is important.
- Costs – [redacted] highlighted the need to prepare for system upgrade costs.

3.3.5 [redacted]

[redacted] Australia was identified by THESL as a utility of interest. Oracle was able to provide an amount of insight. UEC is currently running in Auto-FLISR mode. As a representative example they managed six events over three weeks via Auto-FLISR. One event was executed successfully in automatic mode, one event correctly terminated due to adverse conditions on the network, and for four events no solution was possible due to faults being at the end of the feeder.

For the one event that ran successfully in Auto-FLISR mode customers were restored 40 seconds after outage. Oracle advised the following transaction timings:

- 10 seconds wait for demand scan to complete.
- 1 second for FLISR to find the solution.
- 2 seconds to create and start executing the switch plan.
- 27 seconds to execute the steps in the plan that led up to the re-energization of customers.

[redacted] was contacted and responded to an interview request by making several subject matter experts available for an interview. The interview was also joined by THESL's system operations manager for Q&A. Below are the key takeaways:

- [redacted] has been guided by the principle that Auto-FLISR should be quicker while adhering to the controllers' established practices.

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- Prior to the implementation of Auto-FLISR, [redacted] had a large number of distribution automation devices in operation. On average, there were 1-2 SCADA controlled devices, excluding the tie switch, for early auto-FLISR adoption, and currently 2-3 SCADA controlled devices per feeder.
- The introduction of Auto-FLISR has notably improved reliability, reducing fault response time from 10-30 minutes (manual) to less than 1 minute. Though [redacted] has adjusted their momentary criteria to 3 minutes recently, their aim remains a 1-minute operational time. On average, the entire process took around 45 seconds, with approximately 15-20 seconds allocated for fault detection, demand scanning from NMS, and resolution time, along with an additional 20-40 seconds for command issuance.
- Efforts have been dedicated to enhancing communications, including upgrading device firmware and standardizing configuration settings.
- Currently operating on NMS 2.5, FLISR is employed on [redacted] high-voltage (HV) network model rather than the low-voltage (LV) network.
- While the initial release of Auto-FLISR functioned on legacy kVA mode, which was deemed highly successful, [redacted] has shifted to kVA mode and is transitioning to full power flow mode. This transition results in approximately 40 seconds of the solution time.
- The adoption of power flow mode is driven by UE's intention to utilize more PF-based applications such as Fault Location Analysis (FLA).
- Significant cost components include field work (estimated at 2 - 2.5 million) and NMS upgrades.
- [redacted] opted for a comprehensive deployment of auto-FLISR, enabling its activation circuit-wide once the confidence period had been successfully navigated.
- Scenarios warranting the disabling of auto-FLISR encompass live Line work, bush fire days, and sensitive earth faults.
- The average turn around time for updating GIS model is 2 days.
- Auto-FLISR has been turned on even during “grey-sky” conditions due to the outweighing benefits over associated risks.
- A risk assessment workshop was conducted across different organizational sectors including control room, asset management, and protection.
- Key lessons learned emphasize the importance of meticulous attention to detail. Unique challenges may arise for each circuit, making precise configuration of protection and fault Indicator settings crucial for successful FLISR operations. UE conducted a comprehensive office review to address these aspects.

3.3.6 [redacted]

[redacted] is another Ontario based utility that was identified as a good interview target during the THESL discovery meetings. Alectra was contacted and agreed to a meeting, but as of writing a time for the interview has not been scheduled.

[redacted] advised that they have some experience with FLISR in their “east region,” but the solution is currently de-activated due to an issue in their SCADA system. [redacted] advised that they previously operated FLISR in semi-automatic mode and did not transition to fully automatic mode.

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3.3.7 Other Utilities

[redacted] was identified by THESL as a utility of interest Oracle was able to provide an amount of insight. FirstEnergy conducted a wide ranging ADMS deployment project to deploy the solution across five US states and ten operating companies. The project commenced in 2019 with Go Live millstones for ADMS and FLISR set for Q3, 2022. Manual FLISR is in production on 200+ feeders. In this manual mode suggested switching is provided but not automatically initiated. [redacted] are analyzing the events generated and they also run a Loss of Voltage functionality in production for both substations and feeders.

[redacted] was able to make an operational resource available and email exchange with their technology lead confirmed that while [redacted] uses Oracle NMS it is focused on outage management and is not leveraged for Auto-FLISR. [redacted] has isolated automatic switching on their radial system but not an Auto-FLISR model.

3.4 Oracle Interview

An interview was conducted with key Oracle team members in the context of THESL's intended upgrade for the Oracle Network Management System (NMS), which is intended to be the foundational technology platform for THESL's Auto-FLISR operations.

The Oracle team were able to provide insight as to the status of THESL's current deployment of NMS version 2.3 and the issues and opportunities associated with the upgrade to NMS 2.6 in the context of future Auto-FLISR operations. It was a key point of focus for the Oracle team that THESL should be encouraged to act on the upgrade of NMS 2.3 to NMS 2.6 as a matter of priority as NMS 2.3 will move to a limited support mode, called sustained support, as of December 2024.

The Oracle team also noted that the objective of solving and executing switching solutions in under one minute will be challenging. It was identified that based on studies to date this will require Oracle NMS to establish the switching solution in 15 seconds.

In the context of the upgrade in general the Oracle team noted that the THESL deployment of NMS 2.3 has what Oracle would consider to be a high level of customizations. It was noted that some of these customizations were deployed to delay the need for an upgrade from NMS 2.3 and Oracle identified that NMS 2.6 provides increased configuration options which THESL can leverage. Oracle stressed that should THESL decide to carry forward current NMS 2.3 customizations they would need to be rebuilt in NMS 2.6 which would complicate the upgrade. More detail is provided in this regard in section 5.6 of this document.

In addition to the points around support, Auto-FLISR transaction time, and customizations, the following are key elements from the Oracle interview:

- Establishing data for the manual FLISR pilot has been a key factor.
- Oracle has provided THESL with a "cheat sheet" of the key data needed for a successful FLISR output.
- Oracle has identified the prioritization of the data by its impact on the quality of the FLISR result, and how missing data will impact the FLISR outcome.
- NMS 2.6 will be simpler, less complex, and more powerful than NMS 2.3 with a dedicated power flow engine and various processes running in parallel and more efficiently resulting in quicker processing speed.
- 2.6 manages data in a better manner than 2.3 and does not share services for functions.

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- Performance in a higher security zone may be expected to be slower if transitioning security layers however the build of the new environment will create the opportunity for deployment of new servers with improved processing.
- Auto-FLISR can be run in NMS 2.3 but only if deployed in secure zone with SCADA control.
- Oracle recommends manual mode testing of FLISR in NMS 2.3 be expanded to more than only two substations so more edge cases can be identified and tested in manual mode.
- Oracle estimates a standard upgrade to NMS 2.6 to take one year to 18 months but note that the following factors add to the complexity and required time for the upgrade:
  - Building in a secure control environment.
  - Extent of data cleansing and ETL issues.
  - Amount of customization.
- Oracle advised that THESL have identified 15 to 20 NMS 2.6 enhancements (customizations), not Auto-FLISR related, which are not on the NMS roadmap.
- NMS 2.6 has an extensive set of business rules (called SRS) which allow for considerable configuration flexibility.
- Oracle recommends aligning to product configuration to mitigate upgrade timing, complexity, and cost risk.
- Oracle notes that acceptance of "out of the box" use of systems is a strategy emerging with many utilities and that THESL is potentially following this strategy with their Oracle Customer Care and Billing (CC&B) upgrade.
- Oracle does not believe any new cyber risks as being introduced by NMS 2.6.
- Oracle believes THESL may be a head of some of Oracle's other customers by having a project team with a depth of Auto-FLISR knowledge on the project team.
- Auto-FLISR is included in the overall NMS 2.6 licensing.
- NMS 2.6 can be run in FLISR manual mode where NMS produces the switching solution but waits for operator approval before executing the solution in NMS.
- Oracle identifies that testing can be improved with the inclusion of a real-time SCADA feed to the test environment so edge cases can be found and tested.
- Oracle identified San Diego Gas and Electric (SDGE) as an example of a good NMS Auto-FLISR deployment.

3.5 Observations on FLISR Benefits

Overall, Auto-FLISR offers potential benefits in terms of faster power restoration, improved reliability, enhanced grid resilience, operational efficiency, and increased customer satisfaction. By leveraging advanced automation and smart grid technologies, Auto-FLISR helps utilities respond more effectively to outages and maintain a more reliable power supply. Quantifying the specific benefits of Auto-FLISR can be

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challenging as they depend on various factors such as the specific implementation, network configuration, and operational context.

The utilities interviewed for this assessment have generally considered Auto-FLISR within the context of overall grid modernization type strategies and while there is consistency in the desire to improve SAIFI and SAIDI scores, and to increase field work efficiency via accurate fault location (note that Oracle FLISR and Fault Location Analysis are separate modules unlike OSI or SE ADMS products), definitive improvement goals for these elements have not been established specifically in the context of Auto-FLISR. There is also a theme of a foundational drive to improve situational awareness and automation where appropriate across their business.

In seeking to gain insight into benefit metrics, TRC sourced commentary of FLISR related benefit findings beyond those utilities interviewed. Following are the insights gained:

- Reduced Outages and Momentary Disturbances: Florida Power & Light (FPL) utilized automated feeder switching and FLISR operations to reduce customer interruptions and momentary disturbances: 9 operations serving almost 16,000 customers led to more than 9,000 fewer customer interruptions and approximately 2,500 fewer upstream momentary disturbances. FPL also achieved a significant increase in annual customer minutes of interruption avoided. This leads to benefits like convenience, cost savings, and avoidance of medical and safety problems for residential and commercial customers.[1]
- Reduced Outage Minutes and Increased Member Satisfaction: FLISR actions, such as automated feeder switching, contribute to reducing the number of customers affected by sustained outages and the duration of outages. Pacific Gas & Electric (PG&E) in its 2020 Smart Grid Annual Report[2], identified that Customer Reliability Benefit for FLISR since inception (2014) is $1,320 million, with 472 million customer minutes avoided, as well as approximately 35% Customer Minutes of Interruption (CMI) improvement on 5-year average outage minutes basis.

  In comparison, the Rural Electric Cooperative Smart Grid Benchmarking Report mentioned that FLISR implementation led to a significant reduction (average 10%) in outage minutes reported by members and that members expressed higher satisfaction (with 65% of participating utilities giving a 5-star rating) due to improved reliability.

  The following chart is a summary provided by the Rural Electric Cooperative of their results.

[1]Source: Distribution Automation – Results from the Smart Grid Investment Grant Program (https://www.energy.gov/sites/prod/files/2016/11/f34/Distribution%20Automation%20Summary%20Report_09-29-16.pdf)

[2]Source: Pacific Gas and Electric Smart Grid Annual Report – 2020 (https://www.pge.com/pge_global/common/pdfs/safety/how-the-system-works/electric-systems/smart-grid/AnnualReport2020.pdf)

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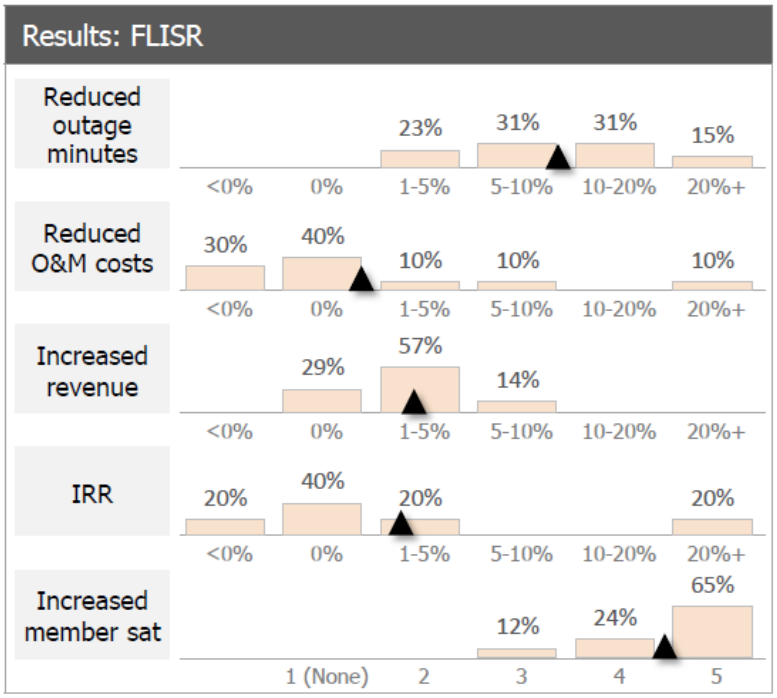

Source: Rural Electric Cooperative Smart Grid Benchmarking Report (https://www.nrtc.coop/wp-content/uploads/2022/08/REC_Smart_Grid_Benchmarking_Report.pdf)

[Triangle indicator for weighted average of the responses]

In the EPRI DA/FLISR State of Industry Survey, provided by THESL, which collects data from 48 respondents worldwide, it is identified that DMS With FLISR system contributes to approx. average reduction of SAIDI by 25%. Often, the benefits of FLISR and Distribution Automation (DA) can become intertwined, especially for utilities with existing DA devices in the field. This is evident in the EPRI report, where most participating utilities already possess Distribution Automation. Therefore, the adoption of Auto-FLISR is seen as an incremental improvement. However, this is not the case for THESL as the distribution automation deployment is still at its early stages, leading to possibly greater benefits (e.g., SAIDI reduction) from Auto-FLISR implementation than the industry average.

Overall, it is important to note that the specific quantification of FLISR benefits will vary depending on the utility's circumstances, the extent of FLISR implementation, and the available of data for comparison.

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4 Potential Timeline

4.1 High-level Potential Timeline

TRC has reviewed the material available on THESL's potential Auto-FLISR timeline and related projects. Insight was also gained from the experience of the benchmark utilities, Oracle and TRC's own project experiences.

The foundational project to the deployment of Auto-FLISR at THESL will be the upgrade of Oracle NMS and the deployment of the platform in the higher security control environment, supported by high availability architecture. Oracle identifies that a typical NMS upgrade takes 18 months but has noted that the THESL deployment is more complex than the norm due to the high amount of code customizations. TRC believes that the complexity of the move to the higher security environment with the high availability architecture argues for a more conservative timeline of 30 to 42 months. Under the worst-case scenario, the NMS 2.6 could be nearing the end of its support cycle once the Auto-FLISR implementation is finalized.

Mitigation to the NMS upgrade schedule impact will be early identification and prioritization of the design elements of the system, expected performance criteria and reduction of system customizations.

There are various activities that are part of any technology deployment, for example planning, design, build, and testing. Each aspect of these can have risk to their execution time and require a dedicated project team of both business owners and technology staff to be successfully executed.

The fact that the platform is to be built in the higher security environment will provide a higher level of cyber security than applied to a typical corporate IT environment. This can be expected to add complexity, and potentially time, to the platform design and build. However, the deployment of technology platforms in a secure operating environment is a known process (similar to what THESL currently has for SCADA) and can be mitigated with effective planning and the deployment of resources with experience building technology in these environments.

THESL has two projects which could potentially impact the Oracle NMS upgrade in the context of the Auto-FLISR functionality. These are the SCADA upgrade and the [redacted] Breaker Control agreement.

The SCADA upgrade is one significant undertaking. TRC has not reviewed the detailed plans for this upgrade, but our understanding is that the SCADA upgrade project is to be completed prior to the NMS upgrade project starting. We recommend that the SCADA upgrade team be advised of the objective of NMS control of SCADA devices so they may plan accordingly. Integration of these systems will be key to the success of the Auto-FLISR deployment and so close coordination between the projects will be important and potentially resources working on the SCADA upgrade can be deployed to support the NMS integration and can potentially be considered as an additional SCADA upgrade phase.

[redacted] Breaker Control agreement will impact the scale of Auto-FLISR rollout. The exact level of the potential impact of the [redacted] Breaker Control agreement is not known at this time but with a level of clarity expected to be gained by the end of 2023, insight as to potential impact, and the potential to plan for this, should be available well in advance of the NMS upgrade planning.

A common issue identified from the utilities who have deployed Auto-FLISR is the requirement for quality data. This is both in the context of existing data and for a process to ensure the quality of new data inputs, both of these are covered under the term data quality. In any integrated technology the Extract, Transform, Load (ETL) process is complex and not fully appreciated by those generating the original source data input, quite often in a system somewhat distant from an end goal such as Auto-FLISR.

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Fortunately, THESL has planned an initial FLISR pilot commencing in August 2023 where the switching outputs from the current NMS system will be compared to the switching plans executed by operators. It is likely this pilot will surface data quality issues and create real-life examples to inform data correction and education. THESL already has a data "cleansing" project planned as part of the manual FLISR pilot and is expected be effective as it will be informed by the outcomes of the FLISR pilot. Conducting these activities prior to commencement of the NMS upgrade will provide insight as to the design of the system for data acquisition and will reduce data related delays during the upgrade project.

If conducted in a broad, collaborative, and transparent fashion the FLISR pilot will also provide a starting point for the change management process. Commencing the change management process prior to the NMS upgrade is another aspect which will mitigate potential design and acceptance delays in the NMS upgrade. Not only will potential procedure changes be able to be discussed in advance of system design meetings but knowledge exchange, and relationship building, between project stakeholders will serve to mitigate communication issues which are the most common point of failure for any technology project. It should also be noted that Oracle identified a fundamental understanding of Auto-FLISR across the project team as an opportunity to improve the NMS upgrade project execution. As it stands, THESL has a dedicated and independent change management team engaged in the NMS upgrade project.

4.2 Deployment Sequencing

The sequencing of major activities is informed by dependencies, the ability of an activity's timing to impact the project success and opportunities for parallel activities to shorten an overall outcome time.

THESL is seeking regulatory approval in order to undertake the activities to enable Auto-FLISR. It is expected that this approval will be for both the field devices and the NMS technology platform upgrade. This regulatory process is expected to take place during the course of 2024 with a decision expected prior to commencement of a new rate period as of January 1, 2025.

Subsequent to regulatory approval THESL will be able to progress with the procurement elements of the Auto-FLISR project. While some of the procurement activities may be able to commence prior to the rate period THESL will not be able to issue any Request for Proposal (RFP) or contracting activities until after the regulatory approval.

As noted above the SCADA upgrade is due to complete prior to the NMS upgrade. It is also recommended that the [redacted] Breaker Control agreement be completed prior to the NMS upgrade project.

The FLISR pilot scheduled to commence in August 2023 is a sound approach by THESL, and not only will it inform the NMS upgrade, data quality, and change management but it can be expected to provide insight valuable to the regulatory filing and procurement activities.

While the data improvement process has already begun it should be expected to be an on-going process that will most like continue in parallel to all other activities and subsequent to the initial Auto-FLISR deployment, as operational experience is likely to create know inputs.

Another parallel activity which will be most important, and most likely the most expensive element, of Auto-FLISR capability will be the continued deployment of remotely controllable switches to allow for greater switching flexibility. THESL's objective is to get to an average of 2.5 controllable devices, with a minimum of 1.5 controllable devices, on each feeder in the horseshoe service area by 2029. Currently there are approximately 196 feeders that meet the 2.5 sectionalizers criteria, 99 feeders with less than 2 sectionalizers and 36 feeders with no SCADA ties.

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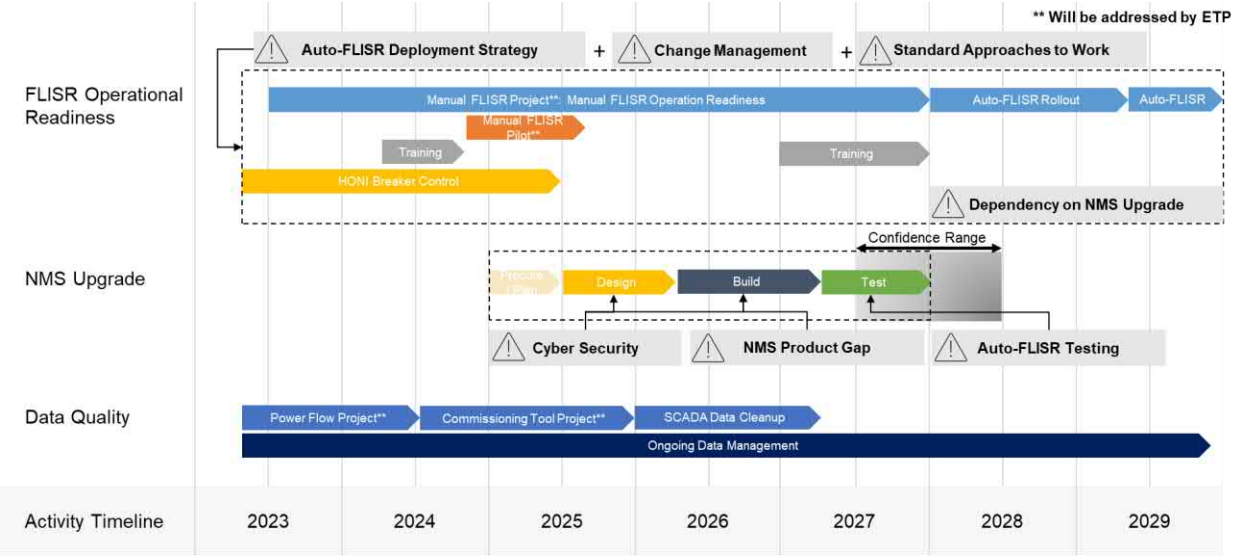
Based on the information above the following is a representative high-level time for the Auto-FLISR project at THESL.



[**NMS UPGRADE/AUTO-FLISR IMPLEMENTATION** – SCHEDULED BASED ON THE MID-POINT OF THE ESTIMATED DEPLOYMENT TIME RANGE. THE RANGE IS 30 TO 42 MONTHS AND THE MID-POINT IS 36 MONTHS.]

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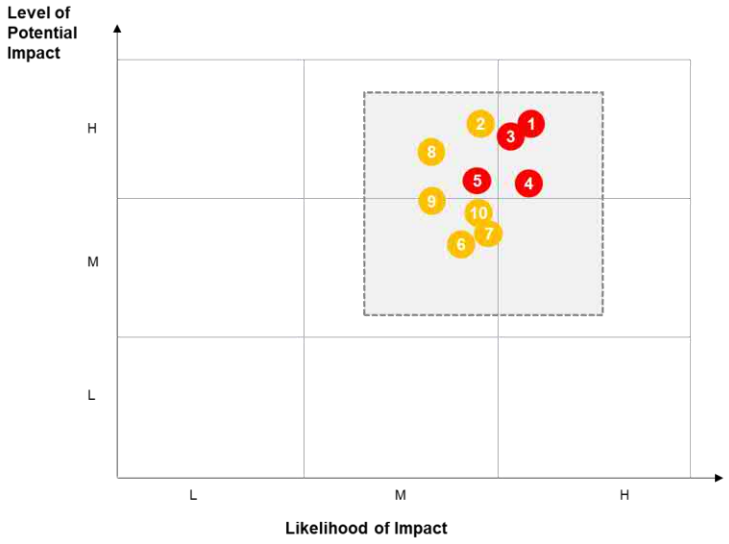
5 Risks and Mitigations

In the sections below items are identified which will to some extent result in an impact to THESL's journey to Auto-FLISR, and subsequent operation of the solution. The insight into these items have been derived from the activities identified earlier in this document. Due to the nature of the investigation these are provided as high-level insights and should be considered as directional rather than definitive.

While all warrant further detailed consideration they should provide a strong basis for consideration of more significant risks that may arise and how these risks may be mitigated. While certain risks are inherently inter-related (e.g., #2 and #4, #6 and #7), it remains crucial to classify them as distinct risks. This approach enables THESL to implement targeted measures more effectively and address each risk with greater attention.

For ease of reference the following table provides a summary of the risk items and the Auto-FLISR aspect which they may impact, to what potential level, and the mitigation difficulty.



#	Risk Item	Category	Difficulty of Mitigation
1	Auto-FLISR Performance	Performance	High
2	Dependency on NMS Upgrade	Schedule	Medium
3	Data Quality	Schedule, Cost, Performance	High
4	NMS Product Gap	Schedule, Cost, Performance	High
5	Auto-FLISR Testing	Schedule, Cost	High
6	Standard Approaches to Work	Schedule, Safety	Medium
7	Change Management & Acceptance	Schedule, Cost, Performance	Medium
8	Operational Safety	Performance, Safety	Medium
9	Cyber Security	Schedule, Cost, Performance	Medium
10	Auto-FLISR Deployment Strategy	Schedule, Performance	Medium

5.1 Auto-FLISR Performance

Likelihood	High
Impact	High – Performance
Difficulty of Mitigation	High

5.1.1 Description

As with any investment it is important to correctly appreciate the expectations for the outcomes or benefits that will result from the investment. This is no different for Auto-FLISR. The primary risk identified is the consistent achievement of the intended 60-second Auto-FLISR performance.

Auto-FLISR is a tool which is expected to complement the operations of the electric system to minimize the extent and time that customers are exposed to the loss of electric supply. Based on pre-set algorithms the Auto-FLISR solution is intended to quickly determine the location of the fault, isolate the location of the fault

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and return service to as many customers as possible. THESL has the goal of solving for these objectives within a period of sixty seconds or less, which results in the incident being considered a momentary outage rather than a sustained outage in the context of performance reporting.

There are many elements that will impact the ability to conduct the required steps in the prescribed time.

Working in cooperation with Oracle, THESL has identified a best-case timeline where a restoration via Auto-FLISR can potentially be expected to be around the 55 second mark. This will be made up of the following components:

- 5 seconds for lockout message.
- 15 seconds for demand scan (Note that Demand Scan in the Oracle Operating Manual is not currently supported in THESL's NMS product).
- 15 seconds for FLISR solution.
- 10 seconds to block reclosers, and isolate.
- 10 seconds to confirm isolation and send restore commands.

The Oracle team identified that the time allocated to NMS to complete the required transactions (solution time) is 15 seconds which is considered challenging. It should be noted that the utility use cases that Oracle references as the most robust Auto-FLISR deployments on their platform are in the United States (US) where a momentary outage is considered under five minutes. The solution time is measured from when the recloser first opens to the time that the Auto-FLISR platform identifies and performs the switching. Benchmarking with [redacted] and [redacted] and other informal enquiries, has identified that their Auto-FLISR solution timing ranges from 90 seconds to three minutes.

The complexity of the solution to be calculated considerably impacts the potential solution time. The complexity is a result of factors such as the following:

- Circuit topology (# of feeders and devices),
- Device status validation time,
- Adjacency to and leveraging of other circuits as part of the solution,
- Post switching plan protection validation,
- Number of switching plans to be run,
- Forward forecasting time for which the switching plan is to solve.

[redacted] noted that their most complex cases can take up to 10 times longer to solve than their less complex standard cases.

The overall solution time can then be further impacted by communication latency and demand on compute resources if a major event requires many simultaneous solutions and actions to be conducted. It should be noted that some utilities may turn off Auto-FLISR during major events due to the constant change of the network and as standard indices may not apply.

In addition to timing, the ability to segment the grid or tie in other supply pathways creates the flexibility to reduce the number of customers impacted. If there are limited controllable devices available on the circuit to isolate the fault the overall potential of Auto-FLISR will be mitigated. This results in a situation where a less impactful solution will run quicker than a solution with the potential to be more impactful.

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It should also be noted that the introduction of distributed energy resources (DERs) adds further complexity to the potential switching approaches and fault solutions. The industry is not yet well advanced in solving for the complexity of DERs via Auto-FLISR and typical solution timing for such are not known.

While Auto-FLISR is an important tool to demonstrate to stakeholders such as customers and regulators THESL's commitment to mitigate the impact of service outages, and certainly [redacted] confirmed that Auto-FLISR "dramatically" improved their performance, particularly in response to storm events, it will be important to not create expectations and/or goals which cannot be met.

5.1.2 Likelihood and Impact

The likelihood of the risk is considered as high for the following reasons:

- In peer utility interviews, it was observed that only 2 utilities ([redacted] and [redacted] during pilot phase) consistently achieved the 60-second target for Auto-FLISR performance.
- The THESL team has not fully explored the complexities of the solutions and communication latency.
- The Oracle team's experience in assisting THESL to achieve the 60-second performance target appears to be limited. In addition, the 55 second target is best-case, implying that there are more cases that are not less than 60 seconds.

The impact of the risk is considered as high in the performance category for the following reasons:

- The risk factors mentioned directly impact the system performance and the expectations that should be set for business units during the Auto-FLISR implementation journey.

5.1.3 Mitigation

Set clear expectations – Clear expectations should be set for what an Auto-FLISR will be able to improve and what may limit these benefits. An Auto-FLISR solution is not a panacea but rather a tool that if correctly deployed will support the expedited return of customers to service.

There may be circuits which have less complexity, essentially fewer options, than other circuits and so these circuits have a higher potential of resolution within the target time than other networks with more complexity. Being able to understand and explain the performance expectations based on the different circuit topology is important. THESL plans to target two pilot circuits with THESL breakers for Auto-FLISR, and the complexity of these circuits should be considered for performance expectations and the likely comparative Auto-FLISR performance as deployment of Auto-FLISR expands to other circuits with different complexity. It may be informative for THESL to deploy to a complex and a less complex circuit to provide some comparative insight.

Consider multiple attempts to reclose – As the initial step in fault response, we note that THESL currently conducts only one reclose attempt before the recloser locks out. Events such as tree contact are the most common reason for transient faults for above ground systems and as a consequence it is industry common practice to conduct two or three reclose attempts before lock-out. THESL is in the process of moving to two recloser attempts instead of one. Another common practice is to program the recloser for what is known as a single-phase trip / three phase lockout which can reduce events on unaffected phases. Reducing the number of transient faults that are treated as a real or sustained outage will reduce the demand on the Auto-FLISR system. Nevertheless, the recloser settings should be driven by THESL's business unit (i.e.: system

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operation and protection team) considering both the need of coordinating FLISR operation and the best practice for improving system reliability for THESL.

Verify communications – To maximize the performance of Auto-FLISR THESL should also ensure that there is a formal process to run daily validation of the communication status of devices and to proactively resolve any issues identified.

Consider sizing infrastructure for high impact – Shared resources, such as compute and communications, are normally sized to perform at the target transaction speed during predetermined conditions. In most cases these predetermined conditions are not high impact, low frequency events. Many utilities have experienced difficulty during unanticipated extreme events as a consequence. THESL should either size infrastructure and develop redundant pathways for high impact, low frequency events or manage the expectations of the ability of the Auto-FLISR solution to perform at the optimal level during such events. A goal of a percent of Auto-FLISR resolutions within one minute should be informed by such inputs.

Consider different solution plans – Simplifying the solution plan will reduce compute time but this may be at the cost of the number of customers that can immediately be returned to service. In this context a clear priority needs to be established so logic can be designed in an appropriate fashion. THESL may be able to investigate with Oracle whether the NMS 2.6 platform allows for a two-step switching solution where optimized solutioning is conducted to meet the response time criteria and then a secondary approach is deployed to return additional customers, even if the return of this additional customer set may be after the one-minute target time.

Considering all the aspects mentioned above, the difficulty of mitigations is regarded as high. This is due to the need for resolving engineering details to optimize performance and concurrently managing expectations for performance as THESL progresses on its Auto-FLISR journey.

5.1.4 Key Recommendations

- Set clear goals and expectations.
- Evaluate performance expectation and FLISR implementation complexity of each feeder. (e.g., is 60s achievable for any specific feeder? What is the expected performance for each feeder?)
- Identify key internal and external stakeholders and establish an education/communications plan.
- Review approach to transient faults and number of reclose attempts.
- Identify circuits by complexity, and by association target Auto-FLISR performance criteria.
    - Complexity may be represented by such as length of the circuit, number of devices to be operated, and diversity of customer operations.
- Communicate where Auto-FLISR is deployed or not deployed.
- Establish device communication status review process.
- Establish transparent performance reporting and goal setting.

5.2 Dependency on NMS Upgrade

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Likelihood	Medium
Impact	High – Schedule
Difficulty of Mitigation	Medium

5.2.1 Description

A foundational aspect of THESL's journey to Auto-FLISR will be the upgrade of the Oracle NMS platform from the current NMS version 2.3 to version 2.6. NMS will then be configured to enable control of SCADA devices, and as a consequence will be moved to the more secure control environment. This will be a complex undertaking. The complexity of this upgrade will increase your Auto-FLISR schedule risk. TRC's experience indicates that NMS upgrades and implementations are complex endeavors and clients typically accept schedule delays in lieu of compromises elsewhere in the project. Compromises such as scope and business process changes.

Enabling and testing SCADA control configuration from NMS is identified as one of the most important dependencies for THESL's Auto-FLISR implementation. It is THESL's intention to move to the configuration, testing and deployment of Auto-FLISR only after the NMS upgrade, environment relocation and SCADA control is successfully deployed in production for operation. The intent is that enablement of Auto-FLISR operations will be a distinct phase of the NMS upgrade project.

The planned NMS upgrade requires THESL to redesign its current system architect and build a new platform environment in a secure zone, and to design with high availability architecture. Integration to key systems will also be of great importance and system integration is an aspect of Auto-FLISR that [redacted] identified as having been challenging. This undertaking inevitably will introduce more complexity in planning and preparing the test cases across identified NMS use cases, especially as the THESL NMS team will be working with new environment conditions. The combination of a software upgrade, new functionality, and a significant infrastructure architecture change will increase the risk of the project getting delayed and delaying the Auto-FLISR go-live.

Oracle has also noted that the current NMS 2.3 deployment is highly customized which further complicates the planned upgrade. We discuss the issue of customizations further in section 5.6.

[redacted] noted that they have the Oracle NMS platform for OMS. [redacted] split their OMS and ADMS team with the ADMS (using the OSI product) in the secure CIP zone while OMS remains in the corporate environment managed by a specific OMS team. PGE was concerned with the challenge of training operators on NMS in addition to the other changes and so keeps this as a separate function. OGE mitigated this risk by moving to a single pane of glass and one system for DMS, OMS, and D-SCADA.

It is common among utilities to first gain confidence by putting NMS-initiated SCADA control into daily operations for some time before enabling Auto-FLISR. There are process changes to be managed once the SCADA control from NMS is enabled, such as the operation process, device commissioning process, and NMS IT-related process, such as increased security monitoring, alarm management, and fault resolution. In this context the transition to Auto-FLISR is a distinct phase after the completion of the NMS upgrade and once SCADA control has been established.

It is quite often the case when technology projects are late against deployment schedules or trending over budget that project elements are reduced or changed to meet amended targets. While THESL will have much to consider should such a situation arise, the impact to the timing and performance of Auto-FLISR should be considered.

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5.2.2 Likelihood and Impact

The likelihood of the risk is considered as medium for the following reasons:

- THESL is actively involved in the NMS upgrade planning, but the scope and exit criteria for NMS core and Auto-FLISR testing as separate release phases are yet to be specified.
- The manual FLISR project will provide THESL with more clearly defined requirements for the NMS 2.6 design phase.
- Constructing a new platform environment in a secure zone with a high-availability architecture is a novel undertaking for THESL.
- The likelihood of the risk is assessed based on the adjusted NMS upgrade schedule estimates, which fall within a range of 30 to 42 months.

The impact of the risk is considered as high in the schedule category for the following reasons:

- As discussed in section 4.1, the TRC team estimates that the NMS upgrade will take between 30 to 42 months to complete, and the enablement of Auto-FLISR depends on the NMS 2.6 go-live. Therefore, the risk is considered high due to the complexity of the NMS upgrade mentioned earlier.

5.2.3 Mitigation

Set NMS Upgrade project dependencies for Auto-FLISR – The scope and project detail of the NMS upgrade and enablement of SCADA control is foundational to the enablement of Auto-FLISR. The expectation should be set that the NMS upgrade and SCADA control is a schedule dependency for the deployment of Auto-FLISR.

The NMS upgrade and Auto-FLISR implementation project will have a comprehensive set of requirements, dependencies, and objectives. The deployment of the new system will also be complemented by new business and technology processes. The elements of the project and processes which track to Auto-FLISR enablement should be identified and tracked. If project decisions are anticipated which will impact these elements the Auto-FLISR leads should be engaged.

We discuss further below the benefits of process standardization and avoidance of customization and note that any technology deployment is helped by simplifying the processes that the technology will support.

Set Auto-FLISR as goal of NMS Upgrade – Due to the dependency of Auto-FLISR on the NMS upgrade with SCADA control enabled we recommend that Auto-FLISR is identified as a specific NMS go-live project goal so connection to the FLISR functionality remains clear and is a success criterion for the NMS upgrade and SCADA control project team. This will also allow for clear tracking of project schedules should there be delays to dependency tasks.

The difficulty of mitigation is considered as medium since the action items primarily revolve around project planning activities.

5.2.4 Key Recommendations

- Identify key project elements and processes which impact Auto-FLISR.
- Leverage learnings from the FLISR pilot in project planning.
- Establish Auto-FLISR functionality as a key project goal.

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5.3 Data Quality

Likelihood	High
Impact	High – Schedule, High – Cost, High – Performance
Difficulty of Mitigation	High

5.3.1 Description

Data quality has been identified as one of the key activities for successful Auto-FLISR implementation. The data quality should cover both data maintained by operational teams, including connectivity models, network model parameters, SCADA data, and other data collected via IT system integrations. Below is a high-level breakdown of Auto-FLISR data requirement based on our current-state analysis for THESL:

Data Category	Impact to Auto-FLISR	Level of Confidence	Level of Mitigation
Connectivity Model	High	High	High
Engineering Data (Impedance, Loading info…)	Medium	Medium	High
Operational Data (Fault Current, Lockout Status…)	High	Medium	Medium

- Connectivity Model: Data quality issue includes problems related to unknown or incorrect transformer connections, consumer-to-transformer connectivity, voltage level discrepancies, partial energization, inconsistent phases, non-existing loops, parallels, and breaks in the network.
- Engineering Data: This category of data quality issue directly impacts the power flow results. It involves inaccurate SCADA reading positions, unknown or incorrect element catalogs or parameters, inaccurate load information (e.g., transferring load from the adjacent feeder), inadequate load profiles, low average annual power values, incorrect status of generation units, inaccurate capacity ratings, and missing load data (load or consumer transformer data not imported).
- Operational Data: Data quality issue includes Inconsistencies in fault indicator SCADA readings, such as duplicate phases, number of signals, or signal existence, and inconsistencies in fault amplitude SCADA readings, including duplicate phases and number of signals.

Both OGE and PGE identified that data quality was a challenge in their Auto-FLISR deployments as gaps or inconsistencies in data impacted the effectiveness of the Auto-FLISR operation. The data comes from a range of sources with a spectrum of parties responsible for the data, which transits via various IT systems.

THESL is seeking to mitigate its data quality issues with data cleansing projects. The extent of this activity, the ability to maintain the quality and consistency of new data, and whether the standards for data quality are set at an enterprise level will be an important consideration. [redacted] advised that they undertook an extensive system-wide data validation project which cost in the range of $30 million . This project verified

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the connectivity and impedance model (wire sizing). The data from the field verification was critical for load flow to operate, which was the foundational component Auto-FLISR and Integrated Volt VAR Control.

Without a strong data quality approach there will likely be a higher percent of data gaps and inconsistencies that will reduce the effectiveness of Auto-FLISR, and which may result in detrimental switching outcomes. It should be noted that this would also be expected to be the case for current operations and so strong data quality has benefits beyond the deployment of Auto-FLISR.

5.3.2 Likelihood and Impact

The likelihood of the risk is considered as high for the following reasons:

- Data quality issues continue to be a prominent concern in peer utility Auto-FLISR implementations. While THESL has proactively undertaken several projects, such as manual FLISR, power flow, and commissioning tools, to create a robust data foundation for Auto-FLISR enablement, it is reasonable to anticipate that some data quality challenges may still emerge along the Auto-FLISR journey.
- According to the Auto-FLISR data requirement analysis in section 5.4.1, the THESL team possesses an overall medium level of confidence in their data quality to facilitate Auto-FLISR implementation.

The impact of the risk is considered as high in the performance, schedule, and cost category for the following reasons:

- As stated in the peer utility interview summary, data quality continues to be a significant factor contributing to Auto-FLISR deactivation. Poor data quality can directly affect Auto-FLISR's performance, leading to solution failures, incorrect switching plans, or solution time-outs.
- Addressing data quality issues is generally perceived as a costly and time-consuming process that necessitates coordination at the corporate level.

5.3.3 Mitigation

Long term view of data quality – Data quality should be planned and budgeted as a broad opportunity across a variety of grid modernization programs, and staff should be encouraged to take ownership of data quality. Some of the activities can be time-consuming and costly. For example, manually validating the network data models and their data mappings over all overhead lines is no small undertaking. Such endeavors need to be backed by a process of data validation and quality control at the initial point of entry. There are various ways this can be done, for example expected number control ranges can be established within electronic forms, barcode reading of components on installation, and verbal three-way communication of activities to confirm data being reported.

Plan for poor data quality – While data quality should be a key objective, it is also important to design for a tolerance to data quality issues during testing and to establish criteria for how Auto-FLISR is deployed where it is known that a specific circuit may have data issues beyond a specific baseline level. For example, how to interpret the circuit violation constraints given the confidence level of a network model.

The FLISR pilot, power flow project, commissioning tool project, upgrade of NMS and development of NMS SCADA control will establish an opportunity to improve foundational data quality and integration quality. The project team should work to determine how to configure the system in a way to better respond to different data quality issues while still reaching the intended system operation target.

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Budget for data quality -- Budgeting should be established for data quality baseline identification and improvement activities as an ongoing effort as part of normal operational activities.

Considering all the aforementioned activities, the difficulty of mitigating data quality issues should be regarded as high, aligning with the experiences of most peer utilities.

5.3.4 Key Recommendations

- Leverage the manual FLISR evaluation pilot to establish a data baseline, validate and correct data.
- Where data quality issues are identified, test the same data elements for use cases beyond the pilot location use cases and correct as required.
- Establish a broad data quality approach. This includes establishing working group to address data quality issue, leveraging data analytic to address data quality issues and establishing data quality framework, etc.
- Broadly communicate and educate staff about data quality objectives.

5.4 NMS Product Gap

Likelihood	High
Impact	High – Cost, High – Performance, High – Schedule
Difficulty of Mitigation	High

5.4.1 Description

It is generally considered best practice when deploying software to use the software as designed, leveraging the configurations that are native to the software. Functionality and configurations that are native to the software are expected to be maintained and upgraded as part of the quality assurance and performance standards included within the software licensing. Software is not an exact match for all of a company's operations and processes and that either the company needs to adapt to the software or that they need a specific change, a customization, to the software to meet their operational process. This section highlights the intricacies associated with the NMS 2.6 implementation, primarily stemming from extensive customizations and configurations. In comparison, the dependency on NMS upgrade risk centers around the activity schedule risk, while the Auto-FLISR performance risk pertains to the limitations of the NMS Auto-FLISR product. Acknowledging that there are overlaps among the three risks, it is important to designate them as separate entities. Doing so enables THESL to implement targeted measures more effectively and address each risk with precision.

During the interview with Oracle, they identify that they consider THESL's NMS 2.3 deployment to be at the high range of customizations that may be deployed to their NMS software. While Oracle noted that some of these customizations were developed to delay THESL's need to upgrade from NMS 2.3, Oracle identified that the extent of customizations will increase the complexity of the upgrade to NMS 2.6. Oracle identified that approximately 90 percent of the NMS customizations to NMS 2.3 are not native within NMS 2.6 and will provide a range of difficulty to reproduce in NMS 2.6.

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Some examples of customizations have been identified by THESL SMEs:

- UWPC (Utility Work Protection Code): Customization of Switching and Safety Document Modules (Custom cross record views, custom validations, custom emailing, printing, etc.).
- Customization of event management.
- OMA (NMS Operations Mobile Application).

Oracle has identified the NMS 2.6 has an expansive set of rule configurations, known as SRS rules, that create the opportunity for considerable configuration flexibility in the product. Oracle believes that these configurations will allow for most use cases. Oracle further noted that there is a common move within utilities to work to leverage software as designed, using native configuration, rather than for extensive customization.

Oracle advised that their experience is that a typical upgrade for NMS takes 12 to 18 months but believe that the THESL upgrade will take longer due to the complexity of the customizations. Also noted that THESL has already made 15 to 20 NMS 2.6 customization requests that are not on the NMS roadmap, meaning that such customizations would need to be supported at THESL's expense.

Oracle also took the opportunity to stress that they will discontinue the full support of NMS 2.3 after the end of 2024. After this time Oracle will offer only sustained support which does not support patches or bug fixes, only support critical issues. With the upgrade expected to take over 18 months THESL will need to plan internally to mitigate any potential operation and cyber security risks until the upgrade is in production.

5.4.2 Likelihood and Impact

The likelihood of the risk is considered as high for the following reasons:

- The current state analysis revealed that there are a number of customizations on the horizon planned for NMS 2.6 upgrade.
- It is unknown if the Oracle NMS team will enhance their current product to address THESL's specific use case in the near future.
- Given that the future state documentation on Auto-FLISR is still pending finalization, this may lead to additional customization or configuration work to bridge any product gaps.

The impact of the risk is considered as high in the cost, schedule and performance category for the following reasons:

- Extra time and budget are expected to be allocated to the Oracle team during the NMS 2.6 build phase due to the additional customizations required to address product gaps.
- As noted in the Auto-FLISR Performance section, configuring NMS Auto-FLISR settings is a critical factor in achieving the 60-second performance target and is inherently an interactive process.

5.4.3 Mitigation

Challenge status quo processes – THESL should seek to use the native functionality of the NMS product. In many cases this may involve product training and coaching managers/leaders to help drive organizational change, especially in the context of long held legacy process.

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[redacted] has had success in creating system super-users during the User Acceptance Testing (UAT) who are persons of influence within the organization to drive change acceptance. Such champions can be developed earlier in the use case review and product configuration stage to support use of the native system functionality and provide credible insight and support for resulting process change.

Establish rigorous customization approval process -- Where it is deemed that customizations are required a criterion should be established for their creation, and in the case of the upgrade from NMS 2.3 to NMS 2.6, their migration to the new version. The criterion should include the following:

- Degree of variance from existing configuration capability.
- Extent of use.
- Extent of operational impact.
- Level of effort to develop and maintain.

Apart from individual customizations, the overall extent should be understood as the sum of the parts may be greater than anticipated. There is a point where an extensive set of customizations has to generate consideration of whether the selected solution is a good fit and raises the question as to whether extent of customization was understood prior to solution selection. The difficulty of mitigation should be deemed high due to the extensive volume of activities that may be involved.

5.4.4 Key Recommendations

- Establish change management / training to leverage tool native functionality.
- Establish an approval criterion for customizations.
- Identify and establish agreement between THELS and Oracle to enhance Oracle NMS product to minimize the customization needs.

5.5 Auto-FLISR Testing

Likelihood	Medium
Impact	High – Schedule, High – Cost
Difficulty of Mitigation	Medium

5.5.1 Description

There are various Auto-FLISR testing approaches among peer utilities depending on the IT/OT system readiness and the FLISR implementation journey. The approach to testing impacts how the utility transitions through the stages of FLISR operation from manual FLISR evaluation through to full Auto-FLISR deployment. Based on our findings regarding THESL's current state, there is a potential risk that THESL may not be entirely prepared for the Auto-FLISR testing to achieve the desired outcome. The significant test areas are:

- Point check remotely controlled switches
- Adding remotely controlled switches into operator's processes

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- Verify switching plans developed by NMS
- Verify Auto-FLISR

Standard switching scenarios are normally tested with a level of rigor. Commonly known as edge cases or end cases, there are a handful of test cases surrounding system abnormal conditions (e.g. situation where there is large generation on the feeder). The process of planning for and gracefully addressing edge cases can be a significant task, and yet this task may be overlooked or underestimated. In particular, building testing cases around edge cases with real time system inputs should be given attention during the manual FLISR testing and are considered as a critical part of successful Auto-FLISR implementation both by Oracle and peer utilities. Different failure modes, protection miscoordination, N-1 operations or non-standard network configuration are not always considered as part of the test case inventory development.

Another aspect of testing is gaining confidence about network system behavior. For manual FLISR testing it is common to leverage a test simulator to test cases around switching plan validation. However, a robust Auto-FLISR testing strategy generally involves end-to-end testing as the last step before enabling the pilot circuits in production environment. Setting test environment around end-to-end testing can be a challenging process and if not planned, is likely to introduce additional schedule and cost impact.

As a major component of the Auto-FLISR journey, outbound SCADA control, is likely to be included in the NMS 2.6 upgrade test cases based on the interviews with THESL, failing to clearly specify the exit criteria for Auto-FLISR related testing during NMS upgrade period may lead to misalignment of expectations from business and IT stakeholders.

5.5.2 Likelihood and Impact

The likelihood of the risk is considered as medium for the following reasons:

- THESL is actively engaged in the NMS upgrade and Auto-FLISR planning, but the finalization of the master Auto-FLISR test strategy is pending. Additionally, the introduction of power flow algorithm changes and other FLISR-related functional modifications in NMS 2.6 could introduce uncertainties for Auto-FLISR testing.
- THESL has limited experience in distribution automation testing, which could be leveraged to inform the Auto-FLISR test strategy.
- In terms of Auto-FLISR testing, utilities often adopt diverse test approaches based on their system maturity and business case, leading to no universally applicable "golden standard" for testing. Consequently, THESL will need to invest time in identifying the most suitable test strategy for their specific requirements and operational confidence level.

The impact of the risk is considered as high in the schedule and cost category for the following reasons:

- If not planned properly, additional Auto-FLISR testing could lead to schedule slip for NMS Upgrade. Failing to include important edge cases into testing could also result in turning off Auto-FLISR after feeder becomes operational.
- The establishment of a dedicated test lab and the extensive point-to-point testing required could present significant costs for THESL.

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5.5.3 Mitigation

Test Case Completeness -- It is important to take a holistic approach to revisit the test case inventory to include both common cases and high-priority edge cases driven by THESL's system failure modes, as well as clearly align the Auto-FLISR test cases with the overall NMS upgrade test cases.

Use of Test Lab for Power Hardware -- As for good practices to prepare a rigorous yet efficient Auto-FLISR testing, key activities, and the timeline to set up a test environment for Auto-FLISR on the NMS 2.6 platform should be established. THESL should consider setting up a test laboratory with several control devices or using (power) hardware in the loop testing to further gain confidence for field device behavior in the context of Auto-FLISR operations. In the case of lab testing with field devices, THESL may consider testing different recloser settings during the test period. For example, configure some reclosers to have multiple operations before lock out. This shall help THESL determine if Auto-FLISR operation requires any protection setting change from the business side. For the purpose of gaining confidence of SCADA outbound control in production mode, advisory mode, where the operator approves the switching plan before permitting NMS control of SCADA devices, can be used for the transition of operations.

Inclusion of Business in Testing – The inclusion of the business in the development and execution of test cases can help with two items. First, including the business will help identify the edge cases as mentioned above. Second, business involvement will help with the change management needed to implement Auto-FLISR.

The difficulty of mitigation is regarded as medium since the main action items focus on establishing appropriate testing planning.

5.5.4 Key Recommendations

- Leverage learnings from FLISR pilot to inform Auto-FLISR testing.
- Establish end-to-end test plan which includes edge cases.
- Establish a test environment and test laboratory.
- Stage deployment based on confidence.

5.6 Standard Approaches to Work

Likelihood	Medium
Impact	Medium – Schedule, Medium – Safety
Difficulty of Mitigation	Medium

5.6.1 Description

[redacted] noted during their 20-year journey to Auto-FLISR that sophisticated protection schemes could not be easily adapted to permanent system changes. Complex relay logic was prone to settings errors and logic holes. Unique procedures for each system were identified as unsustainable and created system complexity, training difficulties and the potential for temporary switching changes to have unintentional impacts. [redacted]

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stressed the need to avoid individual procedures for each sub-station, and the need for consistency of approach with the deployment of Auto-FLISR.

[redacted] identified that a lack of ownership of recloser point architecture resulted in inconsistent point numbering / point mapping. When retrofitting these devices with additional points and/or modifying existing points some years later, a standardized template (currently in use) could not be used. Each point of each device had to be examined and modified by a DMS technician which is time consuming.

Humans have the capacity to deal with variance and to fill gaps where they may exist. While this does increase the risk of human performance errors it is relatively common that some level of variance is accepted. A technology solution is more cost effective when processes are simplified and standardized before their deployment. This reduces the cost of system deployment (reduced configuration work, consistent testing approaches and resolution) and improves the transaction success rate and execution speed.

Oracle noted the high number of customizations that THESL have on their NMS 2.3 platform. While the issue of configuration verse customization is discussed in detail in the next section, variation in processes can be a source of the need for customized solutions and generally do not support the case for the software vendor to develop and support a solution within their core codebase.

5.6.2 Likelihood and Impact

The likelihood of the risk is considered as medium for the following reasons:

- The current state analysis (manual FLISR pilot phase) has not revealed any significant process gaps, but specific process changes and documentations for Auto-FLISR are yet to be determined.
- While a dedicated change management team exists for the NMS upgrade project, there is currently no dedicated change management team specifically focused on Auto-FLISR implementation.

The impact of the risk is considered as medium in the schedule and safety category for the following reasons:

- Process changes generally requires additional work during design phase and additional training time before system goes live, which may result in overall schedule delays if not adequately planned.
- The standardization of Auto-FLISR processes related to protection coordination is expected to directly enhance operational safety.

5.6.3 Mitigation

Establish standard for interrelated activities – The process for standardization starts with standard devices, standard engineering guides, standard protection, and coordination settings (distribution and substation). The standardization has to be backed by ownership and accountability.

The manual FLISR pilot THESL is starting August 2023 will provide an excellent opportunity to identify inconsistencies in processes and their potential impact. The testing team should look to streamline and align processes as their first approach, before any technology solution is found to support inconsistent processes.

Quite often process variation in the field comes from legacy, regional and somewhat siloed operations. Finding those variations and working to consensus does not need to wait for a technology deployment. THESL can commence the identification of misalignment and the opportunity for consistency at their

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convenience. This can in fact serve as a foundational step for change management and for opening the dialogue for process improvement, including the role to be played by Auto-FLISR.

The difficulty of mitigation is considered as medium, as the main action items primarily involve business process improvement and management, which are within the project team's control.

5.6.4 Key Recommendations

- Establish process review and alignment as a goal of the manual FLISR pilot.
- Establish change management working group.
- Monitor compliance with process for training gaps.
- Apply accountability for compliance.

5.7 Change Management and Acceptance

Likelihood	Medium
Impact	Medium – Schedule, Medium – Performance, Medium – Cost
Difficulty of Mitigation	Medium

5.7.1 Description

During the utility benchmark interviews both [redacted] and [redacted] touched on the importance of change management during the journey to Auto-FLISR. Oracle indirectly raised the subject via the conversation around the high number of system customizations to adapt to the operators' legacy process, rather than having them adapt to the functionality of the selected system. This is a common concern voiced by software providers.

And it should be noted that the challenge of change management is not simply resistance to something new. [redacted] gives the example of field trouble-shooters replacing a fuse with what they had in their vehicle rather than the prescribed sized fuse. This is done with the good intent of speedily returning customers to service but without a change in process to report this to the operator or to update a system of record, the operator or automated system is not working with correct operational data knowledge. This was a key discover for [redacted] as when running FLISR, particularly Auto-FLISR, the model accuracy of protective devices like fuse size will be likely to have a larger impact on determining the expected system behavior during a switching event.

[redacted] highlighted that field crews wanted confidence that when Auto-FLISR was offline and that no automated operation would take place while they are working on equipment. Field crews had little prior exposure to automated switching and so engagement was important. Giving the field crews this confidence was a vital aspect of acceptance for Auto-FLISR at [redacted]

For Auto-FLISR implementation, there are several areas of change management identified based on conversations with Oracle and peer utilities:

- Operational procedure (control room, field, and communications with [redacted]).
- Field device commissioning and maintenance.

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- Protection coordination.
- Network model update.

These areas involve a diverse range of staff, many of whom may not have direct interaction with the Auto-FLISR solution and so may not fully appreciate the objectives served by the process changes.

The timeline of change management activities might be impacted by operation seasonality. THESL should consider any potential storm season or wildfire season when FLISR events are more frequent for rolling out the process changes.

While the importance of training was identified by both [redacted] and [redacted] [redacted] provided insight as to aspects of their training approach which have either impacted their Auto-FLISR deployment or been impacted by deployment issues.

As a critical component of change management activities, training was also highlighted for operators, field crews, engineering groups, and technology staff during the peer utilities interview.

[redacted] deployed a thorough change management process and engaged key personnel as varios stages of the Auto-FLISR project, they choose a just-in-time (JIT) training process. Under this model the operators are trained on the system shortly prior to the planned use of the system so that training can be fresh and reinforced by actual use of the system. As operator training has to be scheduled in line with the operator work schedules the planning and coordination for the training has an amount of complexity.

As a point of reference [redacted] advised that their operator training time was between eight and 16 hours of training per operator, but it took six weeks to cover all operators due to the operator shift schedule. [redacted] also noted the importance of training operators on a stable system.

[redacted] was able to successfully execute their JIT training plan based on the intended platform go-live date. Unfortunately, prior to go-live a system error was determine which resulted in a three-month delay to the go-live date. This resulted in [redacted] needing to establish a new JIT training approach around the new go-live date.

Compounding the issue of repeated training is the fact the user training is an operation and maintenance (O&M) cost and not a capital cost. [redacted] identified that consequently the delay of the go-live has been and impact on both capital and O&M costs.

[redacted] also noted that they had four minor operational incidents post go-live and that three of these involved an operator executing controls either in parallel with FLISR or restarting a process on an old event. These incidents resulted in additional training.

5.7.2 Likelihood and Impact

The likelihood of the risk is considered as medium for the following reasons:

- The specific process changes and design documentations for future state Auto-FLISR operation are yet to be determined.
- While a dedicated change management team exists for the NMS upgrade project, there is currently no dedicated change management team specifically focused on Auto-FLISR implementation.
- Given that THESL is a unionized organization, the suggested changes might pose greater challenges during implementation.

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The impact of the risk is considered as medium in the schedule, cost and performance category for the following reasons:

- Process changes generally requires additional work during design phase and additional training time before system goes live, which may result in overall schedule delays if not adequately planned.
- The efficiency and execution of the future process will directly impact the performance of Auto-FLISR, both of which are contingent on successful change management and acceptance.
- It is commonly the case that user training for a new technology is an O&M cost. Such costs should be planned for in the deployment costs and allowance should be made for pre-deployment/JIT type training and post-deployment training.

5.7.3 Mitigation

Place importance on change management – Both [redacted] and [redacted] placed importance on change management and had communication materials developed to share with different stakeholder groups. [redacted] established a Change Manager as a fully budgeted role in support of both ADMS and Auto-FLISR projects. This role led development of the migration strategy and communications plan, conducted extensive stakeholder engagement and message testing. She even identified whether the messaging was becoming too extensive and thereby losing the interest of its target audience.

A potentially good practice of change management also rewards participation. Such an example is [redacted] involving operators and their supervisors during Auto-FLISR UAT and then promoted them as super-users to be on the forefront of managing upcoming process and technology changes as result of Auto-FLISR implementation.

Change management activities should be designed to support the transition throughout the entire FLISR implementation phases, not only for the Auto-FLISR deployment. The implementation stages are discussed in more detail in section 5.11 below.

Focus on training the process and technology – Training is an important pre-requisite to going live with the new system. Assuming that user acceptance testing (UAT) is the final test before go-live, operator JIT training should be scheduled in close coordination with the scheduled UAT completion. An influential set of operators should be involved in platform pilots and design, trained early and involved in the performance of UAT. This allows these operators to become system super-users and system advocates post-deployment.

The difficulty of mitigation is regarded as medium since the main action items focus on business process improvement and management.

5.7.4 Key Recommendations

- Establish a change management lead.
- Create respected solution champions.
- Deploy consistent stakeholder engagement.
- Highlight safe operations as a foundation of trust.
- Leverage Manual FLISR pilot to engage controllers and to help influence change acceptance.
- Establish appropriate O&M funding for comprehensive training.

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- Develop training specific to various roles: operators, field crews, engineering, and technology support.
- Provide just-in-time training.
- Use training to establish influential super-users.
- Reduce complexity of operational process to support improved training success.
- Adopt a phased approach to roll out different change management activities.

5.8 Operational Safety

Likelihood	Medium
Impact	High – Safety, High – Performance
Difficulty of Mitigation	Medium

5.8.1 Description

A key consideration for the use of an automated system for operating switches on any electric grid is to have well understood parameters for such operation, the ability to determine when automated control is taking place and to be able to override that control should it be so required. It is of importance that there is confidence that field crews or others will not be placed in danger of an automated system operating a switch when it is not expected to do so.

It was a common theme from [redacted] and [redacted] that only one entity can be in control of a device at any one time, whether that be an operator or Auto-FLISR. Both utilities spoke to the need to ensure the system clearly showed the status of control and the operator procedures have a clear step to put Auto-FLISR in Off mode when field protection is required. These requirements had two direct impacts for [redacted] and [redacted] the need for system change from their vendor and very focused training of operators in this regard. Both have focused on ensuring that the system status is clearly identified in the user interface, and [redacted] is considering a coded control to block switching of any device with a tag applied.

As noted above, field crews wanted assurance that no automated operation would take place while they were working on equipment in the field. While some switches have a manual device to override remote operation the preference should be for formal process to disable Auto-FLISR control via the operator.

In the system context the potential for automatic actions misinformed by a model not yet updated and the potential for operators to lose situational awareness if Auto-FLISR changes the system without the operator's knowledge were key points of focus. The importance of accurate and updated GIS data was also raised in this context.

5.8.2 Likelihood and Impact

The likelihood of the risk is considered as medium for the following reasons:

- The current state analysis (manual FLISR pilot phase) has not revealed any significant gaps on operational safety, but safety-related process changes and documentations for Auto-FLISR are yet to be determined.

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- Compared with some other peer utilities interviewed, THESL lacks prior experience in working with distribution automation projects or decentralized FLISR. This lack of experience could limit THESL's understanding of operational safety practices in the context of grid automation.

The impact of the risk is considered as high in the safety and performance category for the following reasons:

- Operational safety holds paramount importance in the utility safety portfolio.
- Developing robust operating procedures to ensure operational safety will have a direct impact on the performance of Auto-FLISR, benefiting both operators and field crews.

5.8.3 Mitigation

Focus changes on safety – [redacted] made disabling (turning off) Auto-FLISR for conditions such as hotline hold offs and de-energized work permit key aspects of their Auto-FLISR pilot and updated work processes, but also took the opportunity to re-emphasize the performance of the usual steps for upstream protection. [redacted] stressed "If we are following all of our existing rules, FLISR cannot hurt us."

Consider all aspects of how work might change – As an additional item PGE identified that the use of the term "FLISR" during verbal communication to the field proved problematic as it was often heard as "phase." [redacted] have focused on the use of clear language and avoidance of acronyms in the context of communication between operators and field crews in the context of FLISR operation.

Considering the information from the peer utilities mentioned above, the difficulty of mitigations is estimated to be of medium level and within project team's control.

5.8.4 Key Recommendations

- Introduce a work step for field crews and operators to make sure Auto-FLISR is in Off mode.
- Focus on operational safety during the future state process design.
- Reinforce clear language and three-way communication practices between operators and field crews.
- Establish training scenarios where operator disables Auto-FLISR for field work protection.

5.9 Cyber Security

Likelihood	Medium
Impact	High – Cost, Medium – Performance, Medium – Schedule
Difficulty of Mitigation	Medium

5.9.1 Description

The Oracle team have confirmed that they do not see any change in the cyber profile for the NMS platform upgrade from version 2.3 to 2.6. In general terms it is normally the case that the expectation is that a newer version of a software should be more secure than a prior version, but Oracle did not explicitly confirm this.

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A key aspect of THESL's move to Auto-FLISR will be that the Oracle NMS platform, as part of its upgrade from NMS 2.3 to NMS 2.6, will be deployed in the higher security SCADA control zone, rather than being accessible from corporate environment as is currently the case. This is an important requirement and will result in the platform being at a higher level of system protection than may currently be the case. This is a positive outcome for security of the new platform.

The move to the more secure environment can be expected to result in deployment complexity, solution cost increases, and changes to system maintenance approaches which will require new procedures, and which may result in additional support costs.

All hardware and software being deployed in the higher secure environment can be expected to require specific screening for any introduction of rogue elements and once these hardware and software components are deployed, they are protected by increased levels of cyber and physical protection. Such protection can introduce software gateways, known as firewalls, which can add to system integration complexity and can, in certain cases, impact transaction latency.

Additionally, system support staff may either need additional training and approval to work with a system in a secure environment and/or need to be escorted to enable access to the system.

It is also noted that THESL intends to deploy the NMS 2.6 platform on a high-availability basis which if a new approach for THESL may provide more complexity to the platform build, but will, at the least, require that the alternate instance be also in a secure and presumably physically different location.

5.9.2 Likelihood and Impact

The likelihood of the risk is considered as medium for the following reason:

- Apart from establishing the existing SCADA System in the secure zone, THESL possesses relatively limited experience in constructing a higher security SCADA control zone. In comparison, some other peer utilities have gained more similar experience during their previous endeavors, such as building a transmission Energy Management System.

It is expected that the impacts of the deployment to the secure zone will be expected in the context of the project schedule (medium) and costs (high). To the same extent transaction latency should be understood and tested in the context of expected security transitions, which also impacts the performance of the NMS / Auto-FLISR (medium).

5.9.3 Mitigation

The upgrade of the NMS platform is foundational to the deployment of Auto-FLISR, and it is warranted that any platform controlling devices be in a secure zone. The move to the secure zone should not be avoided.

Prepare support personnel for new secure environment – THESL has an existing SCADA System in the secure zone and as such has established procedures and processes for the management of systems in the secure zone, and the associated training of staff. THESL should determine whether the existing staff should take responsibility for the management of aspects such as hardware installation and system patching or whether the existing NMS support staff are suitably trained to follow the discipline associated with the more secure environment.

Plan for the increased complexity of secure environment – The protocols of the more secure environment should be integrated into the planning for the deployment and management of the NMS platform in the context of control functions such as required by Auto-FLISR. As the protocols are known the deployment of

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equipment to the secure environment any additional implementation considerations and associated costs should be able to be identified and properly integrated to the NMS upgrade planning.

Considering all the factors mentioned above, the overall difficulty of mitigating this risk is considered as medium and falls within the control of the project team.

5.9.4 Key Recommendations

- Design system for secure transit as part of system performance architecture.
- Allow time and budget for a highly secure environment deployment.
- Leverage resources with expertise in working in a highly secure environment.

5.10 Auto-FLISR Deployment Strategy

Likelihood	Medium
Impact	Medium – Schedule, Medium – Performance
Difficulty of Mitigation	Medium

5.10.1 Description

Auto-FLISR is a multi-year journey for which each utility will need to develop a deployment and transition strategy based field technology (controllable switches) deployment and process readiness. For [redacted]E, they went live with Auto-FLISR at a sub-set of circuits in 2019 but it was not until 2022 that [redacted]E deployed Auto-FLISR on systemwide basis. [redacted] identified that this approach as allowing [redacted] to better understand their system behavior under their recently upgraded DMS. In comparison, [redacted] operated their FLISR scheme in auto mode for some time before later reverting to manual mode to validate and improve their distribution model. The consensus from utilities with Auto-FLISR experience is that the actual deployment has taken longer than was originally planned, particularly in the context of stabilizing system operations with automation. Not surprisingly, the efficiency of troubleshooting, finding edge cases, and tuning the system tends to improve over time as the operations and IT staff gain more experience about the product and the root causes of the issues.

During the deployment of Auto-FLISR operators, field crews and technology staff will have to adapt to circuits operating in different stages of Auto-FLISR deployment and transition. Stages can be expected to include manual stages where either NMS FLISR outputs are validated after the event or where the NMS output is used by operators to action switching, advisory or semi-automatic stage where NMS provides the switching solution but only executes after an operator approval, and then Auto-FLISR where the NMS system will execute independent of the operator. It should be noted that the manual stages can be used prior to NMS integration with SCADA control whereas the advisory/semi-automatic and full automatic mode require SCADA control. THESL anticipates that manual stages will be evaluated using first NMS 2.3 and then using NMS 2.6 and that the confidence gained from these manual stages will negate the need at THESL to go to the advisory/semi-automatic stage.

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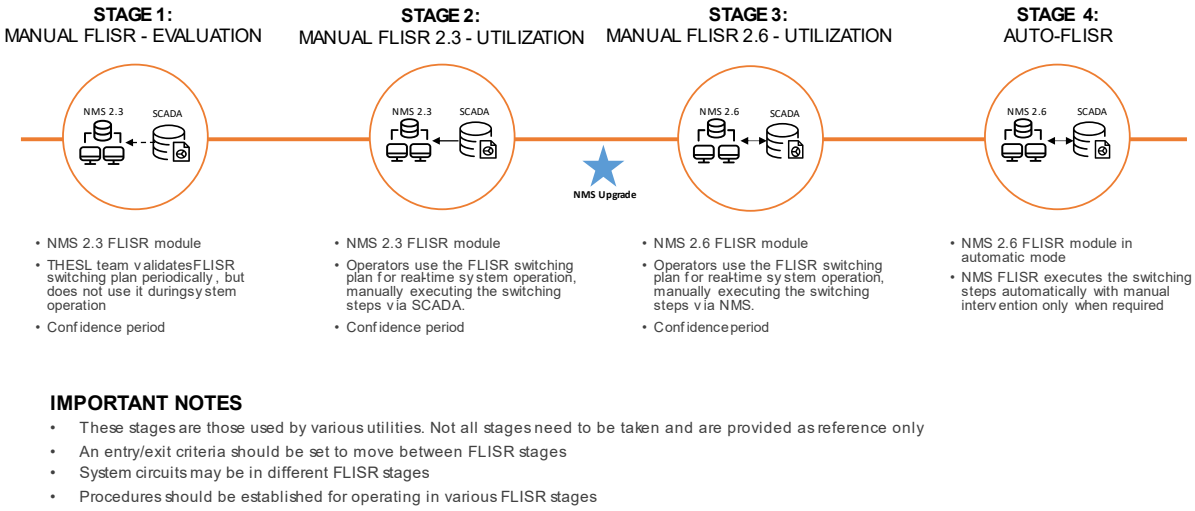
Currently THESL anticipates two pilots: a manual FLISR pilot (two substations) and an Auto-FLISR pilot (selected substations to be determined). It is worth noting that during each pilot phase, the system will need to operate in a hybrid mode in terms of global NMS FLISR settings.

These various modes of operation across the system until such time as Auto-FLISR is fully deployed as an operational norm will introduce additional complexity for control center operators, field crews, and technology staff. The complexity and need for clear process should not be under-estimated.

The Auto-FLISR transition stages expected at THESL are as follows. Note control of network devices from the NMS platform can only take place once SCADA control has been established.



5.10.2 Likelihood and Impact

The likelihood of the risk is considered as medium for the following reasons:

- The detailed Auto-FLISR rollout plan is yet to be finalized and is subject to change depending on THESL's operational confidence level.
- The process change during the transition phase (pilot phase) is not fully established.

The impact of the risk is considered as medium in the schedule and performance category for the following reason:

- Failing to implement a practical and effective rollout plan may lead to premature activation of Auto-FLISR, resulting in subpar system performance or even system failure, leading to the deactivation of Auto-FLISR.

5.10.3 Mitigation

Ensure situational awareness – Change management and training will play an important role to ensure all stakeholders are well informed as to the status of the FLISR deployment and to understand exactly what is in operation on which circuits, particularly in the context of those circuits that operate in a different FLISR mode compared to the majority, which is more extreme at the beginning and end of the Auto-FLISR deployment journey. Visual ques on displays can help operators identify pilot circuits.

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Move swiftly yet deliberately – These risks can be mitigated by more quickly moving through or, should confidence allow, avoiding intermediate steps such as advisory/semi-automatic phases. This will involve ensuring that lessons learned from early deployments and associated remediation of issues are deployed across the enterprise.

Taking into account all the factors mentioned above, the overall difficulty of mitigating this risk is considered as medium and falls within the control of the project team.

5.10.4 Key Recommendations

- Establish transition stage education as part of change management and training.
- Seek to minimize time in transition stages.

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6 Areas for Further Consideration

The following are areas which TRC believes warrant further consideration and investigation due to there potential impact on the success of the Auto-FLISR deployment and operation at THESL.

6.1 [redacted] Controls

As noted earlier in this document, [redacted] was identified during the THESL discovery discussions as a key relationship for THESL in the context of the Auto-FLISR journey. It was identified that there is considerable device switching coordination required between THESL and [redacted] with as many as 30 percent of substation breakers owned and operated by [redacted] in Toronto's horseshoe area.

[redacted] was contacted for an interview which they agreed to for June 30, 2023.

TRC was advised that senior level discussions are underway between THESL and [redacted] as to how THESL may operate the [redacted] breakers. In the roadmap documentation provided to TRC, identification is made of a technical working group process which will progress to technical implementation and testing. In the roadmap document the implementation of the [redacted] breaker control is completed in a timing to allow for input to the configuration of SCADA control from NMS.

The [redacted] breaker control introduces complexity that should be specifically scoped as part of the Auto-FLISR rollout planning process. [redacted] breaker control drives the number of stations THESL will first go live with. If THESL do not get operating control from [redacted] breaker (not a preferred option), other alternative solutions such as installing a recloser outside the station for every feeder will need to be put on the table.

6.2 Procedure Governance

As with any major operating or technology change it is expected that there will be various changes to procedures. It is also to be expected that the changes will result in overall benefits to the operations of the business.

In order to measure a benefit, it is normal to establish a benchmark from which to measure the subsequent improvement or benefit. In the context of a solution such as Auto-FLISR the focus for improvement measurement tends to start with customer impacting outcomes such as SAIFI and SAIDI. Efficiency measures such as time of crew arriving at the correct fault location are tracked as an operational benefit.

What can be more challenging is the recognition of benefits which may not be tracked to the same degree of specificity, or which may have subjective elements to them. These are also the areas which have the potential provide disagreement during the change management process. There will be debate during the discussion of change to procedures as to the effectiveness of the existing and the new procedures, and this becomes particularly complex when new service expectations are being set.

When entering into these conversations it is important to have a view of the effectiveness of the current procedures. The effectiveness of the procedures can be impacted by various aspects of which the following are examples:

- Clarity of purpose.
- Management of updates.
- Accessibility.

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- Training.
- Compliance monitoring.

Apart from providing valuable input for future procedure design and training, the rigor applied to procedure governance will set the foundation for the change management process during and subsequent to the transition to Auto-FLISR.

It is also worth noting that the expansion of activity at the grid edge, with various DERs potentially exporting energy, operational procedures and external compliance requirements are likely to increase in complexity during the period of the transition to Auto-FLISR.

6.3 Staffing and Skills

The progression to a technology such as Auto-FLISR is an example of a move from a previously manual process to a more automated process, where there is greater reliance on technology to conduct operations previously managed by employees.

The introduction of automated processed into the workplace can have many impacts on the operations of the business and key amongst these is the ability of staff to be able to understand the processes of the technology and to effectively manage it to the best outcomes of the business.

Staff roles will in many cases change from performing operations to monitoring a technology performing operations. This can be expected to require staff to learn new skills and potentially require the targeting of new hires with an aptitude for the management of the technology being deployed.

As the NMS platform transitions to a critical operational system, it can also be expected that the staff responsible for the performance of the platform, including system integrations and data governance will need to be re-trained in the context of managing mission critical systems and the disciplines associated with this.

Currently applied staff capability and development approaches for staff in these key areas may need to be reviewed and adjusted to align with future operational needs and expectations.

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Appendix A: Potential Costs

The journey to Auto-FLISR at THESL will involve various cost elements and feedback from [redacted] and [redacted] suggests that these be generally considered in the context of whether they are field/operational costs or technology related costs.

Also of consideration is capital costs as compared to O&M costs.

[redacted] particularly made the observation that while the technology costs were a significant investment, they were not of the scale of the costs involved to deploy newer and additional communicating switches and the overall communication solution. With an indicative cost of $100,000 per recloser the installed field costs can scale quite extensively. [redacted] and [redacted] spoke to the cost of substation relay upgrades that were required and that these projects quite often led to work more extensive than purely a relay replacement. It is noted that the field devices provide benefit beyond the Auto-FLISR capability.

In the context of a typical information technology project it can be expected that what may be considered typical for the upgrade of a system such as Oracle NMS will be increased by the need to build the upgraded solution in the higher security environment with a high availability architecture.

It is the case with such technology projects that it is not the costs of the particular software or hardware that drives the costs but rather the internal and external labour and services required to conduct the implementation effort over the period of several years.

These internal and external labour and services costs can be expected to be increased above an expected level based on Oracle's advice to the increased complexity of the NMS upgrade due to the high level of customization. Leveraging native configuration of the NMS 2.6 platform will be expected to mitigate such cost increases.

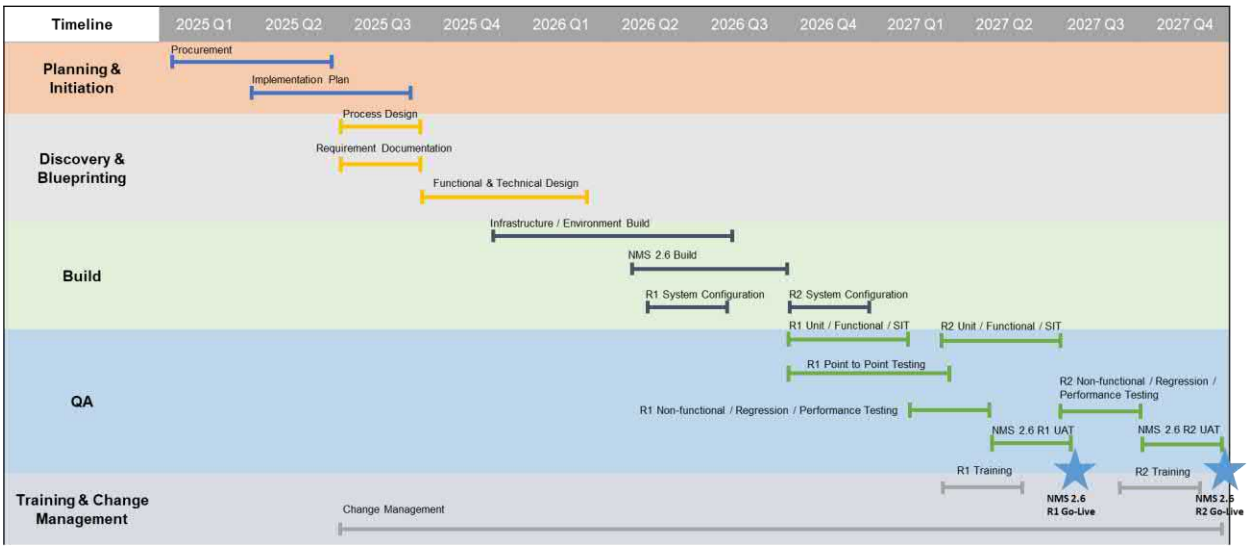
While the capital costs will inevitably be more significant than those of O&M, the planning for available O&M for user training is a vital component which should be planned. The better the users of a system are trained to use the system the more effective the use of that system will be. This is an important investment in support of the overall project investment.

[redacted] and [redacted] were not able to provide the specific costs identified as a discrete Auto-FLISR project as costs were allocated/shared to various operational objectives.

This document contains confidential information of TRC and is subject to the restrictions described in the confidentiality page.

Appendix B: NMS Upgrade Indicative Activities

The following graph lists the main activities for NMS upgrade. The activity date and duration are indicative. Note that R1 activities focus on the NMS core functions including SCADA outbound control, while the R2 activities focus on Auto-FLISR related functions.



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Toronto Hydro-Electric System Limited
EB-2023-0195
Interrogatory Responses
1B-SEC-5
Appendix I
UPDATED: March 26, 2024
(32 Pages)

May 29, 2022

FLEET KEY METRIC BENCHMARKING STUDY

PREPARED FOR THE TORONTO HYDRO-ELECTRIC SYSTEM LIMITED
Final Report



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Fleet Challenge
Driving Change

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1. Executive Summary

Background

Toronto Hydro Fleet Services expressed its interest in exploring new and additional key metrics to accelerate, expand and build on its capacity to measure the performance of its fleet. Fleet Challenge Canada Inc. was selected to complete a *Fleet Vehicle Key Metric Benchmarking Study* for the utility. This report provides our findings, analysis, and recommendations from the study.

About Performance Benchmarking

Performance metrics and benchmarking are highly effective management tools for continuous self-improvement. Typically, internal and external comparisons involving all facets of the organization, ranging from services to organizational practices, form the basis of the benchmarking process.

Benchmarking compares business processes and performance metrics to industry bests and best practices from other companies. Dimensions typically measured are quality, time, and cost.

Current Key Performance Indicators

Toronto Hydro Fleet Services currently tracks several Key Performance Indicators (KPIs) to measure its performance. These include:

- Percentage - utilization (% days over zero kilometers)
- Percentage outside of the home zone
- GHG emissions
- Vehicle Availability (%)
- Idling Hours
- Kilometers-driven
- Operating expenses per vehicle

Electricity Utility Scorecards

The Ontario Energy Board's electricity utility scorecards[1] measure how well Ontario's electricity utilities perform each year. Scorecards are designed to encourage utilities to operate effectively, continually seek ways to improve productivity and focus on improvements that their customers value. Utilities report their scorecard performance results annually and make the results available publicly.

Toronto Hydro-Electric System Limited's Scorecard[2] reflects its emphasis on four corporate pillars:

1. Providing value for money,

[1] https://www.oeb.ca/utility-performance-and-monitoring/scorecard/600/view
[2] https://www.torontohydro.com/documents/20143/407273/2019%20Electricity%20Distributor%20Scorecard

2. Reliable and sustainable system operations,
3. A fully engaged, safe, and healthy workforce, and
4. Financial strength.

How Fleet Supports the Corporate Scorecard

Our organization's position is that the fleet should support the overarching corporate scorecard. Doing so ensures consistency of mission and objectives and that the fleet remains focussed on overarching corporate goals. Of the 21 measures set out in Toronto Hydro's Scorecard, eight measures – *more than one-third* - are directly or indirectly impacted by the Fleet's performance.

Approach and Methodology

Fleet Review

Toronto Hydro's *Fleet Vehicle Key Metric Benchmarking Study* began with a systematic and detailed review of the fleet's current management practices, policies, goals, objectives, and performance measures. This review was accomplished through discussions and email exchanges with the Fleet management and Regulatory teams. The study was designed to bring our team up to speed and familiar with present-day practices. The process was also intended to identify gaps or impediments to success that may be mitigated with new performance management and KPIs.

Peer Fleet Comparisons

We positioned several Toronto Hydro's KPIs, as derived from our recent FAR™ analysis[3], relative to peer fleets in similar operating environments (i.e., urban fleets from our 50,000-vehicle fleet KPI database).

We reached out to several urban and provincial utility fleets to seek attain peer fleet data and benchmarks. We also sought to engage the Canadian Utility Fleet Council[4] (CUFC) to garner interest in sharing their member's KPIs and data with our team. And we completed research into large urban utility fleets in the United States.

Toronto Hydro staff provided statistical data for Ontario electrical utility fleets and several examples (five) of methods used by other Ontario utilities to calculate hourly vehicle rates.

[3] Fleet Analytics Review™ (FAR) is a proprietary Fleet Challenge software program used for baseline and predictive data analysis.

Five Recommended KPIs

We recommend expanding Toronto Hydro Fleet's current KPIs to include five new, additional performance metrics. New and existing KPIs are centered on:

1) Cost (saving, recovery of operating)
2) Service Level (availability, utilization)
3) GHGs

They are:

(1) Customer Ratio
(2) Service Area Ratio
(3) Utilization - Average KMs Travelled
(4) Corporate Average Fuel Economy
(5) Maintenance Ratio

Additional KPIs for Consideration

Additional performance metrics *for future consideration* by Toronto Hydro fleet management are:

1) Cost recovery - billable hours ratio (actual cost recovery from billable hours relative to operating expenses)
2) Utilization Rate by Billable Hours (percentage of billable hours relative to full utilization)
3) Hourly Vehicle Rates (percentage of rate increase/decrease)
4) Vehicles to Headcount Ratio (number of vehicles relative to FTEs)

Recommended KPIs - Features and Benefits

The features and benefits of the five recommended KPIs are summarized below. Further details are provided in *Section 7 – Applicable Key Performance Indicators* of this report.

(1) Customer Ratio

The recommended KPI, *Customer Ratio*, is the ratio of vehicles per number of customers. Customer ratio is a success measure -- when fewer vehicles are required to service a given number of customers, it may be directly relative to optimized asset utilization.

(2) Service Area Ratio

The recommended KPI, *Service Area Ratio*, measures the total service area, in square kilometers per fleet vehicle. Having fewer vehicles to service a given area is more). Success is attained when fewer vehicles are utilized to perform the same work.

(3) Utilization - Average KMs Travelled

Tracking *Utilization - Average KMs-Travelled* as a KPI will help utility fleet management identify chronically under-utilized units. Acting on reducing the number of under-utilized assets will downsize the fleet, which will reduce operating expenses.

Urban utility fleets typically accumulate a low number of kilometers annually relative to commercial fleets in other business sectors, such as couriers or trucking interests. Consequently, for the latter groups, high productivity is often measured by higher rates of kilometers-travelled; whereas the opposite is true for urban utility fleets.

(4) Corporate Average Fuel Economy

We recommend *Corporate Average Fuel Economy* (CAFE) as a new KPI for the fleet. CAFE is a measure of the average liters of fuel consumed per 100 kilometers travelled by the fleet (L/100km). CAFE is directly reflective of a fleet's footprint. It is a measure that encompasses all aspects of fleet operations ranging from:

- Driver behaviours (such as unnecessary idling, harsh driving, and unnecessary trips)
- Right-sizing of vehicles for their assigned tasks (i.e., getting the job done with more fuel-efficient vehicles)
- The increased use of battery-electric vehicles (BEVs), plug-in hybrid vehicles (PHEVs) or other zero-emissions vehicles such as fuel-cell electric vehicles (FCEVs).

A fleet's average age also impacts CAFE since older vehicles are less fuel-efficient than modern units; thus, they cost more to operate and produce more emissions. Improvements to Toronto Hydro's CAFÉ will reduce costs and emissions.

(5) Maintenance Ratio

The fifth recommended KPI, *Maintenance Ratio*, is a measure of costs for preventive maintenance (PM) relative to the costs of all maintenance, including parts and labour. If a maintenance event is not *preventative*, it is *reactive*. Reactive repairs are unplanned, unexpected repair costs, including on-the-road failures and breakdowns, events that may have been avoided through increased levels of PM. Increased PM leads to higher levels of availability. If availability is tracking down, more focus

must be placed on PM, such as more frequent or thorough PM inspections. Increased levels of PM will reduce overall operating costs.

Toronto Hydro Fleet KPI Performance 2017 to 2021

Of 10 select KPIs depicted in *Table 1 – Toronto Hydro Fleet KPI Statistics 2017 to 2021* (below), the five-year performance of the Toronto Hydro fleet has steadily improved in 7 of 10 KPIs, with slight decreases in 3 (KPIs 1, 9 & 10).

Fleet management is encouraged to determine the reason(s) for these slight declines in performance and focus efforts on making improvements in these while sustaining the improved performance of all KPIs. Thus, the value of KPIs and performance management as a roadmap to continuous improvement in fleet performance.

Note: KPIs six to ten in *Table 1* are among those currently tracked by Toronto Hydro. KPIs one to five are our recommended additions.

Table 1 -Toronto Hydro Fleet KPI Statistics 2017 to 2021

	KPI 1 (new)	KPI 2 (new)	KPI 3 (new)	KPI 4 (new)	KPI 5 (new)	KPI 6	KPI 7	KPI 8	KPI 9	KPI 10
Year	Customer Ratio (Customers served per number of vehicles)	Service Area Ratio (Km^2 served per Vehicle)	Utilization - Average KMs Travelled	Corporate Average Fuel Economy (CAFE) (L/100KM)	Maintenance Ratio (PM as % of All Parts/Labour)	Total GHGs (tonnes, tailpipe)	Idle Time (non-PTO)	Utilization - Days Utilized (% outside home zone)	Utilization - (% Travel >0 km)	Availability (%)
2017	1.6	0.50	6,788	30.8	30.0	2,632	59,768			98.7
2018	1.7	0.53	6,343	31.0		2,340	51,462			
2019	1.9	0.59	6,291	31.3		2,094	45,329	45	58	97.7
2020	1.9	0.60	6,142	31.3		2,340	44,759	46	59	98.7
2021	2.0	0.63	4,878	31.3	33.0	1,504	36,180	46	56	97.3

Peer Fleet Comparisons

We set out to put Toronto Hydro's KPI data into context through comparisons to peer fleets. Unfortunately, aside from two data points necessary to calculate KPIs (service area and the number of customers), comparable data points for peer fleets were unavailable. Data was obtained regarding fleet sizes of Ontario electrical utility fleets, in terms of the number of vehicles in each fleet, however, it was not possible to confirm that the methods of calculating fleet size were consistent; therefore, reported fleet size could not be confirmed. Please see *Note 3* (below). For example, some utility fleets may have included off-road equipment units in their totals while others reported only on-road

vehicles. From the two available data points we calculated two KPIs: (1) Customer Ratio and (2) Service area Ratio.

For context, we included the available data for 10 peer fleets. These included, for *comparison purposes only*, a gas utility, a telecom utility, and the *average* data for large Ontario municipal fleets. We compared Toronto Hydro's fleet statistics to these non-electrical utility fleets as they have reasonably similar operating characteristics.

Peer fleet statistics are shown in *Table 2 - Peer Fleet Comparisons* (below).

Table 2 - Peer Fleet Comparisons

Side by Side Comparisons				KPI 1 (new)	KPI 2 (new)
	Fleet Size[5]	Service Area (km^2)	Customers */ Constituents	Customer Ratio (Customers served per number of vehicles) (1,000s)	Service Area Ratio (Km^2 served per Vehicle)
Toronto Hydro (2021)	385	243	785,000	2.0	0.63
Hydro Ottawa	234	1,116	346,347	1.5	4.8
Hydro One (Note 2)	4,630	961,062	1,361,102	0.3	207.6
Niagara PEI	62	827	56,973	0.9	13.3
Waterloo North	54	683	58,438	1.1	12.6
London Hydro	160	423	162,140	1.0	2.6
Alectra	560	1,924	1,062,040	1.9	3.4
Large Urban Municipal Fleet (averages)***	787	836	698,597	0.9	1.1
Gas Utility #1***	762	243			0.3
Telecom Utility***	11,598		13,000,000	1.1	

As shown in *Table 1*, 5-year performance benchmarking statistics (KPIs), for most, the Toronto Hydro fleet has made progress toward cost reduction and service-level performance. The path forward toward continuous improvement is evident. Hence the value of key metric benchmarking.

Note 1: Most utilities do not have a separate "medium-duty" category

Note 2: Hydro One is both a distributor and transmitter of energy; these vehicles are for both roles

Note 3: Total fleet does not include "other" vehicles, i.e. off-road vehicles and bobcats

Note 4: Each utility provides its own definitions of heavy/medium/light duty; they may not necessarily align.

[5] Data was obtained regarding fleet size data for Ontario electrical utility fleets, in terms of the number of vehicles in each fleet, however, it was not possible to confirm that the methods of calculating fleet size were consistent; therefore, reported fleet size could not be confirmed. See Note 3.

Note 5: Hydro Ottawa cites Alectra's fleet size as 1,816, with no source provided. Alectra's 560 figure excludes trailers, forklifts, and "miscellaneous" vehicles

Note 6: London Hydro includes forklifts and trailers in their figures

** TH data for 2021 extrapolated from YTD to Nov 30, 2021

*** Source E3 Fleet Review archives

2. Background

Fleet Challenge Canada Inc completed a *Fleet Vehicle Key Metric Benchmarking Study* study on behalf of Toronto Hydro Fleet Services. The study's objective was to explore new and additional key metrics to accelerate, expand and build on Fleet Service's past work in measuring its performance. This report provides our findings, analysis, and recommendations from the study.

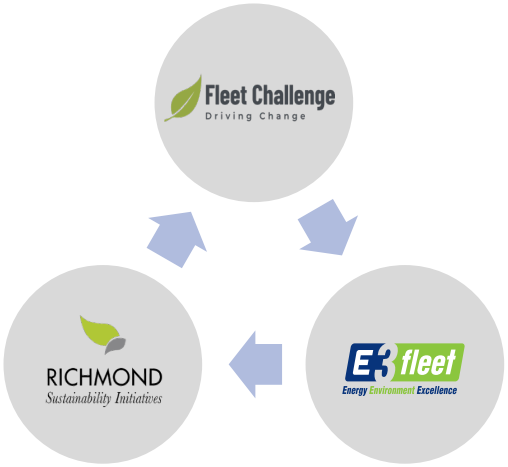
About Fleet Challenge - Who We Are, What We Do

Fleet Challenge Canada Inc. is a fleet management consulting company based in Toronto, Ontario, with Canadian and United States[6] representatives. The Fleet Challenge Canada team is comprised of fleet management, automotive industry, business/finance, data-analysis, environmental, LEED™, and subject matter experts in other areas of business. Since 2005, the Fleet Challenge team has completed dozens of complex fleet reviews and specialized consulting projects for our clients.

Fleet Challenge Canada Inc. www.fleetchallenge.com has become Canada's leading fleet management consulting firm. Fleet Challenge America Inc. (FCA) serves our American clients.

Our team also manages Richmond Sustainability Initiatives www.richmondsustainability.org, a Canadian environmental not-for-profit corporation headquartered in Toronto.

We also manage the national E3 Fleet Standards www.e3fleet.com program, a member-supported, green fleet accreditation program based on principles similar to LEED™.



Unbiased Perspectives

Fleet Challenge Canada Inc. (FCC, Fleet Challenge, FC) believes strongly that management consulting firms must be strictly impartial and unbiased. For this reason, our firm was structured, incorporated, and functions today as an independently funded entity. Accordingly, FCC does not accept or receive remuneration from, endorse, or partner with commercial products or services to remain an unbiased, trusted, independent, neutral third-party.

[6] Fleet Challenge America Inc. is based in Miami, FL, USA

3. Why Fleet Performance Benchmarking?

On Key Performance Benchmarking

It is well known that performance metrics and benchmarking are highly effective management tools for continuous self-improvement. Typically, internal and external comparisons involving all facets of the organization, ranging from services to organizational practices, form the basis of the benchmarking process.

Benchmarking is the practice of comparing business processes and performance metrics to industry bests and best practices from other companies. Dimensions typically measured are quality, Time, and cost.

Benchmarking is used to measure performance using a specific indicator (cost per unit of measure, productivity per unit of measure, cycle time of x per unit of measure, or defects per unit of measure), resulting in a performance metric compared to others.

Also referred to as "best practice benchmarking" or "process benchmarking," this process is used for optimal management. Organizations evaluate various aspects of their operations in relation to best-practice companies' processes, usually within a peer group defined for comparison. The process allows organizations to develop plans and set improvements or adapt specific best practices, usually to increase performance. Benchmarking may be a one-off event but is often treated as a continuous process in which organizations continually seek to improve their practices.

In the transportation sector, commercial fleets often apply the following *high-level* categories to define specific performance measures:

- Cost
- Quality of Service
- Timeliness of Service
- Customer Satisfaction
- Safety
- Regulatory Compliance
- Fleet Utilization
- Appearance and Brand

As per the adage, "you can't manage what you can't measure," our position is that private and public sector fleets of all sizes and types should implement a performance management system complete with several relevant and targeted Key Performance Indicators (KPIs).

KPI's should be updated regularly; monthly would be ideal while quarterly would be the minimum, in our opinion.

Electricity Utility Scorecards

The Ontario Energy Board's electricity utility scorecards[7] measure how well Ontario's electricity utilities perform each year. Scorecards are designed to encourage utilities to operate effectively, continually seek ways to improve productivity and focus on improvements that their customers value. Utilities report their scorecard performance results annually and make the results available publicly.

The scorecard can be used as a tool for consumers to assess the value of the service received from their electric utility. For example:

- When service appointments are booked with my utility, how often did they show up on Time?
- How often did my power go out; how long did the utility take to restore power?
- How successful is my utility at issuing accurate bills?
- Did my utility answer phone calls from customers in a timely way?

Toronto Hydro-Electric System Limited's Scorecard

Toronto Hydro-Electric System Limited's Scorecard[8] reflects its emphasis on four corporate pillars:

1) Providing value for money,
2) Reliable and sustainable system operations,
3) A fully engaged, safe, and healthy workforce, and
4) Financial strength.

As a mature utility serving a dense urban environment, Toronto Hydro continues to address the many challenges in rebuilding its deteriorating system to meet the needs of its customers during rapid growth.

[7] https://www.oeb.ca/utility-performance-and-monitoring/scorecard/600/view
[8] https://www.torontohydro.com/documents/20143/407273/2019%20Electricity%20Distributor%20Scorecard

How the Fleet Supports the Corporate Scorecard

Our organization's position is that the fleet should support the overarching corporate scorecard. Doing so ensures consistency of mission and objectives and that the fleet remains focussed on overarching corporate goals. For example, of the 21 measures set out in Toronto Hydro's Scorecard, eight measures – more than one-third - are directly or indirectly impacted by the fleet's performance.

The Fleet Challenge team identified new, recommended KPIs for tracking the Toronto Hydro Fleet's performance with this objective in mind.

4. Approach and Methodology

Approach

Common to all FCC Inc.'s signature programs is the use of our proprietary software tools to analyze our client's statistical data and other information. For this project, we employed our analytical solutions and standard business processes to inform, guide, and shape our recommendations around key performance metrics for the Toronto Hydro fleet. They included:

1) *Management Practices Review*. Discussions and email exchanges with Toronto Hydro Fleet Services to help us understand the operating environment. We reviewed the fleet's management and maintenance practices, policies, procedures, governance, financial treatments, corporate objectives, and targets.

2) *Fleet Analytics Review™ (FAR).* FAR is a software tool developed and used by our team to calculate the fleet's baseline performance. This process helps us understand the current state regarding the fleet's operating and capital expenses and service level metrics. In addition, FAR calculates many key performance indicators (KPIs), including costs, emissions, and service levels.

   Our team completed a FAR study in 2017 for Toronto Hydro and a FAR data refresh in 2021. Several key metrics from those studies were used to base her recommendations within this report.

3) *Fleet Challenge Statistical Database.* Fleet Challenge maintains a 50,000-fleet vehicle databank which we have compiled over the past 16 years. It includes vital statistical data and numerous KPIs (close to 100) for dozens of private and public sector fleets, including several gas, electric, and telecom utility fleets.

Methodology

Toronto Hydro's *Fleet Vehicle Key Metric Benchmarking Study* began with a systematic and detailed review of the fleet's current management practices, policies, goals, objectives, and performance measures. This review was accomplished through discussions and email exchanges with the Fleet management and Regulatory teams. The study was designed to bring our team up to speed and familiar with present-day practices. The process was also intended to identify gaps or impediments to success that may be mitigated with new performance management and KPIs.

Next, from our recently completed (September 2021) FAR™ analysis of Toronto Hydro's fleet, we examined many of the key performance indicators (KPIs) from that study. Then, finally, we reviewed KPIs from our team's 2017 Toronto Hydro FAR study.

We positioned Toronto Hydro's KPIs (as derived from our recent FAR™ analysis) relative to peer fleets in similar operating environments (i.e., urban utility fleets from our proprietary 50,000 vehicle fleet KPI database).

We attempted to contact several other urban and provincial utility fleets to attain peer fleet data and benchmarks to attain peer fleet data and benchmarks. We also sought to engage the Canadian Utility Fleet Council[9] (CUFC) to garner interest in sharing their KPIs and data with our team. And we completed research into large urban utility fleets in the United States.

Unfortunately, despite numerous attempts at outreach, the urban and provincial utility fleets or the CUFC did not respond to our requests for participation in a fleet KPI study. Data was obtained regarding fleet sizes of Ontario electrical utility fleets, in terms of the number of vehicles in each fleet, however, it was not possible to confirm that the methods of calculating fleet size were consistent; therefore, reported fleet size could not be confirmed. For example, some utility fleets may have included off-road equipment units in their totals while others reported only on-road vehicles.

5. Key Performance Indicators - Recommendations

This section lists and discusses Key Performance Indicators (KPIs), their advantages, and benefits. We will discuss how the recommended KPIs align with and support the measures set out in Toronto Hydro's utility scorecard. We will also describe the features, benefits, and advantages of each.

Fleet Statistical Baseline

It is important to note that, as shown in *Table 3- Fleet Statistical Baseline 2017 to 2021* (below), the overall fleet size in terms of active units steadily *decreased* while the number of customers served by the Toronto Hydro fleet *increased*.

Table 3 - Fleet Statistical Baseline 2017 to 2021

Year	Fleet Size	Service Area (km^2)	Customers */ Constituents	Total Annual KMs Travelled**
2017	486	243	767,569	3,298,806
2018	462	243	771,890	2,930,623
2019	415	243	777,697	2,610,700
2020	405	243	781,230	2,487,472
2021	385	243	785,000	1,878,182

Peer Fleet Comparisons

For comparison purposes and to aid in putting Toronto Hydro's fleet statistical data into perspective, in *Table 4 – Side by Side Business Sector Comparisons* (below), for KPIs 1 and 2, we display data for several peer fleets.

Table 4-Side by Side Comparisons

Side by Side Comparisons				KPI 1 (new)	KPI 2 (new)
	Fleet[10] Size	Service Area (km^2)	Customers */ Constituents	Customer Ratio (Vehicles used per number of customers) (1,000s)	Service Area Ratio (Km^2 served per Vehicle)
Toronto Hydro (2021)	385	243	785,000	2.0	0.63
Hydro Ottawa	234	1,116	346,347	1.5	4.8

[10] Data was obtained regarding fleet sizes of Ontario electrical utility fleets, in terms of the number of vehicles in each fleet, however, it was not possible to confirm that the methods of calculating fleet size were consistent; therefore, reported fleet size could not be confirmed. For example, some utility fleets may have included off-road equipment units in their totals while others reported only on-road vehicles.

Side by Side Comparisons	Fleet[10] Size	Service Area (km²)	Customers */ Constituents	KPI 1 (new) Customer Ratio (Vehicles used per number of customers) (1,000s)	KPI 2 (new) Service Area Ratio (Km² served per Vehicle)
Hydro One (Note 2)	4,630	961,062	1,361,102	0.3	207.6
Niagara PEI	62	827	56,973	0.9	13.3
Waterloo North	54	683	58,438	1.1	12.6
London Hydro	160	423	162,140	1.0	2.6
Alectra	560	1,924	1,062,040	1.9	3.4
Large Urban Municipal Fleet (averages)***	787	836	698,597	0.9	1.1
Gas Utility #1***	762	243			0.3
Telecom Utility***	11,598		13,000,000	1.1	

As shown in *Table 4*, we selected large urban municipal fleet averages as a suitable proxy for the comparison shown in *Table 4*. Municipal fleets share many operational similarities with Toronto Hydro. For example, municipal fleet vehicle types/categories are identical to Toronto Hydro. Both fleets are mixed, with all sizes and types of vehicles from Class 1 light-duty units to Class 8 heavy-duty trucks. Operationally, both fleet types are low-speed operations that travel few kilometers but experience high engine hours. Medium- and heavy-duty trucks for both fleet types (municipal and utility) are typically equipped with power take-offs (PTOs) used to power ancillary equipment.

For context, we included large urban municipal fleet averages (Ontario municipalities with >200k populations), an Ontario regional gas distributor (serves both urban and rural populations), and a national telecom utility (serves both urban and rural populations)

Recommended KPIs

The five new, additional KPIs and several current KPIs and their five-year historical trend from 2017 to 2021 are shown in *Table 5 – Toronto Hydro Fleet KPI Trendline 2017 to 2021*(below). From our observation of these KPIs, we note that the Toronto Hydro fleet has improved its five-year performance for most (7 of 10) of these KPIs.

Note 1: Most utilities do not have a separate "medium-duty" category

Note 2: Hydro One is both a distributor and transmitter of energy; these vehicles are for both roles

Note 3: Total fleet does not include "other" vehicles, i.e. off-road vehicles and bobcats

Note 4: Each utility provides its own definitions of heavy/medium/light duty; they may not necessarily align.
Note 5: Hydro Ottawa cites Alectra's fleet size as 1,816, with no source provided. Alectra's 560 figure excludes trailers, forklifts, and "miscellaneous" vehicles

Note 6: London Hydro includes forklifts and trailers in their figures

** TH data for 2021 extrapolated from YTD to Nov 30, 2021

*** Source E3 Fleet Review archives

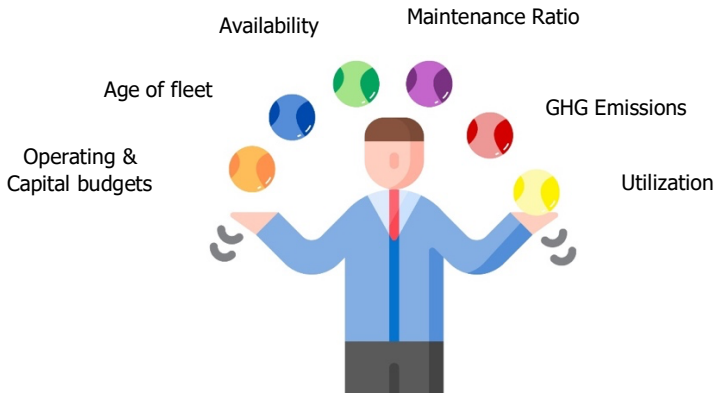
Table 5- Toronto Hydro Fleet KPI Trends 2017 to 2021

Year	KPI 1 (new) Customer Ratio (Vehicles used per number of customers) (1,000s)	KPI 2 (new) Service Area Ratio (Km^2 served per Vehicle)	KPI 3 (new) Utilization - Average KMs Travelled	KPI 4 (new) Corporate Average Fuel Economy (CAFE) (L/100KM)	KPI 5 (new) Maintenance Ratio (PM as % of All Parts/Labour)	KPI 6 Total GHGs (tonnes, tailpipe)	KPI 7 Idle Time (non-PTO)	KPI 8 Utilization - Days Utilized (% outside home zone)	KPI 9 Utilization - (% Travel >0 km)	KPI 10 Availability (%)
2017	1.6	0.50	6,788	30.8	30.0	2,632	59,768			98.7
2018	1.7	0.53	6,343	31.0		2,340	51,462			
2019	1.9	0.59	6,291	31.3		2,094	45,329	45	58	97.7
2020	1.9	0.60	6,142	31.3		2,340	44,759	46	59	98.7
2021	2.0	0.63	4,878	31.3	33.0	1,504	36,180	46	56	97.3

6. The Fleet Management Juggling Act

Figure 1 (below) is intended to show that fleet management is a complex juggling act. Capital investment, operating expenses, depreciation, preventive maintenance levels, fuel consumption, fleet aging, availability, utilization, emissions, and inflation are interconnected issues. Making a change to any one of these critical considerations impacts all of them. If one key performance indicator (KPI) becomes out of bounds, all others are affected – potentially in a negative way.

Figure 1-The Fleet Management Juggling Act



For example, deferred capital spending will result in an aging fleet, which in turn may result in higher reactive repair rates (breakdowns), more downtime, higher fuel consumption, (potentially) increased operating costs, and, ultimately, a larger overall fleet size to allow for more spare vehicles to compensate for the reduced reliability of primary vehicles. Counter to this, value may be lost if vehicles are replaced too soon.

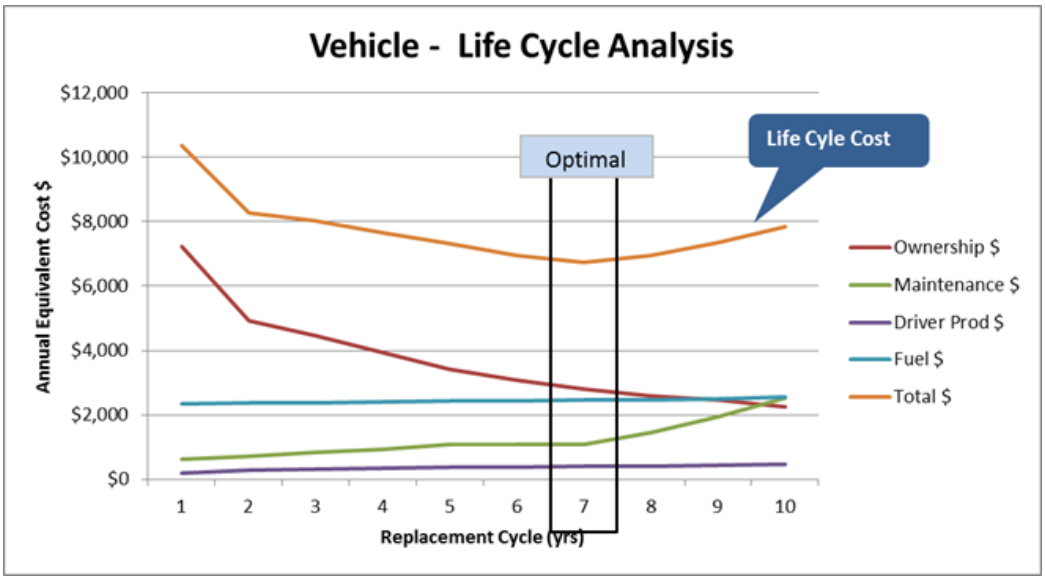
Lifecycle Analysis

Fleet Challenge believes that the key to success is knowing the optimal economic lifecycle for each type of vehicle in a fleet. With that information, fleet managers can balance their go-forward capital spending with service level (uptime) targets, budgeted operating expenses (Opex), and other essential success measures.

Figure 2 - Lifecycle Analysis Example (below) illustrates the concept of LCA. As a vehicle's age at retirement increases, ownership costs decrease, while operating costs increase. In this example, the operating costs include maintenance, loss of driver productivity caused by reduced vehicle reliability, and fuel consumption.

In LCA, the sum of operating and ownership costs represents the "lifecycle cost curve." The ideal time to replace vehicles is before the rise in operating expenses begins to outweigh the decline in ownership costs.

Figure 2: Lifecycle Analysis Example



The Lifecycle Cost Curve

The lifecycle cost curve and the ideal replacement cycle will be different for various vehicles and possibly even for individual vehicles of the same kind. Factors that can cause this variability include differences in vehicle makes/models, model year, equipment design, operating environment, and/or operator habits. Therefore, recommended replacement cycles for a class of vehicles approximates the optimal Time to replace most units within that class based on the category-average cost and performance data by model year.

Replacement cycles should be considered a guideline only, as some vehicles in poor or unsafe condition may require replacement before the criteria are met. Conversely, some vehicles that exceed the criteria may be in good condition and may not warrant replacement. Therefore, fleet managers need to exercise judgment and fleet management principles in either advancing replacement or delaying replacement of individual vehicles case by case.

Vehicle lifecycles are determined by modelling the expected cash flows for owning and operating the vehicle. The approach involves forecasting a stream of costs over a study horizon (future period) for each type of vehicle and determining the replacement cycle that results in the lowest total cost of ownership (TCO).

Fleet Challenge completed a lifecycle analysis (LCA) study for Toronto Hydro in 2013, and we completed a refresh of the LCA data in 2017. For Toronto Hydro, we completed discounted cash flow analysis for each vehicle class. Net present value (NPV) was calculated for outgoing cash flows (vehicle purchase cost, maintenance cost, the impact of downtime on driver productivity cost, improved fuel efficiency of a new vehicle compared to the old vehicle) and incoming cash flows (vehicle residual value) to calculate the total lifecycle cost for various vehicle retention periods.

The NPV amounts for cash flows were converted to annual equivalent cost (AEC) to provide a dollar amount, which is easy to relate to and enables a comparison of alternative lifecycle costs. AEC is the fixed annual payment required to pay back the total capital and operating costs over the study period. Therefore, the AEC can be viewed as an average yearly cost that considers the time value of money for future cash flows.

Fleet Age and Reliability

Most drivers know from personal experience that older vehicles are less reliable, break down more frequently, cost more to repair, and burn more fuel. Multiply that reality many times over as in a commercial fleet, and the impacts can be significant. In general, as commercial vehicle fleets age, higher operating expenses are incurred due to increased reactive repairs (unplanned repairs and breakdowns). In addition, downtime costs for spare/loaner vehicles increase due to decreased reliability, as does the cost of productivity loss for drivers dependent on fleet vehicles to perform their daily work routines.

Downtime costs increase exponentially when one or more employees are dependent on a vehicle to complete their work routines. When an unreliable vehicle fails to perform as expected, downtime costs will be incurred relating to the loss of productivity and the cost of loaner or rental vehicles. In addition to the cost of less reliable, ageing vehicles and the associated increased downtime are the additional expenses of owning, maintaining, licensing, insuring, and parking spare backup vehicles.

Even when downtime is minimized through a rigorous preventive maintenance program, downtime costs are unavoidable and can be substantial. Therefore, ongoing, uninterrupted capital re-investment in modernizing the fleet is critical to any organization that depends on a reliable fleet of vehicles to achieve its objectives and mission, as is the case for all utilities. The benefits of a newer fleet include better fuel economy, increased vehicle uptime, lower risk of repair, increased safety, and, possibly, improved employee morale. Moreover, a modern and reliable fleet may reduce fleet size since fewer spares will be necessary.

Vehicle Replacement at the Rate of Depreciation

Providing capital to replace units each year with new vehicles is essential for any organization that relies on its fleet to provide its core services to customers. A guideline for fleet replacement is to invest capital at the rate of depreciation. For example, if vehicles are depreciated over ten years, then 10% of the total fleet replacement cost (current NPV) would be required each year to maintain the fleet's average age at the desirable level. However, this guideline is only valid if performance indicators such as uptime and fuel efficiency are satisfactory. If not, a one-time increase in spending would help bring the fleet's average age and performance to an acceptable level.

Vehicle Replacement Criteria

Today's vehicles are built better and last longer than ever before. With the proper preventive maintenance, operating conditions, and driver behaviours, vehicle service lives can often be extended longer than in the past. The LCA studies completed for Toronto Hydro in 2013 and 2017 optimized vehicle lifecycle costs based on vehicle age. Vehicle age was the best replacement criteria, given the fleet's relatively low average utilization rates (as measured by kilometers travelled). Because annual kms-travelled are low, most vehicles will time-out versus mileage-out at retirement.

Environmental Considerations

LCA is used to evaluate whether the increased capital costs for newer, more modern, and fuel-efficient vehicles will be offset by lower fuel, repair, and downtime costs. The amount of fuel saved may be minimal for low-mileage units, often resulting in the better financial option of lifecycle extension. However, ageing a fleet to extract total value from each unit may counteract the fleet's progress toward modernization and reduced GHG emissions.

7. Recommended Key Performance Indicators

As described in this report, Fleet Challenge has recommended five new KPIs for Toronto Hydro Fleet Services. And we have recommended three more for future consideration.

Below are more detailed descriptions of the recommended KPIS and other applicable key performance indicators for Toronto Hydro's review and consideration.

Customer Ratio

Recommended KPI, *Customer Ratio,* relates to the customers served per number of vehicles. It is essentially a measure of productivity for the fleet: more customers serviced per vehicle equals higher productivity.

For Toronto Hydro, customers have steadily increased since 2017, peaking at 785,000[11] in 2021. Concurrently, the overall fleet size has continued to be reduced, from 486 units in 2017 to 385 in 2021.

Service Area Ratio

The recommended KPI, *Service Area Ratio*, measures the total service area, in square kilometers per fleet vehicle. Having fewer vehicles to service a given area is more). Success is attained when fewer vehicles are utilized to perform the same work.

The *Service Area Ratio* KPI we recommend for monitoring describes the relationship of vehicles relative to the number of square kilometers being serviced. For example, in 2021, the Toronto Hydro fleet of 385 vehicles services an area of 243 km^2. As the Toronto Hydro vehicle fleet size decreased over the past five years, the same area is now being serviced by fewer vehicles, indicative of increased vehicle productivity.

Utilization - Average KMs Travelled

Measuring utilization for a fleet operated within the boundaries of a city or town is, unfortunately, less than ideal as a productivity measure. For example, a service vehicle may travel just one or two kilometers to transport a crew to their job site.

[11] Source: https://www.torontohydro.com/about-us/company-overview

Once onsite, the service vehicle may be used to power ancillary equipment (such as an aerial device, digger derrick, or crane) or serve as a mobile workshop for the entire day. Other fleet vehicles are used entirely differently, such as vehicles used to transport employees in and around the city to conduct their daily work routines. In our first example, service vehicles will accumulate very few kilometers every year. In the second example, vehicles used for people-transport will accumulate many more kilometers each year.

In a side-by-side comparison of vehicle utilization by average KMs-travelled between the two applications described above, the service vehicle would appear far less productive than the passenger-transport vehicle. Although the service vehicle's total accumulated kilometers would be much less, it is no less productive or valuable to the organization than the passenger-transport vehicle, which accumulated more kilometers.

Hence, measuring vehicle productivity by kilometers travelled is not ideal for tracking utilization and vehicle value to an organization. Regardless, with that stated, chronically low kilometers-driven may be a flag to an under-utilized asset. Therefore, while management should be aware of vehicles with chronically low utilization by kilometers travelled, fleet managers should recognize that many applications will not accumulate large numbers of kilometers.

Corporate Average Fuel Economy

To aid in reducing fuel usage, a best management practice is to monitor the fleet's *Corporate Average Fuel Efficiency* (CAFE). CAFE is one of the most important key performance indicators (KPIs) for cost- and GHG emissions-conscious fleet managers to monitor and take actions for improvement.

CAFE is directly reflective of a fleet's footprint. It is a measure that encompasses many facets of fleet operations ranging from:

- Driver behaviours (such as unnecessary idling, harsh driving, and unnecessary trips)
- Right-sizing of vehicles for their assigned tasks (getting the job done with more fuel-efficient vehicles)
- The increased use of electric vehicles, alternate and renewable low-carbon fuels.

A fleet's average age also impacts CAFE since older vehicles are less fuel-efficient than modern units and cost more to operate and produce more emissions.

Reducing a fleet's *Total Annual Fuel Consumption* is a prime objective and a Key Performance Indicator (KPI) for proactive fleet management. The cost of fuel is usually one of the highest controllable costs for most fleets. In addition, the quantity of fossil fuels consumed by a fleet directly

impacts its greenhouse gas (GHG) footprint – the more fuel consumed, the more GHGs produced. Therefore, proactive fleet managers will make it one of their top priorities to ensure their fleet is as fuel-efficient as possible.

Reducing fuel use is critical, both fiscally and environmentally. Fuel use reductions are achieved when:

- The fleet is modern
- Vehicles are right sized
- The purchasing of fuel-efficient vehicles is prioritized (as opposed to the lowest cost vehicles that meet minimum standards)
- Unnecessary idling is discouraged
- Unnecessary vehicle travel is avoided
- Drivers are instructed on fuel-efficient behaviours (eco-driving techniques)
- User group managers are encouraged or incented to reduce the fuel use of their assigned fleet vehicles

Maintenance Ratio

Maintenance Ratio is a unit of measure that reflects the amount of money spent on preventive maintenance (PM) relative to the cost of reactive repairs (e.g., unplanned repairs, breakdowns).

Fleet Challenge has studied the relationship between preventive maintenance and reactive repairs for over a decade, and there are many peripheral factors. While there is no "golden ratio" for this KPI, we have observed that fleets with a maintenance ratio of .50 - that is, when $.50 is spent for every maintenance dollar, the highest levels of uptime may be achieved.

Preventive maintenance (PM) must be ramped up when the availability (uptime) rate is less than a predetermined target. That is, more frequent or more rigorous PM inspections will be required to bring this KPI up to an acceptable level.

Cost Recovery - Billable Hours Ratio

Presented for Toronto Hydro's consideration, this KPI is a comparison of actual cost recovery from billable vehicle hours relative to actual operating expenses. Total cost recovery would be ideal, but full attainment is dependent on the hours, days, or months of billable hours per vehicle asset. Under-utilized units would reduce the cost recovery and so this is a recommended KPI.

Utilization Rate by Billable Hours

This KPI is an indicator of the billable time posted to user group work orders or time sheets for vehicle usage. The KPI would be reflective of the percentage of billable hours relative to full utilization.

Hourly Vehicle Rates – Increase/Decrease

A success indicator for the fleet is when hourly vehicle rates decrease. This KPI would therefore be used to depict the increases or decrease in billable hourly rate of fleet vehicles. It would be expressed in percentage of cost increase or decrease of hourly rates.

Utilization – Days Utilized

Measuring utilization by the total number of kilometers driven is not an effective measure of utilization for an urban fleet. Therefore, this KPI reports total days of vehicle usage. For this KPI, two measures can be useful.

1) Percentage - utilization (% days over zero kilometers)
2) Percentage – utilization outside of the home zone

A future success measure for the fleet would be to increase the *Utilization by Days Utilized* rate based on this KPI. This KPI represents the percentage of day overs zero kilometers, and/or the percentage hours for fleet units travelling outside their home zone during standard business hours divided by the total available hours during regular business hours.

Availability

Availability, is also referred to as "uptime." Uptime is a measure of reliability, expressed as the percentage of Time a unit (in the context of this report, a vehicle) has been working and available.

Fleet Challenge Canada believes that vehicle uptime is fleet management's primary responsibility. That is, management must ensure that vehicles of the right type are available for use by the fleet's internal customers during prime business hours.

There are only two - *and only two* - ways of increasing availability. They are:

1. Reduce the age of the fleet (in model years)
2. Increase the amount of preventive maintenance (PM) (e.g., conduct more frequent or more rigorous PM routines)

Uptime is the opposite of downtime. Downtime is the result of vehicle failures. High levels of downtime result from one (or more) of:

- Insufficient preventive maintenance
- Vehicle ageing
- Abusive driving
- Vehicles incorrectly configured or specified for the task at hand (e.g., vehicles too small/large, inadequate/excessive power or torque)

Optimal levels of availability occur when safe and modern, job-suited vehicles of the right size and type are adequately and sufficiently maintained. In the following paragraph, we elaborate on several of these criteria:

Fleet Average Age

Fleet Average Age is a critical KPI for fleet management to monitor. Negative impacts of an ageing fleet include increased:

- Reactive repair costs
- Downtime costs

Maintaining the fleet at an average age designed to achieve a specific availability rate is essential to success.

Total Greenhouse Gas (GHG)

Total Greenhouse Gases (GHGs) is a KPI that simply tallies the tailpipe CO_2 emissions produced by the fleet. Fewer GHGs are better.

Factors that affect this KPI include:

- The number of kilometers-driven
- The types of vehicles that make up the overall fleet mix, the concentration of medium and heavy-duty trucks
- The carbon content of the fuels used to power the fleet
- Driver behaviours (idling, harsh driving, unnecessary trips)
- Prevailing climate (cold or hot)
- Terrain

GHG Intensity

Organizations experiencing growth, such as the number of customers it serves, or an increased service area, will often require additional vehicles. More vehicles require more fuel, which means

more greenhouse gases are produced. For fleets trying to achieve a target amount of GHG reduction, the additional fleet size may make it a challenge – it becomes a moving target. For this reason, Fleet challenge recommends tracking the KPI *Greenhouse Gas Intensity*.

Greenhouse Gas Intensity (GHG intensity) is simply the amount of carbon produced by the fleet, divided by kilometers travelled.

GHG intensity is a KPI that is directly reflective of these conditions:

- Vehicle types and sizes (e.g., smaller, lighter versus over-sized units)
- The number of kilometers driven
- The age of the vehicles
- The carbon intensity of the fuels used
- Driver behaviours

Toronto Hydro has experienced steady growth in the number of customers it serves over the past five years. Typically, more customers will lead to an increase in fleet size which, may increase the number of fleet vehicles required to serve the additional customer load, and thusly more total GHGs may result (unless low/no carbon options such as electric vehicles are employed).

Good fleet management policies and practices are required to avoid unrestrained fleet growth and increases in GHG intensity. The Fleet Challenge team has developed a process flow chart to help constrain the fleet size while reducing costs and emissions to assist with this goal.

At-Fault Accident Rate

A KPI aimed at safety, tracking this statistic can lead to improved safety performance and lower operating expenses. When the rate is high, more or enhanced safe driver refresher training initiatives will in time lead to statistical improvements in the KPI.

Idle Time (non-PTO)

Our final recommended KPI is number thirteen – *Idle Time (non-PTO).* Idling reduction is an essential concern for all leading fleets looking to optimize costs and reduce the environmental impact.

The public sees Fleet vehicles left idling for no apparent reason as wasteful and polluting. These negative messages are potentially damaging to the reputation of any organization.

Fuel consumption from the idling of heavy-duty vehicles is significant. While we acknowledge there are times when idling is simply unavoidable, the US Department of Energy estimates that

unnecessarily idling heavy-duty vehicles wastes from half to one US gallon (1.89 to 3.79 liters) or more per hour.

Some fleets idle 30 to 50% or more of their operating time[12]. These are several main approaches to idling reduction, including:

- Idling-reduction policy
- Driver training and motivation
- Idling-reduction awareness and fact-based training
- Incentive programs
- Ongoing driver education
- The use of idling reduction devices, including:
  - Auxiliary power units (APU)
  - Stop/start devices
  - Auxiliary cab heaters
  - Battery backup systems
  - Block heaters/engine preheaters

Idling-Reduction Policy

An idling-reduction policy is a way to motivate fleet drivers to limit unnecessary idling. However, continuous enforcement such as spot-checks, and fuel use tracking must be present for an idling-reduction policy to be successful. Therefore, an idling-reduction policy could be used as an overarching commitment to idle reduction through driver training and motivation sessions rather than an initiative on its own.

When Engine Idling is Unavoidable

There are times when idling is unavoidable. These include:

- Cab heating/ventilation and air conditioning (HVAC)
- Power for critical equipment (such as the use of a PTO for ancillary equipment)
- Maintaining brake air pressure (MD and HD trucks)

It is essential to differentiate between *unnecessary* idling and unavoidable idling due to operational requirements. Therefore, the focus of all idling-reduction initiatives should be to reduce and, ideally,

[12] Source: Fleet Challenge Best Practices Manual 2008

eliminate *unnecessary* idling and explore alternatives of limiting idling for operational purposes with solutions that do not impede operations but offer environmental and economic benefits.

Idling Reduction Devices

There are several idling-reduction technologies available that can aid in idle reduction, including auxiliary power units, start/stops devices etc. Their functionality, potential, and costs vary considerably. Installation should always be accompanied by behavioural solutions of driver training and motivation to reap the most benefits of any idling-reduction technology.

Emissions Reduction Potential

Despite the wide selection of idling reduction solutions, when it comes to internal combustion engines, no technology eliminates CO_2 and other emissions. Only battery-electric and hydrogen fuel cell vehicle technologies can eliminate tailpipe emissions. Nevertheless, Idling-reduction initiatives can help reduce unnecessary idling in the short and medium-term and as a segue to a gradual transition to electric trucks and, potentially, hydrogen fuel cells in the long run.

8. Conclusion

As described in this report, Toronto Hydro Fleet Services has made significant progress by tracking its key performance indicators and taking corrective actions over the past years. However, by building on its successful track record to date, even higher performance levels may be possible by adding several key performance indicators to ensure continuous improvement.

Year Over Year Financial Results

EBITDA Margin as a % of Assets

Toronto Hydro-Electric System Limited
EB-2023-0195
Interrogatory Responses
1B-SEC-5
Appendix J
UPDATED: March 26, 2024
(3 Pages)



Year Over Year Financial Results

EBITDA Margin as a % of Revenues



Privileged & Confidential

Content prepared by Mercer at the request of Management

Year Over Year Financial Results

EBITDA to Customer Ratio



Privileged & Confidential

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-6

Reference: Exhibit 1B

Please provide a copy of all budget guidance documents that were issued regarding the budgets that underlie the application.

RESPONSE:

Please refer to Toronto Hydro's response to 1A-CCC-3.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-7

Reference: [Ex.1B]

QUESTION:

Please provide summaries of all internal audit reports conducted since 2020, related to any aspect that directly or indirectly relates to Toronto Hydro's business, their findings, recommendations, and the status of any actions that have or are to be taken.

RESPONSE:

Please refer to the attached appendix.

Insight: 29 reports were issued between 2020 and 2024 (February 2024), including 209 observations. 150 are remediated and 59 are unremediated but on track for timely completion.

Summary of Internal Audit Findings since 2020 with Status of Actions Taken by Management

Report Issue Date	Internal Audit Report Name	Title of Observation	Summary of Observation	Remediation Status	Agreed Completion Date
07-May-20	Information Technology General Controls - 2020	Documentation of changes to IT Incidents	Changes, including delays and priorities, are not formally documented to ensure that IT incidents are resolved in a timely manner	**Completed**	31-Jan-21
07-May-20	Information Technology General Controls - 2020	Monitoring of application security logs	User application logs, pertaining to key applications, in some instances are not formally monitored by the Information Security Team using an appropriate monitoring application to ensure that security threats (such as unauthorized access) are identified and resolved on a timely basis	**In-Progress**	30-Sep-24
07-May-20	Information Technology General Controls - 2020	Password policy compliance	Password configurations for the Operational Data Store (ODS) application and MV90 database do not fully comply with Toronto Hydro password policies	**Completed**	30-Sep-23
07-May-20	Information Technology General Controls - 2020	Review of information security policy, standards and guidelines	IT Standards and Guidelines, in one instance, was not formally reviewed and signed off to ensure that published versions used by Toronto Hydro personnel are accurate and appropriately approved	**Completed**	30-Jun-21
07-May-20	Information Technology General Controls - 2020	Review of third-party Connexo database controls	Third party controls over the Connexo database, used to store hydro consumption data, are not being formally reviewed to ensure compliance with Toronto Hydro standards	**Completed**	30-Jun-21
07-May-20	Information Technology General Controls - 2020	SAP configuration change management	An opportunity exists to formalize the documentation and approval process for configuration changes, involving the locking and unlocking of the SAP production environment	**Completed**	30-Jun-21
31-Jul-20	IESO Settlement	IESO Invoice Review and Payment Approval	An opportunity exists to streamline and enhance the effectiveness of the IESO invoice review and payment approval process by incorporating high level analysis and insights to support the accuracy of the IESO invoice	**Completed**	31-Dec-20
31-Jul-20	IESO Settlement	Meter Data Review	The daily review of meter data accuracy does not currently include a completeness review to ensure that all grid supply point (GSP) meters are part of the review for load accuracy and reasonability	**Completed**	30-Sep-20
31-Jul-20	IESO Settlement	Purchase Load Completeness Reconciliation	The completeness of the monthly IESO purchase load is not validated by reconciling the total meters included within our monthly purchase load records to the total meters within the IESO records	**Completed**	30-Sep-20
31-Jul-20	IESO Settlement	Timeliness of Journal Entry Reviews	Monthly journal entries pertaining to the cost of power are not in all cases reviewed on a timely basis and the Accounting Policy does not define the deadline for the approval of standard journal entries	**Completed**	31-Dec-20
31-Jul-20	IESO Settlement	IESO Submission Review	Regulatory reporting activities pertaining to the monthly wholesale settlement submissions are not formally and independently reviewed prior to online submission to the IESO	**Completed**	5-Jun-20
31-Jul-20	IESO Settlement	IESO Website Access	Access, for approved Toronto Hydro personnel to login and submit regulatory reporting information to the IESO website, is not reviewed on a periodic basis in accordance with the IESO Market Participant Control Considerations	**Completed**	31-Jul-20
31-Jul-20	IESO Settlement	Monitoring Conservation Demand Management Claims and Receipts	Conservation Demand Management (CDM) claims and receipts from the IESO that are recorded within our financial records are not reconciled on a periodic (ie monthly) basis to ensure timely detection of misalignment requiring investigation	**Completed**	30-Sep-20
31-Jul-20	IESO Settlement	Process Map and Standard Operating Procedures	End-to-End documentation of process maps and standard operating procedures (SOP's) including internal controls are not formally documented	**Completed**	31-Dec-20
31-Jul-20	IESO Settlement	Review of System and Organization Controls (SOC) Report for IESO	IESO's System and Organization Controls (SOC) report is not reviewed to ensure reliance on IESO's control environment is appropriate	**Completed**	31-Dec-22
04-Aug-20	Ontario Cyber Security Framework Compliance	Compliance Documentation	An opportunity exists to establish a more structured and robust work program to ensure consistency, sufficiency and completeness of the documentation supporting compliance with the Ontario Cyber Security Framework	**Completed**	30-Sep-22
04-Aug-20	Ontario Cyber Security Framework Compliance	External Audit Coverage	An opportunity exists to document and report external risk assessment coverage across all cyber security risk domains, including those covered through the assessment of OCSF compliance	**Completed**	31-Dec-21
04-Aug-20	Ontario Cyber Security Framework Compliance	OEB Risk Assessment Tool	An opportunity exists to supplement Toronto Hydro internal Cyber Security risk assessment by utilizing the OEB recommended Inherent Risk Profile Tool to ensure that TH's risk assessment results are determined based on standardized criteria that can be compared with external benchmarks from other local distribution companies	**Completed**	24-Jun-20
04-Aug-20	Ontario Cyber Security Framework Compliance	Residual Risk Assessment	An opportunity exists to perform the residual risk assessment, as recommended by the Ontario Cyber Security Framework, to ensure that the residual risks after controls are appropriately managed	**Completed**	30-Sep-22
07-Aug-20	Employee Travel and Expense	Expense Auditing Methodology	An opportunity exists to assess if a risk-based sampling methodology can more efficiently reduce the residual risk of an inappropriate expense claim to an acceptable level	**Completed**	31-Dec-22

Summary of Internal Audit Findings since 2020 with Status of Actions Taken by Management

Report Issue Date	Internal Audit Report Name	Title of Observation	Summary of Observation	Remediation Status	Agreed Completion Date
07-Aug-20	Employee Travel and Expense	Manager review effectiveness	Employees are submitting a significant volume of reports containing errors and their Leaders are not consistently performing an effective review of their expense reports to ensure that these errors are detected and prevented	**Completed**	30-Apr-21
07-Aug-20	Employee Travel and Expense	Reporting and scorecarding of non-compliance with Expense Reimbursement Policy	Opportunity exists to improve the effectiveness of the existing non-compliance reporting process	**Completed**	31-Jan-21
07-Aug-20	Employee Travel and Expense	Sensitive T&E access	Access to perform highly sensitive T&E SAP transactions has not been appropriately restricted	**Completed**	31-Jan-21
07-Aug-20	Employee Travel and Expense	Standard Operating Procedures	Standard Operating Procedures (SOPs) are not reviewed and updated on timely basis	**Completed**	31-Mar-21
19-Nov-20	Engineering, Capital Planning & Execution - Phase 1	Access to Capital Planning and Budgeting files	Access to key capital planning and budgeting files (eg Capital Model, Capex Budget, etc) is not appropriately restricted to ensure that only authorised personnel have read/write access	**Completed**	31-Dec-20
19-Nov-20	Engineering, Capital Planning & Execution - Phase 1	Process Map and Standard Operating Procedures	End-to-End documentation of process maps and standard operating procedures (SOP's) are not formally documented	**Completed**	31-Dec-20
19-Nov-20	Engineering, Capital Planning & Execution - Phase 1	Reporting Root Causes for Change Requests	An opportunity exists to enhance the existing review process for the key budgetary documents including the Capital Expenditure Budget, In-Service Additions Budget and Capital Model	**Completed**	31-Dec-20
01-Feb-21	Data Loss Prevention	Information Classification Guidelines and Handling Procedures	Guidelines and information handling procedures to support the implementation of the Information Classification Policy have not been developed to ensure that all applicable Toronto Hydro users of information have sufficient awareness and practical guidance required to classify, transmit and store sensitive information in accordance with the policy	**Completed**	30-Jun-22
01-Feb-21	Data Loss Prevention	Third-Party DLP Awareness Program	Opportunities exist for the development of a third-party contractor DLP awareness program to ensure that third-party contractors (ie all vendors with access to our systems and/or handling our sensitive and confidential data) are aware of our requirements and expectations	**Completed**	31-Dec-22
01-Feb-21	Data Loss Prevention	Access to TH Facilities	Access to different parts of the TH facilities including data centers are not reviewed for adequacy, especially for employees who moved within Toronto Hydro organizational structure	**Completed**	31-Dec-21
01-Feb-21	Data Loss Prevention	Change Management for DLP Application	An opportunity exists to formalize the change management governance procedures for McAfee DLP application to address the confidentiality of data and configurations	**Completed**	30-Sep-21
01-Feb-21	Data Loss Prevention	Information Uploads through Cloud Services	Uploads to third party emails (eg Gmail) and cloud storage websites (eg Google Drive) are monitored but not blocked	**Completed**	31-Dec-22
01-Feb-21	Data Loss Prevention	Periodic Review of DLP Rulesets	An opportunity exists to formalize the periodic review procedures of DLP rulesets, including who, when and how the review is performed and documented	**Completed**	31-Dec-21
01-Feb-21	Data Loss Prevention	Retention and Disposal of Data stored by DLP Application	An opportunity exists to define and document the records retention period for data collected by the DLP Monitor application, which is used to scan the majority of data transmitted externally from within Toronto Hydro	**Completed**	31-Dec-21
01-Feb-21	Data Loss Prevention	Review of SOPs and Project Documents	An opportunity exists to review key documents such as the Standard Operating Procedures, Operational Project Documents and Incident Response Playbook(s) to ensure that the most recent versions, being used by personnel, are accurate and appropriately approved	**Completed**	30-Sep-21
01-Feb-21	Information Technology General Controls - 2021	Formalizing the Review and Reporting of Vulnerability Assessment Reports	Timely vulnerability remediation activities are being performed and documented, however monthly Vulnerability Assessment reports are not being formally prepared, reviewed and reported in compliance with the Vulnerability Management Standard	**Completed**	30-Nov-21
01-Feb-21	Information Technology General Controls - 2021	Additional Financial System Backups	Additional financial system's backups (ie an additional backup on top of the full back performed weekly) are not being performed on an annual basis in compliance with Toronto Hydro's Backup policy	**Completed**	30-Sep-21
01-Feb-21	Information Technology General Controls - 2021	Obsolete Guidance	A process that ensures timely decommissioning of obsolete system architecture standards and guidelines, stored on PluggedIn, has not been established	**Completed**	31-Dec-21
01-Feb-21	SCADA	Information Classification Guidelines and Handling Procedures (Remediation in progress)	Guidelines and information handling procedures to support the implementation of the Information Classification Policy have not been developed to ensure that all applicable Toronto Hydro users of information have sufficient awareness and practical guidance required to classify, transmit and store sensitive information in accordance with the policy	**Completed**	30-Jun-22
30-Jul-21	Unbilled Revenue	Journal Entry & Account Reconciliation Review	The journal entry and account reconciliation review controls did not prevent recording errors of Ontario Electricity Rebate (OER) reimbursements from the IESO that resulted in misclassifications between account receivable accounts (ie accounts receivable and unbilled revenue receivables) during Q2 and Q3 2020	**Completed**	30-Jun-21

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Report Issue Date	Internal Audit Report Name	Title of Observation	Summary of Observation	Remediation Status	Agreed Completion Date
30-Jul-21	Unbilled Revenue	Unbilled Revenue Accrual Analysis	An opportunity exists to further substantiate the reasonability of the unbilled revenue accrual, determined by the Electricity Revenue Application, with a more robust analysis including the comparison of the estimated accrual to the subsequent actual billings	**Completed**	31-Dec-22
30-Jul-21	Unbilled Revenue	Unbilled Revenue Accrual Methodology	The methodology for calculating the unbilled revenue accrual, which varies across the electrical utility sector, is not periodically reviewed with a pre-defined frequency (eg annually or bi-annually) to ensure ongoing alignment with best and leading practices	**Completed**	31-Dec-22
30-Jul-21	Unbilled Revenue	Process Map and Standard Operating Procedures	End-to-End documentation of process maps and standard operating procedures (SOP's) including internal controls are not being maintained on a pre-defined frequency	**Completed**	31-Dec-22
30-Jul-21	Unbilled Revenue	Rate Change Assessment Documentation	Changes to rates in the CC&B billing system are reviewed for potential impacts to the unbilled revenue accrual according to Management, however the change assessment impacts are not documented in instances where rate changes are determined to have no impact	**Completed**	30-Sep-21
30-Jul-21	Unbilled Revenue	Retention and Disposal of Data Stored in ERA	An opportunity exists to define and document the records retention period for data collected in ERA	**Completed**	31-Dec-22
30-Jul-21	Unbilled Revenue	System Reconciliation Documentation	The ERA, used to calculate the Unbilled Revenue Accrual, relies on data from the billing system (CC&B), however management has not established a process to evidence the pre-existing monthly completion and review of the system reconciliation	**Completed**	30-Sep-21
05-Nov-21	Customer Billing	Documentation of Process Map and Standard Operating Procedures	End-to-end documentation of operational process maps) and Standard Operating procedures, including internal controls, are not being adequately documented, reviewed and maintained	**Completed**	31-Dec-22
05-Nov-21	Customer Billing	Review of Customer Communication Templates	Customer Letters pertaining to the applicability of the Ontario Energy Rebate and rate pricing options (ie time of use vs fixed rate) were not effectively reviewed prior to distribution and in some circumstances, the letters contained errors	**Completed**	31-Jan-22
05-Nov-21	Customer Billing	Third Party Control Reliance	Reliance is placed on third party vendors for bill processing in Toronto Hydro's CC&B Billing system and for printing customer hydro bills, however the third-party vendors' controls are not validated (via SOC 2 third party control report, control testing or periodic audit) on a predefined basis to ensure that reliance is appropriate	**Completed**	30-Aug-22
05-Nov-21	Customer Billing	Bill Adjustment Approval Access	Access to approve manual billing adjustments (including refunds) in CC&B has not been appropriately restricted	**Completed**	31-Dec-21
05-Nov-21	Customer Billing	Documentation of Billing Quality Assurance Monitoring	The Revenue Assurance and Compliance team performs quality assurance monitoring of Customer Bills on a monthly basis, however the results of expanded sampling, which are performed when exceptions are noted in the original sample, are not documented or included within the internal scorecard metric for billing accuracy	**Completed**	31-May-22
05-Nov-21	Customer Billing	Refund Adjustment Review	In some instances, the monthly review of refund adjustments below $2K is not completed within the control timeline and in some instances the review and approval of the refund adjustment is not documented in an unalterable format by the Supervisor, Accounts Receivable	**Completed**	31-Dec-21
05-Nov-21	SAP Security 2021	Access to development functionality	Access to sensitive development functions are not restricted to authorized personnel	**Completed**	30-Apr-22
05-Nov-21	SAP Security 2021	Firefighter access roles	Access within the Firefighter role in SAP ECC is not sufficiently restricted as it includes more sensitive administrative functions than required	**Completed**	30-Apr-22
05-Nov-21	SAP Security 2021	Access reviews of SAP ECC	Access to Supervisors and above is not included in the annual access review of SAP ECC	**Completed**	31-Jul-22
05-Nov-21	SAP Security 2021	Access reviews of SAP non-ECC systems	An opportunity exists to formalize the documentation for periodic review of access in non-ECC systems to ensure reviews are consistently performed	**Completed**	31-Dec-22
05-Nov-21	SAP Security 2021	Custom program access control	Custom programs & transaction codes in the SAP production environment, some of which may provide user access to update critical financial data and transactions (eg posting journal entries), are not appropriately secured using authorization checks to prevent execution by unauthorized users	**Completed**	31-Oct-22
05-Nov-21	SAP Security 2021	Review of Firefighter access logs	Review evidence of Firefighter access logs, which shows how sensitive access is used by authorized users, is not formally documented	**Completed**	31-Jul-22
05-Nov-21	SAP Security 2021	Review of SOPs	An opportunity exists to review Standard Operating Procedures (SOPs) to ensure that the most recent versions, being used by personnel, are accurate and appropriately approved	**Completed**	31-Jul-22

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Report Issue Date	Internal Audit Report Name	Title of Observation	Summary of Observation	Remediation Status	Agreed Completion Date
05-Nov-21	Software Licensing	IT Software Procurement Guidance	The Procurement Policy provides guidance on IT software purchases greater than $25K, however, guidance for IT software purchases below $25K are not documented within the policy to ensure awareness of the requisite stakeholder workflow and process requirements (eg Review and approval of cloud-based solutions prior to contractual agreements)	**Completed**	30-Apr-22
05-Nov-21	Software Licensing	Software Request Intake and Documentation	In some cases, software requests are not being routed & tracked through the requisite centralized Remedy service ticketing system or being appropriately supported with the required software request scoping document template	**Completed**	31-Mar-22
05-Nov-21	Software Licensing	License Monitoring Program	Guidelines for Toronto Hydro's Licence Monitoring Program are not formally documented to clearly define the program parameters	**Completed**	31-May-22
05-Nov-21	Software Licensing	Software Cost Reporting	OPEX software costs are not tracked and monitored by business cost center or division to ensure cost awareness and collaborative efforts to monitor and control software costs	**Completed**	31-Aug-22
05-Nov-21	Software Licensing	Documentation of Process Maps	Process maps for business case and scoping document (the evaluation method for software requisitioning) are formally documented but do not reflect the current approval processes by the Center of Excellence and IT Senior Leadership	**Completed**	31-Mar-22
05-Nov-21	Software Licensing	Review of Service Request Management Guideline	Evidence of review and approval of the Service Request Management Guideline is not documented and retained	**Completed**	31-Oct-21
05-Nov-21	Software Licensing	Software Cost for Desktop Applications	Business cost center owners are not informed of individual software costs when approving the software access requisitions for desktop apps within Remedy IT ticketing system	**Completed**	31-Dec-21
05-Nov-21	Software Licensing	Software Utilization Review Documentation	Review of software licence utilization, which ensures that purchased software licences are being appropriately deployed and used, are in some cases not formally documented, including sign-off and dating	**Completed**	31-Mar-22
24-Mar-22	Customer Connections	Administrative Duties Management (Design & Billing)	Especially in the absence of an end-to-end integrated customer connection system, administrative duties and related processes within the Designer role require greater levels of diligence, timely execution and management oversight as they are substantially impacting all other downstream processes within the Customer Connection process	**Completed**	31-Dec-22
24-Mar-22	Customer Connections	Backlogged Customer Connection Requests (Intake & Design)	Customer Connection requests, pertaining to low and high voltage connections that are forwarded from Intake to the Design team for triage, are backlogged as they are not consistently being allocated to individual designers by the Design Supervisors (ie for high voltage) and Design Student (ie for low voltage) on a timely basis and/or within the OEB prescribed timelines	**Completed**	31-Dec-22
24-Mar-22	Customer Connections	CC&B Data Input and Integrity (Reporting)	Customer connection data (eg disconnection and connection dates, customer service request dates, etc) is not being consistently entered into the CC&B Billing system by the Office Administration Team on a timely basis as the operational data is not consistently communicated to them by Designers on a timely basis	**Completed**	30-Jun-22
24-Mar-22	Customer Connections	Green Construction Folders (Construction)	Green Construction Folders, which are used to maintain accurate site drawings and hydro asset locations in the GEAR System, are not consistently returned to the Enterprise Program Management Office (EPMO) group upon completion of customer connections projects	**Completed**	31-Jul-22
24-Mar-22	Customer Connections	Intake Process Bypass (Intake)	Complete and accurate records of all customer connection intake requests, required for end-to-end tracking of customer connection projects, are not being maintained in the CC&B system as the intake process is being bypassed in some instances (eg Direct Designer contact by customers instead of call center/online connection requests)	**Completed**	30-Jun-22
24-Mar-22	Customer Connections	System Alignment and Integration (Reporting)	The CRM Project Management System, CC&B System, and SAP Financial Recording System, used within the Customer Connection process, are not reconciled on a predefined basis or with a sufficiently robust process to consistently facilitate optimized data flow and data accuracy within customer billing, OEB reporting, ongoing project status monitoring and financial recording	**Completed**	31-Jul-24
24-Mar-22	Customer Connections	Customer Connection Estimate Disclosure (Design & Billing)	An opportunity exists to review, revise and standardize the documented guidance and practices for disclosing preliminary estimates to customers in advance of the review process, especially as it pertains to customer connections with higher pricing risk, such as large, material and non-routine projects	**Completed**	30-Jun-22
24-Mar-22	Customer Connections	Design Job Quotation Review for Non-OTC Connections Above 50K (Design & Billing)	The review of job quotations that do not require an OTC (eg temporary connections, isolations, demolitions, relocations, etc) is not consistently performed in accordance with the authorization level requirements with the Toronto Hydro Signing Policy for quotations above 50K	**Completed**	31-Mar-22

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24-Mar-22	Customer Connections	Design Work in Advance of Payment (Design & Billing)	Design work, in some circumstances, is performed in advance of payment received from customer without a defined process and/or documented approval for non-compliance with Toronto Hydro standards as documented within the Offer-to-Connect customer agreement	**Completed**	31-Jul-24
24-Mar-22	Customer Connections	Enhancement Work and Customer Connections (Design & Billing)	There are inconsistencies on when and how enhancement work (eg replacement of an aging transformer, asset or duct/cables) is being included in designs and on internal process forms (ie, Designer Input Form) and an opportunity exists to standardize the identification of enhancement work with the Customer Connection work	**Completed**	31-Dec-22
24-Mar-22	Customer Connections	Expanded Variance Analysis (Reporting)	There is an opportunity to expand the existing project variance analysis to periodically identify materials and labour variance trends, insights and anomalies by estimate preparer, estimate reviewer and customer over time	**Completed**	31-Dec-22
24-Mar-22	Customer Connections	Intake Channel Monitoring (Intake)	A process to track, monitor and metric customer connections by intake channel (ie online or call center) has not been established to encourage most cost-efficient channel utilization, establish baseline channel volumes ahead of the incoming improved online intake customer connection portal and identify connection requests received through unofficial channels (eg direct customer to designer contact)	**Completed**	30-Sep-22
24-Mar-22	Customer Connections	Project Variance Threshold Review (Reporting)	While customer connection projects exceeding predefined KPI thresholds are reviewed by the Enterprise Program Management Office on an annual basis, there may be an opportunity to lower/tighten the threshold and/or expand variance analysis using additional selection criteria to ensure that random coverage exists for variances outside of the predefined thresholds	**Completed**	30-May-22
24-Mar-22	Customer Connections	Regional Team Process Standardization (Design & Billing)	There is an opportunity to standardize and document the Designer and Construction team roles, responsibilities and best practices across the East, West and Central regional groups	**Completed**	31-Jul-23
24-Mar-22	Customer Connections	Regulatory Reporting of Service-level Metrics – Timely Completion of Connection Requests (Reporting)	There is an increased risk of inaccurate reporting to the OEB regarding percentage of low-voltage customer connection requests serviced within five days, due to management misinterpretations of the calculation inclusions (ie disconnections were incorrectly included within the calculations) which flowed into the review process	**Completed**	28-Feb-21
24-Mar-22	Customer Connections	Regulatory Reporting of Service-level Metrics – Timely Written Responses to Customer Enquiries and Appointment Scheduling (Reporting)	There is an increased risk of inaccurate reporting to the OEB due to inconsistencies in the methodology of metrics measuring the timeliness of responses to customer enquiries and booking of customer appointments	**Completed**	30-Jun-22
24-Mar-22	Customer Connections	Capital Contribution Rebates from Customers Connected to Assets Previously Expanded (Design & Billing)	There is no process established to identify capital contribution rebates to be collected from customers with Short Form Offers to Connect (OTC) who are being connected to an asset that was previously expanded through a pre-existing OTC	**Completed**	31-Dec-22
24-Mar-22	Customer Connections	Designer Input Form Review (Design & Billing)	A process to review and sign-off the Designer Input Form, the data of which is used to calculate design estimates, capital contributions and expansion deposits, has not been established	**Completed**	31-Jan-23
24-Mar-22	Customer Connections	Payment Instructions (Design & Billing)	An opportunity exists to revise the payment instructions, sent to Connection Customers along with their invoice, to explicitly limit cash payments to situations only allowed under OEB's Distribution System Code, and discourage cash payments	**Completed**	30-Sep-22
24-Mar-22	Customer Connections	Upstream Prerequisites Facilitating Automated Project Variance Analysis (Design & Billing)	The automation of Project Variance Calculations within SAP requires manual intervention to perform as Design Supervisors are not consistently inputting their paper-based customer connection estimate approvals into SAP, which is a prerequisite for the automation of the project variance calculations	**Completed**	31-Dec-22
24-Mar-22	Customer Connections	Work Allocation & Rotation (Design & Billing)	A standardized methodology for allocating design work and work rotation has not been established to ensure that design work is appropriately assigned and that customer familiarity risks are managed and mitigated	**Completed**	31-Dec-22
14-Apr-22	Information Technology General Controls - 2022	Access Approval for New Hires	In some cases, System Access for new hires is not being approved within the Remedy IT Service Ticketing System by the appropriate level of management, as required by the Internal Access Control Standard	**Completed**	30-Jun-22
14-Apr-22	Information Technology General Controls - 2022	Periodic review of Policies, Guidelines and Standards	Information Technology policies, guidelines and standards are not being reviewed within a defined timeline	**Completed**	31-Dec-22
22-Aug-22	Employee Travel and Expense 2022	Expense Auditing Methodology and Duplicate Expense Claim	An opportunity exists to assess if a risk-based sampling methodology can more efficiently reduce the residual risk of an inappropriate expense claim to an acceptable level and to automate the controls for detecting and preventing duplicate T&E claims	**Completed**	29-Dec-23
22-Aug-22	Employee Travel and Expense 2022	Duplicate Expense Claims	An opportunity exists to automate the controls for detecting and preventing duplicate T&E claims	**Completed**	29-Dec-23

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Report Issue Date	Internal Audit Report Name	Title of Observation	Summary of Observation	Remediation Status	Agreed Completion Date
22-Aug-22	Employee Travel and Expense 2022	Non-Compliance Reporting (Repeat Observation)	Reporting of T&E Policy non-compliances, detected and corrected through the review process, are not consistently being reported to Executives on a quarterly basis	**Completed**	31-Jan-24
22-Aug-22	Road Cut Accrual	Differentiating Permits Requiring Restoration Accruals	A process to differentiate which permits require future restoration has not been sufficiently defined and documented to ensure completeness of PM Work Orders and accruals	**Completed**	31-Dec-22
22-Aug-22	Road Cut Accrual	Post-Restoration Accrual Reversal Process	A well-defined process to initiate the road cut accrual reversals in SAP, has not been maintained to ensure all completed projects, for which all invoices have been received, are communicated by the Project Owners to Finance on a timely basis	**Completed**	28-Feb-23
22-Aug-22	Road Cut Accrual	Project Ownership & Assignment	A sufficient process does not exist to ensure that all road cut restoration projects are assigned to a Project Owner upon initiation or to ensure that projects are reassigned in the event of change (ie employee turnover)	**Completed**	31-Dec-22
22-Aug-22	Road Cut Accrual	Reconciliation of Operational and Financial Records	Operational records of road cuts, which trigger the liability for restoration, are not formally reconciled to the road cut accruals recorded in SAP on a predefined frequency, to ensure completeness of the road cut accrual	**Completed**	31-Jan-23
22-Aug-22	Road Cut Accrual	Reconciliation of Toronto Hydro and City Permit Records	Reconciliations, comparing Toronto Hydro's permit records with the City's permit records, are not performed on a predefined frequency, to ensure all road cut permits are tracked and recorded on a timely basis	**Completed**	31-Dec-22
22-Aug-22	Road Cut Accrual	Road Cut Accrual Aging Analysis	A road cut accrual aging analysis has not been established to ensure long-outstanding accruals are identified, monitored and reviewed on a predefined frequency as required by TH policy	**Completed**	31-Oct-22
22-Aug-22	Road Cut Accrual	Timely Execution & Monitoring of Road Cut Restorations	Road cut restorations are not monitored for timely completion or to ensure compliance with the two-year permit deadline	**Completed**	31-Mar-23
22-Aug-22	Road Cut Accrual	Accrual Recording Process	There is an opportunity to increase the auditability, audit trail and transparency associated with road cut recording in SAP by aligning the process for accrual setup and reversal (ie either at the permit or accrual level)	**Completed**	30-Apr-23
22-Aug-22	Road Cut Accrual	Customer Enquiry Process	The Customer Enquiry process does not currently have a process for matching customer complaints with restoration projects and associated project owners to facilitate timely customer responses to complaints and enquiries	**Completed**	31-Dec-22
22-Aug-22	Road Cut Accrual	Management of Restorations Under Warranty	An opportunity exists to clarify the starting point for the two-year warranty period provided by Toronto Hydro (TH) to the City of Toronto for road cut restorations	**Completed**	28-Feb-23
22-Aug-22	Road Cut Accrual	Project Variance Analysis	Road restoration project variance analysis (PVA) are not performed to ensure that actual costs are reasonable when compared to budgeted (estimated) costs	**Completed**	31-Dec-23
22-Aug-22	Road Cut Accrual	Roles, Responsibilities and Process Governance Documentation	An opportunity exists to document the end-to-end road cut restoration accrual process and controls to ensure that roles and responsibilities are clearly defined	**Completed**	31-Dec-23
22-Aug-22	Warehousing and Inventory Management	Assessment of Excess and Obsolete Inventory	Opportunities exist to enhance the analysis of excess and obsolete inventory by including a slow-moving and aged inventory review	**In-Progress**	31-Mar-24
22-Aug-22	Warehousing and Inventory Management	Inventory Count Documentation	Surprise inventory counts, performed by Toronto Hydro personnel at third party (ie TOC Logistics Inc) warehouses, are not documented or performed on a predetermined minimum frequency	**Completed**	31-Dec-22
22-Aug-22	Warehousing and Inventory Management	Physical Access Review	Physical access records for Toronto Hydro warehouses are not reviewed on a predefined frequency and evidence of review is not consistently documented	**Completed**	30-Apr-22
22-Aug-22	Warehousing and Inventory Management	Purchase Requisition Change Access	Changes made to purchase requisitions by employees in the business, after Supply Chain Services has submitted purchase orders to suppliers, is not restricted in the system and a sufficient and standardized process for the business to advise Supply Chain Services of changes does not exist	**Completed**	31-Jul-23
22-Aug-22	Warehousing and Inventory Management	System Access and Segregation of Duties	Inventory system (ie Red Prairie) access provided to Warehouse Managers has not been appropriately segregated as some incompatible transactions in the system are not restricted through necessary system access controls	**Completed**	31-Jul-23
22-Aug-22	Warehousing and Inventory Management	Inventory Count Adjustment Analysis	Root-cause analysis of the inventory count adjustments is not formally documented and maintained	**Completed**	31-Jul-23
22-Aug-22	Warehousing and Inventory Management	Inventory Receipt Documentation	Inventory receipt documentation, including evidence of dated sign-off and validation of quantity received, is not being consistently performed	**Completed**	31-Jul-23
22-Aug-22	Warehousing and Inventory Management	Inventory Returns	Inventory returned to the warehouse is not consistently received into the system on a timely basis	**Completed**	31-Jul-23

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22-Aug-22	Warehousing and Inventory Management	Monitoring Purchase Order Changes	Buyers, within the Supply Chain Services team, have access to make changes to business-initiated purchase orders in emergency or time sensitive circumstances, however, no monitoring is performed to ensure changes are appropriate, approved and limited to allowable circumstances	**Completed**	31-Jul-23
22-Aug-22	Warehousing and Inventory Management	Relocated Inventory Recording	Relocation of inventory, associated with moving harness equipment for safety inspections, is not reflected in the inventory system which can compromise the accuracy of inventory counts or impact availability of inventory for shipping and/or use	**Completed**	31-Jul-23
22-Aug-22	Warehousing and Inventory Management	SAP System Access	System access to create material master data and set up re-order points in SAP has not been appropriately restricted	**Completed**	31-Mar-22
22-Aug-22	Warehousing and Inventory Management	Standard Operating Procedures	In some cases, Standard Operating Procedures are not formally documented, reviewed and updated on timely basis	**Completed**	31-Jul-23
22-Aug-22	Warehousing and Inventory Management	Warehousing Rate Agreement	The agreement with the third-party inventory provider (TOC Logistics Inc) requires an amendment to reflect the current labour rates being charged to and paid by Toronto Hydro	**Completed**	30-Nov-22
29-Aug-22	Customer Connections	Intake Channel Monitoring (Intake) - New issue opened to monitor implementation of KPIs	A process to track, monitor and metric customer connections by intake channel (ie online or call center) has not been established to encourage most cost-efficient channel utilization, establish baseline channel volumes ahead of the incoming improved online intake customer connection portal and identify connection requests received through unofficial channels (eg direct customer to designer contact)	**Completed**	30-Jun-23
14-Nov-22	Entity Level Controls	Fraud Risk Assessment	A fraud risk assessment is not being performed in accordance with the entity level control requirements for the Internal Controls over Financial Reporting (ICFR)	**In-Progress**	31-Dec-24
14-Nov-22	Entity Level Controls	Tracking and Approving Control Overrides	A process to track and approve control overrides, pertaining to ICFR has not been established	**Completed**	31-Jul-23
14-Nov-22	Entity Level Controls	Code of Conduct – Employee Sign-Off Frequency	An opportunity exists to review the three-year frequency for which employees are required to review and sign-off on the Code of Conduct against the annual best practice within the Canadian Hydro Utility sector	**In-Progress**	31-Dec-25
14-Nov-22	Entity Level Controls	Defining Governance Documentation Requirements	An opportunity exists to define the documentation requirements for critical governance, including Policies and Standard Operating Procedures (SOP)	**In-Progress**	31-Dec-24
14-Nov-22	Entity Level Controls	Financial Control Impact Assessment	An opportunity exists to formally evaluate the impact of significant changes to people, process and technology on the ICFR	**Completed**	1-May-23
14-Nov-22	Entity Level Controls	Joint Fraud Committee	An opportunity exists for the Joint Fraud Committee to establish a minimum meeting frequency to ensure ongoing consideration of fraud risk management and related activities	**In-Progress**	30-Apr-24
07-Feb-23	Capital Planning & Execution	Approval for Changes to Capital Projects	Capital Project Change Requests, pertaining to project cost, scope and schedule, are not consistently submitted and approved prior to execution and / or on a timely basis	**Completed**	30-Jun-23
07-Feb-23	Capital Planning & Execution	Reporting Root Causes for Change Requests	A formal process to document and report root causes for Capital Project Change Requests (CR) has not been established, however, is required to support the precision and accuracy of capital project scoping and costing within the Capital Plan	**Completed**	30-Nov-23
07-Feb-23	Capital Planning & Execution	Capital Planning Process SOP Documentation	Some areas of the long-term and short-term capital planning process are not formally documented	**Completed**	30-Sep-23
07-Feb-23	Capital Planning & Execution	Green Construction Folders SOP Documentation	An opportunity exists to formally document the standard operating procedures for returning electronic Green Construction Folders (eGCF)	**Completed**	31-Aug-23
14-Feb-23	Advanced Metering Infrastructure Remediation Review	Tracking and Monitoring of Cyber Security Gaps	Cyber security vulnerabilities identified through externally performed cyber security assessments have not been addressed by Non-SecOps stakeholders on a timely basis	**Completed**	1-Jun-23
15-Feb-23	Software Update Process (Change Management)	System Change Approvals	In one instance a material system change was implemented in advance of approval	**Completed**	1-Jun-23
15-Feb-23	Software Update Process (Change Management)	System Change Documentation, Detection and Monitoring	An opportunity exists to supplement the manual self-reporting process, used to monitor system changes, with an automated system change detection program, to ensure that a full record of system changes is maintained and can be monitored for appropriate pre-approval and potential post-implementation review/correction	**Completed**	1-Jul-23
15-Feb-23	Software Update Process (Change Management)	Validation Procedure and Documentation Standardization	System Change Validation Procedures (ie test requirements) are not formally documented and consistently applied across the Information Technology department	**Completed**	1-Jun-23
15-Feb-23	Software Update Process (Change Management)	Escalation of Latent Changes	An opportunity exists to implement a formal process for the escalation of latent changes to senior management	**Completed**	1-Jun-23
15-Feb-23	Software Update Process (Change Management)	Risk Criteria and Review	An opportunity exists to develop objective criteria to assess the risk associated with system changes and to regularly compare the risk levels assessed by the implementer against the actual incurred risks	**Completed**	1-Jul-23

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28-Feb-23	Advanced Metering Infrastructure Remediation Review	Tracking and Monitoring of Cyber Security Gaps	Cyber security vulnerabilities identified through externally performed cyber security assessments have not been addressed by Non-SecOps stakeholders on a timely basis	**Completed**	1-Jun-23
26-Apr-23	Executive Expense Reimbursement	Expenses Posting on Toronto Hydro Website	An opportunity exists to define a reasonable timeline for posting the Executive and Board of Directors expenses on the external Toronto Hydro website	**Completed**	30-Jun-23
01-Jun-23	Capital Planning & Execution	Long-term Capital Planning Stakeholder Input Consideration (Materials Planning)	An opportunity exists to improve the long-term Investment Planning & Portfolio Reporting (IPPR) process by considering inputs from the Supply Chain Services team with respect to supply chain risks that have been elevated as a result of the pandemic	**Completed**	28-Feb-24
30-Jun-23	Customer Connections	Regional Team Process Standardization (Design & Billing)	Customer Connections & Key Account team has worked with PwC to develop formalized SOPs for customer connections processes	**In-Progress**	30-Apr-24
09-Aug-23	Customer Billing, Global Adjustment	GA Eligibility Governance (Eligibility Determination)	Sufficient governance (eg Internal Policies, Standard Operating Procedures, etc) to interpret the non-prescriptive, complex and evolving requirements of the GA, administered through the ICI program (Class A customers), have not been documented to support the accurate application of the regulation	**Completed**	31-Dec-23
09-Aug-23	Customer Billing, Global Adjustment	Load Aggregation Determination (Eligibility Determination)	Load aggregation (ie the summation of hydro load from customers with multiple accounts for the purpose of determining Class A eligibility for the GA) process and controls are not sufficiently designed and refined to identify all accounts belonging to the same customer and within the same facility	**In-Progress**	15-Apr-24
09-Aug-23	Customer Billing, Global Adjustment	Non-Interval Meters and Class A-Eligibility (Eligibility Determination)	The existing process for validating Class A eligibility does not take into consideration the OEB requirement to review and exclude non-internal meters (ie meters that do not measure when and how much consumption occurred during specific time-intervals)	**Completed**	29-Feb-24
09-Aug-23	Customer Billing, Global Adjustment	Review and Documentation of Load Aggregation (Eligibility Determination)	The algorithm programmed in Alteryx, a tool used to identify accounts in CC&B for load aggregation (ie the summation of hydro load from customers with multiple accounts for the purpose of determining Class A eligibility for the GA), has not been formally documented and reviewed to ensure that all the instances of eligible accounts for load aggregation are identified	**Completed**	29-Feb-24
09-Aug-23	Customer Billing, Global Adjustment	Review and Documentation of the Class A Eligibility Assessment Results (Eligibility Determination)	The procedures for the Class A eligibility assessment for the GA are not sufficiently defined and documented	**In-Progress**	30-Apr-24
09-Aug-23	Customer Billing, Global Adjustment	GA Billing Accuracy Review (Billing)	There is no review of GA billings for Class A customer to ensure that the individual customer billing in the new adjustment period is accurately set-up in CC&B and that the total annual value of GA is billed to the correct customers during the year	**In-Progress**	31-Aug-24
09-Aug-23	Customer Billing, Global Adjustment	Monitoring Changes in Market Participants (Billing)	Roles and responsibilities over monitoring of changes in market participants, that should be excluded from GA billing from Toronto Hydro through Class A, are not defined, assigned and formalized	**In-Progress**	31-Mar-24
09-Aug-23	Customer Billing, Global Adjustment	Review of System Billing Data Inputs (Billing) - Tracking long term action plan of physical review of Billing Data Inputs	Manual updates to Class A accounts in CC&B (ie flagging of Class A status and entry of PDF values) are not independently reviewed to ensure the accurate billing of GA charges	**In-Progress**	30-Sep-24
09-Aug-23	Customer Billing, Global Adjustment	Review of System Billing Data Inputs (Billing) - Tracking short term action plan of developing a review mechanism	Manual updates to Class A accounts in CC&B (ie flagging of Class A status and entry of PDF values) are not independently reviewed to ensure the accurate billing of GA charges	**Completed**	30-Jun-24
10-Aug-23	Payroll and Related Activities	Observation 1	For details, please refer the Payroll and Related Activities report	**In-Progress**	31-Mar-24
10-Aug-23	Payroll and Related Activities	Observation 2	For details, please refer the Payroll and Related Activities report	**Completed**	15-Jan-24
10-Aug-23	Payroll and Related Activities	Observation 3	For details, please refer the Payroll and Related Activities report	**Completed**	15-Jan-24
10-Aug-23	Payroll and Related Activities	Observation 10	For details, please refer the Payroll and Related Activities report	**Completed**	31-May-23
10-Aug-23	Payroll and Related Activities	Observation 4	For details, please refer the Payroll and Related Activities report	**Completed**	10-Nov-23
10-Aug-23	Payroll and Related Activities	Observation 5	For details, please refer the Payroll and Related Activities report	**Completed**	31-Dec-23
10-Aug-23	Payroll and Related Activities	Observation 6	For details, please refer the Payroll and Related Activities report	**Completed**	31-Dec-23
10-Aug-23	Payroll and Related Activities	Observation 7	For details, please refer the Payroll and Related Activities report	**Completed**	10-Jan-24
10-Aug-23	Payroll and Related Activities	Observation 8	For details, please refer the Payroll and Related Activities report	**Completed**	31-Dec-23
10-Aug-23	Payroll and Related Activities	Observation 9	For details, please refer the Payroll and Related Activities report	**Completed**	31-Mar-23

Summary of Internal Audit Findings since 2020 with Status of Actions Taken by Management

Report Issue Date	Internal Audit Report Name	Title of Observation	Summary of Observation	Remediation Status	Agreed Completion Date
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Documentation of General Backup Requirements	General backup procedures for protecting data contained within operational technologies (eg remote terminal units used for collecting data from electric sensors and equipment, supervisory control systems used for monitoring electric equipment activity, and intelligent electronic devices, electronic sensors used to monitor equipment function) have not been documented within the IT departments Security Standards, which is used to document their processes and procedures	**In-Progress**	30-Apr-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Documentation of Recovery Time and Recovery Point Objectives	Recovery time (i.e. the maximum acceptable amount of time that an organization is willing to wait for the recovery of its IT systems and services after a disaster or disruption) and recovery point (i.e. the maximum acceptable amount of data loss that an organization is willing to tolerate) objectives have not been documented within Toronto Hydro's Business Continuity and Recovery Plans.	**In-Progress**	30-Apr-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Pre-Configuration Backup Requirements	Data backup procedures, that precede software configuration changes, have not been documented in the IT departments Security Standards document to ensure that data contained within operational technologies can be recovered in the event of an unsuccessful software configuration change	**In-Progress**	30-Apr-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Asset Disposal and Decommissioning Management	Asset disposal and decommissioning procedures for IT/OT hardware and data storage do not include guidelines pertaining to OT assets to ensure compliance with the NIST requirements	**In-Progress**	30-Oct-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Data-in-Transit Protection	The System Development Standards document, prepared by the Security Operations team, requires improvement in its data-at-rest section and the addition of baseline data flow diagram requirements to ensure compliance with the NIST requirements	**In-Progress**	30-Oct-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Documentation of Access and Authentication Requirements	The Internal Access Control Standards document does not currently provide guidance pertaining to access parameters (eg changing default factory passwords, ongoing validation of superuser access, etc) for IP-based OT assets	**In-Progress**	30-Apr-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Identification of Asset Vulnerabilities	Asset management requirements (eg security incident response simulations, log monitoring, patch management, configuration review etc) have not been documented for OT assets to ensure that vulnerabilities are identified and anaged on a timely basis	**In-Progress**	30-Oct-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Inventory of Information Technology Systems	The inventory of information technology systems has not been documented to ensure cyber security threats from all systems is being tracked and monitored	**In-Progress**	30-Oct-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	Operational Technology Data Disposal	Procedures (eg, data sanitization and destruction, physical asset disposal, notification and communication, documentation and records etc) for the disposal and the decommissioning of data contained within OT assets have not been formally documented	**In-Progress**	30-Oct-24
07-Nov-23	Cyber Security, National Institute of Standards and Technology Compliance	System Development Life Cycle	The System Development Life Cycle (SDLC) requirements for OT assets has not been documented in accordance with NIST to ensure they are appropriately tracked, managed, utilized and protected	**In-Progress**	30-Oct-24
08-Nov-23	Accounts Receivable & Expected Credit Loss	Process Documentation – Accounts Receivable Operations (Customer Care)	Sufficient process governance has not been formally documented to support the Accounts Receivable Operations determination of the critical data inputs for the ECL calculation	**In-Progress**	15-Sep-24
08-Nov-23	Accounts Receivable & Expected Credit Loss	Approval of Inputs to Expected Credit Loss Calculations (Customer Care)	Evidence of approval of the quarterly inputs (eg, Winter Disconnection Moratorium, Arrears Payment Arrangement, write-off accruals, etc) to the ECL calculations prepared by the Accounts Receivable Operations team has not been formally retained in some instances	**Completed**	15-Dec-23
30-Dec-23	Road Cut Accrual	Roles, Responsibilities and Process Governance Documentation	An opportunity exists to document the end-to-end road cut restoration accrual process and controls to ensure that roles and responsibilities are clearly defined	**In-Progress**	30-Jun-24
20-Feb-24	Cyber Security, Cloud Storage	Cloud-Based Risk Assessments	An opportunity exists to perform risk reassessments for cloud-based applications on a pre-defined basis to enhance the existing framework which is event driven which may not sufficiently keep pace with application changes or the rapidly evolving cyber threats	**In-Progress**	31-Dec-24
20-Feb-24	Cyber Security, Cloud Storage	Vendor Cyber Security Requirements	Vendor Cyber Security requirements, as documented within Toronto Hydro's Security Checklist Template, are not being reviewed/revised on a regular basis or on a pre-defined frequency to ensure that evolving Cyber Security threats and organizational security standards are reflected in a timely manner	**In-Progress**	31-Oct-24
20-Feb-24	Cyber Security, Cloud Storage	Vendor Privacy Requirements	Vendor privacy requirements, as documented within Toronto Hydro's Privacy Checklist Template, are not being reviewed/revised on a regular basis or on a pre-defined frequency to ensure that evolving Cyber Security threats and organizational security standards are reflected on a timely basis	**In-Progress**	31-Oct-24

Summary of Internal Audit Findings since 2020 with Status of Actions Taken by Management

Report Issue Date	Internal Audit Report Name	Title of Observation	Summary of Observation	Remediation Status	Agreed Completion Date
20-Feb-24	Cyber Security, Cloud Storage	Application Change Documentation	Minor changes and updates to cloud-based applications hosted by vendors are not consistently being tracked and documented in Remedy, Toronto Hydro's service request ticketing system	**In-Progress**	31-Oct-24
20-Feb-24	Cyber Security, Cloud Storage	Data Sensitivity Assessment	An opportunity exists to enhance the effectiveness of data sensitivity assessments by implementing a systematic and periodic review process for the Data Sensitivity Questionnaire template	**In-Progress**	31-Oct-24
20-Feb-24	Cyber Security, Cloud Storage	Total Data Sensitivity Ratings	There is an opportunity to enhance Cyber Security, for all data including data hosted in cloud applications, by implementing a process to consistently review and revise all total data sensitivity ratings, which are used to describe how sensitive data is for the organization	**In-Progress**	31-Jan-25
20-Feb-24	SAP Security - 2023	Periodic Review of Standard Operating Procedures	An opportunity exists to periodically review the standard operating procedures (SOP's) for SAP security to ensure that they remain current, reflect formal approval and include the current governance requirements and best practices	**In-Progress**	30-Sep-24
20-Feb-24	SAP Security - 2023	Standard Operating Procedures for SuccessFactors	There is an opportunity to improve the existing Standard Operating Procedures for SAP SuccessFactors by ensuring that they are periodically reviewed / approved and address critical inclusions such as access management, change management and governance procedures	**In-Progress**	30-Sep-24
23-Feb-24	Miscellaneous Accounts Receivable	Centralized Cheque Intake	The absence of a formalized, well-defined, and centralized process for handling cheque receipts pertaining to MAR has led to instances of misplaced cheques that were not deposited on a timely basis, became stale dated and required replacements from customers	**In-Progress**	15-Mar-24
23-Feb-24	Miscellaneous Accounts Receivable	Key Performance Indicators (KPI's)	Effective KPI's (e.g., percentage of overdue accounts receivable, timely cheque deposit, timely unapplied payments resolution, timely clearing of customer bank deposits, aging of accounts receivable, write-off rate, etc.) have not been established (i.e., to measure the performance of MAR processes) and are not being reported to key stakeholders on an ongoing basis	**In-Progress**	15-Feb-25
23-Feb-24	Miscellaneous Accounts Receivable	Overdue Receivables Collection Process	A formal process for the collection and management of overdue receivable balances has not been established to ensure that timely action is taken to collect outstanding receivables and minimize write-offs	**In-Progress**	15-Sep-24
23-Feb-24	Miscellaneous Accounts Receivable	Resourcing and Accounting Skillsets	Sufficient resources and requisite accounting skillsets within the MAR department are not in place following personnel turnover, interim resource streamlining attempts and challenges recruiting well suited resources	**In-Progress**	15-May-24
23-Feb-24	Miscellaneous Accounts Receivable	Unapplied Payments Backlog	There is a backlog of long-outstanding unapplied payments from customers, that have accumulated between 2019 to 2023, that have not been applied against customer accounts	**In-Progress**	15-Oct-24
23-Feb-24	Miscellaneous Accounts Receivable	Uncleared Bank Receipts	There is no validation process for ensuring that bank receipts are administratively cleared (i.e., each receipt is accurately applied against a customer invoice) in the SAP system and not over or under applied	**In-Progress**	15-Oct-24
23-Feb-24	Miscellaneous Accounts Receivable	Cheque Clearing Monitoring	A process to monitor and manage customer cheque payments that do not clear has not been established to ensure accurate recording of receivables at the customer account level	**In-Progress**	15-Apr-24
23-Feb-24	Miscellaneous Accounts Receivable	Cheque Deposit Roles and Responsibilities	Roles and responsibilities pertaining to the cheque deposit process have not been appropriately defined and documented to ensure that cheques are handled by appropriate personnel and deposited and recorded on a timely basis (e.g., deposit schedule, appropriate personnel performing, vacation backups, etc.)	**In-Progress**	15-Mar-25
23-Feb-24	Miscellaneous Accounts Receivable	Cheque Deposit Slips	There are cheque payment clearing delays as a result of the use of one deposit slip for multiple cheques, which requires that all cheque payments within the same deposit be properly identified and applied before any of them can be cleared in SAP	**Completed**	21-Aug-23
23-Feb-24	Miscellaneous Accounts Receivable	Cheque Image Record Keeping	Financial records pertaining images of cheques received from customers have not been consistently retained in accordance with TH's records retention policy	**Completed**	31-May-23
23-Feb-24	Miscellaneous Accounts Receivable	Cheque Register Process	A daily cheque register process, that record all cheques received and their details (i.e., payee information, job quote, invoice number, amount, date received, cheque #, etc.) has not been established to ensure that all cheques received, at the MAR department level, are tracked, recorded and deposited on a timely basis	**Completed**	31-May-23
23-Feb-24	Miscellaneous Accounts Receivable	Cheque Register Reconciliation and Review	A cheque register reconciliation, at the MAR department level, is not being prepared and reviewed to ensure a complete and accurate record of cheques received	**In-Progress**	15-Apr-24
23-Feb-24	Miscellaneous Accounts Receivable	Cheque Safekeeping	Cheques received from customers are not consistently being safeguarded and stored in secure location to ensure they are not misplaced, lost or accessible by unauthorized personnel	**Completed**	31-May-23
23-Feb-24	Miscellaneous Accounts Receivable	Customers' Remittance Process	Customers are not complying with remittance process (e.g., not providing sufficient payment details) and an opportunity to simplify the remittance process to encourage compliance exists	**In-Progress**	15-Jan-26
23-Feb-24	Miscellaneous Accounts Receivable	Operational Stakeholder Communication	An effective two-way communication process has not been established to ensure that Operational stakeholders and the MAR group are collaborating to resolve unmatched payments on a timely basis	**In-Progress**	15-Apr-24

Summary of Internal Audit Findings since 2020 with Status of Actions Taken by Management

Report Issue Date	Internal Audit Report Name	Title of Observation	Summary of Observation	Remediation Status	Agreed Completion Date
23-Feb-24	Miscellaneous Accounts Receivable	Payment Instruction Sheet Enhancement	There is an opportunity to enhance the delivery, format and communication of the payment instructions to facilitate customer compliance (i.e., the inclusion of payment identification information to facilitate the payment matching process)	**In-Progress**	15-Dec-24
23-Feb-24	Miscellaneous Accounts Receivable	Policy Documentation and Credit Memo's	A dedicated policy has not been established to address the unique characteristics and requirements of MAR's and there is no policy guidance pertaining to non-routine / emergency type credit memos	**In-Progress**	15-Jun-25
23-Feb-24	Miscellaneous Accounts Receivable	Receivables Aging Visibility	The accounts receivable aging report, which is included within the accounts receivable account reconciliation, combines all balances greater than 120 days into one category and therefore does not provide the account reconciliation reviewer with sufficient information and visibility to perform an effective review and analysis of the account receivable balance	**In-Progress**	15-Apr-24
23-Feb-24	Miscellaneous Accounts Receivable	Substantiating Long-Outstanding Unapplied Payments	Long-outstanding unapplied payments (i.e., a customer payment that has not been posted and cleared against a customer account/invoice in SAP) within the MAR aging report, are not substantiated with documented explanations to support the reviewer with assessing the validity of aged balances and documentation to support the aged account collection follow up and/or write off process	**In-Progress**	15-Jul-24
23-Feb-24	Miscellaneous Accounts Receivable	Timely Recording of Construction Receivables	Construction service receivables are being recorded when cash/payment is received, as opposed to when payment is owed, in accordance with the accrual basis of accounting	**In-Progress**	15-Sep-24
23-Feb-24	Miscellaneous Accounts Receivable	Uncollectible Write-Offs	A process has not been established to ensure that long-outstanding balances are written off on a timely basis in accordance with the Accounts Receivable policy	**In-Progress**	15-Oct-24
23-Feb-24	Miscellaneous Accounts Receivable	Unidentified Payment Intake	A front-end process to prevent payments without adequate identifying information from being processed and deposited to avoid subsequent payment matching delays and backlogs	**In-Progress**	15-Jan-26
23-Feb-24	Miscellaneous Accounts Receivable	Unidentified Payment Resolution	Unidentified payments are not being monitored, investigated and resolved on a timely basis, resulting in a backlog of unapplied payments	**In-Progress**	15-Jun-24
23-Feb-24	Miscellaneous Accounts Receivable	Bank Counter Cash Payments	The customer payment instructions do not include a cautionary note to help prevent customers from making cash payments at the bank counter to TH bank account	**In-Progress**	15-Dec-24
23-Feb-24	Miscellaneous Accounts Receivable	Cheque Deposit Review	There is no review of the weekly cheque deposits to ensure cheques are consistently deposited to the correct Toronto Hydro entity and for the correct amounts	**In-Progress**	15-Apr-24
23-Feb-24	Miscellaneous Accounts Receivable	Customer Compliance Monitoring	The tracking and monitoring of customer adherence to payment instructions are not in place to assess the efficacy of these instructions and the front-end management of the customer remittance process	**In-Progress**	15-Jan-25
23-Feb-24	Miscellaneous Accounts Receivable	Department Governance Sustainment Process	An opportunity exists to ensure ongoing compliance and maintenance of the central governance processes (e.g. KPI's, Standard Operating Procedures, Internal Controls, etc.) by tracking and reporting on these within the Operational Status Meetings and underlying department scorecard	**In-Progress**	15-Nov-24
23-Feb-24	Miscellaneous Accounts Receivable	Standard Operating Procedures (SOP) Documentation	A comprehensive SOP or procedure manual to show the step-by-step procedure of all aspects of the end-to-end MAR process does not exist	**In-Progress**	15-May-25
23-Feb-24	Miscellaneous Accounts Receivable	System Access Alignment with Roles and Responsibilities	There is an opportunity to review MAR personnel access to ensure that it is limited to their roles and responsibilities	**In-Progress**	15-Jul-24
23-Feb-24	Miscellaneous Accounts Receivable	Training and Reference Materials	Sufficient, formal and ongoing training and reference materials for new and existing personnel has not been established to ensure that MAR activities are consistently, accurately and efficiently performed	**In-Progress**	15-Jan-25

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-8

Reference: Exhibit 1B, Tab 1, Schedule 3, Table 9

QUESTION:

Please provide the details of the $5.5 million adjustments, by program for OM&A and by USoA for Other Revenue, which were made to the 2020 approved OM&A of $272.2 million and Other Revenue of $48.1 million, to normalize for the changes related to Accounts 4375 and 4380.

RESPONSE:

It is Toronto Hydro's understanding that in the interrogatory, SEC made a typo in referring to Other Revenues approved by the OEB. Toronto Hydro's OEB approved Other Revenues for 2020 before adjustment for shared services costs was $47.8 million[1].

Toronto Hydro made changes on how shared services costs are presented in accordance with the OEB's decision[2]. As a result, shared services expenses were recorded in USoA 4380 and therefore were reclassified from OM&A to revenue offsets as required by the Account Procedures Handbook.

The adjustments to the 2020 approved OM&A of $272.2 million are summarized in Table 1 below whereas, the adjustments to the 2020 approved Other Revenue of $47.8 million are summarized in Table 2.

[1] EB-2018-0165, Toronto Hydro-Electric System Limited ("Toronto Hydro"), 2020-2024 Custom Incentive Rate-setting ("Custom IR") Application – DRO Reply Submission & DRO Update (February 12, 2020), Schedule 11
[2] EB-2018-0165, Decision and Order (December 19, 2019) at page 131.

Table 1: Adjustment to OM&A

	($ Millions)
2020 OEB Approved OM&A	$272.2
Less: Reclass to USoA 4380 from Allocation and Recoveries Program; Shared Services Segment in OM&A	($5.5)
2020 Normalized OEB Approved OM&A	**$266.7**

The OM&A related revenue requirement approved by the OEB in 2020 was $266.7 (adjusted for Account 4380). The OEB approved this amount on an envelope basis, and therefore Toronto Hydro cannot provide a further breakdown as requested.

Table 2: Adjustment to Revenue Offset

	($ Millions)
2020 OEB Approved Revenue Offsets	$47.8
Less: Reclass to USoA 4380 from Allocation and Recoveries Program; Shared Services Segment	($5.5)
2020 Normalized OEB Approved Revenue Offsets	**$42.3**

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-9

Reference: Exhibit 1B, Tab 2, Schedule 1, Page 12

With respect to Figure 1, please provide the data and underlying calculations and assumptions used.

RESPONSE:

Please see the response to interrogatory 1B-Staff-12(a) and (b) for the requested information.

For the IRM Scenario, Toronto Hydro determined the 2026-2029 revenue requirement by escalating the 2025 revenue requirement outlined in Exhibit 6 with the standard Price Cap IR parameters, namely: an inflation factor (based on a 2% forecast) minus a 0.6% X-factor. Please see the response to 1B-VECC-01 for a breakdown of the capital-related revenue under IRM.

For the CIR 1.0 scenario, Toronto Hydro determined the 2026-2029 revenue that would be collected through rates by escalating the 2025 revenue requirement (outlined in Exhibit 6 and summarized in 1B-Staff-03 at Table 1) with the Custom Price Cap Index (CPCI) approved by the OEB for the current 2020-2024 rate period, namely:

- For non-Capital Related Revenue Requirement (i.e. OM&A and Revenue Offsets) an inflation factor (based on a 2% forecast) minus a 0.6% X-factor (consistent with Price Cap IR parameters).
- For Capital Related Revenue Requirement (CRRR) (i.e. Amortization/Depreciation, Return on Equity, Interest Expense and PILS) the utility applied a 0.9% X-factor to reduce the 2026-2029 forecasted CRRR outlined in Exhibit 6.

Please see the response to interrogatory 1B-Staff-12(b) for a breakdown of the CPCI.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-10

References: EB-2018-0165, Decision and Order, p.24

Preamble

The OEB in its Decision and Order in EB-2018-0165 stated:

"The OEB notes that the Custom IR approach taken has required extensive evidence and time to consider the details provided. Toronto Hydro is encouraged to consider an alternative approach in the future that might be more efficient in establishing the revenue requirement for the base year and following years as well as meeting OEB RRF objectives, and improving the balance of risk between customers and the utility. Toronto Hydro should not assume that future panels will continue to accept Toronto Hydro's current proposed Custom IR framework."

QUESTIONS (A) – (C):

a. Did Toronto Hydro "consider an alternative approach in the future that might be more efficient in establishing the revenue requirement for the base year and following years as well as meeting OEB RRF objectives, and improving the balance of risk between customers and the utility"?
b. If the answer to part (a) is yes, please provide details including a copy of any analysis undertaken and the conclusions that Toronto Hydro drew from that analysis.
c. If the answer to part (a) is no, please explain why not.

RESPONSES (A) – (C):

Revenue requirement reflects the amount of funds that a utility needs to cover the costs of providing its services, namely: operating expenses, maintenance, debt service, and a fair return on investment for shareholders as determined by the cost of capital parameters.[1]

Toronto Hydro forecasted its 2025-2029 revenue requirement in accordance with existing approaches, prescribed rate models, and the OEB's expectations as set out in the *Renewed Regulatory Framework for Electricity Distributors ("*RRF*")* and in the *Handbook for Utility Rate Applications* ("Rate Handbook"):

- In the Custom IR method, rates are set based on a five-year forecast of a distributor's revenue requirement and sales volumes.[2]
- The Board expects that a distributor that applies under this method will file robust evidence of its cost and revenue forecasts over a five-year horizon, as well as detailed infrastructure investment plans over that same time frame.[3]
- The OEB sets just and reasonable rates based on a total revenue requirement that is informed by an assessment of a utility's spending proposals.[4]
- Historical and forecast information: Information filed in support of a rate application facilitates a thorough review of the utility's proposals and ensures continuity in the regulation of each utility over time. The filing of this information does not mean that the OEB will approve every aspect of what is filed in a rate application. The OEB assesses the utility's plans, and the resultant costs and revenue requirement, in order to consider the benefits to customers and a fair return for utilities in setting just and reasonable rates.[5]

In light of the OEB requirements summarized in the bullets above, Toronto Hydro did not explore other approaches to determining the revenue requirement. Rather, it responded to the OEB's

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[1] Ontario Energy Board, Handbook for Utility Rate Applications (October 13, 2016) at page vii ("Rate Handbook").
[2] Ontario Energy Board, *Report of the Board: Renewed Regulatory Framework for Electricity Distributors: A Performance- Based Approach* (October 18, 2012), at page 18.
[3] *Ibid* at page 19.
[4] Rate Handbook, *supra* note 1 at page 9.
[5] *Ibid* at page 6.

guidance in the 2020-2024 decision by challenging itself to innovate and evolve the custom rate framework to improve the balance of risk between customers and the utility in a way that is consistent with RRF objectives. That innovation is the Performance Incentive Mechanism (PIM) – an asymmetrical mechanism (to the benefit of customers) that shifts earnings and performance risk to the utility, ensures greater accountability to customers for outcomes, and maintains the utility's financial viability in accordance with the Fair Return Standard in providing Toronto Hydro the opportunity (*not the guarantee*) to earn the allowed rate of return by achieving target performance outcomes. For more information about how the proposed rate framework aligns with the OEB's requirements outlined in the RRF and the Rate Handbook please see Exhibit 1B, Tab 2, Schedule 2 at page 6.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-11

Reference: Exhibit 1B

For each third-party expert report filed in this proceeding, please provide a copy of a) the retainer and b) the specific instructions/direction provided to the expert regarding their work not included in the retainer.

RESPONSE:

Please see the table below. The scopes of work for each retainer are attached as appendices to the response. As noted in the March 11, 2024 cover letter accompanying the interrogatory responses, the utility is in the process of obtaining consent from the third-parties in question with respect to the disclosure and confidentiality of the underlying agreements, and will file this information an update to this interrogatory response, as soon as reasonably possible.

Table 1: Third Party Experts

Third Party Expert	Evidence	Evidence Reference	Scope of Work
Innovative Research Group	Customer Engagement Study	Exhibit 1B	App A
Clearspring Energy Advisors	Total Cost Benchmarking	Exhibit 1B	App B
	Reliability Benchmarking	Exhibit 1B	App B
UMS Group Inc.	Unit Cost Benchmarking	Exhibit 1B	App C
Scott Madden Associates	Rate Framework Review	Exhibit 1B	App D
Guidehouse	Lead/Lag Study	Exhibit 2A	App E
Concentric Advisors	Financial Useful Lives	Exhibit 2A	App F

Third Party Expert	Evidence	Evidence Reference	Scope of Work
EA Technology	Asset Condition Assessment (ACA) Review	Exhibit 2B	App G
Element Energy	Future Energy Scenarios	Exhibit 2B	App H
Gartner Consulting	IT Cost & Maturity Benchmarking	Exhibit 2B	App I
Stantec	Climate Change Vulnerability	Exhibit 2B	App J
Clearspring Energy Advisors	Load Forecast EV & DER Integration	Exhibit 3	App B
Mercer Canada	Compensation Benchmarking	Exhibit 4	App K

Agreement for Professional Consulting Services

THIS AGREEMENT is made this 22nd day of September, 2021,

BETWEEN:

Toronto Hydro-Electric System Limited,

a corporation incorporated under the laws of Ontario

(hereinafter called "Toronto Hydro")

and

Innovative Research Group Inc.,

a corporation incorporated under the laws of British Columbia

(hereinafter called the "Consultant")

WHEREAS:

A. Toronto Hydro has retained the Consultant to provide certain consulting services as detailed in SCHEDULE A (collectively, the "Services"); and

B. the Consultant has indicated to Toronto Hydro that it has the skill and expertise to provide the Services on the terms and conditions set forth herein;

NOW THEREFORE, in consideration of the mutual covenants set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. INTERPRETATION

Unless otherwise indicated, all capitalized terms in this Agreement shall be as defined in SCHEDULE B and any reference to currency in this Agreement shall refer to lawful money of Canada.

2. RELATIONSHIP OF THE PARTIES

2.1 Retainer

Toronto Hydro hereby retains the Consultant to provide the Services, and the Consultant hereby agrees to provide the Services, during the Term, in accordance with the terms and conditions of this Agreement.

2.2 Independent Contractors

(a) Notwithstanding any provision hereof, this Agreement does not constitute and shall not be construed as constituting a partnership, joint venture, principal/agency relationship, or employer/employee relationship between the parties. The Consultant and Toronto Hydro shall at all times remain independent contractors of each other, and neither party shall represent itself to be an agent or employee of the other.

(b) Without limiting the generality of paragraph 2.2(a), the Consultant hereby acknowledges and agrees that neither it nor its Representatives shall be eligible or entitled, by reason of this Agreement, to participate in any employee-related program offered by Toronto Hydro or any of its Affiliates, including, without limitation, any benefit, insurance, compensation, health plan, bonus or retirement program.

(c) The Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities or claims whatsoever against Toronto Hydro or its Representatives resulting from or relating to the Consultant or its Representatives being deemed to be an employee of Toronto Hydro or any of its Affiliates.

2.3 Conflicts of Interest

The Parties acknowledge that there is potential for a conflict of interest based on services provided by the Consultant from time to time to Toronto Hydro. The Consultant agrees to take all such steps as Toronto Hydro deems necessary, acting reasonably, to remove, mitigate or minimize such conflict of interest.

3. TERM

3.1 Term

Unless otherwise terminated in accordance with the provisions hereof, this Agreement shall be for a term commencing on September 1, 2021 and terminating on June 30, 2024 (the "**Term**").

3.2 Renewal

Toronto Hydro may, at its sole option, and upon written notice to the Consultant at least thirty (30) Business Days before the end of the Initial Term, elect to renew the Agreement for two (2) one (1) year terms on the same terms and conditions contained herein (the "Renewal Term"). The Initial Term and Renewal Term, if any, shall hereinafter together be referred to as the "Term".

4. SERVICE REQUIREMENTS

4.1 Services

During the Term, the Consultant shall perform the Services as detailed in SCHEDULE A hereto.

4.2 Applicable Laws

(a) The Consultant shall, at its sole expense, obtain and maintain during the Term of this Agreement, all permits, licences and approvals required by all Applicable Laws to perform its obligations under this Agreement. The terms and conditions of this Agreement shall be carried out in strict compliance with all Applicable Laws and in the event of any conflict between any Applicable Laws, the Applicable Laws with the most stringent standard shall apply.

(b) Without limiting the generality of the foregoing, the Consultant shall comply with the *Municipal Freedom of Information and Protection of Privacy Act* (Ontario) ("MFIPPA"), the *Personal Information Protection and Electronic Documents Act* (Canada) ("PIPEDA") and any other applicable privacy legislation (collectively, "Privacy Laws") with respect to any personal information collected, used or disclosed in connection with this Agreement and shall indemnify and hold harmless Toronto Hydro and its Representatives from and against any and all claims, demands, suits, losses, damages, causes of action, fines or judgments (including related expenses and legal costs) they may incur related to or arising out of any non-compliance therewith.

(c) Where any Deliverable is subject to the approval or review of any authority, department, government or agency other than Toronto Hydro, such applications for approval or review shall, unless otherwise authorized by Toronto Hydro in writing, be prepared by the Consultant to be approved and submitted by and through the offices of Toronto Hydro, and the Consultant shall not have any direct dealings with the authority, department, government or agency in question with regards to the Deliverable.

(d) The Consultant and the Consultant's personnel shall comply with all rules and direction of Toronto Hydro, whether specified in this Agreement or otherwise, while working on Toronto Hydro's premises or when accessing or connecting to Toronto Hydro's information technology systems, including rules and directions concerning health, safety, security and environmental protection, including without limitation, Toronto Hydro's *Code of Business Conduct*, Toronto Hydro's *Disclosure Policy*, Toronto Hydro's *Social Media and Digital Communication Guidelines*, Toronto Hydro's *Accessibility Policy*, Toronto Hydro's *Workplace Harassment Policy*, Toronto Hydro's *Violence Prevention in the Workplace Policy*, Toronto Hydro's *Alcohol and Drug Policy*, Toronto Hydro's *Environmental Policy*, Toronto Hydro's *Occupational Health & Safety Policy*, Toronto Hydro's *Physical Security* Policy, Toronto Hydro's *Privacy Policy Statement*, Toronto Hydro's *Cyber Security Policy*, Toronto Hydro's *Technology Use Guidelines*, Toronto Hydro's *Physical Security Policy*, Toronto Hydro's *COVID-19 Vaccination Policy* and the *Affiliate Relationships Code for Electricity Distributors and Transmitters* issued by the OEB (together, the "Guidelines"). The Consultant agrees to comply with and to direct its Representatives to comply with such Guidelines, as amended.

4.3 Performance

(a) The Services shall be performed to the satisfaction of Toronto Hydro, and Toronto Hydro shall have the right at all reasonable times, to inspect or otherwise review the Services

performed or being performed. The Consultant shall, upon the request of Toronto Hydro, acting reasonably, provide Toronto Hydro with written reports of the status of the Deliverables and the Consultant's progress in providing the Services.

(b) In the event of any dispute between Toronto Hydro and the Consultant relating to the quality or acceptability or rate of progress of any of the Services, or relating to the interpretation of any instructions or specifications concerning the Services, Toronto Hydro and the Consultant shall attempt to mutually reach a resolution in good faith. Failing a good faith resolution, the reasonable opinion of Toronto Hydro shall govern and be binding on the parties hereto.

5. REPRESENTATIONS, WARRANTIES, INDEMNITIES AND INSURANCE

5.1 Representations and Warranties

The Consultant hereby represents, warrants and agrees that:

(i) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has/have the necessary experience and qualifications to perform the Services;

(ii) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) will perform the Services in a diligent, expeditious and workmanlike manner, consistent with standards generally observed by reputable and competent members of the same industry providing similar services;

(iii) all Services shall be the Consultant's (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) original work and none of the Services or any invention, development, use, production, distribution or exploitation relating thereto will infringe, misappropriate or violate any intellectual property or other right of any person or entity.

5.2 Indemnity

a) The Consultant shall be liable for and shall indemnify and hold harmless Toronto Hydro and its Representatives from all claims, demands, actions, penalties, damages, losses, judgments and settlements, liabilities, costs, expenses, including legal fees and other related costs and expenses arising out of, related to, or incident to, the Consultant or any of its Representatives' performance of the Services under this Agreement, including, without limitation:

i. any breach, violation or non-performance by the Consultant or any of its Representatives of any terms, conditions, warranties, obligations or covenants contained in this Agreement;
ii. any breach or violation by the Consultant or any of its Representatives of any Applicable Laws; and
iii. any actions, omissions, negligence or wilful misconduct of the Consultant or any of its Representatives

except to the extent caused by the negligence or wilful misconduct of Toronto Hydro or its Representatives.

b) In no event shall either party be liable for loss of profit or use or for any indirect, special, incidental or consequential damages of any nature or kind including but not limited to delays, loss of revenue, loss of use, loss of data, loss of product, costs of capital or costs or replacement power, even if that party has been advised of the possibility of such damages.

c) Subject to section 5.2(d), the Consultant's liability for a claim for damages shall be limited to the amount payable by Toronto Hydro to the Consultant pursuant to this Agreement.

d) Notwithstanding the foregoing, no exclusion or limitation of liability shall apply to:

i. Breach of the confidentiality or privacy obligations in this Agreement
ii. Intentional misconduct or gross negligence;
iii. Breach of Applicable Law; or
iv. Breach of intellectual property indemnity in Section 9.

5.3 Insurance

(a) The Consultant shall, during the Term, and at its own expense, maintain and keep in full force and effect (and, when requested, provide Toronto Hydro with proof thereof):

(b) commercial general liability insurance on an occurrence basis having a minimum inclusive coverage limit, including personal injury and property damage, of not less than five million dollars ($5,000,000) per occurrence, which commercial general liability insurance shall be extended to cover contractual liability, products and completed operations liability, and owners/contractors protective liability;

(c) Automobile liability insurance on all owned and non-owned vehicles used in connection with this Agreement and such insurance coverage shall have a limit of not less than two million dollars ($2,000,000.00) per vehicle, in respect of bodily injury (including passenger hazard) and property damage inclusive of any one accident and mandatory accident benefits;

(i) Computer Security and Privacy Liability insurance covering actual or alleged acts, errors or omissions committed by the Vendor or its Representatives of not less than two million dollars ($2,000,000.00), and which shall also extend to include the intentional, fraudulent or criminal acts of the Vendor or its Representatives. The policy shall expressly provide, but not be limited to, coverage for the following perils:

i. unauthorized use/access of a computer system
ii. defense of any regulatory action involving a breach of privacy
iii. failure to protect confidential information (personal and commercial information) from disclosure notification costs, whether or not required by statute.

(d) All insurance coverages and limits required to be maintained hereunder shall: (i) be primary to any insurance maintained by Toronto Hydro, which insurance shall be excess and non-contributory; (ii) contain a cross liability clause and a severability of interest clause; and (iii) contain a thirty (30) day prior written notice to Toronto Hydro for any cancellation, non-renewal or adverse material change.

(e) The Consultant agrees that the insurance required hereunder in no way limits the Consultant's liability pursuant to the Liability and Indemnity provision in Section 5.3.

(f) A waiver of subrogation shall be provided by the insurer(s) to Toronto Hydro.

6. FEES

6.1 Fees

(a) Subject to paragraphs 6.1(c) - 6.1(f), in exchange for the performance of the Services in accordance with the terms hereof, Toronto Hydro shall pay the Consultant the rates outlined in SCHEDULE A, not including HST (the "Fee").

(b) The Fee noted in subsection 6.1(a) shall be the only fee payable by Toronto Hydro under this Agreement. Without limiting the generality of the foregoing, the Consultant hereby agrees and acknowledges that all out-of-pocket expenses, travelling costs, and other disbursements shall be at the sole expense of the Consultant, except with the prior written approval from Toronto Hydro.

(c) Any disbursements for additional incidentals incurred by the Consultant in relation to this Agreement ("Disbursements") must be pre-approved by Toronto Hydro in writing.

(d) The Consultant shall not incur or submit invoices for any work outside the scope of the Services without prior written approval from Toronto Hydro.

(e) The Consultant shall make all payment of taxes, employment insurance premiums, pension plan contributions and any other taxes or other payment of any nature, imposed by any authority in respect of the Fee paid by Toronto Hydro to the Consultant under this Agreement (together, the "Remittances"), and the Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities and claims whatsoever against Toronto Hydro or its Representatives, in any way arising out of or relating to any failure to deduct, withhold, or remit any Remittance.

(f) Without limiting the generality of paragraph 6.1(a), Toronto Hydro reserves the right to deduct any applicable non-resident withholding taxes from any Fee owing to the Consultant under this Agreement and remit such amounts to the applicable taxation authority.

6.2 Payment

The Consultant shall submit invoices to Toronto Hydro on a monthly basis containing:

(i) a description of the Services performed during the invoice period;

(ii) the monthly payment amount;

(iii) the total HST applicable to the Services during the invoice period, as well as the Consultant's HST registration number; and

(iv) a detailed description of the Disbursements incurred around the invoice period, supported by documentation in a form acceptable to Toronto Hydro.

Unless otherwise provided in this Agreement, the Consultant shall invoice Toronto Hydro after final inspection and acceptance by Toronto Hydro of the Services performed and subject to receipt of all documents required by this Agreement. **Invoices must be sent electronically to: AP@torontohydro.com.** Subject to approval of the invoice by Toronto Hydro, receipt of all documents required by this Agreement, and final review by Toronto Hydro, Toronto Hydro shall make payment to the Consultant via electronic funds transfer not later than thirty (30) days following receipt of an acceptable invoice and the EFT Information (as set out below). **The Consultant must provide Toronto Hydro with, in the case of the first payment only, (i) a void cheque, pre-printed deposit slip or bank confirmation letter and (ii) the email address where the Consultant wishes to receive remittance information (together, "EFT Information"). EFT Information must be sent electronically to efthelp@torontohydro.com or to 14 Carlton Street, Toronto, ON, M5B 1K5, Attention: Treasury Department.** Toronto Hydro reserves the right to pay the Consultant through other payment methods.

7. SUSPENSION OR TERMINATION

7.1 Suspension or Termination

(a) Toronto Hydro may, at any time during the Term by notice in writing, suspend all or a portion of the Services. Upon receipt of such written notice, the Consultant shall perform no further work other than as directed by Toronto Hydro, and shall be entitled to payment for time spent in performing the Services up to the date of suspension.

(b) Either party may terminate this Agreement immediately upon written notice where the other party enters into liquidation, whether compulsory or voluntarily, or where a proceeding in receivership, bankruptcy or insolvency has been instituted by or against such party or its property.

(c) Toronto Hydro, at its sole discretion, may terminate this Agreement immediately upon written notice where the Consultant or any of its Representatives has been in material default in the performance of its duties, obligations or undertakings under this Agreement, and has not taken immediate steps to remedy such default within two (2) Business Days following written notice of the specific default by Toronto Hydro. For the purposes of this section, a material default shall include, without limitation, a breach of any of the representations or warranties contained herein or the failure or refusal to provide the Services in accordance with the terms and conditions of this Agreement.

(d) Notwithstanding any other provision in this Agreement, Toronto Hydro, at its sole discretion, shall have the right to terminate this Agreement, for any reason, upon two (2) weeks written notice to the Consultant.

(e) In the event that this Agreement is terminated in accordance with this section 7.1 by either party, the Consultant shall be entitled to payment for time spent in performing the Services up to the date of suspension.

7.2 Effect of Termination

Upon the termination or expiration of this Agreement, upon Toronto Hydro's request, the Consultant shall return to Toronto Hydro and delete any and all electronic copies the Consultant may have of all documents and materials in its possession relating to the Services or this Agreement, including all Confidential Information and all Deliverables, whether completed or not.

8. CONFIDENTIALITY

8.1 Non-Disclosure

In performing the Services required by this Agreement, the Consultant may be provided access to Confidential Information. The Consultant acknowledges and agrees that:

(a) the Consultant shall not disclose, permit access to, transmit, or transfer the Confidential Information to any third party without the prior written authorization of Toronto Hydro;

(b) the Consultant shall protect the confidentiality of the Confidential Information in its possession by exercising the same security measures it normally exercises with respect to its own confidential information and at minimum a reasonable standard of care;

(c) upon the request of Toronto Hydro, and in any event upon the expiration or termination of this Agreement for any reason, the Consultant shall return (or delete, in the case of electronic documents) forthwith to Toronto Hydro all Confidential Information, including all copies and other materials containing the Confidential Information, which are in the possession or under the control of the Consultant; and

(d) the Consultant shall not use any Confidential Information for any purpose other than to perform the Services required by this Agreement. Without limiting the foregoing, the Consultant shall not, and shall not permit any of its Representatives to, use any Confidential Information in furtherance of its, or their, individual business or for its, or their, own benefit, profit or advantage, or for the benefit, profit or advantage of any other party.

Notwithstanding the foregoing, the Consultant may disclose such Confidential Information to any of the Representatives of the Consultant who agree to be bound by the obligations of confidentiality herein and who have a reasonable need to know such Confidential Information in the course of their duties for the Consultant but only for the purposes of the Consultant exercising its rights and obligations under this Agreement; and in the event that the Consultant believes it is required by law to disclose, or is requested by a governmental authority to disclose, any Confidential Information to a governmental authority; provided that the Consultant shall, to the extent permitted by law, first inform Toronto Hydro of the request or requirement for disclosure to allow an opportunity for Toronto Hydro to apply for an order to prohibit or restrict such disclosure.

8.2 Non-Solicitation

Unless Toronto Hydro's Chief Executive Officer provides prior written consent, the Consultant hereby covenants and agrees that during the term of this Agreement and for a period of two (2) years following the termination of the Agreement, however caused, the Consultant will not directly or indirectly, either individually or in partnership or jointly or in conjunction with any other Person,

a) hire or otherwise engage any Protected Employee who is currently employed by Toronto Hydro;

b) hire or otherwise engage any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause;

c) solicit or attempt to solicit any Protected Employee who is currently employed by Toronto Hydro or encourage any such person to leave his/her employment with Toronto Hydro; and

d) solicit or attempt to solicit any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause.

Given the unique expertise and intimate knowledge that the employees have of the operations of Toronto Hydro the Consultant acknowledges and agrees that the restrictions contained in this Subsection 8.2 are reasonable and necessary to preserve the value of Toronto Hydro's business.

9. INTELLECTUAL PROPERTY

9.1 Use

Nothing in this Agreement shall be deemed to transfer, license, assign, permit the use of, or otherwise convey an interest in whole or in part to the Consultant of any Intellectual Property belonging to Toronto Hydro or any of its Representatives or any third party whose Intellectual Property is in Toronto Hydro's custody or control, and the use by the Consultant of any such Intellectual Property shall be subject to the prior written approval of Toronto Hydro.

9.2 Ownership

Toronto Hydro shall at all times have full rights and title to the Deliverables, and may at all times take possession of or use any completed or partially completed Deliverables, notwithstanding any provision, express or implied, to the contrary. Without limiting the generality of the foregoing, Toronto Hydro shall own all Intellectual Property rights in all Deliverables, and the Consultant hereby waives and assigns to Toronto Hydro any such rights, and agrees to give Toronto Hydro and its Representatives all assistance as may be reasonably required to perfect such rights including, without limitation and where the Consultant is a corporation or partnership, obtaining waiver of moral rights from any of the Consultant's employees, partners or other Representatives.

10. HEALTH AND SAFETY

The Consultant shall be responsible for managing the health and safety of its own personnel and other Representatives. Neither Toronto Hydro, nor its Representatives, shall be liable for any loss, damages or claims arising directly or indirectly from the Consultant's access to or work in or around Toronto Hydro's facilities, and the Consultant hereby waives any claims to which it may become entitled for loss or damage and releases Toronto Hydro and its Representatives from any and all such claims.

11. MISCELLANEOUS

11.1 Survival

In addition to the terms in this Agreement that by their nature survive the expiry or termination of the Agreement, the terms of section 5 (Representations, Warranties and Indemnities), section 8 (Confidentiality), section 9 (Intellectual Property), and subsection 11.3 (Injunctive Relief) shall survive the expiry of this Agreement for a term of five (5) years.

11.2 Subcontracting

The Consultant may not subcontract the performance of any part of the Services without Toronto Hydro's prior written approval. Where Toronto Hydro provides its prior written approval to the Consultant to subcontract all or part of the Services, then the Consultant shall enter into agreements with such permitted subcontractor(s) to require the permitted subcontractor(s) to provide Services in accordance with all of the terms of this Agreement. Notwithstanding the foregoing, the Consultant shall remain liable for any and all acts or omissions of any subcontractor(s) as if such acts or omissions were those of Consultant.

11.3 Injunctive Relief

(a) The Consultant acknowledges and agrees that the terms of section 8 (Confidentiality) and section 9 (Intellectual Property) of this Agreement are reasonably necessary to protect the legitimate interests of Toronto Hydro, are reasonable in scope and duration, and are not unduly restrictive.

(b) The Consultant further acknowledges that a breach of any of the terms of section 8 (Confidentiality) or section 9 (Intellectual Property) would render irreparable harm to Toronto Hydro, and that a remedy at law for breach of these sections would be inadequate, and that Toronto Hydro shall therefore be entitled to any and all equitable relief, including, without limitation, injunctive relief, and any other remedy that may be available at law or in equity.

11.4 Force Majeure

Either party will be relieved of liability for delays in performance of its obligations hereunder where such delay is a result of Force Majeure. The party affected by the Force Majeure shall give prompt notice thereof to the other party and, upon cessation of the Force Majeure, shall take all reasonable steps to resume the performance of its obligations hereunder. If a delay in performance by reason of Force Majeure extends beyond thirty (30) Business Days, then either party may terminate this Agreement by written notice.

11.5 Non-Exclusive Agreement

This Agreement will not be interpreted to grant to the Consultant exclusive rights to provide the Services or to bind Toronto Hydro in any way to an exclusive relationship with the Consultant with regards to the Services or any other service.

11.6 Waiver

No delay on the part of either party in exercising any of its rights hereunder or failure to exercise the same, nor the acquiescence thereto shall operate as a waiver except in the specific instance for which it is given and where such waiver is provided in writing by the party waiving its rights.

11.7 Amendments

None of the terms, conditions or provisions of this Agreement shall be varied, modified or altered except by written agreement signed by an authorized representative of each parties.

11.8 Assignment

Save and except for Toronto Hydro's right to assign this Agreement to any of its Affiliates, neither party may assign this Agreement or any of their rights or obligations hereunder, without the prior written authorization of the other party, acting reasonably.

11.9 Enurement

This Agreement shall enure to the benefit of, and be binding upon, the parties hereto and their respective successors and permitted assigns.

11.10 Severability

In the event that any provision or portion of this Agreement is determined to be invalid or unenforceable for any reason, the remaining provisions or portions of this Agreement will be unaffected and will remain in full force and effect to the fullest extent permitted by law.

11.11 Neutral Construction

The parties to this Agreement agree that this Agreement was negotiated fairly between them at arm's length, that the final terms of this Agreement are the product of the parties' negotiations, and that this Agreement shall be deemed to have been jointly and equally drafted by them, and that the provisions thereof should not be construed against a party on the grounds that such party drafted the Agreement in whole or in part.

11.12 Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof. This Agreement supersedes any and all prior correspondence, warranties, covenants, collateral undertakings, or agreements, oral or otherwise, express or implied, unless otherwise contained herein.

11.13 Notices

(a) All questions or other communications regarding this Agreement, including any notices required by this Agreement, are to be addressed to the following addresses:

to Toronto Hydro:

Name:	**Richard McCluskey**
Title:	Director, Public Relations, Litigation and Privacy
Address:	14 Carlton Street, Toronto, ON M5B 1K5
Telephone:	(416) 542-7893
Email:	mmccluskey@torontohydro.com

Name:	**Hasdeep Bhatia**
Title:	Manager, Media and Public Relations

Address: 14 Carlton Street, Toronto, ON M5B 1K5
Telephone: (416) 542-3100 ext. 30463
Email: hbhatia@torontohydro.com

with copy to:

Title: EVP, Public and Regulatory Affairs & Chief Legal Officer
Address: 14 Carlton, Toronto Hydro, ON M5B 1K5
Telephone: (416) 542-3000
Email: legal@torontohydro.com

to the Consultant:

Name: **Greg Lyle**
Title: President
Address: 56 The Esplande, Suite 310, Toronto, ON M5E 1A7
Telephone: 416-642-6340
Email: glyle@innovativeresearch.ca

(b) All notices or communications shall be deemed to be received on the date of acceptance (as evidenced by the signature of the party) if delivered by personal delivery or courier, on the fifth (5th) Business Day after mailing, if mailed by first class mail, or on the first (1st) Business Day after transmission, if sent by facsimile (provided the transmission is evidenced by documented proof of proper fax transmittal).

11.14 Governing Law

This Agreement shall be governed by and construed in accordance with the law of the Province of Ontario and the laws of Canada applicable therein.

11.15 Execution

This Agreement may be signed in counterparts and delivered by electronic means, each of which shall be deemed an original and all of which, together, shall have the same effect as if all constitute one and the same Agreement.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the date first written above:

Innovative Research Group Inc.

Per: 

Name: Greg Lyle

Title: President

I have authority to bind the Consultant.

Toronto Hydro-Electric System Limited

Per: _____

Name: Amanda Klein

Title: Executive Vice President, Public and Regulatory Affairs, and Chief Legal Counsel

I have authority to bind Toronto Hydro.

SCHEDULE A

SERVICES AND RATES

1. Services to be Performed

Services may include, but are not limited to the following:

- Pre-research consultation
- Survey and script development
- Consumer-based research
- Business-to-business based research
- Stakeholder-based research
- Surveying – phone, in-person, digital, customer advisory panel
    - Raw data, tables, models, online reporting tools
- Focus groups and interviews
    - video interviews, audio files, transcripts
- Screening criteria and quota recommendations
- List procurement and data management
- Reporting
    - Data models
    - Full written reports
    - Comprehensive slide decks
    - Onsite workshop and presentations
    - Interactive reporting tools
    - Executive briefings
    - Written management summaries
    - Translation services
    - Provide expert opinion to oversight committees or boards

2. Rates

[Please see attached.]

20P-0625
SCHEDULE H – Pricing Schedule
Market Research

Company Name: Innovative Research Group Inc.

15 minute telephone survey 100 residential customers	Price (No HST)
i. Research/Strategy/Project Mgmt.	$
ii. Survey Development (Assume 45 close-ended questions)	$
iii. Field work (Assume completing 100 residential telephone interviews; includes CATI survey system programming and testing)	$
iv. List procurement (Assume telephone numbers provided by Toronto Hydro)	$
v. Data management (Assume data preparation for CATI system upload and coding and cleaning for analysis)	$
vi. Analysis and reporting (Assume statistical analysis, banner table production, report writing in MS PowerPoint)	$
vii. Presentations (breakout travel if applicable) (Assumes no travel expenses)	$
Total:	**$**
Web-based survey **100 residential customers**	
i. Research/Strategy/Project Mgmt.	$
ii. Survey Development (Assume 10 close-ended questions, as stated in the Addendum)	$
iii. Field work (Assume completing 100 residential online surveys; includes CAWI survey system programming and testing)	$
iv. List procurement (Assume email addresses provided by Toronto Hydro)	$
v. Data management (Assume data preparation for CATI system upload and coding and cleaning for analysis)	$
vi. Analysis and reporting (Assume statistical analysis, banner table production, report writing in MS PowerPoint)	$
vii. Presentations (breakout travel if applicable) (Assumes no travel expenses)	$
Total:	**$**
Online Focus group (5 residential customers from Customer Advisory Panel)	
i. Research/Strategy/Project Mgmt.	$
ii. Discussion Guide Development (Assume 90 minute focus group)	$
iii. Field work (Assume recruiting 6 participants from CAP for 5 to show)	$
iv. Participant procurement (recruited from CAP; assumes an incentive of)	$
v. Data management (list management included above under project management)	$
vi. Analysis and reporting (Assume focus group faciliation by moderator and analyst/note-taker, transcription, and report writing)	$
vii. Presentations (breakout travel if applicable) (Assumes no travel expenses)	$
Total:	**$**
In-person Focus group (5 residential customers from Customer Advisory Panel)	
i. Research/Strategy/Project Mgmt.	$
ii. Discussion Guide Development (Assume 90 minute focus group)	$
iii. Field work (Assume recruiting 6 participants from CAP for 5 to show)	$
iv. Participant procurement (recruited from CAP; assumes an incentive of + **FACILITY RENTAL COSTS**)	$
v. Data management (list management included above under project management)	$
vi. Analysis and reporting (Assume focus group faciliation by moderator and analyst/note-taker, transcription, and report writing)	$
vii. Presentations (breakout travel if applicable) (Assumes no travel expenses)	$
Total:	**$**
Online Focus group (5 small business [GS] customers from Customer Advisory Panel)	
i. Research/Strategy/Project Mgmt.	$
ii. Discussion Guide Development (Assume 90 minute focus group)	$
iii. Field work (Assume recruiting 6 participants from CAP for 5 to show)	$
iv. Participant procurement (recruited from CAP; assumes an incentive of)	$
v. Data management (list management included above under project management)	$
vi. Analysis and reporting (Assume focus group faciliation by moderator and analyst/note-taker, transcription, and report writing)	$
vii. Presentations (breakout travel if applicable) (Assumes no travel expenses)	$
Total:	**$**
In-person Focus group (5 small business [GS] customers from Customer Advisory Panel)	
i. Research/Strategy/Project Mgmt.	$
ii. Discussion Guide Development (Assume 90 minute focus group)	$
iii. Field work (Assume recruiting 6 participants from CAP for 5 to show)	$
iv. Participant procurement (recruited from CAP; assumes an incentive of + **FACILITY RENTAL COSTS**)	$
v. Data management (list management included above under project management)	$
vi. Analysis and reporting (Assume focus group faciliation by moderator and analyst/note-taker, transcription, and report writing)	$
vii. Presentations (breakout travel if applicable) (Assumes no travel expenses)	$
Total:	**$**
Evaluation Based on 5 telephone and 5 web-based surveys and 10 focus groups each year for 3 years	
5 telephone surveys per year	$
Total for 3 years	**$**
5 web-based surveys per year	$
Total for 3 years	**$**
10 focus groups per year	$
Total for 3 years	**$**

NOTES ON PRICING SURVEYS

NOTES ON PRICING FOCUS GROUPS

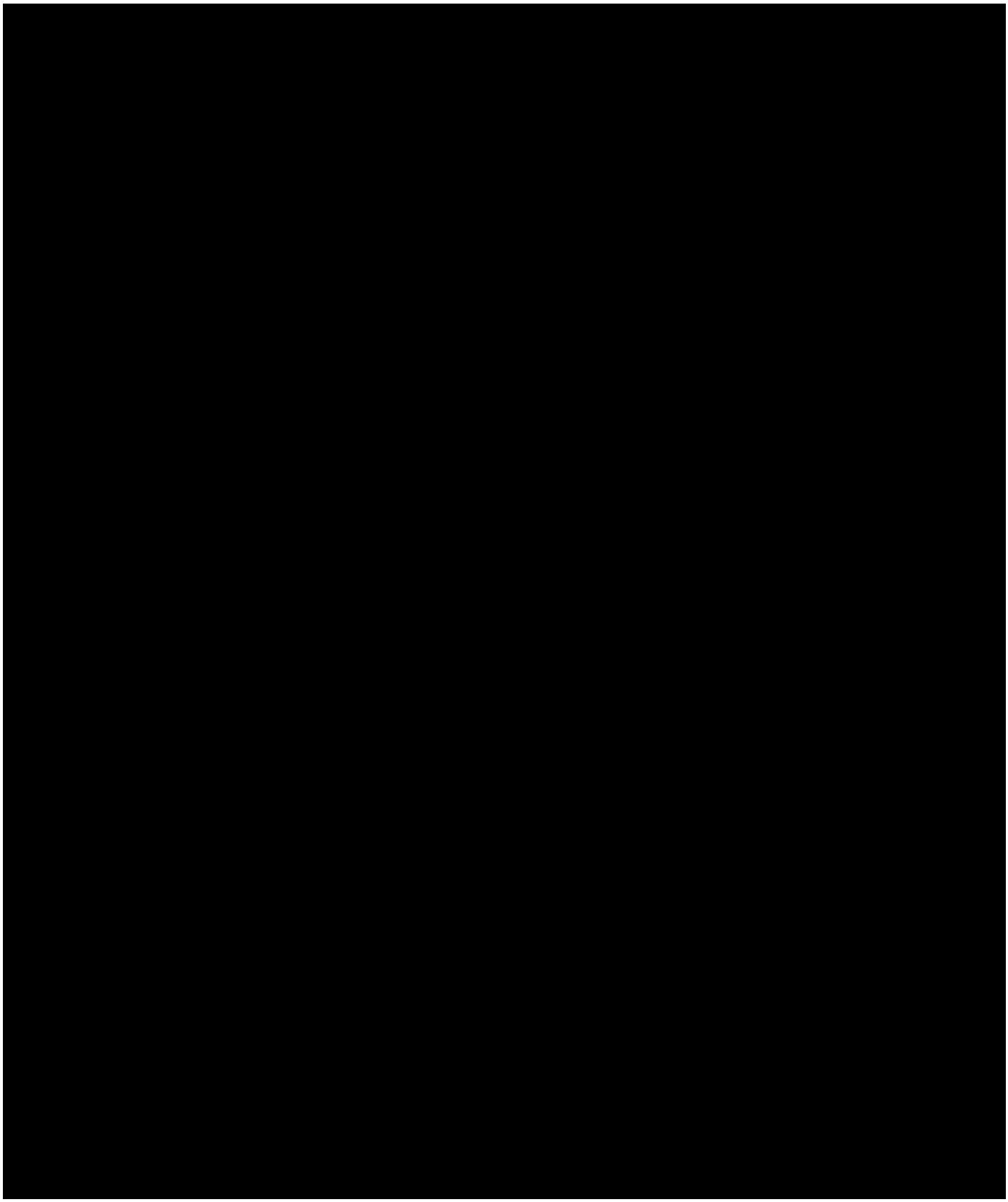
SCHEDULE B

DEFINITIONS

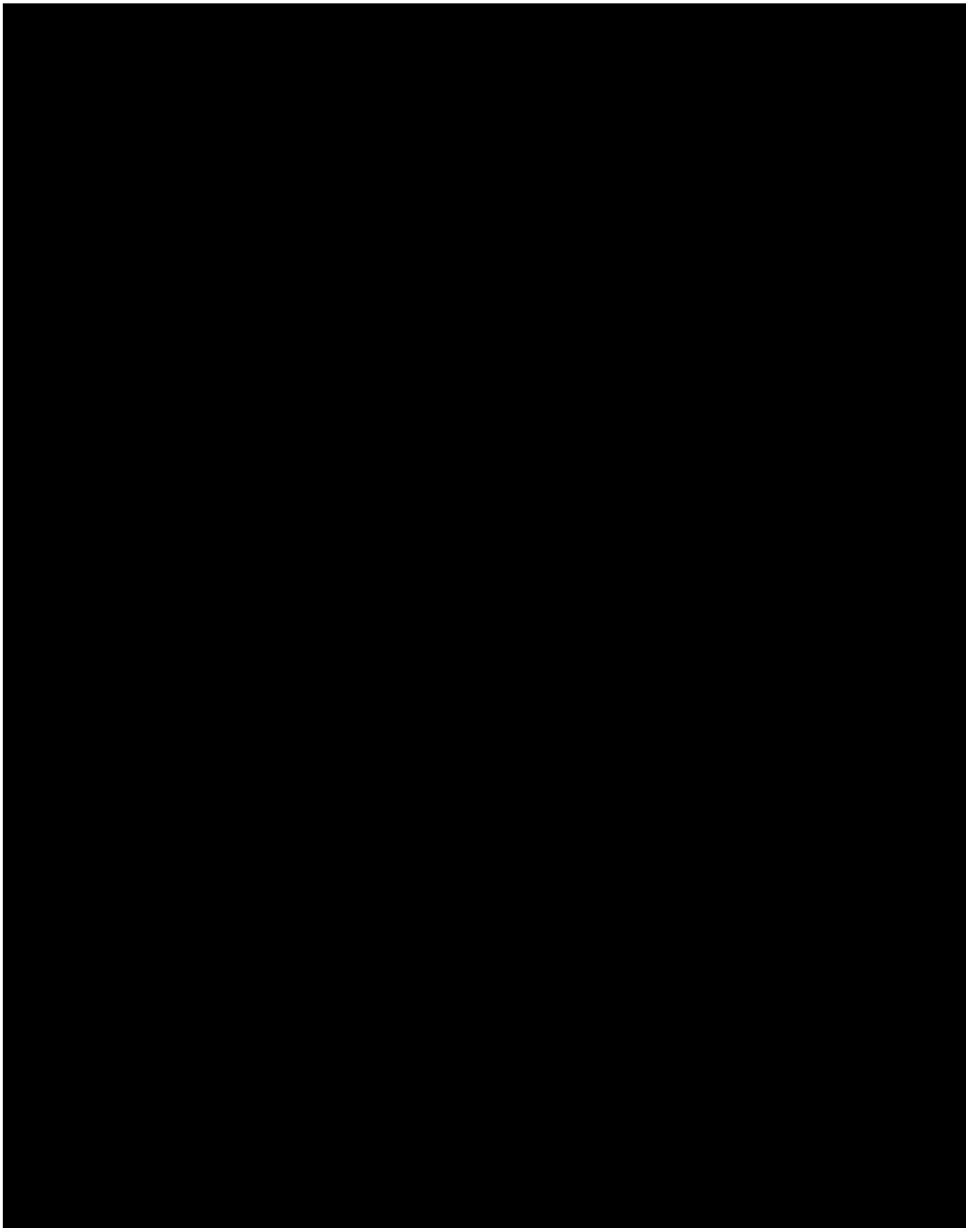
In this Agreement, the following definitions shall apply:

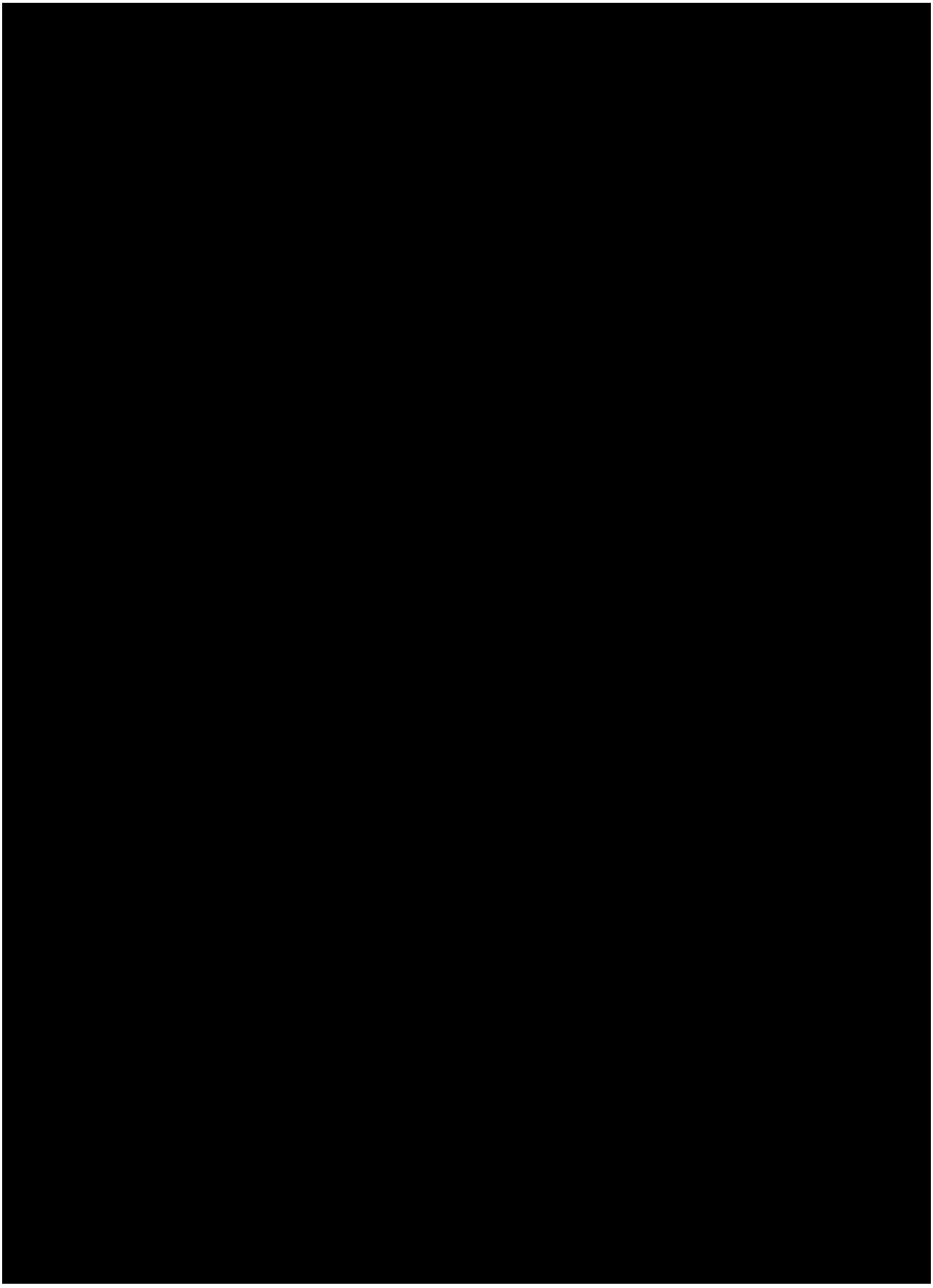
"Affiliates"	has the meaning prescribed to it in the *Business Corporations Act* of Ontario, as amended from time to time;
"Agreement"	means this Agreement for Professional Consulting Services, including all recitals, schedules and attachments thereto;
"Applicable Laws"	means all federal, provincial and municipal statutes, regulations, codes, by-laws, orders in council, directives, rules, guidelines and ordinances applicable to this Agreement, including without limitation all applicable OEB codes, rules or guidelines;
"Business Day"	means a day on which banks are open for business in the City of Toronto, Ontario, but does not include a Saturday, Sunday, or a civic or statutory holiday in the Province of Ontario;
"Confidential Information"	means the terms of this Agreement and any and all data or information relating to the business, management or affairs of Toronto Hydro, its customers, employees, or any of its Affiliates disclosed by Toronto Hydro to the Consultant pursuant to this Agreement, whether or not such Confidential Information is expressly identified as confidential. Notwithstanding the foregoing, Confidential Information does not include any information or data which: (a) information or data that is or becomes publicly known through no breach of the terms or conditions of this Agreement; (b) information or data that is independently developed without reference to Confidential Information and without breach of the terms and conditions of this Agreement; or (c) Confidential Information that is required by court order or other legal compulsion to be disclosed, in which case the Consultant shall give Toronto Hydro prior written notice of such disclosure, as permitted by law;
"Consultant"	means The Innovation Research Group Inc.;
"Deliverable"	means any and all works prepared, generated, created or designed by the Consultant pursuant to this Agreement, including without limitation all drawings, models, designs, formulae, methods, documents, reports, software, specifications, or source codes, and any related works, enhancements, modifications or additions thereto;
"Disbursements"	shall have the meaning as prescribed in paragraph 6.1(c);
"Fees"	shall have the meaning as prescribed in paragraph 6.1(a);

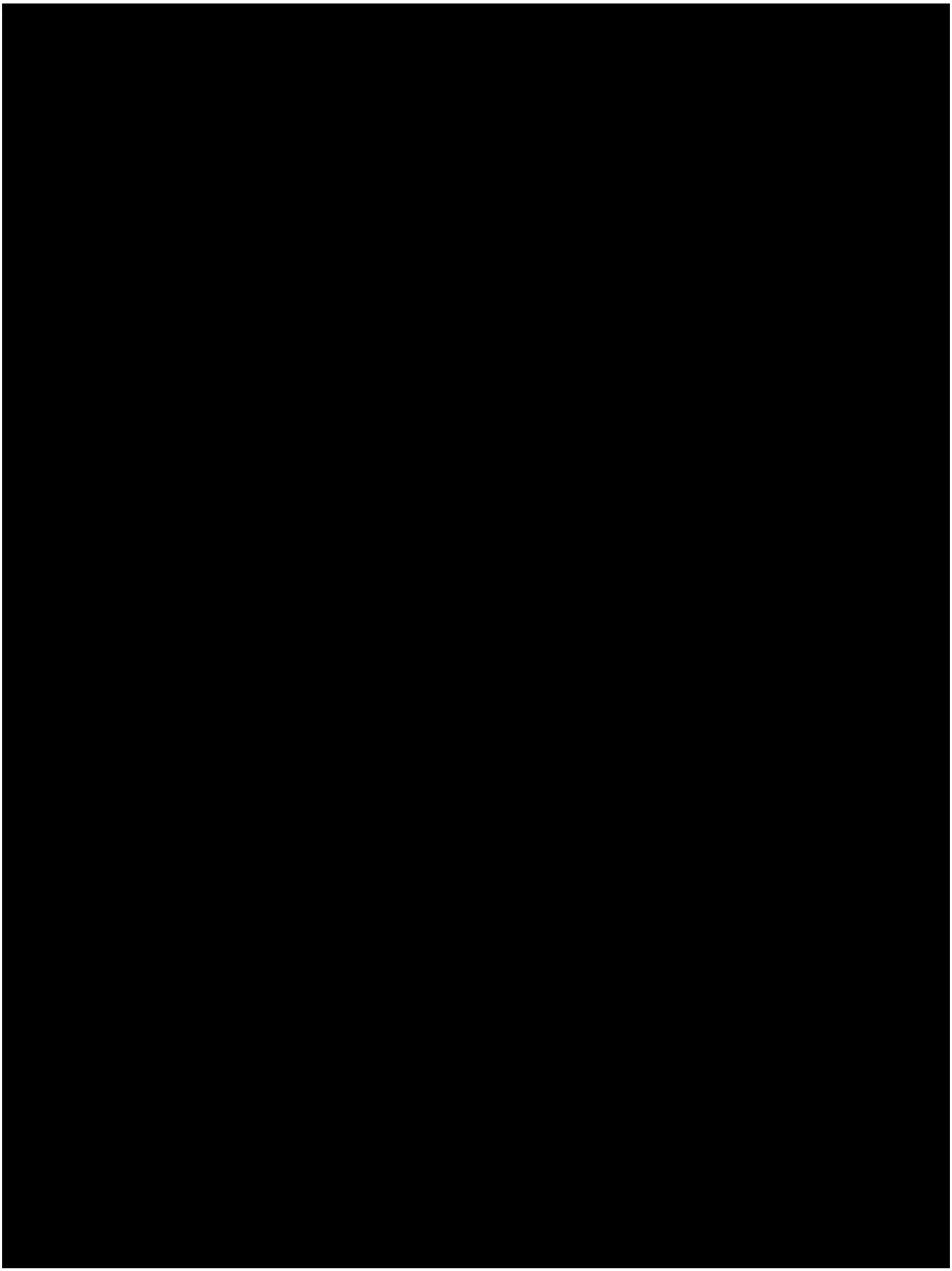
"Force Majeure"	means any impediments beyond the control of the applicable party due, wholly or in part, directly or indirectly, to: strikes, lockouts, riots, epidemics, war, governmental regulations, fire, explosions, acts of God, or any other impediment beyond the control of the party affected;
"Hourly Rate"	shall have the meaning prescribed in paragraph 6.1(a);
"HST"	means Harmonized Sales Tax;
"Guidelines"	has the meaning prescribed in paragraph 4.2(d);
"Intellectual Property"	includes all trademarks, copyrights, patents, business names, trade secrets, proprietary software, analysis or techniques (whether or not patented or patentable), confidential or secret designs and processes, source codes, plans or devices, or other proprietary and intellectual property rights;
"Intervenor"	means any interested group or individual who participates actively in an OEB proceeding either by submitting evidence, arguments or interrogatories (written questions) or by cross-examining a witness or witnesses at an oral hearing;
"Person"	means any individual, firm, corporation, unlimited liability company, partnership, limited liability partnership, joint venture, trust, unincorporated association, unincorporated syndicate, any governmental authority and any other legal or business entity.
"Protected Employee"	means any individual who, during the course of their employment with Toronto Hydro, was directly or indirectly involved in: i. the procurement of the Services of the Consultant on behalf of Toronto Hydro; ii. the negotiation of the Consultant's Agreement on behalf of Toronto Hydro; and/or the awarding and/or approval of the Consultant's Agreement on behalf of Toronto Hydro.
"Remittances"	has the meaning prescribed to it in paragraph 6.1(e);
"Term"	has the meaning prescribed to it in subsection 3.1; and
"Toronto Hydro"	means Toronto Hydro-Electric System Limited.

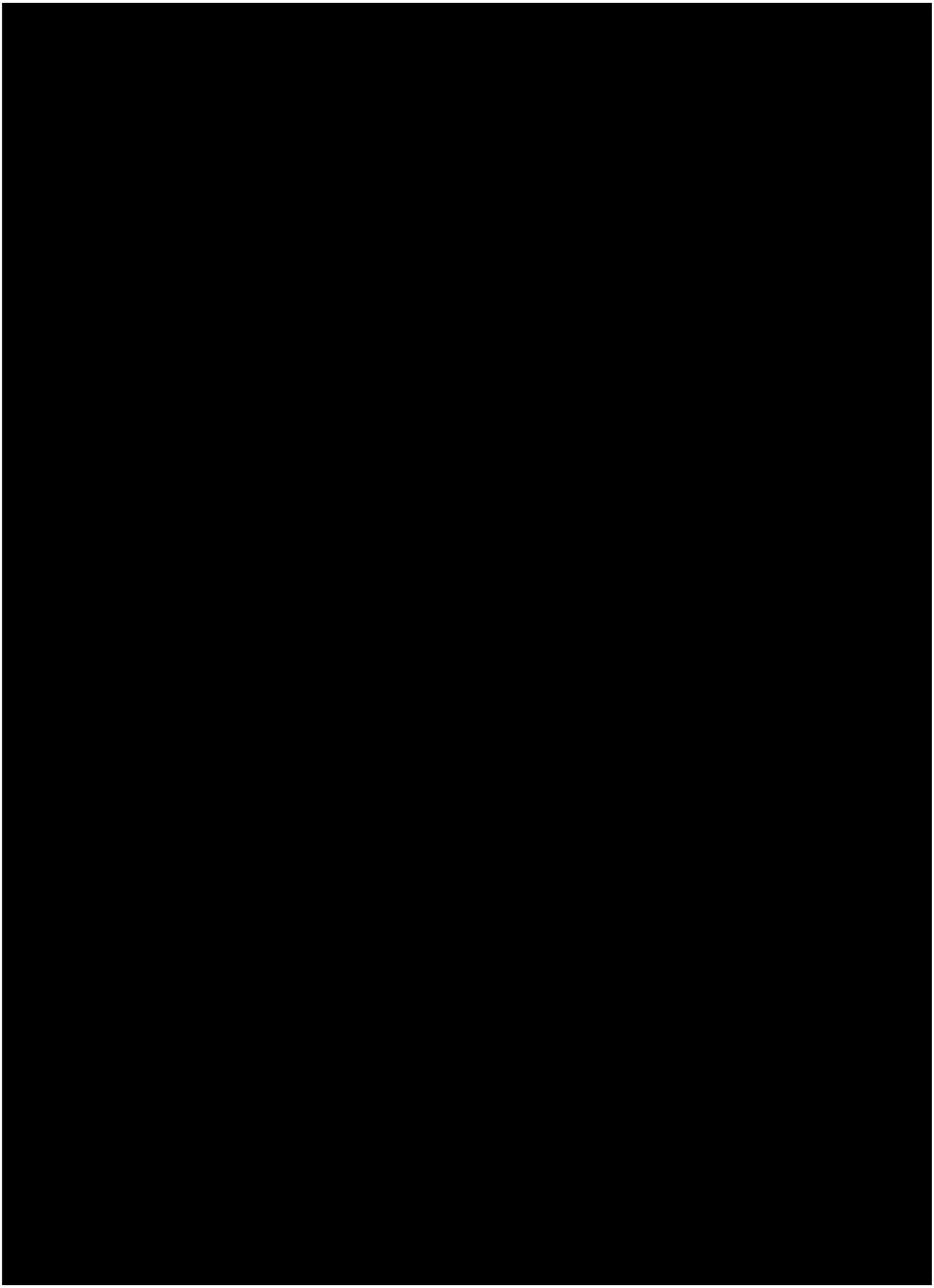


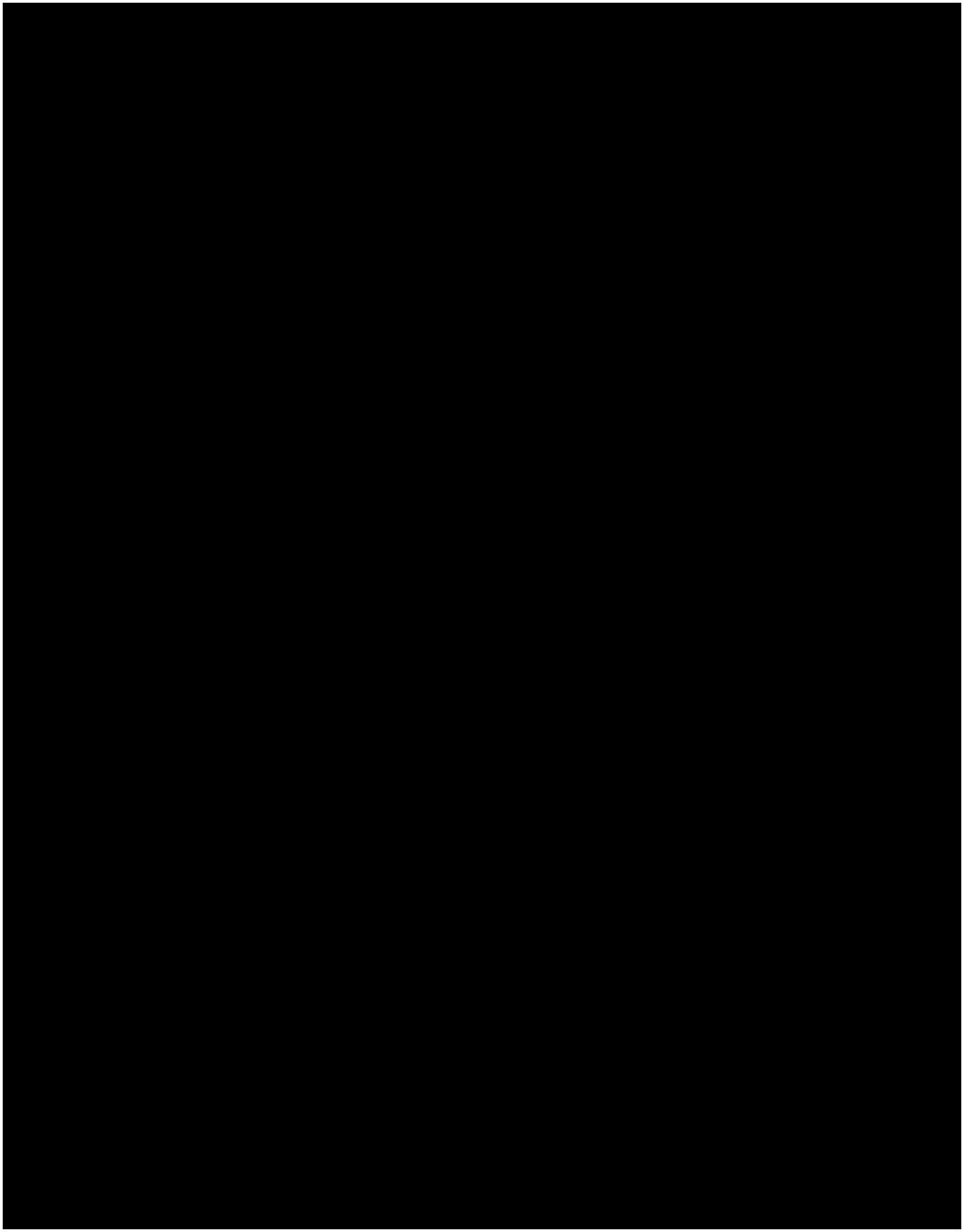


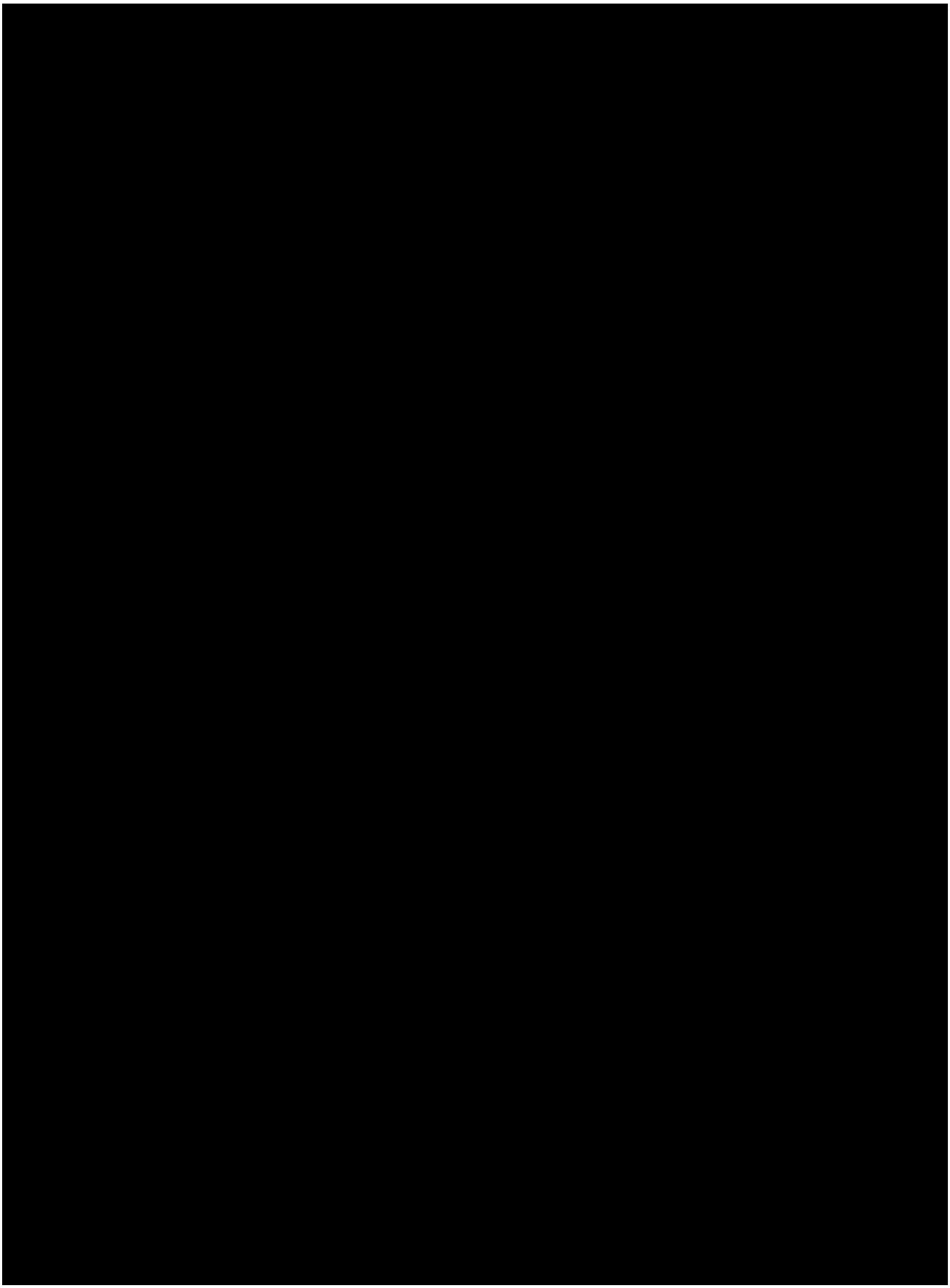


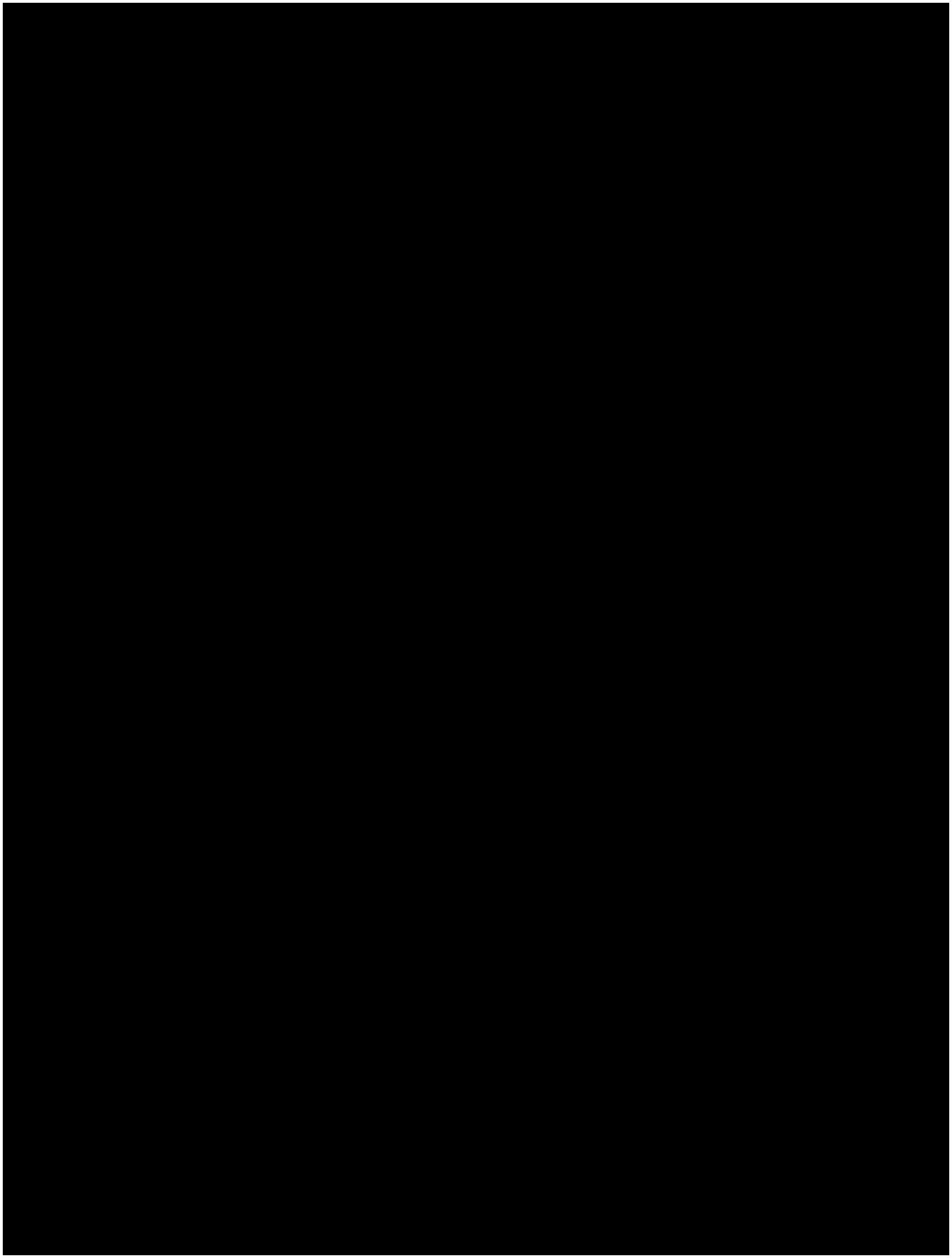














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SECOND AMENDING AGREEMENT

THIS SECOND AMENDING AGREEMENT (the "Second Amending Agreement") is made effective as of June 1, 2023 (the "Effective Date") between **INNOVATIVE RESEARCH GROUP INC.** ("Consultant") and **TORONTO HYDRO-ELECTRIC SYSTEM LIMITED** ("Toronto Hydro") (collectively, the "Parties").

WHEREAS:

1. Toronto Hydro and Consultant entered into an agreement for certain research-based consulting services (the "Services") dated September 22, 2021 (the "Purchase Agreement"); and

2. The Parties entered into an amending agreement dated November 30, 2022 to add Toronto Hydro's privacy terms and conditions to the Agreement (the "First Amending Agreement", and together with the Purchase Agreement, the "Agreement").

3. The Parties wish to further amend the Agreement by attaching the Ontario Energy Board's *Rules of Practice and Procedure* Rule 13A, and make associated amendments related to the Consultant's participation in Toronto Hydro's upcoming rate application, as provided herein.

NOW THEREFORE, THIS SECOND AMENDING AGREEMENT WITNESSES that in consideration of the mutual covenants contained herein and for other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Toronto Hydro and Consultant agree as follows:

1. Any capitalized terms used but not defined herein shall be as defined in the Agreement. The recitals above are agreed by the Parties to be true and deemed to form part of this Second Amending Agreement as if specifically restated herein.

2. Section 4.2 of the Agreement is amended by adding the following subsection (e) immediately following subsection 4.2(d):

   (e) Without limiting the generality of subsection 4.2(a) above, the Consultant shall comply with Rule 13A Expert Evidence of the OEB's *Rules of Practice and Procedure*, attached as SCHEDULE C hereto, in the course of providing the Services and agrees to accept the responsibilities that are or may be imposed on them by that rule.

3. SCHEDULE A is amended by adding the following Section 3 immediately following Section 2:

   3. Participation in Toronto Hydro's Regulatory Application Process

   The Consultant shall be available to speak to the Services in a regulatory proceeding as required by Toronto Hydro and/or the Ontario Energy Board relating to Toronto Hydro's 2025 rate application.

   The degree of Consultant's participation shall be dependent on the degree of interest in the Services by OEB staff or any intervenors. Consultant's participation in such proceeding may entail, but is not limited to, preparation of expert report(s), responding to interrogatories and undertakings, provision of support prior to and during any hearings required by the OEB, and answers to any questions regarding the form, methodology, assumptions, and choices made in the provision of the Services, in either written or oral format (the latter in acting as a witness for Toronto Hydro).

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The Consultant shall comply with the requirements and agrees to accept the responsibilities set out in Rule 13A of the OEB's *Rules of Practice and Procedure*, attached as SCHEDULE C to this Agreement, when providing any Services relating to Toronto Hydro's 2025 rate application.

4. The Parties agree to add a new SCHEDULE C to the Agreement, attached hereto as Appendix 1 to this Second Amending Agreement.

5. All other terms and conditions of the Agreement remain continuously in full force and effect, unamended, and shall be deemed to apply to this Second Amending Agreement.

6. This Second Amending Agreement, together with the Agreement, shall hereinafter constitute the entire agreement between the Parties with respect to the Services as further described in the Agreement, and supersedes any and all other agreements, understandings, discussions, negotiations, representations and correspondence which may have been made by or between the Parties respecting the same.

IN WITNESS WHEREOF the Parties hereto have executed this Second Amending Agreement as of the date first written above.

INNOVATIVE RESEARCH GROUP INC.

Per: DocuSigned by: Greg Lyle 9E236D6798EC426...

Name:

Title:

I have the authority to bind the Consultant.

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED

Per: RM'Cl

Name: Richard McCluskey

Title: Director, Public Relations, Litigation & Privacy

I have authority to bind Toronto Hydro.

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APPENDIX 1

SCHEDULE C

Ontario Energy Board *Rules of Practice and Procedure* Rule 13A

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

a. the expert's name, business name and address, and general area of expertise;
b. the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;
c. the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;
d. the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;
e. in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and
f. an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

a. in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and
b. at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

a. scope and timing;
b. the involvement of any expert engaged by the OEB;
c. the costs associated with the conduct of the activities;
d. the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of Rule **13A.04**; and
e. any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A.**

Agreement for Professional Consulting Services

THIS AGREEMENT is made this 21st day of March, 2022 ("Effective Date")

BETWEEN:

Toronto Hydro-Electric System Limited,

a corporation incorporated under the laws of Ontario

(hereinafter called "Toronto Hydro")

and

Clearspring Energy Advisors, LLC,

a corporation incorporated under the laws of Wisconsin

(hereinafter called the "Consultant")

WHEREAS:

A. Toronto Hydro has retained the Consultant to provide certain consulting services as detailed in SCHEDULE A (collectively, the "Services"); and

B. the Consultant has indicated to Toronto Hydro that it has the skill and expertise to provide the Services on the terms and conditions set forth herein;

NOW THEREFORE, in consideration of the mutual covenants set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. INTERPRETATION

Unless otherwise indicated, all capitalized terms in this Agreement shall be as defined in SCHEDULE C and any reference to currency in this Agreement shall refer to lawful money of Canada.

2. RELATIONSHIP OF THE PARTIES

2.1 Retainer

Toronto Hydro hereby retains the Consultant to provide the Services, and the Consultant hereby agrees to provide the Services, during the Term, in accordance with the terms and subject to the conditions of this Agreement.

2.2 Independent Contractors

(a) Notwithstanding any provision hereof, this Agreement does not constitute and shall not be construed as constituting a partnership, joint venture, principal/agency relationship, or employer/employee relationship between the parties. The Consultant acts at all times in the capacity of an independent contractor, and neither party shall represent itself to be an agent or employee of the other. The Consultant and its Representatives have no authority to commit, act for or on behalf of Toronto Hydro, or to bind Toronto Hydro to any obligation or liability.

(b) Without limiting the generality of Section 2.2(a), the Consultant hereby acknowledges and agrees that neither it nor its Representatives shall be eligible or entitled, by reason of this Agreement, to participate in any employee-related program offered by Toronto Hydro or any of its Affiliates, including, without limitation, any benefit, insurance, compensation, health plan, bonus or retirement program.

(c) The Consultant hereby covenants and agrees to indemnify, defend and hold harmless Toronto Hydro and its Representatives from and against all costs, liabilities or claims whatsoever against Toronto Hydro or its Representatives resulting from or relating to the Consultant or its Representatives being deemed to be an employee of Toronto Hydro or any of its Affiliates.

(d) The Consultant hereby acknowledges and agrees that Toronto Hydro shall not be responsible for and shall not have control or charge of any means, methods, techniques, sequences or procedures used for or in respect of the Services, or for the safety precautions or programs required for the Services or otherwise prescribed hereunder.

2.3 Conflicts of Interest

The Parties acknowledge that there is potential for a conflict of interest based on services provided by the Consultant from time to time to Toronto Hydro. The Consultant agrees to take all such steps as Toronto Hydro deems necessary, acting reasonably, to remove, mitigate or minimize such conflict of interest. The parties acknowledge that the Consultant working for other utility clients will not constitute a conflict of interest unless the work involves a regulatory application put forth by Toronto Hydro.

3. TERM

3.1 Initial Term

This Agreement shall be effective as of the Effective Date and shall continue, unless terminated in accordance with the terms hereof or extended pursuant to Section 3.2, for a period of four (4) years (the "Initial Term").

3.2 Renewal

Toronto Hydro may, at its sole option, elect to renew this Agreement for two (2) additional one (1) year terms (each a "Renewal Term") by giving written notice to the Consultant at least thirty (30) days before the end of the Initial Term or the first Renewal Term (as applicable). The same terms and conditions contained herein shall apply during the Renewal Term(s), save and except as amended in writing by the parties.

3.3 Term

The Initial Term and Renewal Term, if any, shall hereinafter together be referred to as the "Term".

4. SERVICE REQUIREMENTS

4.1 Services

During the Term, the Consultant shall perform the Services as detailed in SCHEDULE A hereto

(a) in accordance with the terms and subject to the conditions set forth in this Agreement;

(b) using personnel of required skill, experience, licences and qualifications;

(c) in a workerlike and professional manner; and

(d) consistent with standards generally observed by reputable and competent members of the same industry providing similar services.

4.2 Revision to Services

(a) The parties acknowledge and agree that the Services to be undertaken and completed by the Consultant under this Agreement may be subject to revision or amendment from time to time during the Term: (i) as required by Toronto Hydro to comply with the Guidelines; (ii) as required by Toronto Hydro to comply with Applicable Laws or any order, instruction, directive or legal requirement of a Governmental Authority; or (iii) as required by Toronto Hydro to ensure that Toronto Hydro receives the expected funding and benefits with respect to the project to which the Services relate.

(b) Toronto Hydro agrees to provide the Consultant with written notice of any revision or amendment to the Services required pursuant to this Section 4.2, and the Consultant shall comply with all such directives.

(c) In the event that the Consultant fails to comply with a directive issued by Toronto Hydro pursuant to this Section 4.2, Toronto Hydro shall have the right, in addition to any other remedies which may be available to Toronto Hydro hereunder or otherwise at law, to terminate this Agreement by giving written notice of termination to the Consultant whereupon this Agreement shall terminate as at the effective date of termination specified in the notice and Section 7 shall apply.

4.3 Applicable Laws

(a) The Consultant shall, at its sole expense, obtain and maintain during the Term of this Agreement, all permits, licences and approvals required to perform its obligations under

this Agreement in accordance with Applicable Laws. The terms and conditions of this Agreement shall be carried out in strict compliance with all Applicable Laws and in the event of any conflict between any Applicable Laws, the Applicable Laws with the most stringent standard shall apply.

(b) Without limiting the generality of the foregoing, the Consultant shall comply with the *Municipal Freedom of Information and Protection of Privacy Act* (Ontario) ("MFIPPA"), the *Personal Information Protection and Electronic Documents Act* (Canada) ("PIPEDA") and any other applicable privacy legislation (collectively, "Privacy Laws") with respect to any personal information collected, used or disclosed in connection with this Agreement and shall indemnify and hold harmless Toronto Hydro and its Representatives from and against any and all claims, demands, suits, losses, damages, causes of action, fines or judgments (including related expenses and legal costs) they may incur related to or arising out of any non-compliance therewith.

(c) Where any Deliverable is subject to the approval or review of any authority, department, government or agency other than Toronto Hydro, such applications for approval or review shall, unless otherwise authorized by Toronto Hydro in writing, be prepared by the Consultant to be approved and submitted by and through the offices of Toronto Hydro, and the Consultant shall not have any direct dealings with the authority, department, government or agency in question with regards to the Deliverable.

(d) The Consultant and the Consultant's personnel and Representatives shall comply with all rules and direction of Toronto Hydro, whether specified in this Agreement or otherwise, while working on Toronto Hydro's premises or when accessing or connecting to Toronto Hydro's information technology systems, including rules and directions concerning health, safety, security and environmental protection, including without limitation, Toronto Hydro's *Code of Business Conduct and Whistleblower Procedure,* Toronto Hydro's *Disclosure Policy*, Toronto Hydro's *Social Media and Digital Communication Policy,* Toronto Hydro's *Accessibility Policy,* Toronto Hydro's *Workplace Harassment Policy and Program*, Toronto Hydro's *Violence Prevention in the Workplace Policy*, Toronto Hydro's *Workplace Alcohol and Drug Policy*, Toronto Hydro's *Environmental Policy,* Toronto Hydro's *Occupational Health and Safety Policy*, Toronto Hydro's *Privacy Policy*, Toronto Hydro's *Cyber Security Policy*, Toronto Hydro's *Technology Use Guidelines*, Toronto Hydro's *Physical Security Policy*, Toronto Hydro's *COVID-19 Vaccination Policy*, and the *Affiliate Relationships Code for Electricity Distributors and Transmitters* issued by the OEB (together, the "Guidelines"). Toronto Hydro premises includes, but is not limited to, all Toronto Hydro-owned or leased buildings, sites, work centres, stations, substations, vaults, radio antenna sites, and any other location where Toronto Hydro stores or maintains physical assets. The Consultant agrees to comply with and to direct its Representatives to comply with such Guidelines, as amended.

4.4 Performance

(a) The Services shall be performed to the satisfaction of Toronto Hydro, and Toronto Hydro shall have the right at all reasonable times, to inspect or otherwise review the Services performed or being performed. The Consultant shall, upon the request of Toronto Hydro, acting reasonably, provide Toronto Hydro with written reports of the status of the Deliverables and the Consultant's progress in providing the Services.

(b) In the event of any dispute between Toronto Hydro and the Consultant relating to the quality or acceptability or rate of progress of any of the Services, or relating to the interpretation of any instructions or specifications concerning the Services, Toronto Hydro and the Consultant shall attempt to mutually reach a resolution in good faith. Failing a good faith resolution, the reasonable opinion of Toronto Hydro shall govern and be binding on the parties hereto.

5. REPRESENTATIONS, WARRANTIES, INDEMNITIES AND INSURANCE

5.1 Representations and Warranties

The Consultant hereby represents, warrants and agrees that:

(a) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has/have the necessary experience and qualifications to perform the Services;

(b) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) will perform the Services in a diligent, expeditious and workerlike manner, consistent with standards generally observed by reputable and competent members of the same industry providing similar services;

(c) all Services shall be the Consultant's (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) original work and none of the Services or any invention, development, use, production, distribution or exploitation relating thereto will infringe, misappropriate or violate any intellectual property or other right of any person or entity.

(d) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has the corporate power and authority to enter into this Agreement and to perform its obligations hereunder, and that this Agreement constitutes a legal, valid, and binding obligation of the Consultant, enforceable against the Consultant in accordance with its terms.

5.2 Indemnity

a) The Consultant shall be liable for and shall indemnify, defend and hold harmless Toronto Hydro and its Representatives from all claims, demands, actions, penalties, damages, losses, judgments and settlements, liabilities, costs, expenses, including legal fees and other related costs and expenses arising out of, related to, or incidental to, the Consultant or any of its Representatives' performance of the Services under this Agreement, including, without limitation:

i. any breach, violation or non-performance by the Consultant or any of its Representatives of any terms, conditions, warranties, obligations or covenants contained in this Agreement;
ii. any breach or violation by the Consultant or any of its Representatives of any Applicable Laws; and
iii. any actions, omissions, negligence or wilful misconduct of the Consultant or any of its Representatives

except to the extent caused by the negligence or wilful misconduct of Toronto Hydro or its Representatives.

b) In no event shall either party be liable for loss of profit or use or for any indirect, special, incidental or consequential damages of any nature or kind including but not limited to delays, loss of revenue, loss of use, loss of data, loss of product, costs of capital or costs or replacement power, even if that party has been advised of the possibility of such damages.

c) Subject to Section 5.2(d), the Consultant's liability for a claim for damages shall be limited to the maximum amounts payable by Toronto Hydro to the Consultant for the Term pursuant to SCHEDULE B.

d) Notwithstanding the foregoing, no exclusion or limitation of liability shall apply to:

i. Breach of the confidentiality or privacy obligations in this Agreement
ii. Intentional misconduct or gross negligence;
iii. Breach of Applicable Law; or
iv. Breach of intellectual property indemnity in Section 9.

5.3 Insurance

The Consultant shall, during the Term, and at its own expense, maintain and keep in full force and effect (and, when requested, provide Toronto Hydro with proof thereof):

(a) commercial general liability insurance on an occurrence basis having a minimum inclusive coverage limit, including personal injury and property damage, of not less than two million dollars ($2,000,000) per occurrence, which commercial general liability insurance shall be extended to cover contractual liability, products and completed operations liability, and owners/contractors protective liability;

(b) Errors and Omissions Insurance (Professional Liability) covering actual or alleged acts, errors or omissions committed by the Consultant or its Representatives, arising out of the performance of this Agreement, which shall also extend to include personal injury, bodily injury and property damage from the performance of professional services, in the amount of not less than two million dollars ($2,000,000);

(c) All insurance coverages and limits required to be maintained hereunder shall: (i) be primary to any insurance maintained by Toronto Hydro, which insurance shall be excess and non-contributory; (ii) contain a cross liability clause and a severability of interest clause; and (iii) contain a thirty (30) day prior written notice to Toronto Hydro for any cancellation, non-renewal or adverse material change.;

(d) The Consultant agrees that the insurance required hereunder in no way limits the Consultant's liability pursuant to the Liability and Indemnity provision in Section 5.3; and

(e) A waiver of subrogation shall be provided by the insurer(s) to Toronto Hydro.

6. FEES

6.1 Fees

(a) Subject to Sections 6.1(c) - 6.1(f), in exchange for the performance of the Services in accordance with the terms hereof, Toronto Hydro shall pay the Consultant the rates

outlined in SCHEDULE B, not including HST (the "Fees"). Fees shall not be in excess of the maximum amounts set out in SCHEDULE B.

(b) The Fees noted in Section 6.1(a) shall be the only fees payable by Toronto Hydro under this Agreement. Without limiting the generality of the foregoing, the Consultant hereby agrees and acknowledges that all out-of-pocket expenses, travelling costs, and other disbursements shall be at the sole expense of the Consultant, except with the prior written approval from Toronto Hydro.

(c) Any disbursements for additional incidentals incurred by the Consultant in relation to this Agreement ("Disbursements") must be pre-approved by Toronto Hydro in writing.

(d) The Consultant shall not incur or submit invoices for any work outside the scope of the Services without prior written approval from Toronto Hydro.

(e) The Consultant shall make all payment of taxes, employment insurance premiums, pension plan contributions and any other taxes or other payment of any nature, imposed by any authority in respect of the Fee paid by Toronto Hydro to the Consultant under this Agreement (together, the "Remittances"), and the Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities and claims whatsoever against Toronto Hydro or its Representatives, in any way arising out of or relating to any failure to deduct, withhold, or remit any Remittance.

(f) Without limiting the generality of Section 6.1(a), Toronto Hydro reserves the right to deduct any applicable non-resident withholding taxes from any Fee owing to the Consultant under this Agreement and remit such amounts to the applicable taxation authority.

6.2 Payment

The Consultant shall submit invoices to Toronto Hydro on a monthly basis containing:

(a) a description of the Services performed during the invoice period;

(b) the monthly payment amount;

(c) the total HST applicable to the Services during the invoice period, as well as the Consultant's HST registration number; and

(d) a detailed description of the Disbursements incurred around the invoice period, supported by documentation in a form acceptable to Toronto Hydro.

Unless otherwise provided in this Agreement, the Consultant shall invoice Toronto Hydro after final inspection and acceptance by Toronto Hydro of the Services performed and subject to receipt of all documents required by this Agreement. **Invoices must be sent electronically to: AP@torontohydro.com.** Subject to approval of the invoice by Toronto Hydro, receipt of all documents required by this Agreement, and final review by Toronto Hydro, Toronto Hydro shall make payment to the Consultant via electronic funds transfer not later than thirty (30) days following receipt of an acceptable invoice and the EFT Information (as set out below). **The Consultant must provide Toronto Hydro with, in the case of the first payment only, (i) a void**

cheque, pre-printed deposit slip or bank confirmation letter and (ii) the email address where the Consultant wishes to receive remittance information (together, "EFT Information"). EFT Information must be sent electronically to efthelp@torontohydro.com or to 14 Carlton Street, Toronto, ON, M5B 1K5, Attention: Treasury Department. Toronto Hydro reserves the right to pay the Consultant through other payment methods.

7. SUSPENSION OR TERMINATION

7.1 Suspension or Termination

(a) Toronto Hydro may, at any time during the Term by notice in writing, suspend all or a portion of the Services. Upon receipt of such written notice, the Consultant shall perform no further work other than as directed by Toronto Hydro, and shall be entitled to payment for time spent in performing the Services up to the date of suspension.

(b) Either party may terminate this Agreement immediately upon written notice where the other party enters into liquidation, whether compulsory or voluntarily, or where a proceeding in receivership, bankruptcy or insolvency has been instituted by or against such party or its property.

(c) Toronto Hydro, at its sole discretion, may terminate this Agreement immediately upon written notice where the Consultant or any of its Representatives has been in material default in the performance of its duties, obligations or undertakings under this Agreement, and has not taken immediate steps to remedy such default within two (2) Business Days following written notice of the specific default by Toronto Hydro. For the purposes of this section, a material default shall include, without limitation, a breach of any of the representations or warranties contained herein or the failure or refusal to provide the Services in accordance with the terms and conditions of this Agreement.

(d) Notwithstanding any other provision in this Agreement, Toronto Hydro, at its sole discretion, shall have the right to terminate this Agreement, for any reason, upon two (2) weeks written notice to the Consultant.

(e) In the event that this Agreement is terminated in accordance with this Section 7.1 by either party, the Consultant shall be entitled to payment for time spent in performing the Services up to the date of suspension.

7.2 Effect of Termination

Upon the termination or expiration of this Agreement, upon Toronto Hydro's request, the Consultant shall return to Toronto Hydro and delete any and all electronic copies the Consultant may have of all documents and materials in its possession relating to the Services or this Agreement, including all Confidential Information and all Deliverables, whether completed or not and shall, upon written request by Toronto Hydro, certify in writing to Toronto Hydro that it has complied with the requirements of this Section 7.2.

8. CONFIDENTIALITY

8.1 Non-Disclosure

In performing the Services required by this Agreement, the Consultant may be provided access to Confidential Information. The Consultant acknowledges and agrees that:

(a) the Consultant shall not disclose, permit access to, transmit, or transfer the Confidential Information to any third party without the prior written authorization of Toronto Hydro;

(b) the Consultant shall protect the confidentiality of the Confidential Information in its possession by exercising the same security measures it normally exercises with respect to its own confidential information and at minimum a reasonable standard of care;

(c) upon the request of Toronto Hydro, and in any event upon the expiration or termination of this Agreement for any reason, the Consultant shall return (or delete, in the case of electronic documents) forthwith to Toronto Hydro all Confidential Information, including all copies and other materials containing the Confidential Information, which are in the possession or under the control of the Consultant; and

(d) the Consultant shall not use any Confidential Information for any purpose other than to perform the Services required by this Agreement. Without limiting the foregoing, the Consultant shall not, and shall not permit any of its Representatives to, use any Confidential Information in furtherance of its, or their, individual business or for its, or their, own benefit, profit or advantage, or for the benefit, profit or advantage of any other party.

(e) Toronto Hydro is subject to MFIPPA and is governed by Governmental Authority such as IESO and the OEB and shall have the right to disclose Confidential Information in accordance with the provisions of MFIPPA or as required by the IESO or the OEB.

Notwithstanding the foregoing, the Consultant may disclose such Confidential Information to any of the Representatives of the Consultant who agree to be bound by the obligations of confidentiality herein and who have a reasonable need to know such Confidential Information in the course of their duties for the Consultant but only for the purposes of the Consultant exercising its rights and obligations under this Agreement; and in the event that the Consultant believes it is required by law to disclose, or is requested by a Governmental Authority to disclose, any Confidential Information to a Governmental Authority; provided that the Consultant shall, to the extent permitted by law, first inform Toronto Hydro of the request or requirement for disclosure to allow an opportunity for Toronto Hydro to apply for an order to prohibit or restrict such disclosure.

8.2 Non-Solicitation

Unless Toronto Hydro's Chief Executive Officer provides prior written consent, the Consultant hereby covenants and agrees that during the term of this Agreement and for a period of two (2) years following the termination of the Agreement, however caused, the Consultant will not directly or indirectly, either individually or in partnership or jointly or in conjunction with any other Person,

(a) hire or otherwise engage any Protected Employee who is currently employed by Toronto Hydro;

(b) hire or otherwise engage any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause;

(c) solicit or attempt to solicit any Protected Employee who is currently employed by Toronto Hydro or encourage any such person to leave his/her employment with Toronto Hydro; and

(d) solicit or attempt to solicit any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause.

8.3 Non-Compete

Given the unique expertise and intimate knowledge that the employees have of the operations of Toronto Hydro the Consultant acknowledges and agrees that the restrictions contained in this section are reasonable and necessary to preserve the value of Toronto Hydro's business.

(a) During the Term and for a period of ten (10) years following the termination of this Agreement, the Consultant shall not appear as an Intervenor, nor aid, assist, or provide services to an Intervenor (whether as an employee, contractor, consultant, agent, or officer) where the services are (i) related to a regulatory proceeding at the OEB involving Toronto Hydro; or (ii) likely to result in disclosure of Toronto Hydro's Confidential Information to an Intervenor or the use of Toronto Hydro's Confidential Information on behalf of an Intervenor;

(b) During the Term, the Consultant shall not aid, assist, or provide services to the OEB; and

(c) For a period of ten (10) years following the termination of this Agreement, the Consultant shall not aid, assist, or provide services to the OEB (whether as an employee, contractor, consultant, agent, or officer) where the services are (i) related to a regulatory proceeding at the Ontario Energy Board (the "OEB") involving Toronto Hydro; or (ii) likely to result in disclosure of Toronto Hydro's Confidential Information to the OEB or the use of Toronto Hydro's Confidential Information in the service of the OEB.

9. INTELLECTUAL PROPERTY

9.1 Use

Nothing in this Agreement shall be deemed to transfer, license, assign, permit the use of, or otherwise convey an interest in whole or in part to the Consultant of any Intellectual Property belonging to Toronto Hydro or any of its Representatives or any third party whose Intellectual Property is in Toronto Hydro's custody or control, and the use by the Consultant of any such Intellectual Property shall be subject to the prior written approval of Toronto Hydro.

9.2 Ownership

Toronto Hydro shall at all times have full rights and title to the Deliverables, and may at all times take possession of or use any completed or partially completed Deliverables, notwithstanding any provision, express or implied, to the contrary. Without limiting the generality of the foregoing,

Toronto Hydro shall own all Intellectual Property rights in all Deliverables, and the Consultant hereby waives and assigns to Toronto Hydro any such rights, and agrees to give Toronto Hydro and its Representatives all assistance as may be reasonably required to perfect such rights including, without limitation and where the Consultant is a corporation or partnership, obtaining waiver of moral rights from any of the Consultant's employees, partners or other Representatives.

9.3 Intellectual Property Protection

The Consultant expressly warrants that the manufacture, delivery, sale or use of the Consultant's Services will not infringe any Canadian or foreign patents, trademarks, copyrights, industrial design or other intellectual property rights and the Consultant shall indemnify and save Toronto Hydro harmless from all claims, judgments and decrees that may be entered against Toronto Hydro or its Representatives and against all damage, liability, costs and expenses (including legal fees and other attendant costs and expenses**)** Toronto Hydro incurs by reason of any infringement or claim thereof.

9.4 Pre-Existing Intellectual Property

Any pre-existing Intellectual Proprietary ("Pre-Existing IP") of Consultant or its licensors used to perform Services, or included in any Development, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of the Consultant and its licensors (collectively, "Consultant Information"). To the extent that Consultant incorporates any Consultant Information into the Development(s), Consultant hereby grants to Toronto Hydro a fully paid up, royalty free, irrevocable and non-cancellable, non-exclusive, assignable and transferable right to Use the Consultant Information without restriction, except that any such Use must be in conjunction with the Developments in which the Consultant Information is incorporated and not as a separate item. For the purpose of the foregoing, "Use" means one or more of the following rights to: use; modify; adapt; translate; create changes, alterations, modifications, improvements, adoptions, enhancements and derivative works based upon or derived from the Consultant Information; reproduce; copy; display; perform; communicate in any manner; license or sublicense. Consultant shall provide Toronto Hydro with a list of any freeware, shareware or open source software used in the Developments. Any pre-existing intellectual property of Toronto Hydro, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of Toronto Hydro.

10. HEALTH AND SAFETY

The Consultant shall be responsible for managing the health and safety of its own personnel and other Representatives. Neither Toronto Hydro, nor its Representatives, shall be liable for any loss, damages or claims arising directly or indirectly from the Consultant's access to or work in or around Toronto Hydro's facilities, and the Consultant hereby waives any claims to which it may become entitled for loss or damage and releases Toronto Hydro and its Representatives from any and all such claims.

11. MISCELLANEOUS

11.1 Survival

In addition to the terms in this Agreement that by their nature survive the expiry or termination of the Agreement, the terms of Section 5 (Representations, Warranties and Indemnities), Section 8

(Confidentiality), Section 9 (Intellectual Property), and Section 11.3 (Injunctive Relief) shall survive the expiry of this Agreement for a term of five (5) years.

11.2 Subcontracting

The Consultant shall not subcontract the performance of all or any part of the Services without Toronto Hydro's prior written approval. Where Toronto Hydro provides its prior written approval to the Consultant to subcontract all or part of the Services, then the Consultant shall enter into agreements with such permitted subcontractor(s) to require the permitted subcontractor(s) to provide Services in accordance with all of the terms of this Agreement. Notwithstanding the foregoing, the Consultant shall remain liable for any and all acts or omissions of any subcontractor(s) as if such acts or omissions were those of Consultant.

11.3 Injunctive Relief

(a) The Consultant acknowledges and agrees that the terms of Section 8 (Confidentiality) and Section 9 (Intellectual Property) of this Agreement are reasonably necessary to protect the legitimate interests of Toronto Hydro, are reasonable in scope and duration, and are not unduly restrictive.

(b) The Consultant further acknowledges that a breach of any of the terms of Section 8 (Confidentiality) or Section 9 (Intellectual Property) would render irreparable harm to Toronto Hydro, and that a remedy at law for breach of these sections would be inadequate, and that Toronto Hydro shall therefore be entitled to any and all equitable relief, including, without limitation, injunctive relief, and any other remedy that may be available at law or in equity.

11.4 Force Majeure

Either party will be relieved of liability for delays in performance of its obligations hereunder where such delay is a result of Force Majeure. The party affected by the Force Majeure shall give prompt notice thereof to the other party and, upon cessation of the Force Majeure, shall take all reasonable steps to resume the performance of its obligations hereunder as soon as reasonably practicable. If a delay in performance by reason of Force Majeure extends beyond thirty (30) Business Days, then either party may terminate this Agreement by written notice.

11.5 Non-Exclusive Agreement

This Agreement will not be interpreted to grant to the Consultant exclusive rights to provide the Services or to bind Toronto Hydro in any way to an exclusive relationship with the Consultant with regards to the Services or any other service.

11.6 Waiver

No delay on the part of either party in exercising any of its rights hereunder or failure to exercise the same, nor the acquiescence thereto shall operate as a waiver except in the specific instance for which it is given and where such waiver is provided in writing by the party waiving its rights.

11.7 Amendments

None of the terms, conditions or provisions of this Agreement shall be varied, modified or altered except by written agreement signed by an authorized representative of each parties.

11.8 Assignment

Save and except for Toronto Hydro's right to assign this Agreement to any of its Affiliates, neither party may assign this Agreement or any of their rights or obligations hereunder, without the prior written authorization of the other party, acting reasonably.

11.9 Enurement

This Agreement shall enure to the benefit of, and be binding upon, the parties hereto and their respective successors and permitted assigns.

11.10 Severability

In the event that any provision or portion of this Agreement is determined to be invalid or unenforceable for any reason, the remaining provisions or portions of this Agreement will be unaffected and will remain in full force and effect to the fullest extent permitted by law.

11.11 Neutral Construction

The parties to this Agreement agree that this Agreement was negotiated fairly between them at arm's length, that the final terms of this Agreement are the product of the parties' negotiations, and that this Agreement shall be deemed to have been jointly and equally drafted by them, and that the provisions thereof should not be construed against a party on the grounds that such party drafted the Agreement in whole or in part.

11.12 Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof. This Agreement supersedes any and all prior correspondence, warranties, covenants, collateral undertakings, or agreements, oral or otherwise, express or implied, unless otherwise contained herein.

11.13 Notices

(a) All questions or other communications regarding this Agreement, including any notices required by this Agreement, are to be addressed to the following addresses:

to Toronto Hydro:

Name:	Anila Dumont
Title:	Manager, Regulatory Services
Address:	14 Carlton Street, Toronto ON 5B 1K5
Telephone:	416-542-2831
Email:	ADumont@TorontoHydro.com

with copy to:

Title:	EVP, Public and Regulatory Affairs & Chief Legal Officer

Address: 14 Carlton, Toronto Hydro, ON M5B 1K5
Telephone: (416) 542-3000
Email: legal@torontohydro.com

to the Consultant:

Name: Steve Fenrick
Title: Principal Consultant
Address: 1050 Regent Street, Suite L3, Madison, WI 53715
Telephone: 608-442-8668
Email: steve.fenrick@clearspringenergy.com

(b) All notices or communications shall be deemed to be received on the date of acceptance (as evidenced by the signature of the party) if delivered by personal delivery or courier, on the fifth (5th) Business Day after mailing, if mailed by first class mail, or on the first (1st) Business Day after transmission, if sent by facsimile (provided the transmission is evidenced by documented proof of proper fax transmittal).

11.14 Governing Law

This Agreement shall be governed by and construed in accordance with the law of the Province of Ontario and the laws of Canada applicable therein.

11.15 Execution

This Agreement may be signed in counterparts and delivered by electronic means, each of which shall be deemed an original and all of which, together, shall have the same effect as if all constitute one and the same Agreement.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the date first written above:

Clearspring Energy Advisors LLC

Per: Steve Fenrick

Name: Steven Fenrick

Title: Executive Vice President

I have authority to bind the Consultant.

Toronto Hydro-Electric System Limited

Per: _____

Name: Amanda Klein

Title: Executive Vice President, Public and Regulatory Affairs, and Chief Lega Officer

I have authority to bind Toronto Hydro.

SCHEDULE A

SCOPE OF SERVICES

1. Services to be Performed

(a) Regulatory Applications and Advocacy

Toronto Hydro is retaining the Consultant to undertake technical analysis, provide advice and/or assist with preparatory activities for upcoming rate applications and regulatory filings at the OEB. Broadly, the Consultant will research and support Toronto Hydro in respect of the following:

- Analyzing regulatory policies, reports, decisions, laws and other energy policy proposals of governments or regulators in relevant jurisdictions;
- Developing advocacy positions and written submissions;
- Detailing application timeline, schedule and milestones;
- Managing the discovery and interrogatory processes;
- Delivering expert testimony in regulatory proceedings;
- Understanding new or modified policies and developing new or modified approach for implementation and compliance purposes;
- Evaluating and creating regulatory frameworks, paradigms and first mover policy ideas to advance the interests of Toronto Hydro; and
- Undertaking technical analysis, drafting evidence and other preparatory activities for rate applications and regulatory filings.

In addition to the foregoing, the Consultant has been retained to provide specific expertise in the areas below. Please note that the list of work or tasks in SCHEDULE A is not guaranteed to include the subjects listed, nor is it limited to the examples listed.

(b) Regulatory Analytics and Technical Services

Toronto Hydro requires support from the Consultant on rate design. The OEB sees a comprehensive rate application as consisting of three main components: the business plan (along with supporting documentation and reports), historical and forecast information, and rate models that show the derivation of specific proposed rates based on the data. The OEB's adjudicative process on Toronto Hydro's regulatory applications can involve a number of steps to ensure that Toronto Hydro's proposals are adequately examined and "tested" during the review to ensure that it is delivering cost effective, efficient, reliable and responsive services to customers. In relation to this, the Consultant will be relied on for its experience, skillsets, knowledge and training in the area of analytics and technical services focused on the following tasks:

- Business case development;
- Econometrics and benchmarking analysis and studies;
- Productivity studies; and
- Incentive regulation principles and frameworks.

Other areas of analytics and technical services may require advice or direction from the Consultant, such as:

- Load and Customer Forecast;
- Energy market analysis
- Lead Lag Study;
- Cost Allocation Model (CAM) review;
- Rate design review;
- Load Profile Analysis as part Cost Allocation Requirements;
- Transformer Allowance;
- Cost Study for Specific Service Charge;
- Standby rates;
- EV rates;
- Loss Adjustment Factor;
- Energy & Demand Load Research Analysis;
- Distributed Energy Resources;
- Line Loss Study;
- Load Profile Analysis;
- IESO market settlement;
- Rate design principles;
- Quantitative models; and
- Other analytics and technical matters that arise.

SCHEDULE B

RATES

Resource Type	**Resource Type Hourly Cost ($/hr)**	**Percentage of Duties**
Principal Consultant (>20 Years experience, Expert Witness)	[redacted]	
Economics Consultant (>10 Years experience)		
Data Analyst (<10 Years experience)		

SCHEDULE C

DEFINITIONS

In this Agreement, the following definitions shall apply:

"Affiliates"	has the meaning prescribed to it in the *Business Corporations Act* of Ontario, as amended from time to time;
"Agreement"	means this Agreement for Professional Consulting Services, including all recitals, schedules and attachments thereto;
"Applicable Laws"	means all federal, provincial and municipal statutes, regulations, codes, by-laws, orders in council, directives, rules, guidelines and ordinances applicable to this Agreement, including without limitation all applicable OEB codes, rules or guidelines;
"Business Day"	means a day on which banks are open for business in the City of Toronto, Ontario, but does not include a Saturday, Sunday, or a civic or statutory holiday in the Province of Ontario;
"Confidential Information"	means the terms of this Agreement and any and all data or information relating to the business, management or affairs of Toronto Hydro, its customers, employees, or any of its Affiliates disclosed by Toronto Hydro to the Consultant pursuant to this Agreement, whether or not such Confidential Information is expressly identified as confidential. Notwithstanding the foregoing, Confidential Information does not include any information or data which: (a) information or data that is or becomes publicly known through no breach of the terms or conditions of this Agreement; (b) information or data that is independently developed without reference to Confidential Information and without breach of the terms and conditions of this Agreement; or (c) Confidential Information that is required by court order or other legal compulsion to be disclosed, in which case the Consultant shall give Toronto Hydro prior written notice of such disclosure, as permitted by law;
"Consultant"	means Clearspring Energy Advisors LLC;
"Consultant Information"	shall have the meaning as prescribed in Section 9.4
"Deliverable"	means any and all works prepared, generated, created or designed by the Consultant pursuant to this Agreement, including without limitation all drawings, models, designs, formulae, methods, documents, reports, software, specifications, or source codes, and any related works, enhancements, modifications or additions thereto;
"Disbursements"	shall have the meaning as prescribed in Section 6.1(c);
"Fees"	shall have the meaning as prescribed in Section 6.1(a);

"Force Majeure"	means any impediments beyond the control of the applicable party due, wholly or in part, directly or indirectly, to: strikes, lockouts, riots, epidemics (other than related to or associated with SARS-Co-V-2 or COVID-19 and any evolutions or mutations thereof), war, governmental regulations, fire, explosions, acts of God, or any other impediment beyond the control of the party affected;
"Governmental Authority"	means any government, legislature, municipality, regulatory authority, agency, commission, department, board or court or other law, regulation or rule-making public entity of similar authority, including, without limitation the OEB;
"Guidelines"	has the meaning prescribed in Section 4.3(d);
"Hourly Rate"	shall have the meaning prescribed in Section 6.1(a);
"HST"	means Harmonized Sales Tax;
"IESO"	Means the Independent Electricity System Operator;
"Initial Term"	has the meaning prescribed to it in Section 3.1;
"Intellectual Property"	includes all trademarks, copyrights, patents, business names, trade secrets, proprietary software, analysis or techniques (whether or not patented or patentable), confidential or secret designs and processes, source codes, plans or devices, or other proprietary and intellectual property rights;
"Intervenor"	means any interested group or individual who participates actively in an OEB proceeding involving Toronto Hydro either by submitting evidence, arguments or interrogatories (written questions) or by cross-examining a witness or witnesses at an oral hearing involving Toronto Hydro;
"MFIPPA"	means the *Municipal Freedom of Information Act*;
"OEB"	means the Ontario Energy Board;
"Person"	means any individual, firm, corporation, unlimited liability company, partnership, limited liability partnership, joint venture, trust, unincorporated association, unincorporated syndicate, any governmental authority and any other legal or business entity.
"Protected Employee"	means any individual who, during the course of their employment with Toronto Hydro, was directly or indirectly involved in: i. the procurement of the Services of the Consultant on behalf of Toronto Hydro;

ii. the negotiation of the Consultant's Agreement on behalf of Toronto Hydro; and/or

iii. the awarding and/or approval of the Consultant's Agreement on behalf of Toronto Hydro.

"Representative"	in respect of a party, means such party's directors, officers, employees, agents, contractors and advisors, the party's Affiliates, and all such Affiliates' respective directors, officers, employees, agents, contractors and advisors;
"Remittances"	has the meaning prescribed to it in Section 6.1(e);
"Renewal Term"	has the meaning prescribed to it in Section 3.2;
"Services"	means all of the Deliverables, services and specifications to be provided, performed and met by the Consultant under this Agreement, as more particularly described in SCHEDULE A;
"Term"	has the meaning prescribed to it in Section 3.3; and
"Toronto Hydro"	means Toronto Hydro-Electric System Limited.

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AMENDING AGREEMENT

THIS AMENDING AGREEMENT (the "Amending Agreement") is made effective as of June 1, 2023 (the "Effective Date") between **CLEARSPRING ENERGY ADVISORS, LLC** ("Consultant") and **TORONTO HYDRO-ELECTRIC SYSTEM LIMITED** ("Toronto Hydro") (collectively, the "Parties").

WHEREAS:

1. Toronto Hydro and Consultant entered into an agreement for professional consulting services dated March 21, 2022 (the "Agreement") pursuant to which the Consultant shall provide various regulatory applications, advocacy, analytics, and technical services (the "Services"); and

2. The Parties wish to amend the Agreement by attaching the Ontario Energy Board's *Rules of Practice and Procedure* Rule 13A, and make associated amendments related to the Consultant's participation in Toronto Hydro's upcoming rate application, as provided herein.

NOW THEREFORE, THIS AMENDING AGREEMENT WITNESSES that in consideration of the mutual covenants contained herein and for other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Toronto Hydro and Consultant agree as follows:

1. Any capitalized terms used but not defined herein shall be as defined in the Agreement. The recitals above are agreed by the Parties to be true and deemed to form part of this Amending Agreement as if specifically restated herein.

2. Section 4.3 of the Agreement is amended by adding the following subsection (e) immediately following subsection 4.3(d):

   (e) Without limiting the generality of subsection 4.3(a) above, the Consultant shall comply with Rule 13A Expert Evidence of the OEB's *Rules of Practice and Procedure*, attached as SCHEDULE D hereto, in the course of providing the Services and agrees to accept the responsibilities that are or may be imposed on them by that rule.

3. The Parties agree to add a new SCHEDULE D to the Agreement, attached hereto as Appendix 1 to this Amending Agreement.

4. All other terms and conditions of the Agreement remain continuously in full force and effect, unamended, and shall be deemed to apply to this Amending Agreement.

5. This Amending Agreement, together with the Agreement, shall hereinafter constitute the entire agreement between the Parties with respect to the Services as further described in the Agreement, and supersedes any and all other agreements, understandings, discussions, negotiations, representations and correspondence which may have been made by or between the Parties respecting the same.

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IN WITNESS WHEREOF the Parties hereto have executed this Amending Agreement as of the date first written above.

CLEARSPRING ENERGY ADVISORS, LLC

Per: DocuSigned by: Steven Fenrick 13BD71201A7B419...

Name: _____

Title: _____

I have the authority to bind the Consultant.

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED

Per: DocuSigned by: Daliana Coban E232C3948F5C435...

Name: Daliana Coban

Title: Director, Regulatory Applications & Business Support

I have authority to bind Toronto Hydro.

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APPENDIX 1

SCHEDULE D

Ontario Energy Board *Rules of Practice and Procedure* Rule 13A

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

a. the expert's name, business name and address, and general area of expertise;
b. the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;
c. the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;
d. the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;
e. in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and
f. an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

a. in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and
b. at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

a. scope and timing;
b. the involvement of any expert engaged by the OEB;
c. the costs associated with the conduct of the activities;
d. the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of Rule **13A.04**; and
e. any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A.**

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AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES

THIS AGREEMENT is made as of the 24th day of March, 2023 between Toronto Hydro-Electric System Limited ("Toronto Hydro"), a corporation incorporated under the laws of the province of Ontario and UMS Group Inc., a corporation incorporated under the laws of the state of New Jersey in the United States of America (the "Consultant"), pursuant to which Toronto Hydro shall retain the Consultant to provide certain Services, and the Consultant shall provide such Services, during the Term, subject to the terms and conditions hereof;

NOW THEREFORE, in consideration of the mutual covenants set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. INTERPRETATION

Unless otherwise indicated, all capitalized terms in this Agreement shall be as defined in C and any reference to currency in this Agreement shall refer to lawful money of Canada.

2. RELATIONSHIP OF THE PARTIES

2.1 Retainer

Toronto Hydro hereby retains the Consultant to provide the Services, and the Consultant hereby agrees to provide the Services, during the Term, in accordance with the terms and conditions of this Agreement.

2.2 Independent Contractors

(a) Notwithstanding any provision hereof, this Agreement does not constitute and shall not be construed as constituting a partnership, joint venture, principal/agency relationship, or employer/employee relationship between the parties. The Consultant and Toronto Hydro shall at all times remain independent contractors of each other, and neither party shall represent itself to be an agent or employee of the other.

(b) Without limiting the generality of Subsection 2.2(a), the Consultant hereby acknowledges and agrees that neither it nor its Representatives shall be eligible or entitled, by reason of this Agreement, to participate in any employee-related program offered by Toronto Hydro or any of its Affiliates, including, without limitation, any benefit, insurance, compensation, health plan, bonus or retirement program.

(c) The Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities or claims whatsoever against Toronto Hydro or its Representatives resulting from or relating to the Consultant or its Representatives being deemed to be an employee of Toronto Hydro or any of its Affiliates.

(d) The Consultant hereby acknowledges and agrees that Toronto Hydro shall not be responsible for and shall not have control or charge of any means, methods, techniques, sequences or procedures

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used for or in respect of the Services, or for the safety precautions or programs required for the Services or otherwise prescribed hereunder.

3. TERM

3.1 Initial Term

Unless otherwise terminated in accordance with the provisions hereof, this Agreement shall be for a term of approximately one (1) year and nine (9) months and seven (7) days commencing on March 24, 2023 and terminating on December 31, 2024 (the "Term").

4. SERVICE REQUIREMENTS

4.1 Services

During the Term, the Consultant shall perform the Services as detailed in SCHEDULE A hereto.

4.2 Time and Availability

(a) Unless otherwise directed in writing by Toronto Hydro, the Consultant shall have discretion in selecting the dates and times it performs the Services throughout the month, giving due regard to the needs of Toronto Hydro's business requirements and provided that any access to Toronto Hydro property shall be during regular business hours.

4.3 Key Employee

The Consultant acknowledges that Jeff Cummings and Nick Austin (the "Key Employee") are each a key employee of the Consultant and are integral to the successful performance of the Services by the Consultant under the Agreement. The Consultant acknowledges and agrees that the Key Employee will manage and be responsible for the performance of the Services and that a substantial portion of the Services will be performed by the Key Employee, unless Toronto Hydro otherwise consents in writing.

4.4 Revision to Services

(a) The Parties acknowledge and agree that the Services to be undertaken and completed by the Consultant under this Agreement may be subject to revision or amendment from time to time during the Term: (i) as required by Toronto Hydro to comply with the Guidelines; (ii) as required by Toronto Hydro to comply with the Applicable Laws or any order, instruction, directive or legal requirement of a Governmental Authority; or (iii) as required by Toronto Hydro to ensure that Toronto Hydro receives the expected funding and benefits with respect to the project to which the Services relate.

(b) Toronto Hydro agrees to provide the Consultant with written notice of any revision or amendment to the Services required pursuant to this Section 4.4 and the Consultant shall comply with all such directives.

(c) In the event that the Consultant fails to comply with a directive issued by Toronto Hydro pursuant to this Section 4.4, Toronto Hydro shall have the right, in addition to any other remedies which may be available to Toronto Hydro hereunder or otherwise at law, to terminate this Agreement by giving written notice of termination to the Consultant whereupon this Agreement shall terminate

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as at the effective date of termination specified in the notice and the provision of Section 7 shall apply.

4.5 Applicable Laws

(a) The Consultant shall, at its sole expense, obtain and maintain during the Term of this Agreement, all permits, licences and approvals required by all Applicable Laws to perform its obligations under this Agreement. The terms and conditions of this Agreement shall be carried out in strict compliance with all Applicable Laws and in the event of any conflict between any Applicable Laws, the Applicable Laws with the most stringent standard shall apply.

(b) Without limiting the generality of the foregoing, the Consultant shall comply with the *Municipal Freedom of Information Act* ("MFIPPA"), the *Personal Information Protection and Electronic Documents Act* (Canada) ("PIPEDA") and any other applicable privacy legislation (collectively, "Privacy Laws") with respect to any personal information collected, used or disclosed in connection with this Agreement and shall indemnify and hold harmless Toronto Hydro and its Representatives from and against any and all claims, demands, suits, losses, damages, causes of action, fines or judgments (including related expenses and legal costs) they may incur related to or arising out of any non-compliance therewith.

(c) Where any Development is subject to the approval or review of any authority, department, government or agency other than Toronto Hydro, such applications for approval or review shall, unless otherwise authorized by Toronto Hydro in writing, be prepared by the Consultant to be approved and submitted by and through the offices of Toronto Hydro, and the Consultant shall not have any direct dealings with the authority, department, government or agency in question with regards to the Development.

(d) The Consultant and the Consultant's personnel shall comply with all rules and direction of Toronto Hydro, whether specified in this Agreement or otherwise, while working on Toronto Hydro's facilities: Toronto Hydro's *Code of Business Conduct and Whistleblower Procedure*, Toronto Hydro's *Disclosure Policy,* Toronto Hydro's *Social Media and Digital Communication Policy,* Toronto Hydro's *Accessibility Policy,* Toronto Hydro's *Workplace Harassment Policy and Program,* Toronto Hydro's *Violence Prevention in the Workplace Policy,* Toronto Hydro's *Workplace Alcohol and Drug Policy*, Toronto Hydro's *Environmental Policy,* Toronto Hydro's *Occupational Health and Safety Policy,* Toronto Hydro's *Privacy Policy,* Toronto Hydro's *Cyber Security Policy*, Toronto Hydro's *Technology Use Guidelines,* Toronto Hydro's *External Supplier Access to Application Services Policy,* Toronto Hydro's *Physical Security Policy* and the *Affiliate Relationships Code for Electricity Distributors and Transmitters* issued by the OEB (together, the "Guidelines"). The Consultant acknowledges that it has been provided with a copy of the Guidelines, has provided and will provide a copy of the Guidelines to each of its Representatives and that it agrees to comply with and to direct its Representatives to comply with such Guidelines, as amended.

4.6 Participation in Toronto Hydro's Regulatory Application Process

(a) The Consultant shall be available to speak to the work carried out as part of Services under this Agreement in a regulatory proceeding as required by the Ontario Energy Board as related to Toronto Hydro's 2025 Rate Application.

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(b) The degree of Consultant's participation shall be dependent on the degree of interest in the Benchmark Study or any other Service deliverable by OEB staff and any intervenors. Consultant's participation in such proceeding may entail, but is not limited to, response to interrogatories and undertakings, provision of support prior to and during any hearings required by the OEB, and answers to any questions regarding the Benchmark Study form, methodology, assumptions, and choices made, in either written or oral format (the latter in acting as a witness for Toronto Hydro). Where the Consultant is required to testify or otherwise provide evidence at a hearing before the OEB, the Consultant shall comply with the requirements set out in rules 13 and 13A of the OEB's Rules of Practice and Procedure, appended hereto as APPENDIX A.1 to this SCHEDULE A.

4.7 Performance

(a) The Services shall be performed to the satisfaction of Toronto Hydro, and Toronto Hydro shall have the right at all reasonable times, to inspect or otherwise review the Services performed or being performed. The Consultant shall, upon the request of Toronto Hydro, provide Toronto Hydro with written reports of the status of the Developments and the Consultant's progress in providing the Services.

(b) Toronto Hydro will have the right to reject any part thereof which is found to be inappropriate or otherwise not in accordance with specifications and of the Developments set out in the Agreement or otherwise required by law. The Consultant, at no additional cost to Toronto Hydro, will promptly redo any of the Services so rejected. This will include, but is not limited to, all reports, policy manuals, implementation plans and written work (howsoever recorded, that is, whether written or on digital media) and data prepared by the Consultant under the Agreement which are found, within a period of one year from date of transmittal to Toronto Hydro, to be incomplete or inaccurate due to a failure to comply with the Agreement or with said specifications and standards.

(c) In the event of any dispute between Toronto Hydro and the Consultant relating to the quality or acceptability or rate of progress of any of the Services, or relating to the interpretation of any instructions or specifications concerning the Services, the reasonable opinion of Toronto Hydro shall govern and be binding on the parties hereto.

4.8 Conflict of Interest

The Consultant is not engaged, and will not engage, in other commercial activities or retainers which conflict with the Services and/or its obligations hereunder. For clarity, the Consultant must obtain Toronto Hydro's consent in writing to provide services to any other entity in any capacity other than Toronto Hydro in relation to the 2025 Rate Application or any associated proceeding. Where Toronto Hydro is involved in an OEB proceeding as an intervenor and/or participant that is not the 2025 Rate Application, the Consultant may provide services to any other entity in any capacity provided that the Consultant utilizes confidentiality or other safeguards, including, but not limited to separate engagement teams and data access controls for the protection of Toronto Hydro's Confidential Information. Consultant commits to comply strictly with the confidentiality terms of this Agreement and to restrict access to – and use of – Toronto Hydro Confidential Information as set out in this Agreement.

4.9 ISNetworld

The Consultant shall subscribe with ISN Software Corporation as a registrant for ISNetworld, maintain such subscription throughout the Term, provide all records and information as required

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by ISN Software Corporation and Toronto Hydro to allow for the maintenance of such subscription and maintain a rating of B or higher on the ISNetworld during the performance of the Services.

4.10 Health and Safety

The Consultant shall be responsible for managing the health and safety of its own personnel and other Representatives. Neither Toronto Hydro, nor its Representatives, shall be liable for any loss, damages or claims arising directly or indirectly from the Consultant's access to or work in or around Toronto Hydro's facilities, and the Consultant hereby waives any claims to which it may become entitled for loss or damage and releases Toronto Hydro and its Representatives from any and all such claims.

4.8 Non-Solicitation

[Intentionally Deleted]

4.9 Security

[Intentionally Deleted]

5. REPRESENTATIONS, WARRANTIES, INDEMNITIES AND INSURANCE

5.1 Representations and Warranties

The Consultant hereby represents, warrants and agrees that:

(i) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has/have the necessary experience and qualifications to perform the Services;

(ii) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) will perform the Services in a diligent, expeditious and workmanlike manner, consistent with standards generally observed by reputable and competent members of the same industry providing similar services;

(iii) all Services shall be the Consultant's (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) original work and none of the Services or any invention, development, use, production, distribution or exploitation relating thereto will infringe, misappropriate or violate any intellectual property or other right of any person or entity;

(iv) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has the corporate power and authority to enter into this Agreement and to perform its obligations hereunder, and that this Agreement constitutes a legal, valid, and binding obligation of the Consultant, enforceable against the Consultant in accordance with its terms.

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5.2 Indemnity

The Consultant shall be liable for and shall indemnify and hold harmless Toronto Hydro and its Representatives from all claims, demands, actions, penalties, damages, losses, judgments and settlements, liabilities, costs, expenses, including legal fees and other related costs and expenses arising out of, related to, or incident to, the Consultant or any of its Representatives' performance of the Services under this Agreement, including, without limitation:

a) any breach, violation or non-performance by the Consultant or any of its Representatives of any terms, conditions, warranties, obligations or covenants contained in this Agreement;

b) any breach or violation by the Consultant or any of its Representatives of any Applicable Laws; and

c) any actions, omissions, negligence or wilful misconduct of the Consultant or any of its Representatives.

5.3 Insurance

(a) The Consultant shall, during the Term, and at its own expense, maintain and keep in full force and effect (and, when requested, provide Toronto Hydro with proof thereof) the following insurance:

(i) commercial general liability insurance on an occurrence basis having a minimum inclusive coverage limit, including personal injury and property damage, of not less than one million dollars ($1,000,000.00) per occurrence with property damage deductible of not more than fifty thousand dollars ($50,000.00), which commercial general liability insurance shall be extended to cover contractual liability, products and completed operations liability, contingent employer's liability, and owners/contractors protective liability;

(ii) Errors and Omissions Insurance (Professional Liability) in the amount of not less than four million dollars ($4,000,000.00); and

(iii) automobile liability insurance on all owned and non-owned vehicles used in connection with this Agreement, with such automobile insurance coverage having a limit of not less than one million dollars ($1,000,000.00) per vehicle, in respect of bodily injury (including passenger hazard), property damage and mandatory accident benefits.

(b) All insurance coverages and limits required to be maintained by the Consultant shall be primary to any insurance maintained by Toronto Hydro, which shall be excess and non-contributory. Prior to the commencement of the delivery of the Services, the Consultant shall deliver to Toronto Hydro a certificate of insurance which evidences the Consultant's compliance with this section, including the provision of a thirty (30) day prior written notice of cancellation, non-renewal or adverse material change, to Toronto Hydro.

(c) The Consultant agrees that the insurance described herein does in no way limit the Consultant's liability pursuant to the indemnity provisions of this Agreement.

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(d) A waiver of subrogation shall be provided by the insurer(s) to Toronto Hydro.

6. FEES

6.1 Fees

(a) In exchange for the performance of the Benchmarking Study, analysis and report Services detailed in Section 1 of SCHEDULE A and in accordance with the terms hereof, Toronto Hydro shall pay the Consultant a fee of [redacted] in accordance with the milestones detailed in SCHEDULE B, inclusive of all applicable taxes.

(b) In exchange for the performance of the Interrogatory Response and Expert Witness Services detailed in Section 2 of SCHEDULE A and in accordance with the terms hereof, Toronto Hydro shall pay the Consultant a fee on a time and material basis at the rates detailed in SCHEDULE B, inclusive of all applicable taxes.

(c) Without limiting the generality of the foregoing, the Consultant hereby agrees and acknowledges that all out-of-pocket expenses, travelling costs, and other disbursements shall be at the sole expense of the Consultant.

(d) The Consultant shall not incur or submit fees for any additional work outside the scope of the Services without prior written approval from Toronto Hydro.

6.2 Payment

The Consultant shall submit invoices to Toronto Hydro on a monthly basis or as otherwise agreed in Section 6.1(a) above, containing:

(i) a detailed description of the Services performed during the invoice period;

(ii) the dates and the amount of time spent by the Consultant for the provision of the Services;

(iii) the total HST applicable to the Services during the invoice period, as well as the Consultant's HST registration number; and

Unless otherwise provided in this Agreement, the Consultant shall invoice Toronto Hydro after final inspection and acceptance by Toronto Hydro of the Services performed and subject to receipt of all documents required by this Agreement. **Invoices must be sent electronically to: AP@torontohydro.com.** Subject to approval of the invoice by Toronto Hydro, receipt of all documents required by this Agreement, and final review by Toronto Hydro, Toronto Hydro shall make payment to the Consultant via electronic funds transfer not later than thirty (30) days following receipt of an acceptable invoice and the EFT Information (as set out below). **The Consultant must provide Toronto Hydro with, in the case of the first payment only, (i) a void cheque, pre-printed deposit slip or bank confirmation letter and (ii) the email address where the Consultant wishes to receive remittance information (together, "EFT Information"). EFT Information must be sent electronically to efthelp@torontohydro.com or to 14 Carlton Street, Toronto, ON, M5B 1K5, Attention: Treasury Department.** Toronto Hydro reserves the right to pay the Consultant through other payment methods.

6.3 Non-Residents: Permits and Withholding Tax

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(a) If applicable, the Consultant is responsible for applying, at its own expense, to Immigration Canada for admission of personnel into Canada and for obtaining work permits where required. All payments made by Toronto Hydro to non-residents of Canada will be made net of any required taxes or withholdings.

(b) Consultant acknowledges that it is a non-resident of Canada for income tax purposes and agrees that Toronto Hydro shall withhold any applicable non-resident withholding taxes from any amount owing hereunder and remit such taxes to the applicable federal taxing authority without provision for gross-up. Services provided in Canada should be detailed and separated from Services provided outside of Canada on invoices issued for payment.

7. SUSPENSION OR TERMINATION

7.1 Suspension or Termination

(a) Toronto Hydro may, at any time during the Term by notice in writing, suspend all or a portion of the Services. Upon receipt of such written notice, the Consultant shall perform no further work other than as directed by Toronto Hydro, and shall be entitled to payment for time spent in performing the Services up to the date of suspension.

(b) Either party may terminate this Agreement immediately upon written notice where the other party enters into liquidation, whether compulsory or voluntarily, or where a proceeding in receivership, bankruptcy or insolvency has been instituted by or against such party or its property.

(c) Toronto Hydro, at its sole discretion, may terminate this Agreement immediately upon written notice where the Consultant or any of its Representatives has been in default in the performance of its duties, obligations or undertakings under this Agreement, and has not taken immediate steps to remedy such default within five (5) Business Days following written notice of the specific default by Toronto Hydro. For the purposes of this section, a material default shall include, without limitation, a breach of any of the representations or warranties contained herein or the failure or refusal to provide the Services in accordance with the terms and conditions of this Agreement.

(d) Notwithstanding any other provision in this Agreement, Toronto Hydro, at its sole discretion, shall have the right to terminate this Agreement, for any reason, upon two (2) weeks written notice to the Consultant.

7.2 Effect of Termination

Upon the termination or expiration of this Agreement, the Consultant shall return to Toronto Hydro and delete any and all electronic copies the Consultant may have of all documents and materials in its possession relating to the Services or this Agreement, including all Confidential Information and all Developments, whether completed or not.

8. CONFIDENTIALITY

(a) In performing the Services required by this Agreement, the Consultant may be provided access to Confidential Information. The Consultant acknowledges and agrees that:

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(i) the Consultant shall not disclose, permit access to, transmit, or transfer the Confidential Information to any third party without the prior written authorization of Toronto Hydro;

(ii) the Consultant shall protect the confidentiality of the Confidential Information in its possession by exercising the same security measures it normally exercises with respect to its own confidential information and at minimum a reasonable standard of care;

(iii) upon the request of Toronto Hydro, and in any event upon the expiration or termination of this Agreement for any reason, the Consultant shall return (or delete, in the case of electronic documents) forthwith to Toronto Hydro all Confidential Information, including all copies and other materials containing the Confidential Information, which are in the possession or under the control of the Consultant;

(iv) the Consultant shall not use any Confidential Information for any purpose other than to perform the Services required by this Agreement. Without limiting the foregoing, the Consultant shall not, and shall not permit any of its Representatives to, use any Confidential Information in furtherance of its, or their, individual business or for its, or their, own benefit, profit or advantage, or for the benefit, profit or advantage of any other party; and

(v) Toronto Hydro is subject to MFIPPA and is governed by Governmental Authority such as the Independent Electricity System Operator ("IESO") and the Ontario Energy Board ("OEB") and shall have the right to disclose Confidential Information in accordance with the provisions of MFIPPA or as required by the IESO or the OEB.

(b) Notwithstanding the foregoing, the Consultant may disclose such Confidential Information:

(i) to any of the Representatives of the Consultant who agree to be bound by the obligations of confidentiality herein and who have a reasonable need to know such Confidential Information in the course of their duties for the Consultant but only for the purposes of the Consultant exercising its rights and obligations under this Agreement; and

(ii) in the event that the Consultant believes it is required by law to disclose, or is requested by a Governmental Authority to disclose, any Confidential Information to a Governmental Authority; provided that the Consultant shall, to the extent permitted by law, first inform Toronto Hydro of the request or requirement for disclosure to allow an opportunity for Toronto Hydro to apply for an order to prohibit or restrict such disclosure.

9. INTELLECTUAL PROPERTY

9.1 Use

Nothing in this Agreement shall be deemed to transfer, license, assign, permit the use of, or otherwise convey an interest in whole or in part to the Consultant of any Intellectual Property belonging to Toronto Hydro or any of its Representatives or any third party whose Intellectual Property is in Toronto Hydro's custody or control, and the use by the Consultant of any such Intellectual Property shall be subject to the prior written approval of Toronto Hydro.

9.2 Ownership

Toronto Hydro shall at all times have full rights and title to the Developments, and may at all times take possession of or use any completed or partially completed Developments, notwithstanding any

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provision, express or implied, to the contrary. Without limiting the generality of the foregoing, Toronto Hydro shall own all Intellectual Property rights in all Developments, and the Consultant hereby waives and assigns to Toronto Hydro any such rights, and agrees to give Toronto Hydro and its Representatives all assistance as may be reasonably required to perfect such rights including, without limitation and where the Consultant is a corporation or partnership, obtaining waiver of moral rights from any of the Consultant's employees, partners or other Representatives.

9.3 Intellectual Property Protection

The Consultant expressly warrants that the manufacture, delivery, sale or use of the Consultant's Services will not infringe any Canadian or foreign patents, trademarks, copyrights, industrial design or other intellectual property rights and the Consultant shall indemnify and save Toronto Hydro harmless from all claims, judgments and decrees that may be entered against Toronto Hydro or its Representatives and against all damage, liability, costs and expenses (including legal fees and other attendant costs and expenses**)** Toronto Hydro incurs by reason of any infringement or claim thereof.

9.4 Pre-Existing Intellectual Property

Any pre-existing Intellectual Proprietary ("Pre-Existing IP") of Consultant or its licensors used to perform Services, or included in any Development, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of the Consultant and its licensors (collectively, "Consultant Information"). To the extent that Consultant incorporates any Consultant Information into the Development(s), Consultant hereby grants to Toronto Hydro a fully paid up, royalty free, irrevocable and non-cancellable, non-exclusive, assignable and transferable right to Use the Consultant Information without restriction, except that any such Use must be in conjunction with the Developments in which the Consultant Information is incorporated and not as a separate item. For the purpose of the foregoing, "Use" means one or more of the following rights to: use; modify; adapt; translate; create changes, alterations, modifications, improvements, adoptions, enhancements and derivative works based upon or derived from the Consultant Information; reproduce; copy; display; perform; communicate in any manner; license or sublicense. Consultant shall provide Toronto Hydro with a list of any freeware, shareware or open source software used in the Developments. Any pre-existing intellectual property of Toronto Hydro, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of Toronto Hydro.

10. MISCELLANEOUS

10.1 Survival

In addition to the terms in this Agreement that by their nature survive the expiry or termination of the Agreement, the terms of Section 5 (Representations, Warranties and Indemnities), Section 8 (Confidentiality), Section 9 (Intellectual Property), and Section 10.2 (Injunctive Relief) shall survive the expiry of this Agreement for a term of five (5) years.

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10.2 Injunctive Relief

(a) The Consultant acknowledges and agrees that the terms of Section 8 (Confidentiality) and Section 9 (Intellectual Property) of this Agreement are reasonably necessary to protect the legitimate interests of Toronto Hydro, are reasonable in scope and duration, and are not unduly restrictive.

(b) The Consultant further acknowledges that a breach of any of the terms of Section 8 (Confidentiality) or Section 9 (Intellectual Property) would render irreparable harm to Toronto Hydro, and that a remedy at law for breach of these sections would be inadequate, and that Toronto Hydro shall therefore be entitled to any and all equitable relief, including, without limitation, injunctive relief without proof of actual damages, and any other remedy that may be available at law or in equity.

10.3 Subcontracting

The Consultant may not subcontract the performance of any part of the Services without Toronto Hydro's prior written approval. Where Toronto Hydro provides its prior written approval to the Consultant to subcontract all or part of the Services, then the Consultant shall enter into agreements with such permitted subcontractor(s) to require the permitted subcontractor(s) to provide Services in accordance with all of the terms of this Agreement. Notwithstanding the foregoing, the Consultant shall remain liable for any and all acts or omissions of any subcontractor(s) as if such acts or omissions were those of Consultant.

10.4 Force Majeure

Either party will be relieved of liability for delays in performance of its obligations hereunder where such delay is a result of Force Majeure. The party affected by the Force Majeure shall give prompt notice thereof to the other party and, upon cessation of the Force Majeure, shall take all reasonable steps to resume the performance of its obligations hereunder. If a delay in performance by reason of Force Majeure extends beyond thirty (30) Business Days, then either party may terminate this Agreement by written notice.

10.5 Waiver

No delay on the part of either party in exercising any of its rights hereunder or failure to exercise the same, nor the acquiescence thereto shall operate as a waiver except in the specific instance for which it is given and where such waiver is provided in writing by the party waiving its rights.

10.6 Amendments

None of the terms, conditions or provisions of this Agreement shall be varied, modified or altered except by written agreement signed by an authorized representative of each parties.

10.7 Assignment

Save and except for Toronto Hydro's right to assign this Agreement to any of its Affiliates, neither party may assign this Agreement or any of their rights or obligations hereunder, without the prior written authorization of the other party.

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10.8 Enurement

This Agreement shall enure to the benefit of, and be binding upon, the parties hereto and their respective successors and permitted assigns.

10.9 Severability

In the event that any provision or portion of this Agreement is determined to be invalid or unenforceable for any reason, the remaining provisions or portions of this Agreement will be unaffected and will remain in full force and effect to the fullest extent permitted by law.

10.10 Non-Exclusive Agreement

This Agreement will not be interpreted to grant to the Consultant exclusive rights to provide the Services or to bind Toronto Hydro in any way to an exclusive relationship with the Consultant with regards to the Services or any other service. However, Consultant shall not provide services to an Intervenor (whether as an employee, contractor, consultant, agent, or officer) that are (i) the same or similar to the services provided to the Client under this Agreement, or (ii) likely to result in disclosure of Client Confidential Information to an Intervenor or the use of Client Confidential Information on behalf of a Intervenor.

10.11 Neutral Construction

The parties to this Agreement agree that this Agreement was negotiated fairly between them at arm's length, that the final terms of this Agreement are the product of the parties' negotiations, and that this Agreement shall be deemed to have been jointly and equally drafted by them, and that the provisions thereof should not be construed against a party on the grounds that such party drafted the Agreement in whole or in part.

10.12 Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof. This Agreement supersedes any and all prior correspondence, warranties, covenants, collateral undertakings, or agreements, oral or otherwise, express or implied, unless otherwise contained herein.

10.13 Notices

(a) All questions or other communications regarding this Agreement, including any notices required by this Agreement, are to be addressed to the following addresses:

to Toronto Hydro:

Name:	Daliana Coban
Title:	Director, Regulatory Applications & Business Support
Address:	14 Carlton Street, Toronto, ON M5B 1K5
Telephone:	(416) 542-2627

with copy to:

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Title:	EVP, Public and Regulatory Affairs & Chief Legal Officer
Address:	14 Carlton, Toronto Hydro, ON M5B 1K5
Telephone:	(416) 542-3000
Email:	legal@torontohydro.com

to the Consultant:

Name:	Nicholas Austin
Title:	V.P. of Consultancy
Address:	111 Littleton Road, Suite 111 Parsippany, NJ 07054
Telephone:	216-396-3179
Facsimile:	973-335-7738
Email:	naustin@umsgroup.com

(b) All notices or communications shall be deemed to be received on the date of acceptance (as evidenced by the signature of the party) if delivered by personal delivery or courier, on the fifth (5th) Business Day after mailing, if mailed by first class mail, or on the first (1st) Business Day after transmission, if sent by facsimile (provided the transmission is evidenced by documented proof of proper fax transmittal).

10.14 Governing Law

This Agreement shall be governed by and construed in accordance with the law of the Province of Ontario and the laws of Canada applicable therein.

10.15 Execution

This Agreement may be signed in counterparts and delivered by electronic means, each of which shall be deemed an original and all of which, together, shall have the same effect as if all constitute one and the same Agreement.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first written above:

UMS Group Inc.

Per: DocuSigned by: Nicholas Austin 4A12A48F4EA448A...

Name: Nicholas Austin

Title: V.P. of Consultancy

I have authority to bind the Consultant.

Toronto Hydro-Electric System Limited

Per: DocuSigned by: Amanda Klein C9DD79AEAAA64A5...

Name: Amanda Klein

Title: Executive Vice-President, Public and Regulatory Affairs and Chief Legal Officer

I have authority to bind Toronto Hydro.

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SCHEDULE A

SERVICES

1. Benchmarking Services to be Performed

Consultant shall, for the fixed fee set out in Section 6.1(a) of the Agreement, supply Benchmark Study Services to assess the efficiency of Toronto Hydro's system investment and maintenance program execution and identify opportunities for continuous improvement, including:

- Reviewing and evaluating Toronto Hydro's methodology for deriving unit costs and comparing this methodology to industry best practices (either those already known to Consultant from previous work and / or those identified while performing this review).
- Producing a list of specific asset categories and maintenance practices to be benchmarked, such list to be finalized at the project kickoff meeting. Lists provided to Consultant in relation to previous requests for proposals for Overhead Pole Replacement, Underground Cable and Duct Replacement, Station Breaker and Switchgear Replacement, Vegetation Management, Pole Testing, Overhead Line Patrols, Overhead Switch Maintenance, and Underground Vault and Equipment Inspections may be used as a viable starting point for discussion.
- An assessment of the reasonableness of the derived and actual unit costs based on "normalized" industry comparisons. A peer group panel will form the basis of these comparisons, the composition of which will be firmed up during the Project Kickoff Meeting.
- Identifying any external factors (e.g., key technical, environmental, and regulatory drivers) that may need to be accounted for in either "normalizing" the comparisons or offering rationale for what could be deemed acceptable variances.
- The presentation of economic, technical, or other considerations that may be required if Consultant offers recommended practices to improve upon actual unit costs.
- A report of preliminary findings.
- A written report which, upon THESL's review and alignment with the preliminary findings, will be used to detail the methodology and analysis performed and ensuing findings and recommendations. The Consultant shall comply with the requirements set out in Rule 13A of the OEB's Rules of Practice and Procedure, appended hereto as Appendix A.1 in the preparation of the report.

2. Application Support and Expert Witness Services

Consultant shall, as per Section 6.1(b) of the Agreement, provide Application Support and Expert Witness Services on a time and material basis at the rates detailed in SCHEDULE B. Such Application Support and Expert Witness Services shall include:

- Respond to any interrogatories applicable to the report and appear at a technical conference if requested.
- If requested or required, testify to the study's findings as an expert witness in the hearing of the 2025 Rate Application at the OEB, and support providing undertakings resulting from the hearing.

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- Where the Consultant is required to testify or otherwise provide evidence at a hearing before the OEB, the Consultant shall comply with the requirements set out in rule 13A of the OEB's Rules of Practice and Procedure, appended hereto as APPENDIX A.1

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APPENDIX A.1

Rules of Practice and Procedure

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12. Affidavits

12.01 An affidavit shall be confined to the statement of facts within the personal knowledge of the person making the affidavit unless the facts are clearly stated to be based on the information and belief of the person making the affidavit.

12.02 Where a statement is made on information and belief, the source of the information and the grounds on which the belief is based shall be set out in the affidavit.

12.03 An exhibit that is referred to in an affidavit shall be marked as such by the person taking the affidavit, and the exhibit shall be attached to and filed with the affidavit.

12.04 The OEB may require the whole or any part of a document filed to be verified by affidavit.

13. Written Evidence

13.01 Other than oral evidence given at the hearing, where a party intends to submit evidence, or is required to do so by the OEB, the evidence shall be in writing and in a form approved by the OEB.

13.02 The written evidence shall include a statement of the qualifications of the person who prepared the evidence or under whose direction or control the evidence was prepared.

13.03 Where a party is unable to submit written evidence as directed by the OEB, the party shall:

(a) file such written evidence as is available at that time;

(b) identify the balance of the evidence to be filed; and

(c) state when the balance of the evidence will be filed.

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

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(a) the expert's name, business name and address, and general area of expertise;

(b) the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;

(c) the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;

(d) the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;

(e) in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and

(f) an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

(a) in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and

(b) at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

(a) scope and timing;

(b) the involvement of any expert engaged by the OEB;

(c) the costs associated with the conduct of the activities;

(d) the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of **Rule 13A.04**; and

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(e) any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A**.

14. Disclosure

14.01 A party who intends to rely on or refer to any document that has not already been filed in a proceeding shall file and serve the document 24 hours before using it in the proceeding, unless the OEB directs otherwise.

14.02 Any party who fails to comply with **Rule 14.01** shall not put the document in evidence or use it in the cross-examination of a witness, unless the OEB otherwise directs.

14.03 Where the good character, propriety of conduct or competence of a party is an issue in the proceeding, the party is entitled to be furnished with reasonable information of any allegations at least 15 calendar days prior to the hearing.

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SCHEDULE B

Purchase Price

a. In furtherance of Section 6.1(a) Fees, the Benchmarking Study and associated work, a base purchase price of [redacted], invoiced and paid as follows:
   i. [redacted] - Kickoff
   ii. [redacted] - Initiation of Benchmarking Effort
   iii. [redacted] - Conclusion of Benchmarking Effort
   iv. [redacted] - Delivery of Unit Cost Report

b. In furtherance of Section 6.1(b) Fees, Application Support and Expert Witness Services, hourly fees are as follows:
   i. SVP (Jeff Cummings): [redacted] (CAD)
   ii. VP (Nick Austin): [redacted] (CAD)
   iii. Senior Associate (Johnny Shearman) - [redacted] (CAD)

c. Any direct expenses will be additional to the fixed professional fees stated above in section (b), and will be invoiced monthly at cost (i.e., no administrative markup). All invoices will specify net thirty (30) days for payment, with offer of early payment discounts for 15 days of 0.5 percent.

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SCHEDULE C

DEFINITIONS

In this Agreement, the following definitions shall apply:

"Affiliates"	has the meaning prescribed to it in the *Business Corporations Act* of Ontario, as amended from time to time;
"Agreement"	means this Agreement for Professional Consulting Services, including all recitals, schedules and attachments thereto;
"Anticipated Hours"	has the meaning prescribed in Section 4.2;
"Applicable Laws"	means all federal, provincial and municipal statutes, regulations, codes, by-laws, orders in council, directives, rules, guidelines and ordinances applicable to this Agreement, including without limitation all applicable OEB codes, rules or guidelines;
"Application Support and Expert Witness Services"	means the Services defined in Section 2 of SCHEDULE A;
"Benchmark Study"	means the Services defined in Section 1 of SCHEDULE A;
"Business Day"	means a day on which banks are open for business in the City of Toronto, Ontario, but does not include a Saturday, Sunday, or a civic or statutory holiday in the Province of Ontario;
"Confidential Information"	means the terms of this Agreement and any and all data or information relating to the business, management or affairs of Toronto Hydro, its customers, employees, or any of its Affiliates disclosed by Toronto Hydro to the Consultant pursuant to this Agreement, whether or not such Confidential Information is expressly identified as confidential. Notwithstanding the foregoing, Confidential Information does not include any information or data which: (a) information or data that is or becomes publicly known through no breach of the terms or conditions of this Agreement; (b) information or data that is independently developed without reference to Confidential Information and without breach of the terms and conditions of this Agreement; or (c) Confidential Information that is required by court order or other legal compulsion to be disclosed, in which case the Consultant shall give Toronto Hydro prior written notice of such disclosure, as permitted by law;
"Consultant"	Means UMS Group Inc.;
“Consultant Information”	has the meaning prescribed in Section 9.4;
"Development"	means any and all works prepared, generated, created or designed by the Consultant pursuant to this Agreement, including without limitation all drawings, models, designs, formulae, methods, documents, reports,

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	software, specifications, or source codes, and any related works, enhancements, modifications or additions thereto;
"Fees"	shall have the meaning as prescribed in Subsection 6.1(a);
"Force Majeure"	means any impediments beyond the control of the applicable party due, wholly or in part, directly or indirectly, to: strikes, lockouts, riots, epidemics, war, governmental regulations, fire, explosions, acts of God, or any other impediment beyond the control of the party affected;
"Governmental Authority"	means any government, legislature, municipality, regulatory authority, agency, commission, department, board or court or other law, regulation or rule-making public entity of similar authority, including, without limitation the OEB;
"Guidelines"	has the meaning prescribed in Subsection 4.5(d);
"HST"	means Harmonized Sales Tax;
"IESO"	means the Independent Electricity System Operator;
"Initial Term"	has the meaning prescribed to it in Section 3.1;
"Intellectual Property"	includes all trademarks, copyrights, patents, business names, trade secrets, proprietary software, analysis or techniques (whether or not patented or patentable), confidential or secret designs and processes, source codes, plans or devices, or other proprietary and intellectual property rights;
"Key Employee"	has the meaning prescribed in Section 4.3;
"MFIPPA"	means the *Municipal Freedom of Information Act;*
"OEB"	means the Ontario Energy Board;
"PIPEDA"	means the *Personal Information Protection and Electronic Documents Act* (Canada);
"Pre-Existing IP"	has the meaning prescribed to it in Section 9.4;
"Privacy Laws"	has the meaning prescribed to it in Section 4.5;
"Representative"	in respect of a party, means such party's directors, officers, employees, agents, contractors and advisors, the party's Affiliates, and all such Affiliates' respective directors, officers, employees, agents, contractors and advisors;

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"Remittances"	has the meaning prescribed to it in Subsection **Error! Reference source not found.**;
"Services"	means all of the Developments, services and specifications to be provided, performed and met by the Consultant under this Agreement, as more particularly described in SCHEDULE A;
“Service Level”	means the standards for the performance of the Services and for Vendor’s management of Security Incidents, as more particularly set out in this Agreement;
“Specifications”	means for any Service, deliverable, vendor system or vendor facility, the technical, functional, physical or other relevant specification, documentation, or requirements set out in the Agreement, otherwise in identified in writing by the parties, or otherwise inherent or necessarily included as part of the specification or requirements specifically set out herein or therein, including any operating manuals or operating plans referenced in a SOW;
"Term"	has the meaning prescribed to it in Section 3.1; and
"Toronto Hydro"	means Toronto Hydro-Electric System Limited.
"2025 Rate Application"	means the application filed by Toronto Hydro with the OEB for the approval of the 2025-2029 electricity rates.

Agreement for Professional Consulting Services

THIS AGREEMENT is made this 12th day of September, 2022 ("Effective Date")

BETWEEN:

Toronto Hydro-Electric System Limited,

a corporation incorporated under the laws of Ontario

(hereinafter called "Toronto Hydro")

and

ScottMadden Inc.,

a corporation incorporated under the laws of North Carolina

(hereinafter called the "Consultant")

WHEREAS:

A. Toronto Hydro has retained the Consultant to provide certain consulting services as detailed in SCHEDULE A (collectively, the "Services"); and

B. the Consultant has indicated to Toronto Hydro that it has the skill and expertise to provide the Services on the terms and conditions set forth herein;

NOW THEREFORE, in consideration of the mutual covenants set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. INTERPRETATION

Unless otherwise indicated, all capitalized terms in this Agreement shall be as defined in SCHEDULE C and any reference to currency in this Agreement shall refer to lawful money of Canada.

2. RELATIONSHIP OF THE PARTIES

2.1 Retainer

Toronto Hydro hereby retains the Consultant to provide the Services, and the Consultant hereby agrees to provide the Services, during the Term, in accordance with the terms and subject to the conditions of this Agreement.

2.2 Independent Contractors

(a) Notwithstanding any provision hereof, this Agreement does not constitute and shall not be construed as constituting a partnership, joint venture, principal/agency relationship, or employer/employee relationship between the parties. The Consultant acts at all times in the capacity of an independent contractor, and neither party shall represent itself to be an agent or employee of the other. The Consultant and its Representatives have no authority to commit, act for or on behalf of Toronto Hydro, or to bind Toronto Hydro to any obligation or liability.

(b) Without limiting the generality of Section 2.2(a), the Consultant hereby acknowledges and agrees that neither it nor its Representatives shall be eligible or entitled, by reason of this Agreement, to participate in any employee-related program offered by Toronto Hydro or any of its Affiliates, including, without limitation, any benefit, insurance, compensation, health plan, bonus or retirement program.

(c) The Consultant hereby covenants and agrees to indemnify, defend and hold harmless Toronto Hydro and its Representatives from and against all costs, liabilities or claims whatsoever against Toronto Hydro or its Representatives resulting from or relating to the Consultant or its Representatives being deemed to be an employee of Toronto Hydro or any of its Affiliates.

(d) The Consultant hereby acknowledges and agrees that Toronto Hydro shall not be responsible for and shall not have control or charge of any means, methods, techniques, sequences or procedures used for or in respect of the Services, or for the safety precautions or programs required for the Services or otherwise prescribed hereunder.

2.3 Conflicts of Interest

Anything in this Agreement to the contrary notwithstanding and for avoidance of doubt, where Toronto Hydro is the Applicant in an Ontario Energy Board ("OEB") proceeding and has retained Consultant to support a component(s) of that Application, Consultant must obtain Toronto Hydro's consent in writing to provide services to any other entity in any capacity other than Toronto Hydro at the proceeding. Where Toronto Hydro is involved in an OEB proceeding as an intervenor and/or participant, but not as an Applicant, the Consultant may provide services to any other entity in any capacity provided that the Consultant utilizes confidentiality or other safeguards, including, but not limited to separate engagement teams and data access controls for the protection of Toronto Hydro's Confidential Information. Consultant commits to comply strictly with the confidentiality terms of this Agreement and to restrict access to – and use of – Toronto Hydro Confidential Information as set out in this Agreement.

3. TERM

3.1 Initial Term

This Agreement shall be effective as of the Effective Date and shall continue, unless terminated in accordance with the terms hereof or extended pursuant to Section 3.2, for a period of four (4) years (the "Initial Term").

3.2 Renewal

Toronto Hydro may, at its sole option, elect to renew this Agreement for two (2) additional one (1) year terms (each a "Renewal Term") by giving written notice to the Consultant at least thirty (30) days before the end of the Initial Term or the first Renewal Term (as applicable). The same terms and conditions contained herein shall apply during the Renewal Term(s), save and except as amended in writing by the parties.

3.3 Term

The Initial Term and Renewal Term, if any, shall hereinafter together be referred to as the "Term".

4. SERVICE REQUIREMENTS

4.1 Services

During the Term, the Consultant shall perform the Services as detailed in SCHEDULE A hereto

(a) in accordance with the terms and subject to the conditions set forth in this Agreement;

(b) using personnel of required skill, experience, licences and qualifications;

(c) in a workerlike and professional manner; and

(d) consistent with standards generally observed by reputable and competent members of the same industry providing similar services.

4.2 Revision to Services

(a) The Parties acknowledge and agree that the Services to be undertaken and completed by the Consultant under this Agreement may be subject to revision or amendment from time to time during the Term: (i) as required by Toronto Hydro to comply with the Guidelines; (ii) as required by Toronto Hydro to comply with Applicable Laws or any order, instruction, directive or legal requirement of a Governmental Authority; or (iii) as required by Toronto Hydro to ensure that Toronto Hydro receives the expected funding and benefits with respect to the project to which the Services relate.

(b) Toronto Hydro agrees to provide the Consultant with written notice of any revision or amendment to the Services required pursuant to this Section 4.2, and the Consultant shall comply with all such directives.

(c) In the event that the Consultant fails to comply with a directive issued by Toronto Hydro pursuant to this Section 4.2, Toronto Hydro shall have the right, in addition to any other

remedies which may be available to Toronto Hydro hereunder or otherwise at law, to terminate this Agreement by giving written notice of termination to the Consultant whereupon this Agreement shall terminate as at the effective date of termination specified in the notice and Section 7 shall apply.

4.3 Applicable Laws

(a) The Consultant shall, at its sole expense, obtain and maintain during the Term of this Agreement, all permits, licences and approvals required to perform its obligations under this Agreement in accordance with Applicable Laws. The terms and conditions of this Agreement shall be carried out in strict compliance with all Applicable Laws and in the event of any conflict between any Applicable Laws, the Applicable Laws with the most stringent standard shall apply.

(b) Without limiting the generality of the foregoing, the Consultant shall comply with the *Municipal Freedom of Information and Protection of Privacy Act* (Ontario) ("MFIPPA"), the *Personal Information Protection and Electronic Documents Act* (Canada) ("PIPEDA") and any other applicable privacy legislation (collectively, "Privacy Laws") with respect to any personal information collected, used or disclosed in connection with this Agreement and shall indemnify and hold harmless Toronto Hydro and its Representatives from and against any and all claims, demands, suits, losses, damages, causes of action, fines or judgments (including related expenses and legal costs) they may incur related to or arising out of any non-compliance therewith.

(c) Where any Deliverable is subject to the approval or review of any authority, department, government or agency other than Toronto Hydro, such applications for approval or review shall, unless otherwise authorized by Toronto Hydro in writing, be prepared by the Consultant to be approved and submitted by and through the offices of Toronto Hydro, and the Consultant shall not have any direct dealings with the authority, department, government or agency in question with regards to the Deliverable.

(d) The Consultant and the Consultant's personnel and Representatives shall comply with all rules and direction of Toronto Hydro, whether specified in this Agreement or otherwise, while working on Toronto Hydro's premises or when accessing or connecting to Toronto Hydro's information technology systems, including rules and directions concerning health, safety, security and environmental protection, including without limitation, Toronto Hydro's *Code of Business Conduct and Whistleblower Procedure,* Toronto Hydro's *Disclosure Policy,* Toronto Hydro's *Social Media and Digital Communication Policy,* Toronto Hydro's *Accessibility Policy,* Toronto Hydro's *Workplace Harassment Policy and Program,* Toronto Hydro's *Violence Prevention in the Workplace Policy,* Toronto Hydro's *Workplace Alcohol and Drug Policy*, Toronto Hydro's *Environmental Policy,* Toronto Hydro's *Occupational Health and Safety Policy,* Toronto Hydro's *Privacy Policy,* Toronto Hydro's *Cyber Security Policy*, Toronto Hydro's *Technology Use Guidelines*, Toronto Hydro's *Physical Security Policy*, Toronto Hydro's *COVID-19 Vaccination Policy,* and the *Affiliate Relationships Code for Electricity Distributors and Transmitters* issued by the OEB (together, the "Guidelines"). Toronto Hydro premises includes, but is not limited to, all Toronto Hydro-owned or leased buildings, sites, work centres, stations, substations, vaults, radio antenna sites, and any other location where Toronto Hydro stores or maintains physical assets. The Consultant agrees to comply with and to direct its Representatives to comply with such Guidelines, as amended.

4.4 Performance

(a) The Services shall be performed to the satisfaction of Toronto Hydro, and Toronto Hydro shall have the right at all reasonable times, to inspect or otherwise review the Services performed or being performed. The Consultant shall, upon the request of Toronto Hydro, acting reasonably, provide Toronto Hydro with written reports of the status of the Deliverables and the Consultant's progress in providing the Services.

(b) In the event of any dispute between Toronto Hydro and the Consultant relating to the quality or acceptability or rate of progress of any of the Services, or relating to the interpretation of any instructions or specifications concerning the Services, Toronto Hydro and the Consultant shall attempt to mutually reach a resolution in good faith. Failing a good faith resolution, the reasonable opinion of Toronto Hydro shall govern and be binding on the parties hereto.

5. REPRESENTATIONS, WARRANTIES, INDEMNITIES AND INSURANCE

5.1 Representations and Warranties

The Consultant hereby represents, warrants and agrees that:

(a) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has/have the necessary experience and qualifications to perform the Services;

(b) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) will perform the Services in a diligent, expeditious and workerlike manner, consistent with standards generally observed by reputable and competent members of the same industry providing similar services;

(c) all Services shall be the Consultant's (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) original work and none of the Services or any invention, development, use, production, distribution or exploitation relating thereto will infringe, misappropriate or violate any intellectual property or other right of any person or entity.

(d) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has the corporate power and authority to enter into this Agreement and to perform its obligations hereunder, and that this Agreement constitutes a legal, valid, and binding obligation of the Consultant, enforceable against the Consultant in accordance with its terms.

5.2 Indemnity

a) The Consultant shall be liable for and shall indemnify, defend and hold harmless Toronto Hydro and its Representatives from all claims, demands, actions, penalties, damages, losses, judgments and settlements, liabilities, costs, expenses, including legal fees and other related costs and expenses arising out of, related to, or incidental to, the Consultant or any of its Representatives' performance of the Services under this Agreement, including, without limitation:

i. any breach, violation or non-performance by the Consultant or any of its Representatives of any terms, conditions, warranties, obligations or covenants contained in this Agreement;
ii. any breach or violation by the Consultant or any of its Representatives of any Applicable Laws; and
iii. any actions, omissions, negligence or wilful misconduct of the Consultant or any of its Representatives

except to the extent caused by the negligence or wilful misconduct of Toronto Hydro or its Representatives.

b) In no event shall either party be liable for loss of profit or use or for any indirect, special, incidental or consequential damages of any nature or kind including but not limited to delays, loss of revenue, loss of use, loss of data, loss of product, costs of capital or costs or replacement power, even if that party has been advised of the possibility of such damages.

c) Subject to Section 5.2(d), the Consultant's liability for a claim for damages shall be limited to the maximum amounts payable by Toronto Hydro to the Consultant for the Term pursuant to SCHEDULE B.

d) Notwithstanding the foregoing, no exclusion or limitation of liability shall apply to:

i. Breach of the confidentiality or privacy obligations in this Agreement
ii. Intentional misconduct or gross negligence;
iii. Breach of Applicable Law; or
iv. Breach of intellectual property indemnity in Section 9.

5.3 Insurance

The Consultant shall, during the Term, and at its own expense, maintain and keep in full force and effect (and, when requested, provide Toronto Hydro with proof thereof):

(a) commercial general liability insurance on an occurrence basis having a minimum inclusive coverage limit, including personal injury and property damage, of not less than five million dollars ($5,000,000) per occurrence, which commercial general liability insurance shall be extended to cover contractual liability, products and completed operations liability, and owners/contractors protective liability;

(b) Errors and Omissions Insurance (Professional Liability) covering actual or alleged acts, errors or omissions committed by the Consultant or its Representatives, arising out of the performance of this Agreement, which shall also extend to include personal injury, bodily injury and property damage from the performance of professional services, in the amount of not less than two million dollars ($2,000,000);

(c) All insurance coverages and limits required to be maintained hereunder shall: (i) be primary to any insurance maintained by Toronto Hydro, which insurance shall be excess and non-contributory; (ii) contain a cross liability clause and a severability of interest clause; and (iii) contain a thirty (30) day prior written notice to Toronto Hydro for any cancellation, non-renewal or adverse material change.;

(d) The Consultant agrees that the insurance required hereunder in no way limits the Consultant's liability pursuant to the Liability and Indemnity provision in Section 5.3; and

(e) A waiver of subrogation shall be provided by the insurer(s) to Toronto Hydro.

6. FEES

6.1 Fees

(a) Subject to Section 6.1(c) - 6.1(f), in exchange for the performance of the Services in accordance with the terms hereof, Toronto Hydro shall pay the Consultant the rates outlined in SCHEDULE B, not including HST (the "Fees"). Fees shall not be in excess of the maximum amounts set out in SCHEDULE B.

(b) The Fees noted in Section 6.1(a) shall be the only fees payable by Toronto Hydro under this Agreement. Without limiting the generality of the foregoing, the Consultant hereby agrees and acknowledges that all out-of-pocket expenses, travelling costs, and other disbursements shall be at the sole expense of the Consultant, except with the prior written approval from Toronto Hydro.

(c) Any disbursements for additional incidentals incurred by the Consultant in relation to this Agreement ("Disbursements") must be pre-approved by Toronto Hydro in writing.

(d) The Consultant shall not incur or submit invoices for any work outside the scope of the Services without prior written approval from Toronto Hydro.

(e) The Consultant shall make all payment of taxes, employment insurance premiums, pension plan contributions and any other taxes or other payment of any nature, imposed by any authority in respect of the Fee paid by Toronto Hydro to the Consultant under this Agreement (together, the "Remittances"), and the Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities and claims whatsoever against Toronto Hydro or its Representatives, in any way arising out of or relating to any failure to deduct, withhold, or remit any Remittance.

(f) Without limiting the generality of Section 6.1(a), Toronto Hydro reserves the right to deduct any applicable non-resident withholding taxes from any Fee owing to the Consultant under this Agreement and remit such amounts to the applicable taxation authority.

6.2 Payment

The Consultant shall submit invoices to Toronto Hydro on a monthly basis containing:

(a) a description of the Services performed during the invoice period;

(b) the monthly payment amount;

(c) the total HST applicable to the Services during the invoice period, as well as the Consultant's HST registration number; and

(d) a detailed description of the Disbursements incurred around the invoice period, supported by documentation in a form acceptable to Toronto Hydro.

Unless otherwise provided in this Agreement, the Consultant shall invoice Toronto Hydro after final inspection and acceptance by Toronto Hydro of the Services performed and subject to receipt of all documents required by this Agreement. **Invoices must be sent electronically to: AP@torontohydro.com.** Subject to approval of the invoice by Toronto Hydro, receipt of all documents required by this Agreement, and final review by Toronto Hydro, Toronto Hydro shall make payment to the Consultant via electronic funds transfer not later than thirty (30) days following receipt of an acceptable invoice and the EFT Information (as set out below). **The Consultant must provide Toronto Hydro with, in the case of the first payment only, (i) a void cheque, pre-printed deposit slip or bank confirmation letter and (ii) the email address where the Consultant wishes to receive remittance information (together, "EFT Information"). EFT Information must be sent electronically to efthelp@torontohydro.com or to 14 Carlton Street, Toronto, ON, M5B 1K5, Attention: Treasury Department.** Toronto Hydro reserves the right to pay the Consultant through other payment methods.

7. SUSPENSION OR TERMINATION

7.1 Suspension or Termination

(a) Toronto Hydro may, at any time during the Term by notice in writing, suspend all or a portion of the Services. Upon receipt of such written notice, the Consultant shall perform no further work other than as directed by Toronto Hydro, and shall be entitled to payment for time spent in performing the Services up to the date of suspension.

(b) Either party may terminate this Agreement immediately upon written notice where the other party enters into liquidation, whether compulsory or voluntarily, or where a proceeding in receivership, bankruptcy or insolvency has been instituted by or against such party or its property.

(c) Toronto Hydro, at its sole discretion, may terminate this Agreement immediately upon written notice where the Consultant or any of its Representatives has been in material default in the performance of its duties, obligations or undertakings under this Agreement, and has not taken immediate steps to remedy such default within two (2) Business Days following written notice of the specific default by Toronto Hydro. For the purposes of this section, a material default shall include, without limitation, a breach of any of the representations or warranties contained herein or the failure or refusal to provide the Services in accordance with the terms and conditions of this Agreement.

(d) Notwithstanding any other provision in this Agreement, Toronto Hydro, at its sole discretion, shall have the right to terminate this Agreement, for any reason, upon two (2) weeks written notice to the Consultant.

(e) In the event that this Agreement is terminated in accordance with this Section 7.1 by either party, the Consultant shall be entitled to payment for time spent in performing the Services up to the date of suspension.

7.2 Effect of Termination

Upon the termination or expiration of this Agreement, upon Toronto Hydro's request, the Consultant shall return to Toronto Hydro and delete any and all electronic copies the Consultant may have of all documents and materials in its possession relating to the Services or this Agreement, including all Confidential Information and all Deliverables, whether completed or not and shall, upon written request by Toronto Hydro, certify in writing to Toronto Hydro that it has complied with the requirements of this Section 7.2.

8. CONFIDENTIALITY

8.1 Non-Disclosure

In performing the Services required by this Agreement, the Consultant may be provided access to Confidential Information. The Consultant acknowledges and agrees that:

(a) the Consultant shall not disclose, permit access to, transmit, or transfer the Confidential Information to any third party without the prior written authorization of Toronto Hydro;

(b) the Consultant shall protect the confidentiality of the Confidential Information in its possession by exercising the same security measures it normally exercises with respect to its own confidential information and at minimum a reasonable standard of care;

(c) upon the request of Toronto Hydro, and in any event upon the expiration or termination of this Agreement for any reason, the Consultant shall return (or delete, in the case of electronic documents) forthwith to Toronto Hydro all Confidential Information, including all copies and other materials containing the Confidential Information, which are in the possession or under the control of the Consultant; and

(d) the Consultant shall not use any Confidential Information for any purpose other than to perform the Services required by this Agreement. Without limiting the foregoing, the Consultant shall not, and shall not permit any of its Representatives to, use any Confidential Information in furtherance of its, or their, individual business or for its, or their, own benefit, profit or advantage, or for the benefit, profit or advantage of any other party.

(e) Toronto Hydro is subject to MFIPPA and is governed by Governmental Authority such as IESO and the OEB and shall have the right to disclose Confidential Information in accordance with the provisions of MFIPPA or as required by the IESO or the OEB.

Notwithstanding the foregoing, the Consultant may disclose such Confidential Information to any of the Representatives of the Consultant who agree to be bound by the obligations of confidentiality herein and who have a reasonable need to know such Confidential Information in the course of their duties for the Consultant but only for the purposes of the Consultant exercising its rights and obligations under this Agreement; and in the event that the Consultant believes it is required by law to disclose, or is requested by a Governmental Authority to disclose, any Confidential Information to a Governmental Authority; provided that the Consultant shall, to the extent permitted by law, first inform Toronto Hydro of the request or requirement for disclosure to allow an opportunity for Toronto Hydro to apply for an order to prohibit or restrict such disclosure.

8.2 Non-Solicitation

Unless Toronto Hydro's Chief Executive Officer provides prior written consent, the Consultant hereby covenants and agrees that during the term of this Agreement and for a period of two (2) years following the termination of the Agreement, however caused, the Consultant will not directly or indirectly, either individually or in partnership or jointly or in conjunction with any other Person,

(a) hire or otherwise engage any Protected Employee who is currently employed by Toronto Hydro;

(b) hire or otherwise engage any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause;

(c) solicit or attempt to solicit any Protected Employee who is currently employed by Toronto Hydro or encourage any such person to leave his/her employment with Toronto Hydro; and

(d) solicit or attempt to solicit any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause.

8.3 Non-Compete

Given the unique expertise and intimate knowledge that the employees have of the operations of Toronto Hydro the Consultant acknowledges and agrees that the restrictions contained in this section are reasonable and necessary to preserve the value of Toronto Hydro's business.

(a) During the Term and for a period of ten (10) years following the termination of this Agreement, the Consultant shall not appear as an Intervenor, nor aid, assist, or provide services to an Intervenor (whether as an employee, contractor, consultant, agent, or officer) in accordance with the conditions agreed to in section 2.3 of this Agreement and where the services are likely to result in disclosure of Toronto Hydro's Confidential Information to an Intervenor or the use of Toronto Hydro's Confidential Information on behalf of an Intervenor;

(b) During the Term, the Consultant shall not aid, assist, or provide services to the OEB; and

(c) For a period of ten (10) years following the termination of this Agreement, the Consultant shall not aid, assist, or provide services to the OEB (whether as an employee, contractor, consultant, agent, or officer) in accordance with the conditions agreed to in section 2.3 of this Agreement and where the services are likely to result in disclosure of Toronto Hydro's Confidential Information to the OEB or the use of Toronto Hydro's Confidential Information in the service of the OEB.

9. INTELLECTUAL PROPERTY

9.1 Use

Nothing in this Agreement shall be deemed to transfer, license, assign, permit the use of, or otherwise convey an interest in whole or in part to the Consultant of any Intellectual Property belonging to Toronto Hydro or any of its Representatives or any third party whose Intellectual Property is in Toronto Hydro's custody or control, and the use by the Consultant of any such Intellectual Property shall be subject to the prior written approval of Toronto Hydro.

9.2 Ownership

Toronto Hydro shall at all times have full rights and title to the Deliverables, and may at all times take possession of or use any completed or partially completed Deliverables, notwithstanding any provision, express or implied, to the contrary. Without limiting the generality of the foregoing, Toronto Hydro shall own all Intellectual Property rights in all Deliverables, and the Consultant hereby waives and assigns to Toronto Hydro any such rights, and agrees to give Toronto Hydro and its Representatives all assistance as may be reasonably required to perfect such rights including, without limitation and where the Consultant is a corporation or partnership, obtaining waiver of moral rights from any of the Consultant's employees, partners or other Representatives.

9.3 Intellectual Property Protection

The Consultant expressly warrants that the manufacture, delivery, sale or use of the Consultant's Services will not infringe any Canadian or foreign patents, trademarks, copyrights, industrial design or other intellectual property rights and the Consultant shall indemnify and save Toronto Hydro harmless from all claims, judgments and decrees that may be entered against Toronto Hydro or its Representatives and against all damage, liability, costs and expenses (including legal fees and other attendant costs and expenses) Toronto Hydro incurs by reason of any infringement or claim thereof.

9.4 Pre-Existing Intellectual Property

Anything contained in this Agreement to the contrary notwithstanding, Consultant and Toronto Hydro shall each retain ownership of their respective pre-existing intellectual property. To the extent that such pre-existing intellectual property is included in the products of the Work, Consultant hereby grants to Toronto Hydro a fully paid up, irrevocable and non-cancellable, non-exclusive, non-transferable, royalty-free license to use such intellectual property for Toronto Hydro's internal business purposes only. Also, nothing in this Agreement shall prevent Consultant from utilizing – on behalf of itself or its future customers – any general know-how, ideas, techniques, concepts, methods, processes, or other knowledge applied in performing the Work. Consultant may perform the same or similar services for others, provided that any of Toronto Hydro's confidential information is treated in accordance with the confidentiality requirements of this Agreement.

10. <u>HEALTH AND SAFETY</u>

The Consultant shall be responsible for managing the health and safety of its own personnel and other Representatives. Neither Toronto Hydro, nor its Representatives, shall be liable for any loss, damages or claims arising directly or indirectly from the Consultant's access to or work in or around Toronto Hydro's facilities, and the Consultant hereby waives any claims to which it may become entitled for loss or damage and releases Toronto Hydro and its Representatives from any and all such claims.

11. MISCELLANEOUS

11.1 Survival

In addition to the terms in this Agreement that by their nature survive the expiry or termination of the Agreement, the terms of Section 5 (Representations, Warranties and Indemnities), section 8 (Confidentiality), Section 9 (Intellectual Property), and Section 11.3 (Injunctive Relief) shall survive the expiry of this Agreement for a term of five (5) years.

11.2 Subcontracting

The Consultant shall not subcontract the performance of all or any part of the Services without Toronto Hydro's prior written approval. Where Toronto Hydro provides its prior written approval to the Consultant to subcontract all or part of the Services, then the Consultant shall enter into agreements with such permitted subcontractor(s) to require the permitted subcontractor(s) to provide Services in accordance with all of the terms of this Agreement. Notwithstanding the foregoing, the Consultant shall remain liable for any and all acts or omissions of any subcontractor(s) as if such acts or omissions were those of Consultant.

11.3 Injunctive Relief

(a) The Consultant acknowledges and agrees that the terms of Section 8 (Confidentiality) and Section 9 (Intellectual Property) of this Agreement are reasonably necessary to protect the legitimate interests of Toronto Hydro, are reasonable in scope and duration, and are not unduly restrictive.

(b) The Consultant further acknowledges that a breach of any of the terms of Section 8 (Confidentiality) or Section 9 (Intellectual Property) would render irreparable harm to Toronto Hydro, and that a remedy at law for breach of these sections would be inadequate, and that Toronto Hydro shall therefore be entitled to any and all equitable relief, including, without limitation, injunctive relief, and any other remedy that may be available at law or in equity.

11.4 Force Majeure

Either party will be relieved of liability for delays in performance of its obligations hereunder where such delay is a result of Force Majeure. The party affected by the Force Majeure shall give prompt notice thereof to the other party and, upon cessation of the Force Majeure, shall take all reasonable steps to resume the performance of its obligations hereunder as soon as reasonably practicable. If a delay in performance by reason of Force Majeure extends beyond thirty (30) Business Days, then either party may terminate this Agreement by written notice.

11.5 Non-Exclusive Agreement

This Agreement will not be interpreted to grant to the Consultant exclusive rights to provide the Services or to bind Toronto Hydro in any way to an exclusive relationship with the Consultant with regards to the Services or any other service.

11.6 Waiver

No delay on the part of either party in exercising any of its rights hereunder or failure to exercise the same, nor the acquiescence thereto shall operate as a waiver except in the specific instance for which it is given and where such waiver is provided in writing by the party waiving its rights.

11.7 Amendments

None of the terms, conditions or provisions of this Agreement shall be varied, modified or altered except by written agreement signed by an authorized representative of each parties.

11.8 Assignment

Save and except for Toronto Hydro's right to assign this Agreement to any of its Affiliates, neither party may assign this Agreement or any of their rights or obligations hereunder, without the prior written authorization of the other party, acting reasonably.

11.9 Enurement

This Agreement shall enure to the benefit of, and be binding upon, the parties hereto and their respective successors and permitted assigns.

11.10 Severability

In the event that any provision or portion of this Agreement is determined to be invalid or unenforceable for any reason, the remaining provisions or portions of this Agreement will be unaffected and will remain in full force and effect to the fullest extent permitted by law.

11.11 Neutral Construction

The parties to this Agreement agree that this Agreement was negotiated fairly between them at arm's length, that the final terms of this Agreement are the product of the parties' negotiations, and that this Agreement shall be deemed to have been jointly and equally drafted by them, and that the provisions thereof should not be construed against a party on the grounds that such party drafted the Agreement in whole or in part.

11.12 Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof. This Agreement supersedes any and all prior correspondence, warranties, covenants, collateral undertakings, or agreements, oral or otherwise, express or implied, unless otherwise contained herein.

11.13 Notices

(a) All questions or other communications regarding this Agreement, including any notices required by this Agreement, are to be addressed to the following addresses:

to Toronto Hydro:

Name:	Anila Dumont
Title:	Manager, Regulatory Services
Address:	14 Carlton Street, Toronto ON 5B 1K5
Telephone:	416-542-2831
Email:	ADumont@TorontoHydro.com

with copy to:

Title:	EVP, Public and Regulatory Affairs & Chief Legal Officer
Address:	14 Carlton, Toronto Hydro, ON M5B 1K5
Telephone:	(416) 542-3000
Email:	legal@torontohydro.com

to the Consultant:

Name:	Logan Toms
Title:	Partner, Finance and Risk
Address:	2626 Glenwood Avenue, Suite 480, Raleigh, NC 27608
Telephone:	(919) 227-3814
Email:	contracts@scottmadden.com

(b) All notices or communications shall be deemed to be received on the date of acceptance (as evidenced by the signature of the party) if delivered by personal delivery or courier, on the fifth (5th) Business Day after mailing, if mailed by first class mail, or on the first (1st) Business Day after transmission, if sent by facsimile (provided the transmission is evidenced by documented proof of proper fax transmittal).

11.14 Governing Law

This Agreement shall be governed by and construed in accordance with the law of the Province of Ontario and the laws of Canada applicable therein.

11.15 Execution

This Agreement may be signed in counterparts and delivered by electronic means, each of which shall be deemed an original and all of which, together, shall have the same effect as if all constitute one and the same Agreement.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the date first written above:

ScottMadden Inc.

Per: Logan Toms

Name: Logan Toms

Title: Partner, Finance and Risk

I have authority to bind the Consultant.

Toronto Hydro-Electric System Limited

Per: _____

Name: Amanda Klein

Title: Executive Vice President, Public and Regulatory Affairs, and Chief Lega Officer

I have authority to bind Toronto Hydro.

SCHEDULE A

SCOPE OF SERVICES

1. Services to be Performed

(a) Regulatory Applications and Advocacy

Toronto Hydro is retaining the Consultant to undertake technical analysis, provide advice and/or assist with preparatory activities for upcoming rate applications and regulatory filings at the OEB. Broadly, the Consultant will research and support Toronto Hydro in respect of the following:

- Analyzing regulatory policies, reports, decisions, laws and other energy policy proposals of governments or regulators in relevant jurisdictions;
- Developing advocacy positions and written submissions;
- Detailing application timeline, schedule and milestones;
- Managing the discovery and interrogatory processes;
- Delivering expert testimony in regulatory proceedings;
- Understanding new or modified policies and developing new or modified approach for implementation and compliance purposes;
- Evaluating and creating regulatory frameworks, paradigms and first mover policy ideas to advance the interests of Toronto Hydro; and
- Undertaking technical analysis, drafting evidence and other preparatory activities for rate applications and regulatory filings.

In addition to the foregoing, the Consultant has been retained to provide specific expertise in the areas below. Please note that the list of work or tasks in SCHEDULE A is not guaranteed to include the subjects listed, nor is it limited to the examples listed.

(b) Energy Policy Analysis

Toronto Hydro's business activities are subject to the actions of regulatory authorities or by changes in regulation, including amendments to Ontario's regulatory model, manner of regulation, and/or broader climate change and energy policy framework. Ontario's electricity industry regulatory and other energy policy developments may affect the electricity distribution rates charged by Toronto Hydro, the costs Toronto Hydro is permitted to recover and the activities Toronto Hydro and others may undertake.

Toronto Hydro actively participates in industry engagement efforts in order to anticipate changes in regulatory, climate change and energy policy development. Through these types of engagements, Toronto Hydro monitors proposed regulatory, climate change and energy policy changes. The Consultant will be relied on for its experience, skillsets, knowledge and training in the area of energy policy for the following tasks:

- Regulatory and energy policy analysis and advocacy;
- Jurisdictional research & comparative analysis;
- Developing the context and history of the policy;
- Conducting interviews with key Toronto Hydro personnel on policy implications;

- Developing a matrix of policy implications for the parties participating in the proceeding;
- Cost-benefit allocation frameworks and studies;
- Rate-setting frameworks and principles;
- Rate design principles;
- Rate design review;
- Rate application strategy, evidence drafting, editing, witness training; and
- Other energy policy matters that arise.

(c) Regulatory Analytics and Technical Services

Toronto Hydro requires support from the Consultant on rate design. The OEB sees a comprehensive rate application as consisting of three main components: the business plan (along with supporting documentation and reports), historical and forecast information, and rate models that show the derivation of specific proposed rates based on the data. The OEB's adjudicative process on Toronto Hydro's regulatory applications can involve a number of steps to ensure that Toronto Hydro's proposals are adequately examined and "tested" during the review to ensure that it is delivering cost effective, efficient, reliable and responsive services to customers. In relation to this, the Consultant will be relied on for its experience, skillsets, knowledge and training in the area of analytics and technical services for the following tasks:

- Business case development;
- Econometrics and benchmarking analysis and studies;
- Productivity studies;
- Load and Customer Forecast;
- Energy market analysis
- Lead Lag Study;
- Cost Allocation Model (CAM) review;
- Rate design review;
- Load Profile Analysis as part Cost Allocation Requirements;
- Transformer Allowance;
- Cost Study for Specific Service Charge;
- Standby rates;
- EV rates;
- Loss Adjustment Factor;
- Energy & Demand Load Research Analysis;
- Distributed Energy Resources;
- Line Loss Study;
- Load Profile Analysis;
- IESO market settlement;
- Rate design principles;
- Quantitative models; and
- Other analytics and technical matters that arise.

SCHEDULE B

RATES

Position	Professional Fees ($/hr) for Services Performed in Each Calendar Year			
	2022	2023	2024	2025-2026
Partner	[redacted]			
Director				
Manager				
Senior Associate				
Director of Research				
Associate				
Benchmarking Manager				
Clean Tech Manager				
Senior Analyst				
Analyst				
Administrative Assistant				

Note all professional Fees quoted in the table above are in US dollars. All applicable taxes, including HST, are not included and will be added to the monthly bill at the time of invoicing.

SCHEDULE C

DEFINITIONS

In this Agreement, the following definitions shall apply:

"Affiliates"	has the meaning prescribed to it in the *Business Corporations Act* of Ontario, as amended from time to time;
"Agreement"	means this Agreement for Professional Consulting Services, including all recitals, schedules and attachments thereto;
"Applicable Laws"	means all federal, provincial and municipal statutes, regulations, codes, by-laws, orders in council, directives, rules, guidelines and ordinances applicable to this Agreement, including without limitation all applicable OEB codes, rules or guidelines;
"Applicant"	means Toronto Hydro when Toronto Hydro has initiated a proceeding by application to the OEB.
"Business Day"	means a day on which banks are open for business in the City of Toronto, Ontario, but does not include a Saturday, Sunday, or a civic or statutory holiday in the Province of Ontario;
"Confidential Information"	means the terms of this Agreement and any and all data or information relating to the business, management or affairs of Toronto Hydro, its customers, employees, or any of its Affiliates disclosed by Toronto Hydro to the Consultant pursuant to this Agreement, whether or not such Confidential Information is expressly identified as confidential. Notwithstanding the foregoing, Confidential Information does not include any information or data which: (a) information or data that is or becomes publicly known through no breach of the terms or conditions of this Agreement; (b) information or data that is independently developed without reference to Confidential Information and without breach of the terms and conditions of this Agreement; or (c) Confidential Information that is required by court order or other legal compulsion to be disclosed, in which case the Consultant shall give Toronto Hydro prior written notice of such disclosure, as permitted by law;
"Consultant"	means ScottMadden Inc.;
"Deliverable"	means any and all works prepared, generated, created or designed by the Consultant pursuant to this Agreement, including without limitation all drawings, models, designs, formulae, methods, documents, reports, software, specifications, or source codes, and any related works, enhancements, modifications or additions thereto;
"Disbursements"	shall have the meaning as prescribed in Section 6.1(c);

"Fees"	shall have the meaning as prescribed in Section 6.1(a);
"Force Majeure"	means any impediments beyond the control of the applicable party due, wholly or in part, directly or indirectly, to: strikes, lockouts, riots, epidemics (other than related to or associated with SARS-Co-V-2 or COVID-19 and any evolutions or mutations thereof), war, governmental regulations, fire, explosions, acts of God, or any other impediment beyond the control of the party affected;
"Governmental Authority"	means any government, legislature, municipality, regulatory authority, agency, commission, department, board or court or other law, regulation or rule-making public entity of similar authority, including, without limitation the OEB;
"Guidelines"	has the meaning prescribed in Section 4.3(d);
"Hourly Rate"	shall have the meaning prescribed in Section 6.1(a);
"HST"	means Harmonized Sales Tax;
"IESO"	Means the Independent Electricity System Operator;
"Initial Term"	has the meaning prescribed to it in Section 3.1;
"Intellectual Property"	includes all trademarks, copyrights, patents, business names, trade secrets, proprietary software, analysis or techniques (whether or not patented or patentable), confidential or secret designs and processes, source codes, plans or devices, or other proprietary and intellectual property rights;
"Intervenor"	means any interested group or individual who participates actively in an OEB proceeding either by submitting evidence, arguments or interrogatories (written questions) or by cross-examining a witness or witnesses at an oral hearing;
"MFIPPA"	means the *Municipal Freedom of Information Act*;
"OEB"	means the Ontario Energy Board;
"Person"	means any individual, firm, corporation, unlimited liability company, partnership, limited liability partnership, joint venture, trust, unincorporated association, unincorporated syndicate, any governmental authority and any other legal or business entity.
"Protected Employee"	means any individual who, during the course of their employment with Toronto Hydro, was directly or indirectly involved in:

i. the procurement of the Services of the Consultant on behalf of Toronto Hydro;

ii. the negotiation of the Consultant's Agreement on behalf of Toronto Hydro; and/or

iii. the awarding and/or approval of the Consultant's Agreement on behalf of Toronto Hydro.

"Representative"	in respect of a party, means such party's directors, officers, employees, agents, contractors and advisors, the party's Affiliates, and all such Affiliates' respective directors, officers, employees, agents, contractors and advisors;
"Remittances"	has the meaning prescribed to it in Section 6.1(e);
"Renewal Term"	has the meaning prescribed to it in Section 3.2;
"Services"	means all of the Deliverables, services and specifications to be provided, performed and met by the Consultant under this Agreement, as more particularly described in SCHEDULE A;
"Term"	has the meaning prescribed to it in Section 3.3; and
"Toronto Hydro"	means Toronto Hydro-Electric System Limited.

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AMENDING AGREEMENT

THIS AMENDING AGREEMENT (the "Amending Agreement") is made effective as of June 1, 2023 (the "Effective Date") between **SCOTTMADDEN INC.** ("Consultant") and **TORONTO HYDRO-ELECTRIC SYSTEM LIMITED** ("Toronto Hydro") (collectively, the "Parties").

WHEREAS:

1. Toronto Hydro and the Consultant previously entered into an Agreement for Professional Consulting Services effective September 12, 2022 (the "Agreement"), pursuant to which the Consultant provides Toronto Hydro with various technical analysis, advisory, and preparatory services related to upcoming rate applications and regulatory filings (the "Services"); and

2. The Parties now wish to amend the Agreement by attaching the Ontario Energy Board's *Rules of Practice and Procedure* Rule 13A, and make associated amendments related to the Consultant's participation in Toronto Hydro's upcoming rate application, as provided herein.

NOW THEREFORE, THIS AMENDING AGREEMENT WITNESSES that in consideration of the mutual covenants contained herein and for other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Toronto Hydro and Consultant agree as follows:

1. Any capitalized terms used but not defined herein shall be as defined in the Agreement. The recitals above are agreed by the Parties to be true and deemed to form part of this Amending Agreement as if specifically restated herein.

2. Section 4.3 of the Agreement is amended by adding the following subsection (e) immediately following subsection 4.3(d):

   (e) Without limiting the generality of subsection 4.3(a) above, the Consultant shall comply with Rule 13A Expert Evidence of the OEB's *Rules of Practice and Procedure*, attached as SCHEDULE C hereto, in the course of providing the Services and agrees to accept the responsibilities that are or may be imposed on them by that rule.

3. The Parties agree to add a new SCHEDULE C to the Agreement, attached hereto as Appendix 1 to this Amending Agreement.

4. All other terms and conditions of the Agreement remain continuously in full force and effect, unamended, and shall be deemed to apply to this Amending Agreement.

5. This Amending Agreement, together with the Agreement, shall hereinafter constitute the entire agreement between the Parties with respect to the Services as further described in the Agreement, and supersedes any and all other agreements, understandings, discussions, negotiations, representations and correspondence which may have been made by or between the Parties respecting the same.

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IN WITNESS WHEREOF the Parties hereto have executed this Amending Agreement as of the date first written above.

SCOTTMADDEN INC.

Per: Logan Toms

Name: Logan Toms

Title: Partner, Finance and Risk

I have the authority to bind the Consultant.

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED

Per: DocuSigned by: E232C3948F5C435...

Name: Daliana Coban

Title: Director, Regulatory Applications and Business Support

I have authority to bind Toronto Hydro.

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APPENDIX 1

SCHEDULE C

Ontario Energy Board *Rules of Practice and Procedure* Rule 13A

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

a. the expert's name, business name and address, and general area of expertise;
b. the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;
c. the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;
d. the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;
e. in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and
f. an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

a. in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and
b. at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

a. scope and timing;
b. the involvement of any expert engaged by the OEB;
c. the costs associated with the conduct of the activities;
d. the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of Rule **13A.04**; and
e. any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A.**

79 Wellington St. W., 30th Floor
Box 270, TD South Tower
Toronto, Ontario M5K 1N2 Canada
P. 416.865.0040 | F. 416.865.7380
www.torys.com

Charles Keizer
ckeizer@torys.com
P. 416.865.7512

January 30, 2023

PRIVILEGED AND CONFIDENTIAL
EMAIL

ScottMadden, Inc.
1900 West Part Drive, Suite 250
Westborough, MA 01581

Attention: Tim Lyons

Dear Sirs/Mesdames:

Re: Letter Agreement – Toronto Hydro-Electric System Limited – ScottMadden, Inc.

Torys LLP ("Torys" or "we") is engaged as legal counsel to Toronto Hydro-Electric System Limited ("Toronto Hydro") in connection with its planned 2025-2029 electricity distribution rate application (the "Application") to the Ontario Energy Board (the "Board").

On behalf of and to assist us in providing legal advice to Toronto Hydro in connection with the Application, Torys requests that you to provide independent consulting services to Torys, effective as of January 10, 2023 (the "Effective Date"). By signing back a copy of this letter (the "Letter Agreement"), which has been acknowledged and agreed to by Toronto Hydro below, you acknowledge and agree that (i) you have been engaged directly by Toronto Hydro to provide consulting services in respect of the Application, (ii) the consulting services you provide in respect of that engagement shall be as further described herein, including with respect to the agreed-upon scope of work, and (iii) the terms of this Letter Agreement shall further govern any consulting services or work product to be provided under the terms of your engagement with Toronto Hydro.

1. No Conflict

The Consultant does not have any conflict of interest or other constraints on its ability to provide expert advice in connection with the Application. You confirm that you are free to provide the consulting services in connection with Torys' representation of Toronto Hydro in the Application. You agree that during the engagement you will not provide, directly or indirectly, any services to any other party to the Application (except Toronto Hydro) in connection with the matters at issue in the Application.

2. Consultant Expertise

The Consultant will provide consulting services to Torys in connection with the Application as further described in Section 3 below. The sponsors of the work of the Consultant and the

persons who have the relevant expertise will be:

- Tim Lyons Partner

(collectively referred to as the "Sponsors").

3. **Scope of Services and Work Product**

The Consultant will:

(a) summarize key findings related electricity sector PBR frameworks and plans approved by regulators in other jurisdictions. The purpose of this work is to collect and analyze materials on how electric utilities with PBR plans – or similar ratemaking mechanisms – have used PBR approaches to address changes in cost and revenue drivers in the electric distribution industry, particularly related to the clean energy transition. Specific activities include:

- Review materials related to electricity sector PBR frameworks and plans in other jurisdictions
- Summarize treatment of costs & revenues under the PBR frameworks and plans reviewed
- Discern the regulatory principles that underlie the PBR frameworks and plans reviewed

(b) discuss the findings and preliminary results of the Study with Torys and Toronto Hydro on a date and at a location to be agreed upon (the "Discussion of Findings");

(c) if requested by Torys, produce draft and/or final written report(s) detailing the Study's methodology, analysis performed and the Consultant's findings and recommendations (the "Report(s)"), which (i) shall be delivered to Torys no later than: March 10, 2023 for the draft Report and March 24, 2023 for the final Report, unless otherwise agreed to by the parties, and (ii) may be filed by Torys with the Board in connection with the Application; and

(d) if requested by Torys, with the consent of Toronto Hydro pursuant to your engagement by Toronto Hydro, provide support during the hearing of Application, which may include:

(i) assistance in responding to interrogatories applicable to the Report;

(ii) appearance at a technical conference to respond to oral questions on the Report;

(iii) testifying about the Report as an expert witness either orally or in writing;

(iv) responding to undertakings (i.e., written questions during a technical conference or hearing) on the Report; and

(v) assistance in connection with the preparation of argument (oral or written) on the issues addressed in the Report.

4. Fees and Invoices

The Consultant acknowledges that the Consultant shall direct all invoices relating to services performed by it, including services performed pursuant to the terms of this Letter Agreement, to Toronto Hydro and that Torys LLP shall have no obligation whatsoever for the invoices rendered in this regard.

5. Confidentiality

This Letter Agreement and all work performed by the Consultant in connection with the consulting services, including all findings, opinions and conclusions the Consultant reaches in relation to the consulting services, and any communications relating thereto, are strictly privileged and confidential and shall not be disclosed to any other person or party without the prior written consent of Torys or Toronto Hydro. The Consultant agrees to designate all written communications and material accordingly. The Consultant further agrees to promptly notify Torys in the event that the Consultant receives a request to disclose information relating to this matter, and agrees to cooperate with Torys, to the fullest extent permitted by law, to prevent or limit the disclosure of such material or otherwise preserve the privileged and confidential status of such material.

The Consultant agrees to hold in confidence: (a) all information provided to the Consultant, and (b) the Consultant's opinions to Torys and to Toronto Hydro as they relate to the information, whether the information or opinions are documentary or oral (collectively, the "Confidential Information"). The Consultant will not disclose the Confidential Information to any person unless Torys or Toronto Hydro authorizes you in writing to do so. All documents given to the Consultant in connection with the consulting services remain the property of Torys or of Toronto Hydro and are held in trust by the Consultant as agent. The Consultant agrees to return these documents on request.

The Consultant will not refer to Torys or to Toronto Hydro, directly or indirectly, in connection with the promotion of its services, without obtaining the prior written consent of Torys or Toronto Hydro, as the case may be.

6. Intellectual Property

Nothing in this Letter Agreement shall be deemed to transfer, license, assign, permit the use of, or otherwise convey an interest in whole or in part to the Consultant of any intellectual property belonging to Toronto Hydro or any of its representatives or any third party whose intellectual property is in Toronto Hydro's custody or control, and the use by the Consultant of any such intellectual property shall be subject to the prior written approval of Toronto Hydro.

Torys and Toronto Hydro shall at all times have full rights and title to all works prepared, generated or created by the Consultant from the consulting services, including without limitation any reports or other documents created by the Consultant, and any related works,

modifications or additions thereto (the "Work Product"), and may at all times take possession of or use any completed or partially completed Work Product, notwithstanding any provision, express or implied, to the contrary. Without limiting the generality of the foregoing, Toronto Hydro shall own all intellectual property rights in all Work Product, and the Consultant hereby waives and assigns to Toronto Hydro any such rights and agrees to give Toronto Hydro and its representatives all assistance as may be reasonably required to perfect such rights including, without limitation, obtaining waiver of moral rights from any of the Consultant's employees, partners or other representatives. Notwithstanding the foregoing, the Consultant shall retain sole and exclusive ownership of any pre-existing Consultant tools, methodologies, proprietary research and data, together will all intellectual property rights therein (the "Consultant Property"). Consultant grants to Torys and Toronto Hydro a fully paid up, irrevocable, perpetual, non-exclusive, royalty-free license to use the Consultant Property contained within the Work Product for the purposes intended in this Letter Agreement.

The Consultant expressly warrants that the delivery, sale or use of the Consultant's services will not infringe any Canadian or foreign patents, trademarks, copyrights, industrial design or other intellectual property rights and the Consultant shall indemnify and save Toronto Hydro harmless from all claims, judgments and decrees that may be entered against Toronto Hydro or its representatives and against all damage, liability, costs and expenses (including legal fees and other attendant costs and expenses) Toronto Hydro incurs by reason of any infringement or claim thereof.

7. **Termination**

Torys may terminate this Letter Agreement at any time on written notice to the Consultant. If not otherwise terminated, this Letter Agreement shall be in effect from the Effective Date and shall expire on the date that is 60 days after a final decision of the Board has been issued on the Application. Upon the termination or expiration of this Letter Agreement, the Consultant shall return to Torys and delete any and all electronic copies the Consultant may have of all non-public documents and materials in its possession acquired from Torys or Toronto Hydro relating to the consulting services or this Letter Agreement, including all Confidential Information (defined above) and Work Product, whether completed or not. The Consultant shall, upon request, provide Torys with a certificate of an officer of the Consultant certifying such deletion of electronic copies.

8. **Independence**

By entering into this Letter Agreement, the Consultant acknowledges and agrees that the Sponsors have received a copy of Rule 13A of the Board's *Rules of Practice and Procedure* concerning expert evidence, and agree to accept the responsibilities that are or may be imposed on them by that rule with respect to testimony before the Board. A copy of the rule and the relevant form are attached as Schedules 'A' and 'B' hereto. When returning an executed copy of this Letter Agreement, the Consultant shall include signed copies of Schedule 'B' for each of the Sponsors.

9. **Responsibility Statement**

The Consultant agrees that the services provided for herein will be performed in a timely, competent, professional manner in accordance with recognized professional consulting standards for similar services to be performed by a leading consulting advisory firm, and that adequate

qualified personnel will be assigned for that purpose. If, during the performance of the services or prior to the Board's issuance of final, non-appealable order(s) disposing of all relevant relief sought in the Application, such services prove to be faulty or defective by reason of a failure to meet such standards, the Consultant agrees that upon prompt written notification from Torys, such faulty or defective portion of the services will be redone at no cost to Torys or Toronto Hydro, up to a maximum amount equivalent to the cost of the services rendered under this Retainer Agreement, or, at Torys' request, the Consultant will refund an amount equal to the amount paid for the faulty or defective portion of the services.

10. **Governing Law**

This Letter Agreement shall be construed and otherwise governed pursuant to the laws of the Province of Ontario and the federal laws of Canada applicable therein.

Sincerely,

TORYS LLP

Per: _____
Name: Charles Keizer

This Letter Agreement is acknowledged and agreed to by TORONTO HYDRO-ELECTRIC SYSTEM LIMITED

Signed _____

Name (please print) Daliana Coban

(I have the authority to bind the Company)

This Letter Agreement is acknowledged and agreed to by SCOTTMADDEN, INC.

Signed Logan Toms

Name (please print) Logan Toms

(I have the authority to bind the Company)

SCHEDULE 'A'

Rule 13A of the Board's Rules of Practice and Procedure

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the Board impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

(a) the expert's name, business name and address, and general area of expertise;

(b) the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;

(c) the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;

(d) the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;

(e) in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and

(f) an acknowledgement of the expert's duty to the Board in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the Board may require two or more of the experts to:

(a) in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and

(b) at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the Board and others as permitted by the Board, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the Board, including as to:

(a) scope and timing;

(b) the involvement of any expert engaged by the Board;

(c) the costs associated with the conduct of the activities;

(d) the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of **Rule 13A.04**; and

(e) any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A**[1].

[1] Attached as Schedule 'B' herein.

SCHEDULE 'B'

FORM A

Proceeding: .....

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is ..... (*name)*. I live at ..... (*city)*, in the ..... (*province/state*) of .....

2. I have been engaged by or on behalf of ..... (*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.....

_____

Signature

AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES

THIS AGREEMENT is made as of the 31st day of October, 2022 between **Toronto Hydro-Electric System Limited** ("Toronto Hydro"), a corporation incorporated under the laws of the province of Ontario and **Guidehouse Canada Ltd.**, a corporation incorporated under the laws of Ontario (the "Consultant"), pursuant to which Toronto Hydro shall retain the Consultant to provide certain Services, and the Consultant shall provide such Services, during the Term, subject to the terms and conditions hereof;

NOW THEREFORE, in consideration of the mutual covenants set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. INTERPRETATION

Unless otherwise indicated, all capitalized terms in this Agreement shall be as defined in SCHEDULE B and any reference to currency in this Agreement shall refer to lawful money of Canada.

2. RELATIONSHIP OF THE PARTIES

2.1 Retainer

Toronto Hydro hereby retains the Consultant to provide the Services, and the Consultant hereby agrees to provide the Services, during the Term, in accordance with the terms and conditions of this Agreement.

2.2 Independent Contractors

(a) Notwithstanding any provision hereof, this Agreement does not constitute and shall not be construed as constituting a partnership, joint venture, principal/agency relationship, or employer/employee relationship between the parties. The Consultant and Toronto Hydro shall at all times remain independent contractors of each other, and neither party shall represent itself to be an agent or employee of the other.

(b) Without limiting the generality of Subsection 00, the Consultant hereby acknowledges and agrees that neither it nor its Representatives shall be eligible or entitled, by reason of this Agreement, to participate in any employee-related program offered by Toronto Hydro or any of its Affiliates, including, without limitation, any benefit, insurance, compensation, health plan, bonus or retirement program.

(c) The Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities or claims whatsoever against Toronto Hydro or its Representatives resulting from or relating to the Consultant or its Representatives being deemed to be an employee of Toronto Hydro or any of its Affiliates.

(d) The Consultant hereby acknowledges and agrees that Toronto Hydro shall not be responsible for and shall not have control or charge of any means, methods, techniques, sequences or

procedures used for or in respect of the Services, or for the safety precautions or programs required for the Services or otherwise prescribed hereunder.

3. TERM

3.1 Term

Unless otherwise terminated in accordance with the provisions hereof, this Agreement shall be for a term of two (2) years and seven (7) months commencing on October 31, 2022 and terminating on May 30, 2025 (the "Term").

4. SERVICE REQUIREMENTS

4.1 Services

During the Term, the Consultant shall perform the Services as detailed in SCHEDULE A hereto.

4.2 Time and Availability

Unless otherwise directed in writing by Toronto Hydro, the Consultant shall have discretion in selecting the dates and times it performs the Services throughout the month, giving due regard to the needs of Toronto Hydro's business requirements and provided that any access to Toronto Hydro property shall be during regular business hours.

4.3 [Intentionally Deleted]

4.4 Revision to Services

(a) The Parties acknowledge and agree that the Services to be undertaken and completed by the Consultant under this Agreement may be subject to revision or amendment from time to time during the Term: (i) as required by Toronto Hydro to comply with the Guidelines; (ii) as required by Toronto Hydro to comply with the Applicable Laws or any order, instruction, directive or legal requirement of a Governmental Authority; or (iii) as required by Toronto Hydro to ensure that Toronto Hydro receives the expected funding and benefits with respect to the project to which the Services relate.

(b) Toronto Hydro agrees to provide the Consultant with written notice of any revision or amendment to the Services required pursuant to this Section 4.4, and subject to the terms of Subsection 4.40 below, the Consultant shall comply with all such directives.

(c) In the event that the Consultant fails to comply with a directive issued by Toronto Hydro pursuant to this Section 4.4, Toronto Hydro shall have the right, in addition to any other remedies which may be available to Toronto Hydro hereunder or otherwise at law, to terminate this Agreement by giving written notice of termination to the Consultant whereupon this Agreement shall terminate as at the effective date of termination specified in the notice and the provision of Section 7 shall apply.

(d) Notwithstanding Subsection 4.40, where a directive from Toronto Hydro results in a material change in the scope and/or implementation of the Services, then the Consultant shall have the right to terminate this Agreement by giving notice of termination to Toronto Hydro whereupon

the Agreement shall terminate as at the effective date of termination specified in the notice and the provisions of Section 7 shall apply.

4.5 Applicable Laws

(a) The Consultant shall, at its sole expense, obtain and maintain during the Term of this Agreement, all permits, licences and approvals required by all Applicable Laws to perform its obligations under this Agreement. The terms and conditions of this Agreement shall be carried out in strict compliance with all Applicable Laws and in the event of any conflict between any Applicable Laws, the Applicable Laws with the most stringent standard shall apply.

(b) Without limiting the generality of subsection 4.5(a) above, the Consultant shall comply with Rule 13A Expert Evidence of the Ontario Energy Board's *Rules of Practice and Procedure*, attached as SCHEDULE C hereto, and agree to accept the responsibilities that are or may be imposed on them by that rule with respect to any testimony before the Ontario Energy Board.

(c) Without limiting the generality of the foregoing, the Consultant shall comply with the *Municipal Freedom of Information Act* ("MFIPPA"), the *Personal Information Protection and Electronic Documents Act* (Canada) ("PIPEDA")and any other applicable privacy legislation (collectively, "Privacy Laws") with respect to any personal information collected, used or disclosed in connection with this Agreement and shall indemnify and hold harmless Toronto Hydro and its Representatives from and against any and all claims, demands, suits, losses, damages, causes of action, fines or judgments (including related expenses and legal costs) they may incur related to or arising out of any non-compliance therewith.

(d) Where any Development is subject to the approval or review of any authority, department, government or agency other than Toronto Hydro, such applications for approval or review shall, unless otherwise authorized by Toronto Hydro in writing, be prepared by the Consultant to be approved and submitted by and through the offices of Toronto Hydro, and the Consultant shall not have any direct dealings with the authority, department, government or agency in question with regards to the Development.

(e) The Consultant and the Consultant's personnel shall comply with all rules and direction of Toronto Hydro, whether specified in this Agreement or otherwise, while working on Toronto Hydro's facilities: Toronto Hydro's *Code of Business Conduct and Whistleblower Procedure*, Toronto Hydro's *Disclosure Policy,* Toronto Hydro's *Social Media and Digital Communication Policy,* Toronto Hydro's *Accessibility Policy,* Toronto Hydro's *Workplace Harassment Policy and Program,* Toronto Hydro's *Violence Prevention in the Workplace Policy,* Toronto Hydro's *Workplace Alcohol and Drug Policy*, Toronto Hydro's *Environmental Policy*, Toronto Hydro's *Occupational Health and Safety Policy*, Toronto Hydro's *Privacy Policy,* Toronto Hydro's *Cyber Security Policy*, Toronto Hydro's *Technology Use Guidelines*, Toronto Hydro's *External Supplier Access to Application Services Policy,* Toronto Hydro's *Physical Security Policy*, Toronto Hydro's *COVID-19 Vaccination Policy,* and the *Affiliate Relationships Code for Electricity Distributors and Transmitters* issued by the OEB (together, the "Guidelines"). The Consultant acknowledges that it has been provided with a copy of the Guidelines, has provided and will provide a copy of the Guidelines to each of its Representatives and that it agrees to comply with and to direct its Representatives to comply with such Guidelines, as amended.

4.6 Performance

(a) The Services shall be performed to the satisfaction of Toronto Hydro, and Toronto Hydro shall have the right at all reasonable times, to inspect or otherwise review the Services performed or being performed. The Consultant shall, upon the request of Toronto Hydro, provide Toronto Hydro with written reports of the status of the Developments and the Consultant's progress in providing the Services.

(b) In the event of any dispute between Toronto Hydro and the Consultant relating to the quality or acceptability or rate of progress of any of the Services, or relating to the interpretation of any instructions or specifications concerning the Services, the reasonable opinion of Toronto Hydro shall govern and be binding on the parties hereto.

4.7 Health and Safety

The Consultant shall be responsible for managing the health and safety of its own personnel and other Representatives. Neither Toronto Hydro, nor its Representatives, shall be liable for any loss, damages or claims arising directly or indirectly from the Consultant's access to or work in or around Toronto Hydro's facilities, and the Consultant hereby waives any claims to which it may become entitled for loss or damage and releases Toronto Hydro and its Representatives from any and all such claims.

4.8 [Intentionally Deleted]

4.9 Security

a) Vendor shall implement and comply with controls ("Security Controls") for the protection of Toronto Hydro's Representatives, customers, systems integrity, systems availability, Confidential Information and Toronto Hydro property, including Toronto Hydro Data, accessed, received or used by Consultant or its Personnel, or that otherwise comes into the possession of Consultant or its Personnel, in accordance with:

   i. the physical safeguards requirements set forth in Toronto Hydro's *Physical Security Policy* in section 4.5(e) of this Agreement ("Physical Security Controls");
   ii. the data security requirements set forth in Schedule D ("Cybersecurity Controls");
   iii. the public cloud requirements set forth in Schedule E ("Public Cloud Controls");

b) The Physical Security and the Cybersecurity Controls include the requirements for identifying, responding to, resolving and reporting on, Security Incidents.

c) A Security Incident is Confidential Information of Toronto Hydro subject to the requirements of this Agreement.

d) In the event of a Security Incident,

   i. Consultant shall promptly investigate such Security Incident and, if the Security Incident is a Cybersecurity Incident, it shall conduct such investigation as set out in Schedule D – Cybersecurity Controls; and
   ii. Consultant shall cooperate with Toronto Hydro in its efforts to (i) investigate the Security Incident, (ii) comply with statutory notice and other legal obligations

applicable to Toronto Hydro or its customers arising out of the Security Incident, and (iii) investigate or bring legal action against third parties in an effort to protect Toronto Hydro's rights. If a Security Incident involves any Personal Information, then if requested by Toronto Hydro, Consultant will assist Toronto Hydro in Toronto Hydro's communication with the media, any affected persons (by press release, telephone, letter, website or any other method of communication), and any Governmental Authorities. The content and method of any such communications will be reasonably determined by Toronto Hydro.

e) Consultant policies to be maintained by Consultant will include current and comprehensive written security policies detailing Consultant's security processes, programs and procedures that are in compliance with Applicable Law and the Security Controls (collectively, "Security Policies"). Upon Toronto Hydro's request, Consultant will provide to Toronto Hydro copies of the Security Policies. During the Term of this Agreement, Consultant shall not amend or modify any part of the Security Policies to diminish the Security Controls then in effect without Toronto Hydro's prior written consent.

f) Not more than once per calendar year, Toronto Hydro reserves the right, upon reasonable notice and at Toronto Hydro's expense, to review Consultant's compliance with the Security Policies and this Agreement. Toronto Hydro may exercise this right directly or use the services of a third party with recognized ability in the area to conduct such review. In the event of a Security Incident, the calendar limitation above shall not apply and Toronto Hydro may conduct such review at any time subsequent to such Security Incident.

5. REPRESENTATIONS, WARRANTIES, INDEMNITIES AND INSURANCE

5.1 Representations and Warranties

The Consultant hereby represents, warrants and agrees that:

(i) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has/have the necessary experience and qualifications to perform the Services;

(ii) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) will perform the Services in a diligent, expeditious and workmanlike manner, consistent with standards generally observed by reputable and competent members of the same industry providing similar services;

(iii) all Services shall be the Consultant's (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) original work and none of the Services or any invention, development, use, production, distribution or exploitation relating thereto will infringe, misappropriate or violate any intellectual property or other right of any person or entity;

(iv) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has the corporate power and authority to enter into this Agreement and to perform its obligations hereunder, and that this Agreement constitutes a legal, valid, and binding obligation of the Consultant, enforceable against the Consultant in accordance with its terms.

Save and except for all warranties set out in this Agreement, the foregoing warranties are in lieu of any other warranties, express or implied, of the Vendor and all such warranties are hereby disclaimed.

5.2 Indemnity

a) The Consultant shall be liable for and shall indemnify and hold harmless Toronto Hydro and its Representatives from all claims, demands, actions, penalties, damages, losses, judgments and settlements, liabilities, costs, expenses, including legal fees and other related costs and expenses arising out of, related to, or incident to, the Consultant or any of its Representatives' performance of the Services under this Agreement, including, without limitation:

   i. any breach, violation or non-performance by the Consultant or any of its Representatives of any terms, conditions, warranties, obligations or covenants contained in this Agreement;

   ii. any breach or violation by the Consultant or any of its Representatives of any Applicable Laws; and

   iii. any actions, omissions, negligence or wilful misconduct of the Consultant or any of its Representatives.

b) The Consultant's aggregate liability under this Agreement shall not exceed three times the value of all amounts paid or payable by Toronto Hydro under the Agreement.

c) Except for losses covered by insurance of the types and to the limits required in this Agreement, the liability of the Consultant is limited to direct damages only, and in no event shall the Consultant be liable for loss of profit or use and for any indirect, special, incidental or consequential damages of any nature or kind howsoever caused or arising.

d) No exclusion or limitation on liability for the Consultant shall apply to:
   i. gross negligence or intentional misconduct;
   ii. death, personal injury, or property damage;
   iii. breach of applicable law; or
   iv. intellectual property indemnity in Section 9.

e) However in case of breach of the confidentiality or privacy obligations as included in this Agreement, Consultant's aggregate liability shall not exceed a value of $5,000,000.

5.3 Insurance

(a) The Consultant shall, during the Term, and at its own expense, maintain and keep in full force and effect (and, when requested, provide Toronto Hydro with proof thereof) the following insurance:

   (i) commercial general liability insurance on an occurrence basis having a minimum inclusive coverage limit, including personal injury and property damage, of not less than two million dollars ($2,000,000) per occurrence with property damage deductible of not more than fifty thousand dollars ($50,000.00) which commercial general liability insurance shall be extended to cover contractual liability, products

and completed operations liability, contingent employer's liability, and owners/contractors protective liability;

(ii) Errors and Omissions Insurance (Professional Liability) in the amount of not less than five million dollars ($5,000,000.00);

(iii) Computer Security and Privacy Liability insurance covering actual or alleged acts, errors or omissions committed by the Vendor or its Representatives of not less than three million dollars ($3,000,000.00) in the aggregate, and which shall also extend to include the intentional, fraudulent or criminal acts of the Vendor or its Representatives. The policy shall expressly provide, but not be limited to, coverage for the following perils:

1) unauthorized use/access of a computer system

2) defense of any regulatory action involving a breach of privacy

3) failure to protect confidential information (personal and commercial information) from disclosure

4) notification costs, whether or not required by statute; and

(iv) automobile liability insurance on all owned and non-owned vehicles used in connection with this Agreement, with such automobile insurance coverage having a limit of not less than two million dollars ($2,000,000.00) per vehicle, in respect of bodily injury (including passenger hazard), property damage and mandatory accident benefits.

(b) All insurance coverages and limits required to be maintained by the Consultant shall be primary to any insurance maintained by Toronto Hydro, which shall be excess and non-contributory. Prior to the commencement of the delivery of the Services, the Consultant shall deliver to Toronto Hydro a certificate of insurance which evidences the Consultant's compliance with this section, and Consultant shall make best efforts to provide a thirty (30) day prior written notice of cancellation, non-renewal or adverse material change, to Toronto Hydro.

(c) The Consultant agrees that the insurance described herein does in no way limit the Consultant's liability pursuant to the indemnity provisions of this Agreement.

(d) A waiver of subrogation shall be provided by the insurer(s) to Toronto Hydro, except with respect to the error and omissions insurance policy.

6. FEES

6.1 Fees

(a) Subject to Subsections 00, 00 and 00, in exchange for the performance of the Services in accordance with the terms hereof, Toronto Hydro shall pay the Consultant the fees set out in SCHEDULE A (plus applicable taxes), (the "Fees"), subject to invoicing as outlined in Section 0.

(b) The Fee noted in subsection 00 shall be the only fee payable by Toronto Hydro under this Agreement. Without limiting the generality of the foregoing, the Consultant hereby agrees and acknowledges that all out-of-pocket expenses, travelling costs, and other disbursements shall be at the sole expense of the Consultant, except with the prior written approval from Toronto Hydro.

(c) Any disbursements for additional incidentals incurred by the Consultant in relation to this Agreement ("Disbursements") must be pre-approved by Toronto Hydro in writing.

(d) The Consultant shall not incur or submit Fees for any work outside the scope of the Services, or exceed the Fees listed in Subsection 6.10 without prior written approval from Toronto Hydro.

(e) The Consultant shall make all payment of taxes, employment insurance premiums, pension plan contributions and any other taxes or other payment of any nature, imposed by any authority in respect of the Fees paid by Toronto Hydro to the Consultant under this Agreement (together, the "Remittances"), and the Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities and claims whatsoever against Toronto Hydro or its Representatives, in any way arising out of or relating to any failure to deduct, withhold, or remit any Remittance.

(f) Without limiting the generality of Subsection 00, Toronto Hydro reserves the right to deduct any applicable non-resident withholding taxes from any Fees owing to the Consultant under this Agreement and remit such amounts to the applicable taxation authority.

6.2 Payment

The Consultant shall submit invoices to Toronto Hydro in accordance with SCHEDULE A of this Agreement containing:

(i) a detailed description of the Services performed during the invoice period;

(ii) the dates and the amount of time spent by the Consultant for the provision of the Services;

(iii) the Hourly Rate (if applicable); and

(iv) the total HST applicable to the Services during the invoice period, as well as the Consultant's HST registration number.

Unless otherwise provided in this Agreement, the Consultant shall invoice Toronto Hydro after final inspection and acceptance by Toronto Hydro of the Services performed and subject to receipt of all documents required by this Agreement. **Invoices must be sent electronically to: AP@torontohydro.com.** Subject to approval of the invoice by Toronto Hydro, receipt of all documents required by this Agreement, and final review by Toronto Hydro, Toronto Hydro shall make payment to the Consultant via electronic funds transfer not later than thirty (30) days following receipt of an acceptable invoice and the EFT Information (as set out below). **The Consultant must provide Toronto Hydro with, in the case of the first payment only, (i) a void cheque, pre-printed deposit slip or bank confirmation letter and (ii) the email address where the Consultant wishes to receive remittance information (together, "EFT Information"). EFT Information must be sent electronically to efthelp@torontohydro.com or to 14 Carlton Street, Toronto, ON, M5B 1K5, Attention: Treasury Department.** Toronto Hydro reserves the right to pay the Consultant through other payment methods.

Any objection to an invoice shall be made within sixty (60) days from the invoice date; lack of timely objection shall indicate Toronto Hydro's agreement to such invoiced amounts. If any amounts remain unpaid for sixty (60) or more days from the invoice date, the Consultant shall have the right to suspend services until payment in full is made.

7. SUSPENSION OR TERMINATION

7.1 Suspension or Termination

(a) Toronto Hydro may, at any time during the Term by notice in writing, suspend all or a portion of the Services. Upon receipt of such written notice, the Consultant shall perform no further work other than as directed by Toronto Hydro, and shall be entitled to payment for time spent in performing the Services up to the date of suspension.

(b) Either party may terminate this Agreement immediately upon written notice where the other party enters into liquidation, whether compulsory or voluntarily, or where a proceeding in receivership, bankruptcy or insolvency has been instituted by or against such party or its property.

(c) Toronto Hydro, at its sole discretion, may terminate this Agreement immediately upon written notice where the Consultant or any of its Representatives has been in default in the performance of its duties, obligations or undertakings under this Agreement, and has not taken immediate steps to remedy such default within five (5) Business Days following written notice of the specific default by Toronto Hydro. For the purposes of this section, a material default shall include, without limitation, a breach of any of the representations or warranties contained herein or the failure or refusal to provide the Services in accordance with the terms and conditions of this Agreement.

(d) Notwithstanding any other provision in this Agreement, Toronto Hydro, at its sole discretion, shall have the right to terminate this Agreement, for any reason, upon two (2) weeks written notice to the Consultant.

7.2 Effect of Termination

Upon the termination or expiration of this Agreement, the Consultant shall return to Toronto Hydro and delete any and all electronic copies the Consultant may have of all documents and materials in its possession relating to the Services or this Agreement, including all Confidential Information and all Developments, whether completed or not.

8. CONFIDENTIALITY

(a) In performing the Services required by this Agreement, the Consultant may be provided access to Confidential Information. The Consultant acknowledges and agrees that:

(i) the Consultant shall not disclose, permit access to, transmit, or transfer the Confidential Information to any third party without the prior written authorization of Toronto Hydro;

(ii) the Consultant shall protect the confidentiality of the Confidential Information in its possession by exercising the same security measures it normally exercises with respect to its own confidential information and at minimum a reasonable standard of care;

(iii) upon the request of Toronto Hydro, and in any event upon the expiration or termination of this Agreement for any reason, the Consultant shall return (or delete, in the case of

electronic documents) forthwith to Toronto Hydro all Confidential Information, including all copies and other materials containing the Confidential Information, which are in the possession or under the control of the Consultant;

(iv) the Consultant shall not use any Confidential Information for any purpose other than to perform the Services required by this Agreement. Without limiting the foregoing, the Consultant shall not, and shall not permit any of its Representatives to, use any Confidential Information in furtherance of its, or their, individual business or for its, or their, own benefit, profit or advantage, or for the benefit, profit or advantage of any other party; and

(v) Toronto Hydro is subject to MFIPPA and is governed by Governmental Authority such as the Independent Electricity System Operator ("IESO") and the Ontario Energy Board ("OEB") and shall have the right to disclose Confidential Information in accordance with the provisions of MFIPPA or as required by the IESO or the OEB.

(b) Notwithstanding the foregoing, the Consultant may disclose such Confidential Information:

(i) to any of the Representatives of the Consultant who agree to be bound by the obligations of confidentiality herein and who have a reasonable need to know such Confidential Information in the course of their duties for the Consultant but only for the purposes of the Consultant exercising its rights and obligations under this Agreement; and

(ii) in the event that the Consultant believes it is required by law to disclose, or is requested by a Governmental Authority to disclose, any Confidential Information to a Governmental Authority; provided that the Consultant shall, to the extent permitted by law, first inform Toronto Hydro of the request or requirement for disclosure to allow an opportunity for Toronto Hydro to apply for an order to prohibit or restrict such disclosure.

9. INTELLECTUAL PROPERTY

9.1 Use

Nothing in this Agreement shall be deemed to transfer, license, assign, permit the use of, or otherwise convey an interest in whole or in part to the Consultant of any Intellectual Property belonging to Toronto Hydro or any of its Representatives or any third party whose Intellectual Property is in Toronto Hydro's custody or control, and the use by the Consultant of any such Intellectual Property shall be subject to the prior written approval of Toronto Hydro.

9.2 Ownership

Toronto Hydro shall at all times have full rights and title to the Developments, and may at all times take possession of or use any completed or partially completed Developments, notwithstanding any provision, express or implied, to the contrary. Without limiting the generality of the foregoing, Toronto Hydro shall own all Intellectual Property rights in all Developments, and the Consultant hereby waives and assigns to Toronto Hydro any such rights, and agrees to give Toronto Hydro and its Representatives all assistance as may be reasonably required to perfect such rights including, without limitation and where the Consultant is a corporation or partnership, obtaining waiver of moral rights from any of the Consultant's employees, partners or other Representatives.

9.3 Intellectual Property Protection

The Consultant expressly warrants that the manufacture, delivery, sale or use of the Consultant's Services will not infringe any Canadian or foreign patents, trademarks, copyrights, industrial design or other intellectual property rights and the Consultant shall indemnify and save Toronto Hydro harmless from all claims, judgments and decrees that may be entered against Toronto Hydro or its Representatives and against all damage, liability, costs and expenses (including legal fees and other attendant costs and expenses**)** Toronto Hydro incurs by reason of any infringement or claim thereof.

9.4 Pre-Existing Intellectual Property

Any pre-existing Intellectual Proprietary ("Pre-Existing IP") of Consultant or its licensors used to perform Services, or included in any Development, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of the Consultant and its licensors (collectively, "Consultant Information"). To the extent that Consultant incorporates any Consultant Information into the Development(s), Consultant hereby grants to Toronto Hydro a fully paid up, royalty free, irrevocable and non-cancellable, non-exclusive, and non-transferable right to Use the Consultant Information solely for Toronto Hydro's internal business purposes and for any specific purposes identified in the Agreement. For the purpose of the foregoing, "Use" means one or more of the following rights to: use; translate; reproduce; copy; display; perform; communicate in any manner. All Developments and Services provided by the Consultant shall be only for Toronto Hydro's internal business purposes and for any specific purposes identified in the Agreement. Consultant shall have no liability to any third parties who rely on any of its Developments or Services. Consultant shall provide Toronto Hydro with a list of any freeware, shareware or open source software used in the Developments. Any pre-existing intellectual property of Toronto Hydro, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of Toronto Hydro.

10. MISCELLANEOUS

10.1 Survival

In addition to the terms in this Agreement that by their nature survive the expiry or termination of the Agreement, the terms of Section 5 (Representations, Warranties and Indemnities), Section 8 (Confidentiality), Section 9 (Intellectual Property), and Section 0 (Injunctive Relief) shall survive the expiry of this Agreement for a term of five (5) years.

10.2 Injunctive Relief

(a) The Consultant acknowledges and agrees that the terms of Section 8 (Confidentiality) and Section 9 (Intellectual Property) of this Agreement are reasonably necessary to protect the legitimate interests of Toronto Hydro, are reasonable in scope and duration, and are not unduly restrictive.

(b) The Consultant further acknowledges that a breach of any of the terms of Section 8 (Confidentiality) or Section 9 (Intellectual Property) would render irreparable harm to Toronto Hydro, and that a remedy at law for breach of these sections would be inadequate, and that Toronto Hydro shall therefore be entitled to any and all equitable relief, including, without limitation,

injunctive relief without proof of actual damages, and any other remedy that may be available at law or in equity.

10.3 Subcontracting

The Consultant may not subcontract the performance of any part of the Services without Toronto Hydro's prior written approval. Where Toronto Hydro provides its prior written approval to the Consultant to subcontract all or part of the Services, then the Consultant shall enter into agreements with such permitted subcontractor(s) to require the permitted subcontractor(s) to provide Services in accordance with all of the terms of this Agreement. Notwithstanding the foregoing, the Consultant shall remain liable for any and all acts or omissions of any subcontractor(s) as if such acts or omissions were those of Consultant.

10.4 Force Majeure

Either party will be relieved of liability for delays in performance of its obligations hereunder where such delay is a result of Force Majeure. The party affected by the Force Majeure shall give prompt notice thereof to the other party and, upon cessation of the Force Majeure, shall take all reasonable steps to resume the performance of its obligations hereunder. If a delay in performance by reason of Force Majeure extends beyond thirty (30) Business Days, then either party may terminate this Agreement by written notice.

10.5 Waiver

No delay on the part of either party in exercising any of its rights hereunder or failure to exercise the same, nor the acquiescence thereto shall operate as a waiver except in the specific instance for which it is given and where such waiver is provided in writing by the party waiving its rights.

10.6 Amendments

None of the terms, conditions or provisions of this Agreement shall be varied, modified or altered except by written agreement signed by an authorized representative of each parties.

10.7 Assignment

Save and except for Toronto Hydro's right to assign this Agreement to any of its Affiliates, neither party may assign this Agreement or any of their rights or obligations hereunder, without the prior written authorization of the other party.

10.8 Enurement

This Agreement shall enure to the benefit of, and be binding upon, the parties hereto and their respective successors and permitted assigns.

10.9 Severability

In the event that any provision or portion of this Agreement is determined to be invalid or unenforceable for any reason, the remaining provisions or portions of this Agreement will be unaffected and will remain in full force and effect to the fullest extent permitted by law.

10.10 Non-Exclusive Agreement

This Agreement will not be interpreted to grant to the Consultant exclusive rights to provide the Services or to bind Toronto Hydro in any way to an exclusive relationship with the Consultant with regards to the Services or any other service.

10.11 Neutral Construction

The parties to this Agreement agree that this Agreement was negotiated fairly between them at arm's length, that the final terms of this Agreement are the product of the parties' negotiations, and that this Agreement shall be deemed to have been jointly and equally drafted by them, and that the provisions thereof should not be construed against a party on the grounds that such party drafted the Agreement in whole or in part.

10.12 Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof. This Agreement supersedes any and all prior correspondence, warranties, covenants, collateral undertakings, or agreements, oral or otherwise, express or implied, unless otherwise contained herein.

10.13 Notices

(a) All questions or other communications regarding this Agreement, including any notices required by this Agreement, are to be addressed to the following addresses:

to Toronto Hydro:

Name:	Ekaterina Dolzhenkova
Title:	Senior Manager, Regulatory Analytics
Address:	14 Carlton Street, Toronto, Ontario M5B 1K5
Telephone:	(416) 275-8574
Email:	edolzhenkova@torontohydro.com

with copy to:

Title:	EVP, Public and Regulatory Affairs & Chief Legal Officer
Address:	14 Carlton, Toronto Hydro, ON M5B 1K5
Telephone:	(416) 542-3000
Email:	legal@torontohydro.com

to the Consultant:

Name:	Kevin Willerton
Title:	Director
Address:	Suite 4950, 100 King St. W. Toronto, ON Canada M5X 1B1
Telephone:	+1 403-816-5714
Email:	kevin.willerton@guidehouse.com

(b) All notices or communications shall be deemed to be received on the date of acceptance (as evidenced by the signature of the party) if delivered by personal delivery or courier, on the fifth

(5th) Business Day after mailing, if mailed by first class mail, or on the first (1st) Business Day after transmission, if sent by facsimile (provided the transmission is evidenced by documented proof of proper fax transmittal).

10.14 Governing Law

This Agreement shall be governed by and construed in accordance with the law of the Province of Ontario and the laws of Canada applicable therein.

10.15 Execution

This Agreement may be signed in counterparts and delivered by electronic means, each of which shall be deemed an original and all of which, together, shall have the same effect as if all constitute one and the same Agreement.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first written above:

Guidehouse Canada Ltd.	**Toronto Hydro-Electric System Limited**
Per: 	Per: _____
Name: Benjamin Grunfeld	Name: Daliana Coban
Title: Partner	Title: Director, Regulatory Applications & Business Support
I have authority to bind the Consultant.	I have authority to bind Toronto Hydro.

SCHEDULE A

SERVICES

1. Services to be Performed

Toronto Hydro requires the Consultant to complete a lead lag study to determine the appropriate level of working capital for Toronto Hydro's 2025-2029 rate application, in accordance with OEB requirements. The final report will be filed with the OEB as expert evidence in Toronto Hydro's rate application in support of Working Capital Allowance. In preparing this report the Consultant shall examine probable future impacts on the working capital, and shall outline material changes compared to prior studies. The Consultant may be required to respond to interrogatories and/or testify before the OEB in relation to the study.

Use in Toronto Hydro's rate applications, OEB proceedings, and related matters shall be deemed a specific purpose of the Services and Developments for the purposes of Section 9.4 of the Agreement.

2. Specifications

The Consultant shall provide the Services to Toronto Hydro through the following two-phase work plan:

Phase 1: Draft Results
The Consultant shall create a preliminary working capital figure that Toronto Hydro can use for the purposes of preparing its regulatory application.

Task	Consultant Actions	Benefits/Outcomes Overview
Task 1: Project Mobilization	• Kick-off meeting • Complete data request templates • Identify key points of contact at Toronto Hydro	• Clear understanding of communication protocols, points of contact, timelines, and expectations
Task 2: Data Review & Confirmation	• Review data from Toronto Hydro • Populate initial model • Benchmark initial model outputs against past studies and peer utilities • Staff interviews to ensure understanding of data and initial results	• Team has a solid understanding of Toronto Hydro's data and drivers behind initial results • Initial model results are compared against multiple reference points to identify areas of improvement and potential points of contention
Task 3: Finalize Model & Present Initial Results	• Integrate Toronto Hydro staff feedback into the model • Complete independent QA/QC of the model • Present initial study results including comparison to previous study results	• Model is developed with robust processes to ensure an accurate reflection of utility operations • Results are reviewed by Toronto Hydro staff

		• Risks are identified early to help formulate regulatory strategy
Task 4: Preliminary Results	• Integrate Toronto Hydro staff feedback from initial study results into the model • Present, in person at Toronto Hydro offices, preliminary study results along with key underlying assumptions in PPT form	• Results and key underlying assumptions will be understood by Toronto Hydro staff

Phase 2: Draft and Final Reports
Based on the results of Phase 1 and feedback provided by Toronto Hydro, the Consultant shall prepare a final report.

Task	Consultant Actions	Benefits/Outcomes Overview
Task 5: Draft Reports	• Incorporate results of Phase 1 and Toronto Hydro feedback into first draft report • Submit to Toronto Hydro for feedback and create a second draft report. Submit second draft to Toronto Hydro for comment.	• Toronto Hydro staff has two opportunities to provide feedback
Task 6: Final Report	• Produce final report	• Multiple iterations of report ensures completeness and improves robustness for submission to OEB

3. Timetable / Developments

a) The Consultant shall provide the following Development as part of the Services:
   i. **Draft Results:** A preliminary working capital figure based on an initial study that Toronto Hydro can use for the purposes of preparing its regulatory application.
   ii. **Final Report**: Final report detailing the methodology and procedures used while conducting the study; assumptions (if any); calculations supporting the working capital amount; the final working capital amount.

b) The Services shall be completed on the following timeline:

Work Plan Stage	Completion Date:
Phase 1	10 weeks post-execution of this Agreement
Phase 2	8 weeks post-completion of Phase 1

The above timeline is conditional upon Toronto Hydro providing responses to data requests within a reasonable time period and feedback on draft reports within 10 business days.

4. Fees

Toronto Hydro shall pay the Consultant a fixed fee of [redacted] for the Services, exclusive of HST. The Consultant shall invoice Toronto Hydro in accordance with Section 6.2 of this Agreement and the following milestones:

Milestone	Invoice Amount
Completion of Task 2	[redacted]
Completion of Task 4	[redacted]
Delivery of Final Report (Task Six)	[redacted]

5. Additional Services

a) In addition to the Services as set out above in this SCHEDULE A, the Consultant shall further provide additional services (the "Additional Services") on an as-needed basis per the request of Toronto Hydro. Additional Services shall be billed on an hourly basis at the following Hourly Rates:

i. For general work outside of the scope of the Services described in sections 2 and 3 above, including any potential scenario or sensitivity analysis:

Level	[redacted]
Partner	
Director	
Associate Director	
Managing Consultant	
Senior Consultant	
Consultant	

ii. For work directly related to a regulatory application, including but not limited to responding to IRs and testifying:

Level	[redacted]
Partner	
Director	
Associate Director	
Managing Consultant	
Senior Consultant	
Consultant	

The Hourly Rates set out in this Section 4(a)(i) are subject to a 5% annual increase starting July 1, 2023.

b) The Consultant shall invoice Toronto Hydro on a monthly basis in accordance with Section 6 of this Agreement for all Additional Services provided.

SCHEDULE B

DEFINITIONS

In this Agreement, the following definitions shall apply:

“Additional Services”	has the meaning prescribed to it in SCHEDULE A;
"Affiliates"	has the meaning prescribed to it in the *Business Corporations Act* of Ontario, as amended from time to time;
"Agreement"	means this Agreement for Professional Consulting Services, including all recitals, schedules and attachments thereto;
"Anticipated Hours"	has the meaning prescribed in Section 0;
"Applicable Laws"	means all federal, provincial and municipal statutes, regulations, codes, by-laws, orders in council, directives, rules, guidelines and ordinances applicable to this Agreement, including without limitation all applicable OEB codes, rules or guidelines;
"Business Day"	means a day on which banks are open for business in the City of Toronto, Ontario, but does not include a Saturday, Sunday, or a civic or statutory holiday in the Province of Ontario;
"Confidential Information"	means the terms of this Agreement and any and all data or information relating to the business, management or affairs of Toronto Hydro, its customers, employees, or any of its Affiliates disclosed by Toronto Hydro to the Consultant pursuant to this Agreement, whether or not such Confidential Information is expressly identified as confidential. Notwithstanding the foregoing, Confidential Information does not include any information or data which: (a) information or data that is or becomes publicly known through no breach of the terms or conditions of this Agreement; (b) information or data that is independently developed without reference to Confidential Information and without breach of the terms and conditions of this Agreement; or (c) Confidential Information that is required by court order or other legal compulsion to be disclosed, in which case the Consultant shall give Toronto Hydro prior written notice of such disclosure, as permitted by law;
"Consultant"	means Guidehouse Canada Ltd.;
“Consultant Information”	has the meaning prescribed in Section 0;
“Cybersecurity Incident”	has the meaning prescribed to it in SCHEDULE D;
"Development"	means any and all works prepared, generated, created or designed by the Consultant pursuant to this Agreement, including without limitation all drawings, models, designs, formulae, methods, documents, reports,

	software, specifications, or source codes, and any related works, enhancements, modifications or additions thereto;
"Fees"	shall have the meaning as prescribed in Subsection 0;
"Force Majeure"	means any impediments beyond the control of the applicable party due, wholly or in part, directly or indirectly, to: strikes, lockouts, riots, epidemics, war, governmental regulations, fire, explosions, acts of God, or any other impediment beyond the control of the party affected;
"Governmental Authority"	means any government, legislature, municipality, regulatory authority, agency, commission, department, board or court or other law, regulation or rule-making public entity of similar authority, including, without limitation the OEB;
"Guidelines"	has the meaning prescribed in Subsection 0;
"Hourly Rate"	shall have the meaning prescribed in SCHEDULE A;
"HST"	means Harmonized Sales Tax;
"IESO"	means the Independent Electricity System Operator;
"Industry Standards"	means the then-current industry standards and best practices used or observed by leading Canadian and United States providers of services to companies similar to Toronto Hydro and which are the same or similar to the Services;
"Intellectual Property"	includes all trademarks, copyrights, patents, business names, trade secrets, proprietary software, analysis or techniques (whether or not patented or patentable), confidential or secret designs and processes, source codes, plans or devices, or other proprietary and intellectual property rights;
"MFIPPA"	means the *Municipal Freedom of Information Act;*
"OEB"	means the Ontario Energy Board;
"Personal Information"	means information from or about an individual (or any information that is combined with such information) including information that can be used to authenticate that individual, that is: (i) provided to Vendor by Toronto Hydro; or (ii) collected, accessed, used, stored or disclosed by Vendor on behalf of Toronto Hydro in connection with Consultant's obligations pursuant to the Agreement;

“PIPEDA”	means the *Personal Information Protection and Electronic Documents Act* (Canada);
“Pre-Existing IP”	has the meaning prescribed to it in Section 0;
"Privacy Laws"	has the meaning prescribed to it in Section 4.5;
"Representative"	in respect of a party, means such party’s directors, officers, employees, agents, contractors and advisors, the party’s Affiliates, and all such Affiliates’ respective directors, officers, employees, agents, contractors and advisors;
"Remittances"	has the meaning prescribed to it in Subsection 0;
“Security Incident”	means any set of facts or circumstances that would lead a reasonable person to conclude that there has been the loss of or improper, unauthorized or unlawful access to, use of, destruction of, or disclosure of Toronto Hydro Data, including, but not limited to, a Cybersecurity Incident;
"Services"	means all of the Developments, services and specifications to be provided, performed and met by the Consultant under this Agreement, as more particularly described in SCHEDULE A;
“Service Level”	means the standards for the performance of the Services and for Vendor’s management of Security Incidents, as more particularly set out in this Agreement;
“Specifications”	means for any Service, deliverable, vendor system or vendor facility, the technical, functional, physical or other relevant specification, documentation, or requirements set out in the Agreement, otherwise in identified in writing by the parties, or otherwise inherent or necessarily included as part of the specification or requirements specifically set out herein or therein, including any operating manuals or operating plans referenced in a SOW;
“System”	means any computer system, including any network, used in connection with the provision of the Services;
"Term"	has the meaning prescribed to it in Section **Error! Reference source not found.**;
"Toronto Hydro"	means Toronto Hydro-Electric System Limited; and
“Toronto Hydro Data”	means (i) Personal Information and (ii) any other related data that Consultant collects, uses, or stores pursuant to the Agreement that contains the confidential or proprietary information of Toronto Hydro.

SCHEDULE C

Ontario Energy Board *Rules of Practice and Procedure* Rule 13A

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

a. the expert's name, business name and address, and general area of expertise;
b. the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;
c. the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;
d. the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;
e. in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and
f. an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

a. in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and
b. at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

a. scope and timing;
b. the involvement of any expert engaged by the OEB;
c. the costs associated with the conduct of the activities;
d. the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of Rule **13A.04**; and
e. any issues in relation to confidentiality.

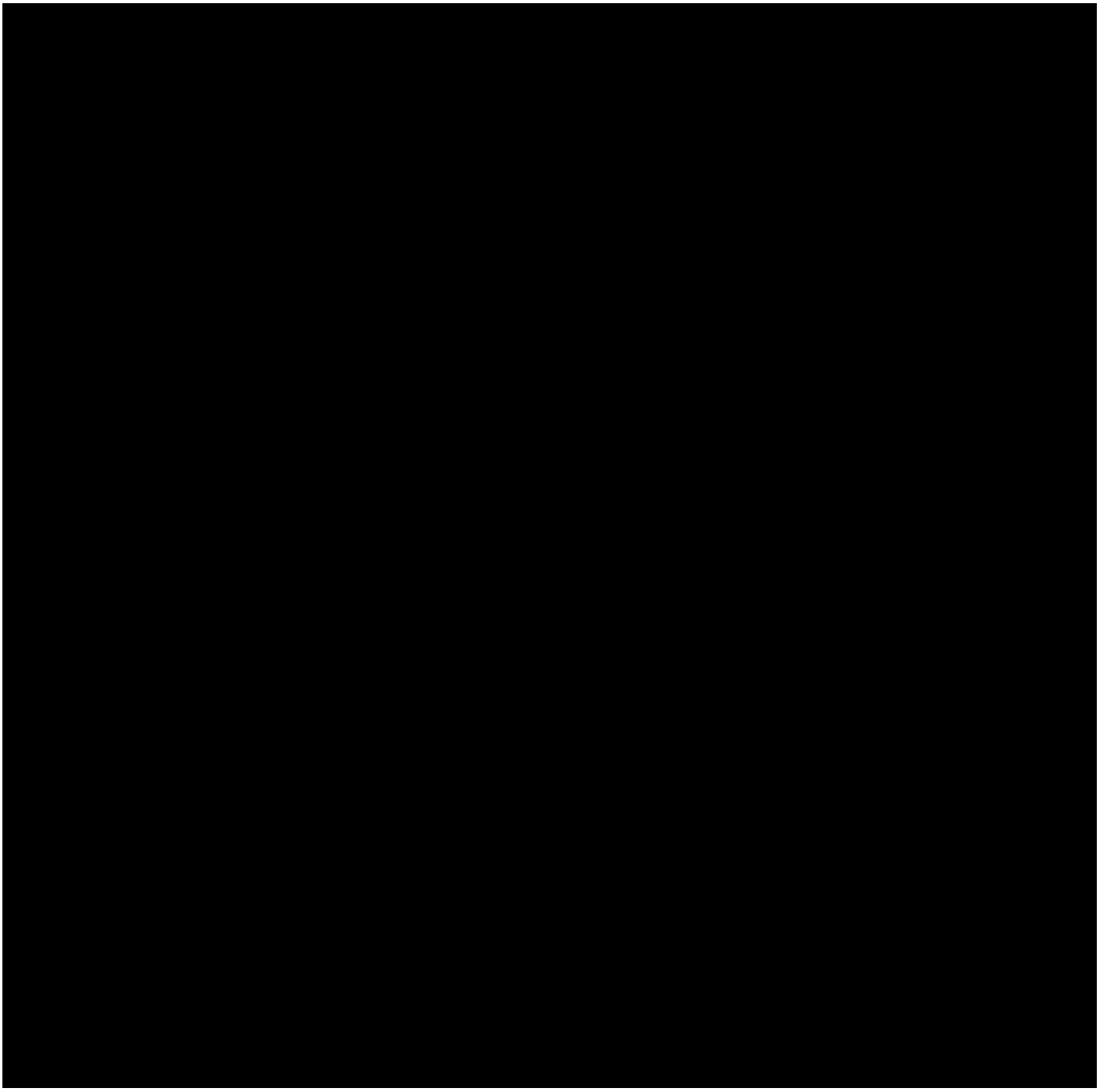
13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A**.

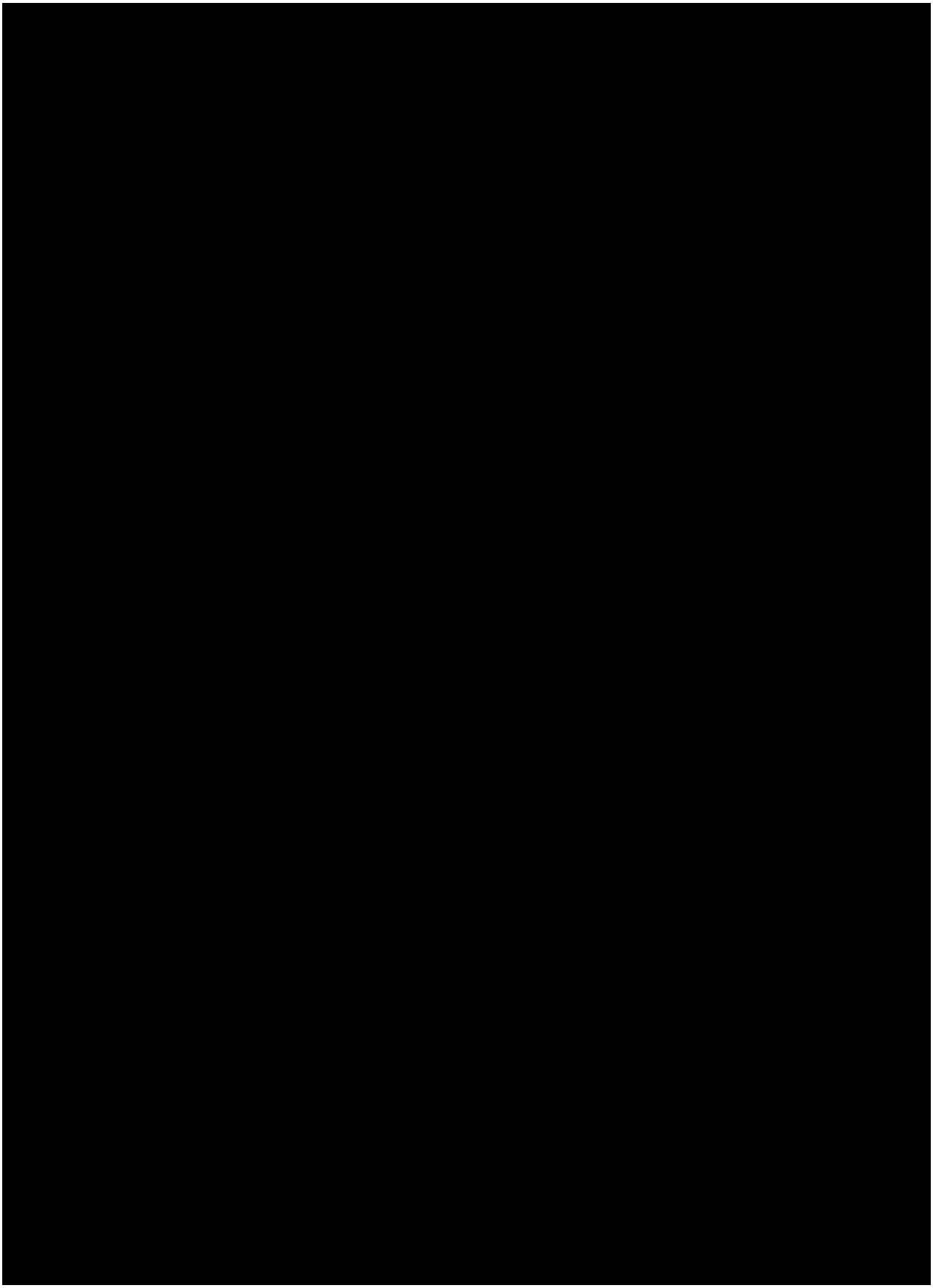
SCHEDULE D

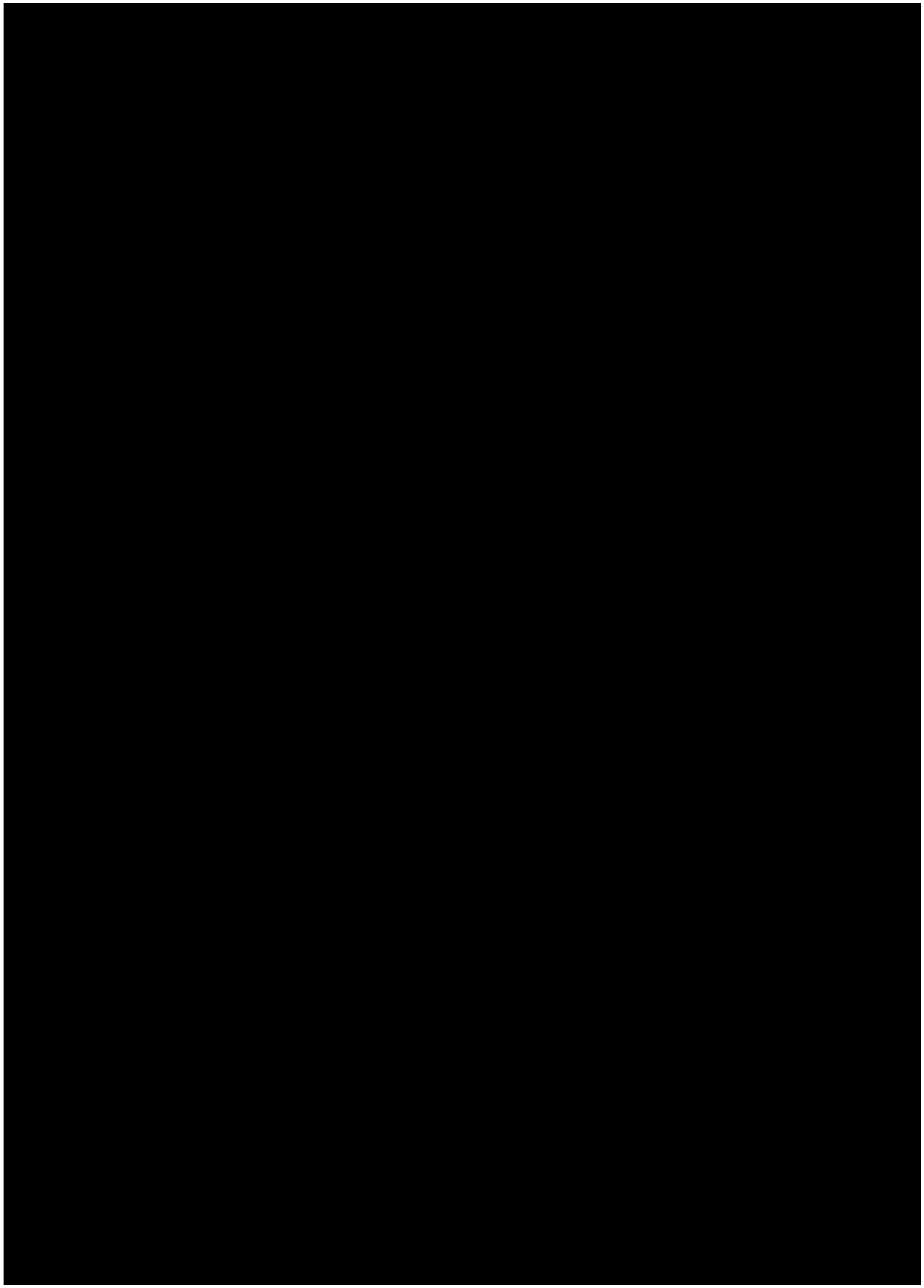
Cybersecurity Controls

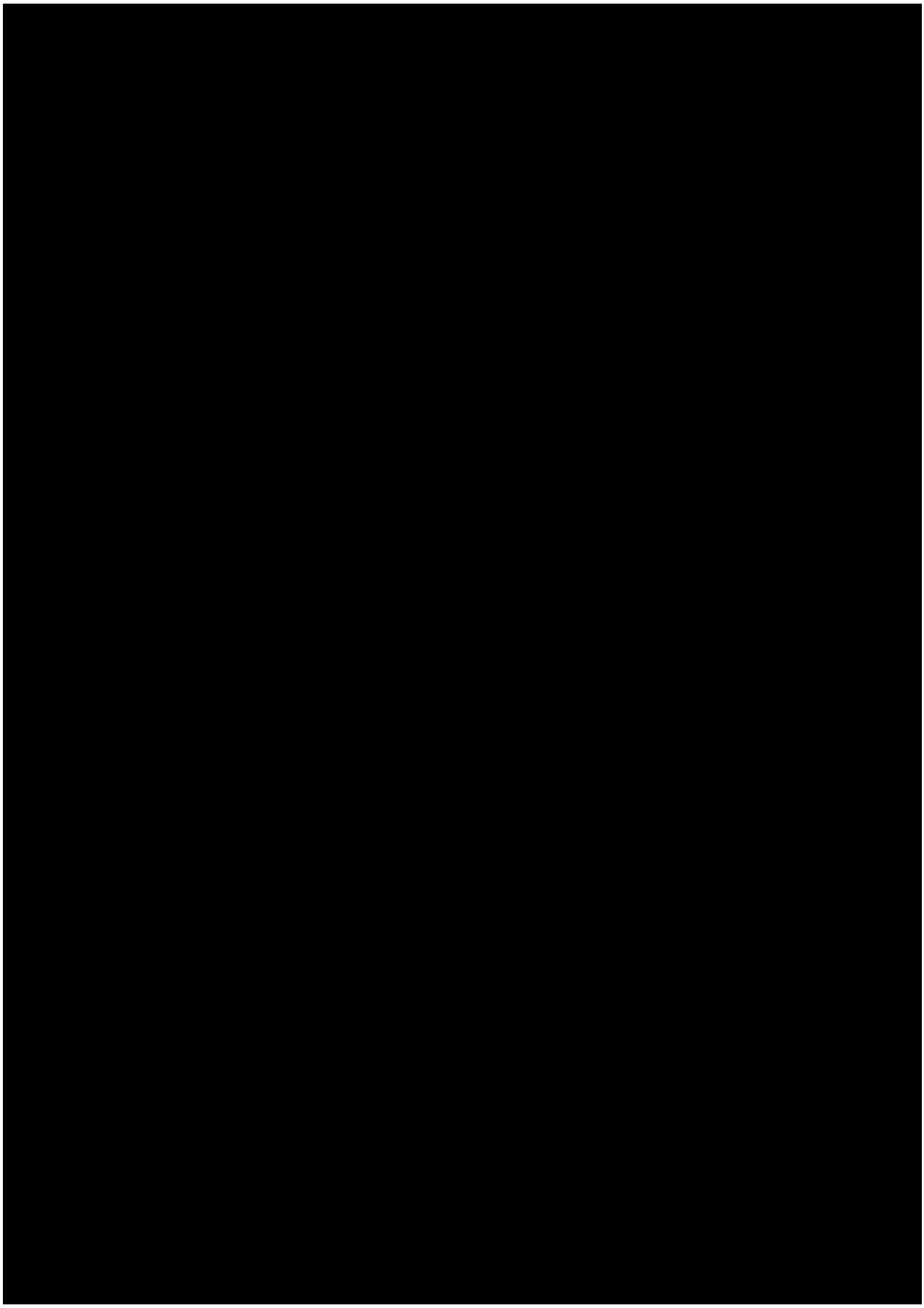
This Schedule D ("**Schedule**") is attached to, and made part of, the Agreement for Professional Consulting Services dated as of October 31, 2022 (the "**Agreement**") by and between Toronto Hydro-Electric System ("**Toronto Hydro**") and Guidehouse Canada Ltd. ("**Vendor**"). All capitalized terms used in this Schedule and not defined in this Schedule have the same meaning as set forth in the Agreement.

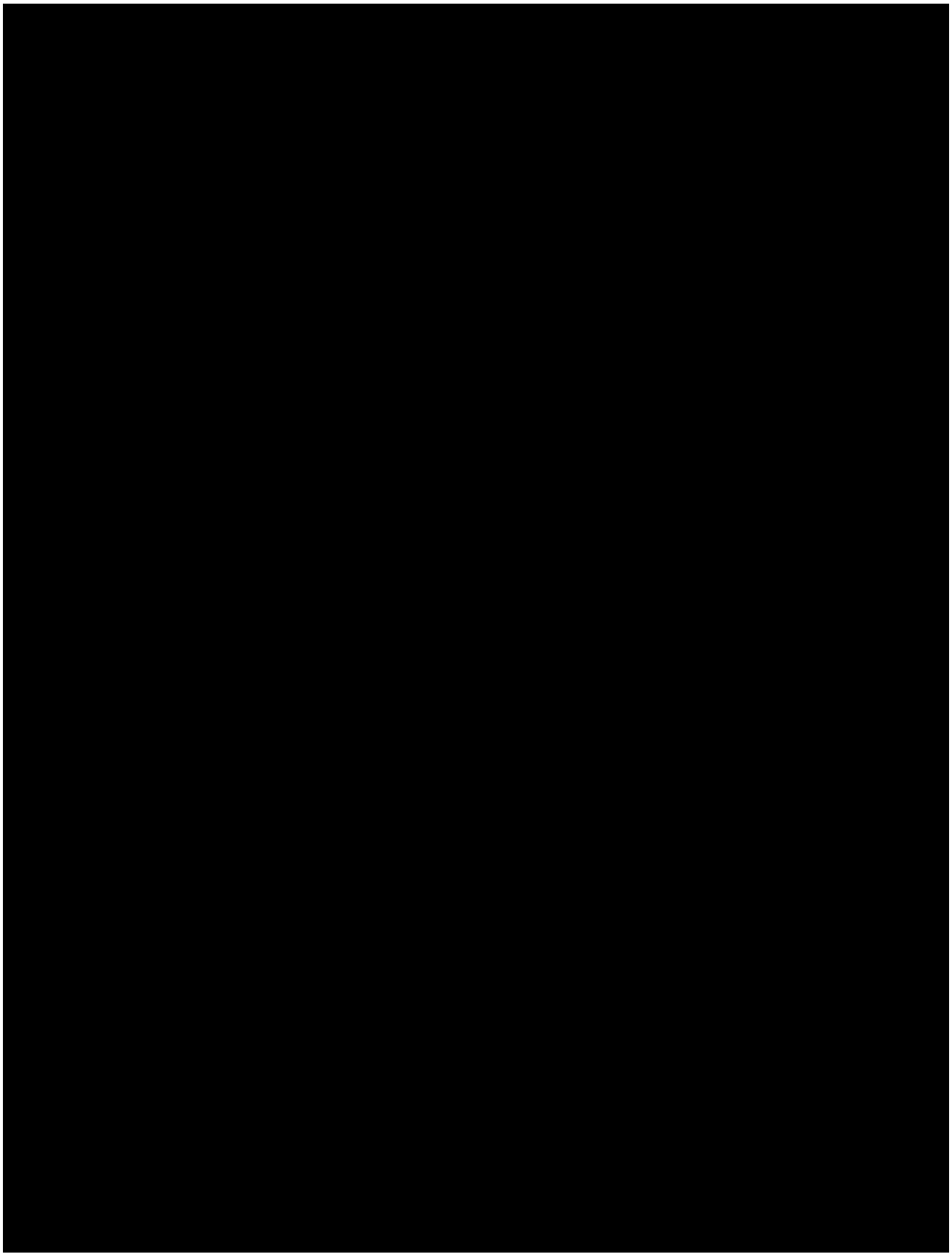
Vendor will provide Cybersecurity Controls in accordance with the requirements set forth in this Schedule.

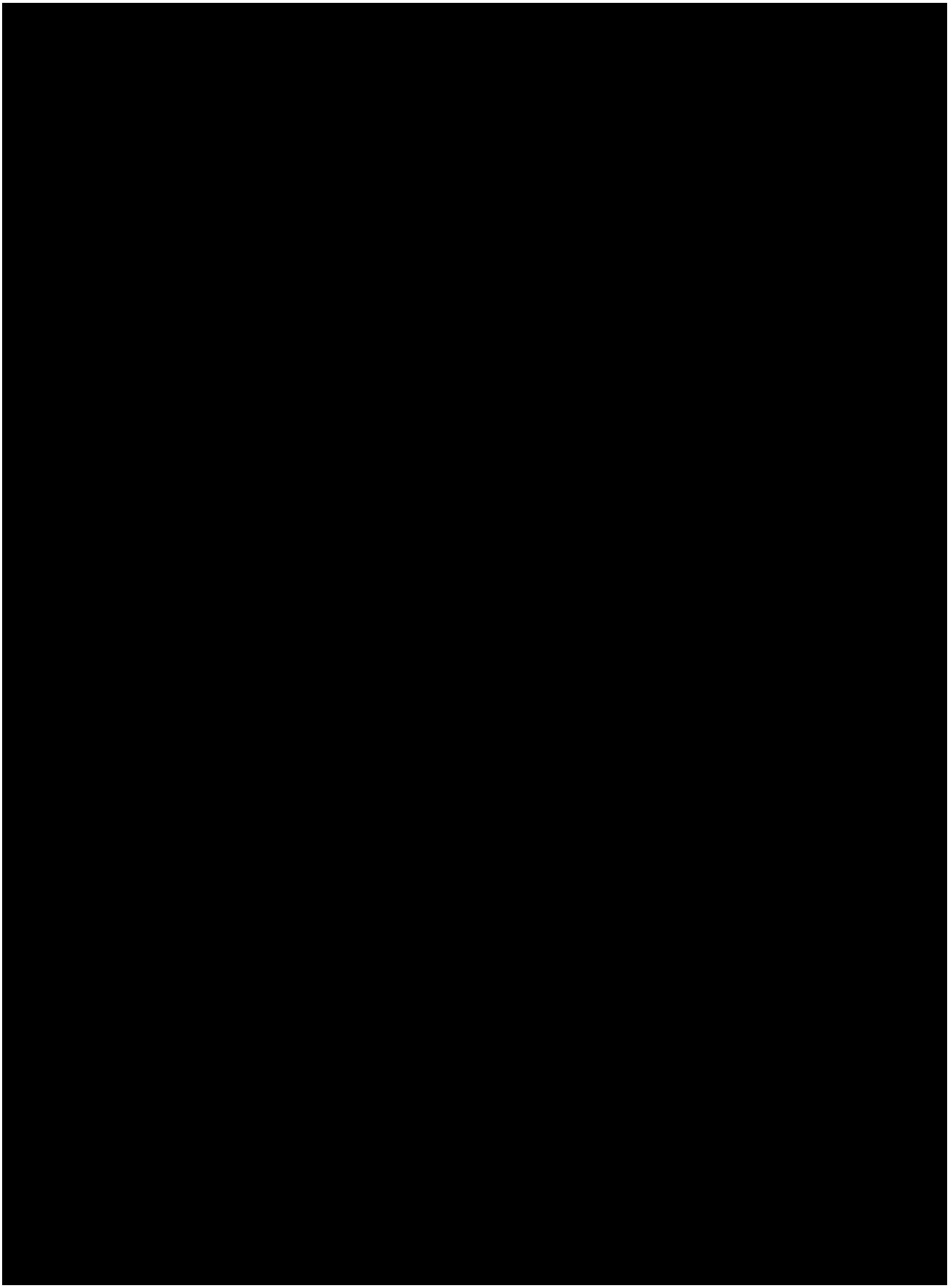


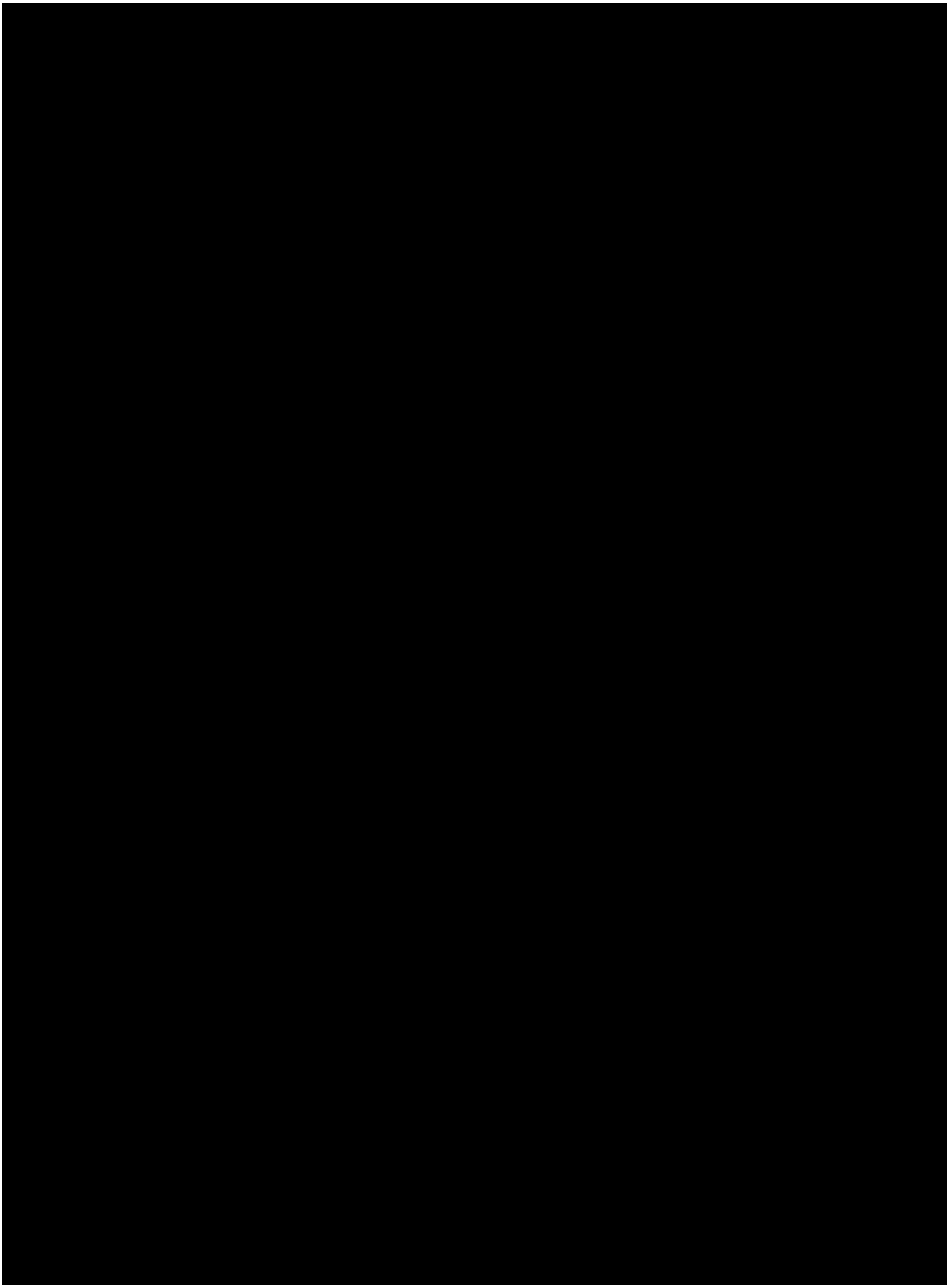


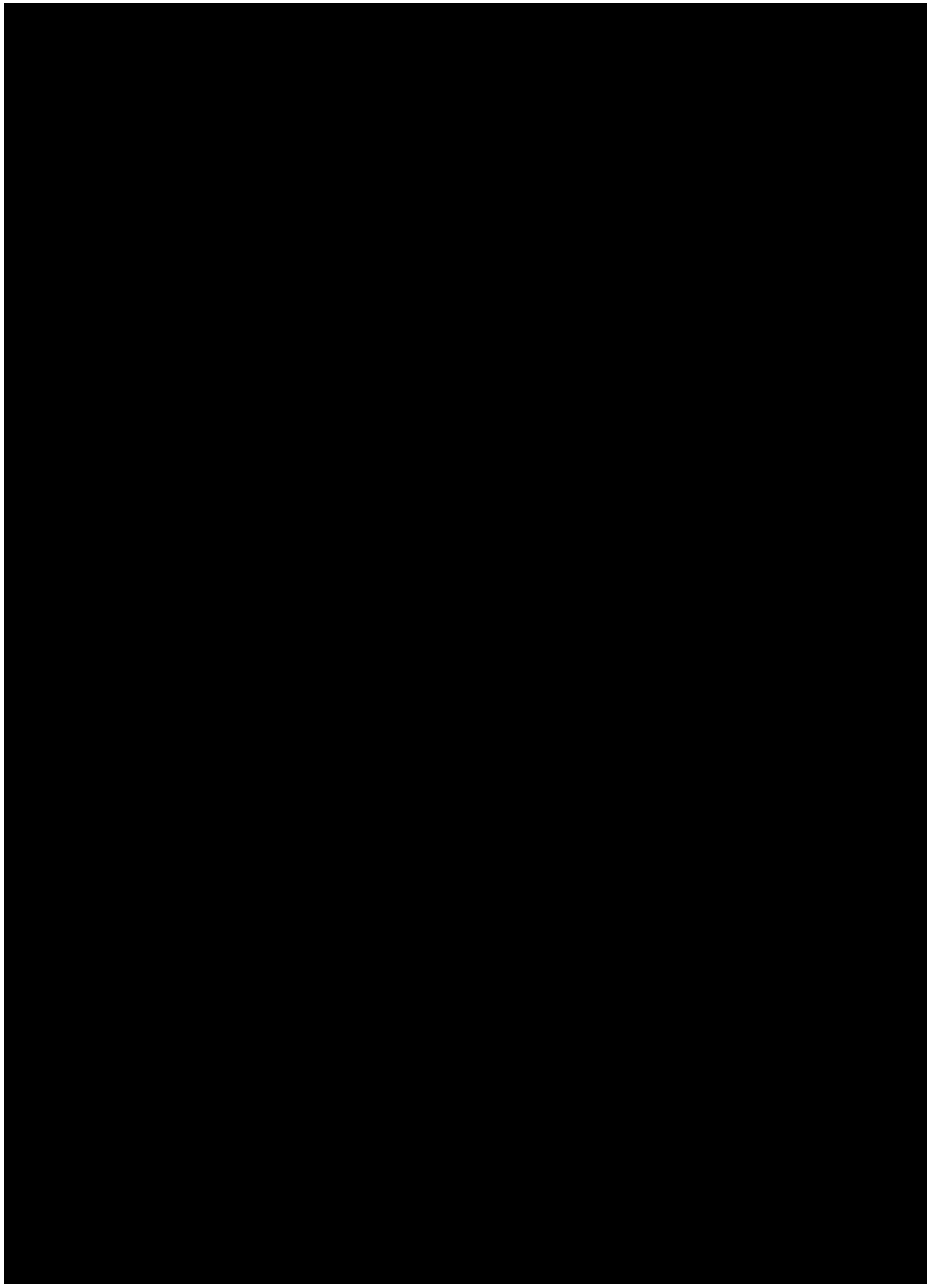










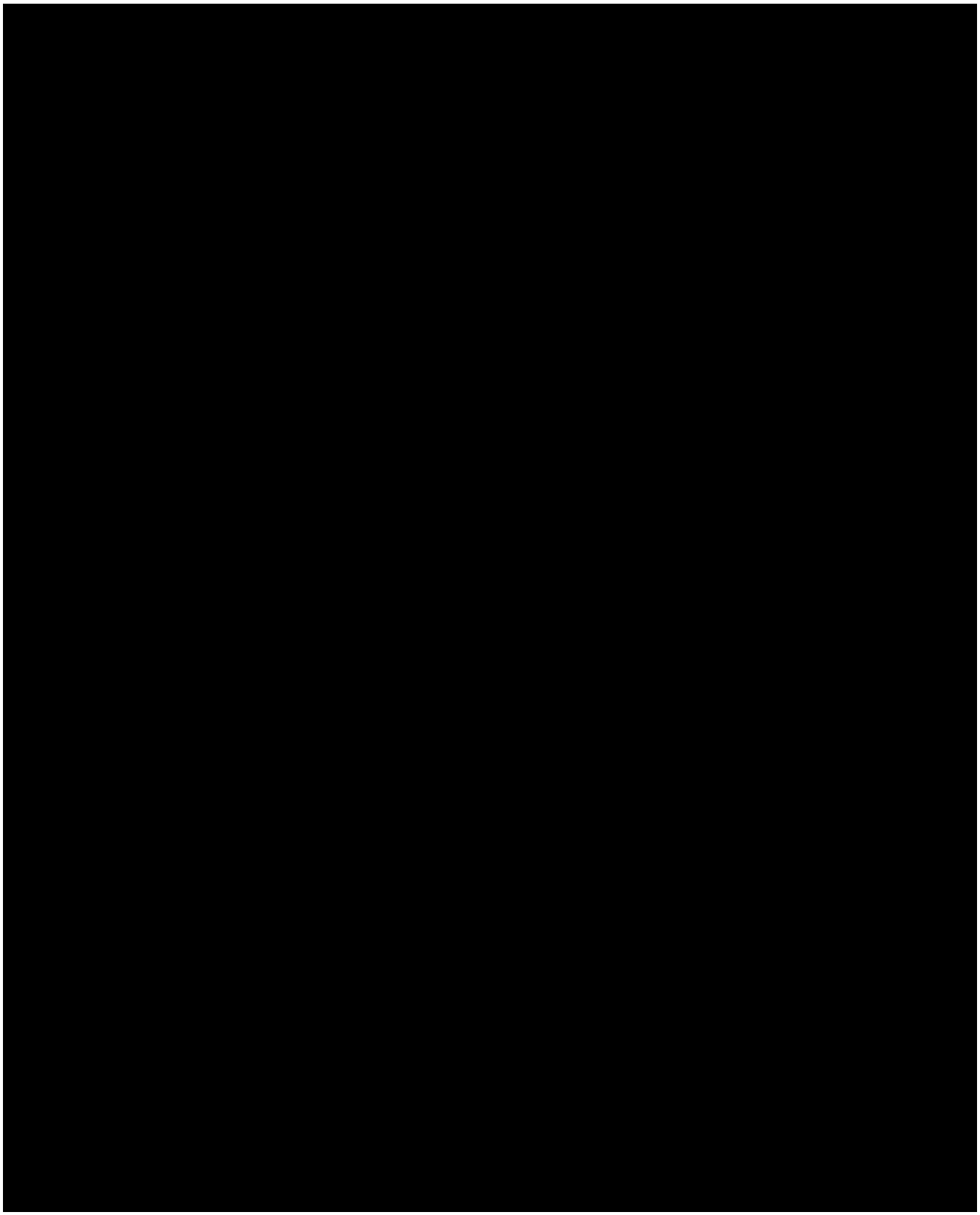


Appendix A to Schedule D Cybersecurity Controls

Vulnerability and Remediation Response

The vulnerability of the risk rating is determined by the CVSS score set forth below.



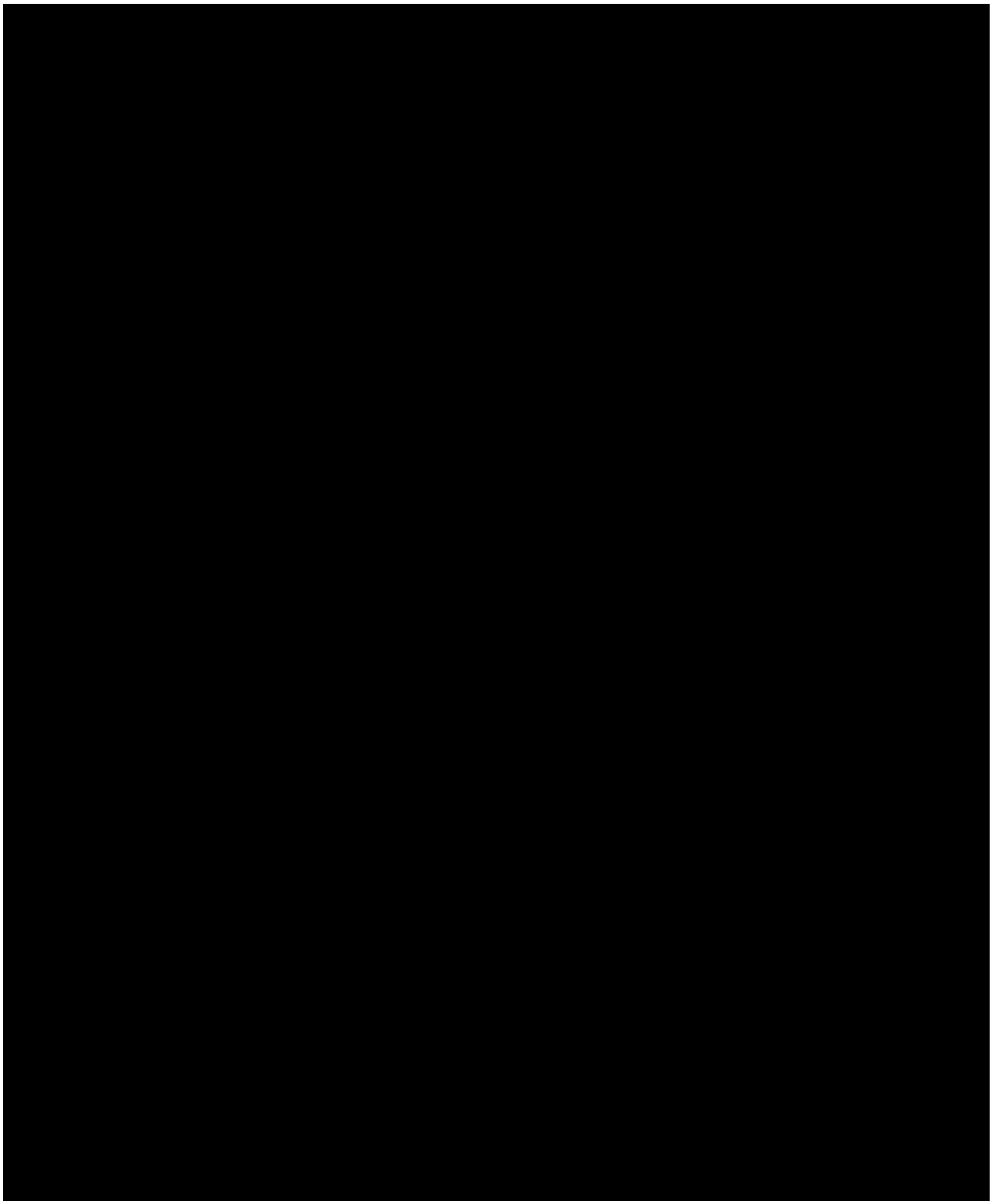


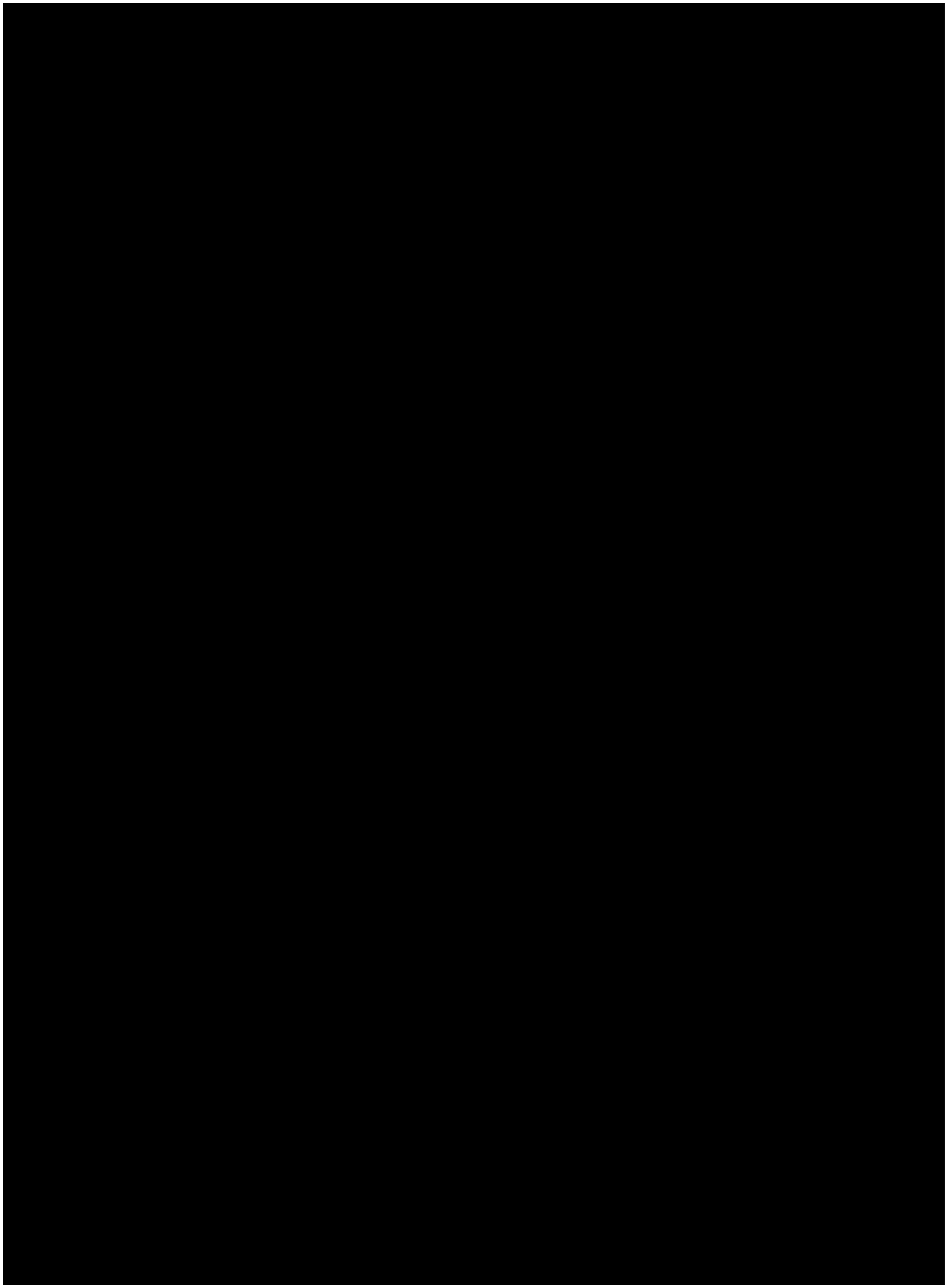


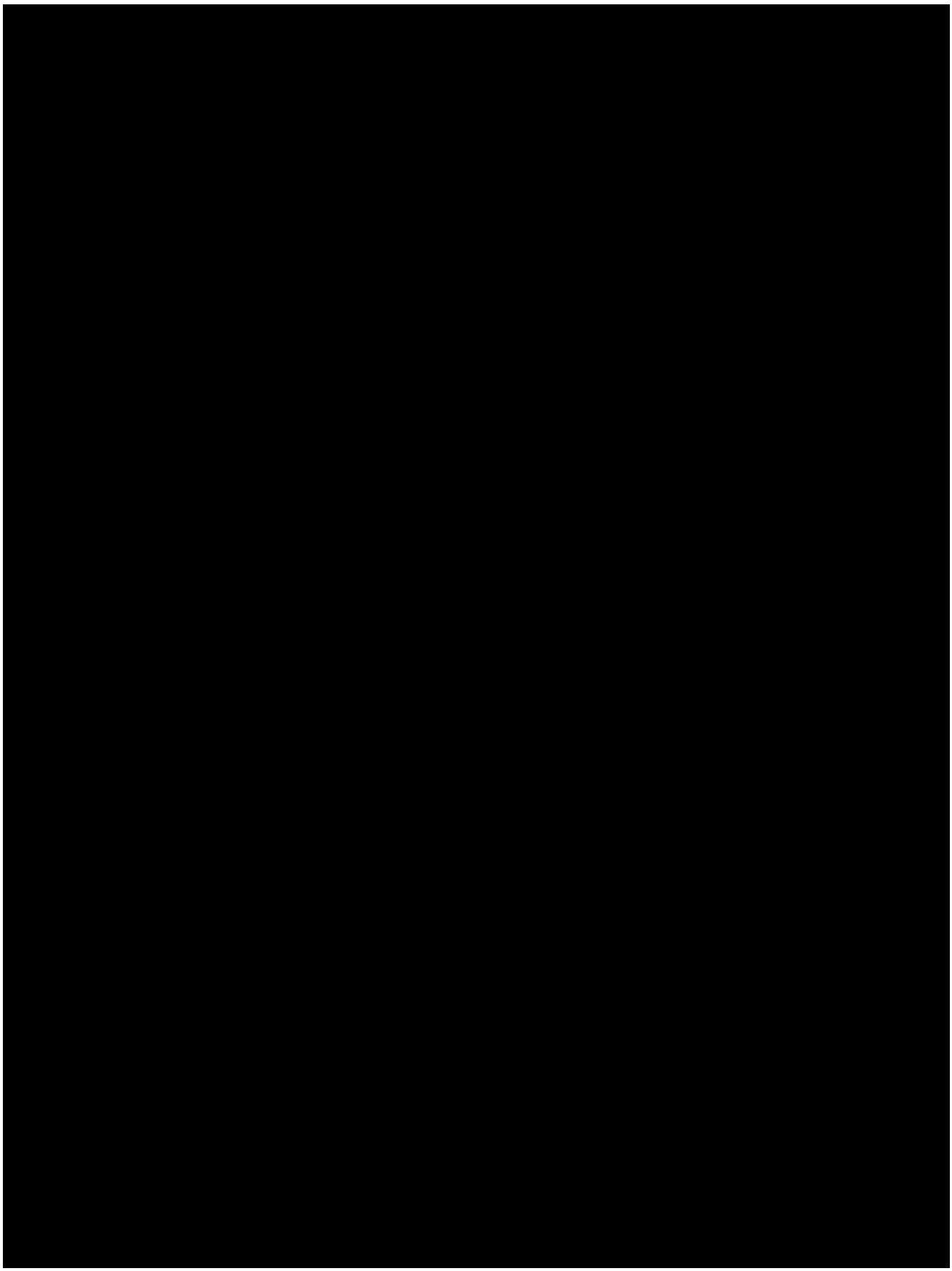


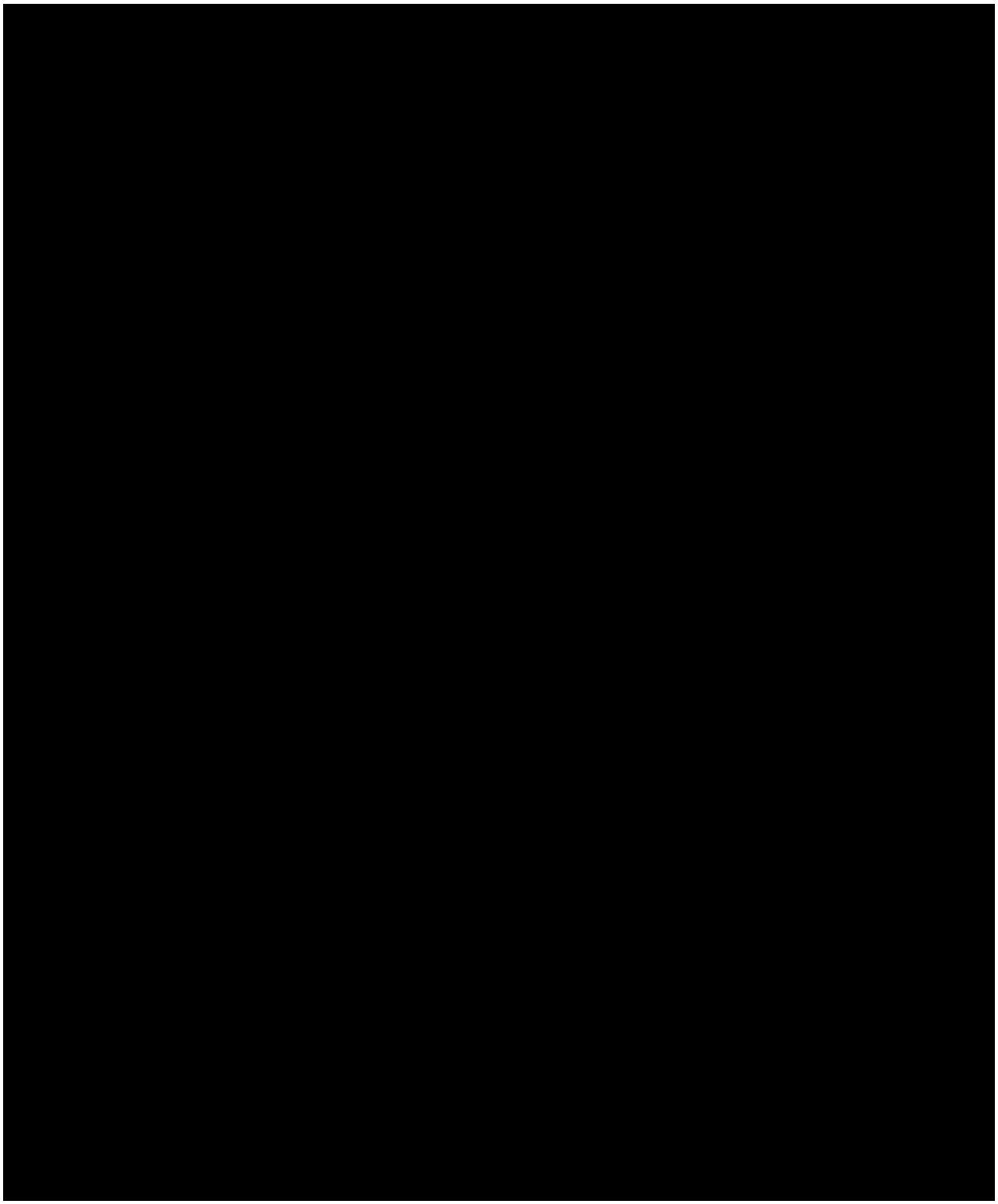
Appendix B to Schedule D Cybersecurity Controls

Cybersecurity Incident Response









Agreement for Professional Consulting Services

THIS AGREEMENT is made as of the 27th day of April, 2022 between **Toronto Hydro-Electric System Limited** ("Toronto Hydro"), a corporation incorporated under the laws of the province of Ontario and **Concentric Advisors ULC**, a corporation incorporated under the laws of the province of Alberta (the "Consultant"), pursuant to which Toronto Hydro shall retain the Consultant to provide certain Services, and the Consultant shall provide such Services, during the Term, subject to the terms and conditions hereof;

NOW THEREFORE, in consideration of the mutual covenants set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. INTERPRETATION

Unless otherwise indicated, all capitalized terms in this Agreement shall be as defined in SCHEDULE B and any reference to currency in this Agreement shall refer to lawful money of Canada.

2. RELATIONSHIP OF THE PARTIES

2.1 Retainer

Toronto Hydro hereby retains the Consultant to provide the Services, and the Consultant hereby agrees to provide the Services, during the Term, in accordance with the terms and conditions of this Agreement.

2.2 Independent Contractors

(a) Notwithstanding any provision hereof, this Agreement does not constitute and shall not be construed as constituting a partnership, joint venture, principal/agency relationship, or employer/employee relationship between the parties. The Consultant and Toronto Hydro shall at all times remain independent contractors of each other, and neither party shall represent itself to be an agent or employee of the other.

(b) Without limiting the generality of paragraph 2.2(a), the Consultant hereby acknowledges and agrees that neither it nor its Representatives shall be eligible or entitled, by reason of this Agreement, to participate in any employee-related program offered by Toronto Hydro or any of its Affiliates, including, without limitation, any benefit, insurance, compensation, health plan, bonus or retirement program.

(c) The Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities or claims whatsoever against Toronto Hydro or its Representatives resulting from or relating to the Consultant or its Representatives being deemed to be an employee of Toronto Hydro or any of its Affiliates.

(d) The Consultant hereby acknowledges and agrees that Toronto Hydro shall not be responsible for and shall not have control or charge of any means, methods, techniques,

sequences or procedures used for or in respect of the Services, or for the safety precautions or programs required for the Services or otherwise prescribed hereunder.

2.3 Conflicts of Interest

The Parties acknowledge that there is potential for a conflict of interest based on services provided by the Consultant from time to time to Toronto Hydro. The Consultant agrees to take all such steps as Toronto Hydro deems necessary, acting reasonably, to remove, mitigate or minimize such conflict of interest.

3. TERM

3.1 Term

Unless otherwise terminated in accordance with the provisions hereof, this Agreement shall be for a term commencing on April 27, 2022 and terminating on April 26, 2025 (the "**Term**").

4. SERVICE REQUIREMENTS

4.1 Services

During the Term, the Consultant shall perform the Services as detailed in SCHEDULE A hereto.

4.2 Time and Availability

(a) Unless otherwise directed in writing by Toronto Hydro, the Consultant shall have discretion in selecting the dates and times it performs the Services throughout the month, giving due regard to the needs of Toronto Hydro's business requirements and provided that any access to Toronto Hydro property shall be during regular business hours.

4.3 Revision to Services

(a) The Parties acknowledge and agree that the Services to be undertaken and completed by the Consultant under this Agreement may be subject to revision or amendment from time to time during the Term: (i) as required by Toronto Hydro to comply with the Guidelines or other standards set out in section 4.4 below; (ii) as required by Toronto Hydro to comply with the Applicable Laws or any order, instruction, directive or legal requirement of a Governmental Authority; or (iii) as required by Toronto Hydro to ensure that Toronto Hydro receives the expected funding and benefits with respect to the project to which the Services relate.

(b) Toronto Hydro agrees to provide the Consultant with written notice of any revision or amendment to the Services required pursuant to this Section 4.3, and subject to the terms of Subsection 4.3(d) below, the Consultant shall comply with all such directives.

(c) In the event that the Consultant fails to comply with a directive issued by Toronto Hydro pursuant to this Section 4.3, Toronto Hydro shall have the right, in addition to any other remedies which may be available to Toronto Hydro hereunder or otherwise at law, to terminate this Agreement by giving written notice of termination to the Consultant whereupon this Agreement shall terminate as at the effective date of termination specified in the notice and the provision of Section 7 shall apply.

(d) Notwithstanding Subsection 4.3(b), where a directive from Toronto Hydro results in a material change in the scope and/or implementation of the Services, then the Consultant shall have the right to terminate this Agreement by giving notice of termination to Toronto Hydro whereupon the Agreement shall terminate as at the effective date of termination specified in the notice and the provisions of Section 7 shall apply.

4.4 Applicable Laws

(a) The Consultant shall, at its sole expense, obtain and maintain during the Term of this Agreement, all permits, licences and approvals required by all Applicable Laws to perform its obligations under this Agreement. The terms and conditions of this Agreement shall be carried out in strict compliance with all Applicable Laws and in the event of any conflict between any Applicable Laws, the Applicable Laws with the most stringent standard shall apply.

(b) Without limiting the generality of the foregoing, the Consultant shall comply with:

(i) the *Municipal Freedom of Information and Protection of Privacy Act* (Ontario) ("MFIPPA"), the *Personal Information Protection and Electronic Documents Act* (Canada) ("PIPEDA") and any other applicable privacy legislation (collectively, "Privacy Laws") with respect to any personal information collected, used or disclosed in connection with this Agreement and shall indemnify and hold harmless Toronto Hydro and its Representatives from and against any and all claims, demands, suits, losses, damages, causes of action, fines or judgments (including related expenses and legal costs) they may incur related to or arising out of any non-compliance therewith;

(ii) In its performance of the Services under this Agreement, the International Financial Reporting Standards (IFRS) including International Accounting Standards (IAS) and Interpretations thereto;

(c) Where any Deliverable is subject to the approval or review of any authority, department, government or agency other than Toronto Hydro, such applications for approval or review shall, unless otherwise authorized by Toronto Hydro in writing, be prepared by the Consultant to be approved and submitted by and through the offices of Toronto Hydro, and the Consultant shall not have any direct dealings with the authority, department, government or agency in question with regards to the Deliverable.

(d) The Consultant and the Consultant's personnel shall comply with all rules and direction of Toronto Hydro, whether specified in this Agreement or otherwise, while working on Toronto Hydro's premises or when accessing or connecting to Toronto Hydro's information technology systems, including rules and directions concerning health, safety, security and environmental protection, including without limitation, Toronto Hydro's *Code of Business Conduct and Whistleblower Procedure,* Toronto Hydro's *Disclosure Policy,* Toronto Hydro's *Social Media and Digital Communication Policy,* Toronto Hydro's *Accessibility Policy,* Toronto Hydro's *Workplace Harassment Policy and Program,* Toronto Hydro's *Violence Prevention in the Workplace Policy,* Toronto Hydro's *Workplace Alcohol and Drug Policy*, Toronto Hydro's *Environmental Policy,* Toronto Hydro's *Occupational Health and Safety Policy,* Toronto Hydro's *Privacy Policy,* Toronto Hydro's *Cyber Security Policy*, Toronto Hydro's *Technology Use Guidelines*, Toronto

Hydro's *Physical Security Policy*, Toronto Hydro's *COVID-19 Vaccination Policy,* and the *Affiliate Relationships Code for Electricity Distributors and Transmitters* issued by the OEB (together, the "Guidelines"). The Consultant agrees to comply with and to direct its Representatives to comply with such Guidelines, as amended.

4.5 Performance

(a) The Services shall be performed to the satisfaction of Toronto Hydro, and Toronto Hydro shall have the right, at all reasonable times, to inspect or otherwise review the Services performed or being performed. The Consultant shall, upon the request of Toronto Hydro, acting reasonably, provide Toronto Hydro with written reports of the status of the Deliverables and the Consultant's progress in providing the Services.

(b) In the event of any dispute between Toronto Hydro and the Consultant relating to the quality or acceptability or rate of progress of any of the Services, or relating to the interpretation of any instructions or specifications concerning the Services, Toronto Hydro and the Consultant shall, both acting reasonably, attempt to mutually reach a resolution in good faith.

5. REPRESENTATIONS, WARRANTIES, INDEMNITIES AND INSURANCE

5.1 Representations and Warranties

The Consultant hereby represents, warrants and agrees that:

(i) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has/have the necessary experience and qualifications to perform the Services;

(ii) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) will perform the Services in a diligent, expeditious and workmanlike manner, consistent with standards generally observed by reputable and competent members of the same industry providing similar services;

(iii) all Services shall be the Consultant's (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) original work and none of the Services or any invention, development, use, production, distribution or exploitation relating thereto will infringe, misappropriate or violate any intellectual property or other right of any person or entity.

(iv) If, during the performance of these Services or within six months following completion of the Services, such Services shall prove to be faulty or defective by reason of a failure to meet such standards, Consultant agrees that upon prompt written notification from Toronto Hydro prior to the expiration of the six month period following the completion of the Services containing any such fault or defect, such faulty portion of the Services shall be redone at no cost to Toronto Hydro up to a maximum amount equivalent to the cost of the Services rendered under this Agreement. The foregoing shall constitute

Consultant's sole liability with respect to the accuracy or completeness of the work and the activities involved in its preparation, but shall not limit or exclude the Consultant's obligations otherwise set out under this Agreement, including, but not limited to sections 5.2 and 9.3 below.

5.2 Indemnity

a) The Consultant shall be liable for and shall indemnify and hold harmless Toronto Hydro and its Representatives from all claims, demands, actions, penalties, damages, losses, judgments and settlements, liabilities, costs, expenses, including legal fees and other related costs and expenses arising out of, related to, or incident to, the Consultant's or any of its Representatives' performance of the Services under this Agreement, including, without limitation:

i. any breach, violation or non-performance by the Consultant or any of its Representatives of any terms, conditions, warranties, obligations or covenants contained in this Agreement;
ii. any breach or violation by the Consultant or any of its Representatives of any Applicable Laws; and
iii. any actions, omissions, negligence or wilful misconduct of the Consultant or any of its Representatives

except to the extent directly caused or contributed to by the negligence or wilful misconduct of Toronto Hydro or its Representatives.

b) In no event shall either party be liable for loss of profit or use or for any indirect, special, incidental or consequential damages of any nature or kind including but not limited to delays, loss of revenue, loss of use, loss of data, loss of product, costs of capital or costs or replacement power, even if that party has been advised of the possibility of such damages.

c) Subject to section 5.2(d), the Consultant's liability for a claim for damages shall be limited to three (3) times the amounts paid or payable by Toronto Hydro to the Consultant pursuant to this Agreement.

d) Notwithstanding the foregoing, no exclusion or limitation of liability shall apply to:

i. Breach of the confidentiality or privacy obligations in this Agreement
ii. Intentional misconduct or gross negligence;
iii. Breach of Applicable Law; or
iv. Breach of intellectual property indemnity in Section 9.

5.3 Insurance

(a) The Consultant shall, during the Term, and at its own expense, maintain and keep in full force and effect (and, when requested, provide Toronto Hydro with proof thereof):

(i) commercial general liability insurance on an occurrence basis having a minimum inclusive coverage limit, including personal injury and property damage, of not less than two (2) million dollars ($2,000,000) per occurrence, which commercial general liability insurance shall be extended to cover contractual liability, products and completed operations liability, and owners/contractors protective liability;

(ii) Automobile liability insurance on all hired and non-owned vehicles used in connection with this Agreement and such insurance coverage shall have a limit of not less than one (1) million dollars ($1,000,000.00) combined single limit, in respect of bodily injury (including passenger hazard) and property damage inclusive of any one accident and mandatory accident benefits;

(iii) Errors and Omissions Insurance (Professional Liability) in the amount of not less than two million dollars ($2,000,000);

(iv) Umbrella insurance coverage limit of not less than two million dollars ($2,000,000.00).

(b) All insurance coverages and limits required to be maintained hereunder shall: (i) be primary to any insurance maintained by Toronto Hydro, which insurance shall be excess and non-contributory; (ii) contain a cross liability clause and a severability of interest clause; and (iii) contain a thirty (30) day prior written notice to Toronto Hydro for any cancellation, non-renewal or adverse material change.

(c) The Consultant agrees that the insurance required hereunder in no way limits the Consultant's liability pursuant to the Liability and Indemnity provision in Section 5.3.A waiver of subrogation shall be provided by the insurer(s) to Toronto Hydro.

6. FEES

6.1 Fees

(a) Subject to paragraphs 6.1(b) - 6.1(e), in exchange for the performance of the Services in accordance with the terms hereof, Toronto Hydro shall pay the Consultant the amounts outlined in SCHEDULE A, not including HST (the "Fee")_, plus any reasonable out-of-pocket expenses or other disbursements made on the behalf of Toronto Hydro by the Consultant while on assignment for Toronto Hydro. Consultant shall be reimbursed for reasonable and customary travel expenses incurred on Toronto Hydro's behalf, provided that the prior authorization of Toronto Hydro has been obtained with respect to such expenses.

(b) Any disbursements for additional incidentals incurred by the Consultant in relation to this Agreement ("Disbursements") exceeding $500 CAD_must be pre-approved by Toronto Hydro in writing.

(c) The Consultant shall not incur or submit invoices for any work outside the scope of the Services without prior written approval from Toronto Hydro.

(d) The Consultant shall make all payment of taxes, employment insurance premiums, pension plan contributions and any other taxes or other payment of any nature, imposed by any authority in respect of the Fee paid by Toronto Hydro to the Consultant under this Agreement (together, the "Remittances"), and the Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities and claims whatsoever against Toronto Hydro or its Representatives, in

any way arising out of or relating to any failure to deduct, withhold, or remit any Remittance.

(e) Without limiting the generality of paragraph 6.1(a), Toronto Hydro reserves the right to deduct any applicable non-resident withholding taxes from any Fee owing to the Consultant under this Agreement and remit such amounts to the applicable taxation authority.

6.2 Payment

The Consultant shall submit invoices to Toronto Hydro on a monthly basis containing:

(i) a description of the Services performed during the invoice period;

(ii) the monthly payment amount;

(iii) the total HST applicable to the Services during the invoice period, as well as the Consultant's HST registration number; and

(iv) a detailed description of the Disbursements incurred around the invoice period, supported by documentation in a form acceptable to Toronto Hydro.

Unless otherwise provided in this Agreement, the Consultant shall invoice Toronto Hydro after final inspection and acceptance by Toronto Hydro of the Services performed and subject to receipt of all documents required by this Agreement. **Invoices must be sent electronically to: AP@torontohydro.com.** Subject to approval of the invoice by Toronto Hydro, receipt of all documents required by this Agreement, and final review by Toronto Hydro, Toronto Hydro shall make payment to the Consultant via electronic funds transfer not later than thirty (30) days following receipt of an acceptable invoice and the EFT Information (as set out below). **The Consultant must provide Toronto Hydro with, in the case of the first payment only, (i) a void cheque, pre-printed deposit slip or bank confirmation letter and (ii) the email address where the Consultant wishes to receive remittance information (together, "EFT Information"). EFT Information must be sent electronically to efthelp@torontohydro.com or to 14 Carlton Street, Toronto, ON, M5B 1K5, Attention: Treasury Department.** Toronto Hydro reserves the right to pay the Consultant through other payment methods.

7. SUSPENSION OR TERMINATION

7.1 Suspension or Termination

(a) Toronto Hydro may, at any time during the Term by notice in writing, suspend all or a portion of the Services. Upon receipt of such written notice, the Consultant shall perform no further work other than as directed by Toronto Hydro, and shall be entitled to payment for time spent in performing the Services up to the date of suspension, and, if applicable, the costs of returning Consultant personnel to home base and other reasonable costs and expenses incurred in the suspension of the Services.

(b) Either party may terminate this Agreement immediately upon written notice where the other party enters into liquidation, whether compulsory or voluntarily, or where a

proceeding in receivership, bankruptcy or insolvency has been instituted by or against such party or its property.

(c) Toronto Hydro, at its sole discretion, may terminate this Agreement immediately upon written notice where the Consultant or any of its Representatives has been in material default in the performance of its duties, obligations or undertakings under this Agreement, and has not taken immediate steps to remedy such default within two (2) Business Days following written notice of the specific default by Toronto Hydro. For the purposes of this section, a material default shall include, without limitation, a breach of any of the representations or warranties contained herein or the failure or refusal to provide the Services in accordance with the terms and conditions of this Agreement.

(d) Notwithstanding any other provision in this Agreement, Toronto Hydro, at its sole discretion, shall have the right to terminate this Agreement, for any reason, upon two (2) weeks written notice to the Consultant.

(e) In the event that this Agreement is terminated by Toronto Hydro in accordance with section 7.1(d), the Consultant shall be entitled to payment for time spent in performing the Services up to the date of termination, plus the costs of returning Consultant personnel to home base and other reasonable costs and expenses incurred in effecting termination and returning documents.

7.2 Effect of Termination

Upon the termination or expiration of this Agreement, upon Toronto Hydro's request, the Consultant shall return to Toronto Hydro and delete any and all electronic copies the Consultant may have of all documents and materials in its possession relating to the Services or this Agreement, including all Confidential Information and all Deliverables, whether completed or not.

8. CONFIDENTIALITY

8.1 Non-Disclosure

In performing the Services required by this Agreement, the Consultant may be provided access to Confidential Information. The Consultant acknowledges and agrees that:

(a) the Consultant shall not disclose, permit access to, transmit, or transfer the Confidential Information to any third party without the prior written authorization of Toronto Hydro;

(b) the Consultant shall protect the confidentiality of the Confidential Information in its possession by exercising the same security measures it normally exercises with respect to its own confidential information and at minimum a reasonable standard of care;

(c) upon the request of Toronto Hydro, and in any event upon the expiration or termination of this Agreement for any reason, the Consultant shall return (or delete, in the case of electronic documents) forthwith to Toronto Hydro all Confidential Information, including all copies and other materials containing the Confidential Information, which are in the possession or under the control of the Consultant; and

(d) the Consultant shall not use any Confidential Information for any purpose other than to perform the Services required by this Agreement. Without limiting the foregoing, the

Consultant shall not, and shall not permit any of its Representatives to, use any Confidential Information in furtherance of its, or their, individual business or for its, or their, own benefit, profit or advantage, or for the benefit, profit or advantage of any other party.

Notwithstanding the foregoing, the Consultant may disclose such Confidential Information to any of the Representatives of the Consultant who agree to be bound by the obligations of confidentiality herein and who have a reasonable need to know such Confidential Information in the course of their duties for the Consultant but only for the purposes of the Consultant exercising its rights and obligations under this Agreement; and in the event that the Consultant believes it is required by law to disclose, or is requested by a governmental authority to disclose, any Confidential Information to a governmental authority; provided that the Consultant shall, to the extent permitted by law, first inform Toronto Hydro of the request or requirement for disclosure to allow an opportunity for Toronto Hydro to apply for an order to prohibit or restrict such disclosure.

8.2 Non-Solicitation

Unless Toronto Hydro's Chief Executive Officer provides prior written consent, the Consultant hereby covenants and agrees that during the term of this Agreement and for a period of two (2) years following the termination of the Agreement, however caused, the Consultant will not directly or indirectly, either individually or in partnership or jointly or in conjunction with any other Person,

a) hire or otherwise engage any Protected Employee who is currently employed by Toronto Hydro;

b) hire or otherwise engage any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause;

c) solicit or attempt to solicit any Protected Employee who is currently employed by Toronto Hydro or encourage any such person to leave his/her employment with Toronto Hydro; and

d) solicit or attempt to solicit any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause.

Given the unique expertise and intimate knowledge that the employees have of the operations of Toronto Hydro the Consultant acknowledges and agrees that the restrictions contained in this Section 8.2 are reasonable and necessary to preserve the value of Toronto Hydro's business.

9. INTELLECTUAL PROPERTY

9.1 Use

Nothing in this Agreement shall be deemed to transfer, license, assign, permit the use of, or otherwise convey an interest in whole or in part to the Consultant of any Intellectual Property belonging to Toronto Hydro or any of its Representatives or any third party whose Intellectual Property is in Toronto Hydro's custody or control, and the use by the Consultant of any such Intellectual Property shall be subject to the prior written approval of Toronto Hydro. It is understood and agreed that Consultant's use of its proprietary computer software, methodology,

procedures, or other proprietary information in connection with an assignment shall not give Toronto Hydro any rights with respect to such proprietary computer software, methodology, procedures or other proprietary information. Consultant may retain and further use the technical content of its work hereunder.

Any Deliverables prepared for Toronto Hydro by Consultant pursuant to this Agreement that are reports or other written documentation shall be for Toronto Hydro's use consistent with the Services set out under this Agreement. For greater clarity, for the purposes of this section 9.1 only, "use" shall include, but is not limited to, the leveraging of such Deliverables and disclosure of such Deliverables to third parties as may be required for Toronto Hydro's disclosure obligations including, but not limited to, annual financial filings as well as disclosures to the Ontario Energy Board (OEB) as part of Toronto Hydro's utility rate application(s).

Notwithstanding the foregoing, Toronto Hydro shall refrain from using such Deliverables in connection with a public offering of securities or in connection with any other financing not directly related to Toronto Hydro's activities as a utility without Consultant's prior written consent, which shall not be unreasonably withheld or delayed.

9.2 Ownership

Toronto Hydro shall at all times have full rights and title to the Deliverables, and may at all times take possession of or use any completed or partially completed Deliverables, notwithstanding any provision, express or implied, to the contrary. Without limiting the generality of the foregoing, Toronto Hydro shall own all Intellectual Property rights in all Deliverables, and the Consultant hereby waives and assigns to Toronto Hydro any such rights, and agrees to give Toronto Hydro and its Representatives all assistance as may be reasonably required to perfect such rights including, without limitation and where the Consultant is a corporation or partnership, obtaining waiver of moral rights from any of the Consultant's employees, partners or other Representatives.

9.3 Intellectual Property Protection

The Consultant expressly warrants that the manufacture, delivery, sale or use of the Consultant's Services will not infringe any Canadian or foreign patents, trademarks, copyrights, industrial design or other intellectual property rights and the Consultant shall indemnify and save Toronto Hydro harmless from all claims, judgments and decrees that may be entered against Toronto Hydro or its Representatives and against all damage, liability, costs and expenses (including legal fees and other attendant costs and expenses) Toronto Hydro incurs by reason of any infringement or claim thereof.

9.4 Pre-Existing Intellectual Property

Any pre-existing Intellectual Proprietary ("Pre-Existing IP") of Consultant or its licensors used to perform Services, or included in any Deliverables, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of the Consultant and its licensors (collectively, "Consultant Information"). To the extent that Consultant incorporates any Consultant Information into the Deliverable(s), Consultant hereby grants to Toronto Hydro a fully paid up, royalty free, irrevocable and non-cancellable, non-exclusive, assignable and transferable right to Use the Consultant Information without restriction, except that any such Use must be in conjunction with the Deliverables in which the Consultant Information is incorporated and not as a separate item. For the purpose of the foregoing, "Use" means one or more of the following rights to: use; modify; adapt; translate; create changes, alterations, modifications,

improvements, adoptions, enhancements and derivative works based upon or derived from the Consultant Information; reproduce; copy; display; perform; communicate in any manner; license or sublicense. Consultant shall provide Toronto Hydro with a list of any freeware, shareware or open source software used in the Deliverables. Any pre-existing intellectual property of Toronto Hydro, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of Toronto Hydro.

10. HEALTH AND SAFETY

The Consultant shall be responsible for managing the health and safety of its own personnel and other Representatives. Neither Toronto Hydro, nor its Representatives, shall be liable for any loss, damages or claims arising directly or indirectly from the Consultant's access to or work in or around Toronto Hydro's facilities, and the Consultant hereby waives any claims to which it may become entitled for loss or damage and releases Toronto Hydro and its Representatives from any and all such claims.

11. MISCELLANEOUS

11.1 Survival

In addition to the terms in this Agreement that by their nature survive the expiry or termination of the Agreement, the terms of section 5 (Representations, Warranties and Indemnities), section 8 (Confidentiality), section 9 (Intellectual Property), and subsection 11.3 (Injunctive Relief) shall survive the expiry of this Agreement for a term of five (5) years.

11.2 Subcontracting

The Consultant may not subcontract the performance of any part of the Services without Toronto Hydro's prior written approval. Where Toronto Hydro provides its prior written approval to the Consultant to subcontract all or part of the Services, then the Consultant shall enter into agreements with such permitted subcontractor(s) to require the permitted subcontractor(s) to provide Services in accordance with all of the terms of this Agreement. Notwithstanding the foregoing, the Consultant shall remain liable for any and all acts or omissions of any subcontractor(s) as if such acts or omissions were those of Consultant.

Toronto Hydro reserves the right to remove or add any subcontractors that are involved in Toronto Hydro projects at sole discretion.

11.3 Injunctive Relief

(a) The Consultant acknowledges and agrees that the terms of section 8 (Confidentiality) and section 9 (Intellectual Property) of this Agreement are reasonably necessary to protect the legitimate interests of Toronto Hydro, are reasonable in scope and duration, and are not unduly restrictive.

(b) The Consultant further acknowledges that a breach of any of the terms of section 8 (Confidentiality) or section 9 (Intellectual Property) would render irreparable harm to Toronto Hydro, and that a remedy at law for breach of these sections would be inadequate, and that Toronto Hydro shall therefore be entitled to any and all equitable relief, including,

without limitation, injunctive relief, and any other remedy that may be available at law or in equity.

11.4 Force Majeure

Either party will be relieved of liability for delays in performance of its obligations hereunder where such delay is a result of Force Majeure. The party affected by the Force Majeure shall give prompt notice thereof to the other party and, upon cessation of the Force Majeure, shall take all reasonable steps to resume the performance of its obligations hereunder. If a delay in performance by reason of Force Majeure extends beyond thirty (30) Business Days, then either party may terminate this Agreement by written notice.

11.5 Non-Exclusive Agreement

This Agreement will not be interpreted to grant to the Consultant exclusive rights to provide the Services or to bind Toronto Hydro in any way to an exclusive relationship with the Consultant with regards to the Services or any other service.

11.6 Waiver

No delay on the part of either party in exercising any of its rights hereunder or failure to exercise the same, nor the acquiescence thereto shall operate as a waiver except in the specific instance for which it is given and where such waiver is provided in writing by the party waiving its rights.

11.7 Amendments

None of the terms, conditions or provisions of this Agreement shall be varied, modified or altered except by written agreement signed by an authorized representative of each parties.

11.8 Assignment

Save and except for Toronto Hydro's right to assign this Agreement to any of its Affiliates, neither party may assign this Agreement or any of their rights or obligations hereunder, without the prior written authorization of the other party, acting reasonably.

11.9 Enurement

This Agreement shall enure to the benefit of, and be binding upon, the parties hereto and their respective successors and permitted assigns.

11.10 Severability

In the event that any provision or portion of this Agreement is determined to be invalid or unenforceable for any reason, the remaining provisions or portions of this Agreement will be unaffected and will remain in full force and effect to the fullest extent permitted by law.

11.11 Neutral Construction

The parties to this Agreement agree that this Agreement was negotiated fairly between them at arm's length, that the final terms of this Agreement are the product of the parties' negotiations, and that this Agreement shall be deemed to have been jointly and equally drafted by them, and that the

provisions thereof should not be construed against a party on the grounds that such party drafted the Agreement in whole or in part.

11.12 Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof. This Agreement supersedes any and all prior correspondence, warranties, covenants, collateral undertakings, or agreements, oral or otherwise, express or implied, unless otherwise contained herein.

11.13 Notices

(a) All questions or other communications regarding this Agreement, including any notices required by this Agreement, are to be addressed to the following addresses:

to Toronto Hydro:

Name:	Leslie Armstrong
Title:	Manager, Capital Planning & Reporting
Address:	14 Carlton Street
Telephone:	647-297-9265
Email:	larmstrong@torontohydro.com

with copy to:

Title:	EVP, Public and Regulatory Affairs & Chief Legal Officer
Address:	14 Carlton, Toronto Hydro, ON M5B 1K5
Telephone:	(416) 542-3000
Email:	legal@torontohydro.com

to the Consultant:

Name:	**Larry Kennedy**
Title:	Senior Vice President
Address:	200 Rivercrest Drive SE, Ste 277, Calgary, AB T2C 2X5
Telephone:	587-997-6489
Email:	lkennedy@ceadvisors.com

(b) All notices or communications shall be deemed to be received on the date of acceptance (as evidenced by the signature of the party) if delivered by personal delivery or courier, on the fifth (5th) Business Day after mailing, if mailed by first class mail, or on the first (1st) Business Day after transmission, if sent by facsimile (provided the transmission is evidenced by documented proof of proper fax transmittal).

11.14 Governing Law

This Agreement shall be governed by and construed in accordance with the law of the Province of Ontario and the laws of Canada applicable therein.

11.15 Execution

This Agreement may be signed in counterparts and delivered by electronic means, each of which shall be deemed an original and all of which, together, shall have the same effect as if all constitute one and the same Agreement.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the date first written above:

Concentric Advisors ULC

Per: _____

Name: Larry Kennedy

Title: Senior Vice President

I have authority to bind the Consultant.

Toronto Hydro-Electric System Limited

Per: _____

Name: Federico Zeni

Title: Interim Chief Financial Officer

I have authority to bind Toronto Hydro.

SCHEDULE A

SERVICES AND RATES

1. Services to be Performed

(a) The Consultant will complete a depreciation study based on available Toronto Hydro asset data and drawing on the knowledge and experience of relevant Toronto Hydro subject matter experts (SMEs). The study will need to be completed in accordance with International Financial Reporting Standards (IFRS), Ontario Energy Board (OEB) requirements and expectations, and any relevant industry standards. It will need to determine financial useful lives (i.e. to be used for rate making and in financial reporting) for existing asset classes, including both distribution and non-distribution (facilities, fleet, IT). The study shall assess whether current componentization is sufficient and in line with IFRS standards, and if not, recommend where to further componentize to be in line with IFRS and industry standards. The study should include support for the rationale of the proposed asset useful lives in accordance with International Accounting Standard (IAS) 16, "Property, Plant and Equipment". An important consideration is alignment, as appropriate, with any other Toronto Hydro asset analyses and its asset management practices. As per the OEB Rate Handbook, "the study must be supported by high quality evidence and a thorough analysis that can be rigorously tested."

(b) The Consultant shall review the current and past asset classification documents for non-distribution facilities assets during the analysis process. The Consultant will be responsible to determine the most appropriate asset category, threshold and useful life; based on industry knowledge and best practices and apply this new asset classification to the existing facilities asset base.

(c) Toronto Hydro requires a final report on the depreciation study with a draft report provided for review prior to issuance of the final report. The final report will need to include the following (naming conventions, ordering, and grouping are a draft proposal, can all be adjusted in accordance with consultant's best practices):

- Executive Summary
- Credentials of the Consultant
- Objective and Scope of Work
    - Scope: All asset classes which fall under the regulated entity
- Execution Process / Study Procedure
- Methodology
- For each asset or component – detailed derivations of useful lives by asset class, including:
    - Survivor Curves or Failure Curves and summary of any adjustments or special treatment of data
    - Details on Methodology used, assumptions and key considerations
    - Commentary to support the accuracy of existing componentization or provide support and rationale for any changes to componentization where applicable in accordance with IFRS standards and IAS 16Recommended Useful Life and upper/lower values
    - Clear explanations and rationale provided for any deviations of recommended useful life from the Asset Depreciation Study prepared for the Ontario Energy Board by Kinectrics Inc (Report No: K-418033-RA-011-R000)

- Clear explanations and rationale provided for any deviations of recommended useful life from the existing Toronto Hydro Electric System Useful Life of Assets Report by Kinectrics Inc (Report No: K-418021-RA-0001-R002) (e.g. changes in industry standards since initial report was issued)
- Clear explanations and rationale provided for any deviations from useful lives used for asset management decision making

- Summary of Results and Findings, including:
  - Demonstration that all asset classes covered
  - Quantification of impact of the recommended, high, and low-end changes on the existing net asset base for rate making as of December 31, 2021 (which is projected to be $4.6B) (comparison of current and recommended depreciation rates and accruals); SAP Experience will be preferred/beneficial
    - Gross Depreciation Impact on 2023 and 2024 Test Years; as well as 2025-2029 Test Years
    - Breakdown of impacts associated with 2020-2021 asset additions vs. pre-2020 asset additions (regulatory reporting requirements)
    - Other Revenue Amortization Impact (from Capital Contribution Assets) on 2023 and 2024 Test Years; as well as 2025-2029 Test Years
    - Breakdown of impacts associated with 2020-2021 asset additions vs. pre-2020 asset additions (regulatory reporting requirements)
    - Exclusion of assets that have been appropriately assessed as having a unique useful life compared to the existing standard
    - Inclusion of impact of any new componentization splitting to existing asset base

- Conclusions

(d) The Consultant shall also provide an updated report, subsequent to December 31, 2022 year end, to update any quantifications to reflect the impact of new additions in between January 1, 2022 and December 31, 2022.

(e) The Consultant shall also provide related support as needed for auditor queries and Toronto Hydro's 2025 rebasing application proceeding (details to be determined but could include for example responding to interrogatories and undertakings and providing support ahead of and during hearings). The level of application support required will depend on the degree of OEB Staff and intervenor interest in the depreciation study. The financial statement auditors may have clarifying questions as part of their quarterly and/or annual testing procedures (could include clarifications around componentization decisions, walkthroughs of process and/or quantifications, sample testing, etc). In written or oral format (i.e. acting as a witness for Toronto Hydro in a technical conference or oral hearing for the application), the Consultant must be able to answer clarifying questions regarding the study and explain and defend the methodology, assumptions, and choices made (written responses generally expected to be provided under tight timelines).

(f) The Consultant shall, prior to commencement of the Services, provide a proposed schedule and comprehensive and detailed project management plan including start date, breakdown into stages and milestones with corresponding timing and roles of respondent and Toronto Hydro resource requirements as well as required utility inputs and approximate personnel time commitments. Include any risks to meeting the timeframes that are deemed relevant, and how the respondent will mitigate them.

There are two phases of services required:

Study:

Kick-off early 2022 with biweekly updates/touchpoints until delivery of Final Report
Draft Report to be submitted no later than Aug. 1, 2022.
Final report to be submitted no later than Nov. 1, 2022.
Subsequent report update no later than March 31, 2023 (to reflect additional impact of 2022 additions).

Support:

Specific timing to be confirmed
Audit Queries: Q4 2022 to Q1 2024; turn around time of 2-3 business days
Application Support: ~Q3 2023 to Q4 2024; Interrogatory response draft turnaround time of ~ 1 week, Undertaking response draft turnaround time of 24 hours. Hearing time – as general support and/or in the hearing room as a witness – to be decided

(g) Toronto Hydro to provide asset data to the Consultant and make Toronto Hydro subject matter experts available for surveys/interviews.

2. Rates

In exchange for Consultant's provision of the Services under this Agreement, Toronto Hydro shall pay Consultant Fees at a time and materials basis at the rates indicated below, up to a maximum of [redacted] (the "Anticipated Fees"). Consultant shall not exceed the Anticipated Fees, nor commence any Services in excess of the Anticipated Fees, without the prior express written consent of Toronto Hydro.

Ad Hoc Services	Rate
All post study support (excludes update to the report in 2023) including:	As per below chart
Responding to audit queries	As per below chart
Responding to application interrogatories	As per below chart
Application hearing support including responses to undertakings and any time spent preparing for and acting as witness.	As per below chart

Title	[redacted]
Senior Vice President	
Project Manager	
Senior Consultant	
Consultant	
Senior Analyst	
Analyst	
Project Assistant	

The Anticipated Fees shall be allocated to the below Deliverables under the Agreement:

Description of Services / Resource Type	[redacted]
Compete Depreciation Study including draft and final reports (up to delivery of final report)	
Report Update ~ March 2023	
Total ceiling cost to provide the Services per the Scope of Work	
HST /Taxes as applicable	
Total	

SCHEDULE B

DEFINITIONS

In this Agreement, the following definitions shall apply:

"Affiliates"	has the meaning prescribed to it in the *Business Corporations Act* of Ontario, as amended from time to time;
"Agreement"	means this Agreement for Professional Consulting Services, including all recitals, schedules and attachments thereto;
"Applicable Laws"	means all federal, provincial and municipal statutes, regulations, codes, by-laws, orders in council, directives, rules, guidelines and ordinances applicable to this Agreement, including without limitation all applicable OEB codes, rules or guidelines;
"Business Day"	means a day on which banks are open for business in the City of Toronto, Ontario, but does not include a Saturday, Sunday, or a civic or statutory holiday in the Province of Ontario;
"Confidential Information"	means the terms of this Agreement and any and all data or information relating to the business, management or affairs of Toronto Hydro, its customers, employees, or any of its Affiliates disclosed by Toronto Hydro to the Consultant pursuant to this Agreement, whether or not such Confidential Information is expressly identified as confidential. Notwithstanding the foregoing, Confidential Information does not include any information or data which: (a) information or data that is or becomes publicly known through no breach of the terms or conditions of this Agreement; (b) information or data that is independently developed without reference to Confidential Information and without breach of the terms and conditions of this Agreement; or (c) Confidential Information that is required by court order or other legal compulsion to be disclosed, in which case the Consultant shall give Toronto Hydro prior written notice of such disclosure, as permitted by law;
"Consultant"	means Concentric Advisors ULC;
"Deliverable"	means any and all works prepared, generated, created or designed by the Consultant pursuant to this Agreement, including without limitation all drawings, models, designs, formulae, methods, documents, reports, software, specifications, or source codes, and any related works, enhancements, modifications or additions thereto;
"Disbursements"	shall have the meaning as prescribed in paragraph 6.1(b);
"Fees"	shall have the meaning as prescribed in paragraph 6.1(a);

"Force Majeure"	means any impediments beyond the control of the applicable party due, wholly or in part, directly or indirectly, to: strikes, lockouts, riots, epidemics, war, governmental regulations, fire, explosions, acts of God, or any other impediment beyond the control of the party affected;
"Hourly Rate"	shall have the meaning prescribed in paragraph 6.1(a);
"HST"	means Harmonized Sales Tax;
"Guidelines"	has the meaning prescribed in paragraph 4.4(d);
"Intellectual Property"	includes all trademarks, copyrights, patents, business names, trade secrets, proprietary software, analysis or techniques (whether or not patented or patentable), confidential or secret designs and processes, source codes, plans or devices, or other proprietary and intellectual property rights;
"Intervenor"	means any interested group or individual who participates actively in an OEB proceeding either by submitting evidence, arguments or interrogatories (written questions) or by cross-examining a witness or witnesses at an oral hearing;
"Person"	means any individual, firm, corporation, unlimited liability company, partnership, limited liability partnership, joint venture, trust, unincorporated association, unincorporated syndicate, any governmental authority and any other legal or business entity.
"Protected Employee"	means any individual who, during the course of their employment with Toronto Hydro, was directly or indirectly involved in: i. the procurement of the Services of the Consultant on behalf of Toronto Hydro; ii. the negotiation of the Consultant's Agreement on behalf of Toronto Hydro; and/or the awarding and/or approval of the Consultant's Agreement on behalf of Toronto Hydro.
"Remittances"	has the meaning prescribed to it in paragraph 6.1(d);
"Term"	has the meaning prescribed to it in subsection 3.1; and
"Toronto Hydro"	means Toronto Hydro-Electric System Limited.

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AMENDING AGREEMENT

THIS AMENDING AGREEMENT (the "Amending Agreement") is made effective as of June 1, 2023 (the "Effective Date") between **CONCENTRIC ADVISORS ULC.** ("Consultant") and **TORONTO HYDRO-ELECTRIC SYSTEM LIMITED** ("Toronto Hydro") (collectively, the "Parties").

WHEREAS:

1. Toronto Hydro and Consultant entered into an agreement for professional consulting services dated April 27, 2022 (the "Agreement") pursuant to which the Consultant shall provide a depreciation study and related services (the "Services"); and

2. The Parties wish to amend the Agreement by attaching the Ontario Energy Board's *Rules of Practice and Procedure* Rule 13A, and make associated amendments related to the Consultant's participation in Toronto Hydro's upcoming rate application, as provided herein.

NOW THEREFORE, THIS AMENDING AGREEMENT WITNESSES that in consideration of the mutual covenants contained herein and for other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Toronto Hydro and Consultant agree as follows:

1. Any capitalized terms used but not defined herein shall be as defined in the Agreement. The recitals above are agreed by the Parties to be true and deemed to form part of this Amending Agreement as if specifically restated herein.

2. Section 4.4 of the Agreement is amended by adding the following subsection (e) immediately following subsection 4.4(d):

   (e) Without limiting the generality of subsection 4.4(a) above, the Consultant shall comply with Rule 13A Expert Evidence of the OEB's *Rules of Practice and Procedure*, attached as SCHEDULE C hereto, in the course of providing the Services and agrees to accept the responsibilities that are or may be imposed on them by that rule.

3. The Parties agree to add a new SCHEDULE C to the Agreement, attached hereto as Appendix 1 to this Amending Agreement.

4. All other terms and conditions of the Agreement remain continuously in full force and effect, unamended, and shall be deemed to apply to this Amending Agreement.

5. This Amending Agreement, together with the Agreement, shall hereinafter constitute the entire agreement between the Parties with respect to the Services as further described in the Agreement, and supersedes any and all other agreements, understandings, discussions, negotiations, representations and correspondence which may have been made by or between the Parties respecting the same.

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IN WITNESS WHEREOF the Parties hereto have executed this Amending Agreement as of the date first written above.

CONCENTRIC ADVISORS ULC.

Per: DocuSigned by: 5DBB223B0E8F4F0...

Name:

Title:

I have the authority to bind the Consultant.

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED

Per: DocuSigned by: C7C2BC2528154DA...

Name: Federico Zeni

Title: Controller

I have authority to bind Toronto Hydro.

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APPENDIX 1

SCHEDULE C

Ontario Energy Board *Rules of Practice and Procedure* Rule 13A

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

a. the expert's name, business name and address, and general area of expertise;
b. the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;
c. the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;
d. the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;
e. in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and
f. an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

a. in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and
b. at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

a. scope and timing;
b. the involvement of any expert engaged by the OEB;
c. the costs associated with the conduct of the activities;
d. the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of Rule **13A.04**; and
e. any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A.**

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AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES

THIS AGREEMENT is made as of the 10th day of May, 2023 (the "Effective Date") between **Toronto Hydro-Electric System Limited** ("Toronto Hydro"), a corporation incorporated under the laws of the province of Ontario and **EA Technology LLC,** a corporation incorporated under the laws of the State of New Jersey (the "Consultant"), pursuant to which Toronto Hydro shall retain the Consultant to provide certain Services, and the Consultant shall provide such Services, during the Term, subject to the terms and conditions hereof;

NOW THEREFORE, in consideration of the mutual covenants set forth herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. INTERPRETATION

Unless otherwise indicated, all capitalized terms in this Agreement shall be as defined in SCHEDULE B and any reference to currency in this Agreement shall refer to lawful money of Canada.

2. RELATIONSHIP OF THE PARTIES

2.1 Retainer

Toronto Hydro hereby retains the Consultant to provide the Services, and the Consultant hereby agrees to provide the Services, during the Term, in accordance with the terms and conditions of this Agreement.

2.2 Independent Contractors

(a) Notwithstanding any provision hereof, this Agreement does not constitute and shall not be construed as constituting a partnership, joint venture, principal/agency relationship, or employer/employee relationship between the parties. The Consultant and Toronto Hydro shall at all times remain independent contractors of each other, and neither party shall represent itself to be an agent or employee of the other.

(b) Without limiting the generality of Subsection 2.2(a), the Consultant hereby acknowledges and agrees that neither it nor its Representatives shall be eligible or entitled, by reason of this Agreement, to participate in any employee-related program offered by Toronto Hydro or any of its Affiliates, including, without limitation, any benefit, insurance, compensation, health plan, bonus or retirement program.

(c) The Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities or claims whatsoever against Toronto Hydro or its Representatives resulting from or relating to the Consultant or its Representatives being deemed to be an employee of Toronto Hydro or any of its Affiliates.

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(d) The Consultant hereby acknowledges and agrees that Toronto Hydro shall not be responsible for and shall not have control or charge of any means, methods, techniques, sequences or procedures used for or in respect of the Services, or for the safety precautions or programs required for the Services or otherwise prescribed hereunder.

3. TERM

3.1 Term

Unless otherwise terminated in accordance with the provisions hereof, this Agreement shall be for a term commencing on the Effective Date and terminating two (2) years thereafter (the "Term").

4. SERVICE REQUIREMENTS

4.1 Services

During the Term, the Consultant shall perform the Services as detailed in SCHEDULE A hereto.

4.2 Time and Availability

Unless otherwise directed in writing by Toronto Hydro, the Consultant shall have discretion in selecting the dates and times it performs the Services throughout the month, giving due regard to the needs of Toronto Hydro's business requirements and provided that any access to Toronto Hydro property shall be during regular business hours.

4.3 Key Employee

[Intentionally deleted].

4.4 Revision to Services

(a) The Parties acknowledge and agree that the Services to be undertaken and completed by the Consultant under this Agreement may be subject to revision or amendment from time to time during the Term: (i) as required by Toronto Hydro to comply with the Guidelines; (ii) as required by Toronto Hydro to comply with the Applicable Laws or any order, instruction, directive or legal requirement of a Governmental Authority; or (iii) as required by Toronto Hydro to ensure that Toronto Hydro receives the expected funding and benefits with respect to the project to which the Services relate.

(b) Toronto Hydro agrees to provide the Consultant with written notice of any revision or amendment to the Services required pursuant to this Section 4.4, and subject to the terms of Subsection 4.4(d) below, the Consultant shall comply with all such directives.

(c) In the event that the Consultant fails to comply with a directive issued by Toronto Hydro pursuant to this Section 4.4, Toronto Hydro shall have the right, in addition to any other remedies which may be available to Toronto Hydro hereunder or otherwise at law, to terminate this Agreement by giving written notice of termination to the Consultant whereupon this Agreement shall terminate as at the effective date of termination specified in the notice and the provision of Section 7 shall apply.

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(d) Notwithstanding Subsection 4.4(b), where a directive from Toronto Hydro results in a material change in the scope and/or implementation of the Services, then the Consultant shall have the right to terminate this Agreement by giving notice of termination to Toronto Hydro whereupon the Agreement shall terminate as at the effective date of termination specified in the notice and the provisions of Section 7 shall apply.

4.5 Applicable Laws

(a) The Consultant shall, at its sole expense, obtain and maintain during the Term of this Agreement, all permits, licences and approvals required by all Applicable Laws to perform its obligations under this Agreement. The terms and conditions of this Agreement shall be carried out in strict compliance with all Applicable Laws and in the event of any conflict between any Applicable Laws, the Applicable Laws with the most stringent standard shall apply.

(b) Without limiting the generality of the foregoing, the Consultant shall comply with the *Municipal Freedom of Information Act* ("MFIPPA"), the *Personal Information Protection and Electronic Documents Act* (Canada) ("PIPEDA")and any other applicable privacy legislation (collectively, "Privacy Laws") with respect to any personal information collected, used or disclosed in connection with this Agreement and shall indemnify and hold harmless Toronto Hydro and its Representatives from and against any and all claims, demands, suits, losses, damages, causes of action, fines or judgments (including related expenses and legal costs) they may incur related to or arising out of any non-compliance therewith.

(c) Without limiting the generality of subsection 13(a) above, the Vendor shall comply with Rules 13 and 13A Expert Evidence of the OEB's *Rules of Practice and Procedure*, attached as APPENDIX A.1 hereto, in the course of providing the Services and agrees to accept the responsibilities that are or may be imposed on them by that rule.

(d) Where any Development is subject to the approval or review of any authority, department, government or agency other than Toronto Hydro, such applications for approval or review shall, unless otherwise authorized by Toronto Hydro in writing, be prepared by the Consultant to be approved and submitted by and through the offices of Toronto Hydro, and the Consultant shall not have any direct dealings with the authority, department, government or agency in question with regards to the Development.

(e) The Consultant and the Consultant's personnel shall comply with all rules and direction of Toronto Hydro, whether specified in this Agreement or otherwise, while working on Toronto Hydro's facilities: Toronto Hydro's *Code of Business Conduct and Whistleblower Procedure*, Toronto Hydro's *Disclosure Policy,* Toronto Hydro's *Social Media and Digital Communication Policy,* Toronto Hydro's *Accessibility Policy*, Toronto Hydro's *Workplace Harassment Policy and Program*, Toronto Hydro's *Violence Prevention in the Workplace Policy,* Toronto Hydro's *Workplace Alcohol and Drug Policy*, Toronto Hydro's *Environmental Policy,* Toronto Hydro's *Occupational Health and Safety Policy*, Toronto Hydro's *Privacy Policy,* Toronto Hydro's *Cyber Security Policy*, Toronto Hydro's *Technology Use Guidelines*, Toronto Hydro's *External Supplier Access to Application Services Policy,* Toronto Hydro's *Physical Security Policy,* and the *Affiliate Relationships Code for Electricity Distributors and Transmitters* issued by the OEB (together, the "Guidelines"). The Consultant acknowledges that it has been provided with a copy of the Guidelines, has provided and will provide a copy of the Guidelines to each of its Representatives and that it agrees to comply with and to direct its Representatives to comply with such Guidelines, as amended.

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4.6 Performance

(a) The Services shall be performed to the satisfaction of Toronto Hydro, and Toronto Hydro shall have the right at all reasonable times, to inspect or otherwise review the Services performed or being performed. The Consultant shall, upon the request of Toronto Hydro, provide Toronto Hydro with written reports of the status of the Developments and the Consultant's progress in providing the Services.

(b) In the event of any dispute between Toronto Hydro and the Consultant relating to the quality or acceptability or rate of progress of any of the Services, or relating to the interpretation of any instructions or specifications concerning the Services, the reasonable opinion of Toronto Hydro shall govern and be binding on the parties hereto.

4.7 Health and Safety

The Consultant shall be responsible for managing the health and safety of its own personnel and other Representatives. Neither Toronto Hydro, nor its Representatives, shall be liable for any loss, damages or claims arising directly or indirectly from the Consultant's access to or work in or around Toronto Hydro's facilities, and the Consultant hereby waives any claims to which it may become entitled for loss or damage and releases Toronto Hydro and its Representatives from any and all such claims.

5. REPRESENTATIONS, WARRANTIES, INDEMNITIES AND INSURANCE

5.1 Representations and Warranties

The Consultant hereby represents, warrants and agrees that:

(i) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has/have the necessary experience and qualifications to perform the Services;

(ii) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) will perform the Services in a diligent, expeditious and workmanlike manner, consistent with standards generally observed by reputable and competent members of the same industry providing similar services;

(iii) all Services shall be the Consultant's (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) original work and none of the Services or any invention, development, use, production, distribution or exploitation relating thereto will infringe, misappropriate or violate any intellectual property or other right of any person or entity;

(iv) it (or, where the Consultant is a corporation or partnership, its Representatives performing the Services) has the corporate power and authority to enter into this Agreement and to perform its obligations hereunder, and that this Agreement constitutes a legal, valid, and binding obligation of the Consultant, enforceable against the Consultant in accordance with its terms.

5.2 Indemnity

The Consultant shall be liable for and shall indemnify and hold harmless Toronto Hydro and its Representatives from all claims, demands, actions, penalties, damages, losses, judgments and settlements,

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liabilities, costs, expenses, including legal fees and other related costs and expenses arising out of, related to, or incident to, the Consultant or any of its Representatives' performance of the Services under this Agreement, including, without limitation:

a) any breach, violation or non-performance by the Consultant or any of its Representatives of any terms, conditions, warranties, obligations or covenants contained in this Agreement;

b) any breach or violation by the Consultant or any of its Representatives of any Applicable Laws; and

c) any actions, omissions, negligence or wilful misconduct of the Consultant or any of its Representatives.

5.3 Insurance

(a) The Consultant shall, during the Term, and at its own expense, maintain and keep in full force and effect (and, when requested, provide Toronto Hydro with proof thereof) the following insurance:

(i) commercial general liability insurance on an occurrence basis having a minimum inclusive coverage limit, including personal injury and property damage, of not less than two million dollars ($2,000,000.00) per occurrence with property damage deductible of not more than fifty thousand dollars ($50,000.00), which commercial general liability insurance shall be extended to cover contractual liability, products and completed operations liability, contingent employer's liability, and owners/contractors protective liability;

(ii) automobile liability insurance on all owned and non-owned vehicles used in connection with this Agreement, with such automobile insurance coverage having a limit of not less than two million dollars ($2,000,000.00) per vehicle, in respect of bodily injury (including passenger hazard), property damage and mandatory accident benefits.

(b) All insurance coverages and limits required to be maintained by the Consultant shall be primary to any insurance maintained by Toronto Hydro, which shall be excess and non-contributory. Prior to the commencement of the delivery of the Services, the Consultant shall deliver to Toronto Hydro a certificate of insurance which evidences the Consultant's compliance with this section, including the provision of a thirty (30) day prior written notice of cancellation, non-renewal or adverse material change, to Toronto Hydro.

(c) The Consultant agrees that the insurance described herein does in no way limit the Consultant's liability pursuant to the indemnity provisions of this Agreement.

(d) A waiver of subrogation shall be provided by the insurer(s) to Toronto Hydro.

6. <u>FEES</u>

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6.1 Fees

(a) Subject to Subsections 6.1(d), 6.1(e) and 6.1(f), in exchange for the performance of the Services in accordance with the terms hereof, Toronto Hydro shall pay the Consultant [redacted] (plus applicable taxes), (the "Fees"), subject to invoicing as outlined in Section 6.2.

(b) The Fee noted in subsection 6.1(a) shall be the only fee payable by Toronto Hydro under this Agreement. Without limiting the generality of the foregoing, the Consultant hereby agrees and acknowledges that all out-of-pocket expenses, travelling costs, and other disbursements shall be at the sole expense of the Consultant, except with the prior written approval from Toronto Hydro.

(c) Any disbursements for additional incidentals incurred by the Consultant in relation to this Agreement ("Disbursements") must be pre-approved by Toronto Hydro in writing.

(d) The Consultant shall not incur or submit Fees for any work outside the scope of the Services, or exceed the Fees listed in Subsection 6.1(a) without prior written approval from Toronto Hydro.

(e) The Consultant shall make all payment of taxes, employment insurance premiums, pension plan contributions and any other taxes or other payment of any nature, imposed by any authority in respect of the Fees paid by Toronto Hydro to the Consultant under this Agreement (together, the "Remittances"), and the Consultant hereby covenants and agrees to indemnify and save harmless Toronto Hydro and its Representatives from and against all costs, liabilities and claims whatsoever against Toronto Hydro or its Representatives, in any way arising out of or relating to any failure to deduct, withhold, or remit any Remittance.

(f) The Consultant acknowledges that it is a non-resident of Canada for income tax purposes and agrees that Toronto Hydro shall withhold any applicable non-resident withholding taxes from any amount owing hereunder and remit such taxes to the applicable federal taxing authority without provision for gross-up. Services provided in Canada should be detailed and separated from Services provided outside of Canada on invoices issued for payment.

6.2 Payment

The Consultant shall submit invoices to Toronto Hydro monthly (with respect to the Services set out under subsection 4(c) of SCHEDULE A) or on acceptance of the Developments hereunder containing:

(i) a detailed description of the Services performed during the invoice period; and

(ii) the dates and the amount of time spent by the Consultant for the provision of the Services;

All Services under this Agreement shall be performed outside of Canada. The Consultant acknowledges that it is not an HST registrant and it is not required to register for HST under Canadian tax law.

Unless otherwise provided in this Agreement, the Consultant shall invoice Toronto Hydro after final inspection and acceptance by Toronto Hydro of the Services performed and subject to receipt of all documents required by this Agreement. **Invoices must be sent electronically to: AP@torontohydro.com.** Subject to approval of the invoice by Toronto Hydro, receipt of all documents required by this Agreement, and final review by Toronto Hydro, Toronto Hydro shall

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make payment to the Consultant via electronic funds transfer not later than thirty (30) days following receipt of an acceptable invoice and the EFT Information (as set out below). **The Consultant must provide Toronto Hydro with, in the case of the first payment only, (i) a void cheque, pre-printed deposit slip or bank confirmation letter and (ii) the email address where the Consultant wishes to receive remittance information (together, "EFT Information"). EFT Information must be sent electronically to efthelp@torontohydro.com or to 14 Carlton Street, Toronto, ON, M5B 1K5, Attention: Treasury Department.** Toronto Hydro reserves the right to pay the Consultant through other payment methods.

7. SUSPENSION OR TERMINATION

7.1 Suspension or Termination

(a) Toronto Hydro may, at any time during the Term by notice in writing, suspend all or a portion of the Services. Upon receipt of such written notice, the Consultant shall perform no further work other than as directed by Toronto Hydro, and shall be entitled to payment for time spent in performing the Services up to the date of suspension.

(b) Either party may terminate this Agreement immediately upon written notice where the other party enters into liquidation, whether compulsory or voluntarily, or where a proceeding in receivership, bankruptcy or insolvency has been instituted by or against such party or its property.

(c) Toronto Hydro, at its sole discretion, may terminate this Agreement immediately upon written notice where the Consultant or any of its Representatives has been in default in the performance of its duties, obligations or undertakings under this Agreement, and has not taken immediate steps to remedy such default within five (5) Business Days following written notice of the specific default by Toronto Hydro. For the purposes of this section, a material default shall include, without limitation, a breach of any of the representations or warranties contained herein or the failure or refusal to provide the Services in accordance with the terms and conditions of this Agreement.

(d) Notwithstanding any other provision in this Agreement, Toronto Hydro, at its sole discretion, shall have the right to terminate this Agreement, for any reason, upon two (2) weeks written notice to the Consultant.

7.2 Effect of Termination

Upon the termination or expiration of this Agreement, the Consultant shall return to Toronto Hydro and delete any and all electronic copies the Consultant may have of all documents and materials in its possession relating to the Services or this Agreement, including all Confidential Information and all Developments, whether completed or not.

8. CONFIDENTIALITY

(a) In performing the Services required by this Agreement, the Consultant may be provided access to Confidential Information. The Consultant acknowledges and agrees that:

(i) the Consultant shall not disclose, permit access to, transmit, or transfer the Confidential Information to any third party without the prior written authorization of Toronto Hydro;

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(ii) the Consultant shall protect the confidentiality of the Confidential Information in its possession by exercising the same security measures it normally exercises with respect to its own confidential information and at minimum a reasonable standard of care;

(iii) upon the request of Toronto Hydro, and in any event upon the expiration or termination of this Agreement for any reason, the Consultant shall return (or delete, in the case of electronic documents) forthwith to Toronto Hydro all Confidential Information, including all copies and other materials containing the Confidential Information, which are in the possession or under the control of the Consultant;

(iv) the Consultant shall not use any Confidential Information for any purpose other than to perform the Services required by this Agreement. Without limiting the foregoing, the Consultant shall not, and shall not permit any of its Representatives to, use any Confidential Information in furtherance of its, or their, individual business or for its, or their, own benefit, profit or advantage, or for the benefit, profit or advantage of any other party; and

(v) Toronto Hydro is subject to MFIPPA and is governed by Governmental Authority such as the Independent Electricity System Operator ("IESO") and the Ontario Energy Board ("OEB") and shall have the right to disclose Confidential Information in accordance with the provisions of MFIPPA or as required by the IESO or the OEB.

(b) Notwithstanding the foregoing, the Consultant may disclose such Confidential Information:

(i) to any of the Representatives of the Consultant who agree to be bound by the obligations of confidentiality herein and who have a reasonable need to know such Confidential Information in the course of their duties for the Consultant but only for the purposes of the Consultant exercising its rights and obligations under this Agreement; and

(ii) in the event that the Consultant believes it is required by law to disclose, or is requested by a Governmental Authority to disclose, any Confidential Information to a Governmental Authority; provided that the Consultant shall, to the extent permitted by law, first inform Toronto Hydro of the request or requirement for disclosure to allow an opportunity for Toronto Hydro to apply for an order to prohibit or restrict such disclosure.

9. INTELLECTUAL PROPERTY

9.1 Use

Nothing in this Agreement shall be deemed to transfer, license, assign, permit the use of, or otherwise convey an interest in whole or in part to the Consultant of any Intellectual Property belonging to Toronto Hydro or any of its Representatives or any third party whose Intellectual Property is in Toronto Hydro's custody or control, and the use by the Consultant of any such Intellectual Property shall be subject to the prior written approval of Toronto Hydro.

9.2 Ownership

Toronto Hydro shall at all times have full rights and title to the Developments, and may at all times take possession of or use any completed or partially completed Developments, notwithstanding any provision, express or implied, to the contrary. Without limiting the generality of the foregoing, Toronto Hydro shall own all Intellectual Property rights in all Developments, and the Consultant hereby waives and assigns to Toronto Hydro any such rights, and agrees to give Toronto Hydro

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and its Representatives all assistance as may be reasonably required to perfect such rights including, without limitation and where the Consultant is a corporation or partnership, obtaining waiver of moral rights from any of the Consultant's employees, partners or other Representatives.

9.3 Intellectual Property Protection

The Consultant expressly warrants that the manufacture, delivery, sale or use of the Consultant's Services will not infringe any Canadian or foreign patents, trademarks, copyrights, industrial design or other intellectual property rights and the Consultant shall indemnify and save Toronto Hydro harmless from all claims, judgments and decrees that may be entered against Toronto Hydro or its Representatives and against all damage, liability, costs and expenses (including legal fees and other attendant costs and expenses**)** Toronto Hydro incurs by reason of any infringement or claim thereof.

9.4 Pre-Existing Intellectual Property

Any pre-existing Intellectual Proprietary ("Pre-Existing IP") of Consultant or its licensors used to perform Services, or included in any Development, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of the Consultant and its licensors (collectively, "Consultant Information"). To the extent that Consultant incorporates any Consultant Information into the Development(s), Consultant hereby grants to Toronto Hydro a fully paid up, royalty free, irrevocable and non-cancellable, non-exclusive, assignable and transferable right to Use the Consultant Information without restriction, except that any such Use must be in conjunction with the Developments in which the Consultant Information is incorporated and not as a separate item. For the purpose of the foregoing, "Use" means one or more of the following rights to: use; modify; adapt; translate; create changes, alterations, modifications, improvements, adoptions, enhancements and derivative works based upon or derived from the Consultant Information; reproduce; copy; display; perform; communicate in any manner; license or sublicense. Consultant shall provide Toronto Hydro with a list of any freeware, shareware or open source software used in the Developments. Any pre-existing intellectual property of Toronto Hydro, including but not limited to software, appliances, methodologies, code, templates, tools, policies, records, working papers, know-how, data or other intellectual property, written or otherwise shall remain the exclusive property of Toronto Hydro.

10. <u>MISCELLANEOUS</u>

10.1 Survival

In addition to the terms in this Agreement that by their nature survive the expiry or termination of the Agreement, the terms of Section 5 (Representations, Warranties and Indemnities), Section 8 (Confidentiality), Section 9 (Intellectual Property), and Section 10.2 (Injunctive Relief) shall survive the expiry of this Agreement for a term of five (5) years.

10.2 Injunctive Relief

(a) The Consultant acknowledges and agrees that the terms of Section 8 (Confidentiality) and Section 9 (Intellectual Property) of this Agreement are reasonably necessary to protect the legitimate interests of Toronto Hydro, are reasonable in scope and duration, and are not unduly restrictive.

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(b) The Consultant further acknowledges that a breach of any of the terms of Section 8 (Confidentiality) or Section 9 (Intellectual Property) would render irreparable harm to Toronto Hydro, and that a remedy at law for breach of these sections would be inadequate, and that Toronto Hydro shall therefore be entitled to any and all equitable relief, including, without limitation, injunctive relief without proof of actual damages, and any other remedy that may be available at law or in equity.

10.3 Subcontracting

The Consultant may not subcontract the performance of any part of the Services without Toronto Hydro's prior written approval. Where Toronto Hydro provides its prior written approval to the Consultant to subcontract all or part of the Services, then the Consultant shall enter into agreements with such permitted subcontractor(s) to require the permitted subcontractor(s) to provide Services in accordance with all of the terms of this Agreement. Notwithstanding the foregoing, the Consultant shall remain liable for any and all acts or omissions of any subcontractor(s) as if such acts or omissions were those of Consultant.

10.4 Force Majeure

Either party will be relieved of liability for delays in performance of its obligations hereunder where such delay is a result of Force Majeure. The party affected by the Force Majeure shall give prompt notice thereof to the other party and, upon cessation of the Force Majeure, shall take all reasonable steps to resume the performance of its obligations hereunder. If a delay in performance by reason of Force Majeure extends beyond thirty (30) Business Days, then either party may terminate this Agreement by written notice.

10.5 Waiver

No delay on the part of either party in exercising any of its rights hereunder or failure to exercise the same, nor the acquiescence thereto shall operate as a waiver except in the specific instance for which it is given and where such waiver is provided in writing by the party waiving its rights.

10.6 Amendments

None of the terms, conditions or provisions of this Agreement shall be varied, modified or altered except by written agreement signed by an authorized representative of each parties.

10.7 Assignment

Save and except for Toronto Hydro's right to assign this Agreement to any of its Affiliates, neither party may assign this Agreement or any of their rights or obligations hereunder, without the prior written authorization of the other party.

10.8 Enurement

This Agreement shall enure to the benefit of, and be binding upon, the parties hereto and their respective successors and permitted assigns.

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10.9 Severability

In the event that any provision or portion of this Agreement is determined to be invalid or unenforceable for any reason, the remaining provisions or portions of this Agreement will be unaffected and will remain in full force and effect to the fullest extent permitted by law.

10.10 Non-Exclusive Agreement

This Agreement will not be interpreted to grant to the Consultant exclusive rights to provide the Services or to bind Toronto Hydro in any way to an exclusive relationship with the Consultant with regards to the Services or any other service.

10.11 Neutral Construction

The parties to this Agreement agree that this Agreement was negotiated fairly between them at arm's length, that the final terms of this Agreement are the product of the parties' negotiations, and that this Agreement shall be deemed to have been jointly and equally drafted by them, and that the provisions thereof should not be construed against a party on the grounds that such party drafted the Agreement in whole or in part.

10.12 Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof. This Agreement supersedes any and all prior correspondence, warranties, covenants, collateral undertakings, or agreements, oral or otherwise, express or implied, unless otherwise contained herein.

10.13 Notices

(a) All questions or other communications regarding this Agreement, including any notices required by this Agreement, are to be addressed to the following addresses:

to Toronto Hydro:

Name:	Binendra Shakya
Title:	Manager, Maintenance Planning
Address:	500 Commissioners St, Toronto Hydro, ON M4M 3N7
Telephone:	416-902-6904
E-mail:	Bshakya@torontohydro.com

with copy to:

Title:	EVP, Public and Regulatory Affairs & Chief Legal Officer
Address:	14 Carlton, Toronto Hydro, ON M5B 1K5
Telephone:	(416) 542-3000
Email:	legal@torontohydro.com

to the Consultant:

Name:	William Higinbotham
Title:	President
Address:	400 Morris Ave Suite 240, Denville NJ 07853

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Telephone: (862) 261-2759
E-mail: bill.higinbotham@eatechnologyusa.com

(b) All notices or communications shall be deemed to be received on the date of acceptance (as evidenced by the signature of the party) if delivered by personal delivery or courier, on the fifth (5th) Business Day after mailing, if mailed by first class mail, or on the first (1st) Business Day after transmission, if sent by facsimile (provided the transmission is evidenced by documented proof of proper fax transmittal).

10.14 Governing Law

This Agreement shall be governed by and construed in accordance with the law of the Province of Ontario and the laws of Canada applicable therein.

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10.15 Execution

This Agreement may be signed in counterparts and delivered by electronic means, each of which shall be deemed an original and all of which, together, shall have the same effect as if all constitute one and the same Agreement.

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first written above:

EA Technology LLC

Per: DocuSigned by: William Higinbotham 5FAF02F8BA2F41E...

Name: William Higinbotham

Title: President

I have authority to bind the Consultant.

Toronto Hydro-Electric System Limited

Per: DocuSigned by: Matthew Higgins D6102E17E3B9484...

Name: Matthew Higgins

Title: Director, Integrated Planning and Modernisation

I have authority to bind Toronto Hydro.

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SCHEDULE A

SERVICES

1. Services to be Performed

Toronto Hydro requires the Consultant to perform a review of asset condition assessments and condition-based risk management (CBRM) enhancements and customisations Toronto Hydro has implemented since 2018 (collectively, the "Services"). The Services shall include consideration of the general outputs of Toronto Hydro's Asset Condition Assessment (ACA) model, alignment with the core principles of the CBRM methodology, and generally accepted industry practices for condition and risk-based asset management.

2. Specifications

The Consultant shall carry out the following tasks with respect to the Services:

a) Review changes and enhancements Toronto Hydro has made to its health score methodologies since 2018.

A high-level review of the changes that have been implemented since 2018 to determine whether the assumptions are reasonable and appropriate.

The review will cover:

- Updates to calibration values (factors and condition caps and collars).
- Inclusion of additional inputs, e.g. flood plains, distance to roads, salt usage in location factor, etc.

Toronto Hydro shall provide the following to the Consultant to enable performance of this component of the Services:

- Summary of additional inputs (if any) that have been included in the models since 2018.
- Summary of changes to factors, caps and collars that have been implemented since 2018 and rationale for the changes.

Consultant shall ensure this review will be carried out by considering groups of asset classes together, where appropriate. For example, it is anticipated that calibration values for some transformer asset classes can be considered together.

b) Review the Current and Future Health Score outputs for all applicable asset classes.

Review the outputs (health index profiles) to examine if the results are reasonable for the calibrations used for two asset classes to be selected by Toronto Hydro.

Toronto Hydro shall provide the following to the Consultant to enable performance of this component of the Services:

- Current and future health index profiles for both asset classes selected.

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- Summary of the inputs to the current health score (initial health score, observed condition factors and measured condition factors, reliability factor) on a per asset basis for both asset classes selected.

c) Review Toronto Hydro's implementation of additional CBRM components, including Probability of Failure, Consequence of Failure, asset criticality, and risk.

Review how Toronto Hydro have set the different consequence of failure, asset criticalities and probability of failure values to determine whether the implementation is reasonable and aligned with generally accepted industry practices. In addition, review Toronto Hydro's adoption of consequence of failure from their broader Value Framework to assess reasonable application and alignment with the CBRM approach.

Toronto Hydro shall provide the following to the Consultant to enable performance of this component of the Services:

- Details of how the consequence of failure values have been selected.
- Definitions of failure modes and categorisation of failures.

3. Timetable / Developments

The Consultant shall provide to Toronto Hydro the following Developments:

- Report(s) outlining its review, findings, and conclusions with respect to the Services tasks outlined in section 2 of this SCHEDULE A above.

Consultant shall provide a draft version of the above-noted Development(s) for Toronto Hydro's review prior to acceptance by Toronto Hydro and finalisation by the Consultant. Consultant may provide a portion of the Development(s) responsive to each task separately for Toronto Hydro's review.

Consultant hereby warrants that the Development(s) will meet all applicable specifications and shall correct any deficiencies discovered by Toronto Hydro for a period of thirty (30) days after final acceptance/receipt of the Development(s) by Toronto Hydro (the "**Warranty Period**").

Notwithstanding anything to the contrary in this Agreement, the Consultant shall provide the final version of the Deliverables to Toronto Hydro no later than June 30, 2023.

4. Services Conditions

The following additional conditions shall apply to the performance of the Services:

a) The Services shall be performed remotely.

b) All meetings between Toronto Hydro and the Consultant shall be facilitated via Webex or similar web-based platforms.

c) The Consultant acknowledges that the Development may be implemented by Toronto Hydro in its filings to a Governmental Authority. The Consultant shall further be available to speak to the Services in a regulatory proceeding as required by Toronto Hydro and/or the Ontario Energy Board relating to Toronto Hydro's 2025 rate application.

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The degree of Consultant's participation shall be dependent on the degree of interest in the Services by OEB staff or any intervenors. Consultant's participation in such proceeding may entail, but is not limited to, preparation of expert report(s), responding to interrogatories and undertakings, provision of support prior to and during any hearings required by the OEB, and answers to any questions regarding the form, methodology, assumptions, and choices made in the provision of the Services, in either written or oral format (the latter in acting as a witness for Toronto Hydro).

The Consultant shall further comply with the requirements and agrees to accept the responsibilities set out in Rules 13 and 13A of the OEB's Rules of Practice and Procedure, attached as APPENDIX A.1 to this Agreement, when providing any Services relating to Toronto Hydro's 2025 rate application.

5. Fees

In exchange for the Services and Developments set out under this Agreement, Toronto Hydro shall pay to the Consultant a fixed fee in the amount of [redacted] on delivery of the Developments set out in section 2 of this SCHEDULE A above. Consultant shall invoice for the Services in accordance with section 6.2 of this Agreement.

With respect to the component of the Services set out under subsection 4(c) of this SCHEDULE A above, Toronto Hydro shall pay to the Consultant on a time and materials basis according to the Consultant's then-current rates as of the Effective Date of this Agreement, or as may otherwise be agreed upon by the parties in writing via an amendment to this Agreement.

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APPENDIX A.1

EXCERPTED OEB RULES OF PRACTICE AND PROCEDURE

[please see attached]

APPENDIX A.1.pdf

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12. Affidavits

12.01 An affidavit shall be confined to the statement of facts within the personal knowledge of the person making the affidavit unless the facts are clearly stated to be based on the information and belief of the person making the affidavit.

12.02 Where a statement is made on information and belief, the source of the information and the grounds on which the belief is based shall be set out in the affidavit.

12.03 An exhibit that is referred to in an affidavit shall be marked as such by the person taking the affidavit, and the exhibit shall be attached to and filed with the affidavit.

12.04 The OEB may require the whole or any part of a document filed to be verified by affidavit.

13. Written Evidence

13.01 Other than oral evidence given at the hearing, where a party intends to submit evidence, or is required to do so by the OEB, the evidence shall be in writing and in a form approved by the OEB.

13.02 The written evidence shall include a statement of the qualifications of the person who prepared the evidence or under whose direction or control the evidence was prepared.

13.03 Where a party is unable to submit written evidence as directed by the OEB, the party shall:

(a) file such written evidence as is available at that time;

(b) identify the balance of the evidence to be filed; and

(c) state when the balance of the evidence will be filed.

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

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(a) the expert's name, business name and address, and general area of expertise;

(b) the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;

(c) the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;

(d) the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;

(e) in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and

(f) an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

(a) in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and

(b) at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

(a) scope and timing;

(b) the involvement of any expert engaged by the OEB;

(c) the costs associated with the conduct of the activities;

(d) the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of **Rule 13A.04**; and

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(e) any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A**.

14. Disclosure

14.01 A party who intends to rely on or refer to any document that has not already been filed in a proceeding shall file and serve the document 24 hours before using it in the proceeding, unless the OEB directs otherwise.

14.02 Any party who fails to comply with **Rule 14.01** shall not put the document in evidence or use it in the cross-examination of a witness, unless the OEB otherwise directs.

14.03 Where the good character, propriety of conduct or competence of a party is an issue in the proceeding, the party is entitled to be furnished with reasonable information of any allegations at least 15 calendar days prior to the hearing.

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SCHEDULE B

DEFINITIONS

In this Agreement, the following definitions shall apply:

"Affiliates"	has the meaning prescribed to it in the *Business Corporations Act* of Ontario, as amended from time to time;
"Agreement"	means this Agreement for Professional Consulting Services, including all recitals, schedules and attachments thereto;
"Anticipated Hours"	has the meaning prescribed in Section 4.2;
"Applicable Laws"	means all federal, provincial and municipal statutes, regulations, codes, by-laws, orders in council, directives, rules, guidelines and ordinances applicable to this Agreement, including without limitation all applicable OEB codes, rules or guidelines;
"Business Day"	means a day on which banks are open for business in the City of Toronto, Ontario, but does not include a Saturday, Sunday, or a civic or statutory holiday in the Province of Ontario;
"Confidential Information"	means the terms of this Agreement and any and all data or information relating to the business, management or affairs of Toronto Hydro, its customers, employees, or any of its Affiliates disclosed by Toronto Hydro to the Consultant pursuant to this Agreement, whether or not such Confidential Information is expressly identified as confidential. Notwithstanding the foregoing, Confidential Information does not include any information or data which: (a) information or data that is or becomes publicly known through no breach of the terms or conditions of this Agreement; (b) information or data that is independently developed without reference to Confidential Information and without breach of the terms and conditions of this Agreement; or (c) Confidential Information that is required by court order or other legal compulsion to be disclosed, in which case the Consultant shall give Toronto Hydro prior written notice of such disclosure, as permitted by law;
"Consultant"	Means EA Technology LLC;
“Consultant Information”	has the meaning prescribed in Section 9.4;
"Development"	means any and all works prepared, generated, created or designed by the Consultant pursuant to this Agreement, including without limitation all drawings, models, designs, formulae, methods, documents, reports, software, specifications, or source codes, and any related works, enhancements, modifications or additions thereto;
"Fees"	shall have the meaning as prescribed in Subsection 6.1(a);

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"Force Majeure"	means any impediments beyond the control of the applicable party due, wholly or in part, directly or indirectly, to: strikes, lockouts, riots, epidemics, war, governmental regulations, fire, explosions, acts of God, or any other impediment beyond the control of the party affected;
"Governmental Authority"	means any government, legislature, municipality, regulatory authority, agency, commission, department, board or court or other law, regulation or rule-making public entity of similar authority, including, without limitation the OEB;
"Guidelines"	has the meaning prescribed in Subsection 4.5(e);
"HST"	means Harmonized Sales Tax;
"IESO"	means the Independent Electricity System Operator;
"Industry Standards"	means the then-current industry standards and best practices used or observed by leading Canadian and United States providers of services to companies similar to Toronto Hydro and which are the same or similar to the Services;
"Initial Term"	has the meaning prescribed to it in Section 3.1;
"Intellectual Property"	includes all trademarks, copyrights, patents, business names, trade secrets, proprietary software, analysis or techniques (whether or not patented or patentable), confidential or secret designs and processes, source codes, plans or devices, or other proprietary and intellectual property rights;
"MFIPPA"	means the *Municipal Freedom of Information Act;*
"OEB"	means the Ontario Energy Board;
"PIPEDA"	means the *Personal Information Protection and Electronic Documents Act* (Canada);
"Pre-Existing IP"	has the meaning prescribed to it in Section 9.4;
"Privacy Laws"	has the meaning prescribed to it in Section 4.5;
"Representative"	in respect of a party, means such party's directors, officers, employees, agents, contractors and advisors, the party's Affiliates, and all such Affiliates' respective directors, officers, employees, agents, contractors and advisors;
"Remittances"	has the meaning prescribed to it in Subsection 6.1(e);

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"Services"	means all of the Developments, services and specifications to be provided, performed and met by the Consultant under this Agreement, as more particularly described in SCHEDULE A;
"Term"	has the meaning prescribed to it in Section 3.1; and
"Toronto Hydro"	Means Toronto Hydro-Electric System Limited.

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SECOND AMENDING AGREEMENT

THIS SECOND AMENDING AGREEMENT (the "Amending Agreement") is made effective as of November 19, 2022 (the "Effective Date") between **ELEMENT ENERGY LIMITED** (the "Consultant") and **TORONTO HYDRO-ELECTRIC SYSTEM LIMITED** ("Toronto Hydro").

WHEREAS:

1. Toronto Hydro and the Consultant (each a "Party" and collectively, the "Parties") previously entered into an agreement for professional consulting services dated February 7, 2022 (the "Consulting Agreement"), pursuant to which the Consultant would develop a future energy scenarios model (the "FES Model"), as well as related services related to maintenance of the model, stakeholder engagement on behalf of Toronto Hydro, and weather correction of network data (the "Services");

2. The parties subsequently entered into a renewal and amending agreement dated June 1, 2022 to clarify scoping requirements related to the FES Model, implementing a change request process, set out changes relating to the applicable Fees, and renewing the Term of the Consulting Agreement for one (1) additional year (the "First Amending Agreement" and, together with the Consulting Agreement, the "Agreement"); and

3. The Parties hereto wish to further amend the Agreement to clarify the requirements of the Consultant's obligations as applicable to the Consultant's submissions to the Ontario Energy Board (OEB), as more particularly set out herein;

NOW THEREFORE, THIS AMENDING AGREEMENT WITNESSES that in consideration of the mutual covenants contained herein and for other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Toronto Hydro and the Consultant agree as follows:

1. Any capitalized terms used but not defined herein shall be as defined in the Agreement, where applicable. The recitals above are agreed by the Parties to be true and deemed to form part of this Amending Agreement as if specifically restated herein.

2. Subsection 1(g) of SCHEDULE A to the Agreement is hereby deleted and replaced with the following:

(g) Participation in Toronto Hydro's Regulatory Application Process

The Consultant shall be available to provide information and documentation regarding the work carried out by the Consultant as part of the FES Report and all related Services for Toronto Hydro and the Consultant shall participate in a regulatory proceeding as required by the Ontario Energy Board as related to Toronto Hydro's 2025 rate application, provided that Toronto Hydro shall, to commercially reasonable efforts, request that the Ontario Energy Board meet the following accommodations:

i. The Consultant shall be given reasonable notice to participate in such proceeding.
ii. Any communication with the OEB shall be in English.
iii. The Consultant may attend the hearings of the OEB remotely (e.g. via Teams, Zoom or another similar teleconference facility), unless otherwise required by Toronto Hydro to attend the proceedings in person.
iv. The attendance by the Consultant shall take place, where feasible, during its working hours (between 9:00 – 18:00 UK time).

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Notwithstanding the foregoing, the Consultant acknowledges and agrees that the OEB is a Governmental Authority and a regulator of Toronto Hydro. Toronto Hydro cannot direct the OEB to comply with any requests for accommodation on the part of the Consultant nor can Toronto Hydro exercise any binding authority over its own regulator.

If the OEB does not meet the above requested accommodations, Toronto Hydro shall reimburse to the Consultant its reasonable costs required for travel and attendance.

If the Consultant is not given reasonable notice to participate in such proceeding, it shall not be liable to Toronto Hydro for failure to participate in a regulatory proceeding. Notwithstanding the foregoing, the Consultant shall, in all circumstances, make commercially reasonable efforts to participate in all proceedings where requested by Toronto Hydro or a Governmental Authority, regardless of the timing of such notice.

The degree of Consultant's participation shall be dependent on the degree of interest in the FES Report by OEB staff and any intervenors. Consultant's participation in such proceeding may entail, but is not limited to, response to interrogatories and undertakings, provision of support prior to and during any hearings required by the OEB, and answers to any questions regarding the FES Report's form, methodology, assumptions, and choices made, in either written or oral format (the latter in acting as a witness for Toronto Hydro). Where the Consultant is required to testify or otherwise provide evidence at a hearing before the OEB, the Consultant shall comply with the requirements set out in rules 13 and 13A of the OEB's Rules of Practice and Procedure, appended hereto as APPENDIX A.3 to this SCHEDULE A.

Toronto Hydro shall, in exchange for its provision of the Services under this section 1(g), pay to the Consultant fees on an hourly basis at the rates set out in section 2(c) of this SCHEDULE A

3. The document attached hereto as Appendix 1 to this Amending Agreement is hereby appended as APPENDIX A.3 – OEB Rules of Evidence to SCHEDULE A of the Agreement. For greater clarity, APPENDIX A.3 shall form part of SCHEDULE A to the Agreement and shall not constitute an independent schedule.

4. All other terms and conditions of the Agreement remain continuously in full force and effect, unamended and shall be deemed to apply to this Amending Agreement.

[remainder of this page intentionally left blank]

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5. This Amending Agreement, together with the Agreement, shall hereinafter constitute the entire agreement between the Parties with respect to the Services as further described in the Agreement, and supersedes any and all other agreements, understandings, discussions, negotiations, representations and correspondence which may have been made by or between the Parties respecting the same.

IN WITNESS WHEREOF the Parties hereto have executed this Amending Agreement as of the date first written above.

ELEMENT ENERGY LIMITED

DocuSigned by:
Per: Ian Walker
04A25D133611489...

Name: Ian Walker

Title: Partner

I have the authority to bind the Consultant.

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED

DocuSigned by:
Per: Elias Lyberogiannis
D6B8ED38A44E42F...

Name: Elias Lyberogiannis

Title: Executive Vice President, Planning, Chief Engineering & Modernisation Officer

I have the authority to bind Toronto Hydro.

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Appendix 1 to this Amending Agreement

APPENDIX A.3 – OEB Rules of Evidence

[please see attached]

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12. Affidavits

12.01 An affidavit shall be confined to the statement of facts within the personal knowledge of the person making the affidavit unless the facts are clearly stated to be based on the information and belief of the person making the affidavit.

12.02 Where a statement is made on information and belief, the source of the information and the grounds on which the belief is based shall be set out in the affidavit.

12.03 An exhibit that is referred to in an affidavit shall be marked as such by the person taking the affidavit, and the exhibit shall be attached to and filed with the affidavit.

12.04 The OEB may require the whole or any part of a document filed to be verified by affidavit.

13. Written Evidence

13.01 Other than oral evidence given at the hearing, where a party intends to submit evidence, or is required to do so by the OEB, the evidence shall be in writing and in a form approved by the OEB.

13.02 The written evidence shall include a statement of the qualifications of the person who prepared the evidence or under whose direction or control the evidence was prepared.

13.03 Where a party is unable to submit written evidence as directed by the OEB, the party shall:

(a) file such written evidence as is available at that time;

(b) identify the balance of the evidence to be filed; and

(c) state when the balance of the evidence will be filed.

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

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(a) the expert's name, business name and address, and general area of expertise;

(b) the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;

(c) the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;

(d) the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;

(e) in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and

(f) an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

(a) in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and

(b) at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

(a) scope and timing;

(b) the involvement of any expert engaged by the OEB;

(c) the costs associated with the conduct of the activities;

(d) the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of **Rule 13A.04**; and

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(e) any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A**.

14. Disclosure

14.01 A party who intends to rely on or refer to any document that has not already been filed in a proceeding shall file and serve the document 24 hours before using it in the proceeding, unless the OEB directs otherwise.

14.02 Any party who fails to comply with **Rule 14.01** shall not put the document in evidence or use it in the cross-examination of a witness, unless the OEB otherwise directs.

14.03 Where the good character, propriety of conduct or competence of a party is an issue in the proceeding, the party is entitled to be furnished with reasonable information of any allegations at least 15 calendar days prior to the hearing.

Master Client Agreement – Gartner Canada Co.

This **MASTER CLIENT AGREEMENT** (the "**MCA**") for subscription-based research and related services, dated April 20, 2022 (the "Effective Date"), is between Gartner Canada Co. of 5000 Yonge Street, 14th Floor, Suite 1402, M2N 7E9, Toronto ("**Gartner**") and Toronto Hydro-Electric System Limited of 14 Carlton Street Toronto, ON ("**Client**"), and sets forth the general terms applicable to the use of Gartner products and services (the "**Services**") provided to Client or any of its Affiliates. For purposes of the MCA, "**Affiliates**" means any entity that, directly or indirectly, controls, is controlled by, or is under common control of that party. "**Control**" means direct or indirect ownership of 50% or more of the stock or other interests entitled to vote for the election of the board of directors or other governing body of the entity.

1) ***Service Agreements***. Service Agreements set forth the Service(s) to be provided by Gartner (as more fully described in one or more "**Service Descriptions**"), the term of Client's license for such Services, and the fees payable by Client. Service Agreements are non-cancellable, and may be terminated only for material breach by either party, upon 30 days prior written notice, if the breach is not cured within the notice period. In the event of an inconsistency between any provision of this MCA and a provision of a Service Agreement, the Service Agreement shall control during its term.

2) ***Ownership and Use of the Services***. Gartner owns and retains all rights to the Services not expressly granted to Client. Only the individuals named in the Service Agreement (each a "**Licensed User**") may access the Services. Each Licensed User will be issued a unique password, which may not be shared. Client agrees to review and comply with the *Gartner Usage Policy* which is accessible to all Licensed Users via the "Policies" section of gartner.com. Among other things, the *Gartner Usage Policy* describes how Client may substitute Licensed Users, excerpt from and/or share Gartner research documents within the Client organisation, and quote or excerpt from the Services externally.

3) ***Warranty and DISCLAIMER OF WARRANTIES.*** Gartner warrants that the Services, in the form provided by Gartner to Client, and Client's use of the Services in accordance with this MCA will not infringe on any intellectual property rights of a third party. THE SERVICES ARE PROVIDED ON AN "AS IS" BASIS, AND GARTNER EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EXCEPT AS EXPLICITLY SET OUT IN THIS AGREEMENT, WHETHER SUCH WARRANTIES ARE EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND WARRANTIES AS TO ACCURACY, COMPLETENESS OR ADEQUACY OF INFORMATION. CLIENT RECOGNISES THE UNCERTAINTIES INHERENT IN ANY ANALYSIS OR INFORMATION THAT MAY BE PROVIDED AS PART OF THE SERVICES, AND ACKNOWLEDGES THAT THE SERVICES ARE NOT A SUBSTITUTE FOR ITS OWN INDEPENDENT EVALUATION AND ANALYSIS AND SHOULD NOT BE CONSIDERED A RECOMMENDATION TO PURSUE ANY COURSE OF ACTION. GARTNER SHALL NOT BE LIABLE FOR ANY ACTIONS OR DECISIONS THAT CLIENT MAY TAKE BASED ON THE SERVICES OR ANY INFORMATION OR DATA CONTAINED THEREIN. CLIENT UNDERSTANDS THAT IT ASSUMES THE ENTIRE RISK WITH RESPECT TO THE USE OF THE SERVICES.

4) ***Client Confidential Information.*** Gartner agrees to keep confidential any Client-specific information communicated by Client to Gartner in connection with this MCA that is (i) clearly marked confidential if provided in written form, or (ii) preceded by a statement that such information is confidential, if provided in oral form, and such statement is confirmed in writing within 30 days of its initial disclosure. This obligation of confidence shall not apply to any information that: (1) is in the public domain at the time of its communication; (2) is independently developed by Gartner; (3) entered the public domain through no fault of Gartner subsequent to Client's communication to Gartner; (4) is in Gartner's possession free of any obligation of confidence at the time of Client's communication to Gartner; or (5) is communicated by the Client to a third party free of any obligation of confidence. Additionally, Gartner may disclose such information to the extent required by legal process provided that Gartner shall, to the extent permitted by applicable law, notify Client prior to such disclosure to permit Client to seek remedy to prevent such disclosure.

5) ***Data Protection.*** In performing its obligations under this MCA, Gartner and Client will each comply with all applicable data protection legislation. In providing the services Gartner shall comply with its global privacy policy available at gartner.com/privacy.

6) ***Pricing.*** Notwithstanding anything to the contrary in this MCA or in any Service Agreement, the pricing quoted for the applicable Services under a Service Agreement will be consistent with the Gartner's fee categories then in-effect based on the Service(s) ordered, duration, and purchasing terms of the Service Agreement. The pricing quoted to a provincial crown corporation client will be consistent with Gartner's local government public sector fees for the services ordered.

7) ***Miscellaneous***

a) ***Assignability.*** This MCA and the rights granted to Client hereunder or under any Service Agreement may not be assigned, sublicensed or transferred, in whole or in part, by either party without the prior written consent of the other party, except to a successor to substantially all of the business or assets of a party by merger or acquisition. Where consent is required, it will not be unreasonably withheld.

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b) ***Dispute Resolution.*** Any unresolved dispute arising out of or in connection with this MCA shall be decided by a single arbitrator appointed by and under the International Arbitration Rules of ADR Chambers International or the parties may agree on a sole arbitrator or, failing such agreement, a party may apply to a competent court in the Province of Ontario for the appointment of an arbitrator in accordance with the International Commercial Arbitration Act, R.S.O. 1990, Chapter I-9. The arbitration hearing shall take place in Toronto, Ontario, Canada, unless otherwise agreed by the parties or ordered by the arbitrator. The decision of the arbitrator shall be final and binding, and the award may be entered in any court having jurisdiction over the parties. The parties consent to the jurisdiction of the courts of the Province of Ontario. If a party seeks recognition and enforcement of an arbitration award in Quebec, such an award will be homologated in accordance with the Code of Civil Procedure of Quebec. Gartner shall have the right to obtain injunctive relief in any court of competent jurisdiction in the event of a breach of Section 2. The prevailing party in any arbitration shall be entitled to its reasonable attorneys' fees and costs, in addition to any award of damages or other relief. Notwithstanding the foregoing, a breach of sections 2, 3, 4, and 5 of this MCA or a breach by either party of any applicable law shall be excluded from the dispute resolution provisions set forth in this section 6 b), and the applicable party may take all steps it deems fit at law or equity or as otherwise prescribed in this MCA in the event of either event.

c) ***Applicable Law.*** This MCA shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein.

d) ***Use of Name, Trademark, and Logo***. Absent the prior written consent of the other party, neither party shall use the name, trademarks, or logo of the other in promotional materials, publicity releases, advertising, or any other similar publications or communications.

e) ***No Third Party Beneficiaries***. Subject to any permitted assignments pursuant to Section 6(a) above, this MCA is for the benefit of the parties only.

f) ***Surviving Clauses***. Sections 3, 4, 5 and 7 (b), (c), (d), (e), (f) and (g) shall survive the expiration or termination of this MCA.

g) ***Entire Agreement.*** This MCA, together with any Service Agreements, sets forth the entire agreement between the parties with respect to the subject matter hereof. This MCA supersedes any previous agreements between the parties and shall not be effective until countersigned by Gartner. No modifications may be made except in writing signed by both parties.

h) ***Term.*** This MCA shall remain in effect for a period of five (5) years from the Effective Date and may be terminated by either party, for any reason, upon written notice to the other party provided, however, that the MCA shall continue to govern any active Service Agreement through its term that was entered into between the parties before the MCA termination.

Gartner Canada Co.

Authorised Signature: DocuSigned by: Ashley Belinda 3C6881B4DAC2436...

Date: April 27, 2022

Toronto Hydro-Electric System Limited

Authorised Signature:

Date April 28, 2022

Printed Name and Title: Anthony Haines, President & CEO

Address:

Telephone:

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Consulting Services Supplement to the Master Client Agreement - Gartner Canada Co.

This Consulting Services Supplement ("Supplement") to the Master Client Agreement effective October 31, 2022 ("MCA") between Gartner Canada Co. located at 5000 Yonge Street, 14th Floor, Suite 1402, M2N 7E9, Toronto, ("Gartner") and TORONTO HYDRO-ELECTRIC SYSTEM LIMITED located at 14 CARLTON STREET, TORONTO, Ontario, M5B1K5 ("Client") amends the terms of the current MCA between Gartner and Client, and shall apply to all Consulting and/or Benchmarking Services ("Services") ordered by Client or its Affiliates from Gartner or its Affiliates. All other terms of the MCA shall remain in full force and effect. In the event of any conflict between the MCA and this Supplement, this Supplement shall prevail solely with respect to the subject matter hereto. The specific engagement and related fees shall be set forth in separate Statements of Work ("SOW"). For purposes of this Supplement, "Affiliates" shall mean any entity that, directly or indirectly, controls, is controlled by, or is under common control of that party. "Control" shall mean direct or indirect ownership of 50% or more of the stock or other interests entitled to vote for the election of the board of directors or other governing body of the entity. "Deliverable" means the written work product Gartner is to supply, or make available to Toronto Hydro as contemplated by this Supplement and set out and described in a SOW.

1. ***Intellectual Property.*** Client shall retain all right, title and interest in any proprietary materials supplied to Gartner ("Client Materials"), and grants Gartner all necessary rights and licenses for Gartner to fulfill its obligations under each SOW. Excluding any Client Materials, Gartner shall retain sole and exclusive ownership of the Deliverable(s), Gartner tools, methodologies, questionnaires, responses, and proprietary research and data generated in the course of performing the Services, together with all intellectual property rights therein (the "Gartner Materials"). Gartner grants Client a perpetual, non-exclusive, royalty-free license to use the Deliverables, subject to the limitations set forth in Section 3 (Use of Deliverables). Gartner shall not be restricted in its use of ideas, concepts, know-how, data and techniques acquired or learned in the course of performing the Services, provided that Gartner shall not use or disclose any of Client's confidential or proprietary information, as further defined in Section 4 (Confidentiality).

2. ***Benchmarking Services.*** With respect to any benchmarking services performed by Gartner, Gartner will only use Client's data in an aggregate and anonymous format and represents to Client that Client's data will not be capable of being de-aggregated or re-identified. Client acknowledges that the contents of the benchmarking Deliverables are based upon information which is proprietary to Gartner and contained in Gartner's database. Client's data will become part of the database. The database will be used by Gartner in future consulting and benchmarking engagements, provided that Gartner shall not, at any time, de-aggregate or re-identify Client's data or disclose such data to other existing Gartner clients, and Gartner acknowledges and agrees that Client's data shall remain the confidential property of Client.

3. ***Use of Deliverables.*** Subject to payment in full of the applicable fees, Gartner grants to Client, for internal purposes only, a worldwide, royalty-free, perpetual license to use, reproduce, display, distribute copies of, and prepare derivative works of the Deliverables. Unless the Deliverable is identified in a SOW as intended for external distribution by Client such as a Request for Proposal or similar document, Client shall not make the Deliverables available, in whole or in part, to anyone outside of Client, or quote excerpts from the Deliverables to the public. Notwithstanding the foregoing, Client may share the Deliverables with (i) its outside auditors and/or accountants, (ii) third parties who have signed appropriate confidentiality agreements with Client who are engaged by Client to review or implement suggestions or to further research the issues contained in the Deliverables, (iii) governmental or regulatory bodies as required by law, (iv) with Client's Affiliates provided that its Affiliates are made aware of the obligations under this Section and that Client remains liable for the use made of the Deliverables by its Affiliates.

4. ***Confidentiality & Data Protection***.
(a) The parties agree to keep confidential and not to use or disclose to any third parties any information of the other party learned or disclosed in connection with each SOW, including the Gartner Materials, regardless of

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whether such information is clearly marked as confidential. The obligation of the parties with respect to the confidential information shall terminate with respect to any particular portion of the confidential information if and when: (i) it is in the public domain at the time of its communication; (ii) it is developed independently by the receiving party without use of any confidential information; (iii) it enters the public domain through no fault of the receiving party subsequent to the time of the disclosing party's communication to the receiving party; (iv) it is in the receiving party's possession free of any obligation of confidence at the time of the disclosing party's communication; (v) it is communicated by the disclosing party to a third party free of any obligation of confidence; or (vi) the receiving party has the disclosing party's written permission.

(b) Each party shall provide notice to the other of any demand made upon it under lawful process to disclose or provide any of the other party's confidential information. The receiving party agrees to cooperate with the disclosing party, at the disclosing party's expense, if the disclosing party elects to seek reasonable protective arrangements or oppose such disclosure. Any confidential information disclosed pursuant to such lawful process shall continue to be confidential information.

(c) In performing its obligations under this Supplement, each of Gartner and Client will comply with all applicable data protection legislation. In the event that any personal data is exchanged under this Supplement or any SOW, the parties shall treat such personal data in accordance with their respective privacy policies and, in the case of Gartner, its global privacy policy and its obligations at section 5 of the MCA.

5. ***Limitation of Liability.*** Neither party shall be liable for any consequential, indirect, special or incidental damages, including but not limited to, lost profits, business failure or loss of use, arising out of use of the Deliverables or the Services, whether or not advised of the possibility of such damages. Except for liability for personal injury or death or for damage to property caused by the negligence or willful misconduct of a party or its employees, or a party's breach of its confidentiality, privacy, or intellectual property obligations under this Supplement, each party's total liability arising out of this Supplement and the provision of the Services shall be limited to three times (3x) the fees paid or payable by Client under the SOW under which such liability arises.

6. ***Fees and Expenses.*** The fees due to Gartner in connection with each SOW are set forth in the SOW and are exclusive of any applicable taxes. All taxes are the responsibility of the party to which those taxes apply. Client agrees to pay all reasonable travel-related expenses incurred by Gartner in connection with the consulting services. Out-of-pocket expenses related to travel and subsistence will be billed at the actual amount incurred, and are not included in the professional fee applicable to each SOW.

7. ***Acceptance of Deliverables.*** All Deliverables provided by Gartner to Client shall be deemed to be accepted within 15 days of receipt by Client unless Gartner receives written notice of non-acceptance within 15 days after delivery. Any notice of non-acceptance must state in reasonable detail how the Deliverables did not conform to the SOW and Gartner shall use its reasonable business efforts to correct any deficiencies in the Deliverables so that they conform to the SOW.

8. ***No Third-Party Beneficiaries.*** This Supplement is for the benefit of the parties only. None of the provisions of this Supplement are for the benefit of, or enforceable by, any third party. The parties agree that no third party shall have the right to (i) rely on the consulting services provided by Gartner, or (ii) seek to impose liability on Gartner as a result of the consulting services or any Deliverables furnished to Client.

9. ***Survival.*** Sections 1-5, 7, 8 10, and 11 shall survive any expiration or termination of this Supplement.

10. In addition to all other representations made in the MCA or this Supplement, Gartner further warrants that:

    a. The Services and Deliverables shall be provided in accordance with the specifications more particularly described in an applicable SOW;

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b. The Services shall be performed in a timely, professional, diligent and competent manner by personnel appropriately trained in the performance of such Services, and shall meet or exceed those standards generally observed by reputable and competent members of the same industry providing similar services;
c. in the course of performing the Services, Gartner shall comply with applicable law;
d. it has the corporate power and authority to enter into this Supplement and to perform its obligations hereunder, and that this Supplement constitutes a legal, valid, and binding obligation of Gartner, enforceable against Gartner in accordance with its terms;
e. all Deliverables are and will be free and clear of any pledges, liens, charges, security interests, restrictions, title defects, or encumbrances of any kind or character whatsoever such that title to the Deliverables and all media, materials and supplies housing the Deliverables delivered hereunder shall pass to Toronto Hydro in accordance with the terms hereof free and clear of all liens and encumbrances; and
f. it is a registrant for purposes of the Excise Tax Act and the regulations thereunder, each as amended.

11. ***Indemnification.*** Gartner warrants that the Services and/or Deliverables, in the form provided by Gartner to Client and Client's use of the Services and/or Deliverables will not infringe on any intellectual property rights of a third party, and Gartner has the full unencumbered right and entitlement to license and/or assign all intellectual property rights in the Deliverables to Toronto Hydro, where so required.

Gartner agrees to indemnify, defend and hold Client, its officers, directors, agents and employees harmless from and against any and all liabilities, damages, losses, expenses, claims, demands, suits, fines, penalties (whether civil or criminal) or judgments, including reasonable attorneys' fees, costs arising from or relating to a claim by a third party that the Services infringe upon any third party intellectual property right. Client shall: 1) promptly notify Gartner in writing of any such claim; 2) permit Gartner to control the defense or settlement of such claim, and 3) reasonably cooperate with Gartner in such defense or settlement. Gartner shall have no obligation under this section for a claim of infringement to the extent it is based on any unauthorized modification or use of the Services by Client.

This Supplement shall be subject to the terms and conditions of Gartner's Master Client Agreement, which is incorporated herein by this reference, and together with the applicable SOW for the services shall constitute the entire legal agreement for such services. This Supplement may be executed in counterparts.

The parties have caused this Supplement to be executed by their authorized representatives.

Gartner Canada Co.

DocuSigned by:
David Vixama
CCE13228C8BD44B...

David Vixama

Contracts Manager

Authorised Signatory

November 4, 2022

Date

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED

Signature

October 31, 2022

Date

Anthony Haines, President and Chief Executive Officer

Name and Title

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Toronto Hydro Enterprise IT Benchmark and Capability Maturity Assessment



Statement of Work (SOW)

16th September 2022

Engagement Number: 330079917 | Version 1

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1.0 Scope, Objectives and Outcomes

Toronto Hydro-Electric System Limited ("Toronto Hydro") requires an independent and objective expert assessment of process maturity of its IT functional areas and to establish a reliable baseline of its overall IT spend and staffing positions relative to comparable peer organizations in the utility industry.

In the short-term, these maturity and cost baseline assessments will provide a fact-based action plan for the organization's regulatory filing and catalyze a roadmap of initiatives that Toronto Hydro's IT Leaders will drive to advance maturity and efficiency levels consistent with Toronto Hydro's Business and IT strategic objectives.

Longer term, these maturity and cost baseline assessments will form the basis for a transformational strategy as a result of the current state baseline and recommendations of this effort.

Gartner Canada Co. ("Gartner")'s insights and recommendations will highlight IT capabilities needed for Toronto Hydro to align to existing organizational strategies, increase the pace of value being brought to the business, and enable the possibility for future transformational aspirations.

- Gartner will combine several unique and proprietary Gartner assets and capabilities that will give Toronto Hydro a fact-based, objective starting point for its ongoing strategic direction. These capabilities include:
    - Gartner Research maturity models aligned to key capability areas that integrate Gartner Research insights and industry leading frameworks to support maturation objectives.
    - Gartner's world-leading IT Benchmark database to support a fact-based comparison, using a custom-built peer group to Toronto Hydro's environment, to anchor the current state in key IT enterprise-level cost and staffing measures.
- Outcomes of the engagement will include:
    - A current state summary of Toronto Hydro's maturity across the Utility Industry.
    - A current state summary of Toronto Hydro's IT spend and staffing levels relative to peers with a comparable environment that will identify optimization opportunities to focus future strategic efforts. The analysis will include, but not be limited to, the following metrics:
        - IT Spending as a Percentage of Revenue
        - IT Spending as a Percentage of Operating Expense
        - IT Spending per Company Employee
        - Capital vs Operational Spending
        - Run vs Grow vs Transform Spending
        - Distribution of IT Spending by Category (Hardware, Software, Personnel etc.)
        - Distribution of IT Spending by Domain (Apps Development, App Support etc)

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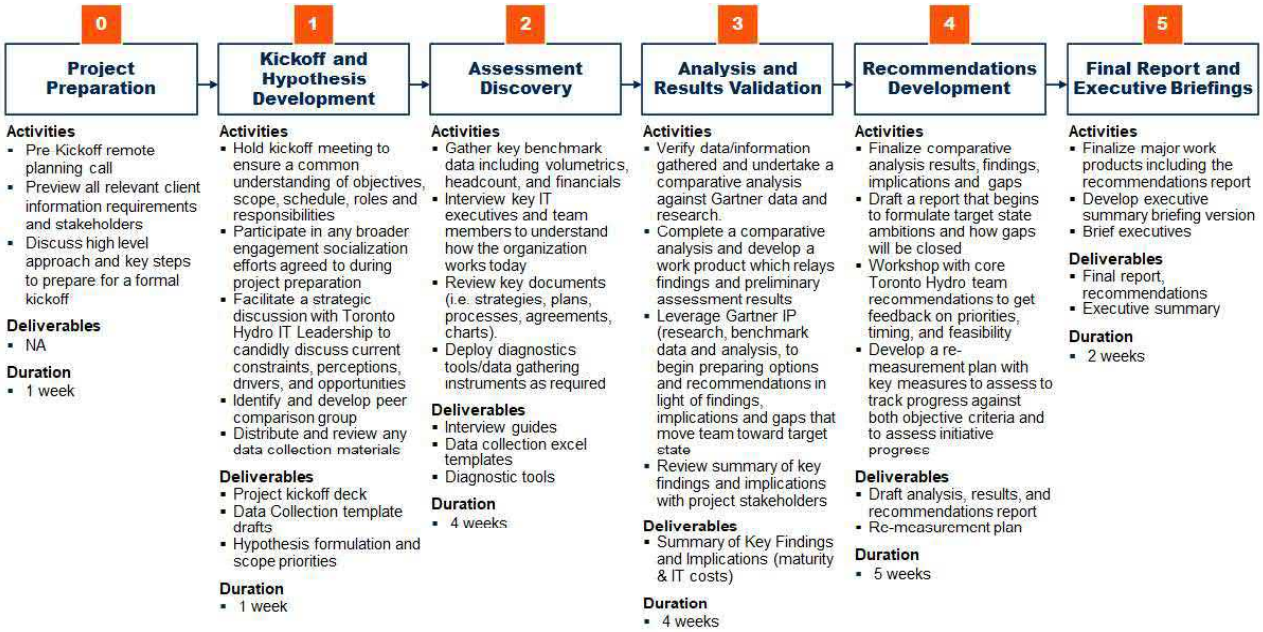
- Revenue Per Employee
- IT Staff as a Percentage of Company Employees
- IT Contractor Usage
- Distribution of IT Staff by Domain
- Other broad spending measures as mutually agreed

- A set of prioritized recommendations based on the comparative analysis that will advance Toronto Hydro in areas directly impactful to the IT and business objectives.
- Guidance on appropriate re-measurement periods and the foundation to measure progress objectively.

1.1 Overall Approach and Methodology

1.1.1 Overall Approach

Gartner will utilize its knowledge and experience in working with Utilities and Ontario Government and other public sector organizations which engage in similar enterprise IT benchmarks and maturity assessments to document the spending and capability maturity compared to peers. Gartner will use its Research, IT Optimization and Consulting IP to inform this activity, and we will also apply our best practices in conducting such benchmarks and assessments.



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1.1.2 Methodology Detail

Table 1. Gartner Task Descriptions

Step 0. Project Preparation	
Objective	• Set the foundation for a successful project that is delivered on time, within budget and meets Toronto Hydro's objectives
Activities Performed by Gartner	• Pre-Kickoff remote planning call • Preview all relevant client information requirements and stakeholders • Discuss high level approach and key steps to prepare for a formal kickoff
Toronto Hydro's Responsibilities	• Ensure attendance at (1 hour teleconference) kickoff meeting by Project Executive Sponsor, Project Core team and key stakeholders, as determined prior to kickoff • Provide relevant context and/or early documentation
Deliverable(s)	• None
Time Frame	• 1-2 Days

Step 1. Project Kickoff and Approach Refinement	
Objective	• Work closely with Toronto Hydro to refine the scope of the project, ensuring that design principles are identified for the relevant design domains /groupings
Activities Performed by Gartner	• Hold kickoff meeting to ensure a shared understanding of objectives, scope, schedule, roles and responsibilities • Participate in any broader engagement socialization efforts agreed to during project preparation • Facilitate a strategic discussion with Toronto Hydro IT Leadership to discuss current constraints, perceptions, drivers, and opportunities • Distribute and review any data collection materials • Discuss and agree on key stakeholders to participate in Step 2
Toronto Hydro's Responsibilities	• Ensure attendance at (2-3 hr) project kickoff Executive Sponsor, Project Core team and key stakeholders, as required
Deliverable(s)	• Project kickoff deck • Data Collection template drafts • Hypothesis formulation and scope priorities

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Time Frame	• 1 Week

Step 2. Assessment Discovery

Objective	• Gather sufficient information and insight to develop an understanding of the current state of IT at Toronto Hydro across in-scope areas, as well the current spend and staffing posture; model preliminary benchmark peers
Activities Performed by Gartner	• Gather key benchmark data including volumetrics, headcount, and financials • Interview key IT resources across functional areas • Review key documents (i.e. strategies, plans, processes, agreements, charts). • Deploy diagnostics tools/data gathering instruments as required
Toronto Hydro's Responsibilities	• Coordinate meetings with Toronto Hydro personnel • Attend interviews to provide input and identify opportunities & challenges • Provide relevant documentation as required • Complete data gathering templates as required
Deliverable(s)	• Interview guides; Data collection excel templates; Diagnostic tools • Ongoing Project Status Reports to convey progress
Time Frame	• 4 Weeks

Step 3. Analysis and Results Validation

Objective	• Complete an iterative comparative analysis of maturity against industry standards and best practices, as well as analysis of the benchmark data gathered vs. the custom peer group selected.
Activities Performed by Gartner	• Verify data/information gathered and undertake a comparative analysis against Gartner data and research. • Provide key observations for Toronto Hydro's performance against it's peer group. • Complete a comparative analysis and develop a work product which relays findings and preliminary assessment results. • Leverage Gartner IP (research, benchmark data and analysis) to begin preparing options and recommendations in light of findings, implications and gaps that move team toward target state. • Review summary of key findings and implications with project stakeholders to present key themes emerging from the comparative analysis, from which recommendations can be made.

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Toronto Hydro's Responsibilities	• Support ongoing questions, or requests for information • Attend workshop to review preliminary results and provide feedback on the analysis
Deliverable(s)	• Draft Findings, Analysis, and Benchmark Results
Time Frame	• 4 Weeks

Step 4. Recommendations Development

Objective	• Based on nuanced context to support Toronto Hydro's IT Strategic Objectives and the results of the assessment, develop and prioritize specific recommendations and provide a strategic roadmap to advance Toronto Hydro IT
Activities Performed by Gartner	• Finalize comparative analysis results, findings, implications and gaps. • Draft a report that begins to formulate target state ambitions and how gaps will be closed across all in scope areas, advancing both strengthening operations and supporting efficiency objectives • Workshop with core Toronto Hydro team recommendations to get feedback on priorities, timing, and feasibility • Develop a re-measurement plan with key measures to assess to track progress against both objective criteria and to assess initiative progress
Toronto Hydro's Responsibilities	• Participate in (2-3 hour) recommendations and priorities workshop
Deliverable(s)	• Draft analysis, results, and recommendations report • Re-measurement plan and measures
Time Frame	• 5 Weeks

Step 5. Final Report and Executive Briefing

Objective	• Finalize report, brief executives, and support execution momentum
Activities Performed by Gartner	• Finalize major work products including the recommendations report. • Develop executive summary briefing version. • Brief executives • Provide inputs and support in preparation for the regulatory filing, drafting responses to Interrogatory questions etc. (up to a maximum of 25 hours of effort)
Toronto Hydro's Responsibilities	• Review report and provide feedback
Deliverable(s)	• Final Report

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- Executive Summary Briefing
- Interrogatory responses (where applicable)

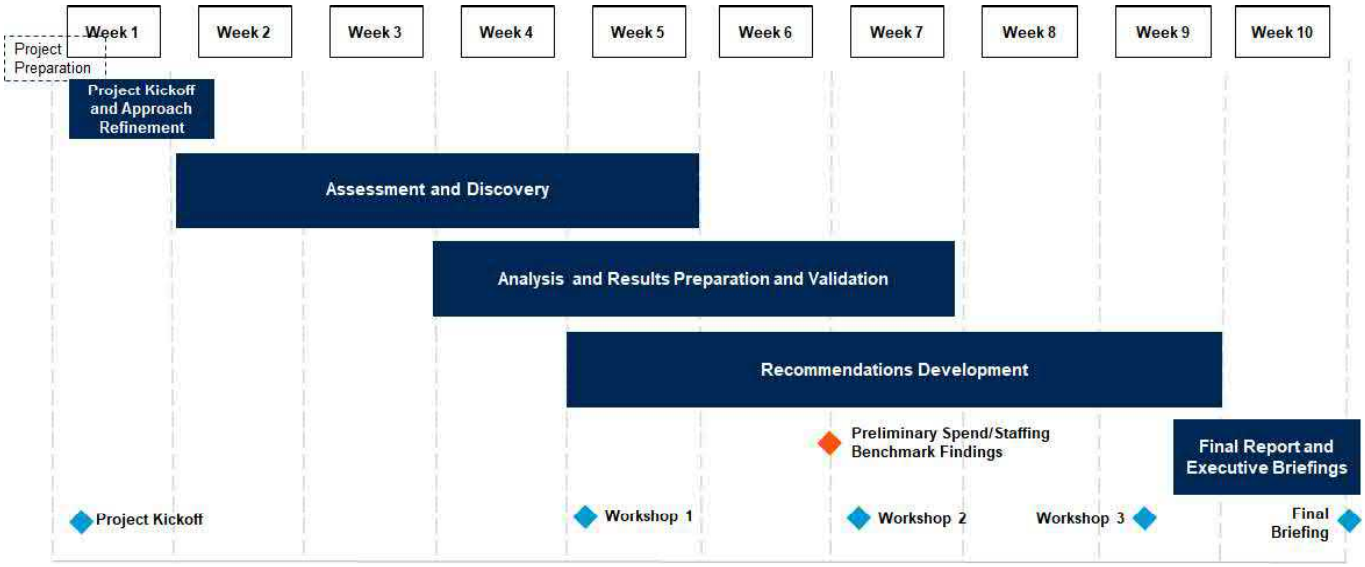
Time Frame

- 2 Weeks

1.1.3 Project Plan and Schedule

Gartner anticipates completion of each annual benchmark within 10 weeks, as detailed in the following figure. This schedule is dependent on the assumptions included in this Statement of Work (SOW). Actual start date is indicative and will be confirmed upon authorization of SOW.

Figure 1. Estimated Engagement Schedule



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2.0 Assumptions

The deliverables, schedule and pricing in this SOW are based on the following assumptions:

Toronto Hydro Participation:

- Toronto Hydro will designate a project manager to act as the primary point of contact for this project. The Toronto Hydro project manager will be expected to work closely with the Gartner employees as needed and will: (a) approve project priorities, detailed step plans and schedules; (b) facilitate the scheduling of Gartner interviews with appropriate client personnel; (c) notify Gartner in writing of any project or performance issues; and (d) assist in resolving project issues that may arise
- The work effort described in this SOW assumes Toronto Hydro IT personnel are available to assist in the manner defined in this SOW. In the event that Toronto Hydro personnel are not available, a change request may be necessary if there is an impact on scope, schedule or other key parameters.
- Toronto Hydro will review and approve documents within five business days. If no formal approval or rejection is received within that time, the deliverable is considered to be accepted by Toronto Hydro
- Toronto Hydro will schedule Toronto Hydro resources for project activities and provide meeting facilities as necessary
- Toronto Hydro personnel will be available per the final project schedule
- Gartner will formally capture feedback on your overall experience via our client survey. This allows us to quantify our performance on this project and to ensure a culture of continuous improvement of process and best practice

Data Collection:

- The due diligence (as-is) data are reasonably available via interviews and documentation review
- Toronto Hydro will provide timely access to all appropriate personnel to be interviewed. These personnel will provide data necessary to complete this project, answer questions, provide existing documentation and attend working sessions
- Project pricing assumes that Gartner will conduct 15 – 20 interviews/consultations and that Toronto Hydro will arrange all sessions with Toronto Hydro IT Personnel
- All data collection and interviews/workshops will take place via telephone or web conference

Key Personnel:

- Resumes of key personnel provided in this SOW are representative resumes of Gartner team members that deliver these types of engagements.
- Where it is indicated in this SOW, that a proposed project team member is a sub-contractor to Gartner, Toronto Hydro agrees to the inclusion of that individual as a member of the project team so long as the sub-contractor is suitably qualified to provide the services. In the event that such inclusion is not reasonably acceptable to Toronto Hydro, Gartner will be informed at the earliest opportunity and requested to find an alternative team member

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Place of Performance:

- All Gartner services will be performed at Gartner locations.

Deliverables and Change to Scope:

- Any requests for additional information or resource (beyond the details described in the steps above) that are made by Toronto Hydro will be considered a change in scope for this project and will be handled accordingly (see Changes to Scope section of this SOW)
- All deliverables will be developed using Microsoft products (e.g., Word and PowerPoint) and will be produced in English only.

Gartner Independence and Objectivity:

- Gartner Research and Consulting recommendations are produced independently by the Company's analysts and consultants, respectively, without the influence, review or approval of outside investors, shareholders or directors. For further information on the independence and integrity of Gartner Research, see "Guiding Principles on Independence and Objectivity" on our website, gartner.com or contact the Office of the Ombuds at ombuds@gartner.com or +1 203 316 3334.
- Notwithstanding anything to the contrary, Gartner shall further, with respect to the Services under this Statement of Work, comply with Rule 13A Expert Evidence of the Ontario Energy Board's Rules of Practice and Procedure, and agrees to accept the responsibilities imposed on them by that rule with respect to any testimony before the Ontario Energy Board

Timeline

- Notwithstanding anything to the contrary in this SOW, Gartner shall complete all services and deliver all Deliverables no later than ten (10) weeks from the execution of this SOW by both parties, ***provided that,*** Toronto Hydro promptly completes its duties and/or obligations set forth in this SOW.

Intellectual Property

- Notwithstanding anything to the contrary in this SOW, the Master Client Agreement, or the Consulting Services Supplement to the Master Client Agreement between the parties, the parties acknowledge and agree that Toronto Hydro shall, at all times, have full rights and title to the Deliverables generated by Gartner under this SOW, including without limitation any reports any related modifications, or additions thereto (collectively, the "SOW Work Product"), and may at all times take possession of or any use of any completed SOW Work Product, notwithstanding any provision, express or implied, to the contrary. Without limiting the generality of the foregoing, Toronto Hydro shall own all intellectual property rights in all SOW Work Product, and Gartner hereby waives and assigns to Toronto Hydro any such rights, and agrees to give Toronto Hydro and its representatives all assistance as may be reasonably required to perfect such rights including, without limitation, obtaining waiver of moral rights from any of Gartner's employees, partners, or other representatives.

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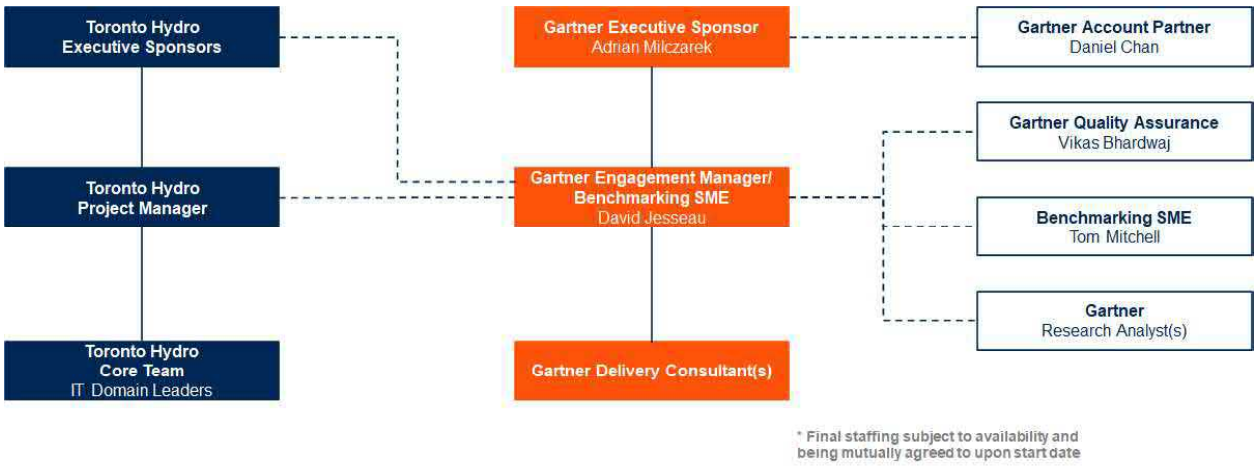
Notwithstanding the foregoing, Gartner shall retain sole and exclusive ownership of any pre-existing Gartner tools, methodologies, questionnaires, responses, and proprietary research and data, together with all intellectual property rights therein (the "Gartner Materials"). Gartner grants to Toronto Hydro a fully paid up, perpetual, non-exclusive, royalty-free, non-assignable license to the Gartner Materials contained within the SOW Work Product. For the avoidance of any doubt, Toronto Hydro may share the SOW Work Product and any embedded Gartner Materials with the Ontario Energy Board (OEB).

3.0 Gartner Project Team Overview and Experience

Gartner is proposing a team that is highly qualified in the areas of IT Benchmarks and capability maturity assessments. This section details the proposed team, brief description of their roles, responsibilities and expertise, and organizational chart.

Gartner has created an organization structure for this engagement that ensures high-level sponsorship and quality assurance, strong day-to-day project management, a focused team of project consultants, and deep subject matter expertise. The key roles and proposed individuals for the Gartner team are shown in Figure 2 below.

Figure 2. Gartner Project Team for Toronto Hydro



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Functional Role	Responsibilities
Executive Sponsor	▪ Ensure that Gartner activities support Toronto Hydro's goals. ▪ Build and maintain a long-standing relationship with Toronto Hydro. ▪ Provide high-level oversight to the engagement and become more heavily involved should any issue resolution be necessary.
Gartner Engagement Manager	▪ Be responsible for the day-to-day management of engagement initiatives. ▪ Ensure that deliverables are completed on time and meet the Gartner quality standards. ▪ Act as the primary point of contact for the Gartner team. ▪ Work closely with Toronto Hydro to ensure that Gartner is meeting its needs.
Project Consultant(s) and SME(s)	▪ Provide day-to-day consulting support for project steps. ▪ Provide support for data collection, data analysis and recommendations for activities. ▪ Participate in deliverable creation, deliverable review and client presentations as needed. ▪ Present results to Toronto Hydro as needed.
Quality Assurance	▪ Provide quality assurance review of Gartner project plan and Gartner deliverables throughout the engagement. ▪ Ensure value through use of the Gartner Project Management Life Cycle detailed in this document. ▪ Provide team with deep industry advisory and oversight ▪ Verify industry best practices and provide industry insights
Research Analyst(s)	▪ Support the core project team by providing a context-sensitive perspective to issues specific to Toronto Hydro based on Gartner industry-leading research. ▪ Participate in analysis and comparisons, and review deliverables as needed.

Role	Responsibilities
Executive Sponsor(s)	The Sponsors are responsible for the overall conduct of all phases of the project. The Sponsors: ▪ Provide executive level sponsorship. ▪ Appoint members to the Steering Committee. ▪ Approve the charter. ▪ Authorize project expenditures within the approved project budget.
Toronto Hydro Project Manager	The Project Manager works closely with the Proponent Project Manager to execute the project and is jointly accountable for project delivery and success. ▪ Manages Toronto Hydro's activities of the project within the approved plans and budget and oversees the overall project plan ▪ Plans, schedules and assigns Toronto Hydro project resources as required. ▪ Ensures all Proponent deliverables are meeting Toronto Hydro's scope, quality, timeline and budgetary requirements. ▪ Initiates corrective action for deviations from the approved plans. ▪ Drives the overall project to meet milestone & completion dates. ▪ Controls scope of the overall project to ensure on-time, on-budget delivery. ▪ Manages day-to-day tasks, issues, budgets and risks.
Toronto Hydro Extended Project Team	▪ Performs work as directed by Toronto Hydro's Project Manager.

4.0 Changes to Scope

- The scope of this engagement is defined by this SOW. All Toronto Hydro requests for changes to the SOW must be in writing and must set forth with specificity the requested changes. As soon as practicable, Gartner shall advise Toronto Hydro of the cost and schedule implications of the requested changes and any other necessary details to allow both parties to make an informed decision as to whether they will proceed with the requested changes. The parties shall agree in writing upon any requested changes prior to Gartner commencing work.
- As used herein, "changes" are defined as work activities or work products not originally planned for or specifically defined by this SOW. By way of example and not limitation, changes may include the following:
  - Any activities not specifically set forth in this SOW

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- Providing or developing any deliverables not specifically set forth in this SOW
- Any material change in the respective responsibilities of Gartner and Toronto Hydro, including any reallocation or any changes in engagement or project manager staffing
- Any rework of completed activities or Deliverables following acceptance of such Deliverables by Toronto Hydro
- Any additional work caused by a material change in the assumptions set forth in this SOW
- Any material delays in deliverable caused by modification of acceptance criteria in this SOW

i. Any changes to Research Analysts' time or resources

5.0 Investment Summary: Fees and Expenses

Gartner will conduct the steps outlined in this SOW for a firm-fixed price of $275,000 CAD, exclusive of any applicable taxes.

Billing:

- Gartner will conduct the steps as outlined in this SOW for the firm-fixed price defined above.
- Gartner will bill for 50% of the professional fees upon execution of this SOW by both parties, followed by the balance of 50% upon completion of the final report, approved by Toronto Hydro

i. This includes pre-payment of 25 hours towards Regulatory Filing support, per Step 5 in section 1.1.2

Invoicing:

- All invoices are payable net 30 days from the date of invoice. While we do not itemize billing for services, we agree and will comply with any reasonable requests for records substantiating our invoices.
- If Toronto Hydro requires a purchase order (PO) number, please specify the PO number in the Authorization section and forward a copy of the PO, with this agreement, to name/address or fax of appropriate individual. Ensure that the PO includes all labor and travel expenses quoted in this SOW. Any pre-printed terms on the PO that are in addition to or in contradiction of the terms of this agreement shall be inapplicable.

6.0 Authorization

- This SOW is submitted under the terms and conditions of the Master Client Agreement dated April 20, 2022 and the Consulting Services Supplement to the Master Client Agreement dated October 31, 2022 each between Gartner Canada Co. and Toronto Hydro-Electric System Limited.

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- When signed by Gartner Canada Co. and Toronto Hydro, this Proposal/SOW is an attachment to and governed by the above noted agreements. These documents will set forth the relationship between the parties for this engagement. This SOW may be modified at any time provided such changes (i) are agreed by the parties in writing and (ii) where applicable, are in accordance with the Change Order provision.
- IF USING A DIGITAL SIGNATURE, PLEASE CONFIRM THE FOLLOWING AS A CONDITION OF CONTRACT EXECUTION:
- [ ] By ticking this box, I agree that by affixing my digital signature hereunder I am attesting that: (i) this is my own personal legal signature; and (ii) I am a duly authorized signatory for my company. My signature verifies that the information provided to Gartner hereunder is subscribed by me, under penalty of false statement and material breach of contract.

SUBMITTED ON BEHALF OF GARTNER CANADA CO.

DocuSigned by:
Kim Blimka
9FB5551581C34B5...

SIGNATURE

Kim Blimka Contracts Specialist

PRINT NAME AND TITLE

November 4, 2022

DATE

AGREED ON BEHALF OF Toronto Hydro

SIGNATURE

Sheikh Nahyaan, Executive Vice President, Customer Care, and Chief Information Officer

PRINT NAME AND TITLE

October 31, 2022

DATE

PO NUMBER (If applicable)

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Agreement for Purchase of Services

THIS AGREEMENT is made this 1st day of October, 2020,

BETWEEN:

Toronto Hydro-Electric System Limited.,

a corporation incorporated under the laws of Ontario

(hereinafter called "Toronto Hydro")

and

Stantec Consulting Ltd.

a corporation incorporated under the laws of Canada

(hereinafter called the "Vendor")

WHEREAS:

A. Toronto Hydro requires the supply of engineering services including the design, development, and drafting of construction standards, technical support for distributed energy resources connections and protection, systems planning and market analysis, program and project management services, data science and analytics, and enterprise asset management (EAM) for ERP, as detailed in SCHEDULE A (collectively, the "Services");

B. the Vendor carries on the business of providing these engineering and related services and has indicated to Toronto Hydro that it has the skill and expertise to provide the Services on the terms and conditions set forth herein;

C. the Vendor has agreed to provide the Services to Toronto Hydro and Toronto Hydro has agreed to purchase the Services, upon the terms and conditions as set forth below; and

D. this Agreement is issued in connection with RFP 20P-0448 dated March 9, 2020 (the, including any schedules, attachments, amendments, supplements or addenda thereto and the Vendor's submission in response thereto dated April 20, 2020.

NOW THEREFORE, in consideration of the mutual covenants contained herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. Interpretation

a) All capitalized terms in this Agreement shall have the meaning as defined in SCHEDULE C;

b) The recitals hereto shall form an integral part of this Agreement as if specifically restated herein;

c) Words denoting the singular include the plural and vice versa and words denoting any gender include all genders;

d) The word "including" shall mean "including without limitation";

e) Any reference to a statute shall mean the statute in force as of the date hereof, together with all regulations promulgated thereunder as may be amended, re-enacted, consolidated and/or replaced, from time to time, and any successor statute thereto, unless otherwise provided;

f) When calculating a period of time within which or following which any act is to be done or step taken, the date which is the reference day in calculating such period shall be excluded, and if the last day of such period is a Saturday, Sunday or statutory holiday, the period shall end on the next Business Day;

g) All dollar amounts in this Agreement are expressed in Canadian dollars, unless otherwise stated;

h) The division of this Agreement into separate articles, sections, subsections and Schedules and the insertion of headings is for convenience of reference only and shall not affect the construction or interpretation of this Agreement; and

i) Save and except as otherwise expressly defined within the body of this Agreement or in SCHEDULE C hereto, words or abbreviations which have well known or trade meanings are used herein in accordance with their recognized meanings.

2. Schedules, Exhibits and Appendices

The following schedules and appendices are attached to and form part of this Agreement:

a) SCHEDULE A –Services Required
    i. Appendix 1 – Project Work Order

b) SCHEDULE B – Purchase Price

c) SCHEDULE C – Defined Terms

d) SCHEDULE D – Supplier Quality Manual

In the event of a conflict between the terms of any schedule, exhibit or appendix and the terms of this Agreement, the terms of this Agreement shall govern.

3. Purchase and Sale

Subject to the terms and conditions of this Agreement, and in reliance on the representations, warranties and conditions set forth in this Agreement, Toronto Hydro agrees to purchase the Services from the Vendor and the Vendor agrees to supply the Services to Toronto Hydro during the Term of this Agreement.

4. Term

a) Subject to any termination rights herein, this Agreement shall be for a term of 3 years, from October 1, 2020 to October 1, 2023 (the "Initial Term").

b) Toronto Hydro may, at its sole option, elect to renew this Agreement for three (3) additional 1 year terms (each a "Renewal Term") by giving written notice to the Vendor at least sixty (60) days before the end of the Initial Term or the first Renewal Term, as applicable. The same terms and conditions contained herein shall apply during the Renewal Term, save and except as amended in writing by the parties.

c) The Initial Term and the Renewal Term, if any, shall hereinafter together be referred to as the "Term".

5. Price and Payment

a) The prices for the Services shall be as specified in SCHEDULE B hereto and, except as otherwise provided, shall be in Canadian dollars DDP Toronto Hydro's location (INCOTERMS 2010), and shall represent the total cost to Toronto Hydro, excluding any value added taxes (including HST) but including without limitation all other applicable taxes, duties, packaging, handling and delivery costs. Toronto Hydro shall withhold any applicable non-resident withholding taxes from any amount owing in this Agreement and remit such taxes to the appropriate federal taxing authority. If no price is stipulated in this Agreement, the price must not exceed the last previous quotation made by the Vendor to Toronto Hydro for the same Services.

b) Unless otherwise provided in this Agreement, the Vendor shall invoice Toronto Hydro after final inspection and acceptance by Toronto Hydro of the Services performed and subject to receipt of all documents required by this Agreement. **Invoices must be sent electronically to: AP@torontohydro.com.** Subject to approval of the invoice by Toronto Hydro, receipt of all documents required by this Agreement, and final review by Toronto Hydro, Toronto Hydro shall make payment to the Vendor via electronic funds transfer not later than thirty (30) days following receipt of an acceptable invoice and the EFT Information (as set out below). **The Vendor must provide Toronto Hydro with, in the case of the first payment only, (i) a void cheque, pre-printed deposit slip or bank confirmation letter and (ii) the email address where the Vendor wishes to receive remittance information (together, "EFT Information"). EFT Information must be sent electronically to efthelp@torontohydro.com or to 14 Carlton Street, Toronto, ON, M5B 1K5, Attention: Treasury Department.** Toronto Hydro reserves the right to pay the Vendor through other payment methods.

6. Delivery of Services

a) All Services shall be performed in accordance with the terms, specifications and schedules included in SCHEDULE A. The Vendor shall immediately notify Toronto Hydro, in writing, of any circumstances known or suspected that may cause delay in performance of the Services.

b) In the event of any question, dispute, disagreement or difference of opinion between Toronto Hydro and the Vendor relating to the quality or acceptability or rate of progress of any Services or relating to the interpretation of the specifications in SCHEDULE A or the performance of this Agreement,

the opinion of Toronto Hydro or its authorized Representative shall govern and be binding on the parties hereto.

7. Invoice Requirements

The Vendor shall submit invoices to Toronto Hydro in accordance with Section 5 of this Agreement and the payment terms as set out in SCHEDULE B. Each invoice shall contain:

a) a detailed description of the Services performed during the invoice period;

b) the dates and the amount of time spent by the Vendor for the provision of the Services;

c) the hourly rates;

d) the total HST applicable to the Services during the invoice period, as well as the Vendor's HST registration number; and

e) a detailed description of any applicable disbursements incurred around the invoice period, supported by documentation in a form acceptable to Toronto Hydro.

8. Inspection

All Services performed will be subject to final inspection and approval by Toronto Hydro after performance, notwithstanding any prior payment. In the event that Services are performed which are not in conformity with the terms and conditions and specifications of this Agreement, Toronto Hydro may, at its option:

a) reject the Services and require the Vendor to immediately re-perform the Services;

b) negotiate with the Vendor an agreeable reduction in the price of the delivered, non-conforming Services;

c) rework, or cause to be reworked, the delivered, non-conforming Services, at the Vendor's expense, which expense shall constitute a proper set-off by Toronto Hydro against amounts otherwise due to the Vendor under this Agreement; or

d) reject the Services and require a repayment of applicable amounts for such deliverables.

9. Representations, Warranties and Covenants

The Vendor represents and warrants to Toronto Hydro that:

a) it has the corporate power and authority to enter into this Agreement and to perform its obligations hereunder, and that this Agreement constitutes a legal, valid, and binding obligation of the Vendor, enforceable against the Vendor in accordance with its terms;

b) the Vendor, after conducting due diligence, is not aware of any actions, suits or other legal proceedings which may affect its ability to perform this Agreement;

c) the Services shall be performed in a professional, diligent and competent manner and shall meet those standards generally observed by reputable and competent members of the same industry providing similar services;

d) it is an expert, trained, equipped and capable in providing the Services and shall only use reliable, qualified and Competent Persons to perform the Services;

e) it is in compliance with and has paid, and will continue to pay, all assessments and other amounts owing pursuant to the WSIA; and

f) it is satisfied with the conditions under which the Services will be performed, and shall assume full responsibility for understanding the conditions of supply, operations, and service.

10. Warranty

All Services shall be provided in compliance with Applicable Laws in a professional, diligent, and competent manner using fully qualified, professionally and technically, personnel entitled to legally work in the Ontario, Canada exercising the level of skill and diligence required of a qualified and reasonable contractor. The Services will conform to the descriptions as specified in SCHEDULE A hereto. This warranty is in addition to all other warranties specified in SCHEDULE A or implied by law and shall survive acceptance and payment.

11. Personnel

The Vendor shall inform Toronto Hydro of turnover of all personnel within its organization that are connected to the Services being provided by the Vendor to Toronto Hydro (whether a Required Resource or not) in a timely fashion, but in no case longer than five (5) Business Days from such effective termination, in order to allow Toronto Hydro to make arrangements for its protection.

12. Health and Safety

The Vendor shall be responsible for:

a) managing the health and safety of its own personnel and its other Representatives;

b) ensuring compliance with all Applicable Laws related to health and safety, including without limitation the OHSA; and

c) ensuring that its personnel and its other Representatives are aware of any safety hazards involved in working in or around Toronto Hydro's facilities and all Applicable Laws with respect thereto.

Neither Toronto Hydro, nor its Representatives, shall be liable for any loss, damages or claims arising directly or indirectly from the Vendor's work in or around Toronto Hydro's facilities, and the Vendor hereby waives any claims to which it may become entitled for loss or damage and releases Toronto Hydro and its Representatives from any and all such claims.

13. Permits and Applicable Laws

a) The Vendor shall, at its sole expense, obtain and maintain during the Term of this Agreement, all permits, licences and approvals required by all Applicable Laws to perform its obligations under this Agreement. The terms and conditions of this Agreement shall be carried out in strict

compliance with all Applicable Laws and in the event of any conflict between any Applicable Laws, the Applicable Laws with the most stringent standard shall apply.

b) Without limiting the generality of subsection 13(a) above, the Vendor shall comply with the *Personal Information Protection and Electronic Documents Act* (Canada), MFIPPA and any other applicable privacy legislation with respect to any personal information collected, used or disclosed in connection with this Agreement and shall indemnify and hold harmless Toronto Hydro and its Representatives from and against any and all claims, demands, suits, losses, damages, causes of action, fines or judgments (including related expenses and legal costs) they may incur related to or arising out of any non-compliance therewith by the Vendor or its Representatives.

14. Compliance with Guidelines

The Vendor's personnel shall comply with all rules and direction of Toronto Hydro, whether specified in this Agreement or otherwise, while working on Toronto Hydro's premises, distribution system or when accessing or connecting to Toronto Hydro's information technology systems, including rules and directions concerning health, safety, security and environmental protection, including without limitation, Toronto Hydro's *Code of Business Conduct*, Toronto Hydro's *Disclosure Policy*, Toronto Hydro's *Social Media and Digital Communication Guidelines*, Toronto Hydro's *Accessibility Standards for Customer Service Policy*, Toronto Hydro's *Workplace Harassment Policy*, Toronto Hydro's *Violence Prevention in the Workplace Policy*, Toronto Hydro's *Environmental Policy*, Toronto Hydro's *Occupational Health & Safety Policy*, Toronto Hydro's *Privacy Policy Statement*, Toronto Hydro's *Cyber Security Policy*, Toronto Hydro's *Technology Use Guidelines*, and the *Affiliate Relationships Code for Electricity Distributors and Transmitters* issued by the OEB (together, the "Guidelines"). The Vendor acknowledges that it has been provided with a copy of the Guidelines, has provided and will provide a copy of the Guidelines to each of its Representatives and that it agrees to comply with and to direct its Representatives to comply with such Guidelines, as amended.

15. Liability and Indemnification

The Vendor shall be liable for and shall indemnify and hold harmless Toronto Hydro and its Representatives from all claims, demands, actions, penalties, damages, losses, judgments and settlements, liabilities, costs, expenses, including legal fees and other related costs and expenses arising out of, related to, or incident to, the Vendor or any of its Representatives' performance of the Services under this Agreement, including, without limitation:

a) any breach, violation or non-performance by the Vendor or any of its Representatives of any terms, conditions, warranties, obligations or covenants contained in this Agreement;

b) any breach or violation by the Vendor or any of its Representatives of any Applicable Laws; and

c) any actions, omissions, negligence or wilful misconduct of the Vendor or any of its Representatives.

Except for losses arising out of, related to or incident to: (i) breach of Applicable Laws; (ii) wilful misconduct; (iii) damage to persons or tangible property due to negligence; (iv) breach of confidentiality or privacy obligations; or (v) breach of Section 21 (Intellectual Property Protection), Vendor's total liability shall not exceed the greater of : (i) the total amount of fees paid to Vendor under the applicable purchase order; and (ii) five million dollars ($5,000,000.00) and the proceeds of insurance, as set out in Section 16 below. Subject to the foregoing, in no event shall either party be liable for any indirect or consequential damages (including lost profits or loss of revenue).

16. Insurance

a) Unless otherwise specified in this Agreement, the Vendor shall, during the Term of this Agreement, and at its own expense, maintain and keep in full force and effect:

i. commercial general liability insurance on an occurrence basis having a minimum inclusive coverage limit, including personal injury and property damage, of five million dollars ($5,000,000.00) per occurrence, which shall be extended to cover contractual liability, products and completed operations liability, contingent employer's liability, owners/contractors protective liability and must also contain a cross liability clause and a severability of interest clause, and must name Toronto Hydro and its Affiliates as additional insureds;

ii. Errors and Omissions Insurance (Professional Liability) covering actual or alleged acts, errors or omissions committed by the Vendor or its Representatives, arising out of the performance of this Agreement, which shall also extend to include personal injury, bodily injury and property damage from the performance of professional services, in the amount of two million dollars ($2,000,000.00);

iii. any and all insurance and/or financial assurance required by the Ministry of the Environment and any applicable Governmental Authority as well as environmental liability insurance and pollution liability coverage on at least a sudden and accidental basis, all on a per occurrence basis having a coverage limit of five million dollars ($5,000,000.00) per occurrence.

iv. automobile liability insurance on all owned and non-owned vehicles used in connection with this Agreement and such insurance coverage shall have a limit of two million dollars ($2,000,000.00) per accident, in respect of bodily injury (including passenger hazard) and property damage inclusive of any one accident and mandatory accident benefits.

b) All insurance coverages and limits required to be maintained by the Vendor shall be primary to any insurance maintained by Toronto Hydro, which shall be excess and non-contributory. Prior to the commencement of the delivery of the Services, the Vendor shall deliver to Toronto Hydro a certificate of insurance which evidences the Vendor's compliance with this Section, including the provision of a thirty (30) day prior written notice of cancellation to Toronto Hydro. The Vendor agrees that the insurance described herein does in no way limit the Vendor's liability pursuant to the indemnity provisions of this Agreement.

c) A waiver of subrogation shall be provided by the commercial liability insurer(s) to Toronto Hydro.

17. Subcontractors

The Vendor may only subcontract any of the Service under this Agreement with the prior written consent of Toronto Hydro. If subcontracting is permitted, the Vendor shall enter into agreements with such subcontractors to require them to perform the Services in accordance with all Applicable Laws and the terms of this Agreement and the Vendor shall be liable for any acts or omissions of such subcontractors as if such acts or omissions were those of persons directly employed by the Vendor. The Vendor agrees to incorporate the terms of this Agreement into all subcontract agreements with its subcontractors. Any subcontract shall not relieve the Vendor from any of its obligations or liabilities under this Agreement.

18. Termination

a) Toronto Hydro may, for its convenience and at its sole option, terminate this Agreement by providing at least sixty (60) days prior written notice of such termination. Upon issuance of such notice, the Vendor shall stop performance of the Services under this Agreement, except as may be necessary to carry out such termination and take any other action which Toronto Hydro may reasonably direct. Upon a termination for convenience, Toronto Hydro shall pay for such Services requested and accepted by Toronto Hydro up until the effective date of such termination. Toronto Hydro shall not be liable to the Vendor for any other costs or damages whatsoever arising from such termination, including without limitation, any indirect, consequential or special damages such as a loss of profit or loss of opportunity.

b) If the Vendor fails to fulfil any covenant or material obligation under this Agreement, including, without limitation, the failure to meet the delivery schedule or any specification contained herein, or breaches any representation or warranty contained herein, then Toronto Hydro may, without prejudice to any other right or remedy Toronto Hydro may have, notify the Vendor in writing that the Vendor is in default of its contractual obligations and instruct the Vendor to correct the default within five (5) Business Days immediately following the receipt of such notice. If the Vendor fails to correct the default in the time specified, then, without prejudice to any other right or remedy Toronto Hydro may have, Toronto Hydro may either correct such default and deduct the cost thereof from any payment then or thereafter due to the Vendor and/or terminate this Agreement.

c) If bankruptcy or insolvency proceedings are instituted by or against the Vendor or the Vendor is adjudicated a bankrupt, becomes insolvent, makes an assignment for the benefit of creditors or proposes or makes arrangements for the liquidation of its debts, or a receiver or receiver and manager is appointed with respect to all or part of the assets of the Vendor, Toronto Hydro may, without prejudice to any other rights or remedies it may have, immediately terminate this Agreement.

d) The termination of this Agreement shall not affect any rights or obligations which may have accrued prior to such termination or any other rights which the terminating party may have arising out of either the termination or the event giving rise to the termination.

19. Time of the Essence

Time is of the essence in this Agreement. The Vendor shall perform all Services in accordance with the dates and times for performance and delivery specified in SCHEDULE A hereto and Toronto Hydro shall have the right to take possession of and use any completed or partially completed portions notwithstanding any provisions expressed or implied to the contrary.

20. Force Majeure

a) As used herein, “Force Majeure” means events beyond the reasonable control of a party applying reasonable diligence and foresight given the nature of the Services being provided under the Agreement, including, as applicable, any acts of God and the public enemy, the elements; fire; accidents; vandalism; sabotage; power failure; strikes, lockouts or any other industrial, civil or public disturbances; any laws, orders, rules, regulations, acts or restraints of any government or governmental body or authority, civil or military, including the orders and judgments of courts and any other similar causes or acts.

b) If, by reason of Force Majeure, either party hereto (the "Frustrated Party") is delayed or unable, in whole or in part, to perform or comply with any obligation or condition of this Agreement, then it will be relieved of liability and will suffer no prejudice for failing to perform or comply or for delaying such performance or compliance during the continuance and to the extent of the inability so caused from and after the happening of the event of Force Majeure, provided that it gives to the other party prompt notice of such inability, reasonably full particulars of the cause thereof and the expected cessation. If notice is not promptly given, then the Frustrated Party will only be relieved from performance or compliance from and after the giving of such notice. The Frustrated Party will use its best efforts to remedy the situation and remove, so far as possible with reasonable dispatch, the cause of its inability to perform or comply, provided, however, that settlement of strikes, lockouts and other industrial disputes shall be within the discretion of the Frustrated Party. The Frustrated Party will give prompt notice of the cessation of Force Majeure. If at any time the Vendor cannot deliver the Services required to be provided pursuant to the Agreement due to Force Majeure, Toronto Hydro may engage any other party to provide such Services which the Vendor cannot provide. The benefit of this provision of Force Majeure shall only survive for thirty (30) days from the commencement of an event of Force Majeure. A requirement to disclose Confidential Information other than under Canadian law pursuant to the terms of this Agreement shall not be an event of Force Majeure. A failure by a sub-contractor to perform shall not be an event of Force Majeure for a Frustrated Party unless such sub-contractor is itself suffering from an event of Force Majeure and the provisos set forth above are followed.

21. Intellectual Property Protection

The Vendor expressly warrants that the manufacture, delivery, sale or use of the Vendor's Services will not infringe any Canadian or foreign patents, trademarks, copyrights, industrial design or other intellectual property rights and the Vendor shall indemnify and save Toronto Hydro harmless from all claims, judgments and decrees that may be entered against Toronto Hydro or its Representatives and against all damage, liability, costs and expenses (including legal fees and other attendant costs and expenses) Toronto Hydro incurs by reason of any infringement or claim thereof.

22. Confidential Information

The parties agree and acknowledge that, subject to Applicable Laws or court order,

a) each party (the "Receiving Party") shall maintain in strict confidence the terms of this Agreement and any and all proprietary and confidential information about the business, operations or customers of the other party or any of their Affiliates, which it acquires in any form from the other party (the "Disclosing Party") by virtue of this Agreement ("Confidential Information") and will not disclose to any third party or make use of such Confidential Information for itself or any third party without the prior written consent of the Disclosing Party;

b) the Receiving Party may disclose such Confidential Information to any of the Representatives of the Receiving Party or any of its Affiliates who agree to be bound by the obligations of confidentiality herein and who have a reasonable need to know such Confidential Information in the course of their duties for the Receiving party but only for the purposes of the Receiving party exercising its rights and obligations under this Agreement;

c) Toronto Hydro is subject to MFIPPA and is governed by governmental authorities such as the IESO and the OEB and shall have the right to disclose Confidential Information in accordance with the provisions of MFIPPA or as required by the IESO or the OEB;

d) a party shall be entitled to all remedies available at law or in equity to enforce, or seek relief in connection with any breach of obligations pursuant to this section;

e) the Receiving Party shall be responsible for any breach of this Agreement by it and its Representatives and by any other person to whom it discloses any Confidential Information. The Parties agree that the Disclosing Party would be irreparably injured by a breach of this Agreement by the Receiving Party, or by any person to whom it discloses any Confidential Information, and that monetary damages would not be a sufficient remedy. Therefore, in such event, the Disclosing Party shall be entitled to all available equitable relief, including injunctive relief without proof of actual damages, as well as specific performance. Such remedies shall not be deemed to be exclusive remedies for a breach of this Agreement but shall be in addition to all other remedies available at law or equity;

f) upon termination of this Agreement, or upon ten (10) days' prior written notice from the Disclosing Party requesting return of any or all Confidential Information, the Receiving Party shall forthwith return to the Disclosing Party all Confidential Information, including without limitation all copies of any form of the Confidential Information, the Receiving Party has received and, at the option of the Disclosing Party, deliver to the Disclosing Party, or destroy or have destroyed, any copies or other reproductions of the Confidential Information together with all notes, analyses, reports and other written material whatsoever prepared by, or on behalf of, the Receiving Party, from, or in respect of, the Confidential Information; provided that the Receiving Party shall be entitled to keep, subject always to all the provisions of this Agreement, one copy of such notes, analyses, reports or other written material prepared by, or on behalf, the Receiving Party for its records. The Receiving Party shall provide to the Disclosing Party, upon request, a certificate of an officer of the Receiving Party certifying such destruction; and

g) notwithstanding section 22(a), in the event that the Receiving Party believes it is required by law to disclose, or is requested by a Governmental Authority to disclose, any Confidential Information to a Governmental Authority, the Receiving Party may so disclose; provided that if legally allowed to do so, it shall, to the extent permitted by law, first inform the Disclosing Party of the request or requirement for disclosure to allow an opportunity for the Disclosing Party to apply for an order to prohibit or restrict such disclosure.

The terms of this Section 18 shall survive the expiry or termination of the Contract for a period of three (3) years.

23. Audit Rights

a) For the purpose of verifying the Vendor's compliance with this Agreement (including, without limitation, compliance with all Applicable Laws and verification of all amounts invoiced to Toronto Hydro), Toronto Hydro or its authorized Representative shall have access at all reasonable times to the Vendor's premises, financial data, personnel, files and records, correspondence, computer files, and books and accounting records relating in any manner to the Services. The Vendor shall ensure that Toronto Hydro or its authorized Representative has the same audit access with respect to subcontractors. All costs of conducting such audits shall be borne by Toronto Hydro.

b) If an audit indicates errors in any amount claimed by Vendor in respect of the Services, the Vendor shall make the appropriate adjustments to the amount claimed and promptly refund overpayments to Toronto Hydro.

c) Notwithstanding the foregoing, Toronto Hydro's right to inspect, copy and audit shall not extend to the composition of the Vendor's rates and fees, percentage mark-ups or multipliers but shall apply only to their application to the applicable units.

24. Workers' Rights

a) The Vendor shall at all times pay or cause to be paid any assessments or compensation required to be paid by the Vendor or its subcontractors pursuant to any applicable workers' compensation legislation, and upon failure to do so, Toronto Hydro may pay such assessments or compensation to the Workplace Safety and Insurance Board or other applicable authority, body or agency and may deduct such assessments or compensation from monies due to the Vendor. The Vendor shall comply with all regulations and laws relating to workers' compensation.

b) The Vendor agrees to indemnify and save harmless Toronto Hydro from and against all losses, liability, costs, charges, claims, damages, expenses or liens which may arise as a consequence of or result from any failure, including any delay in complying, of the Vendor or any of its subcontractors to comply fully with the provisions of this Section 24 or which may arise as a consequence of any illness, injury or death of any employee of the Vendor or any such subcontractor.

25. [INTENTIONALLY OMITTED]

26. Non-Solicitation

Unless Toronto Hydro's Chief Executive Officer provides prior written consent, the Vendor hereby covenants and agrees that during the term of this Agreement and for a period of two (2) years following the termination of the Agreement, however caused, the Vendor will not directly or indirectly, either individually or in partnership or jointly or in conjunction with any other Person,

a) hire or otherwise engage any Protected Employee who is currently employed by Toronto Hydro;

b) hire or otherwise engage any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause;

c) solicit or attempt to solicit any Protected Employee who is currently employed by Toronto Hydro or encourage any such person to leave his/her employment with Toronto Hydro; and

d) solicit or attempt to solicit any Protected Employee who was formerly employed by Toronto Hydro and is within the twelve (12) month period immediately following the Protected Employee's termination date provided that the Protected Employee's employment was not terminated without cause.

Given the unique expertise and intimate knowledge that the employees have of the operations of Toronto Hydro the Vendor acknowledges and agrees that the restrictions contained in this Section 23 are reasonable and necessary to preserve the value of Toronto Hydro's business.

27. Changes

a) Toronto Hydro may, without invalidating the Agreement, change or issue instructions or schedules for the Services, require the Vendor to perform extra or additional work, or require the Vendor to delete certain parts of the Services (any such change, a "Change Order"), with the purchase price and schedule for the Services being adjusted accordingly by the Change Order.

b) If the Vendor's costs or ability to meet the schedule are impacted by any failure by Toronto Hydro to perform any of Toronto Hydro's obligations under the Agreement in the manner or within the time periods required by the Agreement, the Vendor may submit a request for a Change Order pursuant to this Section for a change in the purchase price, the schedule or both, to the extent the Vendor incurs any additional costs or is delayed on account of Toronto Hydro's failure.

c) Upon receipt of notice of a required change in the Services, the Vendor shall promptly, and in any event within five (5) Business Days of receiving such written request, provide Toronto Hydro with a written estimate of the additional costs for such change or the cost savings with respect to deleted portions of the Services, as well as the impact to the schedule. In each case the estimate shall show the hours and costs to the Vendor for labour, materials, and equipment overhead, along with the impact on delivery, all with adequate supporting documentation.

d) After receipt of an estimate of costs related to a Change Order from the Vendor, Toronto Hydro will determine what amendments to the Agreement, if any, may be reasonably required by such changes. Any change to the scope of work will be agreed to by the parties prior to implementation and evidenced in a written Change Order signed by both parties provided that Toronto Hydro may direct the Vendor to proceed with a change pending dispute resolution.

e) Extra or additional work performed by the Vendor without a prior Change Order from Toronto Hydro shall be at the Vendor's sole cost and expense and Toronto Hydro shall not be liable for any claim by the Vendor.

f) The Vendor shall not suspend the unaffected portions of the Services while Toronto Hydro is in the process of making such changes and any related adjustment unless so initiated by Toronto Hydro.

28. Suspension

Toronto Hydro may, at any time during the term by notice in writing, suspend all or a portion of the Services. Upon receipt of such written notice, the Vendor shall perform no further work other than as directed by Toronto Hydro, and shall be entitled to payment for time spent in performing the Services up to the date of suspension.

29. Toronto Hydro Not Responsible

Notwithstanding any other provision in this Agreement, Toronto Hydro shall not be responsible for and shall not have control or charge of any means, methods, techniques, sequences or procedures used for or in respect of the Services, or for the safety precautions or programs required for the Services or otherwise prescribed hereunder. Toronto Hydro shall not be responsible for or have control or charge over the acts or omissions of the Vendor, subcontractors (if any) or their agents, employees or other persons performing any of the Services.

30. Preparation of the Agreement

Notwithstanding the fact that this Agreement was drafted by Toronto Hydro and its legal and other profession advisors, the parties acknowledge and agree that any doubt or ambiguity in the meaning, application or enforceability of any term or provision of this Agreement will not be construed or interpreted against Toronto Hydro or in favour of the Vendor when interpreting such term or provision, by virtue of such fact.

31. Publicity

The Vendor shall not use Toronto Hydro's (or its Affiliates') name, corporate logos or trade-marks in advertising or publicity nor the fact that any agreement between the Vendor and Toronto Hydro has been entered into without Toronto Hydro's express prior written consent, which may be withheld in the sole discretion of Toronto Hydro.

32. No Minimum Volume

The Vendor acknowledges and agrees that: (i) no portion of the Agreement shall be interpreted as imposing any minimum volume purchase commitment on Toronto Hydro; (ii) the Agreement does not obligate Toronto Hydro to award the procurement of any or all services associated with the Agreement to the Vendor, and services may be added or deleted in Toronto Hydro's absolute and sole discretion at any time; and (iii) the volume of purchase of the Services may diminish or be eliminated prior to the termination date of the Agreement without any liability on the part of Toronto Hydro, including but not limited to any claims by the Vendor for loss of anticipated profits.

33. Non-Exclusive Contract

It is expressly understood that the Agreement is non-exclusive with respect to the Vendor and Toronto Hydro. Toronto Hydro may contract with others for the procurement of the Services described herein in its sole discretion.

34. Assignment

Save and except for Toronto Hydro's right to assign this Agreement to any of its Affiliates, neither party may assign this Agreement or any of its rights or obligations hereunder, in whole or in part, without the prior written consent of the other party, which consent may not be unreasonably withheld.

35. Relationship of the Parties

Nothing contained in this Agreement shall be construed to constitute either party as the partner, employee or agent of, or joint venturer with the other party, nor shall either party have any authority to bind the other in any respect, it being intended that each party shall remain an independent contractor of the other. The Vendor is responsible for all deductions and remittances required by law in relation to its employees, including those required for Canada unemployment insurance, workers' compensation and income tax.

36. Severability

In the event that any of the covenants herein shall be held unenforceable or declared invalid for any reason whatsoever, to the extent permitted by law, such unenforceability or invalidity shall not affect the

enforceability or validity of the remaining provisions of this Agreement and such unenforceable or invalid portion shall be severable from the remainder of this Agreement.

37. No Waiver

A waiver of any provisions of this Agreement shall not constitute either a waiver of any other provisions or a continuing waiver, unless otherwise expressly indicated in writing.

38. Enurement

This Agreement and everything contained herein shall enure to the benefit of, and be binding upon, the parties hereto and their respective successors and permitted assigns.

39. Notice

All notices, requests, claims, demands and other communications hereunder shall be in writing and shall be deemed (in the absence of evidence of prior receipt) to have been validly and effectively given on the same day if personally served, the next Business Day if sent by e-mail or similar means of recorded communication or on the fifth Business Day next following if sent by registered mail. Notices shall be addressed as follows:

to Toronto Hydro:

Name:	Hani Taki
Title:	Director, Standards and Technical Studies
Address:	500 Commissioners St.
Telephone:	416 542 7853
Email:	htaki@torontohydro.com

with copy to:

Title:	Executive Vice-President, Public & Regulatory Affairs and Chief Legal Officer
Address:	14 Carlton Street, Toronto, ON M5B 1K5
Telephone:	(416) 542-3000
Email:	legal@torontohydro.com

to the Vendor:

Name:	Arielle Kadoch, P.Eng
Title:	Principal, Sector Leader
Address:	1060 Robert-Bourassa Boulevard, Suite 600
Telephone:	(514) 781-4488
Email:	Arielle.Kadoch@stantec.com

40. Compliance with Supplier Quality Manual

The Vendor shall comply with the Supplier Quality Manual which has been attached to this Agreement as SCHEDULE D.

41. ISN Compliance

The Vendor shall subscribe with ISN Software Corporation as a registrant for ISNetworld, maintain such subscription throughout the Term, provide all records and information as required by ISN Software Corporation and Toronto Hydro to allow for the maintenance of such subscription and maintain a rating of B or higher on the ISNetworld system by [insert date] and during the remainder of the Term.

42. Governing Law

This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein. The parties irrevocably attorn to the jurisdiction of the courts of Ontario with respect to any matter arising under or related to this Agreement. Either party can terminate for cause without the obligation to engage in dispute resolution, mediation or arbitration.

43. Entire Agreement

a) This Agreement, including all schedules and appendices referred to herein and subsequent amendments, constitutes the entire agreement between the Vendor and Toronto Hydro relating to the subject matter hereof. This Agreement supersedes the terms of the RFP, the Proposal, any purchase order, and all prior correspondence, representations, warranties, covenants, collateral undertakings, discussions, negotiations, understandings or agreements, oral or otherwise, express or implied, unless otherwise provided in this Agreement.

b) No modification or amendment to this Agreement shall be binding on Toronto Hydro unless agreed to in writing.

44. Further Assurances

The Vendor agrees to execute such further assurances and documents, including any bills of sale, and to do all such things and actions which shall be necessary or proper for the carrying out of the purposes and intent of this Agreement.

45. Survival

In addition to the terms of this Agreement that by their nature survive the expiry or termination of this Agreement, the terms of Sections 9 (Representations, Warranties and Covenants), 15 (Liability and Indemnification), 21 (Intellectual Property Protection), 22 (Confidential Information), 36 (Severability), 38 (Enurement), 39 (Notice) and 42 (Governing Law) shall survive the expiry or termination of this Agreement for a period of five (5) years.

46. Execution and Counterparts

This Agreement may be executed in any number of counterparts (including by way of email) and all of such counterparts taken together shall be deemed to constitute one and the same instrument.

[*signature page follows*]

IN WITNESS WHEREOF, the parties have duly executed this Agreement as of the day and year first written above:

Stantec Consulting Ltd.

Per: 

Name: Arielle Kadoch, ing.

Title: Sector Leader Power Delivery Canada and International

I have authority to bind the Vendor.

Saisissez du texte ici

Toronto Hydro-Electric System Limited

Per: 

Name: Elias Lyberogiannis, P.Eng, MBA

Title: Executive Vice-President, Planning and Chief Engineering and Modernization Officer

I have authority to bind Toronto Hydro.

SCHEDULE A

Services Required

Introduction

Toronto Hydro requires the Vendor to provide the Services for various Toronto Hydro civil and electrical engineering projects. The Vendor shall have the resources and expertise available to execute a large volume of concurrent projects spread across various locations and range in a variety of scopes.

Continued assignments for the Services shall be based, at Toronto Hydro's discretion, on the quality of previous project work, timely submission of deliverables, and the ability of the Vendor to meet project expectations, as set out on a project-by-project basis.

Project Work Orders

Requests to perform the Services shall be assigned to the Vendor by Toronto Hydro in its sole discretion on a project by project basis through a project work order. The scope of work, staffing, and total price shall be determined prior to commencement of the Services on the project and set out in writing (the **"Project Work Order"** in the form provided at Appendix 1 to this Schedule).

Toronto Hydro may, in its sole discretion, terminate a Project Work Order by providing two (2) weeks' notice to the Vendor in writing, which notice shall specify the termination date of the Project Work Order. Upon termination of a Project Work Order, Toronto Hydro shall pay for such services requested and accepted by Toronto Hydro under the Project Work Order up until the effective date of such termination. Toronto Hydro shall not be liable to the Vendor for any other costs or damages whatsoever arising from such termination, including without limitation, any indirect, consequential or special damages such as loss of profit or loss of opportunity.

Services Required

1. Design, Development and Drafting of Construction Standards

a) Development of Construction Standards, including:

i. Electrical distribution system constructions standards development based on appropriate codes and regulations that govern a utility's practices, including, but not limited to, CAN/CSA C22.3 Overhead and Underground standards, Ontario Electrical Safety Code and Ontario Regulation 22/04, as applicable to:

- Overhead distribution systems
- Underground distribution systems
- Primary and secondary network systems
- Transformer and municipal stations
- Civil components of the standards
- Street Lighting
- Grounding
- Cable and conductors

- Switchgear

ii. Assessment of design and tool implications;
iii. Developing training documentation and provide technical training to Toronto Hydro staff and contractors;
iv. Instruction of engineering applications, as per field requirements; and
v. Approval of all standards by a Professional Engineer (P.Eng.), with Civil and Electrical disciplines required.

b) Drafting

i. Electrical equipment, civil equipment, and Construction Standards (both to scale or not to scale);
ii. Title blocks and cover page;
iii. Drafting to be completed in MicroStation; and
iv. Develop a quality assurance process to validate the outgoing quality of the completed work.

c) Design Consultation

i. Assess field requirements of system design and assess the applicability of components for fit and the provision of safe and reliable power;
ii. Identify different options and provide recommendations of the best designs;
iii. Research options for new requirements (code, regulatory, etc.) and applications;
iv. Assess safety, environmental, quality, and reliability impacts of design proposals;
v. Review and assess proposals and engineering drawings and provide recommendations;
vi. Ensure compliance with Standard Design Practices, Standard Practices, Conditions of Service and other internal policy documents;
vii. Review, revise and align Standard Design Practices, Standards Practices and other internal policy documents with industry best practices;
viii. Review design proposals from external parties and provide recommendations based on compliance to standards, design practices, codes and regulations and other internal processes/documents;
ix. Integrity evaluation/loading calculations and performing review and reporting on civil infrastructure such as vaults or pole lines over railway tracks;
x. Evaluation to ensure ample structural support when transporting equipment with flatbed or haulage company to worksite for overhaul or change out;
xi. Geotech Reporting for sensitivity areas;
xii. Excavation for areas with low water table to install or rebuild vaults and ducts; and
xiii. Preparing civil designs:

(a) where no underground infrastructure information is available for foreign utilities; and
(b) within private residential or commercial properties

d) Material Approval

i. Develop equipment and material requirements specifications for procurement purposes;

ii. Identification, technical assessments, verification of components, and how they are applied within the electrical distribution system while focusing on safety, productivity, quality, reliability, cost, and environmental impact;
iii. Review test reports and test results during the material approval process to ensure compliance; and
iv. Develop training documentation and provide technical training during new material introductions.

e) Quality Assurance

i. Perform statistical analysis of given data sets to generate trends, conclusions and recommendations;
ii. Perform root cause investigations of equipment failures and generate a technical report on subsequent analysis;
iii. Perform incoming source inspection of materials; and
iv. Perform inspections on equipment and construction installations against required specifications and Construction Standards.

Appendix 1 to Schedule A

Project Work Order

PROJECT WORK ORDER	
Retainer Date: (mm/dd/yyyy)	
Between (Firm name): ("Toronto Hydro") (the "Firm") and Toronto Hydro Electric-System Limited	
Title:	Reporting To:
Target Start Date: (mm/dd/yyyy)	Target Completion Date: (mm/dd/yyyy)
Description:	
Applicable Guidelines and/or Special Requirements: (By signing this Project Work Order, the Firm acknowledges having received a copy of the Guidelines and certifies it understands and agrees to the special requirements.)	
Ancillary Goods and Costs:	
This Project Work Order is subject to and governed by that certain Master Agreement for the Provision of Retained Staffing Services dated •, 2012 between Toronto Hydro and the Firm (the "Agreement"). Defined terms, usually denoted with initial capital letters, if not otherwise defined herein, shall have the respective meanings assigned thereto in the Agreement.	

SCHEDULE B

Purchase Price

Pricing for the supply of the Services shall be as according to one of the methods set out below, the method of compensation to be determined by Toronto Hydro in its sole discretion.

All pricing set out below shall be inclusive of the costs of equipment, materials, and required vehicles necessary for performing the Services. For clarity, the timing intervals used below shall have the following meanings:

1. Quarterly: 13 standard work-weeks, 40 hours per week;
2. Semi-annual: 26 standard work-weeks, 40 hours per week; and
3. Annual: 52 standard work-weeks, 40 hours per week.
4. Standard work week: 40 hours of work, excluding statutory and civic holidays in the Province of Ontario.

Price Schedule - Design, Development and Drafting of Construction Standards		
Name, if applicable	**Title/Role**	**Rate**
Jose Ribon	Account Manager and Team leader Distribution team	[redacted]
Dan Pentahtegoose	Overhead transmission and OH and underground distribution	
Justin Lefnesky	Overhead and underground distribution	
Andrew Rees	Overhead and underground distribution	
Sean Freihaut	Overhead and underground distribution	
	Drafting resources	
Tom Tisdale	Project Manager	
Roberto Falcon	Civil and Structural Engineer	
Vinson Fan	Structural Engineer	
Randy Wedge	Civil and Structural Engineer	
John Brisbois	Geotechnical	
Jeff Dietz	Geotechnical	
Katherine Guay	Electrical Engineer	
Abdi Bahrami	Electrical Engineer	
Amir Tashakori	Electrical Engineer	
Derek Van Gaal	Switchgear Expert and Power Systems Engineer	
Peter Dyck	Switchgear Expert and Power Systems Engineer	
Idlir Mero	Electrical Engineer	
Hassan Fayaz	Power systems Lead	
	* based on 37,5 hours weekly for the duration	

Price Escalation	
Term	**% Increase/Decease**
Year 2	[redacted]
Year 3	
Year 4	
Year 5	

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SCHEDULE C

Defined Terms

In this Agreement, the following definitions shall apply:

"Affiliates"	shall have the meaning as prescribed in the *Business Corporations Act* (Ontario);
"Agreement"	means this Agreement for Purchase of Services, including all Schedules and Appendices hereto and subsequent amendments;
"Applicable Laws"	means all federal, provincial and municipal statutes, regulations, codes, by-laws, orders in council, directives, rules, guidelines and ordinances applicable to this Agreement, including without limitation all applicable OEB codes, rules or guidelines;
"Business Day"	means a day on which banks are open for business in the City of Toronto, Ontario, but does not include a Saturday, Sunday, or a statutory holiday in the Province of Ontario;
"Change Order"	has the meaning prescribed to it in Section 27;
"Competent Persons"	shall have the meaning as prescribed in the OHSA;
"Confidential Information"	has the meaning prescribed to it in Section 22;
"DDP"	shall have the meaning prescribed to it in the Incoterms2010 rules published by the International Chamber of Commerce;
"Disclosing Party"	has the meaning prescribed to it in Section 22;
"EFT Information"	has the meaning prescribed to it in subsection 5(b);
"Force Majeure"	has the meaning prescribed to it in Section 20;
"Frustrated Party"	has the meaning prescribed to it in subsection 20(b);
"Governmental Authority"	means any government, legislature, municipality, regulatory authority, agency, commission, department, board or court or other law, regulation or rule-making public entity of similar authority, including, without limitation the OEB;
"Guidelines"	has the meaning prescribed to it in Section 14;
"HST"	means Harmonized Sales Tax;
"IESO"	means Independent Electricity System Operator;

"Initial Term"	has the meaning prescribed to it in subsection 4(a);
"MFIPPA"	means *Municipal Freedom of Information and Protection of Privacy Act* (Ontario) and the regulations thereunder, each, as amended;
"OEB"	means Ontario Energy Board;
"OHSA"	means *Occupational Health and Safety Act* (Ontario) and the regulations thereunder, each, as amended;
"Person"	means any individual, firm, corporation, unlimited liability company, partnership, limited liability partnership, joint venture, trust, unincorporated association, unincorporated syndicate, any governmental authority and any other legal or business entity;
"Project Work Order"	has the meaning prescribed to it in Schedule A and is in the form provided at Schedule E;
"Protected Employee"	means any individual who, during the course of their employment with Toronto Hydro, was directly or indirectly involved in: i. the procurement of the Services of the Vendor on behalf of Toronto Hydro; ii. the negotiation of the Vendor's Agreement on behalf of Toronto Hydro; and/or the awarding and/or approval of the Vendor's Agreement on behalf of Toronto Hydro;
"Quotation"	has the meaning prescribed to it in Recital D;
"Receiving Party"	has the meaning prescribed to it in Section 22;
"Renewal Term"	has the meaning prescribed to it in subsection 4(b);
"Representative"	in respect of a party, means such party's directors, officers, employees, agents and contractors, the party's Affiliates, and all such Affiliates' respective directors, officers, employees, agents and contractors;
"Required Resources"	has the meaning prescribed to it in subsection 11(a);
"RFQ"	has the meaning prescribed to it in Recital D;
"Services"	has the meaning prescribed to it in Recital A;
"Term"	has the meaning prescribed to it in subsection 4(c);
"Toronto Hydro"	has the meaning prescribed to in the preamble to this Agreement;
"Vendor"	has the meaning prescribed to in the preamble to this Agreement; and

"WSIA"	means *Workplace Safety and Insurance Act, 1997* (Ontario) and the regulations thereunder.

SCHEDULE D

Supplier Quality Manual

[*Please see attached*]



QSM-QA-74300 Supplier Quality Manual.pdf

Toronto Hydro-Electric System Limited
14 Carlton Street
Toronto, Ontario M5B 1K5

Toronto Hydro
Climate Change Vulnerability Assessment Update

Scope of Work

June 2022

1 Purpose

Toronto Hydro is seeking to update the climate parameters as described in the engineering analysis results in the 2015 Toronto Hydro-Electric System Limited Climate Change Vulnerability Assessment (the "2015 Study") (copy enclosed) with newly available global climate modelling (GCM) data.

1.1 Background

The 2015 Study evaluated Toronto Hydro's electrical distribution system utilizing Engineers Canada's Public Infrastructure Engineering Vulnerability Assessment Protocol (PIEVC). The 2015 Study identified infrastructure climate change vulnerabilities and suggested opportunities for adapting infrastructure to climate change impacts. It included:

- The use of a system level approach to assess the impacts of climate change on the TH's electrical distribution system.
- Climate parameters and the annual probability including high temperature, heavy rainfall, snowfall, freezing rain, lightning strike, etc.
- A risk-based framework to assess vulnerability of TH's electrical system to the climate parameters A mapping of risk ratings was completed as part of the existing study.
- High level adaptation options under the themes of engineering actions, management actions, monitoring activities and further study.

The 2015 Study was filed with the Ontario Energy Board as part of Toronto Hydro's 2020-2024 Rate Application.

1.2 Updated Global Climate Modelling Data

The climate parameters in the 2015 Study were prepared using GCM data obtained from the Intergovernmental Panel on Climate Change's 5th Assessment Report (IPPC AR5). Earlier this year, the IPPC released updated GCM data in the 6th Assessment Report (https://www.ipcc.ch/assessment-report/ar6/) (IPPC AR6).

The purpose of this new engagement is to assess whether the IPPC AR6 data materially impacts the probability assessment set out in the 2015 Study (which relied on IPPR AR5).

2 Scope of Work

The scope of this engagement is to assess the impact of the new IPPC AR6 data to the 2015 Study assessment:

A) Does the new GCM data (IPPC AR6) materially impact the probability assessment set out in the THESL Climate Change Vulnerability Assessment?

B) If yes, is any further action required to address those revised/updated climate parameters in addition to those described in the Engineering Analysis Results at page 43 of the 2015 Study? For example, if the IPPC AR6 data supports a new finding that the projected incidents of daily maximum temperatures of 35°C in 2030 and 2050 have doubled (now 6 days per year, 16 per year respectively), would that materially modify the recommendations in the 2015 Study related to the impact of high temperatures on transmission stations.[1]

2.1 Timeline

This engagement shall be completed in final form, by no later than September 30, 2022.

2.2 Meetings with Toronto Hydro

Regular meetings with Toronto Hydro staff should take place to update status of work and discuss any issues that may arise. Frequency of meetings is to be jointly agreed upon when the contract is awarded.

[1] See Appendix A for excerpt.

3 Appendix A – Excerpts from 2015 Study re impact of high temperatures on transmission stations

6.1 Municipal and Transmission Stations and Communications Systems

…

2. High temperature above 35°C / transmission stations

Further action recommended, conclusions for high temperature and power transformers also apply (see Chapter 7). Transmission station designers will need to take into account the significant increase in days with maximum temperatures above 35°C, which reduces station capacity while, on the other hand, experiences an increased load demand. At the moment, no load growth rate for the period of this study was estimated. The recommendations given in Chapter 7 for transmission stations and maximum temperature above 40°C / average temp above 30°C also apply to this interaction.[2]

…

[Chapter 7] 7.1 Vulnerabilities to a Changing Climate

…

High Ambient Temperatures – Station and Feeder Assets

High ambient temperatures create problems for the distribution system because of the compounding effect of high demand (e.g. for cooling) and high ambient temperature affecting equipment cooling and electrical transmission efficiency. Two specific climate parameters were of most significant concern, daily peak temperatures exceeding 40°C (excluding humidity) and daily average temperatures exceeding 30°C. In these cases, the climate analysis found that such extreme temperatures have occurred only rarely in the past, but are projected to occur on an almost semi-annual to annual basis by the 2030's and 2050's respectively. Through preliminary demand and supply growth projections completed for this study, these vulnerabilities were identified based on the notion that extreme heat will generate electrical demand for cooling in areas where station excess capacity is projected to be marginal. Furthermore, such temperature extremes may cause equipment, notably power transformers, to operate beyond their design specifications and increases the likelihood of failure. It is anticipated that vulnerability to high heat events will be concentrated in the Former Toronto area,

[2] 2015 Study at pg. 44.

although there are several horseshoe station service areas which would also be vulnerable.[3]

[3] 2015 Study at pg. 49.

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AMENDING AGREEMENT

THIS AMENDING AGREEMENT (the "Amending Agreement") is made effective as of June 1, 2023 (the "Effective Date") between **STANTEC CONSULTING LTD.** ("Vendor") and **TORONTO HYDRO-ELECTRIC SYSTEM LIMITED** ("Toronto Hydro") (collectively, the "Parties").

WHEREAS:

1. Toronto Hydro and the Vendor previously entered into an Agreement for Purchase of Services effective October 1, 2020 in connection with RFP #20P-0448 (the "Agreement"), pursuant to which the Vendor provides Toronto Hydro with various engineering services including the design, development, and drafting of construction standards; technical support for distributed energy resources connections and protection; systems planning and market analysis; program and project management services; data science and analytics; and enterprise asset management (EAM) for ERP (the "Services"); and

2. The Parties now wish to amend the Agreement by attaching the Ontario Energy Board's *Rules of Practice and Procedure* Rule 13A, and make associated amendments related to the Vendor's participation in Toronto Hydro's upcoming rate application, as provided herein.

NOW THEREFORE, THIS AMENDING AGREEMENT WITNESSES that in consideration of the mutual covenants contained herein and for other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Toronto Hydro and Vendor agree as follows:

1. Any capitalized terms used but not defined herein shall be as defined in the Agreement. The recitals above are agreed by the Parties to be true and deemed to form part of this Amending Agreement as if specifically restated herein.

2. Section 2 of the Agreement is amended by adding the following subsection (e) immediately following subsection 2(d):

   (e) SCHEDULE E - Ontario Energy Board *Rules of Practice and Procedure* Rule 13A

3. Section 13 of the Agreement is amended by adding the following subsection (c) immediately following subsection 13(b):

   (d) Without limiting the generality of subsection 13(a) above, the Vendor shall comply with Rule 13A Expert Evidence of the OEB's *Rules of Practice and Procedure*, attached as SCHEDULE E hereto, in the course of providing the Services and agrees to accept the responsibilities that are or may be imposed on them by that rule.

4. SCHEDULE A is amended by adding the following heading and contents immediately following the "Services Required" section:

   Participation in Toronto Hydro's Regulatory Application Process

   The Vendor shall be available to speak to the Services in a regulatory proceeding as required by Toronto Hydro and/or the Ontario Energy Board relating to Toronto Hydro's 2025 rate application.

   The degree of Vendor's participation shall be dependent on the degree of interest in the Services by OEB staff or any intervenors. Vendor's participation in such proceeding may entail, but is not

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limited to, preparation of expert report(s), responding to interrogatories and undertakings, provision of support prior to and during any hearings required by the OEB, and answers to any questions regarding the form, methodology, assumptions, and choices made in the provision of the Services, in either written or oral format (the latter in acting as a witness for Toronto Hydro).

The Vendor shall comply with the requirements and agrees to accept the responsibilities set out in Rule 13A of the OEB's *Rules of Practice and Procedure*, attached as SCHEDULE E to this Agreement, when providing any Services relating to Toronto Hydro's 2025 rate application.

5. The Parties agree to add a new SCHEDULE E to the Agreement, attached hereto as Appendix 1 to this Amending Agreement.

6. All other terms and conditions of the Agreement remain continuously in full force and effect, unamended, and shall be deemed to apply to this Amending Agreement.

7. This Amending Agreement, together with the Agreement, shall hereinafter constitute the entire agreement between the Parties with respect to the Services as further described in the Agreement, and supersedes any and all other agreements, understandings, discussions, negotiations, representations and correspondence which may have been made by or between the Parties respecting the same.

IN WITNESS WHEREOF the Parties hereto have executed this Amending Agreement as of the date first written above.

STANTEC CONSULTING LTD.

DocuSigned by:

Per: _____
2FF535D87FC140A...

Name:

Title:

I have the authority to bind the Vendor.

TORONTO HYDRO-ELECTRIC SYSTEM LIMITED

DocuSigned by:

Per: Elias Lyberogiannis _____
D6B8ED36A44E42F...

Name: Elias Lyberogiannis

Title: Executive Vice-President, Planning & Chief Engineering & Modernization Officer

I have authority to bind Toronto Hydro.

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APPENDIX 1

SCHEDULE E

Ontario Energy Board *Rules of Practice and Procedure* Rule 13A

13A. Expert Evidence

13A.01 A party may engage, and two or more parties may jointly engage, one or more experts to give evidence in a proceeding on issues that are relevant to the expert's area of expertise.

13A.02 An expert shall assist the OEB impartially by giving evidence that is fair and objective.

13A.03 An expert's evidence shall, at a minimum, include the following:

a. the expert's name, business name and address, and general area of expertise;
b. the expert's qualifications, including the expert's relevant educational and professional experience in respect of each issue in the proceeding to which the expert's evidence relates;
c. the instructions provided to the expert in relation to the proceeding and, where applicable, to each issue in the proceeding to which the expert's evidence relates;
d. the specific information upon which the expert's evidence is based, including a description of any factual assumptions made and research conducted, and a list of the documents relied on by the expert in preparing the evidence;
e. in the case of evidence that is provided in response to another expert's evidence, a summary of the points of agreement and disagreement with the other expert's evidence; and
f. an acknowledgement of the expert's duty to the OEB in **Form A** to these Rules, signed by the expert.

13A.04 In a proceeding where two or more parties have engaged experts, the OEB may require two or more of the experts to:

a. in advance of the hearing, confer with each other for the purposes of, among others, narrowing issues, identifying the points on which their views differ and are in agreement, and preparing a joint written statement to be admissible as evidence at the hearing; and
b. at the hearing, appear together as a concurrent expert panel for the purposes of, among others, answering questions from the OEB and others as permitted by the OEB, and providing comments on the views of another expert on the same panel.

13A.05 The activities referred to in **Rule 13A.04** shall be conducted in accordance with such directions as may be given by the OEB, including as to:

a. scope and timing;
b. the involvement of any expert engaged by the OEB;
c. the costs associated with the conduct of the activities;
d. the attendance or non-attendance of counsel for the parties, or of other persons, in respect of the activities referred to in paragraph (a) of Rule **13A.04**; and
e. any issues in relation to confidentiality.

13A.06 A party that engages an expert shall ensure that the expert is made aware of, and has agreed to accept, the responsibilities that are or may be imposed on the expert as set out in this **Rule 13A** and **Form A.**

Mercer

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www.mercer.ca

16 August 2022

PROJECT INITIATION FORM (PIF)

The objective of this Project Initiation Form (PIF) is to confirm the scope of our work and the compensation for this project. This terms and conditions of our existing agreement (Agreement of Purchase Compensation Consulting Services – dated 1, December 2016) apply.

Project Details

1. Client Name: **Toronto Hydro Electric System Limited ("THESL")**
2. Project name: **Total Remuneration Review (Non-Executive)**
3. Description of Mercer responsibilities: **Mercer will work with THESL to complete the following:**

Step 1: Project Planning, Information Gathering, and Management

- Conduct a project planning meeting (approximately 1 hour) to:
  - Confirm project scope, timeline, and deliverables
  - Discuss current programs, challenges, and objectives going forward
  - Discuss data requirements
  - Confirm the current compensation philosophy (if available)

[redacted]

Step 2: Benchmark and Peer Group Confirmation

[redacted]

[redacted]

Step 3: Benefits and Pension Relative Value Analysis

[redacted]

Step 4: Market Research and Analysis

[redacted]

[redacted]

Step 5: Report Development

[redacted]

Step 6: Presentation to Senior Management

- Be available to attend a senior management team meeting to discuss the reports (assumes one 1-hour meeting)

4. Description of client responsibilities: **Provide requested data and information and be available to answer questions**

5. Estimated period of time over which work will be performed: We can begin this work immediately and estimate completing the above scope of work within between August 2022 to January 2023, following approval of this PIF. **For accounting purposes, this project will remain active to March 31, 2023.**

6. Estimated fees ($CDN) [redacted]

Fee Assumptions

- Applicable taxes are in addition to the above fees
- Fee estimates from any one step may be transferred to another
- If the scope of the project changes significantly, we will discuss the change with you and revise our fee estimates accordingly
- Any required travel expenses will be charged at cost (no travel is expected)
- THESL is expected to provide complete, consolidated, and up-to-date data. Any data "cleaning" will result in additional fees

[redacted]

Mercer issues detailed monthly invoices. The terms of our engagement would be covered within our standard engagement letter.

Should additional support be required beyond the scoped above, Mercer fees will be based on our hourly rates ($CDN) outlined below:

Role	Hourly Rate
Partner	[redacted]
Principal	
Sr. Associate	
Analytical Support	
Administrative Support	

Conclusion

We appreciate your business and look forward to working with you on this assignment. Please acknowledge your agreement to the assignment terms by returning a signed copy of this PIF.

MERCER (CANADA) LIMITED

By: 

Name: Marvin Reyes Date: August 16, 2022

Title: Senior Principal

AGREED AND ACCEPTED

Toronto Hydro Electric System Limited

By:

Name: Shirley Powell Digitally signed by Shirley Powell DN: cn=Shirley Powell, email=spowell@torontohydro.com Date: 2022.08.25 12:00:57 -04'00' Date:

Title: Director, HR Systems and Rewards

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-12

Reference: Exhibit 1B, Tab 2, Schedule 1, p. 26

QUESTIONS (A) – (D):

With respect to the proposal to use a custom Toronto Hourly Salary and Wages Index:

a. Toronto Hydro notes that the "index can either be derived by the Conference Board of Canada ("CBC") economic data subscription service, or can be reproduced by purchasing relevant tax data from Statistics Canada". Is the Conference Board of Canada Toronto Hourly Salary and Wages Index based on the same relevant tax data from Statistics Canada that Toronto Hydro refers to, or would there be a difference in results based on the source of the information?

b. Please provide any documents from the Conference Board of Canada that details the methodology for its Toronto Hourly Salary and Wages Index.

c. The Toronto Hourly Salary and Wages Index appears to be an hourly wage index. Please provide a revised version of Table 4 that compares the proposed Conference Board of Canada Toronto Hourly Salary & Wages, with Statistics Canada Average Hourly Earnings (AHE) Ontario, and Toronto Hydro Average Blended Hourly Salary Increase.

d. Please provide a copy of any Conference Board of Canada forecast for Toronto and/or Ontario wage and salary information that is available to Toronto Hydro.

RESPONSE (A) – (D):

Please see response to 1B-Staff-93.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-13

References: Exhibit 1B, Tab 2, Schedule 1, Page 30

QUESTION:

Toronto Hydro states: "Any combination between the empirical efficiency-factor and the performance incentive that make-up the total X-factor should be capped at 0.75 percent in order to maintain balance between the utility risk and customer reward derived from the PIM." Please explain, in detail, the basis of the view that the specific number of 0.75 percent should be a cap.

RESPONSE:

The proactive component of the X factor is a voluntary contribution by Toronto Hydro reflecting an amount that it ordinarily would be able to recover in rates as a fair return, but which Toronto Hydro has put at risk with the opportunity to earn it back upon the achievement of certain results under the Plan. This reflects the fact that the utility stands behind its plan as being the minimum amount of investment necessary to address grid needs and deliver customer outcomes. However, in setting the performance factor it needs to be recognized that the voluntary contribution and the ability to earn back its fair return must be matched with a reasonable level of risk. Otherwise, the X-factor would be placing Toronto Hydro in a position where instead of being able to have an opportunity to earn a fair return, it actually forfeits that right. This does not yield just and reasonable rates, nor does it create suitable performance incentives.

Any level of the X-factor is a reduction of revenue that the utility must fund in order to achieve its Plan and provide customer benefits. The X-factor cannot be so large that it either is inconsistent with the results of total cost benchmarking or transfers risk to such a degree that Toronto Hydro cannot fund the activities necessary to deliver the plan and its objectives and outcomes. Toronto Hydro believes that a X-factor greater than 0.75 – which is already 0.15% larger than the OEB-approved X-factor for Price Cap IR – would reflect an inordinate transfer of risk, and would not be in the best

interest of customers because it would mean that the plan and its outcomes are less likely to be achieved.

A 0.75% X-factor reflects a cap that should not be increased as it would: (i) distort a reasonble balance of risk/benefit between the utility and customers as illustrated in the scenarios below; (ii) put at risk Toronto Hydro's ability to deliver a plan which is necessary to address both foundational and emerging outcomes that being a distributor requires and customers value; and (iii) place an unacceptable level of financial risk on the utility that effectively preclude it from having a reasonable opportunity (*not guarantee*) to earn the allowed rate of return.

As shown in the response to 1B-Staff-3(b) the proposed Custom Revenue Cap Index (CRCI) reduces the revenue that the utility can collect (relative to the revenue it requires to fund the 2025-2029 Investment Plan) by approximately $81.5 million over the rate term, through the application of the 0.75% X-factor as part of the CRCI.

By constraining the utility's revenues relative to its true costs, the X-factor creates a significant upfront rate reduction benefit for customers, in addition to the benefits associated with achievement of the PIM targets as detailed in Exhibit 1B, Tab 3, Schedule 1. Table 1 below summarizes the risk that X-factor places on the utility compared to the benefits it provides to customers.

Utility Risk (Revenue Deficiency)	Utility Reward (PIM)	Net Utility Risk/Reward	Minimum Customer Benefits	Customer Cost (PIM)	Net Customer Cost/Benefit
($81.5M)	$65.1M	($16.4M)	$90.3M	($65.1M)	$25.2M

In Table 1 above, the utility risk is the $81.5 million revenue deficiency imposed by the CRCI, and the utility reward represents the proposed $65.1 million PIM incentive. The utility net risk/reward is the difference between the two previous items, which is the unmitigated revenue risk imposed by empirical efficiency factor (0.15%) to find continuous improvement in efficiency and productivity.

The customer benefits represent the direct minimum benefits associated with the achievement of the PIM targets over the 2025-2029 rate period as outlined in the evidence in Exhibit 1B, Tab 3, Schedule 1 at pages 57-58. The customer cost is the PIM incentive to be paid by customers if the utility achieves the targets. The net customer cost benefit is the difference between these items. The analysis above, shows that through the X-factor, the CRCI provides customers a net benefit of $25.2 million and places a net risk of $16.4 million on the utility. Toronto Hydro considers this to be a balanced outcome between the utility and its customers with a net favorable impact for customers. In addition to striking this balance, the 0.75% X-factor imposes a financial risk on the utility that is within an acceptable range, and that provides the utility a reasonable opportunity (*not guarantee*) to earn the allowed regulated rate of return. The table below shows the annual ROE risk imposed by the CRCI through the X-factor.

2025-2029 Financial Performance (ROE) under the proposed CRCI

	2025	2026	2027	2028	2029
CRCI Revenue Deficiency	n/a	7.3	14.9	22.9	31.5
ROE Impact (basis points)	n/a	27	55	85	117

Toronto Hydro's believes that the 0.75% X-factor reflects a cap that should not be increased for the reasons discussed above. For illustrative purposes, please see the hypothetical scenarios below where a higher X-factor imposes an additional $10M revenue deficiency on the utility.

Balanace of Risk and Benefits between the Utility and Customers – Scenarios

Scenario A – higher PIM

	A	B	C	D	E	F
	Utility Risk (Revenue Deficiency)	Utility Reward (PIM)	Net Utility Risk/Reward	Minimum Customer Benefits	Customer Cost (PIM)	Net Customer Cost/Benefit
Base	**($81.5M)**	**$65.1M**	**($16.4M)**	**$90.3M**	**($65.1M)**	**$25.2M**
1	**($91.5M)**	**$75.1M**	**($16.4M)**	**$90.3M**	**($75.1M)**	**$15.2M**

In Scenario 1, the balance is distorted relative to the base case, because the spread between utility net risk (column C) and customer net benefits (column F) gets narrower to the detriment of customers (i.e. net customer benefit decreases by $10M relative to the base case).

Scenario B – higher Efficiency-Factor

	A	B	C	D	E	F
	Utility Risk (Revenue Deficiency)	Utility Reward (PIM)	Net Utility Risk/Reward	Minimum Customer Benefits	Customer Cost (PIM)	Net Customer Cost/Benefit
Base	**($81.5M)**	**$65.1M**	**($16.4M)**	**$90.3M**	**($65.1M)**	**$25.2M**
2	**($91.5M)**	**$65.1M**	**($26.4M)**	**$100.3M**	**($65.1M)**	**$35.2M**

In Scenario 2, where the efficiency factor is higher, the balance is distorted relative to the base case, because the spread between utility net risk (C) and customer net benefits (F) gets wider to the detriment of the utility. In this scenario, Toronto Hydro assumes that the revenue reduction imposed on the utility through a higher efficiency-factor would depart from total cost benchmarking that *appropriately* takes into consideration the unique and distinct asset needs and operational challenges of serving Canada's largest and one of North America's fastest growing city. In that case, the level of financial risk placed on the utility becomes unacceptable. The is because efficiency expectations that are not supported by empirical evidence are unachievable, and thus preclude the utility from having a reasonable opportunity (*not guarantee*) to earn the allowed rate of return.

Scenario C – both factors are higher (i.e. allocate $10M additional risk equally to each factor)

	A	B	C	D	E	F
	Utility Risk (Revenue Deficiency)	Utility Reward (PIM)	Net Utility Risk/Reward	Minimum Customer Benefits	Customer Cost (PIM)	Net Customer Cost/Benefit
Base	**($81.5M)**	**$65.1M**	**($16.4M)**	**$90.3M**	**($65.1M)**	**$25.2M**
3	**($91.5M)**	**$70.1M**	**($21.4M)**	**$95.3M**	**($70.1M)**	**$25.2M**

In Scenario 3, where both the PIM and the efficiency factor are increased, the balance is also distorted because additional revenue risk is placed on the utility without any corresponding net benefit to customers (i.e. column F comparison).

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-14

Reference: Exhibit 1B, Tab 2, Schedule 1, p. 32

QUESTION:

Toronto Hydro proposes that the PIM-DA be "brought forward for review and disposition in the utility's next rebasing application, based on known (or forecasted) performance results for the 2025-2029 rate period." As that application will be filed and considered before the end of the rate term, for performance targets that have not been achieved (or can properly be assessed at that time), when does Toronto Hydro propose for them to be reviewed and relevant PIM-DA balances to be recovered from customers?

RESPONSE:

Toronto Hydro envisions that by the final year of the 2025-2029 rate period, the utility can either confirm that the target was achieved, or can forecast with confidence that the target will be achieved. This forecast can either be provided at the pre-filed evidence stage or during the bridge year update process that typically occurs during the discovery phase. In the event that a target is forecasted to be achieved, but is not in fact achieved at year-end 2029, the utility would withdraw its request to recover the associated balances in the PIM-DA at the Draft Rate Order stage which normally occurs in the first quarter of the new rate period (i.e. Q1 of 2030).

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-15

Reference: Exhibit 1B, Tab 2, Schedule 1, Page 36

With respect to the proposed Demand-Related Variance Account - Expenditure Variance sub-account:

QUESTION (A):

a) Please provide a table that shows for each year of the rate term (2025-2029),
   i. the total proposed revenue requirement,
   ii. the total proposed revenue requirement that would be subject to the proposed sub-account,
   iii. total in-service additions,
   iv. total in-service additions subject to the proposed sub-account,
   v. total OM&A costs, and
   vi. total OM&A costs subject to the proposed account.

RESPONSE (A):

The Total Revenue Requirement presented below is based on pre-filed evidence (November 17, 2023) whereas the DRVA revenue requirement below is based on an estimate of the updated 2025-2029 Total Revenue Requirement, which includes impact from: (i) the 2023 actuals and updated 2024 forecast (presented in 2A-Staff-104), and (ii) the January 29, 2024 evidence update. The final PILS models for the updated 2025-2029 total Revenue Requirement (Exhibit 6) are not yet available because it was not possible to complete this work within the timelines for responding to interrogatories. This information will be provided in advance of the Technical Conference as indicated in 1A-Staff-01 and noted in the Application Evidence Update cover letter.[1]

[1] EB-2023-0195, Evidence Update Letter (January 29,2024)

With respect to parts (i) and (ii), Table 1 shows total revenue requirement and total revenue requirement subject to the proposed sub-account.

Table 1: 2025-29 Revenue Requirement ($ Millions)

	2025	2026	2027	2028	2029
Total Revenue Requirement (i)	972.4	1,027.0	1,074.4	1,175.7	1,219.2
DRVA Revenue Requirement (ii)	22.0	34.8	48.5	64.1	77.1
DRVA % of Total Revenue Requirement	2.26%	3.39%	4.51%	5.45%	6.32%

With respect to parts (iii) and (iv), Table 2 show total In-Service Additions and total in-service additions subject to the proposed sub-account.

Table 2: 2025-29 In-Service Additions ($ Millions)

	2025	2026	2027	2028	2029
Total In-Service Additions (iii)	653.8	699.9	795.1	770.1	860.1
DRVA In-Service Additions (iv)	144.0	167.1	158.5	157.8	198.6
DRVA % of Total In-Service Additions	22.03%	23.87%	19.93%	20.49%	23.09%

With respect to (v) and (vi) of this question, Table 3 shows total OM&A costs, and total OM&A costs subject to the proposed sub-account.

Table 3: 2025-29 OM&A ($ Millions)

	2025	2026	2027	2028	2029
Total OM&A (v)	343.0	358.0	370.2	385.5	399.6
DRVA OM&A (vi)	4.9	5.7	6.3	7.0	7.6
DRVA % of Total OM&A	1.43%	1.59%	1.70%	1.82%	1.90%

QUESTION (B):

b) Please provide a table that for each year between 2016 and 2024 shows,

i. the approved revenue requirement,

ii. the total approved revenue requirement that was subject to a similar symmetrical variance account treatment as the proposed sub-account,
iii. total approved in-service additions,
iv. total approved in-service additions that was subject to a similar symmetrical variance account treatment as the proposed sub-account,
v. total approved OM&A costs, and
vi. total approved OM&A costs that was subject to a similar symmetrical variance account treatment as the proposed sub-account.

RESPONSE (B):

With respect to subparts (i) and (ii) of this question, Table 4 shows 2016-2024 total approved revenue requirement and total approved revenue requirement that was subject to similar symmetrical variance account treatment – i.e. Externally Driven Capital (2016-2024) and Derecognition (2015-2019).

Table 4: 2016-2024 Revenue Requirement ($ Millions)

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Total Revenue Requirement (i)	659.2	709.0	749.7	781.5	750.2	786.2	799.4	852.2	892.9
Revenue Requirement subject to Symmetrical Treatment (ii)	33.1	33.3	33.4	35.7	1.6	3.7	4.2	4.3	4.5
Similar Symmetrical Variance Treatment % of Total Revenue Requirement	5.02%	4.70%	4.46%	4.57%	0.21%	0.47%	0.53%	0.50%	0.50%

With respect to subparts (iii) and (iv) of this question, Table 5 shows total in-service additions ("ISA") and total approved in-service additions that were subject to similar symmetrical variance account treatment as proposed by the sub-account.

Table 5: In-Service Additions ($ Millions)

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Total ISA (iii)	621.1	459.5	397.7	477.2	527.4	456.2	565.1	565.8	559.1

	2016	2017	2018	2019	2020	2021	2022	2023	2024
ISA Subject to Symmetrical Variance Treatment (iv)	4.0	4.0	4.0	4.0	11.4	20.8	4.6	4.7	4.5
Similar Symmetrical Variance Treatment % of Total ISA	0.64%	0.87%	1.01%	0.84%	2.16%	4.56%	0.81%	0.83%	0.80%

With respect to subparts (v) and (vi) of this question, Table 6 shows total OEB-approved OM&A cost for 2020, the USoA 4380 adjustment,[2] and the reclassified Total OEB-Approved OM&A for 2020. To determine the approved-OM&A over the period, Toronto Hydro escalated the 2020 Test Year by the OEB inflation factor (I) and the approved 0.6% X factor for the current rate period.

For 2023-24, OM&A costs subject to similar symmetrical variance account treatment reflects costs that are eligible for variance treatment under the *Getting Ontario Connected Act* Variance Account (see 4-Staff-296 for more information).

Table 6: OM&A Costs Subject Symmetrical Variance Treatment ($ Millions)

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Total Approved OM&A	247.6	250.8	252.3	254.6	272.2	276.6	284.0	292.8	305.1
USoA 4380 adjustment	(3.5)	(3.5)	(3.5)	(3.5)	(5.5)	(5.6)	(5.7)	(5.9)	(6.2)
Reclassified Total Approved OM&A (v)	244.1	247.3	248.8	251.1	266.7	271.0	278.3	286.9	298.9
OM&A Subject to Symmetrical Variance Treatment (vi)	-	-	-	-	-	-	-	4.8[3]	5.0

In addition to the OM&A costs subject to symmetrical variance treatment listed above, Toronto Hydro also notes that distributors (including Custom IR filers) are eligible to apply for deferral accounts for (1) cloud-related implementation costs,[4] and (2) operations, maintenance, and

[2] See 1B-SEC-8 for more information about the shared services reclassification.
[3] Please see the response to interrogatory 4-Staff-296 related to locates.
[4] Ontario Energy Board, *Accounting Order (003-2023) for the Establishment of a Deferral Account to Record Incremental Cloud Computing Arrangement Implementation Costs* (November 2, 2023)

administration (OM&A) costs related to DER integration and use, pending their rebasing applications.[5]

QUESTION (C):

c) Please explain how Toronto Hydro plans to incorporate any approved X-Factor into the calculation of any sub-account balance.

RESPONSE (C):

Toronto Hydro proposes to set the base amount against which actuals are tracked based on the revenue requirement (i.e., before the application of the X-factor) and to track symmetrical variances against this amount. This approach ensures that the X-Factor (which places earnings risk on the utility that can only be mitigated through productivity and performance achievements) cannot be mitigated (i.e. earned-back) through recoveries under the variance account.

QUESTION (D):

d) Toronto Hydro lists the programs for which both capital and operations variances from actuals will be recorded in the Expenditure Variance Sub-Account: Customer Connections, Customer Operations, Stations Expansion, Load Demand, Non-Wires Solutions, Generation Protection Monitoring and Control and Externally-Initiated Plant Relocations and Expansions. Only one of the Programs listed above is a specific OM&A Program (Ex. 4-2-8) however other listed programs impact a wide number of OM&A Programs, e.g. Non-Wires Solutions affects Asset and Program Management and Control Centre Operations. For each of the OM&A Programs and segments in which the cost variance will be included in the sub-account, please provide information on the forecasted costs for 2025-2029.

[5] Ontario Energy Board, *Framework for Energy Innovation: Setting a Path Forward for DER Integration (January 2023)* at page 4

RESPONSE (D):

Table 6 below shows the OM&A segments for which cost variance would have been included in the DRVA expenditure sub-account. Although the Control Center program will support the delivery of the Flexibility Services segment, Toronto Hydro has not proposed variance account treatment for the Control Center program because the costs in this program are driven by many factors other than demand.

Table 6: OM&A Costs Subject to the Proposed DRVA Expenditure Sub-Account ($ Millions)

Program	Segment	2025	2026	2027	2028	2029
Customer Operations (Exhibit 4, Tab 2, Schedule 8)	Customer Connections	3.2	3.3	3.5	3.6	3.8
	Key Accounts	1.5	1.5	1.7	1.8	1.9
Asset & Program Management (Exhibit 4, Tab 2, Schedule 9)	Flexibility Services (see the Non-Wires Solutions program in Exhibit 2B, E7.2)	0.2	0.9	1.1	1.6	1.9
Total		**4.9**	**5.7**	**6.3**	**7.0**	**7.6**

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-16

Reference: Exhibit 1B-2-1, Page.46

QUESTION (A-C):

With respect to the proposed Demand-Related Variance Account - Revenue Variance sub-account:

a. Please provide a table that shows for each year of the rate term (2025-2029), a) total forecast revenue, and b) total forecast revenue subject to the proposed sub-account.
b. Please provide a table that shows for each year of the rate term (2016-2024), a) total approved revenue, and b) total approved revenue subject to a similar symmetrical variance account treatment as the proposed sub-account.
c. Please provide a table that shows for each year of the rate term (2016-2024), a) total revenue, and b) total weather normalized revenue.

RESPONSE (A-C):

Table 1 below provides the information requested in part (a). Since the 2025-2029 load forecast in Exhibit 3 is weather-normalized, the total forecasted revenue in the application is subject to the proposed sub-account, as summarized in the table 1 below.

Table 1

2025	2026	2027	2028	2029
$972 M	$1,020 M	$1,059 M	$1,151 M	$1,185 M

Historically, there were no revenues subject to similar symmetrical variance account treatment as the proposed sub-account. Table 2 below provides the 2016-2023 total revenue before and after weather normalization, and the weather normalized revenue for 2024 forecasted in Exhibit 3.

Table 2

Year	Actual Revenues ($M)	Weather-normalized Actual Revenues ($M)	Board-Approved Revenues ($M)	Variance ($M)
2016*	$657.7	$651.5	$659.2	-$7.7
2017	$692.0	$694.8	$709.0	-$14.2
2018	$746.1	$737.4	$749.7	-$12.3
2019	$763.1	$761.0	$781.6	-$20.0
2020*	$721.6	$720.9	$750.2	-$29.3
2021	$756.1	$756.8	$786.2	-$29.4
2022	$782.5	$780.7	$799.4	-$18.7
2023	$834.4	$839.5	$852.2	-$12.6

**The revenues for 2016 and 2020 have been normalized due to delay in the approval of rates for respective years.*

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-17

Reference: Exhibit 1B, Tab 2, Schedule 1, Page 48

In addition to the revenue requirement and DVA accounts that may be approved in this application, please detail all other distribution ratepayer funding mechanisms Toronto Hydro believes would be available to it during the rate term.

RESPONSE:

Toronto Hydro would continue to have access to the Z-factor mechanism in accordance with the OEB's standard criteria, as well as any generic DVA accounts that distributors may be granted, or have the opportunity to apply for, under applicable existing or future OEB policy instruments.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-18

Reference: Exhibit 1B, Tab 2, Schedule 1, Appendix A

QUESTION (A):

With respect to Scott Madden, Review of Rate Framework Report:

a) [p. 4-5] The Report provides examples of jurisdictions that have approved Attrition Relief Mechanisms, Alternative Cost Recovery Mechanism, Performance Incentive Mechanisms, and separate funding for innovation projects. For each of the jurisdictions referred to, please provide a summary of all the components of their respective rate and regulatory framework and how each compare to what is being proposed by Toronto Hydro.

RESPONSE (A) - PREPARED BY SCOTTMADDEN:

Please refer to the response to 1B-SEC-19.

QUESTION (B):

b) [p.14] Please provide more details on the difference between building blocks vs the stair-step approach.

RESPONSE (B) - PREPARED BY SCOTTMADDEN:

The stair-step approach sets rates annually based on pre-determined rate levels. By comparison, the building blocks approach sets rates annually based on pre-determined formula that reflects forecasted capital, OM&A expenditures, and adjustments to account for performance incentives, tax impacts, inflation, and other supplementary funding mechanisms.

QUESTION (C):

c) [p.14-15] Is the trend in distribution rate framework towards building block rate mechanisms, the stair-step approach, or forms of incentive regulation? Please discuss your answer.

RESPONSE (C) - PREPARED BY SCOTTMADDEN:

ScottMadden did not evaluate trends in distribution rate frameworks. ScottMadden evaluated Toronto Hydro's proposed custom IR plan for its relative consistency with other electric utility ratemaking frameworks and practices that support a clean energy transition. Please refer to the response to 1B-EP-23, part (a).

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-19

Reference: Exhibit 1B, Tab2, Schedule 1, Appendix B

Preamble:

With respect to Scott Madden, Jurisdictional Review of Modernized Performance-Based Regulation Report:

QUESTION (A):

a) [p. 20-41] The Report provides examples of jurisdictions that have approved Modified Attrition Relief Mechanisms, Alternative Cost Recovery Mechanism, Performance Incentives, and separate funding for innovative/demonstration projects. For each of the jurisdictions referred to in the Report, please provide a summary of all the components of the respective rate and regulatory framework and how each compare to what is being proposed by Toronto Hydro.

RESPONSE (A) - PREPARED BY SCOTTMADDEN:

Please refer to the table below.

Utility (Jurisdiction)	Framework Overview
ATCO Electric (Alberta)	**ARM:** Formulaic approach linked to average historical capex; indexed O&M **Cost Recovery**: Capital trackers for costs related to extraordinary events or net-zero laws **PIM:** None **Innovation Funding:** None
SDG&E (CA)	**ARM:** Uses utility-specific cost index for O&M rather than general inflation; capital investments based on an escalated seven-year historic and forecast average of capital additions **Cost Recovery**: Various two-way balancing accounts and riders, such as AMI balancing account **PIM:** IDER Pilot **Innovation Funding:** Rate Rider (Public Purpose Programs)

Utility (Jurisdiction)	Framework Overview
PG&E (CA)	**ARM:** Uses utility-specific cost index for O&M rather than general inflation; most capital costs escalated using utility specific cost index ; certain capital costs (that are "unique and not appropriately projected with any available index mechanism") forecasted in post-test years **Cost Recovery**: Various two-way balancing accounts and riders **PIM:** IDER Pilot **Innovation Funding:** Rate Rider (Public Purpose Programs)
Hawaiian Electric (HI)	**ARM:** Annual revenues adjusted using indexed formula **Cost Recovery**: EPRM and various riders **PIM:** 3 reward only performance incentives; 2 symmetrical performance incentives **Innovation Funding:** "Pilot Process" recovers innovative pilot costs through annual target revenues
Ameren (IL)	**ARM:** To be determined (MYRP rate case decision pending) **Cost Recovery**: To be determined (MYRP rate case decision pending) **PIM:** 8 symmetrical performance incentives **Innovation Funding:** "Pilot Process" recovers innovative pilot costs through annual target revenues
Central Maine Power (ME)	**ARM:** Forecast O&M and capital **Cost Recovery**: No alternative cost recovery mechanisms **PIM:** 6 penalty-only service quality metrics **Innovation Funding:** None
Eversource (MA)	**ARM:** O&M adjusted annually by I-X ; K-bar for supplement capital funding based on average historical capex **Cost Recovery**: 10% variance allowed for forecasted capital budget; Forecast excludes certain capital projects, such as solar investments, meter-related capital, and grid mod, eligible for recovery through other rate mechanisms outside of base rates **PIM:** 7 penalty-only service quality metrics; reward-only energy efficiency metric **Innovation Funding:** None
Xcel (MN)	**ARM:** Forecast O&M and capital **Cost Recovery**: Various riders/trackers to recover various pass-through costs, related to energy efficiency, services for specific customer classes, and environmental improvement, among other areas. **PIM:** None (tracking-only metrics) **Innovation Funding:** None
PSE&G (NJ)	**ARM:** N/A – no MYRP **Cost Recovery**: Multiple trackers, including Energy Strong **PIM:** None **Innovation Funding:** None

Utility (Jurisdiction)	Framework Overview
Con Edison (NY)	**ARM:** Forecast O&M and capital (used in settlements) **Cost Recovery**: Multiple riders, such as the Systems Beneift Charge **PIM:** 7 reward-only incentives (based on 2020 rate case) **Innovation Funding:** Rate Rider for REV demonstration projects
National Grid (NY)	**ARM:** Forecast O&M and capital (used in settlements) **Cost Recovery**: Multiple riders, such as the Systems Beneift Charge **PIM:** 9 reward-only incentives **Innovation Funding:** Rate Rider for REV demonstration projects
Duke Energy (NC)	**ARM:** Commission-authorized "step-ups" in revenue requirements for incremental capital spending projects and associated O&M for each year of the MYRP **Cost Recovery**: Multiple riders, such as the Systems Beneift Charge **PIM:** 1 penalty-only metric; 2 reward-only metric **Innovation Funding:** Rate Rider for REV demonstration projects
Nova Scotia Power (NS)	**ARM:** Forecast O&M and capital **Cost Recovery**: Various riders **PIM:** None **Innovation Funding:** Rate Rider
AEP (OH)	**ARM:** N/A – no MYRP **Cost Recovery**: Various riders, such as the Enhanced Service Reliability Rider **PIM:** None **Innovation Funding:** None
PECO (PA)	**ARM:** N/A – no MYRP **Cost Recovery**: Various riders, such as the Distribution System Improvement Charge **PIM:** None **Innovation Funding:** None
Rhode Island Energy (RI)	**ARM:** Forecast O&M and capital **Cost Recovery**: Various adjustment provisions, such as the Infrastructure, Safety, and Reliability Provision **PIM:** 4 service quality penalty-only metrics; 1 demand reduction reward-only metric **Innovation Funding:** None
UK RIIO	**ARM:** Forecast O&M and capital (building blocks method) **Cost Recovery**: Uncertainty mechanisms **PIM:** 10 symmetrical performance incentives **Innovation Funding:** Multiple funding mechanisms, including the Strategic Innovation Fund and the Network Innovation Allowance

Utility (Jurisdiction)	Framework Overview
Green Mountain Power (VT)	**ARM:** Hybrid ARM approach with forecasted CAPEX capped over the plan period and OPEX treated in one of three ways: forecasted and capped, capped and tied to an external inflation index, or reforecast annually **Cost Recovery**: Various riders **PIM:** None (tracking-only metrics) **Innovation Funding:** Recovers innovative pilot costs through annual target revenues

The table shows Toronto Hydro's proposed Custom IR Framework is comparable with the other electric utility ratemaking frameworks and practices referenced in the report, as summarized in Exhibit 1B, Tab 2, Schedule 1, pp. 5-8, Appendix B.

QUESTION (B):

b) Please identify which jurisdictions are the referenced regulatory mechanism/approach applied to vertically integrated utilities vs. distribution only utilities.

RESPONSE (B) - PREPARED BY SCOTTMADDEN:

Utilities in Alberta, UK, Illinois, Maine, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, and Rhode Island are distribution-only.

Utilities in Nova Scotia, California, Hawaii, Minnesota, North Carolina, and Vermont are vertically integrated.

QUESTION (C):

c) [p.40-41] For jurisdictions that have separate funding mechanisms for innovation projects, please provide information regarding the parameters and any conditions related to the projects and funding. Please provide a comparison with what Toronto Hydro has proposed in its application.

RESPONSE (C) - PREPARED BY SCOTTMADDEN:

Please see the response to 1B-PP-19 (b). Toronto Hydro's proposed Innovation Fund is similar to the other electric utilities referenced in the report, including program objectives, characteristics, and funding mechanisms.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-20

Reference: Exhibit 1B, Tab 3, Schedule 1, Pages 6-68

With respect to the proposed 2025-2029 Performance Incentives Scorecard Measures:

QUESTION (A):

a) Please detail all Performance Incentive Measures that Toronto Hydro considered, but ultimately rejected.

RESPONSE (A):

The consideration of measures not put forward as part of the proposed scorecard is not relevant to the assessment and approval of the measures forming part of the proposed scorecard. It reflects considerations that are draft in nature, and which provide no probative value to assessing the merits of the actual measures proposed in this application.

QUESTION (B)

b) Please explain the basis for the relative weights for each measure.

RESPONSE (B):

Toronto Hydro applied a balanced scorecard approach to determine the relative weight for each measure on the Custom Scorecard. This approach entailed two steps: (1) an assessment of the weight to be attributed to each area of performance, and (2) a determination of the weight for each measure within that area of performance based on a consideration of value to customers.

In the first step, the utility was guided by the customer needs and priorities ascertained through the Phase 1 engagement study:

- **Price and reliability are the top customer priorities**: Relative to price, reliability has become increasingly important to residential customers. When it comes to reliability, customers prioritize reducing the length of outages.
- **New Technology**: Almost as equally important to price and reliability, customers expect the utility to invest in new technologies that will reduce costs and make the system better, even if the benefits aren't immediate, as long as the costs and benefits are clear.
- **System Capacity**: Customers expect Toronto Hydro to invest proactively in system capacity to ensure that high growth areas do not experience a decrease in service levels.

With these key considerations in mind, Toronto Hydro attributed:

- 30% weight to Reliability and Resilience;
- 30% weight to Efficiency and Financial Performance,
- 20% weight to Customer Service & Experience,
- 20% weight to Environment Safety and Governance.

In step 2, once the performance measures were finalized, Toronto Hydro's subject matter experts worked cross-functionally to allocate weight to each measure, applying their judgement and expertise to determine a leading measure for each category and to place the greatest weights on the measures that (i) best align customer and utility priorities, and (ii) provide high value to customers as quantified by the Benefits Analysis in section 3 of the evidence (Exhibit 1B, Tab 3, Schedule 1 starting on page 56) and summarized at Table 21. For example, within the Reliability and Resilience category Toronto Hydro placed greater weight on Outage Duration (SAIDI) over Outage Frequency (SAIFI) because when it comes to reliability, customers prioritize reducing the length of outages over the total number of outages. In the Efficiency and Financial Performance category, Toronto Hydro prioritized Efficiency Achievements to recognize the importance of cost-effectiveness in (i) providing value for money to customers, and (ii) achieving the utility's financial performance objectives with respect to being able to earn the allowed rate of return.

QUESTION (C):

c) If the application is approved as filed, does Toronto Hydro expect to achieve each Performance Incentive Measure?

RESPONSE (C):

Yes.

QUESTION (D) :

d) [p.16] Please explain why a 2 standard deviation range is an appropriate target for SAIFI defective requirements measure.

RESPONSE (D):

Standard deviation measures the amount of variation or dispersion in SAIFI Defective Equipment historical values and quantifies how much the metric's performance varies from the average. Two standard deviations encompass approximately 95% of the data points. This means that setting SAIFI Defective Equipment PIM within this range can account for the variability of outcomes expected based on the past performance, making the target realistic and achievable in the face of typical volatility. The target range set too close to the average might be unachievable/demotivating due to inherent volatility leading to the performance being outside of the range despite the utility's efforts. A target of two standard deviations strikes a balance, challenging the organization to be proactive in managing SAIFI Defective Equipment while still being within a statistically reasonable range of outcomes.

See response to 2B-SEC-42 for a detailed explanation of Toronto Hydro reliability projection methodology.

QUESTION (E):

e) [p.37] Please explain in detail Toronto Hydro's methodology for calculating its scope 1 emissions.

RESPONSE (E):

Scope 1 emissions are calculated by multiplying the activity data for Toronto Hydro's sources of direct emissions by the appropriate emissions factor. The activity data includes cubic meters of natural gas, litres of fuel, and kilograms of sulfur hexafluoride (SF_6) emissions. Toronto Hydro uses the emission factors published in the National Inventory Report ("NIR"), which is prepared by Environment and Climate Change Canada and submitted annually to the United Nations.

QUESTION (F):

f) [p.41-42] Toronto Hydro proposes an Efficiency Achievement measure which "tracks this commitment over the next rate period by holding the utility accountable for delivering sustained (and quantifiable) efficiency benefits to customers in the next rebasing application."

   i. Please explain the methodology for calculating efficiency achievements.

   ii. Please provide how the methodology ensures that the savings or cost avoidance are sustainable.

RESPONSE (F):

The proposed custom measure tracks efficiency benefits realized through cost reduction and cost avoidance strategies that Toronto Hydro would deploy in the next rate term in order to manage the revenue deficiency and meet the efficiency expectation imposed by the 0.15% efficiency factor proposed as part of the custom revenue cap index.

Toronto Hydro would ensure that benefits are sustained into future rate periods by excluding any savings related to expenditures that are simply deferred into future periods. For example, the deferral of the S4 Hana upgrade in the current 2020-2024 rate period would not have met the criteria for this measure, because the costs associated with this project were deferred into the 2025-2029 rate period.

Efficiency achievements would be tracked and measured in accordance with the following methodologies:

- **Cost Reduction:** Projects with cost reduction efficiency benefits yield an absolute reduction in an overall expenditures. Cost reduction benefits are measured by comparing actual costs in a defined area of scope (e.g. an expense category) against an annual (or justified pro-rated amount) baseline cost based on previously funded expenses in rates. For example, if the utility introduces process automation to reduce OM&A expenses associated with completing a manual work process, the OM&A savings would be tracked as a cost reduction benefit.
- **Cost Avoidance:** Projects with cost avoidance efficiency benefits yield an avoidance of future cost increases which were not included in the forecasts used to set base rates for 2025-2029. Cost avoidance benefits are measured by determining a forecast annual (or justified pro-rated amount) incremental cost that the utility must manage. For example, if the utility faces an incremental business requirement that was not included in the 2025-2029 Investment Plan, such as the need to lease additional office space to house its growing workforce, and is able to reconfigure its existing workspaces to avoid the incremental costs associated with obtaining additional office space, the annual savings would be tracked as a cost avoidance benefit.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-21

Reference: [Exhibit 1B-3-1, p.46-68]

QUESTION:

SEC seeks to understand how changes in the capital budget as may be ordered by the OEB would impact the PIM targets. For each of the following scenarios, please provide the revised PIM targets, and a detailed explanation of the basis of any change, including any underlying calculations.

a. Scenario 1: The OEB reduced the proposed capital expenditure budget by 10% (envelope reduction).
b. Scenario 2: The OEB reduced the proposed capital expenditure budget by 20% (envelope reduction).
c. Scenario 3: The OEB reduced the proposed capital expenditure budget by 30% (envelope reduction).

RESPONSE:

Toronto Hydro is unable to forecast PIM targets on the basis of the scenarios outlined above. To determine targets, the utility would need to undertake a bottom-up planning exercise to assess and evaluate the implications of the proposed reductions on its capital expenditure plan. It is not possible to complete such an exercise within the context of IRs. Furthermore, Toronto Hydro notes that the scenarios are "incomplete" in that they do not contemplate any consideration of operational funding requirements. Nonetheless, to be helpful and responsive to this question, in Table 1 below Toronto Hydro gauges the impact of not investing in programs that have a direct link to specific targets. The total cumulative impact of these programs is approximately $1,121 million, which is close to the 30% scenario above. For the reasons noted above, Toronto Hydro underscores that the information provided below does not reflect an investment plan and that the noted impacts on specific metrics cannot be treated as targets. The only way to set meaningful PIM targets is to undertake a holistic

evaluation of total expenditures levels along with consideration of other key approvals outlined in this application (e.g. the proposed Deferral and Variance Accounts).

Capital Investment	Program Cost ($ Millions)	Impacts to Performance Outcomes					
		SAIDI (2025-2029 Avg.)[1]	SAIFI (2025-2029 Avg.)[2]	System Security	Grid Automation	GHG Reductions	Efficiency Achievements
Horseshoe Renewal: Underground and Overhead	~$784[3]	6% Decline	15% Decline				
Downtown Renewal: Underground and Network	~$164[4]	0.1% Decline	1.2% Decline				
System Enhancements	~$151[5]	1.7% Decline	1.4% Decline		Cannot be achieved		
ADMS	~$34[6]						
Cyber and Physical Security	~$50[7]			Cannot be achieved			
Fleet and Building Electrification	$52[8]					Cannot be achieved	
Process Automation	$50[9]						Cannot be achieved

1

[1] Toronto Hydro calculated deterioration in SAIDI (Excluding Loss of Supply, Major Events and Scheduled Outages) based on the five-year rolling projection for each scenario compared to the 2025-2029 Investment Plan. Note, the underlying rate of deterioration is different when comparing 2029 annual performance instead of a rolling average. 10%, 0.2%, and 2.9%, respectively, for Horseshoe Renewal, Downtown Renewal, and System Enhancements. See 2B-SEC-42.
[2] Toronto Hydro calculated deterioration in SAIFI (Defective Equipment) based on the five-year rolling projection for each scenario compared to the 2025-2029 Investment Plan. Note, the underlying rate of deterioration is different when comparing 2029 annual performance instead of a rolling average. 26%, 0%, and 2.3%, respectively, for Horseshoe Renewal, Downtown Renewal, and System Enhancements. See 2B-SEC-42 for more information.
[3] Exhibit 2B, Section E6.2 and E6.5
[4] Exhibit 2B, Section E6.3 and E6.4
[5] Exhibit 2B, Section E7.1
[6] Exhibit 2B, Section E8.4 at Appendix A
[7] Exhibit 2B, Section E8.4 at page 20 and Exhibit 2B, Section E8.2 at page 26.
[8] See 2B-AMPCO-66 and 2B-Staff-265.
[9] See 1B-CCC-42.

Horseshoe Renewal: Overhead, Underground

In addition to the originally filed scenarios (Toronto Hydro's 2025-2029 Proposed Investment Plan, and IRM filed under Exhibit 1B, Tab 3, Schedule 1, Pg. 10 & 17), Toronto Hydro has made its best effort to produce additional Reliability Projections that reflect hypothetical budgetary reduction scenarios. These scenarios should be used for comparative purposes only. Please see the response to interrogatory 2B-SEC-42 for more information on Toronto Hydro's reliability projection methodology.

This Reliability Projection (SAIDI and SAIFI Forecast) scenario reflects a reduction to renewal spending in the Horseshoe region over the 2025-2029 period, with some investment in 2025 to continue the removal of PCB transformers from Toronto Hydro's distribution system. These reductions would almost entirely eliminate the Underground System Renewal – Horseshoe (Exhibit 2B, Section E6.2) and Overhead System Renewal (Exhibit 2B, Section E6.5) programs, going from a combined cost of approximately $834 million down to approximately $50 million over the 2025-2029 period.

Downtown Renewal: Underground and Network

This Reliability Projection (SAIDI and SAIFI Forecast) scenario reflects a reduction to Downtown Renewal spending over the 2025-2029 period, with some investment in 2025 to continue the removal of PCB transformers from Toronto Hydro's distribution system. These reductions would eliminate almost all of the 2025-2029 funding for Underground System Renewal - Downtown (Exhibit 2B, Section E6.3), from a cost of approximately $165 million to less than $1 million over the 2025-2029 period.

System Enhancements

This Reliability Projection (SAIDI and SAIFI Forecast) scenario reflects the elimination of System Enhancements spending over the 2025-2029 period (primarily the elimination of additional SCADA switches and mid-line reclosers). The entire funding proposed for the System Enhancements

Program (Exhibit 2B, Section E7.1) for 2025-2029 would be cut to zero from a cost of roughly $151 million.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-22

Reference: Exhibit 1B, Tab 3, Schedule 1, Pages 46-68

With respect to the proposed System Capacity (Non-Wires) Performance Incentive Measure:

QUESTION (A):

a) [p.49] Please explain why the target is based on capacity procured (30 MW) and not financial benefit ($10M).

RESPONSE (B):

Toronto Hydro's proposal is consistent with the reference measures outlined in the fixed incentive option outlined at page 8 of the OEB's *Filing Guidelines for Incentives for Electricity Distributors to Use Third-Party DERs as Non-Wires Alternatives*. Specifically, the target will be based on actual versus forecast "*amount of system capacity provided by third-party owned DER solutions that would otherwise have to be provided by a wires solution.*" Furthermore, the utility notes that the amount of capacity procured is trackable and measurable, whereas the financial benefit associated with that capacity could be different because of (i) an updated BCA methodology as the OEB framework evolves and takes shape, and (ii) the actual load demand projects that are deferred or avoided in the next rate period, which could change as noted the response to 1B-Staff-89(a).

QUESTION (B):

b) [p.51] Toronto Hydro has provided a benefit-cost analysis ("BCA") of the proposed non-wire investment in its Horseshoe north area.

   i. Please provide a copy of the full BCA calculation, including any live Excel spreadsheet used.

ii. Please undertake a similar BCA analysis for the same investment, using the proposed OEB BCA Draft Framework. Please provide all calculations and any live Excel spreadsheet used.

iii. Based on Toronto Hydro's BCA, the total NPV benefits of the investment is $3.32M which is equal to the benefit it would receive if it met the System Capacity (Non-Wires) Performance Incentives Measure. Please explain why it is appropriate for Toronto Hydro to receive 100% of the NPV benefit of undertaking the investment.

RESPONSE (B):

i) Please see 1B-Staff-49 Appendix A for the live Excel spreadsheet.

ii) Please see 1B-Staff-89 part (c).

iii) Refer to pages 54-55 of Exhibit 1B, Tab 3, Schedule 1 under *Concluding Remarks* re Toronto Hydro's Non-Wires Incentive Proposal.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-23

Reference: Exhibit 1B, Tab 3, Schedule 2

With respect to Toronto Hydro's scorecard:

QUESTION (A) AND (B):

a) [p.22] Please update Table 3 Custom Measure Performance to include 2023 results, as well as include the measure targets as set out in EB-2018-0165.

b) For each of the measures on Toronto Hydro's OEB scorecard, please provide the 2023 results.

RESPONSE (A) AND (B):

Toronto Hydro is unable provide the requested information because the 2023 performance results have not yet been verified. The requested information will be provided by April 2, 2024 in advance of the Technical Conference.

Please see an updated Table 3 from Exhibit 1B, Tab 3, Schedule 1 to include the targets as approved in the OEB's Decision.[1]

Toronto Hydro Outcome	OEB Reporting Category	Toronto Hydro's Custom Measures	2020 Results	2021 Results	2022 Results	Target
Customer Service	**Customer Satisfaction**	Customers on eBills	317,341	350,993	381,490	Improve
Safety	**Safety**	Total Recordable Injury Frequency	0.58	0.56	0.47	Maintain
		Network Units Modernization	61%	63%	65%	Improve
Reliability	**System Reliability**	SAIDI - Defective Equipment	0.36	0.36	0.34	Maintain
		SAIFI - Defective Equipment	0.40	0.46	0.46	Maintain

[1] EB-2018-0165, Decision and Order (December 1, 2019) at page 49.

Toronto Hydro Outcome	OEB Reporting Category	Toronto Hydro's Custom Measures	2020 Results	2021 Results	2022 Results	Target
		FESI-7 System (# of feeders)	9	10	27	Improve
		FESI-6 Large Customers (# of feeders)	10	5	12	Maintain
		MAIFI	3.18	3.39	3.36	Monitor
	Asset Management	System Capacity (# of Stations)	11	11	12	Maintain
		System Health (Asset Condition) – Wood Poles[2]	11%	14%	9%	Monitor
		Direct Buried Cable Replacement	729 km	697 km	679 km[3]	Improve
		In-Service Additions (Cumulative)	17%	35%	56%	Monitor
Financial	**Cost Control**	Average Wood Pole Replacement Cost	$7,779	$7,847	$7,973	Improve
		Vegetation Management Cost per Km	$2,158	$2,213	$2,175	Improve
Environment	**Environment**	Oil Spills Containing PCBs (# of spills)	0	0	1	Improve
		Waste Diversion Rate	90.3%	91.5%	92.4%	Monitor

[2] As explained in Section 2.10 of this Schedule and Exhibit 2B, Section D3, Appendix A, Toronto Hydro refined its asset condition assessment methodology for wood poles. With this approach, the System Health (Asset Condition) for Wood Poles decreases to 6% in 2020 and decreases to 8% in 2021.
[3] In preparing this evidence, Toronto Hydro identified a data error in the number of km of direct buried cable remaining on the system reported for 2022 actuals. As of the end of 2022, Toronto Hydro has 666 kilometers of cable remaining rather than 679 kilometers. Please refer to Section 2.11 of this Schedule.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-24

Reference: Exhibit 1B, Tab 3, Schedule 3, Pages 21-22

For each listed divisional and departmental productivity initiative, please detail how the cost reduction/avoidance were calculated, including all assumptions.

RESPONSE:

Please see Toronto Hydro's response to 1B-AMPCO-07.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-25

Reference: Exhibit 1B, Tab 3, Schedule 3

For each year between 2025-2029, please detail all productivity and efficiency initiatives that Toronto Hydro plans to undertake. For each please provide a quantitative estimate of forecast savings, and include the full methodology and assumptions used in the calculation.

RESPONSE:

Consistent with the expectations of the X-factor, the 2025-2029 Custom Scorecard includes an Efficiency Achievements metric with a target to achieve approximately $6.9 million in sustained and quantified efficiency benefits per year by the end of the rate period (i.e. 2029). Table 16 in the referenced evidence details the types of investments that will enable Toronto Hydro to achieve the $6.9 million target on this custom metric. Please refer to the utility's response to 1B-SEC-20(f) for an explanation of how these Efficiency Achievements will be tracked in the next rate period.

In the next rate period, the utility intends to continue to focus on process automation (e.g. digitization, robotics and predictive analytics) to drive continuous improvement in efficiency and productivity. A detailed list of specific initiatives will be determined as part of Toronto Hydro's IT Investment Planning process and Enterprise Technology Portfolio (ETP) framework as described in Exhibit 2B, Section D8, pages 7-10. As initiatives are prioritized and approved for execution, expected savings and benefits will be tracked and evaluated. Please see the evidence in Exhibit 1B, Tab 3, Schedule 3 for a detailed list and explanation of over 30 productivity initiatives undertaken in the current rate period, and the response to 1B-AMPCO-07 for more information about these initiatives.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-26

Reference: Exhibit 1B, Tab 3, Schedule 3

Please revise Tables 10 to 19, to include a comparison against the industry average.

RESPONSE:

Please see Tables 1-10 below for comparisons against the industry average.[1] Toronto Hydro stands behind the evidence in Exhibit 1B, Tab 3, Schedule 3 and the submissions in its March 18, 2022 letter[2] regarding the limitations of the APB econometric model, which does not account for recognized differences that set Toronto Hydro apart from other Ontario utilities. For a further discussion of these considerations please see also the response to interrogatory 2B-Staff-121.

Table 1: 2018-2022 Billing O&M Cost per Customer

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5315]	9,626	16,633	22,200	21,444	24,401	18,861
Scale (1,000 Customers)	772.6	777.9	779.2	785.7	790.5	781.2
Unit Cost ($/Customer)	12.46	21.38	28.49	27.29	30.87	24.10
Industry Average ($/Customer)	35.57	34.89	35.69	35.52	36.13	36.88

Table 2: 2018-2022 Metering O&M Cost per Customer

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5065 + 5175 + 5310]	5,193	5,556	5,656	4,656	4,853	5,183
Scale (1,000 Customers)	772.6	777.9	779.2	785.7	790.5	781.2
Unit Cost ($/Customer)	6.72	7.14	7.26	5.93	6.14	6.64
Industry Average ($/Customer)	20.23	19.76	19.21	19.58	18.68	19.43

[1] Toronto Hydro calculated the industry average by taking the average of all distributor unit costs (excluding any zero values) in each year.
[2] EB-2018-0278, Toronto Hydro Letter, Activities and Program-based Benchmarking: Enhancements Inititative (March 18, 2022)

Table 3: 2018-2022 Vegetation Management O&M Cost per Pole

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5135]	3,309	2,826	3,230	2,083	3,431	2,976
Scale (1,000 Poles)	179.4	180.3	181.8	182.6	183.6	181.6
Unit Cost ($/Pole)	18.44	15.67	17.76	11.40	18.69	16.39
Industry Average ($/Pole)	35.29	35.26	34.22	36.02	43.93	36.62

Table 4: 2019-2022 Lines O&M Cost per Circuit km

	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5020:5030 + 5040:5050 + 5090:5095 + 5125:5130 + 5145:5155]	21,869	23,264	25,850	29,596	23,661
Scale (Circuit km of Primary Line)	10,528	10,597	10,625	10,663	10,583
Unit Cost ($/Circuit km of Primary Line)	2,077	2,195	2,433	2,776	2,235
Industry Average ($/Circuit km of Primary Line)	1,800	1,811	1,779	1,926	1,797

Table 5: 2018-2022 Stations O&M Cost per Total MVA

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5016 + 5017 + 5114]	12,779	8,051	6,488	9,187	8,602	9,021
Scale (Total MVA)	7,583	7,617	7,774	7,891	7,853	7,744
Unit Cost ($/MVA)	1,685	1,057	835	1,164	1,095	1,167
Industry Average ($/MVA)	1,374	1,503	1,477	1,790	1,680	1,554

Table 6: 2018-2022 Poles, Towers, and Fixtures O&M Cost per Pole

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [5120]	581	1,161	2,123	2,102	1,751	1,296
Scale (1,000 Poles)	179.4	180.3	181.8	182.6	183.6	180.6
Unit Cost ($/Pole)	3.24	6.44	11.68	11.51	9.54	7.15
Industry Average ($/Pole)	11.29	11.16	10.53	10.66	14.11	11.03

Table 7: 2018-2022 Stations Capital Additions per Total MVA

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [1820] Capital Additions	30,320	16,655	21,541	25,606	26,295	24,083
Scale (Total MVA)	7,583	7,617	7,774	7,891	7,853	7,744
Unit Cost ($/MVA)	3,998	2,186	2,771	3,245	3,348	3,110
Industry Average ($/MVA)	2,605	4,444	4,013	3,002	7,413	5,211

Table 8: 2018-2022 Poles, Towers, and Fixtures Capital Addition Costs per Pole

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [1830] Capital Additions	21,288	32,866	33,134	33,663	29,573	30,105
Scale (Pole Additions)	3,254	3,525	3,367	3,677	3,312	3,427
Unit Cost ($/Pole Addition)	6,542	9,324	9,841	9,155	8,929	8,758
Industry Average ($/Pole Addition)	6,480	8,202	8,832	10,856	11,202	9,472

Table 9: 2018-2022 Line Transformer Capital Addition Costs per Transformer

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [1850] Capital Additions	62,026	79,731	84,980	87,980	78,613	78,666
Scale (Lines Transformer Additions)	2,900	2,746	2,716	3,086	2,470	2,784
Unit Cost ($/Line Transformer Addition)	21,388	29,035	31,289	28,510	31,827	28,410
Industry Average ($/Line Transformer Addition)	8,468	9,185	10,180	10,672	13,771	10,455

Table 10: 2018-2022 Meter Capital Addition Costs per Customer

	2018	2019	2020	2021	2022	Avg.
Cost ($1,000) - USoA [1860] Capital Additions	24,359	14,491	19,983	15,476	17,882	18,438
Scale (1,000 Customers)	773	778	779	786	791	781
Unit Cost ($/Customer)	32	19	26	20	23	24
Industry Average ($/Customer)	13	13	12	11	11	12

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-27

Reference: Exhibit 1B-3-3, Appendix A

With respect to the Clearspring Energy Advisors, Econometric Benchmarking Study of Toronto Hydro's Total Cost and Reliability Metrics Report:

QUESTIONS (A)

a. Please detail all changes to Clearspring's methodology since its report in Toronto Hydro's last custom IR application EB-2018-0165. Please explain the reason for the change.

RESPONSE (A) – PREPARED BY CLEASPRING::

There have been a series of methodological refinements since the study in the previous Toronto Hydro application. The best and detailed description of them is contained in [i] Clearspring's Hydro One JRAP benchmark report in EB-2021-0110 titled, "Benchmarking and Productivity Research for Hydro One Networks' Joint Rate Application", [ii] the Joint Clearspring/PEG Report in that application as we adopted PEG's suggestion on the new scope variable, and [iii] the Clearspring Report in this application that carries forward all of the Joint Report methodology and variables but then discusses the three new variables that have been added since then (distribution substations, substation capacity, and the time variant percent urban). Section 2 in the Clearspring benchmarking report for Hydro One provides a series of research items, Clearspring's approach to them, and the rationale for them. These items include the sample period where we have determined a consistent start year of 2000 is appropriate, model specification, peak demand variable definition, capital asset price levels, Canadian input price inflation, capital benchmark year, customized labour and non-labour OM&A weights, and pensions and benefits treatment.

QUESTIONS (B)

b. [p.11] Please explain the reason for excluding pension and benefit costs. Directionally, what impact would it likely have on the results if it was included?

RESPONSE (B) – PREPARED BY CLEASPRING::

Excluding pensions and benefits is the approach taken by both Clearspring and PEG in the Hydro One Joint Report. Pensions and benefits can be sensitive to external shocks and conditions such as stock prices and the differing regulatory environments of Ontario and the U.S. can impact those expense categories. Clearspring states on page 17 of the Clearspring benchmarking report for Hydro One, "Including or excluding pensions and benefits has been a topic of discussion in several CIR proceedings. Driving the issue is that Ontario distributors do not consistently report OM&A pensions and benefits expenses. Further, the different health care and other regulatory differences between the U.S. and Ontario can cause pensions and benefits to be higher in the U.S. than in Ontario, creating a small bias in favor of Ontario utilities when they are included. We believe it is fair to say that both consultants would prefer to exclude these expenses when it is possible to consistently do so."

QUESTIONS (C)

c. [p.20] Please explain why Clearspring did not include any Ontario utilities in its benchmarking sample.

RESPONSE (C)– PREPARED BY CLEASPRING:

Using a U.S. only dataset is the approach that both Clearspring and PEG agreed upon as being appropriate in the Hydro One Joint Clearspring/PEG Report, and PEG had also taken that approach in the previous Toronto Hydro application. One of the reasons is the pensions and benefits issue discussed in part (b). Using a U.S. only dataset allows pensions and benefits to be excluded and avoids issues related to their inclusion. Clearspring has continued the methodology established in the Hydro One Joint Report. That research did not include Ontario utilities. Only using a U.S. sample assists in assuring consistent cost definitions. For these reasons, we have settled on a U.S. only sample when benchmarking the large, outlier utilities within Ontario.

QUESTIONS (D)

d. [p.21] Based on the model, please provide both forecast incremental capital and OM&A benchmark costs for each additional customer and MW of peak demand.

RESPONSE (D) – PREPARED BY CLEASPRING:

Clearspring did not estimate a capital or OM&A model, only a total cost model. The stretch factor has been and should continue to be based upon total cost benchmarking results. Disaggregated models will suffer from both accounting differences between comparators and substitution differences between capital, labour, and non-labour inputs within the sample.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-28

Reference: Exhibit 1B, Tab 3, Schedule 3, Appendix C

Preamble:

With respect to UMS Group, Unit Cost Benchmarking Study:

QUESTION (A):

a) Please detail all methodological differences in this study as compared to similar studies filed in Toronto Hydro's EB-2018-0165 application.

RESPONSE (A) PROVIDED BY UMS GROUP:

The only methodical differences involved the absence of what we would consider a fully normalized comparison, not addressing the effect of regional cost differences and difficulty factors. This difference is described in the report. Referring to our report in the EB-2018-0165 filing, the Board provided THESL and UMS Group constructive feedback regarding certain aspects of the normalization formula. In response to that feedback, we simplified our normalization efforts to focus on those criteria accepted by the Board in 2018. Thus, we truncated the normalization effort to only include the USD to CAD dollar and metric conversions, and differences in accounting practices. Please also see our response to 1B-AMPCO-12, part (f).

RESPONSE (A) PROVIDED BY TORONTO HYDRO:

Toronto Hydro updated the methodology of the unit costs that served as an input into the UMS Unit Cost Benchmarking Study. Please see Toronto Hydro's response to interrogatory 1B-AMPCO-9 for the methodology differences that were applied to the capital assets in this study.

QUESTION (B):

b) [p.2] Please explain how the various asset categories and OM&A programs/practices were selected. Please provide a list of others that were considered, and reasons for why they were not selected.

RESPONSE (B) PROVIDED BY UMS GROUP:

We started with the list of asset classes from the previous application (EB-2018-0165) as a starting point for discussion and considering our experience with a similar study for Hydro Ottawa, reviewed the viability of gaining consistency across utilities for each Asset Class and Maintenance Program. Citing significant variability in the selection, installation, and accounting for overhead switches, we opted to remove that category from the study, and two asset classes were added:

- Substation maintenance in consideration of the significant attention being paid to this area across the industry, and
- Cable Chambers / Manholes (please refer to our response to 1B-AMPCO-12, part (d)).

The validity of these asset classes and maintenance programs as indicative of THESL's overall unit cost performance was verified when it was determined that the seven asset categories represented approximately half of the planned capital budget over the 2020 through 2022 period; and the five maintenance programs represented almost 60% of all preventative and predictive maintenance costs in each year over the same timeframe.

QUESTION (C):

c) Please confirm the Study benchmarks average unit cost over the 2020-2022 period.

RESPONSE (C) PROVIDED BY UMS GROUP:

Confirmed. The weighted average unit costs over the 2020-2022 period are reflective of the input received from THESL and each member of the Peer Group Panel.

QUESTION (D):

d) [Appendix F] Please provide Toronto Hydro's completed Appendix F.

RESPONSE (D) PROVIDED BY UMS GROUP

Toronto Hydro's completed Appendix F is included as an attachment (Unit Cost Survey_THESL.xls).

QUESTION (E):

e) [Appendix F] Using the same methodology used to complete Appendix F, for each unit of measure, please provide Toronto Hydro's actual unit cost for each year between 2020 and 2023, and forecast for 2024 to 2029.

RESPONSE (E) PROVIDED BY TORONTO HYDRO:

Appendix F for the UMS Unit Cost Benchmarking Study consisted of years 2020-2022. Please see 1B-SEC-28 App B for the requested yearly breakdown.

Toronto Hydro is unable to forecast the unit cost for 2024-2029 as the unit cost methodology utilizes ISA data from completed projects.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1B-SEC-29

References: Exhibit 1B, Tab 4, Schedule 2

With respect to the Innovation Fund Proposal:

QUESTION (A) :

a) Please provide details regarding Toronto Hydro's proposed public reporting on projects costs, benefits, evaluations and lessons learned.

RESPONSE (A):

The Governance Framework for the proposed Innovation Fund (Exhibit 1B-4-2, pp. 8-16) refers to three types of reports that will be produced, for different purposes, including the pilot selection report, milestone reports, and the pilot evaluation and learnings report. Of these, only the pilot evaluation and learning report is intended for public circulation. The pilot evaluation and learnings report will contain information on the costs, benefits, evaluations and lessons learned. The specific requirements of the report will be determined during the 2025-2029 rate period. For more information on all other (e.g. not public) Innovation Fund reporting, please see Toronto Hydro's response to interrogatory 1B-CCC-46 part e).

QUESTION (B) :

b) Please explain how potential projects and proposals will be identified and selected.

RESPONSE (B):

The potential pilot projects will be selected from the four areas of innovation identified in the referenced evidence. For more information about pilot project identification and selection, please see Toronto Hydro's response to interrogatory 1B-CCC-46 part (c).

QUESTION (C) :

c) [p.16] Toronto Hydro is proposes the Innovation Fund Variance Account to record the difference in amounts collected and the actuals to deploy the selected pilot projects. Does this mean that customers may end up paying more than $16M for innovating pilot projects, if final costs are greater than $16M?

RESPONSE:

Yes, it is possible that customers may end up paying more than $16M for pilot projects under the Innovation Fund, as follows.

First, for clarity, Toronto Hydro is proposing to recover through a rate rider an amount equal to 0.3% of the total revenue requirement that gets approved by the OEB. The $16 million amount that is forecast to be recovered currently through the rate rider is based on 0.3% of the total revenue requirement presented in Exhibit 6 of the evidence. The total dollar amount that would need to be recovered through the rate rider will be recalculated during the Draft Rate Orders stage on the basis of the approved revenue requirement.

Second, as part of the Innovation Fund proposal, Toronto Hydro is requesting a symmetrical variance account (IFVA) to track actual expenditures, whether capital or OM&A, on a revenue requirement basis against the forecasted amount that will be recovered through the rate rider. Toronto Hydro will propose an approach to clearing the balance in the variance account in its next rebasing application. Please see Toronto Hydro's response to 9-Staff-342 part (a) for more information.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1B-VECC-1

Reference: Exhibit 1B, Tab 2, Schedule 1, Page 13

"Under a standard IRM scenario, Toronto Hydro's 2025-2029 capital investment plan would be underfunded by approximately 35 percent or $1.5 billion."

QUESTION (A):

Please provide the model, calculations and assumptions which support this statement. Specifically show which capital categories are assumed to be reduced under a lower capital spending plan.

RESPONSE (A):

The table below provides a breakdown the utility's capital-related revenue (CRR) under IRM used to inform the statement referenced above.

Table 1: 2025-2029 Capital Related Revenue (CRR) under IRM

	2025	2026	2027	2028	2029
Amortization/Depreciation	285.3	289.3	293.4	297.5	301.7
Deemed Interest Expense	143.1	145.1	147.1	149.2	151.3
Return on Equity	220.9	224.0	227.2	230.4	233.6
PILs	27.9	28.3	28.7	29.1	29.5
Capital Related Revenue (CRR)	**677.2**	**686.7**	**696.3**	**706.1**	**716.0**

For this IRM scenario, Toronto Hydro determined the 2026-2029 CRR by escalating the 2025 capital CRR (detailed in Exhibit 6 and summarized in 1B-Staff-03 at Table 1) with standard Price Cap IR parameters, namely: an inflation factor (based on a 2% forecast) minus a 0.6% X-factor.

To determine the approximate total capital expenditures (CAPEX) that could be funded by the CRR available under this IRM scenario, Toronto Hydro applied CRR to CAPEX ratio of 1:10. Applying this ratio to the CRR in Table 1 above, yields an approximate 2025-2029 CAPEX envelope of $2.4 billion, which is $1.6 billion less than the CAPEX requirements described in Toronto Hydro's plan as-filed.

Table 2 below shows the CAPEX reductions that were assumed in the IRM scenario compared to the 2025-2029 Investment Plan, for the purpose of modelling the reliability impacts under an IRM scenario (i.e. Outage Duration and Outage Frequency as shown in Exhibit 1B, Tab 03, Schedule 1 at pages 7 and 10, respectively).

Table 2: Comparison of 2025-2029 Final Plan vs. IRM Scenario

Category	Final Plan 2025-2029 ($M)	Final Plan[1] % of Total	Total IRM 2025-2029 ($M)	IRM % of Total	$ Reduction	% Reduction
System Access	1,071.7	27%	1,071.1	45%	0.6	0%
System Renewal	1,970.3	49%	747.0	31%	1,223.3	62%
System Service	352.9	9%	179.3	7%	173.6	49%
General Plant	562.6	14%	375.8	16%	186.8	33%
Other	44.3	1%	26.7	1%	17.6	40%
Total CapEx	4,001.7	100%	2,400.0	100%	1601.7	40%

[1] As filed on November 17, 2023.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1B-VECC-02

Reference: Exhibit 1B, Tab 2, Schedule 1, Page 13

"Adoption of a plan constrained by this funding envelope would force the utility into a sustainment plan that would be almost entirely reactive in nature, resulting in roughly an 8 percent deterioration in system reliability by the end of the rate period,."

QUESTION (A):

a) Please provide the model, calculations and assumptions which derive an 8% system reliability deterioration noted in this reference.

RESPONSE (A):

Please see Toronto Hydro's responses to interrogatories: (i) 1B-EP-15 for an explanation of how the 8% was derived; (ii) 1B-VECC-1 for a breakdown of the capital expenditure assumptions that underpin this IRM funding scenario; and (iii) 2B-SEC-42 for a description of the reliability forecasting model that Toronto Hydro used to estimate the result.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1B-VECC-3

Reference: Exhibit 1B, Tab 3, Schedule 1, Page 2

QUESTION (A):

a) How was the 0.6 ($65 million) value for PIM amount chosen?

RESPONSE (A):

Toronto Hydro applied the following key considerations in the decision to include a 0.6% incentive-factor attributed to the PIM in the proposed custom rate framework:

- The OEB's expectation in the Rate Handbook that the X-Factor included in a custom index should be higher than X-Factor that would otherwise be assigned under Price Cap IR. Together the efficiency-factor of 0.15% and the PIM of 0.6%, Toronto Hydro's proposed X-Factor is 0.75%, which is 0.15% greater than the X-factor under Price Cap IR;
- The principle and objective of balancing the utility risk/reward under the PIM with the customer cost and benefits that can be reasonably quantified from the achievement of PIM scorecard targets. As shown in the cost benefit analysis in Exhibit 1B, Tab 3, Schedule 1 at pages 57-58, in addition to the efficiency-factor, the achievement of PIM targets provide customers a minimum direct benefit of approximately $74 million over the 2025 to 2029 period (plus indirect benefits), relative to a utility incentive of $65 million.
- The utility's assessment of an appropriate level of financial risk (i.e. *revenue reduction*) that can be assigned to the combined X-factor (*i.e. the empirically-derived efficiency factor and the proactive PIM*). Please see the response to interrogatory 1B-Staff-03(b) for a summary of the revenue deficiency (i.e. *financial risk*) imposed by combined X-factor over the rate period. See also 1B-SEC-13.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1B-VECC-4

Reference: Exhibit 1B, Tab 2, Schedule 1, Page 32

"Only if the set performance targets are achieved (or forecasted be achieved with a high degree of confidence) by the end of the rate term would the incentive be recovered from customers in the next decade. As such, Toronto Hydro confirms that that there would be no rate recovery associated with the PIM in the 2025-2029 period."

QUESTION (A):

a) The PIM mechanism may create issues with respect to intergeneration inequities in that the cost (incentive) is recovered in the period after which the efficiencies are achieved. Is this correct? If so how is/could this issue be addressed or mitigated?

RESPONSE (A):

Toronto Hydro does not believe the proposed recovery of any PIM-DA entries in the 2030+ period creates material intergenerational inequities. While measurement of performance is assessed on the basis of 2025 to 2029 results, many of the metrics reflect the output/results of multi-year investments or initiatives which will continue to provide value to customers beyond the next rate term. This is evidenced by the analysis on pages 57-58 of Exhibit 1B, Tab 3, Schedule 1 which shows that quantifiable benefits associated with target achievement entail significant minimum lifetime benefits of $892 million on a nominal basis, or $266 million on a present value basis.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1.0-VECC-5

Reference: Exhibit 1B, Tab3, Schedule 1, Page 8

"Toronto Hydro proposes to remove the Scheduled Outages cause code from its 2025-2029 custom SAIDI performance measure for two reasons: (1) major forecasting uncertainty caused by the ongoing implementation of Oracle's Utility Analytics ("OUA"), and (2) the utility expects Scheduled Outages to increase in the 2025-2029 period as the result of a larger work program."

QUESTION (A):

a) Please confirm (or correct) that the proposal for the PIM measurement includes scheduled outages (as per Table 1 at 1B/T3/S1/pg.7).

RESPONSE (A):

The proposal for the PIM measure as indicated in Table 1 in Exhibit 1B, Tab 03, Schedule 1 for Outage duration does not include Major Event Days, Loss of Supply or Scheduled Outages.

QUESTION (B):

b) Given THESL's aggressive capital plan for the rate period could lead to more customer interruptions, what mechanisms are being employed to ensure that customers do not endure more and scheduled outages than during the last rate plan?

RESPONSE (B):

Scheduled outages (as detailed in Exhibit 2B, Section C2.4) are necessary in order for work to be safely performed on the distribution system. While an increased volume of electrical work will require an increased volume of scheduled outages, Toronto Hydro plans and reviews all outage requests such that the customer impact is as small as possible while still enabling work to be

undertaken safely. Prior to any scheduled outage, Toronto Hydro's Customer Operations Communication Office (COCO) provides advanced notice to customers of the impending project work to be performed in their area to allow customers to plan for the scheduled outage and thereby minimize its impact. Toronto Hydro intends to track customer satisfaction with respect to scheduled outage communications as part of the 2025-2029 Custom Scorecard (please see Exhibit 1B, Tab 3, Schedule 3 at page 27).

QUESTION (C):

c) In its customer engagement did THESL explain that more or longer scheduled outages might occur as a result of implementing the plan? If so, please provide the references which show customers' acceptance of that in order to support the more aggressive capital plan.

RESPONSE (C):

Scheduled Outages were not discussed during the Customer Engagement.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1.0-VECC-6

Reference: Exhibit 1B, Tab 3, Schedule 1, Page 7, Table 1

QUESTION (A):

a) THESL' proposed PIM Scorecard differs from the Board specified Electricity Distributor Scorecard (EDS). Why? Specifically what advantages does THESL see in using its customized scorecard as opposed to adopting the EDS for the PIM?

RESPONSE (A):

As noted in the evidence in Exhibit 1B, Tab 3, Schedule 2 on page 1 Toronto Hydro intends to continue delivering performance on the Electricity Distributor Scorecard ("EDS") and the Electricity Service Quality Requirements ("ESQR") consistent with the historical results presented in Exhibit 1B, Tab 3, Schedule 2. In addition to fulfilling the OEB's general expectations of distributor performance, as part of this custom incentive rate application, Toronto Hydro has put forward a Custom Scorecard and a Performance Incentive Mechanism. Together these components of the custom rate framework shift notable incremental risk to the utility for achieving performance objectives that: (i) represent expanded priorities of the utility's 2025-2029 Investment Plan which are not captured by the EDS (i.e. system security, post-transactional customer satisfaction, customer escalations resolution, grid automation readiness, non-wires system capacity, efficiency achievements, GHG reductions and alignment with international standards in key management system); and (ii) are aligned with the areas of performance explored in the Phase 2 Customer Engagement study whereby over 33,000 customers completed a detailed survey reviewing Toronto Hydro's draft plan and its key outcomes, and an average of 84% of customers surveyed supported the draft plan or one that does even more to advance key outcomes.

QUESTION (B):

b) None of the PIM measures provide performance comparability with other electricity distributors in Ontario. For example, with respect to service reliability there are no metrics which would compare THESL performance with, for example adjoining utilities like Alectra, or similar aging utilities like London Hydro or Hydro Ottawa. Did THESL undertake any studies which compare its performance to other utilities? Specifically, has THESL performed any analysis which compares THESL productivity or service quality performance over the past five years with any other individual or group of Ontario utilities?

RESPONSE (B):

As noted above, the custom measures reflect specific investment objectives of Toronto Hydro's 2025-2029 Investment Plan, which were informed by customers' needs and preferences. While Toronto Hydro did not undertake a specific study to compare its custom measures to other utilities on these metrics, it did where possible consider industry benchmarks or standards in the development of the PIM and associated targets. Please see the table below for a summary:

Table 1: Alignment with Industry Benchmarking or Standards

Performance Measures	Alignment with Industry Benchmarking or Standards
Reliability (SAIDI)	Clearspring Study at Exhibit 1B, Tab 3, Schedule 3, Appendix A, which shows that Toronto Hydro is above benchmark in SAIFI, and below benchmark in CAIDI performance relative to the established peer group.[1]
New Services Connected on Time	See the Tables 27 and 28 in Exhibit 1B, Tab 3, Schedule 1 which indicate average Ontario LDC performance for HV and LV connections at 97% compared to Toronto Hydro's target of 99%.

[1] Exhibit 1B, Tab 3, Schedule 3, Appendix A, p. 5

Performance Measures	Alignment with Industry Benchmarking or Standards
Grid Automation Readiness	***2021 Utility Grid Modernization Survey*, Accenture, July 30, 2021**: General grid modernization benchmarking survey including 21 North American utilities covering 23 jurisdictions. Study finds that "automated sectionalizing devices have been well integrated in many utilities with a majority stating over 50% of their feeders had such operational technology. Many utilities, 52% of respondents, have recognized the potential of sectionalizers beyond reclosing activities and have devices provide telemetry and integrate data into operational models (e.g., ADMS)." ***Smart Energy Benchmarking: Utility Scorecard Results*, SGIN, June 2023**: Modernization benchmarking study covering 12 Canadian utilities. Example of relevant findings: "Three quarters of utilities had deployed an Advanced Distribution Management System (ADMS) as of 2021 or were about to do so. Only three utilities had no ADMS or short-term plans to deploy one, ranging across different provinces and size categories. Moreover, several utilities of various sizes have recently deployed Fault Location Isolation and Service Restoration (FLISR) technology."
Non-Wires System Capacity	Toronto Hydro continues to be a leader in the development and integration of non-wires solutions into distribution system planning. Toronto Hydro's target of 30 MW for demand response capacity triples with volume of capacity targeted in the 2020-2024 rate period. This demonstrates an ambitious and, to date, unprecedented commitment to NWSs by any other local distribution company in Ontario. Other utility leaders in this space, such as Alectra, have procured capacity in the range of 10-15 MW.
System Security	Aligned with NIST Cybersecurity Framework standards.

Performance Measures	Alignment with Industry Benchmarking or Standards
Total Recordable Injury Frequency Rate (TRIF)	Toronto Hydro's TRIF target of 0.85 is below the Electricity Canada industry average of 1.35.
ISO Standards	By definition this measure reflects alignment of the utility's performance in its key management systems with international standards. Toronto Hydro notes that, to its knowledge, the following utilities have achieved or are pursing ISO55001 certification in the U.S. and Canada: Hydro Ottawa, Lansing Board of Water and Light – REO Cogeneration, New York Power Authority, Palm Beach County Water Utilities Department, PG&E Electrical, PG&E Gas, and PG&E Power Generation.[2]
Efficiency Achievements	This target is informed by the Clearspring Total Cost Benchnmarking (Exhibit 1B, Tab 3, Schedule 3, Appendix A) which concludes that Toronto Hydro is below (i.e. less costly) than benchmark expectations, with a 2020 to 2022 score relative to benchmark of -28.0%.[3]

[2] Please note that the list only includes organizations who have 'self-declared' their certification. There may be others that Toronto Hydro is not aware of.
[3] Exhibit 1B, Tab 3, Schedule 3, Appendix A, page 2

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1B-VECC-7

Reference: Exhibit 1B, Tab 3, Schedule 2, pg. 13 /Schedule 3, page 31

Preamble:

"As the sub-metering market has become more mature in Toronto over the last decade, a greater share of new multi-unit buildings is opting for bulk-metering service connections. The practical effect of operating in this urban environment with a deregulated sub-metering market is a slower rate of formally reported customer growth from 2013 to 2022, which is putting artificial upward pressure on cost performance metrics like Total Cost Per Customer and Total Cost per km of Line."

QUESTION (A) AND (B) :

a) Does THESL provide sub-metering services in competition with other service providers in Ontario?

b) If yes, are any sub-metering costs included in this application for recovery from ratepayers?

RESPONSE (A) AND (B):

No. In accordance with Part III of the *Energy Consumer Protection Act, 2010*, Toronto Hydro provides services as a unit smart meter provider, meaning a distributor licensed by the Board to engage in unit smart metering. The utility does not engage in *competitive unit sub-metering* activities related to multi-unit complexes that are connected to a bulk meter. The evidence referenced above notes that as the unit *sub-metering market* has become more mature, a greater share of the multi-unit buildings being constructed are opting for a Toronto Hydro bulk meter service (with competitive unit sub-metering), rather than a Toronto Hydro unit smart metering service.

QUESTION (C):

It is unclear to us why sub-metering would result in higher costs per customers. For example, presumably THESL avoids the cost of individual metering, meter reading, line connection and other high-cost activities associated with individual metered customers. Conversely bulk metered customers are a lower cost to serve. The result would be that while the number of residential units is increasing in the average costs to THESL of serving those customers is also decreasing. In any event, what evidence/studies does THESL have to demonstrate that sub-metering (all other things being equal) results in a higher, rather than lower, or unchanged cost per customer?

RESPONSE (C):

The referenced evidence is not an assertion about the relative cost of serving bulk metered vs. individually metered customers. Rather, it is about the prevalence of unit sub-metering in Toronto Hydro's service territory skewing comparative metrics that use customer count as the denominator. Unit sub-metering results in the aggregation of dozens or hundreds of end-consumers behind a single bulk-meter, and subsequently counts each multi-unit building with a bulk-meter as a single customer. As noted in the OM&A Overview evidence at Exhibit 4, Tab 1, Schedule 1 at page 11, Toronto Hydro estimates that it serves approximately 340,000 end-consumers or more behind bulk meters.

QUESTION (D):

A similar insinuation of costs per customer is made at Schedule 3 which notes that Toronto Hydro provides an average of 31.8 MWh per customer, more load per customer relative to the peer group of utilities who have a multi-year average of 23.6 MWh. The evidence ascribes this relative difference to the proliferation of high rises. However, it is not clear why this is a relevant consideration if one assumes that there is a lower cost of delivered power for utilities with a greater proportion of bulk metered units. Please provide the studies that THESL relies upon to support its contention that higher density of customers is a more costly delivery model than lower density service.

RESPONSE (D):

Operating in a dense urban environment drives unique challenges which have an impact on costs as evidenced in Exhibit 1B, Tab 3, Schedule 3 at pages 2-8 and in the Total Cost Benchmarking Study found at Appendix A of the same reference.

The referenced analysis illustrates a key operational difference between the utility and its Ontario peers that should be considered when evaluating cost per customer benchmarks. Because Toronto Hydro has substantially more high-rise buildings than comparator utilities in Ontario, its customer count denominator is lower than it otherwise would be if that number included sub-metered residential customers in buildings serviced by a bulk-metered. As a result it is not unreasonable to see in the cost per customer benchmarking analyses that Toronto Hydro has more demand, more consumption, more net fixed assets, and more OM&A cost per customer compared to its peers.

For a specific discussion of how serving a dense service territory relates to asset utilization and costs, please see Toronto Hydro's response to 2B-Staff-121.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1B-VECC-8

References: Exhibit 1B, Tab 3, Schedule 2, Page 19

Decision EB-2023-0143

"In this regard, the OEB notes that the incremental costs of locates activity anticipated to be triggered by Bill 93 will not be limited to a 12-month period as is typically associated with a Z-factor event and as set out in the OEB's Chapter 3 Filing Guidelines. The account will be in place for each utility until their next rebasing application, to be reviewed for disposition as part of that application, unless large balances have accrued that may require disposition in an IRM year."

QUESTION (A):

a) Does this application incorporate an estimate for the costs of Bill 93 as contemplated by the Board's Decision for utilities in a rebasing application?

RESPONSE (A):

Yes, please refer to Toronto Hydro's response to 4-Staff-296(e) for an update to the balance of the *Getting Ontario Connected Act* variance account for the period of April 1, 2023 to December 31, 2024.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1B-VECC-09

Reference: Exhibit 1B, Tab 3, Schedule 3

QUESTION (A):

a) Does THESL's customer call/contact operations produce a monthly or annual report. If yes, please provide the reports for 2022 and 2023. If not, please explain what reporting is provided to senior and executive management with respect to customer contacts.

RESPONSE (A):

Please refer to the appendices to this response.

QUESTION (B):

b) What proportion (annually) of customer contacts come from sub-metered electricity users. Are these calls generally referred back to the sub-meter entity?

RESPONSE (B):

Toronto Hydro does not track customer contacts from sub-metered electricity users. Where appropriate, such contacts would be referred to unit sub-metering providers.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1B-VECC-10

Reference: Exhibit 1B, Tab 3, Schedule 3, Section 4.7

QUESTION:

a) For each of the AFB benchmarks shown at section 4.7 in tables 10 through 18 please provide a summary table showing the 2018-2022 THEL average and for the same period the associated Ontario distributor average.

RESPONSE:

Please refer to Toronto Hydro's response to interrogatory 1B-SEC-26.

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 1-VECC-11

Reference: Exhibit 1B, Tab 3, Schedule 3, Appendix A Clearspring

"To make this congested urban variable time variant, Clearspring gathered the number of high-rise skyscrapers at or above 100 metres for each year and for each city served within the U.S. sample and Toronto."

QUESTIONS (A)

a) Is the "urban" variable composed entirely of 100 metre (30 story) buildings? If not please provide a description of the other data used as part of the urban variable.

RESPONSE (A)– PREPARED BY CLEASPRING:

The prior congested urban variable, which was gathered by examining the proportion of each service territory that contained buildings with seven stories or more, continues to be the foundation of the urban variable. The refinement that has now been made is to address the fact that the original variable was not escalated by the change in skyscraper buildings from year to year. So in 2017, when the prior variable was calculated, the value of the variable is exactly the same as in the prior benchmarking models conducted by Clearspring. But that 2017 congested urban variable has now been escalated for years subsequent to 2017 (or reduced for years prior to 2017) based on an adjusted rate of change in the number of skyscrapers present.

QUESTIONS (B)

b) Does this variable include data from Canadian cities other than Toronto?

RESPONSE (B)– PREPARED BY CLEASPRING:

No, only Toronto data was gathered because the dataset is a U.S. only one other than Toronto Hydro.

QUESTIONS (C)

c) What adjustment is made to capture potential differences between high rise buildings which are themselves congested and isolated high-rise buildings. That is, how is the difference between isolated building distinguished between multi-complex developments?

RESPONSE (C)– PREPARED BY CLEASPRING:

This distinction was made in the construction of the percent congested urban variable. The area designated as congested urban required 7-story or higher buildings to be clustered together. In using the skyscraper data to escalate the percent congested urban variable there was no distinction made between isolated and multi-complex developments. We do not see this as a significant concern, as it is likely that most buildings 100 meters or above would be surrounded by area designated as congested urban service territory.

QUESTIONS (D)

d) High rise developments are also often associated with transportation infrastructure improvements, for example in Toronto along the new Eglington LRT. Such developments can allow an opportunity for utilities to replace infrastructure at lower costs due to multi-party sharing of costs. How is this phenomenon captured in the "urban" variable.

RESPONSE (D)– PREPARED BY CLEASPRING:

To the extent that utilities can reduce costs due to possible savings opportunities and sharing this will tend to reduce the coefficient on the urban variable.

QUESTIONS (E)

e) The 'urban" variable captures the correlation as between the change in high-rise buildings and what specific costs?

RESPONSE (E)– PREPARED BY CLEASPRING:

From a modeling perspective, the variable is capturing the correlation between serving a highly urban area and the total costs incurred by the utility. The model does not disaggregate to specific costs below that total cost level.

QUESTIONS (F)

f) Ontario allows for third party suite metering in high rise developments. Do all or any of the other jurisdictions which are in the data set do the same? Does Clearspring's model/data capture the relative proportion of suite metered high rises?

RESPONSE (F)– PREPARED BY CLEASPRING:

We are not aware if other jurisdictions have similar arrangements. The model is not adjusting for this situation. This is likely to the disadvantage of Toronto Hydro who is serving more customers than the model is crediting to the Company.