EB-2014-0116

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act 1998*, Schedule B to the *Energy Competition Act*, 1998, S.O. 1998, c.15;

AND IN THE MATTER OF an Application by Toronto Hydro-System Electric Limited for an Order or Orders approving or fixing just and reasonable rates and other service charges for the distribution of electricity as of May 1, 2015.

CROSS-EXAMINATION COMPENDIUM OF THE SCHOOL ENERGY COALITION
(Panel 1 – Distribution Capital and System Maintenance)

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average of actual and forecasted spending over the three-year ICM period (2012-2014), and (iii) the proposed level of capital spending for each of the five years in the planning horizon.

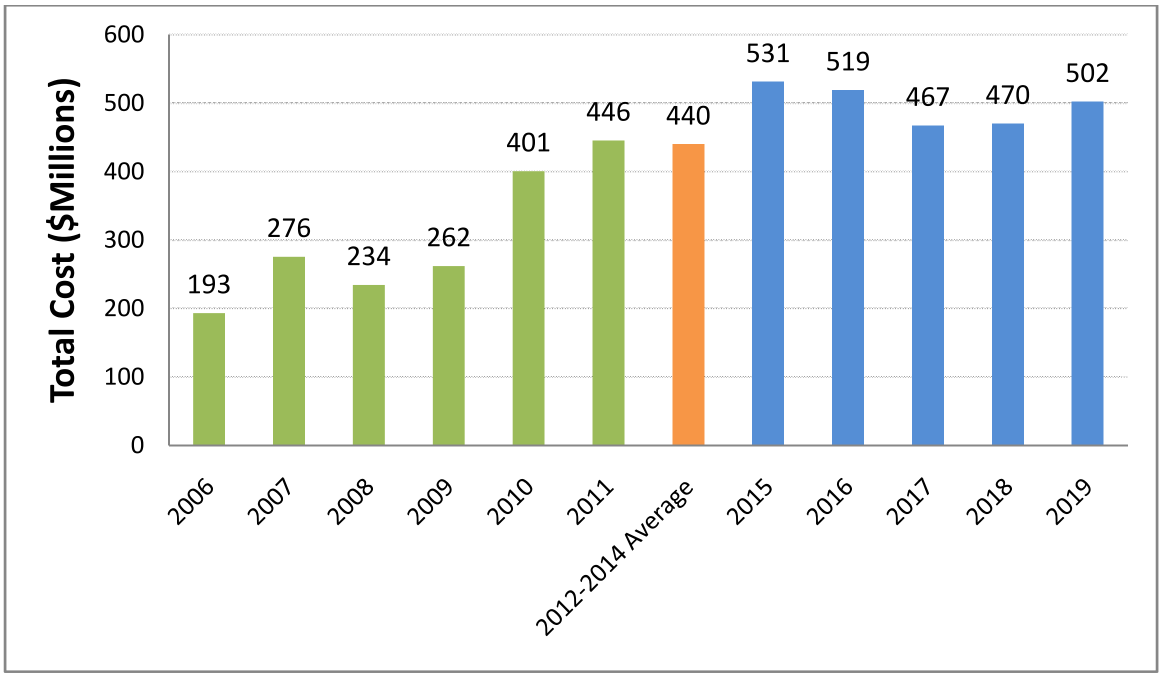

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Figure 1: Historical and Forecast Capital Spending (2006 – 2019) ($Millions)

As shown above, the average annual level of investment for the proposed capital program is comparable to the level of spending during the utility's 2012-2014 IRM/ICM period. This level of investment is required primarily to address the large and growing backlog of end-of-life and obsolete assets, while also addressing critical system challenges and operational needs at a pace and in a manner that moderates rate increases and is consistent with customer preferences. As demonstrated in the DSP, and as validated in the Navigant Report (Appendix B of this Schedule), this level of spending is the minimum level of investment that is appropriate during the 2015-2019 period given the distribution system's needs. While the optimal level of capital investment exceeds the

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 25:

Reference(s): **Exhibit 2B**

Please provide a table showing for each year between 2015-2019, the in-service additions, for each capital program. Please detail all assumptions made in the calculation.

RESPONSE:

Toronto Hydro forecasted in-service additions for 2015 on an asset basis, not by capital program. Please refer to Exhibit 2A, Tab 1, Schedule 2, Appendix 2-BA showing in-service additions of $653.6M. The 2016 to 2019 in-service additions were forecasted based on the 2015 assumptions with consideration to forecasted completion dates of known programs. The table below summarizes the total in-service additions forecasted for 2015 to 2019.

	2015	2016	2017	2018	2019
In-service Additions	$653.6M	$543.1M	$505.7M	$441.0M	$529.9M

The 2015 in-service addition assumptions for System Access, System Renewal, and System Service investments were based on historical in-service additions.

The forecasted in-service additions assumptions for General Plant, Copeland, and HONI were based on the latest projections related to the specific programs. For example, information technology, a program within General Plant, is comprised of discrete projects with varying completion dates. Each discrete project is assigned an estimated completion

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

date based on the best information available at the time of the forecast. Where the project is estimated to be completed in 2015, it was included in the forecasted in-service additions for 2015.

RESPONSES TO SUSTAINABLE INFRASTRUCTURE ALLIANCE OF ONTARIO INTERROGATORIES

INTERROGATORY 22:

Reference(s): Exhibit 2B Section E5.3, Page 3; Exhibit 9, Tab 1, Schedule 1

Concerning the Externally Initiated Plant project in Section E5.3, THESL states that:

> "Although the utility forecasts that this program will cost approximately $119 million between 2015 and 2019, it has included only one-sixth of this amount (approximately $20 million) in its revenue requirement, or approximately $4.0 million of net Toronto Hydro costs per year. This sub-forecast amount represents a base level of spending that will be required over this term. Toronto Hydro proposes to seek rates funding only for this sub-forecast base amount, with a variance account to record differences from this amount."

In Exhibit 9, Tab 1, Schedule 1 THESL goes on to say that:

> "To reconcile the variable, non-discretionary nature of the work with its resulting bill impact, Toronto Hydro has intentionally included a below-forecast level of Relocation Spending in the utility's Distribution System Plan ("DSP") for the 2015-2019 period"

a) Given that the $4.0 million annually is less than any annual actual amount of historic spending in this area since 2010, and given that THESL is actually forecasting a notable increase in spending in this area over 2015-2019, please explain why THESL nonetheless proposes including a "below forecast level" of spending in rates. Does THESL anticipate the possibility that its forecast variances could be overstated by as much as 5/6ths in each year?

RESPONSES TO SUSTAINABLE INFRASTRUCTURE ALLIANCE OF ONTARIO INTERROGATORIES

b) Is THESL concerned that the proposed approach could result in a likely material underrecovery, requiring an additional collection from customers in 2019 and beyond? Why should ratepayers in 2019 and onwards be responsible for costs deliberately under-recovered from 2015- 2019 ratepayer groups?

c) Would THESL consider including the full forecast amount (or some materially higher percentage of it – e.g., 90%) in its revenue requirement, subject to variance account treatment at the end of 2019? Why or why not?

RESPONSE:

a) The work contained in the Externally Initiated Plant Relocation Program (Exhibit 2B Section E5.3) is entirely driven by capital projects initiated by other agencies. As their capital programs change over time, the impact on Toronto Hydro is often uncertain. For example, $73M out of $119M predicted for 2015-2019 comprises large projects such as GO Transit Electrification between Union and Pearson, Eglinton Light Rail Transit ("LRT") project and other Metrolinx Transit projects such as Finch West and Sheppard LRT, for which the scopes and timing are not entirely confirmed and are subject to change.

Historically, annual spending in respect of externally-initiated plant relocation work has ranged between $1M and $19M. Toronto Hydro has estimated that expenditures of $4M annually would capture the majority of the more consistently incurred small and medium size relocation projects that the utility reasonably expects over the forecast period. The proposed variance account will be used to record the cost of the additional projects and protect ratepayers from the potential that any portion of the

RESPONSES TO SUSTAINABLE INFRASTRUCTURE ALLIANCE OF ONTARIO INTERROGATORIES

full forecast of third party work does not materialize due to the unpredictable nature, cost and timing of externally-initiated plant relocations.

b) Toronto Hydro believes its proposed approach best balances the need for funding for these uncertain projects with the recognition of the potential rate impacts for the 2015-19 period. Toronto Hydro's is not deliberately under-recovering any amounts. Please see response to part (a).

c) Please see response to part (b).

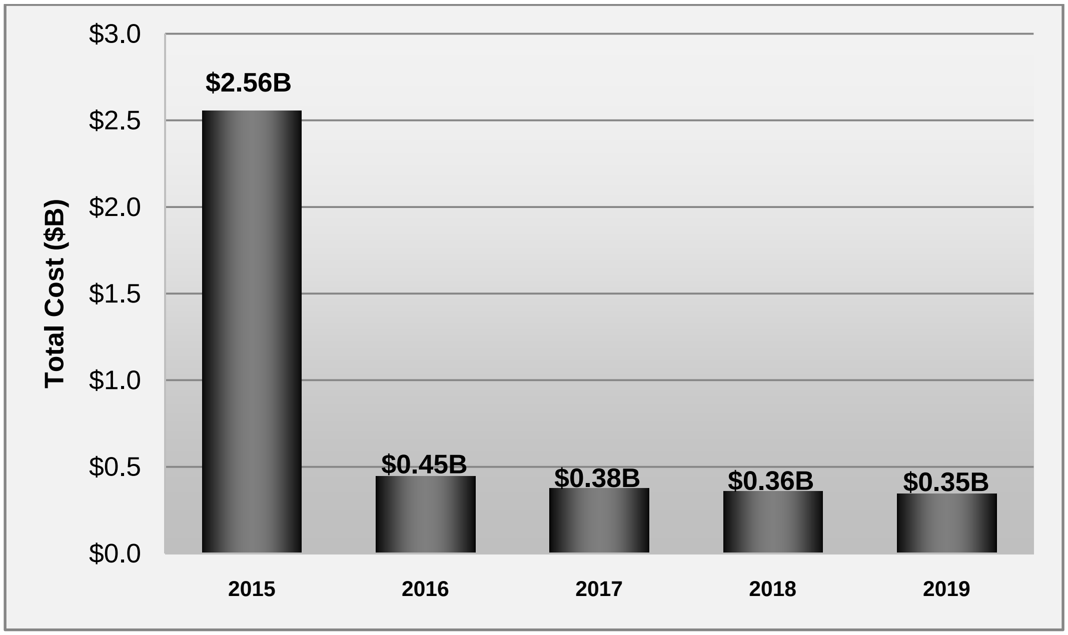

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FIGURE 7: ECONOMICALLY OPTIMAL CAPITAL INVESTMENT APPROACH (2015-2019)

This economically optimal capital investment approach would theoretically achieve steady state by 2016. However, this approach would constitute an unprecedented single-year capital investment that Toronto Hydro recognizes would result in large step-increases in rates, and, in any event, could not be completed as a practical matter. In short, this backlog of investments cannot be reasonably addressed in one year when considering bill impacts, system constraints and available resources.

For a more reasonable investment program, Toronto Hydro considered two alternatives: an “accelerated” strategy and a “paced” strategy. The accelerated strategy would allow for the backlog of investments to be managed over the five-year DSP period, such that “steady state” is achieved by 2019 with a level of investment of approximately $830 million on average per year, for a total of $4.17 billion over five years.

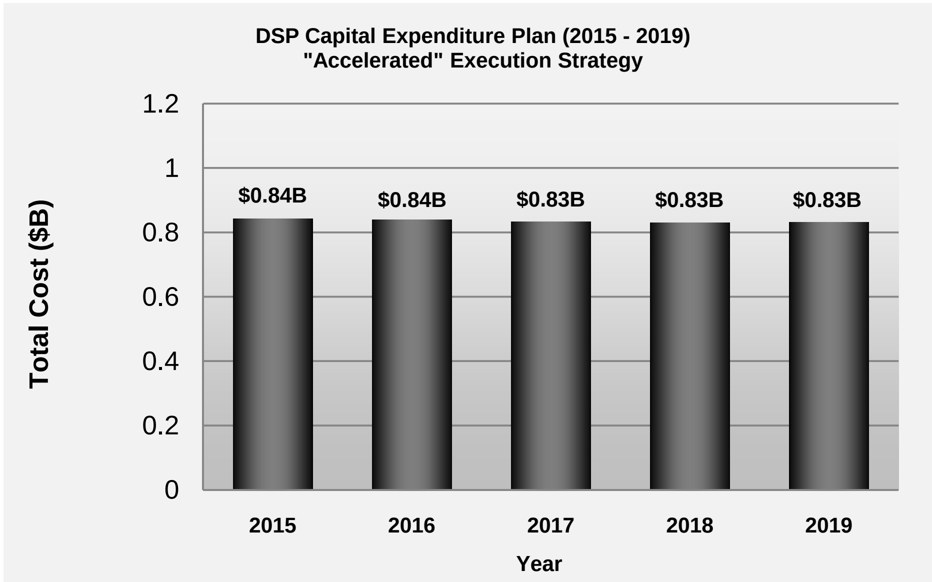

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FIGURE 8: ACCELERATED CAPITAL INVESTMENT STRATEGY (2015-2019)

One of the benefits of the accelerated strategy is that the system would be forecast to reach steady state in time for Toronto Hydro’s next five-year rate filing, delivering more predictable rate impacts and system performance beginning in 2020.

However, the accelerated strategy would still feature levels of investment that do not immediately align to Toronto Hydro’s current resources and system constraints, and, most importantly, would result in steeper rate increases over the DSP forecast period that would likely be unacceptable to customers. For this reason, Toronto Hydro’s DSP is based on a paced strategy, which is illustrated in the figure below and represents the level of capital investment in the proposed 2015-2019 DSP. (Note that the annual investment amounts vary in this scenario. This is because these amounts are based on detailed DSP program level forecasts of assets to be replaced and projects to be executed within the DSP forecast period. For the reasons described above, the utility has not developed the accelerated strategy to this level of detail.)

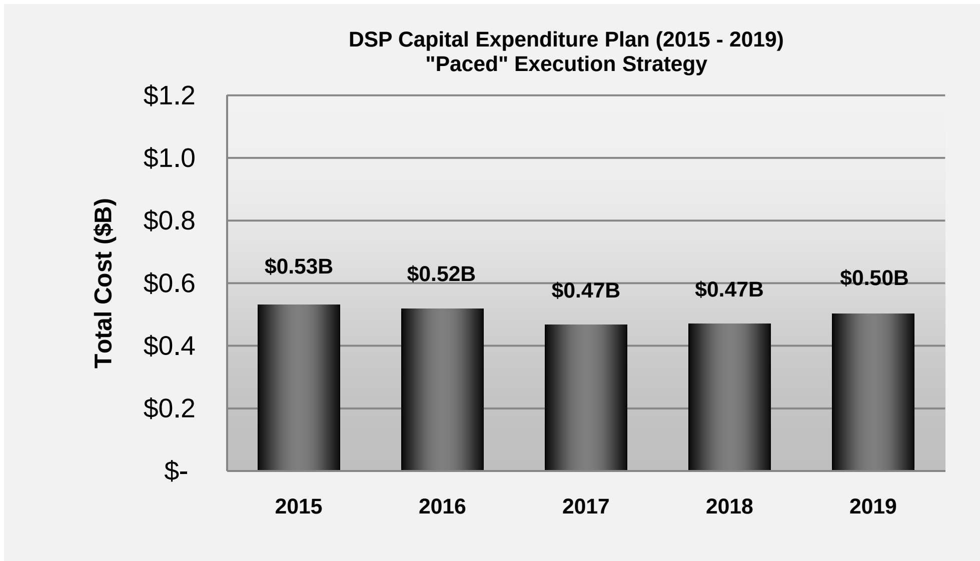

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FIGURE 9: PACED CAPITAL INVESTMENT STRATEGY (2015-2019)

The paced execution strategy features an average annual investment of just under $500 million, which, as the DSP evidence in Chapters D and E demonstrates, is the minimum level of investment that is appropriate given the magnitude of the asset backlog and other critical system issues and operational needs. If Toronto Hydro were to continue at this annual pace beyond 2019, the system is forecast to reach steady state by approximately 2037.

The disadvantage of this strategy is that customers are exposed to greater total asset lifecycle costs during the entire period of 2015 to 2037. However, this approach has the advantage of more predictable and tolerable bill increases during the 2015-2019 period and alignment with Toronto Hydro's immediate execution capacity.

The paced strategy has another significant advantage over the accelerated strategy: bill impacts and system performance are forecast to be more predictable beyond the achievement of steady-state. This is because the paced strategy takes a more gradual or dispersed approach to clearing the backlog of end-of-life assets. While achieving steady-state faster would maximize customer value sooner, the rapid renewal of aging assets would likely result in another large "lump" of end-of-life assets in the future, which would require another period of significantly large, multi-year investment needs.

To illustrate the overall impact on the system of reaching steady state, Figure 10 shows the forecast useful life demographics of the system as of 2037. The projected steady state in 2037 features a 15 percentage point reduction in the percentage of assets operating beyond end-of-life versus the current state of the system illustrated in Figure 2.

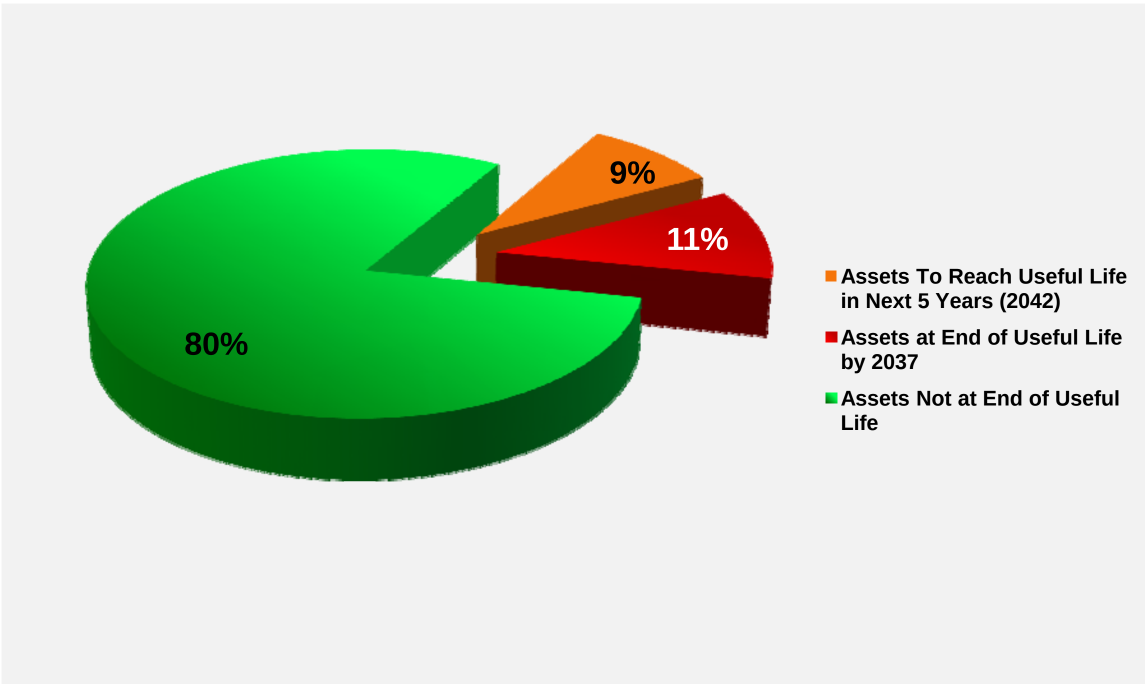

FIGURE 10: PROJECTED ASSET AGE DEMOGRAPHICS AS OF 2037

3 Coordinated Planning with Third Parties

Toronto Hydro recognizes the importance of coordinated regional planning between licensed distributors and transmitters and agrees with the view articulated in the RRFE that regional planning is an essential input to the cost-effective development of electricity infrastructure. The OEB's RRFE report and associated filing requirements place an emphasis on the integration of regional issues and requirements into utility planning processes.

Toronto Hydro, through its participation in the Central Toronto Integrated Regional Resource Plan led by the OPA, and in its participation in the Needs Screenings for Metro Toronto Northern sub-region and GTA North Western sub-region led by Hydro One Networks Inc. (HONI), has coordinated its planning efforts and subsequent DSP with the outcomes of the completed plans. The utility continues to coordinate with regional plans that are under development.

	Asset	USoA Account Number	USoA Account Description	Depreciation Useful Life	Useful Life		Economic End of Life 1		
							Min	Mid	Max
	Poles	1830	Poles, Towers and Fixtures	40 - 50	Poles - Wood, Concrete, Steel	45	3	61	100*
	OH Switch	1835	Overhead Conductors and Devices	30	OH Switch - Load Break	40	2	27	100*
					OH Switch - Disconnect	45	1	32	83
					OH Switch - SCADAMATE	40	2	11	100*
	O/H SMD - 20 Switches	1835	Overhead Conductors and Devices	45	NA		NA	NA	NA
	OH Primary Conductors	1835	Overhead Conductors and Devices	50	OH Primary Conductor	64	NA	NA	NA
	OH Secondary Conductors	1855	Services	50	OH Secondary Conductor	64	NA	NA	NA
	OH Transformers	1850	Line Transformers	30	OH TX	35	1	39	114*
Stations	Power Transformers	1815	Transformer Station Equipment - Normally Primary Above 50 kV	32	Stations - Power TX	44	NA	NA	NA
		1820	Distribution Station Equipment - Normally Primary Below 50 kV	32			NA	NA	NA
	AC Station Service Equip (TS)	1815	Transformer Station Equipment - Normally Primary Above 50 kV	32	NA		NA	NA	NA
	AC Station Service Equip (MS)	1820	Distribution Station Equipment - Normally Primary Below 50 kV	32	NA		NA	NA	NA
	Stations Grounding Transformer	1820	Distribution Station Equipment - Normally Primary Below 50 kV	25 - 30	NA		NA	NA	NA
	Stations - DC Batteries	1820	Distribution Station Equipment - Normally Primary Below 50 kV	10	Stations - DC Batteries	10	NA	NA	NA
	Storage Battery Equipment	1825	Storage Battery Equipment	15	NA		NA	NA	NA
	DC Station Service Battery Charger	1820	Distribution Station Equipment - Normally Primary Below 50 kV	20	NA		NA	NA	NA
	Stations Switchgear	1820	Distribution Station Equipment - Normally Primary Below 50 kV	40	Stations - Switchgear Enclosures	50	NA	NA	NA
	Substation Equipment - Outdoor Breaker	1820	Distribution Station Equipment - Normally Primary Below 50 kV	30	CB - Air Blast	40	NA	NA	NA
					CB - Magnetic Air	43	NA	NA	NA
					CB - SF6	45	NA	NA	NA
					CB - Vacuum	45	NA	NA	NA
					CB - Oil	45	NA	NA	NA
	Transformer Station Equip - Disconnect Switch	1815	Transformer Station Equipment - Normally Primary Above 50 kV	30	NA		NA	NA	NA
	Substation Equipment - Disconnect Switch	1820	Distribution Station Equipment - Normally Primary Below 50 kV	30	NA		NA	NA	NA
	Digital & Numeric Relays	1980	System Supervisory Equipment	20	NA		NA	NA	NA
	Transformer Station Equip - Steel Structure & OH Bus	1815	Transformer Station Equipment - Normally Primary Above 50 kV	35	NA		NA	NA	NA
	Transformer Station Equip - Steel Structure & OH Bus	1820	Distribution Station Equipment - Normally Primary Below 50 kV	35	NA		NA	NA	NA
	UG Primary Cable - PILC	1845	Underground Conductors and Devices	60	UG Primary Cable - PILC	75	31	100	100*
	UG Primary (Direct Buried)	1845	Underground Conductors and Devices	20	UG Primary Cable - DB Jacketed	40	23	49	100
					UG Primary Cable - DB Unjacketed	23	8	36	66
					UG Primary Cable - Conduit, Jacketed	50	21	62	100*

	Asset	USoA Account Number	USoA Account Description	Depreciation Useful Life	Useful Life		Economic End of Life 1		
							Min	Mid	Max
UG	U/G Dist Lines And Feeders - Primary Cable in Duct	1845	Underground Conductors and Devices	40	UG Primary Cable - Conduit, Unjacketed	50	17	52	100*
					UG Primary Cable - Concrete, Unjacketed	50	20	63	100*
					UG Primary Cable - Concrete, Jacketed	50	21	62	100*
	UG Secondary Cable Direct Buried	1845	Underground Conductors and Devices	20	UG Secondary Cable - DB	23	NA	NA	NA
	UG Secondary Services - Direct Buried	1855	Services	20			NA	NA	NA
	UG Secondary Cable - In Duct	1845	Underground Conductors and Devices	40	UG Secondary Cable - Conduit	50	NA	NA	NA
	UG Secondary Services - In Duct	1855	Services	40			NA	NA	NA
	UG Network Transformers	1850	Line Transformers	20	UG Network Units - Fibertop	30	12	47	67
					UG Network Units - Semi-Dust-Type	30	3	44	100*
					UG Network Units - Submersible	30	2	100	100*
	UG Transformers	1850	Line Transformers	30	UG TX - Pad-Mounted	35	3	21	90
					UG TX - Submersible	33	3	21	100*
	Vaults	1840	Underground Conduit	40	Civil - Network Vaults	60	5	70	100*
					Civil - UG Submersible Tx Vault	60	NA	NA	NA
	Vault Roofs	1840	Underground Conduit	20	Civil - Network Vaults Roofs	25	NA	NA	NA
	Vault Switches	1845	Underground Conductors and Devices	30	UG Switch - Minirupter	40	3	32	100*
	UG Switches - Padmount Switchgear	1845	Underground Conductors and Devices	20	UG Switch - PMH	30	7	100	100*
					UG Switch - SF6	40	8	26	100*
					UG Switch - SF6 PAD SCADA	35	10	100	100*
	Civil - Duct Structures	1840	Underground Conduit	30	NA		NA	NA	NA
	Cable Chambers	1840	Underground Conduit	50	Civil - Cable Chambers	65	NA	NA	NA
	Cable Chambers - Roof	1840	Underground Conduit	20	Civil - Cable Chambers Roof	25	NA	NA	NA
	System Supervisory Equipment	1835	System Supervisory Equipment	30	NA		NA	NA	NA
		1980	System Supervisory Equipment	15 - 30	NA		NA	NA	NA
Meters	Residential Energy Meters	1860	Meters	25	Residential Energy Meters	18	NA	NA	NA
	Industrial/Commercial Energy Meters	1860	Meters	25	Industrial/Commercial Energy Meters	18	NA	NA	NA
	Wholesale Energy Meters	1860	Meters	25	Wholesale Energy Meters	18	NA	NA	NA
	Current & Potential Transformer (CT & PT)	1860	Meters	25 - 40	Current & Potential Transformer (CT & PT)	18	NA	NA	NA
	Smart Meters	1860	Meters	15	Smart Meters	18	NA	NA	NA
		1970	Load Management Controls - Customer Premises	10		18	NA	NA	NA

Note 1: In some cases, the Economic End-of-Life results at the minimum range will indicate assets at a very young age that require replacement – this may be due to the manner in which these assets are connected, as a significant amount of customers may experience an outage should those assets fail. In these instances, the FIM could be indicating that it is worthwhile to reconfigure the existing state of assets such that a reduced amount of customers are exposed to an impact of failure. On the maximum end of the range, there are certain assets that have received Economic End-of-Life results of 100 or 114 years of age (marked with asterisks in this table) – in actuality, these Economic End-of-Life results represent the limits of the time domain that is being evaluated within the FIM, and the actual Economic End-of-Life results in these instances may be a higher age beyond these time intervals.

E1.2 Expenditure Summary Tables

This section provides breakdowns of the investments contained within Toronto Hydro's Distribution System Plan (DSP) based upon investment categories and drivers.

E1.2.1 Expenditures by Investment Category

Table 1 shows the capital expenditure for the 2015-2019 period for each category. The System Renewal category has the highest spending of around $1.26 billion ($250 million annually) due to Toronto Hydro's continual renewal and replacement of aging distribution assets. The other CAPEX category has the lowest spending of around $147 million ($29 million annually) as it includes costs related to Engineering Capital, Road Cuts, Allowance for Funds Used During Construction (AFUDC), Major Tools and inflation. Section 4.2 provides the details around the spending profiles for all these categories and the major variances within them along with the inter-relationships between each of these elements. In addition, Sections E5-E8 provides the details of the capital programs in these categories.

TABLE 1: CAPITAL INVESTMENT BY CATEGORIES

CATEGORY	Forecasted Spend ($M)						
	Avg.	2015	2016	2017	2018	2019	Total
System Access	$91.29	$86.13	$93.54	$100.93	$90.41	$85.47	**$456.47**
System Renewal	$251.73	$251.74	$234.99	$246.35	$260.08	$265.49	**$1,258.64**
System Service	$66.41	$76.45	$69.60	$62.51	$49.54	$73.95	**$332.05**
General Plant	$58.60	$104.63	$99.44	$28.93	$32.13	$27.88	**$293.01**
Other CAPEX	$29.86	$12.18	$21.22	$28.65	$37.89	$49.37	**$149.31**
Total	**$497.90**	**$531.13**	**$518.79**	**$467.36**	**$470.05**	**$502.16**	**$2,489**

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TABLE C: HISTORICAL AND FUTURE SPENDING

	Historical Spending					Future Spending				
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
CAPEX ($M)	108.4	90.3	53.8	68.8	108.1	96.0	80.1	84.0	99.7	99.5

Given that a high population of assets will be approaching the end of their useful lives in 2015, Toronto Hydro expects to maintain a level of investment similar to the forecasted 2014 magnitude throughout the 2015-2019 period. Minor fluctuations in the pacing of investment over the forecast period (e.g. the drop in spending in 2016 and 2017) will likely be required to facilitate other high-priority renewal and service investments in the underground system using similar resources. The proposed rate of investment in the Underground Circuit Renewal program will allow Toronto Hydro to prudently and proactively manage the significant backlog of end-of-life and poor condition underground assets, maintaining system reliability performance while enhancing customer value with the installation of more robust and reliable underground construction.

1 **TABLE 9: 2015 PROJECTS**

Project Number	Project Name	Total Project Cost	Start Date	Project Type (ICM or CIR)
E11628	E11628 Morningview UG Rebuild Phase 1 - Elec (47M3)	$344,403	2014	ICM
E11629	E11629 Morningview UG Rebuild Phase 2 - Elec (47M3)	$574,005	2014	ICM
E11803	E11803 Rebuild feeder egress H9M32 and M26 Ellesmere-Civil	$770,354	2015	CIR
E12128	E12128 Morningview UG Rebuild Phase 3 -Civil(47M3)	$1,607,213	2014	ICM
E12210	E12210 - Venture Drive UG SCNT47M1 - Civ / Elec	$1,838,314	2015	ICM
E12213	E12213 - Morningside Casebridge SCNT47M1 - Elec	$1,963,487	2015	ICM
E12217	E12217 Windfield Bayview Area Rebuild (51M21, NYSS27F1)	$172,201	2014	ICM
E12243	E12243 Durnford-Rylander-Tideswell Rebuild ph2 Electrical (47M17)	$57,400	2014	ICM
E12244	E12244 Tallpine Rebuild Phase Electrical (47M17)	$688,805	2014	ICM
E12251	E12251 Scenic Millway Rebuild SS27 - Electrical	$1,722,014	2014	ICM
E12267	E12267 Clappison Rebuild Electrical (47M17)	$229,602	2014	ICM
E12278	E12278 Nashdene-Tiffield UG Rebuild - Elec (NAR26M22) (DESIGN ONLY)	$3,628,734	2015	CIR
E12302	E12302 McNicoll Maybrook SCNAR26M32 UG Rebuild – Civil	$1,378,994	2015	CIR
E12310	E12310 Scunthorpe Invergordon UG Rebuild Ph A - Civil H9M26 SCNAH9M26	$1,273,978	2015	CIR
E12311	E12311 Scunthorpe Invergordon UG Rebuild Ph A - Electrical H9M26 SCNAH9M26	$739,958	2015	CIR
E12324	E12324 Dynamic Dr/McNicoll - Electrical (NAR26M32)	$919,012	2015	CIR
E12331	E12331 Civil Works for Rebuild of NYSS38F2 off Bunty Lane NYSS38F2	$51,856	2015	CIR
E12346	E12346 Bluffwood Saddletree Electrical NY51M3	$124,286	2015	ICM
E12380	E12380 Rebuild of NY51M4 Consumers Rd & Victoria Park Areas - Electrical NY51M4	$1,540,160	2015	CIR
E12385	E12385 Don Mills / Eglinton Rebuild - Civil (53M1)	$131,366	2015	ICM

Project Number	Project Name	Total Project Cost	Start Date	Project Type (ICM or CIR)
E12386	E12386 Don Mills / Eglinton Rebuild - Electrical (53M1)	$285,129	2015	ICM
E12400	E12400 Cass Ave UG VC NHF3 to 502M22 - Civil SCNHF3	$2,247,023	2015	CIR
E12406	E12406 Palmdale Dr UG VC NHF3 to 502M22 - Civil SCNHF3	$1,203,205	2015	CIR
E12409	E12409 Thimble Berryway Aspenwood UG Rebuiild Electrical NY51M3	$206,194	2015	ICM
E12428	E12428 Rebuild of NY51M4 Consumers Rd & Victoria Park Areas - Civil NY51M4	$342,386	2015	CIR
E12430	E12430 Cherrystone Aspenwood - Electrical (51M27)	$166,171	2015	ICM
E12477	E12477 Middlefield Passmore StateCrown Civil SCNAR26M21	$1,403,077	2015	CIR
E12487	E12487 Middlefield Industrial UG 63M6 Rebuild-Civil SCNT63M6	$859,191	2015	CIR
E13041	E13041 Ironside Crescent UG Rebuild Civil SCNAR26M21	$953,041	2015	ICM
E13046	E13046 NY53M26 UG Rebuild in Curlew and Victoria Park areas – Civil	$348,912	2015	CIR
E13065	Rebuild of SCNAE5-1M25 by Brimley Rd and Skagway Avenue – Electrical	$392,239	2015	ICM
E13069	E13069 NY51M24 UG Rebuild North of Finch	$430,208	2014	ICM
E13194	E13194 off Don Mills/Graydon Hall UG Reh (NY51M29)	$2,066,416	2014	ICM
E13212	E13212 Teesdale Place UG Reb Civil (SCNAR43M27)	$240,432	2015	CIR
E13240	E13240 51M22, 51M4 UG rehab off Sheppard & Victoria Park Intersection-Civil	$633,781	2015	CIR
E13621	Brandy Court PandC Civil Elec NY53M24	$113,533	2015	CIR
E13673	E13673 FESI mitigation 47M13 submersible transformer SCNA47M13	$75,664	2015	CIR
E14008	E14008 Rebuild Trunk 502M1 M22 Birchmount – Electrical	$362,801	2015	CIR
E14035	E14035 Teesdale Place UG Rebuild Electrical SCNAR43M27	$360,264	2015	CIR
E14116	E14116 DB Cable Replacements on SS63F1-Cummer & Maxome area-Civil	$262,347	2015	CIR
E14141	E14141 UG Rebuild 502M32 Eastwood SD- Civil	$1,442,504	2015	CIR
E14160	E14160 UG Cable Replacement 53M25 Cassandra 3Ph	$408,725	2015	CIR

Project Number	Project Name	Total Project Cost	Start Date	Project Type (ICM or CIR)
E14177	E14177 UG Rebuild 502M29 Carabob Crt - Civil	$415,952	2015	CIR
E14179	E14179 UG Rebuild 502M29 Bonis King Henrys- Civil	$936,238	2015	CIR
E14191	E14191 UG Rebuild H9M30 Kingston Mason -Electrical	$623,791	2015	CIR
E14230	E14230 Manse Road 209-245 UG Rebuild Civil	$744,400	2015	CIR
E14234	E14234 Grenoble Gateway UG Rebuild Civl NY53M9	$297,997	2015	CIR
E14236	E14236 185 Galloway UG Rebuild SCNAH9M29 - Civil	$457,867	2015	CIR
E14281	E14281 UG Rebuild VC 64F2 to 51M5 Argonne Simeon- Civil	$1,175,981	2015	CIR
E14322	E14322 Establish Neilson Tapscott R26M34 Main – Electrical	$737,921	2015	ICM
E14411	E14411 Crow Tr Remaining UG Rebuild Civ and Elect R26M34 SCNAR26M34	$473,989	2015	CIR
E14432	E14432 P01 47M1 Mammoth Hall UG Rebuild Ph3 (Electrical) SCNT47M1	$855,398	2015	ICM
E15024	E15024 P01 Sheppard UGDB Cable Reb Ele	$429,796	2015	CIR
E15193	E15193 Leslie-Clovercrest-UG Renewal-Civil & Elec-51M6 NY51M6	$540,298	2015	CIR
E15195	E15195 Morningside Ave UG trunk-Civil NT47M3 SCNT47M3	$431,057	2015	CIR
E15197	E15197 P01-Finch-Sheppard-Replacement 51M22 trunk-Elec-51M22-Leslie Ts	$539,483	2015	CIR
E15198	E15198 Finch-Sheppard-trunk cable repl.-Elec- 51M28 NY51M28	$476,680	2015	CIR
E15231	E15231 Leslie/Finch Replace UG cable 51M23 NY51M23	$137,417	2015	CIR
E15232	E15232 Leslie/Finch Replace UG trunk cable 51M7 NY51M7	$123,896	2015	CIR
E15233	E15233 Woody Vineway & Curly Vineway UG renewal 51M6 NY51M6	$290,478	2015	CIR
E15267	E15267 -P162 Bermondsey Trunk UG Renewal Elec 53M2, M12, M27, M28 NY	$1,687,487	2015	CIR
E15270	E15270 Victoria Park Gordon Baker UG renewal Phase II Civil 51M32 NY51M3	$1,456,519	2015	CIR
E15273	E15273 Wynford Heights Crescent UG Renewal Elec NY53M2	$378,823	2015	CIR
E15306	E15306 Leslie Francine Gideon Conversion Civil SS68-F10 to 51M3	$2,695,018	2015	CIR

Project Number	Project Name	Total Project Cost	Start Date	Project Type (ICM or CIR)
	NYSS68F1			
E15307	E15307 Bridgeport UG Rebuild Ph1 - Civil 47M13 SCNA47M13	$1,896,861	2015	CIR
E15316	E15316 Leslie Threadneedle Clansman Conversion SS68F10 to 51M3 NYSS68F10	$501,360	2015	CIR
E15317	E15317 Bridgeport UG Rebuild Ph2 - Civil 47M13 SCNA47M13	$1,853,593	2015	CIR
E15318	E15318 Bridgeport UG Rebuild Ph3 - Civil 47M13 SCNA47M13	$1,943,271	2015	CIR
E15324	E15324 Paul Markway Conversion Civil SS68-F10 to 51M27 NYSS68F10	$559,217	2015	CIR
E15325	E15325 Paul Markway Conversion Elec SS68-F10 to 51M27 NYSS68F10	$123,755	2015	CIR
E15328	E15328 McNicoll Leslie Conversion Civil SS68F10 to 51M3 NYSS68F10	$2,933,082	2015	CIR
E15332	E15332 Guildpark Pathway UG Rebuild - Civil H9M30 SCNAH9M30	$401,734	2015	CIR
E15342	E15342 Tahoe Court UG Rebuild Civil NY53M24	$243,928	2015	CIR
E15350	E15350 Confederation Angora UG Rebuild - Civil H9M30 SCNAH9M30	$2,007,342	2015	CIR
E15353	E15353 Brahms Clansman Don Mills Conversion Civil SS68-F1 to 51M27	$569,495	2015	CIR
E15355	E15355 Gracemount UG Rebuild - Civil H9M30 SCNAH9M30	$975,476	2015	CIR
E15356	E15356 Gracemount UG Rebuild - Electrical H9M30 SCNAH9M30	$340,470	2015	CIR
E15379	E15379 Victoria Park York Mills UG cable replacement 51M25 NY51M25	$817,406	2015	CIR
E15390	E15390 Scunthorpe Invergordon UG Rebuild Ph B - Civil H9M26 SCNAH9M26	$1,466,283	2015	CIR
E15392	E15392 Scunthorpe Invergordon UG Rebuold Ph D - Civil H9M26 SCNAH9M26	$1,737,054	2015	CIR
E15393	E15393 Scunthorpe Invergordon UG Rebuild Ph E - Civil H9M26 SCNAH9M26	$761,102	2015	CIR
E15395	E15395 Consumers Rd Sheppard UG Renewal 51M28 NY51M28	$929,773	2015	CIR
E15397	E15397 Scunthorpe Invergordon UG Rebuild Ph G- Civil H9M26 SCNAH9M26	$900,235	2015	CIR
E15429	E15429 Bridletowne-Warden 1-Ph UG	$1,738,101	2015	CIR

Project Number	Project Name	Total Project Cost	Start Date	Project Type (ICM or CIR)
	Rehab Civ SCNA502M22			
E15442	E15442 McGrisken Rd UG Rebuild - Electrical H9M23 SCNAH9M23	$180,272	2015	CIR
E15445	E15445 Cromwell Senator UG Rebuild - Civil 47M14 SCNA47M14	$1,594,380	2015	CIR
E15476	E15476 45 Birchmount Road UG Rebuild Civil SCNAR43M24	$88,288	2015	CIR
E15477	E15477 45 Birchmount UG Rebuild Elec SCNAR43M24	$97,275	2015	CIR
E15558	E15558 Bridletown-Warden 3-Ph UG Rehab Civ SCNA502M22	$97,275	2015	CIR
E15587	1123 Leslie St at Eglinton UG cable replacement 34M5	$32,837	2015	CIR
E16071	E16071 Morningside Ave UG trunk Electrical NT47M3 SCNT47M3	$409,540	2015	CIR
E16110	E16110 Guildpark Pathway UG Rebuild - Electrical H9M30 SCNAH9M30	$318,278	2015	CIR
E16131	E16131 Scunthorpe Invergordon UG Rebuild Ph D - Electrical H9M26 SCNAH9M26	$556,505	2015	CIR
W11156	35M10, M2, M4 & M9 Fairbank TS PILC Cable Replacmnt (Revised)	$826,754	2015	CIR
W11161	W11161 35M9 Fairbank TS PILC Cable Replacmnt	$74,025	2015	CIR
W11170	W11170 35M4 Fairbank TS PILC Cable Replacmnt	$215,957	2015	CIR
W11287	W11287 FESI - NY55M22 - Lateral Cable Replacmnt - Rowntree (ph4)	$718,430	2015	CIR
W11288	W11288 FESI 55M22 LATERAL CABLE REPLACEMENT-ISLINGTON	$332,907	2015	CIR
W12077	Hoggs Hollow PH4	$1,722,014	2013	ICM
W12308	W12308 FESI Clubhouse Crt and Brookwell Dr Rebuild	$1,290,728	2015	CIR
W12480	W12480 Primary Trunk Cable Replacement-The East Mall	$585,421	2015	CIR
W13114	W13114 Trunk Cable Replacement-The East Mall-ETHL-F2/F4	$597,047	2015	CIR
W13284	W13284 UG Lateral Repalcement Phase 1	$1,509,954	2015	CIR
W13287	W13287 UG Lateral Repalcement Phase 2	$1,951,438	2015	CIR
W14130	Rebuild Russfax & Twin Circle Crt	$439,236	2015	CIR
W14217	UG Lateral Cable Replacement - Signet/Kenhar 55M1	$1,063,379	2015	CIR

Project Number	Project Name	Total Project Cost	Start Date	Project Type (ICM or CIR)
W14274	UG Lateral Cable Replacement - Fenmar/Ormout 55M1	$1,055,354	2015	CIR
W14653	W14653-P01-Richview Feeder Egress Via Kelfield Rd	$1,341,461	2015	ICM
W14730	W14730-P01-Cable Upgrade to Increase Capacity on 88M46	$116,478	2015	CIR
W15268	W15268 - P01 - Red Robinway & Arnott UG Direct-Buried Cable Renewal CIVIL	$507,205	2015	CIR
W15269	W15269 - P01 - Red Robinway & Arnott UG Direct-Buried Cable renewal ELEC	$578,936	2015	CIR
W15278	W15278 The East Mall area UG Voltage Conversion Civil LDF1, LDF2 and LDF3 LDF1	$622,916	2015	CIR
W15279	W15279 - Dundas/Shaver area UG VC Civil QCF1, QCF2 and QCF3	$617,408	2015	CIR
W15298	W15298 West of Kipling Avenue, UG Voltage Conversion AHF2, AHF5	$573,753	2015	CIR
W15357	W15357 270 The Kingsway, Upgrade PT44103 Humbertown Plaza, 38M7 38-M7	$208,386	2015	CIR
W15363	W15363 150 Berry Rd VC of Tx/Sw at loc PT7257 to feeder 38M29 T-F1	$386,009	2015	CIR
W15462	W15462 Alcester Crt Underground Rebuild 35M7	$304,772	2015	CIR
W16076	W16076 - P01 Mayall Avenue Underground Rebuild 55M26	$564,185	2015	CIR
X12138	X12138 Larksong Crt Feeder DB Cable Replace (53M8) (DESIGN ONLY)	$240,187	2015	CIR
X12497	X12497 - Lotherton Parkway UG reconfiguration NY35M12	$880,289	2015	CIR
X15590	Electrical Work for the Replacement of A60CS and A61CS	$72,565	2015	CIR

The following subsections provide project details for all 2015 projects.

E12210 Project Description

Investment Category: **System Renewal**

Program: **Underground Circuit Renewal**

Project Title: **E12210 - Venture Drive UG SCNT47M1 - Elec**

Project Number: **E12210**

Project Year: **2015**

Estimated Cost: **$1,838,314**

(i) Objective

Rebuild a portion of SCNT47M1 out of Sheppard TS to improve reliability and service to customers. The civil portion has been completed. E12210 will complete the electrical portion of the project.

(ii) Scope of Work

TABLE 15: SCOPE OF WORK DETAILS

District Neighborhood	Scarborough-Rouge River
Station(s):	Sheppard TS
Feeder(s):	SCNT47M1

TABLE 16: ASSETS TO BE REPLACED

Assets to be Replaced	
Primary Cable	3,490.06 m
Underground Transformers	0
Underground Switchgear	1
Poles	0
Overhead Transformer	0
Overhead Switch	1

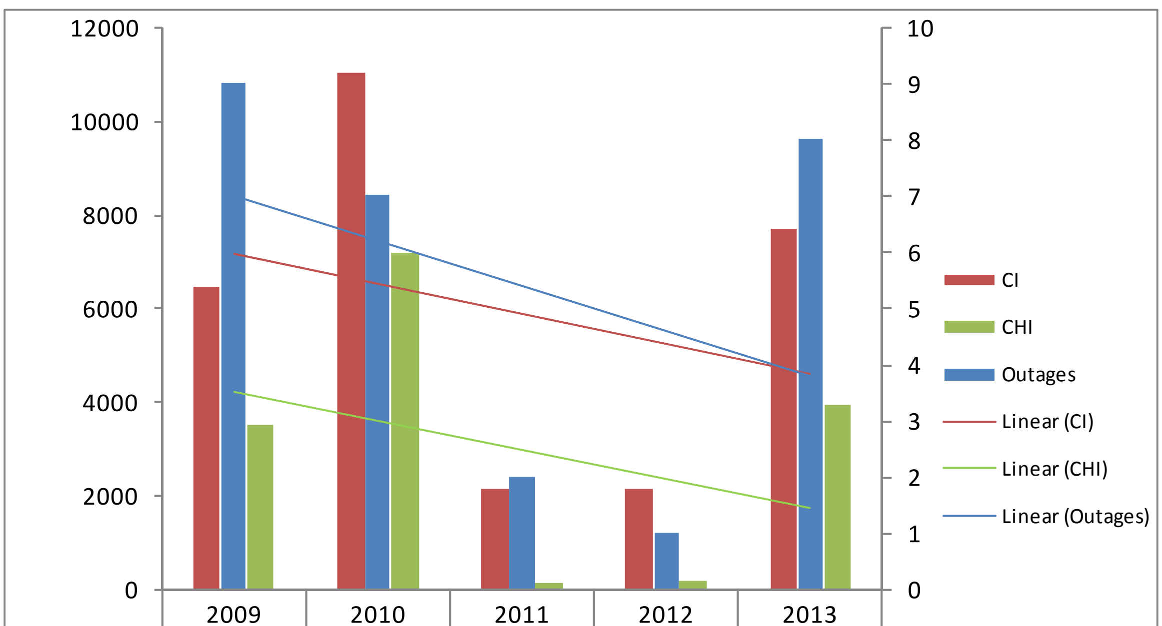
(iii) Justification & Benefits

Supplemental details pertaining to the justification and benefits of this project are summarized as follows:

TABLE 17: SUPPLEMENTAL DETAILS

Supplemental Details	Description
Age/Condition	▪ Direct buried cable ▪ Installed 1983 (31 years old)
Reliability	▪ Reliability improvements seen up until 2012 ▪ Reliability weakened in 2013, with the feeder experiencing 8 sustained outages in 2013 alone
Other (i.e. road moratoriums, etc)	▪ This is the electrical portion of the project and needs to be completed to help improve reliability in the area

Historical reliability including number of customers interrupted (CI), customer hours interrupted (CHI) and outages along the feeder are given in Figure 35.



	2009	2010	2011	2012	2013
CI	6436	11039	2151	2141	7685
CHI	3493	7163	143	178	3912
Outages	9	7	2	1	8

FIGURE 35: HISTORICAL RELIABILITY DETAILS FOR SCNT47M1

TABLE 1: UNDERGROUND CIRCUIT RENEWAL PROGRAM ASSET REPLACEMENT UNITS

Assets (Units)	2015	2016	2017	2018	2019	Total
Underground Switches	84	71	74	88	88	405
Underground Transformer	348	291	305	362	361	1,667
Underground Cable (circuit km)	149	125	131	155	155	715

/C

TABLE 2: SUMMARY PROGRAM BENEFITS

Customer Value	▪ Installing newer assets allows for reduced customer disruption in the event of an outage (i.e. quicker restoration due to SCADA switches and no digging for cable replacement). ▪ Improved neighborhood aesthetics depending on the age and condition of existing assets (i.e. heavily rusted transformers and switches). ▪ The completion of the first year of activities in this program is expected to result in an avoided estimated risk cost (ARC) of $102 million. A positive ARC value is indicative of a reduction in negative impacts to customers (e.g., customer interruption costs, emergency repair costs) through the renewal of the assets within this program (see Section E6.1.7).
Reliability	Proactively replacing assets with a high risk of failure will: ▪ Reduce customers interruptions ▪ Mitigate safety risks to employees ▪ Minimize reactive repair costs
Safety	▪ Minimize safety related issues due to flashovers (seen with pad-mounted and submersible switches and non-switchable submersible transformers). ▪ Minimize the risk associated with dig-ins of direct buried cables and cables in direct buried PVC ducts.
Efficiency	▪ Improved restoration time by replacing older and unreliable assets with modern equipment capable of remote sensing and operation (i.e. switch). ▪ Improved isolation of transformers without affecting power supply to customers on the rest of the distribution system. ▪ Faster cable replacement of underground cables due to the concrete encased duct infrastructure.
Other (flashovers, dig-ins)	▪ Elimination of routine CO_2 washing used to maintain pad-mounted switches. ▪ Complete removal of cables in duct when a feeder is abandoned rather than dead-ending the cables and leaving it in the ground where removal of direct buried cables is not economically feasible.

AMPCO Table

Exhibit 2B Secrion D2 Appendix A: 2014 Audit Results By Asset Class

	Asset	Population	Sample Size %	% very poor	% poor	% fair	% good	% very good	% very poor & poor	% very poor, poor & fair	# very poor	# poor	# fair	# good	# very good	Total	% very poor & poor	% very poor, poor & fair
1	Station Power Transformer	268	90.30	1.24%	13.64%	49.59%	23.14%	12.40%	14.88%	64.47%	3	37	133	62	33	268	40	173
2	Station Switchgear	279	88.89	4.84%	36.69%	33.47%	9.27%	15.73%	41.53%	75.00%	14	102	93	26	44	279	116	209
3	*Air Blast Circuit Breakers*	290	62.07	0.00%	3.89%	87.78%	2.78%	5.56%	3.89%	91.67%	0	11	255	8	16	290	11	266
4	*Air Magnetic Circuit Breakers*	627	74.32	0.21%	4.72%	74.25%	18.88%	1.93%	4.93%	79.18%	1	30	466	118	12	627	31	496
5	Oil Circuit Breakers	332	47.29	0.64%	10.19%	82.80%	6.37%	0.00%	10.83%	93.63%	2	34	275	21	0	332	36	311
6	*Oil KSO Breakers*	59	37.29	0.00%	4.55%	81.82%	13.64%	0.00%	4.55%	86.37%	0	3	48	8	0	59	3	51
7	SF6 Circuit Breaker	201	32.34	0.00%	0.00%	7.69%	46.15%	46.15%	0.00%	7.69%	0	0	15	93	93	201	0	15
8	Vacuum Circuit Breakers	675	70.81	0.00%	0.21%	3.14%	10.25%	86.40%	0.21%	3.35%	0	1	21	69	583	675	1	23
9	Submersible Transformers	9554	95.20	0.00%	0.02%	6.68%	34.93%	58.36%	0.02%	6.70%	0	2	638	3337	5576	9553	2	640
10	Vault Transformers	13034	88.24	0.00%	0.23%	23.48%	39.80%	36.50%	0.23%	23.71%	0	30	3060	5188	4757	13035	30	3090
11	Padmounted Transformers	7160	84.55	0.00%	0.02%	10.09%	43.51%	46.38%	0.02%	10.11%	0	1	722	3115	3321	7160	1	724
12	Padmounted Switches	802	97.01	0.00%	0.39%	7.20%	36.12%	56.30%	0.39%	7.59%	0	3	58	290	452	802	3	61
13	3 Phase O/H Gang Manual Switches	1108	32.94	0.00%	0.39%	3.01%	63.84%	33.15%	0.39%	3.40%	0	4	33	707	367	1112	4	38
14	3 Phase O/H Gang Remote Switches	15	86.67	0.00%	0.00%	15.38%	76.92%	7.69%	0.00%	15.38%	0	0	2	12	1	15	0	2
15	SCADAMATE Switches	926	85.31	0.13%	0.00%	1.14%	57.34%	41.39%	0.13%	1.27%	1	0	11	531	383	926	1	12
16	Wood Poles	123280	37.66	2.34%	7.64%	44.13%	7.28%	38.61%	9.98%	54.11%	2885	9419	54403	8975	47598	123280	12303	66707
17	Automatic Transfer Switches	58	91.38	0.00%	16.98%	32.08%	30.19%	20.75%	16.98%	49.06%	0	10	19	18	12	58	10	28
18	Network Transformers	1892	99.58	0.00%	0.00%	16.40%	41.45%	42.14%	0.00%	16.40%	0	0	310	784	797	1892	0	310
19	Network Protectors	1615	97.52	0.00%	0.00%	3.75%	32.25%	64.00%	0.00%	3.75%	0	0	61	521	1034	1615	0	61
20	Network Vaults	1062	99.53	1.70%	8.80%	72.37%	16.08%	1.04%	10.50%	82.87%	18	93	769	171	11	1062	112	880
21	Cable Cambers	10902	35.01	0.26%	1.60%	10.77%	50.17%	37.20%	1.86%	12.63%	28	174	1174	5470	4056	10902	203	1377

TABLE 3: CAPITAL EXPENDITURE SUMMARY

CATEGORY	Historical Spend ($M)					Forecasted Spend ($M)				
	2010A	2011A	2012A	2013A	2014P	2015	2016	2017	2018	2019
System Access	$44.37	$58.31	$53.15	$86.62	$76.01	$86.13	$93.54	$100.93	$90.41	$85.47
System Renewal	$215.00	$219.25	$157.25	$231.08	$286.37	$251.74	$234.99	$246.35	$260.08	$265.49
System Service	$35.32	$75.63	$38.35	$83.67	$101.34	$76.45	$69.60	$62.51	$49.54	$73.95
General Plant	$55.53	$67.71	$29.28	$33.77	$109.47	$104.63	$99.44	$28.93	$32.13	$27.88
Other CAPEX	$50.36	$24.63	$9.92	$10.52	$12.73	$12.18	$21.22	$28.65	$37.89	$49.37
Total	**$400.58**	**$445.53**	**$287.95**	**$445.66**	**$585.92**	**$531.13**	**$518.79**	**$467.36**	**$470.05**	**$502.16**
System O&M	$114.64	$111.89	$109.03	$119.84	$118.94	$128.76	-	-	-	-

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The following sections provide a summary of System Access, System Service, System Renewal and General Plant programs as well as System O&M expenditures. For full details and justification of the programs listed throughout these sections, see Sections E5 through E8 of the DSP. For a detailed explanation of System O&M expenditures, see Section E4.2.6.

7.1 System Access

Toronto Hydro's capital expenditures under the System Access investment category are driven by statutory, regulatory or other obligations that require Toronto Hydro to provide customers with access to the distribution system or to otherwise respond to service requests.

TABLE 4: SUMMARY OF SYSTEM ACCESS PROGRAMS

Program Index and Name		Description	Total (5 yrs)	Trigger Driver	Secondary Drivers
E5.1	**Metering**	Enable Toronto Hydro to meet its mandatory service obligations with respect to revenue metering and wholesale metering. This will be accomplished by testing meters, replacing damaged and obsolete meters, and upgrading the under-capacity and obsolete collector stations. Upgrading Toronto Hydro's Interval Metering MDM software will help customers manage their energy use and costs by providing them with timely access to their data.	**$81.5 M**	Mandated Service Obligations	Failure Risk

RESPONSES TO ENERGY PROBE RESEARCH FOUNDATION INTERROGATORIES

INTERROGATORY 24:

Reference(s): **Exhibit 2B, Section D3, Distribution System Plan**

Preamble:

Page 31 discusses the Maintenance Cost component of the Cost of Ownership in the BCE analysis. Lines 11-12 state "when a program results in a net reduction in the amount of maintenance required for a system…. This change contributes to the difference in the COO, which in turn is shown as a benefit of the program."

a) Please provide a chart showing those capital programs that result in a net reduction in the amount of maintenance required for the system along with the estimated annual savings in maintenance costs associated with the program.

b) Are there programs that result in an increase in annual maintenance costs? Please describe them and provide an estimate of the annual maintenance costs required to support them.

RESPONSE:

a) The table below summarizes the annual maintenance savings by program that were captured as part of the business case evaluation (BCE) process:

Program Name	Annual Maintenance Savings ($M)
Rear Lot Conversion	$ 0.03
Box Construction	$ 0.10

RESPONSES TO ENERGY PROBE RESEARCH FOUNDATION INTERROGATORIES

The above table includes a correction to the maintenance savings associated with Rear Lot Conversion. Due to this correction, the associated business case evaluation results for Rear Lot Conversion have been updated in Tables 1 and 2 below.

Table 1: Cost of Ownership of Status Quo

Business Case Element	Cost (in Millions)
Status Quo/Existing State of Infrastructure	
Asset Risk [AR_E]	$3.48
Non Asset Risk [NAR_E]	$23.62
Maintenance Cost [MC_E]	$0.60
Additional Quantifiable Benefits [AQB_E]	$0
Cost of Ownership of Existing Assets [COO_E]	$27.70

Table 2: Rear-Lot Conversion Program Business Case Evaluation (BCE)

Business Case Element	Cost (in Millions)
Option 2:	
Asset Risk [AR_N]	$1.73
Non Asset Risk [NAR_N]	$0
Maintenance Cost [MC_N]	$0.07
Additional Quantifiable Benefits [AQB_N]	$0
Cost of Ownership of New Assets [COO_N]	$1.80
Option 2: Project Net Benefit (NPV_2)	
Difference in Cost of Ownership [$\Delta COO_2 = (COO_E - COO_N)$]	$25.90
Program Cost [PC_2]	$21.30
Program Net Benefit [$NPV_2 = (\Delta COO_2 - PC_2)$]	$4.60

It should be noted that there may be further maintenance savings that are identified with respect to certain investments that are not quantifiable at present time. These

RESPONSES TO ENERGY PROBE RESEARCH FOUNDATION INTERROGATORIES

savings would be further identified and quantified as part of continuous improvements contained within the "measurement & enhancement" element within the AM Planning Process, as defined in Section D1.2.4 of Toronto Hydro's Distribution System Plan (Exhibit 2B, Section D1, page 16).

b) Yes, the Downtown Contingency program (Exhibit 2B, Section E7.7) is expected to increase the maintenance cost of the new state. The program introduces new tie points between feeders by installing new overhead switches. These new switches are expected to contribute extra maintenance cost of approximately $1,600 per switch over a three-year cycle. Please refer to Exhibit 2B, Section E7.7 for more details.

Capital Projects Table

Projects	2010	2011	2012	2013	2014 BRIDGE	2015 TEST	2016 TEST	2017 TEST	2018 TEST	2019 TEST	2014 Actual (YTD June)
Reporting Basis	**CGAAP**	**CGAAP**	**USGAAP**	**USGAAP**	**USGAAP**	**MIFRS**	**MIFRS**	**MIFRS**	**MIFRS**	**MIFRS**	**USGAAP**
Metering	28.4	22.1	12.1	12.2	14.0	24.7	16.6	14.7	11.7	13.7	6.8
Customer Connections	15.2	31.2	31.0	53.4	52.1	39.3	53.8	64.9	56.9	46.6	23.4
Externally-Initiated Plant Relocation & Expansion	0.7	5.0	9.8	18.6	8.8	4.0	4.0	4.0	4.0	4.0	3.9
Load Demand	-	-	0.3	2.4	1.1	12.0	13.9	14.0	15.7	19.2	0.0
Generation Projects Protection and Control	-	-	-	-	-	6.1	5.2	3.3	2.1	2.0	-
System Access Investments Sub-total	**44.4**	**58.3**	**53.2**	**86.6**	**76.0**	**86.1**	**93.5**	**100.9**	**90.4**	**85.5**	**34.1**
Underground Circuit Renewal	108.4	90.3	53.8	68.8	108.1	96.0	80.1	84.0	99.7	99.5	43.0
Paper-Insulated Lead-Covered (PILC) Piece-outs and Leakers	-	5.5	1.5	2.4	4.7	3.5	1.4	0.7	0.8	0.5	2.7
Underground Legacy Infrastructure	-	-	-	-	-	2.1	6.7	6.6	6.5	5.5	-
Overhead Circuit Renewal	25.8	28.3	23.2	49.0	53.3	44.0	23.0	24.9	25.3	30.3	30.1
Overhead Infrastructure Relocation	-	-	-	-	-	0.7	1.4	1.8	2.3	3.6	-
Rear Lot Conversion	6.9	16.6	17.5	23.8	22.7	17.0	8.1	10.3	10.3	13.6	7.3
Box Construction Conversion	5.7	7.1	0.8	13.8	23.3	16.8	20.7	21.1	21.6	22.7	9.7
SCADAMATE R1 Renewal	-	-	-	1.9	2.6	6.2	4.1	2.7	-	-	0.5
Network Vault Renewal	1.7	0.9	3.6	10.8	0.9	4.0	10.4	10.3	10.3	10.2	0.9
Network Unit Renewal	7.3	4.4	5.1	7.3	3.6	5.2	7.4	7.3	7.3	7.3	1.6
Legacy Network Equipment Renewal (ATS & RPB)	0.4	0.0	0.1	1.6	0.2	0.4	1.0	1.1	0.9	1.1	0.2
Network Circuit Reconfiguration	-	-	-	-	-	-	2.3	2.3	2.3	2.3	-
Stations Switchgear Renewal	14.9	12.9	11.6	7.9	24.6	11.9	18.9	25.5	27.6	22.4	3.4
Stations Power Transformer Renewal	1.8	4.0	2.7	1.7	1.3	1.7	2.6	2.6	2.7	2.7	0.9
Stations Circuit Breaker Renewal	0.0	0.9	0.2	1.0	2.1	1.7	1.8	1.8	2.1	1.8	0.1
Stations Control & Monitoring	-	-	0.1	0.5	0.2	0.1	0.9	1.1	1.5	1.4	0.2
Stations Ancillary Systems	0.1	0.1	0.2	0.6	0.2	0.7	0.6	0.4	0.3	0.4	-
Station Buildings	-	-	0.5	0.0	0.2	0.5	2.5	2.3	2.6	3.3	-
Stations DC Battery Renewal	0.2	0.2	0.4	0.3	0.6	0.3	0.7	0.7	0.7	0.7	0.2
Reactive Capital	25.1	28.6	29.2	37.4	32.1	31.9	32.7	33.1	33.6	34.2	17.6
Worst Performing Feeder	16.7	19.3	6.7	1.2	4.8	1.2	1.8	1.8	1.8	1.8	1.2
Distribution System Communication Infrastructure	-	-	-	-	-	-	-	-	-	-	-
Telecom Program	-	-	-	1.0	0.9	6.1	6.0	4.0	-	-	-
System Renewal Investments Sub-total	**215.0**	**219.3**	**157.2**	**231.1**	**286.4**	**251.7**	**235.0**	**246.3**	**260.1**	**265.5**	**119.5**
Contingency Enhancement	-	-	-	-	-	10.0	5.9	9.7	9.7	13.5	-
Design Enhancements	-	-	-	-	-	0.4	1.7	1.7	1.7	1.7	-
Feeder Automation	3.3	0.9	6.2	8.8	0.8	11.1	15.1	9.4	10.0	8.5	0.3
Overhead Momentary Reduction	-	-	-	-	-	-	-	0.6	0.6	0.6	-
Handwell Upgrades	21.1	32.9	12.6	11.7	16.2	5.0	-	-	-	-	4.0
Polymer SMD-20 Renewal	-	-	-	0.8	2.8	4.8	-	-	-	-	0.7
Downtown Contingency	1.1	4.7	0.1	1.1	1.0	-	0.7	0.7	1.0	0.9	0.5
Customer Owned Station Protection	-	-	-	-	-	0.6	1.0	1.0	0.8	0.6	-
Stations Expansion	6.9	32.5	18.6	61.2	82.2	54.2	28.5	36.5	22.0	44.0	28.6
Energy Storage Systems	-	-	-	-	1.0	0.5	1.1	2.2	3.2	3.8	-
Local Demand Response	-	-	-	-	-	0.2	2.4	0.6	0.5	0.3	-
Grid Intelligence	3.0	4.8	0.8	0.1	-	-	-	-	-	-	-
EV	-	-	0.0	0.0	-	-	-	-	-	-	-
System Service Investments Sub-Total	**35.3**	**75.6**	**38.4**	**83.7**	**104.1**	**86.8**	**56.5**	**62.5**	**49.5**	**73.9**	**34.2**
Fleet and Equipment Services	10.6	11.8	0.8	2.2	2.6	3.9	3.2	3.7	3.5	3.6	0.5
Facilities	12.1	25.3	6.6	14.5	90.3	53.8	24.2	2.0	2.0	1.9	41.8
IT Hardware	10.6	9.4	7.4	6.0	5.2	5.9	8.0	7.4	9.8	5.6	2.1
IT Software	22.2	21.2	14.5	9.6	10.1	15.5	16.2	15.8	16.8	16.8	3.8
Radio Project	-	-	-	-	-	6.7	13.7	-	-	-	-
ERP*	-	-	-	1.5	0.9	17.7	33.6	-	-	-	0.3
Program Support	-	-	-	-	0.4	1.2	0.5	-	-	-	-
General Plant Investments Sub-Total	**55.5**	**67.7**	**29.3**	**33.8**	**109.5**	**104.6**	**99.4**	**28.9**	**32.1**	**27.9**	**48.6**
Miscellaneous	12.3	(4.2)	4.5	5.4	3.2	0.9	1.2	1.2	1.2	1.2	2.0
AFUDC	3.5	5.2	2.3	3.3	7.1	6.1	4.3	4.5	4.6	4.6	2.3
Roadcuts	-	-	3.1	1.8	3.0	3.3	4.1	4.1	4.1	4.1	-
EAR	34.5	23.6	-	-	-	-	-	-	-	-	-
Inflation	-	-	-	-	-	-	10.2	18.9	28.0	39.5	-
Other Sub-Total	**50.4**	**24.6**	**9.9**	**10.5**	**13.3**	**10.3**	**19.8**	**28.6**	**37.9**	**49.4**	**4.3**
Total	**400.6**	**445.5**	**288.0**	**445.7**	**589.2**	**539.6**	**504.2**	**467.4**	**470.0**	**502.2**	**240.7**
Less Renewable Generation Facility Assets and Other Non Rate-Regulated Utility Assets (input as negative)	-	-	-	-	-	(6.3)	(5.9)	(5.1)	(5.0)	(5.4)	-
Total	**400.6**	**445.5**	**288.0**	**445.7**	**589.2**	**533.4**	**498.3**	**462.3**	**465.0**	**496.7**	**240.7**

In addition, the following table lists the major cost-saving factors with brief explanations into how programs are achieving a more efficient process within Toronto Hydro and reducing costs:

TABLE 4: COST SAVING FACTORS

Cost-Saving Factors	Description
Tree-trimming	▪ Use of tree proof conductor in areas where it is expected to reduce the pace of tree trimming cycles by mitigating tree contact outages
Maintenance	▪ Increased capacity is expected to allow for more flexibility in scheduling planned outages for maintenance at the effected stations ▪ Limiting the number of different types of assets in the system is expected to result in savings in maintenance since there are fewer equipment types with different maintenance needs ▪ Improved availability of spare parts for equipment repair ▪ Automatic switching capability is expected to help achieve maintenance efficiency by reducing maintenance crew hours to complete the same work through a more effective streamlining of functions ▪ Analysis of SCADA monitoring data may help Toronto Hydro make adjustments and corrections, which may result in corrective maintenance cost savings
Control and Monitoring	▪ Improved restoration time by replacing older and unreliable assets with modern equipment capable of remote troubleshooting and switching capabilities at with no SCADA connection ▪ Installation of sensors providing Toronto Hydro's Control Room the ability to remotely view real time statuses such as flooding, temperature and loading. This is expected to reduce the number of visits to vaults and stations
Operation Efficiencies	▪ Improved productivity for power system controllers and system response crews – Crews will not have to patrol the entire feeder, only the faulted section, reducing time for restoration ▪ Deploying SCADA-enabled tie point and sectionalizing switches reduces the need to send crews to perform the extensive switching work that would otherwise be needed to restore power during outages; is expected to result in labor cost savings by eliminating manual switching

Cost-Saving Factors	Description
	▪ Automated switches allow system controllers to make more efficient use of their time. Since switching actions on automated feeders would be able to occur autonomously, they would be able to focus on other areas requiring restoration
Elimination of Functionally Obsolete Assets	▪ Provide better access to distribution equipment and allowing for use of standard equipment in the future (i.e. bucket trucks); this is expected to reduce operational costs ▪ Expenditure of engineering resources to deal with asset failure on a reactive basis is avoided, improving organizational efficiency ▪ Installing a current standard asset, opposed to like-for-like legacy asset – if it is even available, is better for the system and is more efficient from a cost/procurement/standards perspective ▪ Reduce cost associated with repairing obsolete assets and supporting assets (e.g. communication systems)
Reduction of Failure Risk	▪ Saving cost by planned replacements compared to reactive replacements of failed assets
Project coordination with external parties	▪ Reduction in capital costs during the installation of infrastructure through cost sharing agreements, as well as shared construction efforts between Toronto Hydro and other organizations
Grouping assets together in projects	▪ Coordinate work with other asset replacement projects where optimization of work program can be achieved through time and material saving efforts. This includes pole/transformer coordinated replacements to reduce truck rolls, executing work on adjacent feeders to minimize manual switching efforts, etc.
Future Planning	▪ Enhanced condition monitoring on automated feeders is expected to allow day to day operating decisions and long term asset investment decisions to be made more efficiently and effectively ▪ Implementing the best the technology and material used in construction to extend asset and civil life

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 17:

Reference(s): **Exhibit 2B, Section A, p.12**

Please provide a chart showing the 2015-2019 cost savings for each 'Cost-Saving Factor'.

RESPONSE:

The cost-saving factors presented in Section A2.2, Table 4, page 12 of Toronto Hydro's Distribution System Plan cannot be accurately isolated or quantified at this time. The purpose of the table is to identify sources of cost savings that have been derived based upon subject matter expert knowledge and are meant to provide qualitative insight into savings.

As part of continuous improvements, Toronto Hydro will be working to quantify these cost saving factors over the next five-year period. As these savings are quantified, Toronto Hydro will integrate them into its AM Planning Process, for improved planning and support for capital investment programs. For instance, Toronto Hydro has introduced enhancements to its business case evaluation process, by incorporating cost savings associated with maintenance programs. Examples include Rear Lot Conversion, where savings associated with reduced maintenance when transitioning from overhead rear lot to front lot underground were quantified and incorporated into the programs' associated BCE.

TABLE 6: OTHER CAPITAL EXPENDITURES (CAPEX) – HISTORICAL & FORECASTED

CATEGORY	Historical Spend ($M)					Forecasted Spend ($M)					
	2010A	2011A	2012A	2013A	2014P	2015	2016	2017	2018	2019	
Other CAPEX	$50.36	$24.63	$9.92	$10.52	$12.73	$12.18	$21.22	$28.65	$37.89	$49.37	/C

Spending reductions in this category from 2010 to 2011 are largely attributed to reductions in engineering capital spending, as certain overhead costs were deemed to be no longer directly attributable to assets as per the 2011 accounting update, therefore resulting in a reduced amount of engineering capital being eligible for capitalization in 2011. The full details associated with the 2011 accounting update and impacts are further explained and defined within Exhibit Q1, Tab 2, Schedule 1 as part of Toronto Hydro's 2011 cost-of-service EDR application (EB-2010-0142).

Engineering capital expenditures are only included within this investment category between 2010 and 2011, and from 2012 and onwards, these costs are integrated within capital investment programs, which therefore drives further reduction in this category between 2011 and 2012 respectively. Increases in this spending category from 2015 onwards to 2019 are largely the product of spending inflation. Furthermore, the AFUDC rate applied by Toronto Hydro from 2010 onwards to 2014 is based on the OEB prescribed rate, whereas the forecasted expenditures from 2015 and onwards are based on MIFRS and thus include AFUDC calculated based on Toronto Hydro's weighted average cost of debt.

From 2016 onwards to 2019, inflation costs are also included within this category, which result in the year-over-year increases.

E4.2.6 System Operating & Maintenance (O&M) Spending Profile

System Operational and Maintenance (O&M) expenditures represent the following five functional areas:

- Supply Chain Services;
- Control Centre;
- Operations Support;
- Distribution Maintenance Programs; and

- Fleet and Equipment Services.

O&M programs within these areas are outlined in greater detail in Exhibit 4A, Tab 02.

Operational programs that support Toronto Hydro's capital and maintenance programs include:

- **Supply Chain Services**, which supports the execution of Toronto Hydro's asset management plans and other operating programs that rely on procurement and warehousing activities. The overarching goal of the program is to facilitate timely and cost-effective acquisition of services, materials and equipment at requisite quality, while also maintaining an optimal amount of inventory to support uninterrupted work execution and manage materials handling costs.

- **The Control Centre**, which allows Toronto Hydro to safely and reliably operate the utility's distribution grid through real-time system control and monitoring activities carried out from a single location. The control room coordinates the necessary system switching and restoration work to mitigate the impact of emergency outages, enables load transfers for capital and maintenance work, and monitors the flow of electricity across Toronto Hydro's distribution plant.

- **Operations Support**, which provides functions such as program and work management, planning, contractor administration, trades training, and engineering support.

Maintenance programs, which assess the condition and prolong the useful life of Toronto Hydro's assets include:

- **Distribution Maintenance Programs**, which are designed to maintain asset performance (i.e. reliability) and mitigate risks associated with asset failures. The core philosophy at the heart of many of the programs is Reliability-Centered Maintenance (RCM). RCM defines maintenance tasks for a particular asset class to maximize its reliability based on its function and its criticality to the distribution system, while minimizing costs. Programs are also designed to account for risks and other factors such as the safety of Toronto Hydro's employees and the public, obligations found in environment, health and safety legislation and regulations, equipment performance and failure data, manufacturers' recommendations, and industry best practices. Distribution Maintenance programs are executed under four categories which include:

- Preventive Maintenance: Typically cyclical inspection and maintenance tasks, which emphasize assessing asset condition, preserving performance over the expected life of the asset, and maintaining public and employee safety.
- Predictive Maintenance: Testing or auditing of equipment for a predetermined condition (or conditions) that anticipates failures and enables further maintenance tasks to prevent those failures.
- Corrective Maintenance: Repairing or replacing equipment after a deficiency has been reported. Corrective Maintenance actions typically arise from deficiencies discovered during the execution of Preventive or Predictive Maintenance tasks, or temporary repairs that have been made during Emergency Maintenance to restore power.
- Emergency Maintenance: Responding to unplanned and urgent events that occur on the distribution system including the repair or replacement of equipment that has failed and caused a power disruption to Toronto Hydro customers.

- **Fleet and Equipment Services**, which oversees procurement, maintenance and disposal of Toronto Hydro vehicles, associated equipment, and employee personal protective gear. It is also responsible for ensuring that certain safety equipment and implements are tested and/or repaired in accordance with the requirements of the *Occupational Health and Safety Act, 1990*,[3] the Infrastructure Health & Safety Association, and other applicable standards.

The expenditures for System O&M are as follows:

TABLE 7: SYSTEM OPERATION & MAINTENANCE EXPENDITURES – HISTORICAL & FORECASTED ($ MILLIONS)

CATEGORY	Historical Spend ($M)					Forecasted Spend ($M)				
	2010A	2011A	2012A	2013A	2014P	2015	2016	2017	2018	2019
System O&M	$114.64	$111.89	$109.03	$119.84	$118.94	$128.76	-	-	-	-

During the 2010 to 2012 period, System O&M expenditures decreased primarily due to reductions in Operation Support services from 2010 to 2011 and reductions in Corrective Maintenance from 2011 to 2012. In 2013, expenditures increased due to costs associated with Toronto Hydro's

[3] R.S.O. 1990, C. O.1. ["*OHSA*"]

emergency storm response following the December 21, 2013 ice storm. In 2014, expenditures are forecasted to increase from 2012 spending levels due to additional Operation Support services for Toronto Hydro's capital and maintenance programs. In 2015, expenditures are planned to increase primarily due to increases in Distribution Maintenance programs. The projected budgets from 2016 to 2019 are expected to increase in line with inflation.

The number of assets that are approaching or are beyond their expected useful lives has been and will continue to grow during the 2015 to 2019 period. Aging assets necessitate robust maintenance programs to mitigate a wide variety of potential risks associated with possible asset failures including public and employee safety, environmental, system reliability and financial risks. As a result, Toronto Hydro expects that it will be necessary to sustain an increased level of System O&M expenditures during the 2015 to 2019 period in order to allow Toronto Hydro to detect deteriorating equipment conditions and deficiencies prior to equipment failure.

In addition, Toronto Hydro expects that a sustained increase in expenditures will allow the utility to:

- reduce vegetation management cycles;
- conduct PCB testing at below-grade structures, pad-mounted equipment locations and customer locations;
- expand the usage of modern and new technologies, tools and testing methods such as ultrasonic testing to detect partial discharge (corona), infrared scanning to detect thermal anomalies, oil testing to monitor transformer health, and cable testing to detect degradation of underground cables;
- increase proactive maintenance activities at customer locations and substations; and
- enable Toronto Hydro to maintain assets that were formerly part of the street lighting system in Toronto.

Capital and System O&M programs are interrelated, as ageing and deteriorated assets that are not replaced through capital work will result in deteriorating conditions over time. These conditions must be managed through System O&M work, including inspections, tests, and corrective maintenance to mitigate elevated risks of failure. These activities place upwards pressure on expenditures within certain segments of System O&M programs. The opposite also holds true as increases in capital work can result in reductions in some System O&M work.

Examples of this include capital replacements and enhancements for legacy distribution assets such as fibertop network units, reverse power breakers, and porcelain insulators. Examples also include corrective maintenance expenditures, which during the 2010 to 2013 period, experienced a reduction in part due to increases in planned capital expenditures on ageing and deteriorated assets. For 2014 and 2015, corrective maintenance is expected to rise, however it will remain below the peak levels experienced in 2011.

Although System O&M and capital investments are interrelated, a significant portion of System O&M expenditures are directed to activities that are independent of particular capital expenditure levels, including routine maintenance to preserve asset performance over its expected life; vegetation management to maintain minimum clearance requirements for overhead conductor and equipment; cyclical patrols and inspections undertaken to comply with minimum Distribution System Code requirements; corrective maintenance activities to address deficiencies caused by animal, pest, or tree contacts; and emergency maintenance following severe weather and storm damage. In addition, System O&M programs are necessary to provide the information that is used to plan Toronto Hydro's capital programs such as asset health and condition information. This is particularly important given Toronto Hydro's ageing asset base, which cannot be feasibly replaced through capital work in a short time frame due to a variety of factors such as resource and logistic constraints. The information captured through Toronto Hydro's System O&M programs is necessary to enable the prioritization of assets for capital work and to maximize the likelihood that assets that remain in-service have not surpassed end-of-life.

E4.2.6 Overall Trends

As illustrated in Table 11 above, with the exception of 2012, Toronto Hydro's historical capital expenditures have generally increased over the five-year historical period from 2010 to 2014 in the System Access, System Renewal, and System Service investment categories. This increase in investment was made because of Toronto Hydro's gradually worsening distribution system reliability due to a large number of aging and deteriorating infrastructure assets. Also, an increase in investment was required for the capacity growth seen between 2010 and 2014 and the increase in real estate developments and large infrastructure projects during that period.

General Plant spending was elevated in 2010 and 2011, partly due to the corresponding ramp-up in distribution system capital spending. Routine General Plant investments were stable from 2012-2014, but spending increase sharply in 2014 due to the initiation of the Operating Centres Consolidation Program. Spending in the General Plant category appears front-loaded during the 2015-2019 due to a number of larger, one-time investments required in the early years. *IC*

TABLE 7: AVOIDED RISK COST BUSINESS CASE EVALUATION

Business Case Element	Cost (in Millions)
Asset Renewal	
Present Value of Net Cost in 2020 **[PV(NET_COST(2020)]**	$192.56
Net Cost for the First Year of Activity **[NET_COST(First Year of Activity)]**	$96.00
Avoided Risk Cost of Executing Work for the First Year of Activities [ARC = (PV(NET_COST(2020)) - (NET_COST(First Year of Activity))]	$102.93

E6.1.7 2015 Project Details

Table 9 shows the total program cost for 2015. The costs are broken into capital expenditure amounts associated with:

(a) previously filed projects that appeared as jobs in the OEB approved Underground Infrastructure segment as part of Toronto Hydro's 2012-2014 Incremental Capital Module (ICM) filing; and

(b) projects appearing for the first time as part of the 2015-2019 Customer Incentive Rate-setting (CIR) application.

TABLE 8: 2015 PROGRAM COSTS

2015 CAPEX ($M)	
ICM Jobs	**CIR Projects**
18.6	77.3

IC

Table 10 lists all projects that will be partially or completely executed as part of the 2015 work program. Note that the table shows total costs for each project. Depending on the precise start date of each project, portions of the total project cost may be incurred before or after 2015. For reference, projects that originally appeared as ICM segment jobs have been flagged as "ICM".

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(b) projects appearing for the first time as part of the 2015-2019 Customer Incentive Rate-setting (CIR) application.

TABLE 8: 2015 PROGRAM COSTS

2015 CAPEX ($M)	
ICM Jobs	**CIR Projects**
14.0	82.0

Table 10 lists all projects that will be partially or completely executed as part of the 2015 work program. Note that the table shows total costs for each project. Depending on the precise start date of each project, portions of the total project cost may be incurred before or after 2015. For reference, projects that originally appeared as ICM segment jobs have been flagged as "ICM".

APPENDIX A: Capital Summary Table (ISAs)

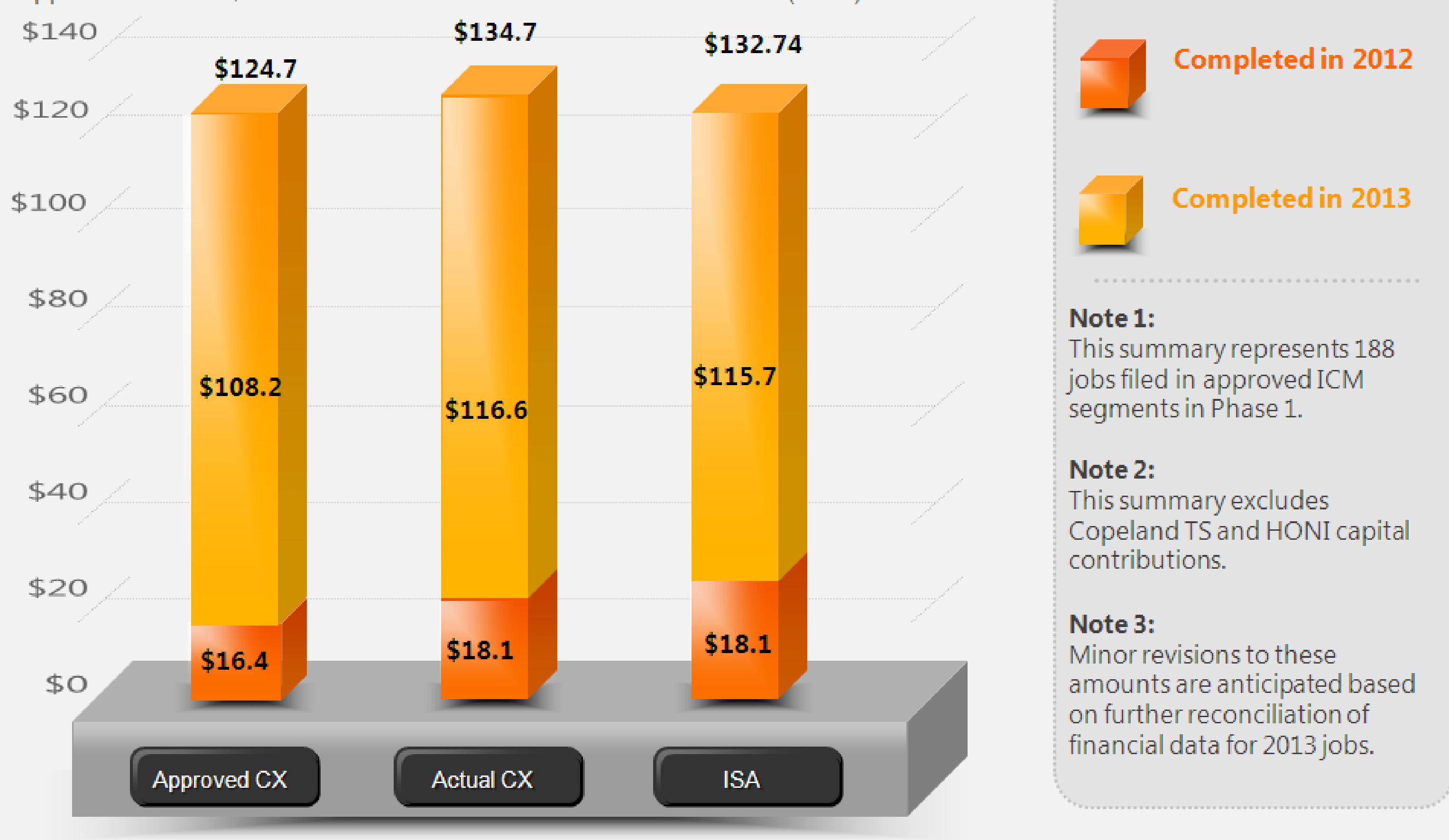
		Phase 1: Approved			Phase 2: Approved	Phase 1 + 2: Approved		Phase 1 + 2: Actual/Forecast					Variance	
		In-Service Additions												
		A	B	C	D	E = C + D	F = A + B + E	G	H	I	J	K = G + H + J	L = J - E	M = K - F
Schedule Number	Segments	Total 2012 In-Service Additions	Total 2013 In-Service Additions	Total 2014 In-Service Additions	Total 2014 In-Service Additions	Total 2014 In-Service Additions	Total Approved In-Service Additions (2012-2014)	2012 In-Service Additions Actual (Annual)	2013 In-Service Additions Actual (Annual)	2014 In-Service Additions Actual (YTD June)	2014 In-Service Additions Forecast (Annual)	Total Forecast In-Service Additions (2012-2014)	Total 2014 In-Service Additions Approved vs Forecast	Total 2012-2014 In-Service Additions Approved vs Forecast
B1	Underground Infrastructure	12.74	51.88	23.07	36.70	59.77	124.39	9.35	62.17	10.07	76.54	148.06	16.78	23.67
B2	Paper Insulated Lead Covered Cable - Piece Outs and Leakers	0.04	3.34	2.12	1.42	3.54	6.92	0.11	0.15	0.38	6.17	6.44	2.63	(0.48)
B3	Handwell Replacement	6.05	17.73	6.52	7.22	13.74	37.53	5.41	16.61	2.34	10.89	32.92	(2.85)	(4.60)
B4	Overhead Infrastructure	4.02	39.06	21.87	14.78	36.65	79.73	1.03	33.47	12.86	49.82	84.32	13.17	4.59
B5	Box Construction	0.26	14.35	9.02	5.72	14.74	29.34	0.02	5.24	2.90	18.45	23.71	3.71	(5.64)
B6	Rear Lot Construction	7.25	27.02	11.52	5.00	16.52	50.79	3.49	27.23	8.35	16.70	47.42	0.18	(3.37)
B9	Network Vault & Roofs	1.26	13.00	7.34	0.90	8.24	22.50	-	12.33	2.05	2.29	14.62	(5.95)	(7.88)
B10	Fibertop Network Units	0.65	5.52	3.02	2.84	5.85	12.02	0.96	7.06	0.94	5.60	13.62	(0.25)	1.60
B11	Automatic Transfer Switches (ATS) & Reverse Power Breakers (RPB)	-	1.99	1.28	0.10	1.38	3.36	-	1.51	0.29	0.30	1.81	(1.08)	(1.55)
B12	Stations Power Transformers	0.17	2.33	1.36	-	1.36	3.86	-	0.35	0.99	2.90	3.25	1.54	(0.60)
B13.1 & 13.2	Stations Switchgear - Municipal and Transformer Stations	0.77	9.16	5.37	1.41	6.78	16.71	-	-	3.21	3.61	3.61	(3.17)	(13.10)
B20	Metering	2.10	7.75	3.29	3.82	7.11	16.96	-	7.13	3.41	10.82	17.95	3.72	0.99
B21	Externally-Initiated Plant Relocations and Expansions	4.50	20.78	9.72	1.87	11.59	36.87	1.94	7.37	0.03	17.80	27.10	6.21	(9.77)
BXX	ICM Understatement of Capitalized Labour	3.69	4.63	-	-	-	8.32	-	-	-	-	-	-	(8.32)
Total ICM Projects (Excluding Copeland)		43.49	218.53	105.49	81.78	187.27	449.29	22.31	180.62	47.82	221.90	424.83	34.63	(24.46)
B17	Copeland Transformer Station	-	-	124.10	-	124.10	124.10	-	2.08	1.30	1.30	3.38	(122.80)	(120.72)
B18.2	Hydro One Capital Contributions	-	-	60.00	-	60.00	60.00	-	-	-	-	-	(60.00)	(60.00)
Total ICM Projects		**43.49**	**218.53**	**289.59**	**81.78**	**371.37**	**633.39**	**22.31**	**182.70**	**49.12**	**223.21**	**428.21**	**(148.16)**	**(205.18)**
B7	Polymer SMD-20 Switches	-	0.93	0.60	1.59	2.19	3.12	-	0.84	-	1.51	2.35	(0.68)	(0.77)
B8	SCADA-Mate R1 Switches	-	0.87	0.56	1.89	2.45	3.32	-	1.88	0.03	0.03	1.91	(2.43)	(1.42)
B14	Stations Circuit Breakers	0.34	0.76	0.22	1.05	1.27	2.36	0.22	0.90	0.19	0.50	1.62	(0.77)	(0.74)
B16	Downtown Station Load Transfers	0.30	1.68	0.84	-	0.84	2.82	-	0.03	1.33	1.33	1.36	0.49	(1.46)
B18.1	Hydro One Capital Contributions	-	1.48	-	2.64	2.64	4.12	5.48	2.61	-	1.76	9.85	(0.88)	5.73
C1	Operations Portfolio Capital	29.00	87.75	29.66	49.29	78.95	195.70	39.93	79.39	30.76	99.43	218.76	20.48	23.05
C2	Information Technology Capital	9.25	21.47	6.28	11.25	17.53	48.25	7.56	20.28	6.24	17.49	45.33	(0.04)	(2.92)
C3	Fleet Capital	0.29	0.76	1.75	2.00	3.75	4.80	0.80	0.44	1.83	3.72	4.96	(0.03)	0.16
C4	Buildings and Facilities Capital	3.76	2.90	3.35	5.00	8.35	15.00	1.40	6.16	0.04	7.21	14.77	(1.13)	(0.23)
Total Normal Capital Budget		**42.94**	**118.60**	**43.25**	**74.71**	**117.96**	**279.49**	**55.38**	**112.55**	**40.40**	**132.96**	**300.89**	**15.01**	**21.40**
Total		**86.43**	**337.12**	**332.84**	**156.49**	**489.33**	**912.88**	**77.69**	**295.25**	**89.53**	**356.17**	**729.10**	**(133.16)**	**(183.78)**

APPENDIX B: Capital Summary Table (CAPEX)

		Phase 1: Approved Capital Spending			Phase 2: Approved Capital Spending	Total Phase 1 + 2 Capex Approved		Phase 1 + Phase 2: Actual/Forecasted Capital Spending					Variance	
		CapEx			CapEx	CapEx	CapEx	CapEx						
		A	B	C	D	E = C + D	F = A + B + E	G	H	I	J	K = G + H + J	L = J - E	M = K - F
Schedule Number	Segments	2012 Approved Capex	2013 Approved Capex	2014 Approved Capex	Total 2014 Approved Capex	Total 2014 Approved Capex	Total Approved Capex (2012-2014)	2012 Capex (Actual)	2013 Capex (Actual)	2014 Capex Actual (YTD Jun)	2014 Capex IR Fcst as at Jul 2014 (Annual)	Total Fcst Capex (2012-2014)	Total 2014 Capex Approved vs Fcst	Total 2012-2014 Capex Approved vs Fcst
B1	Underground Infrastructure	28.75	58.94	-	77.86	77.86	165.56	36.90	55.97	41.69	107.08	199.95	29.22	34.39
B2	Paper Insulated Lead Covered Cable - Piece Outs and Leakers	0.08	5.42	-	3.55	3.55	9.05	0.14	1.98	2.33	5.96	8.08	2.42	(0.96)
B3	Handwell Replacement	13.65	16.65	-	18.06	18.06	48.36	12.39	11.87	3.96	15.52	39.77	(2.54)	(8.59)
B4	Overhead Infrastructure	9.07	55.88	-	26.01	26.01	90.96	11.59	40.42	28.23	64.12	116.13	38.10	25.16
B5	Box Construction	0.58	23.04	-	14.27	14.27	37.90	0.84	13.84	9.70	23.03	37.71	8.76	(0.18)
B6	Rear Lot Construction	16.36	29.43	-	12.51	12.51	58.29	15.98	23.20	7.35	26.42	65.60	13.91	7.31
B9	Network Vault & Roofs	2.84	18.76	-	2.25	2.25	23.85	2.81	10.58	1.17	1.18	14.58	(1.07)	(9.27)
B10	Fibertop Network Units	1.48	7.71	-	7.09	7.09	16.28	2.14	6.83	1.59	4.66	13.63	(2.43)	(2.65)
B11	Automatic Transfer Switches (ATS) & Reverse Power Breakers (RPB)	-	3.26	-	0.25	0.25	3.51	-	1.59	0.22	0.22	1.81	(0.03)	(1.70)
B12	Stations Power Transformers	0.38	3.48	-	-	-	3.86	0.02	1.54	0.87	2.66	4.21	2.66	0.36
B13.1 & 13.2	Stations Switchgear - Municipal and Transformer Stations	1.73	13.72	-	3.54	3.54	18.98	2.43	5.08	3.21	9.34	16.85	5.81	(2.13)
B20	Metering	4.74	8.40	-	9.54	9.54	22.68	5.69	4.72	4.91	12.56	22.97	3.02	0.29
B21	Externally-Initiated Plant Relocations and Expansions	10.16	24.84	-	4.55	4.55	39.55	9.20	18.57	3.87	6.46	34.23	1.91	(5.33)
BXX	ICM Understatement of Capitalized Labour	8.32	-	-	-	-	8.32	-	-	-	-	-	-	(8.32)
Total ICM Projects (Excluding Copeland)		**98.13**	**269.53**	**-**	**179.49**	**179.49**	**547.15**	**100.13**	**196.19**	**109.12**	**279.21**	**575.53**	**99.72**	**28.38**
B17	Copeland Transformer Station	8.50	81.00	34.60	-	34.60	124.10	4.07	26.72	20.57	54.51	85.29	19.91	(38.81)
B18.2	Hydro One Capital Contributions	-	23.00	37.00	-	37.00	60.00	-	18.60	8.85	21.20	39.80	(15.80)	(20.20)
Total ICM Projects		**106.63**	**373.53**	**71.60**	**179.49**	**251.09**	**731.25**	**104.19**	**241.51**	**138.54**	**354.92**	**700.63**	**103.83**	**(30.63)**
B7	Polymer SMD-20 Switches	-	1.53	-	3.97	3.97	5.50	-	0.84	0.71	1.85	2.69	(2.13)	(2.82)
B8	SCADA-Mate R1 Switches	-	1.43	-	4.73	4.73	6.16	-	1.90	0.45	1.79	3.69	(2.94)	(2.47)
B14	Stations Circuit Breakers	0.76	0.55	-	2.63	2.63	3.94	0.22	1.02	0.09	1.81	3.05	(0.82)	(0.89)
B16	Downtown Station Load Transfers	0.68	2.14	-	-	-	2.82	0.05	2.31	0.42	1.29	3.65	1.29	0.84
B18.1	Hydro One Capital Contributions	1.48	-	-	2.64	2.64	4.12	26.63	20.49	1.04	5.88	53.00	3.24	48.88
C1	Operations Portfolio Capital	64.78	81.63	-	103.78	103.78	250.19	66.67	93.24	41.61	98.24	258.15	(5.53)	7.96
C2	Information Technology Capital	22.00	15.00	-	15.00	15.00	52.00	23.20	17.12	5.99	16.24	56.57	1.24	4.57
C3	Fleet Capital	0.80	2.00	-	2.00	2.00	4.80	0.79	2.16	0.51	2.00	4.95	-	0.15
C4	Buildings and Facilities Capital	5.00	5.00	-	5.00	5.00	15.00	5.13	5.71	1.35	8.25	19.10	3.25	4.10
	Allowance for Funds Used During Construction	1.20	1.40	-	7.95	7.95	10.55	-	-	-	-	-	(7.95)	(10.55)
Total Normal Capital Budget		**96.70**	**110.68**	**-**	**147.70**	**147.70**	**355.08**	**122.70**	**144.80**	**52.15**	**137.35**	**404.85**	**(10.34)**	**49.77**
Total		**203.33**	**484.22**	**71.60**	**327.18**	**398.78**	**1,086.33**	**226.89**	**386.31**	**190.69**	**492.27**	**1,105.47**	**93.49**	**19.14**

APPENDIX C: Phase 1 ICM Jobs Completed in 2012-2013

Filed ICM Phase 1 Jobs Completed in 2012-2013 ($ millions)
Approved CAPEX, actual CAPEX and actual in-service amount (ISAs)



Note 1:
This summary represents 188 jobs filed in approved ICM segments in Phase 1.

Note 2:
This summary excludes Copeland TS and HONI capital contributions.

Note 3:
Minor revisions to these amounts are anticipated based on further reconciliation of financial data for 2013 jobs.

RESPONSES TO BUILDING OWNERS AND MANAGERS ASSOCIATION, GREATER TORONTO INTERROGATORIES

INTERROGATORY 31:

Reference(s): Exhibit 1B, Tab 2, Schedule 4, Capital, page 16

a) Does "steady state" in Toronto Hydro's vocabulary mean a state where no assets (other than as required for efficient execution) operate beyond the useful life, or is there another number, for example, 5% or 10% of assets in service beyond their useful life that represents an acceptable solution?

b) To what extent does Toronto Hydro take into account the different probabilities of failure and the consequences of failure of an asset beyond end of useful life, including the assets that have been found to be in fair, good, very good shape, in the Asset Condition Review? Please discuss fully and provide examples.

c) Please indicate for each year between now and 2037 the impact of the proposed annual investment to achieve the "steady state" condition.

RESPONSE:

a) As stated in Section E2.1 of Toronto Hydro's Distribution System Plan (Exhibit 2B, Section E2, page 1), steady state "reflects an optimal balance between the capital investments required for the distribution system and aggregate risk costs associated with the broader asset population. In order to achieve a steady state, assets across the distribution system must be evaluated and intervened upon based upon their optimal intervention timing results – also known as the economic end-of-life criteria". The achievement of steady state allows total life cycle costs of the assets across the system to be minimized. A reduction in the percentage of assets past useful life would be

RESPONSES TO BUILDING OWNERS AND MANAGERS ASSOCIATION, GREATER TORONTO INTERROGATORIES

considered an outcome of the steady state achievement, but is not the target by which the steady state is defined.

b) Toronto Hydro's Feeder Investment Model, further described in Exhibit 2B, Section D3.1.2.1(i), page 13, line 24, applies both age-based and condition-based failure probability calculations in order to determine the probability of failure for a given asset. The age-based failure probability calculation is derived from Hazard Rate Distribution Functions (HDF), which account for the typical lifespan of a given asset out of its respective asset class population – for these reasons, the age-based failure probability calculation produces the default, or baseline failure probability for a given asset. Where a health index value is unavailable for a given asset, that asset will be assigned its age-based failure probability value. Where a Health Index value is available for a given asset, that asset will be assigned its corresponding condition-based failure probability result only if the condition-based result exceeds the baseline failure probability produced from the age-based calculation.

Through this relationship between the age-based and condition-based failure probability calculations, the Health Index is being used to identify if the failure probability for a given asset is greater than the baseline value established based on age. In other words, where an asset is experiencing an accelerated failure rate due to its condition, the Health Index and condition-based failure probability calculations are applied to increase the probability of failure. Condition-based probability information is used in this manner due to the fact that the Health Index in itself represents a "defect" analysis. Its parameters are based on degradation factors. Where a given degradation factor has been identified for a given asset, it will reduce the corresponding Health Index score. In contrast, the Health Index calculation does

RESPONSES TO BUILDING OWNERS AND MANAGERS ASSOCIATION, GREATER TORONTO INTERROGATORIES

not contain any parameters that would result in improvements, or increases, to a given Health Index score.

As an example, consider a wood pole that is 61 years of age and possesses a Health Index score of 100 (Very Good). The Health Index score of 100 would translate into a condition-based failure probability result of 0.00%. However, the asset would receive an age-based failure probability result of 2.63%, which would represent the baseline or default failure probability of that asset given its age. A Health Index score of 100 means that the asset is not failing at an accelerated pace when compared to its baseline age-based failure probability value; it does not mean that the asset's failure probability based on age has been improved. Therefore, the asset will be assigned a failure probability value of 2.63%.

c) For discussion of capital spending requirements beyond 2019, please see Toronto Hydro's response to interrogatory 1A-SEC-1.

ORAL HEARING UNDERTAKING RESPONSE TO ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO

UNDERTAKING NO. J1.5:

Reference(s):

To indicate where in the Evidence asset condition information may be found.

RESPONSE:

Information about the condition of Toronto Hydro's assets is presented in Exhibit 2B, Section D, Appendix A, which is the <u>Toronto-Hydro-Electric System Limited 2014 Asset Condition Assessment Audit</u> prepared by Kinetrics Inc.

As shown in Exhibit 2B, Section D1, Figure 2, page 6, asset condition assessment is one of the tools Toronto Hydro uses as an input into its planning process. As discussed in Exhibit 2B, Section D3.2.1, pages 16-18, the asset condition assessment is used to create health indices for the various asset classes shown in Figure 6 of that section. Specifically, the information on asset condition is used to produce an outlook of the asset population's condition and highlight trends in that condition to support project planning.

However, asset condition is not the primary driver of Toronto Hydro's asset renewal program. As explained in response to interrogatory 1B-BOMA-31(b) with regard to the Feeder Investment Model, age-based failure probabilities are the primary driver of projected asset failures, with condition based assessment used "only if the condition-based result exceeds the baseline failure probability produced from the age-based calculation". As 1B-BOMA-31(b) goes on to explain, "where an asset is experiencing an accelerated failure rate due to its condition, the Health Index and condition-based failure probability calculations are applied to increase the probability of failure". Moreover,

ORAL HEARING UNDERTAKING RESPONSE TO ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO

asset condition assessment information may not be comprehensive because information may only be available for certain conditions that impact asset performance.

Toronto Hydro's approach reflects the reality that as assets reach and then exceed their useful lives, their probability of failure increases regardless of their known condition. In other words, assets at or beyond their useful lives are more likely to fail, even if they appear to be in good condition, but assets that are both at or beyond their useful and in poor condition are that much more likely to fail. For this reason, asset condition assessment information, where available, is used to help prioritize capital work.

As an example, the power transformers scheduled for replacement in 2015 are all at or beyond their useful lives and in fair or poor condition as shown in Table 1 below. Note that this excludes one 2015 project for which the scope of work involves installation of an oil containment system rather than installation of a new transformer. As noted in Exhibit 2B, Section E6.14, Table 5, page 23-24 (the source of Table 1 below), the power transformers shown as being in fair condition have specific issues that support their immediate replacement.

ORAL HEARING UNDERTAKING RESPONSE TO ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO

Table 1: Assets for renewal identified in the Power Transformer Program for 2015

Asset (Power Transformer)	Age (As of 2014)	Past Useful Life (Y/N)	Health Index	HI Grade	Optimal Intervention Time (Feeder Investment Model)
Blaketon MS Transformer TR1	45	Y (At Useful Life)	67	Fair Condition	0
High Level MS Transformer TR2	68	Y	48	Poor Condition	0
Coronation Bennett MS Transformer TR1	58	Y	36	Poor Condition	0
Norseman MS Transformer TR1	58	Y	59	Fair Condition	0

In a similar manner, contractor project estimates require adjustments to account for the project-related cost drivers that are incremental to their project costs, including costs of audit and verification mandated by Toronto Hydro, and administration charges from the utility's Program Support Office that manages the design and construction contractors. After the completion of the adjustment process, Toronto Hydro's reference project costs are reasonably comparable to the contractor estimates..

C3.4.2 Historical Performance Trends

Based on the above comparison methodology, the costs of Toronto Hydro's internal project construction were on average [redacted] higher[3] than the costs of the same projects had they been constructed by the six design and construction contractors. The cost gap value was calculated using the weighted average of individual estimate variances commensurate to the proportion of external contract work performed by each of the six contractors in a reference year.

Toronto Hydro's analysis indicates that a significant portion of fully burdened construction cost variance stems from the higher overhead and burden expenditures associated with the scale and scope of the utility's operations as compared to the analogous cost drivers for the external contractors. Some of these costs are driven by the terms of Toronto Hydro's collective agreements and by the need for Toronto Hydro to have specialized trades to work on unique aspects of its distribution system (downtown network, lead cable, box construction etc.). Contractors, on the other hand, generally employ high voltage workers with generic qualifications and experience needed for more standard overhead and underground systems most prevalent across their customer base. However, with respect to other cost drivers, such as facilities expenditures and the On-Cost rate, Toronto Hydro anticipates overall improvement due to the planned or ongoing productivity and efficiency initiatives. For the purposes of the 2015-2019 CIR period, Toronto Hydro will use the results of its historical analysis as a general point of reference. The utility notes, however, that it has recently issued a Request for Proposals (RFP) with the goal of awarding and re-negotiating its contracts with all external design and construction service providers for the 2015 – 2018 timeframe. The outcomes of the RFP may materially affect the results of future comparative efforts relative to the past year assessments. This is especially relevant in light of the high demand for qualified services currently characterizing Toronto Hydro's electrical construction market, and expected to remain a significant factor in the medium term. This is primarily due to a large number of construction projects planned or underway in the city

[3] The redacted information has been filed confidentially pursuant to the OEB's *Practice Direction on Confidential Filings*

RESPONSES TO CANADIAN UNION OF PUBLIC EMPLOYEES LOCAL ONE INTERROGATORIES

INTERROGATORY 3:

Reference(s): Exhibit 2B, Section C, C 3.4.1

a) For the period 2011-2019 inclusive, provide the annual OM&A cost for all external contract services, such as consultants or vegetation management services, and including D&C contractors. Also provide the percentage this represents of total annual OM&A expenditures.

b) For the period 2011-2019 inclusive, provide the annual capital expenditures cost for all external contract services including consultants and D&C contractors as well as the percentage this represents of total annual capital expenditures.

RESPONSE:

a) Please see Table 1 below, which provides Toronto Hydro's total OM&A costs for all external contract services such as consultants or vegetation management services, and including D&C contractors. For the 2016-2019 period, Toronto Hydro is not in a position to provide a specific forecast at this time, but expects results consistent with 2015 Test Year, subject to changes driven by the nature and volume of required work.

Table 1: External OM&A Contractor Costs

Category	2011Actual	2012Actual	2013Actual	2014Bridge	2015Test
External OM&A Costs	$59.4M	$57.5M	$72.9M	$73.5M	$89.2M
% Total OM&A	25%	27%	30%	30%	33%

/C

RESPONSES TO CANADIAN UNION OF PUBLIC EMPLOYEES LOCAL ONE INTERROGATORIES

b) Please see Table 2 below, which provides Toronto Hydro's total capital expenditures for all external contract services such as consultants or vegetation management services, and including D&C contractors. For the 2016-2019 period, Toronto Hydro is not in a position to provide a specific forecast at this time, but expects results consistent with the 2015 Test Year. The actual results, however, will depend on a number of factors, including the nature and volume of approved work.

Table 2: External Capital Contractor Costs

Category	2011 Actual	2012 Actual	2013 Actual	2014 Bridge	2015 Test
External Capital Costs	$220.5M	$133.7M	$261.6M	$376.7M	$300.8M
% Total Capital	50%	46%	59%	64%	56%

TABLE 1: PROPOSED PERFORMANCE MEASURES FRAMEWORK

Customer-Oriented Performance	Cost Efficiency/ Effectiveness of Planning and Implementation	Asset/System Operation Performance
1. System Average Interruption Duration Index (SAIDI). 2. System Average Interruption Frequency Index (SAIFI). 3. Customer Average Interruption Duration Index (CAIDI). 4. Feeders Experiencing Sustained Interruptions (FESI). 5. Momentary Average Interruption Frequency Index (MAIFI).	1. Distribution System Plan Implementation Progress. 2. Planning Efficiency: Engineering, Design and Support Costs. 3. Supply Chain Efficiency: Materials Handling On-Cost. 4. Construction Efficiency: Internal vs. Contractor Cost Benchmarking. 5. Construction Efficiency: Standard Asset Assembly Labour Input.	1. Outages caused by defective equipment. 2. Stations capacity availability.

In developing the proposed measures, Toronto Hydro referred to the Section 5.2.3, Chapter 5 of the Ontario Energy Board's (OEB) *Filing Requirements for Electricity Transmission and Distribution Applications*[1], which sets out the key parameters for measures or metrics supporting the applicants' Distribution System Plan filings. Toronto Hydro's proposed framework of measures is consistent with the OEB's expectations set out in the Chapter 5 Filing Requirements, and should provide the OEB with useful insights into the quality and sophistication of the utility's distribution planning and implementation activities, as well as Toronto Hydro's improvement in recent years.

For each proposed measure, (with the exception of new measures) Toronto Hydro provides performance results along with the associated trend over the recent years, describes the methodology used to calculate the measure and its implementation, and outlines the ways in which the measure informs and/or otherwise interacts with the utility's Distribution System Plan and the related processes. Where relevant, Toronto Hydro also describes the unique planning

[1] Ontario Energy Board, *Filing Requirements for Electricity Transmission and Distribution Applications*, (Toronto: Ontario Energy Board, 2013). ["*OEB Filing Requirements*"]

C3 COST EFFICIENCY & EFFECTIVENESS

C3.1 Distribution System Plan Implementation Progress

C3.1.1 Measure Description

Toronto Hydro plans to measure the overall progress of its Distribution System Plan implementation as a rolling ratio of total capital expenditures made over the plan years completed to date, divided by the five-year total amount of OEB-approved capital expenditures approved as a part of the utility's 2015-2019 Distribution System Plan, Including the System Access, System Renewal, System Service, and General Plant investment categories. The proposed measure will be calculated using the following formula:

$$\text{Implementation Progress} = \frac{\sum(\$\text{ Spend Year n} + \$\text{Spend Year n} + 1 \ldots)}{\$\text{ Five Year OEB Approved Plan}} \; [\%\text{ of Plan Total}]$$

According to this formula, if Toronto Hydro's total five-year approved capital envelope was approved to be $2.47 billion and the utility's Year 1 (2015) and Year 2 (2016) capital expenditures amounted to $524 million, and $502 million respectively, then the utility's plan implementation progress metric at the end of the 2016 rate year would be:

$$\frac{(\$524\text{M} + \$502\text{M})}{\$2.47\text{B}} = 41.5\%$$

Toronto Hydro's preference for using the rolling measure of plan implementation progress stems from the fact that the utility operates in a dynamic business environment, where a number of **issues can emerge over the course of any given year that require the utility to advance,**

postpone, or otherwise amend the schedule, sequencing or pacing of projects slated for completion in that year. These considerations are often outside of the utility's control, and include the following factors:

- Major weather events (floods, ice storms);
- Atypical seasonal conditions (shorter construction seasons or limited switching capability);
- Urgent third-party work requests (e.g. plant relocations for transit);
- City and/or third-party (e.g. Hydro One Networks Inc. (HONI)) dependencies (resulting in longer project timelines);
- Changes in labour force availability (job action, higher than anticipated retirement rates, changes in the contractor community);
- Actions of HONI or the IESO (e.g. outage coordination challenges);
- Other related circumstances.

While these activities can have a significant affect on Toronto Hydro's ability to implement certain programs or projects in any specific year, that potential impact is significantly reduced over a longer (five-year) timeframe, providing the utility sufficient flexibility to adjust the pace on the affected projects, while redeploying its resources towards the work that can be completed in the immediate term. The aggregate five-year target ensures that the utility will work towards delivering the entirety of the capital program approved for the 2015-2019 planning period.

C3.1.2 Historical Performance Trends

The proposed 2015-2019 Distribution System Plan is the first time that Toronto Hydro expects to implement an approved medium-length multi-year capital plan. Accordingly, the utility is not in a position to provide the comparable historical results in a similar format, in light of the variety of circumstances under which Toronto Hydro's capital plans for 2009 through 2014 were prepared, amended and subsequently reviewed and approved by the OEB.

C3.1.3 Interaction with the Distribution System Plan

The proposed plan implementation progress measure is expected to allow Toronto Hydro and the OEB to gauge the utility's progress towards the completion of its entire 2015-2019 capital plan at regular intervals. Reviewing the progress at one-year intervals will assist in providing the OEB regular updates regarding the plan progress.

C3.2 Planning, Engineering & Support Efficiency

C3.2.1 Measure Description

Planning, engineering, and other eligible administrative costs associated with capital program or project development are a component of Toronto Hydro's total capital costs. For the purposes of its 2015-2019 Distribution System Plan, Toronto Hydro proposes to track the proportion of its total capital expenditures on distribution plant and associated civil infrastructure that is comprised of indirect planning, engineering and support labour costs related to this portion of the utility's capital expenditures. By measuring the resulting ratio and taking steps to ensure that it remains within or below the historical levels, Toronto Hydro plans to drive the efficiency and productivity of these processes, ultimately resulting in more cost-effective assets being put into service.

The eligible costs to be tracked for the proposed measure include capitalized labour costs associated with long-term, short-term planning functions, including development of the long-term system studies, capital investment programs and specific projects. Section D1 provides a high level summary of each of the planning processes, while Section D3 provides details with respect to the elements and outputs produced by each planning process. The work to develop and refine the utility's decision support systems is also included in Section D3.1.2.1. The formula for the proposed performance measure is as follows:

$$\text{Planning, Engineering \&Support Cost Efficiency(\%)} = \frac{\text{\$ Capital Planning, Engineering \& Support Spend (Dx Plant)}}{\text{\$ Total Capital Spend (Dx Plant)}}$$

Using a hypothetical example to illustrate the mechanics of this formula, if Toronto Hydro's total capitalized indirect labour costs related to electric distribution plant amounted to $5 million in a year, while the utility's total capital expenditures attributable to the distribution plant and associated civil infrastructure were $50 million, the resulting metric for the year in question would be:

$$\frac{\$5\text{M}}{\$50\text{M}} = 10\%$$

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 19:

Reference(s): **Exhibit 2B, Section C, p. 18**

For each between 2015-2019, please provide the proposed ' Capital Planning, Engineering & Support Spend (Dx Plant)' and 'Total Capital Spend (Dx Plant)'.

RESPONSE:

Please see the table below:

	2015 TEST	2016 TEST	2017 TEST	2018 TEST	2019 TEST
Capital Planning, Engineering & Support Spend (Dx Plant)	$ 28.0	$ 28.5	$ 29.3	$ 30.0	$ 30.7
Total Capital Spend (Dx Plant)	$ 451.1	$ 418.7	$ 453.0	$ 454.2	$ 491.9
Planning, Engineering & Support Cost Efficiency %	6.20%	6.81%	6.46%	6.60%	6.24%

As noted in Exhibit 2B, Section C, Toronto Hydro has not previously tracked its Capital Planning, Engineering and Support costs explicitly for the purpose of performance measurement, as proposed in this application. Accordingly, Toronto Hydro submits that given the relative novelty of the OEB's performance measurement requirements in the area of capital planning and implementation, it would be premature to set firm performance targets for the 2015-2019 period.

9/24/2014

Scorecard - Toronto Hydro-Electric System Limited

Performance Outcomes	Performance Categories	Measures		2009	2010	2011	2012	2013	Trend	Target: Industry	Target: Distributor
Customer Focus Services are provided in a manner that responds to identified customer preferences.	**Service Quality**	New Residential/Small Business Services Connected on Time		96.60%	96.20%	94.00%	92.50%	94.20%	down, target met	90.00%	
		Scheduled Appointments Met On Time		99.70%	99.90%	99.60%	99.30%	99.60%	down, target met	90.00%	
		Telephone Calls Answered On Time		83.70%	69.90%	72.70%	76.90%	82.00%	up, target met	65.00%	
	Customer Satisfaction	First Contact Resolution						77%			
		Billing Accuracy						96.6%			
		Customer Satisfaction Survey Results									
Operational Effectiveness Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.	**Safety**	Public Safety [measure to be determined]									
	System Reliability	Average Number of Hours that Power to a Customer is Interrupted		2.76	1.19	1.38	1.46	17.81	up, target not met		at least within 1.19 - 2.76
		Average Number of Times that Power to a Customer is Interrupted		1.71	1.54	1.48	1.47	2.39	up, target not met		at least within 1.47 - 1.71
	Asset Management	Distribution System Plan Implementation Progress						105%			
	Cost Control	Efficiency Assessment					5	5			
		Total Cost per Customer [1]		$821	$885	$951	$900	$924			
		Total Cost per Km of Line [1]		$57,785	$62,061	$67,015	$65,273	$66,793			
Public Policy Responsiveness Distributors deliver on obligations mandated by government (e.g., in legislation and in regulatory requirements imposed further to Ministerial directives to the Board).	**Conservation & Demand Management**	Net Annual Peak Demand Savings (Percent of target achieved) [2]				17.00%	21.00%	32.70%			286.27MW
		Net Cumulative Energy Savings (Percent of target achieved)				52.00%	78.00%	99.80%			1,303.99GWh
	Connection of Renewable Generation	Renewable Generation Connection Impact Assessments Completed On Time			90.32%	70.11%	90.79%	100.00%			
		New Micro-embedded Generation Facilities Connected On Time						100.00%		90.00%	
Financial Performance Financial viability is maintained; and savings from operational effectiveness are sustainable.	**Financial Ratios**	Liquidity: Current Ratio (Current Assets/Current Liabilities)		0.69	1.05	1.26	0.59	0.80			
		Leverage: Total Debt (includes short-term and long-term debt) to Equity Ratio		1.40	1.52	1.43	1.37	1.34			
		Profitability: Regulatory Return on Equity	Deemed (included in rates)			9.58%	9.58%	9.58%			
			Achieved			9.73%	7.62%	7.10%			

Notes:
1. These figures were generated by the Board based on the total cost benchmarking analysis conducted by Pacific Economics Group Research, LLC and based on the distributor's annual reported information.
2. The Conservation & Demand Management net annual peak demand savings do not include any persisting peak demand savings from the previous years.

Legend:
- up
- down
- flat
- target met
- target not met

Service Quality

1. New Residential/Small Business Services Connected on Time

In 2013 Toronto Hydro-Electric System Limited (“Toronto Hydro” or “utility”) connected 94.2% of approximately 2,700 eligible low-voltage residential and small business customers (those utilizing connections under 750 volts) to its system within the five-day timeline prescribed by the Distribution System Code. This is a 2% improvement from the previous year and above the OEB-mandated threshold of 90%. Serving one of the fastest growing cities in North America, Toronto Hydro receives high volumes of requests to connect new residential developments or businesses each year. Toronto Hydro integrates the connection work with its planned construction activities to help ensure that the scope, nature and timing of connection work do not adversely affect the utility’s planned work program. Where possible, Toronto Hydro strives to identify and leverage any potential synergies between the connection work and other planned construction activities undertaken by the utility, other utilities or municipal and provincial government agencies. Toronto Hydro is currently working with its shareholder, the City of Toronto, to further enhance the coordination between the City’s and the utility’s construction activities.

2. Scheduled Appointments Met on Time

Providing excellence in customer service is at the core of Toronto Hydro’s corporate philosophy, and the utility is consistently seeking new ways to foster meaningful two-way communication, expand the range of service offerings, improve service convenience, and integrate new technological advancements to drive service level improvements. In 2013, Toronto Hydro scheduled almost 14,700 appointments with its customers (about 55 appointments per working day) to complete work requested by customers, read meters, reconnect, or otherwise necessary to perform. The utility met 99.6% of these appointments, surpassing the previous year’s record by 0.3% and significantly exceeding the industry target of 90%.

3. Telephone Calls Answered on Time

In 2013 Toronto Hydro customer contact centre agents received over 534,000 calls from its customers – over 2,000 calls per working day. An agent answered a call in 30 seconds or less in 82% of these calls, once customers selected an option to speak to the utility’s representative. This result significantly exceeds the OEB-mandated 65% target for timely call response. Year over year, the 2013 result amounts to a 5% improvement over 2012, driven primarily by a reduction in the number of calls. Call volumes decreases are attributed to successfully promoting online self-serve features, internal process improvements, and increased customer preference to contact Toronto Hydro via email. In performing this work, Toronto Hydro closely monitors the quality and efficiency of its customer contact activities using a combination of OEB-mandated and internally developed measures and metrics. Toronto Hydro reviews and sets target Telephone Call Answer times on an annual basis based on customer feedback and customer satisfaction priorities, and allocates resources between the various contact centre activities to ensure appropriate levels of service across all types of customer interactions.

Customer Satisfaction

4. First Contact Resolution

In providing assistance to its customers, Toronto Hydro strives to resolve customer enquiries as quickly and efficiently as possible. Starting in 2013, the OEB implemented a new measure to gauge the success rate with which distribution utilities are able to address customer requests at the first instance of contact. For the purposes of 2013 reporting, and given the novelty of this measure, utilities were given an opportunity to define the First Contact Resolution measure in the manner that provides the most meaningful assessment of their performance.

Toronto Hydro measures its first contact resolution as a percentage of telephone enquiries resolved in one call over a 21-day time period. An eligible enquiry is considered resolved in the first call, if a customer does not call back regarding the same enquiry for the same account within 21 calendar days. The metric includes all residential and commercial customer account-related enquiries including those related to:

- Billing;
- Moves;
- Payment and account arrears assistance;
- Online tools; and
- Conservation programs.

Based on the above definition, in 2013 Toronto Hydro successfully resolved 77% of customer requests at the first instance of contact with the utility’s customer contact centre. As with other performance measures, Toronto Hydro is exploring opportunities for continuous and sustained improvement on this measure, thus enhancing the value of service delivered to its customers.

5. Billing Accuracy

Every year, Toronto Hydro issues about 5.1 million electronic and paper-based bills to approximately 730,000 customers. Similar to the First Contact Resolution, Billing Accuracy is a measure that has not been tracked by the OEB prior to this year’s rollout of the LDC Scorecard. For the purposes of 2013 reporting and given the novelty of this measure, utilities were given an opportunity to define the Billing Accuracy measure in the manner that provides the most meaningful assessment of their performance. In measuring billing accuracy, Toronto Hydro gauges its ability to effectively set up, maintain, and retrieve on an ongoing basis all billing inputs needed to produce a bill. These activities can be broken down into two main areas:

a) Success in obtaining actual meter read data in a timely manner; and

b) Ensuring that meters, meter configurations, rate classes, pricing, customer transactions and other factors that impact the accuracy of the bill are set up and processed accurately, in a timely manner, and are properly maintained.

Accordingly, Toronto Hydro measures Billing Accuracy using a composite approach comprised of two distinct but complementary metrics:

- Percent of Actual Meter Reads Obtained (displayed on the 2013 Scorecard);

- Percent of Bills Cancelled (described for additional context below).

Toronto Hydro measures Percent of Actual Meter Reads Obtained as the combined actual meter readings received by Toronto Hydro's four meter data collection systems, divided by the total number of expected meter reads. The percent of actual meter reads obtained is a weighted average of the four systems, weighted based on number of meters in each system. In 2013, Toronto Hydro was able to obtain Customer Meter Reads 96.6% of the time.

The Percent of Bills Cancelled measure is calculated by comparing the number of all cancelled bills due to an error by Toronto Hydro in a month, versus the aggregate number of completed bills in the same month. The calculation excludes customer-initiated cancels (such as a failure of the customer to provide move notification in a timely manner). In 2013, Toronto Hydro cancelled 1.65% of the bills it issued to its customers in the course of the year.

Toronto Hydro notes that starting October 1, 2014, the OEB is implementing a standard definition of billing accuracy for all distributors, which will not align with the definitions and results provided n this update. Accordingly, the Billing Accuracy results reported on this Scorecard will not be comparable to the 2014 results on the next edition of Toronto Hydro's LDC Scorecard.

6. Customer Satisfaction Survey Results

The Results of a Customer Satisfaction Survey is another new measure introduced by the OEB for the purposes of the Scorecard. As with most other newly introduced measures, the utilities were allowed to define the measure themselves, but were not required to submit the results for the inaugural edition of the Scorecard. Toronto Hydro is not submitting results for this measure in the 2013 reporting year. The utility is in the process of investigating the customer satisfaction survey is best suited for the purposes of the LDC Scorecard. Consistent with OEB guidance, Toronto Hydro expects to submit the results of a Customer Satisfaction Survey for the purposes of the next edition of the Scorecard.

Safety

7. Public Safety Measure.

The OEB is still in the process of determining the suitable parameters for this measure in cooperation with the Electrical Safety Authority (ESA). As such, there are no reporting requirements associated with this measure for 2013. Toronto Hydro takes public safety in the vicinity of its distribution equipment very seriously, and regularly carries out activities such as proactive contact voltage scans on street-level assets, taking prompt corrective action where potential public safety issues are identified.

System Reliability

8. Average Number of Hours that Power to a Customer is Interrupted.

The average duration of outages experienced by Toronto Hydro customers in 2013 has significantly increased from the prior year, from 1.46 hours to 17.81 hours. The vast majority of this increase is attributable to two weather events that had a major impact on the utility's system and its customers, namely the July 8-9, 2013 major rainstorm and the December 21-26 ice storm. Both events left significant portions of Toronto Hydro's customers without power for an extended period of time. In both instances, Toronto Hydro moved to restore service to its customers as quickly as possible, providing regular updates through a variety of media channels. When controlling for the impact of these major events, outages on the provincial transmission grid, and scheduled outages, Toronto Hydro's 2013 average outage duration statistics have been showing a stable trend over the last five years. This trend is attributable in part to infrastructure renewal investments that the utility has made during that period to address a major portion of its assets that have surpassed and/or are rapidly approaching the end of their useful lives. Going forward, and as described in detail in the Distribution System Plan filed with the OEB as a part of the utility's 2015-2019 Custom Incentive Regulation (CIR) rate application, Toronto Hydro needs to continue making significant investments into its aging distribution system to maintain reliability and safety, modernize the grid and support Toronto's urban growth.

Following the December ice storm, Toronto Hydro engaged an independent expert panel to examine the utility's response to this major weather event. The panel released its final report on June 18, 2014, generally endorsing Toronto Hydro's response to the weather event, and providing a series of recommendations for further improvements. Toronto Hydro is in the process of assessing these recommendations – some of which have already been implemented – and is developing an action plan for implementation that considers all recommendations in the report. It should be noted that many of the recommendations require significant resources and, consequently, factors such as funding, cost benefit analysis, customer impact and environmental impact will have to be carefully considered.

9. Average Number of Times that Power to a Customer is Interrupted.

Similar to outage duration, the average number of times Toronto Hydro customers experienced an outage in 2013 has also increased from 1.47 times in 2012 to 2.39 times in 2013. As with the outage duration measure, a predominant driver for this negative trend is the impact of the July 2013 rainstorm and the December 2013 ice storm. When controlling for the impact of these major events, outages on the provincial transmission grid, and scheduled outages, Toronto Hydro's average outage frequency statistics have been showing a stable trend over the last five years. This trend is attributable in part to infrastructure renewal investments that the utility has made during that period to address a major portion of its assets that have surpassed and/or are rapidly approaching the end of their useful lives. Going forward, and as described in detail in the Distribution System Plan filed with the OEB as a part of the utility's 2015-2019 Custom IR rate application, Toronto Hydro needs to continue making significant investments into its aging distribution system to maintain reliability and safety, modernize the grid and support Toronto's urban growth.

Asset Management

10. Distribution System Plan Implementation Progress

The progress of the distribution system plan implementation is a new performance measure instituted by the OEB starting in 2013. Consistent with other new measures, utilities were given an opportunity to define it in the manner that provides the most meaningful assessment of their performance. Toronto Hydro measures the progress of its Distribution System Plan implementation as a ratio of total capital expenditures made in a calendar year over the total amount of OEB-approved capital expenditures for that calendar year. Given the dynamic, dense, urban environment in which Toronto Hydro operates, a number of issues emerge over the course of the year that require the management to postpone, re-prioritize or otherwise amend the capital work plan adopted at the start of the year. The measure excludes capital funding for special projects (such as Copeland Transformer Station currently under construction in downtown Toronto).

Toronto Hydro deems its year-end results to be successful if the year-end results are within a +/- 20% deadband from the approved amount. Toronto Hydro notes that it has recently submitted to the OEB a five-year application for electricity rates for the 2015-2019 years, which includes a comprehensive five-year distribution system plan prepared in accordance with the OEB requirements. Based on the outcomes of this future proceeding, Toronto Hydro may consider revising its approach to this particular measure in the future years.

Cost Control

11. Efficiency Assessment

The OEB assesses distributor efficiency using a comprehensive econometric benchmarking study that compares each utility's actual total costs, to the average efficient levels predicted by the model. While Toronto Hydro endorses the importance of sophisticated quantitative assessment of utility efficiency, in the utility's view the current methodology used by the OEB does not optimally assess efficiency performance of a utility of Toronto Hydro's size, location, and asset base. This is primarily due to the fact that the sample of utilities included in the OEB's assessment is limited to Ontario-based LDCs only. In Toronto Hydro's view, the operating conditions and the ensuing cost pressures facing its Ontario peers are in many ways different in scale, scope and nature to those experienced by the utility. Accordingly, Toronto Hydro believes that a more optimal assessment of its efficiency involves expanding the sample of observed utilities beyond Ontario, to include other large North American utilities, such as those serving Chicago, New York, Boston, San Francisco and other major U.S. metropolitan centres.

In Toronto Hydro's view, an econometric efficiency study based on a combined Ontario-U.S. sample balances n important objective of maintaining relevance with Ontario's regulatory and economic conditions, with the need to conduct an "apples to apples" comparison that includes other utilities similar to Toronto Hydro. The utility has filed such an econometric study as a part of its 2015-2019 CIR rate application to the OEB. This econometric benchmarking study produced by a third-party expert compares Toronto Hydro's total cost performance against that of 156 Ontario and U.S. utilities, including all Ontario LDCs. Based on this assessment, Toronto Hydro's total cost performance is in the top 13% for comparable U.S. utilities and in the top quartile – or 30th – out of 156 Ontario and U.S. utilities. The study, along with the remainder of the CIR rate application, is subject to OEB review.

12. Total Cost per Customer

In 2013, Toronto Hydro's total cost per customer was $924, or $24 higher than the 2012 result. The cost per customer increase is consistent with Toronto Hydro's ongoing operating activities and capital work to replace, refurbish and modernize the utility's aged distribution plant, connect new customers in one of the fastest growing North American cities, and modernize the grid through the use of emerging technologies. Toronto Hydro notes that its Total Cost per Customer results as calculated by the OEB do not account for an estimated 352,000 multi-unit dwelling residents occupying buildings that are meter by a single "bulk" meter. Adding these residents into the calculation would significantly reduce Toronto Hydro's unitized total cost result. In addition, Toronto Hydro understands that the calculation of total costs of the purposes of this analysis (the numerator) follows a methodology used by the OEB's external quantitative analysis consultant.

13. Total Cost per Km of the Line

In 2013, Toronto Hydro's Total Cost per Km of Distribution Line was $66,793, or $1,520 higher than the 2012 results. As with Total Cost per Customer measure, Toronto Hydro's higher expenditures are driven by the cost of the utility's operating activities and capital program to address the utility's aging asset base, connect new customers and modernize the grid. Toronto Hydro notes that this measure as calculated by the OEB does not account for the presence of a unique and expansive downtown underground network of secondary (lower-voltage) wires that provides an enhanced reliability to Toronto's downtown customers. Unlike the ordinary secondary wires used to connect individual buildings to the distribution system, which are typically excluded from total line length calculations, Toronto Hydro's secondary network is unique in its size and span in Ontario and performs a function similar to that of higher-voltage primary lines that comprise the calculation. Including the length of the downtown underground secondary network into the Total Cost per Line Km calculation would result in a lower unitized cost. In addition, Toronto Hydro understands that the calculation of total costs of the purposes of this analysis (the numerator) follows a methodology used by the OEB's external quantitative analysis consultant.

Conservation & Demand Management

14. Net Annual Peak Demand Savings (Percent of Target Achieved)

As at the end of 2013, Toronto Hydro's 2013 Net Annual Peak Demand Savings amounted to 32.70% of the OEB-mandated target. A comprehensive description of Toronto Hydro's conservation program results for the year 2013 will be provided in the utility's 2013 Conservation and Demand Management Annual Report expected to be submitted to the OEB at the end of September 2014.

15. Net Cumulative Energy Savings (Percent of Target Achieved)

As at the end of 2013, Toronto Hydro's 2013 Net Cumulative Peak Demand Savings amounted to 99.8% of the OEB-mandated target. A comprehensive description of Toronto Hydro's conservation program results for the year 2013 will be provided in the utility's 2013 Conservation and Demand Management Annual Report expected to be submitted to the OEB at the end of September 2014.

Connection of Renewable Generation

16. Renewable Generation Connection Impact Assessments Completed On Time

A Connection Impact Assessment is a detailed technical study that a utility must undertake prior to connecting all new qualifying sources of supply to its electricity network. The study ensures that generators seeking connection can be safely accommodated on the system, without having an adverse impact on system reliability for the existing customers. In 2013 Toronto Hydro completed 239 of such studies following requests by connecting customers. In every case, the eligible studies were completed within the timelines specified by the Distribution System Code. The 100% result in 2013 constitutes a 9% improvement from the 2012 results due to process enhancements and dedicated interconnection team.

17. New Micro-Embedded Generation Facilities Connected on Time
In 2013 Toronto Hydro successfully connected 159 solar micro generation facilities, all of which were connected within the 5-day timeline, or as negotiated with individual proponents, in accordance with the Distribution System Code provisions.

Financial Ratios

18. Liquidity: Current Ratio
The financial performance measures reflected in the related Scorecard are in compliance with the OEB's methods of calculation for the purposes of electricity sector regulation in Ontario. These methods are not consistent with generally accepted methods of calculating similar financial ratios or are not based on the financial amounts reflected in the audited financial statements filed with the Ontario Securities Commission.

For analysis of the financial performance of Toronto Hydro Corporation, including that of the utility, please refer to the Management Discussion & Analysis available at www.torontohydro.com.

19. Leverage: Total Debt to Equity Ratio
The financial performance measures reflected in the related Scorecard are in compliance with the OEB's methods of calculation for the purposes of electricity sector regulation in Ontario. These methods are not consistent with generally accepted methods of calculating similar financial ratios or are not based on the financial amounts reflected in the audited financial statements filed with the Ontario Securities Commission.

For analysis of the financial performance of Toronto Hydro Corporation, including that of the utility, please refer to the Management Discussion & Analysis available at www.torontohydro.com.

20. Profitability: Regulatory Return on Equity
The financial performance measures reflected in the related Scorecard are in compliance with the OEB's methods of calculation for the purposes of electricity sector regulation in Ontario. These methods are not consistent with generally accepted methods of calculating similar financial ratios or are not based on the financial amounts reflected in the audited financial statements filed with the Ontario Securities Commission.

For analysis of the financial performance of Toronto Hydro Corporation, including that of the utility, please refer to the Management Discussion & Analysis available at www.torontohydro.com.

TECHNICAL CONFERENCE UNDERTAKING RESPONSE TO SCHOOL ENERGY COALITION

UNDERTAKING NO. J2.22:

Reference(s):

To explain why there were changes in the KPIs between 2013 and 2014.

RESPONSE:

Toronto Hydro reviews the balanced Corporate Scorecard every year to recalibrate the strategic focus for the workforce. During this process, the scorecard is populated with the relevant Key Performance Indicators ("KPIs") for the year.

In 2014, the Corporation introduced four new KPIs ("First Call Resolution," "Key Account Worst Performing Feeders," "Productivity – Fleet" and "Productivity – Facilities"). Also, two KPIs were reintroduced to the 2014 scorecard from earlier years ("Attendance" and "Productivity – Operating Expenses").

"Net Income" and "THESL Regulated Capital" KPIs are part of the 2014 Corporate Scorecard but were omitted from the original response to interrogatory 1B-SIA-2 due to a formatting error. Toronto Hydro has filed as Appendix A to this undertaking response the corrected listing of KPIs for 2014 and has also filed a correction to the original undertaking response.

Key Performance Indicator (KPI)	2014 Target	2014 Results
Enhanced Customer Engagement (ECE)	214,000	N/A
First Call Resolution	78%	N/A
Safety - Total Recordable Injury Frequency (TRIF)	2.58	N/A
Attendance	5.75	N/A
SAIFI	1.53	N/A
SAIDI	72.5	N/A
Key Accounts - Worst Performing Feeders (KAWPF)	49	N/A
Productivity - Fleet Utilization	663	N/A
Productivity - Facilities - Occupied SqFt. Reduction	3,930	N/A
Productivity - Operating Expenses	$260.2	N/A

Key Performance Indicator (KPI)	2014 Target	2014 Results
Net Income	$103.5	N/A
THESL Regulated Capital	$395.0	N/A

TECHNICAL CONFERENCE UNDERTAKING RESPONSE TO VULNERABLE ENERGY CONSUMERS COALITION

UNDERTAKING NO. J1.1:

Reference(s):

To identify what incentives or penalties are applied with respect to meeting any of the metrics or targets that Toronto Hydro is proposing to report on as part of its plan.

RESPONSE:

Toronto Hydro has developed a set of 12 measures to monitor quality and drive continuous improvement in its distribution system planning and implementation work over the 2015-2019 planning horizon. The measures cover several distinct dimensions of the utility's capital planning and implementation processes and/or speak directly to the outcomes of such processes, motivated by customer needs, regulatory compliance, or corporate efficiency objectives. These metrics are intended to provide the OEB and other interested stakeholders a transparent view into what and how the utility conducts capital planning and execution, and monitor the associated activities. Together with reporting under the OEB Scorecard, Toronto Hydro believes that it has proposed a robust reporting and monitoring program for the 2015 – 2019 CIR term.

The measures and metrics underlying the Distribution System Plan are based on the OEB's Chapter 5 Filing Requirements, particularly section 5.2.3. The Filing Requirements do not require utilities to establish specific targets associated with these metrics. As such, the utility has not established specific incentives or penalties associated with its performance in respect of the proposed measures and metrics. Moreover, a number of the proposed metrics are still in early stages of their development and/or

TECHNICAL CONFERENCE UNDERTAKING RESPONSE TO VULNERABLE ENERGY CONSUMERS COALITION

require further research/pilot studies to confirm viability. Accordingly, Toronto Hydro does not believe it would be appropriate to set targets and associated incentives and penalties for these metrics.

In addition, it is Toronto Hydro's assessment that establishing firm targets based on projections is premature for the purposes of the 2015-2019 CIR period, given the relative lack of experience in capital-related performance measurement on the part of the OEB and utilities. This is Toronto Hydro's position in relation to all 12 proposed measures, including those for which the utility provided the forecasted values.

Toronto Hydro notes, however, that several of the measures advanced, specifically SAIDI, SAIFI, FESI and Supply Chain Efficiency: Materials Handling On Cost, are related in various degrees to Toronto Hydro's internal Key Performance Indicators ("KPIs") as provided in response to the Interrogatory 1B-SIA-2. The utility's performance is measured internally on the basis of these and other KPIs that together form a balanced Corporate Scorecard, and are part of Toronto Hydro's performance management system.

Moreover, the SAIDI, SAIFI and Distribution System Plan Implementation Progress measures also form a part of the utility's OEB Distributor Scorecard, initiated by the OEB in 2013, and reproduced as a part of response to Interrogatory 2B-EP-14 part (d). These metrics include targets.

Following the conclusion of this proceeding, the utility intends to review its Corporate Scorecard for opportunities to further align the scorecard with regulatory reporting and monitoring activities.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 1:

Reference(s): **Exhibit 1A, Tab 2, Schedule 1, page 3**

Please confirm that the Applicant plans to continue capital spending at forecast levels beyond 2019. Please advise at what point in the future capital expenditures are expected to get below 150% of annual depreciation.

RESPONSE:

As explained in Exhibit 2B, Section E2, Toronto Hydro faces a significant backlog of assets operating beyond economic end-of-life. While it would be economically optimal to renew these assets as quickly as possible, doing so entirely within the five-year CIR period would be infeasible from both a rate impact and program execution perspective.

The “paced” capital investment strategy proposed in this application is intended to address renewal needs (and other important capital needs/opportunities) in a manner that is sensitive to execution capacity and customer expectations. As a result of the proposed pace of investment during the CIR period, Toronto Hydro anticipates that capital expenditures will continue, past 2019, at levels comparable to those within the 2015-2019 period. However, actual expenditure levels post-2019 will depend on numerous factors including, but not limited to, system and equipment reliability performance, load growth capacity requirements, City and regional development trends, external demand requirements and rate impacts.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

Toronto Hydro does not have a specific forecast of when future capital expenditures will be below 150% of depreciation; however, the utility notes that the timing of this event depends not only on the size of its capital program, but also the size of its depreciation expense. While Toronto Hydro anticipates that capital expenditure needs of approximately $500M/year will persist for some time due to system renovation requirements, as the system is renewed, the utility's depreciation levels will increase. As a result, Toronto Hydro expects that the rate impacts associated with its capital program will begin to stabilize such that over time, its ordinary annual capital expenditures will be closer to depreciation, and thus the utility will generally need less incremental capital funding over and above IRM levels.

RESPONSES TO SCHOOL ENERGY COALITION INTERROGATORIES

INTERROGATORY 21:

Reference(s): Exhibit 2B, Section D1, p.7

Does the Applicant have a long-term (>5 years) capital plan that is either stand-alone or part of a long-term business plan? If so, please provide a copy.

RESPONSE:

No. Toronto Hydro’s current capital plan is the five-year Distribution System Plan document prepared pursuant to the OEB’s *Filing Requirements For Electricity Transmission and Distribution Applications*, Chapter 5.