EB-2018-0165

Toronto Hydro-Electric System Limited
Application for electricity distribution rates beginning January 1, 2020 until December 31, 2024

VECC COMPENDIUM

PANEL 3

July 9, 2018

TAB 1

GDP and CUSTOMER COUNT FORECASTS

	GDP		Customer Count			
	($ M 2007)		GS<50 kW		GS 50-999 kW	
	Application	Update	Application	Update	Application	Update
June 2018	345,979	346,774	71,306	71,170	10,396	10,515
June 2024	392,843	398,895	71,885	72,130	10,330	10,297
Percent Change	13.5%	15.0%	0.8%	1.3%	-0.6%	-2.1%
Source	3-VECC 21 c)	U/3/1, App. F	U/3/1, page 5			

Note: In the Update the 2018 customer counts are actual values.

TAB 2

1.1 Load Forecast Update

Toronto Hydro's original load forecast was based on regression models using actual historical loads and input variables to the end of 2017, and forecasts of input variables for the 2018-2024 period. For the updated forecast, regression models were re-run using actual historical loads and input variables to the end of 2018. Specifically, the updated load forecasts include the following:

a) 2018 actual kWh and kVA billing determinants by class;
b) updated 10 year historical average HDD and CDD: 2009-2018 period, compared to 2008-2017 period in the original forecast;
c) updated forecasts of model input variables: updated forecasts of GDP and Unemployment rates based on the latest (January 2019) Conference Board of Canada forecast; and
d) re-estimated model co-efficients: models were tested for goodness of fit and reasonableness of independent variable co-efficients. Model specifications remained unchanged for all classes except for GS 1,000-4,999 kW class. The unemployment rate variable was found to be statistically insignificant for the specific rate class and was removed from the model in this update.

The updated load forecast models also incorporate the latest information related to actual IESO verified CDM savings to the end of 2017, and non-verified 2018 results. For the 2019-2024 forecast period, the CDM savings included in the forecast are based on the latest CDM plan submitted to the IESO.

Toronto Hydro notes the very recent Provincial directives on conservation programs in the province. However, at time of preparation of the load forecast for the update, the potential impacts are unknown, and therefore Toronto Hydro has included the latest

TAB 3

UPDATE TO 3-VECC-25

Table 1: Verified Gross CDM Savings per IESO/OPA Reports

Verified Gross CDM Savings per IESO/OPA Reports (MWh)																				
Program Year	Calendar Year																			
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
2006	56,010	56,010	56,010	56,010	9,964	9,964	9,138	9,138	8,604	8,604	8,145	8,145	8,145	8,145	7,400	6,206	6,206	6,206	3,341	**341,389**
2007	-	325,918	237,877	226,833	226,833	226,824	40,551	40,551	40,551	18,405	15,514	12,062	12,062	12,062	12,062	5,774	1,403	1,256	1,256	**1,457,795**
2008	-	-	198,427	196,101	195,318	195,318	189,358	182,963	161,114	132,580	118,377	89,579	87,072	87,072	85,420	85,153	85,032	82,365	16,808	**2,188,058**
2009	-	-	-	207,499	183,543	183,543	183,487	182,023	177,457	170,241	157,083	106,015	74,958	58,123	36,220	26,986	26,976	26,616	23,866	**1,824,635**
2010	-	-	-	-	412,648	376,505	376,497	376,461	374,876	319,471	253,239	236,281	209,686	99,652	24,345	24,345	24,176	24,160	24,160	**3,156,503**
2011	-	-	-	-	-	290,029	289,158	287,288	280,372	278,421	274,558	263,083	262,934	243,971	238,509	208,193	207,404	206,173	35,115	**3,365,210**
2012	-	-	-	-	-	-	148,470	146,814	144,960	139,327	134,919	123,593	117,465	117,404	114,059	77,560	67,968	62,334	49,951	**1,444,823**
2013	-	-	-	-	-	-	-	185,316	182,084	175,009	169,472	155,245	147,549	147,471	143,269	138,920	120,027	93,232	88,365	**1,745,959**
2014	-	-	-	-	-	-	-	-	301,636	289,914	280,742	257,174	244,424	244,296	237,336	237,336	231,486	198,351	161,708	**2,684,402**
2015	-	-	-	-	-	-	-	-	-	404,267	389,832	385,053	384,740	384,278	383,152	375,930	375,834	372,162	291,543	**3,746,792**
2016	-	-	-	-	-	-	-	-	-	-	390,281	390,281	390,281	390,281	286,325	283,121	283,121	283,121	269,273	**2,966,084**
	56,010	**381,928**	**492,314**	**686,443**	**1,028,306**	**1,282,183**	**1,236,660**	**1,410,555**	**1,671,655**	**1,936,239**	**2,192,161**	**2,026,510**	**1,939,315**	**1,792,756**	**1,568,098**	**1,469,524**	**1,429,631**	**1,355,975**	**965,386**	**24,921,649**

Table 2: Cumulative Annual Gross CDM Savings (MWh)

Year	CUMULATIVE ANNUAL GROSS CDM SAVINGS (MWh)						
	Residential	CSMUR	GS<50 kW	GS50 -999 kW	GS1,000 – 4,999 kW	LU	**Total**
2006	23,311	-	-	-	-	-	**23,311**
2007	103,758	-	15,342	16,418	15,360	15,176	**166,054**
2008	235,152	-	68,853	72,194	70,403	69,562	**516,164**
2009	278,982	82	99,383	103,820	108,691	118,935	**709,892**
2010	337,794	339	172,007	177,242	187,203	205,179	**1,079,763**
2011	374,635	599	222,968	240,000	225,696	221,152	**1,285,051**
2012	412,941	913	279,602	329,834	262,093	250,368	**1,535,750**
2013	431,024	967	324,436	407,657	280,159	261,249	**1,705,493**
2014	457,816	1,225	369,622	502,026	324,608	283,352	**1,938,649**
2015	497,648	1,931	412,922	653,204	425,570	353,433	**2,344,707**
2016	555,301	4,081	435,450	811,045	525,668	420,890	**2,752,435**

Table 3: Reconciliation of CDM Verified Results and Cumulative CDM Savings Used in Load Forecast

Year	CDM Verified Results	Persistence Variance	Realization Rates Variance	Line Loss Varinace	CDM in Load Forecast Appendix A-1
	(MWh)	(MWh)	(MWh)	(MWh)	(MWh)
2006	56,009.98	-	-33,366.83	667.97	23,311.13
2007	381,927.82	-	-220,454.10	4,579.96	166,053.68
2008	492,314.24	88,040.36	-78,163.74	13,973.49	516,164.35
2009	686,443.43	101,199.36	-96,695.23	18,944.79	709,892.35
2010	1,028,306.14	151,343.44	-128,416.61	28,530.35	1,079,763.33
2011	1,282,182.89	151,350.22	-182,706.82	34,225.20	1,285,051.49
2012	1,236,660.45	344,676.81	-86,652.76	41,065.74	1,535,750.24
2013	1,410,554.91	355,617.64	-106,481.63	45,801.85	1,705,492.77
2014	1,671,655.17	395,250.49	-180,480.16	52,223.25	1,938,648.76
2015	1,936,238.54	534,933.22	-189,500.30	63,035.59	2,344,707.05
2016	2,192,161.23	669,291.64	-182,944.27	73,926.59	2,752,435.20

TAB 4

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 79:

Reference(s): **Exhibit U, Tab 3, Schedule 1, pp. 2-3;**
Exhibit U, Tab 3, Schedule 1, Appendix C and Appendix D

a) With respect to Appendix C, Table 2, please add rows that indicate the Cumulative Annual Gross CDM savings from 2006-2016 programs in each of the years 2017-2024.

b) With respect to Appendix C, Table 3, please add rows that reconcile the total values reported for each year 2017-2024 in the response to part (a) with the values for 2017-2024 are reported in Appendix C, Table 1.

c) Please confirm that, for each customer class, the values reported in part (a) for the years 2017-2024 are equal to the values reported for 2006-2016 in Appendix D, Tables 9-15. If not confirmed, please explain why.

RESPONSE:

a) Please see Table 1.

Table 1: Cumulative Annual Gross CDM Savings (MWh)

Year	Residential	CSMUR	GS<50 kW	GS50 – 999 kW	GS1,000 – 4,999 kW	LU	Total
2006	23,311	0	0	0	0	0	**23,311**
2007	103,758	0	15,342	16,418	15,360	15,176	**166,054**
2008	235,152	0	68,853	72,194	70,403	69,562	**516,164**
2009	278,982	82	99,383	103,820	108,691	118,935	**709,892**
2010	337,794	339	172,007	177,242	187,203	205,179	**1,079,763**
2011	374,635	599	222,968	240,000	225,696	221,152	**1,285,051**
2012	412,941	913	279,602	329,834	262,093	250,368	**1,535,750**
2013	431,024	967	324,436	407,657	280,159	261,249	**1,705,493**
2014	457,816	1,225	369,622	502,026	324,608	283,352	**1,938,649**
2015	497,648	1,931	412,922	653,204	425,570	353,433	**2,344,707**
2016	555,301	4,081	435,450	811,045	525,668	420,890	**2,752,435**
2017	593,313	5,682	443,161	881,384	572,936	444,020	**2,940,497**
2018	593,313	5,682	443,161	881,384	572,936	444,020	**2,940,497**
2019	593,313	5,682	443,161	881,384	572,936	444,020	**2,940,497**
2020	593,313	5,682	443,161	881,384	572,936	444,020	**2,940,497**
2021	593,313	5,682	443,161	881,384	572,936	444,020	**2,940,497**
2022	593,313	5,682	443,161	881,384	572,936	444,020	**2,940,497**
2023	593,313	5,682	443,161	881,384	572,936	444,020	**2,940,497**
2024	593,313	5,682	443,161	881,384	572,936	444,020	**2,940,497**

b) Please see Table 2 below for the updated Table 3: Reconciliation of CDM Verified Results and Cumulative CDM Savings Used in Load Forecast. 2015 and 2016 persistent savings were not revised in the update to 3-VECC-25. Please refer to a corrected version of Exhibit U, Tab 3, Schedule 1, Appendix C, appended to this response. The revised persistent savings for those years are shown in the corrected Appendix C.

Table 2: Reconciliation of CDM Verified Results and Cumulative CDM Savings Used in Load Forecast (MWh)

Year	CDM Verified Results	Persistence Variance	Realization Rates Variance	Line Loss Variance	CDM in Load Forecast Appendix A-1
2006	56,010	0	-33,367	668	23,311
2007	381,928	0	-220,454	4,580	166,054
2008	492,314	88,040	-78,164	13,973	516,164
2009	686,443	101,199	-96,695	18,945	709,892
2010	1,028,306	151,343	-128,417	28,530	1,079,763
2011	1,282,183	151,350	-182,707	34,225	1,285,051
2012	1,236,660	344,677	-86,653	41,066	1,535,750
2013	1,410,555	355,618	-106,482	45,802	1,705,493
2014	1,671,655	395,250	-180,480	52,223	1,938,649
2015	1,936,239	534,933	-189,500	63,036	2,344,707
2016	2,199,818	661,635	-182,944	73,927	2,752,435
2017	2,037,727	823,726	0	79,044	2,940,497
2018	1,951,115	910,338	0	79,044	2,940,497
2019	1,804,198	1,057,255	0	79,044	2,940,497
2020	1,684,035	1,177,418	0	79,044	2,940,497
2021	1,582,947	1,278,506	0	79,044	2,940,497
2022	1,542,040	1,319,413	0	79,044	2,940,497
2023	1,469,789	1,391,664	0	79,044	2,940,497
2024	1,134,031	1,727,422	0	79,044	2,940,497

c) Toronto Hydro confirms that the values reported in part (a) for the years 2017-2024 are equal to the values reported for 2006-2016 in Appendix D, Tables 9-15.

UPDATE TO 3-VECC-25

Table 1: Verified Gross CDM Savings per IESO/OPA Reports

Verified Gross CDM Savings per IESO/OPA Reports (MWh)																					
Program Year	**Calendar Year**																				
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**	
2006	56,010	56,010	56,010	56,010	9,964	9,964	9,138	9,138	8,604	8,604	8,145	8,145	8,145	8,145	7,400	6,206	6,206	6,206	3,341	**341,389**	
2007	-	325,918	237,877	226,833	226,833	226,824	40,551	40,551	40,551	18,405	15,514	12,062	12,062	12,062	12,062	5,774	1,403	1,256	1,256	**1,457,795**	
2008	-	-	198,427	196,101	195,318	195,318	189,358	182,963	161,114	132,580	118,377	89,579	87,072	87,072	85,420	85,153	85,032	82,365	16,808	**2,188,058**	
2009	-	-	-	207,499	183,543	183,543	183,487	182,023	177,457	170,241	157,083	106,015	74,958	58,123	36,220	26,986	26,976	26,616	23,866	**1,824,635**	
2010	-	-	-	-	412,648	376,505	376,497	376,461	374,876	319,471	253,239	236,281	209,686	99,652	24,345	24,345	24,176	24,160	24,160	**3,156,503**	
2011	-	-	-	-	-	290,029	289,158	287,288	280,372	278,421	274,558	263,083	262,934	243,971	238,509	208,193	207,404	206,173	35,115	**3,365,210**	
2012	-	-	-	-	-	-	148,470	146,814	144,960	139,327	134,919	123,593	117,465	117,404	114,059	77,560	67,968	62,334	49,951	**1,444,823**	
2013	-	-	-	-	-	-	-	185,316	182,084	175,009	169,472	155,245	147,549	147,471	143,269	138,920	120,027	93,232	88,365	**1,745,959**	
2014	-	-	-	-	-	-	-	-	301,636	289,914	280,742	257,174	244,424	244,296	237,336	237,336	231,486	198,351	161,708	**2,684,402**	
2015	-	-	-	-	-	-	-	-	-	404,267	397,489	396,534	396,750	396,287	395,720	395,697	395,599	393,356	355,578	**3,927,277**	**/c**
2016	-	-	-	-	-	-	-	-	-	-	390,281	390,017	390,072	389,714	389,694	376,778	375,764	375,742	373,883	**3,451,943**	**/c**
	56,010	**381,928**	**492,314**	**686,443**	**1,028,306**	**1,282,183**	**1,236,660**	**1,410,555**	**1,671,655**	**1,936,239**	**2,199,818**	**2,037,727**	**1,951,115**	**1,804,198**	**1,684,035**	**1,582,947**	**1,542,040**	**1,469,789**	**1,134,031**	**25,587,994**	**/c**

Table 2: Cumulative Annual Gross CDM Savings (MWh)

Year	**CUMULATIVE ANNUAL GROSS CDM SAVINGS (MWh)**						
	Residential	CSMUR	GS<50 kW	GS50 -999 kW	GS1,000 – 4,999 kW	LU	**Total**
2006	23,311	0	0	0	0	0	**23,311**
2007	103,758	0	15,342	16,418	15,360	15,176	**166,054**
2008	235,152	0	68,853	72,194	70,403	69,562	**516,164**
2009	278,982	82	99,383	103,820	108,691	118,935	**709,892**
2010	337,794	339	172,007	177,242	187,203	205,179	**1,079,763**
2011	374,635	599	222,968	240,000	225,696	221,152	**1,285,051**
2012	412,941	913	279,602	329,834	262,093	250,368	**1,535,750**
2013	431,024	967	324,436	407,657	280,159	261,249	**1,705,493**
2014	457,816	1,225	369,622	502,026	324,608	283,352	**1,938,649**
2015	497,648	1,931	412,922	653,204	425,570	353,433	**2,344,707**
2016	555,301	4,081	435,450	811,045	525,668	420,890	**2,752,435**

Table 3: Reconciliation of CDM Verified Results and Cumulative CDM Savings Used in Load Forecast

Year	**CDM Verified Results**	**Persistence Variance**	**Realization Rates Variance**	**Line Loss Variance**	**CDM in Load Forecast Appendix A-1**
	(MWh)	**(MWh)**	**(MWh)**	**(MWh)**	**(MWh)**
2006	56,010	0	-33,367	668	23,311
2007	381,928	0	-220,454	4,580	166,054
2008	492,314	88,040	-78,164	13,973	516,164
2009	686,443	101,199	-96,695	18,945	709,892
2010	1,028,306	151,343	-128,417	28,530	1,079,763
2011	1,282,183	151,350	-182,707	34,225	1,285,051
2012	1,236,660	344,677	-86,653	41,066	1,535,750
2013	1,410,555	355,618	-106,482	45,802	1,705,493
2014	1,671,655	395,250	-180,480	52,223	1,938,649
2015	1,936,239	534,933	-189,500	63,036	2,344,707
2016	2,199,818	661,635	-182,944	73,927	2,752,435

TAB 5

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 25:

Reference(s): **Exhibit 3, Tab 1, Schedule 1, pp. 12-13**
Exhibit 3, Tab 1, Schedule 1, Appendix A-1

a) Please provide copies of the IESO Reports setting out the 2006-2016 verified results used in the Application (per page 12).

b) Based on the results from the IESO's verified reports please complete the following schedule:

Verified Gross CDM Savings per IESO Reports (MWh)							
Program Year	Calendar Year						
	2006	2007	Annual Values for 2008 to 2023				2024
2006							
2007	X						
2008	X	X					
2009	X	X					
2010	X	X					
2011	X	X					
2012	X	X					
2013	X	X					
2014	X	X					
2015	X	X					
2016	x	x					
Total							

c) Based on the monthly CDM values set out in Appendix A-1 please complete the following schedule:

CUMULATIVE ANNUAL GROSS CDM SAVINGS (MWh)							
Year	Residential	CSMUR	GS<50	GS50 - 999	GS1,000 – 4,999	LU	Total
2006							
2007							

2008							
2009							
2010							
2011							
2012							
2013							
2014							
2015							
2016							

d) Please demonstrate that the total cumulative savings by year as used in the load forecast models (per the response to part (c)) can be reconciled with the reported results verified by the IESO (as summarized in the response to part (b)).

RESPONSE:

a) Please refer to Appendix A for 2006-2010 Final OPA CDM Result Report – Toronto Hydro-Electric System Limited; Appendix B for 2011-2014 Final IESO CDM Result Report – Toronto Hydro-Electric System Limited; and Appendix C for 2015-2016 Final Verified IESO CDM Result Report – Toronto Hydro-Electric System Limited, all filed in Excel format.

b) Please refer to Appendix D for Table 1: Verified Gross CDM Savings per IESO Reports (MWh).

c) Please see Table 2: Cumulative Annual Gross CDM Savings (MWh).

Table 2: Cumulative Annual Gross CDM Savings (MWh)

Year	CUMULATIVE ANNUAL GROSS CDM SAVINGS (MWh)						
	Residential	CSMUR	GS<50 kW	GS50 -999 kW	GS1,000 – 4,999 kW	LU	**Total**
2006	23,313						**23,313**
2007	103,768		15,343	16,419	15,361	15,176	**166,068**
2008	235,175		68,860	72,201	70,410	69,562	**516,208**
2009	279,009	82	99,392	103,830	108,702	118,935	**709,950**
2010	337,827	339	172,024	177,259	187,221	205,179	**1,079,848**
2011	374,671	599	222,990	240,023	225,718	221,152	**1,285,155**
2012	420,517	924	279,629	329,866	262,119	250,368	**1,543,423**
2013	442,802	983	324,468	407,697	280,186	261,249	**1,717,385**
2014	470,067	1,251	369,658	502,074	324,639	283,352	**1,951,041**
2015	504,357	1,951	414,378	648,721	426,561	351,826	**2,347,794**
2016	558,221	3,934	435,190	780,596	509,886	410,205	**2,698,032**

d) The differences between the verified results and CDM values set out in Appendix A-1 are created mostly by the following variances: persistence, realization rates, and line losses.

Persistence: This is an adjustment made to conservation program savings to help account only for the savings that can be directly attributable to the program's impact, so for instance a measure with a 5 year life will only have savings attributed to it for the measure life. However, for load forecasting purposes persistence impacts are removed as it is assumed that the measure will be replaced with a similar technology at end of life and thus the load reduction will be permanent.

Realization Rates: The IESO verified savings are full year savings for each project aggregated to a total, so do not account for the implementation of projects throughout the year. The load forecast takes into account the fact that projects are

implemented throughout the year, so not all savings attributed to a specific year are in place at the beginning of a year. For the 2015-2020 Conservation First programs savings are assumed to occur evenly throughout a year. For earlier conservation programs the savings distribution is based on historical analysis.

Line Losses: In order to appropriately interpret the CDM impact on purchased energy, the CDM savings were grossed up to account for line losses.

Table 3 demonstrates numerical reconciliation summary of CDM verified results and cumulative CDM savings by year as used in the load forecast models.

Table 3: Reconciliation of CDM Verified Results and Cumulative CDM Savings Used in Load Forecast

Year	CDM Verified Results (MWh)	Persistence Variance (MWh)	Realization Rates Variance (MWh)	Line Loss Varinace (MWh)	CDM in Load Forecast Appendix A-1 (MWh)
2006	56,010	-	-33,367	670	23,313
2007	381,928	-	-220,454	4,595	166,068
2008	492,314	88,040	-78,164	14,017	516,208
2009	686,443	101,199	-96,695	19,002	709,950
2010	1,028,306	151,343	-128,417	28,615	1,079,848
2011	1,282,183	151,350	-182,707	34,329	1,285,155
2012	1,236,660	344,677	-79,105	41,191	1,543,423
2013	1,410,555	355,618	-94,730	45,942	1,717,385
2014	1,671,655	395,250	-168,248	52,384	1,951,041
2015	1,929,280	534,933	-179,558	63,139	2,347,794
2016	2,093,043	662,333	-129,863	72,519	2,698,032

RESPONSE TO 3-VECC-25 Part b

Table 1: Verified Gross CDM Savings per IESO/OPA Reports

Verified Gross CDM Savings per IESO/OPA Reports (MWh)																				
Program Year	Calendar Year																			
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
2006	56,010	56,010	56,010	56,010	9,964	9,964	9,138	9,138	8,604	8,604	8,145	8,145	8,145	8,145	7,400	6,206	6,206	6,206	3,341	**341,389**
2007	-	325,918	237,877	226,833	226,833	226,824	40,551	40,551	40,551	18,405	15,514	12,062	12,062	12,062	12,062	5,774	1,403	1,256	1,256	**1,457,795**
2008	-	-	198,427	196,101	195,318	195,318	189,358	182,963	161,114	132,580	118,377	89,579	87,072	87,072	85,420	85,153	85,032	82,365	16,808	**2,188,058**
2009	-	-	-	207,499	183,543	183,543	183,487	182,023	177,457	170,241	157,083	106,015	74,958	58,123	36,220	26,986	26,976	26,616	23,866	**1,824,635**
2010	-	-	-	-	412,648	376,505	376,497	376,461	374,876	319,471	253,239	236,281	209,686	99,652	24,345	24,345	24,176	24,160	24,160	**3,156,503**
2011	-	-	-	-	-	290,029	289,158	287,288	280,372	278,421	274,558	263,083	262,934	243,971	238,509	208,193	207,404	206,173	35,115	**3,365,210**
2012	-	-	-	-	-	-	148,470	146,814	144,960	139,327	134,919	123,593	117,465	117,404	114,059	77,560	67,968	62,334	49,951	**1,444,823**
2013	-	-	-	-	-	-	-	185,316	182,084	175,009	169,472	155,245	147,549	147,471	143,269	138,920	120,027	93,232	88,365	**1,745,959**
2014	-	-	-	-	-	-	-	-	301,636	289,914	280,742	257,174	244,424	244,296	237,336	237,336	231,486	198,351	161,708	**2,684,402**
2015	-	-	-	-	-	-	-	-	-	397,309	389,832	385,053	384,740	384,278	383,152	375,930	375,834	372,162	291,543	**3,739,833**
2016	-	-	-	-	-	-	-	-	-	-	291,163	291,163	291,163	291,163	286,325	283,121	283,121	283,121	269,273	**2,569,611**
	56,010	**381,928**	**492,314**	**686,443**	**1,028,306**	**1,282,183**	**1,236,659**	**1,410,554**	**1,671,654**	**1,929,281**	**2,093,044**	**1,927,393**	**1,840,198**	**1,693,637**	**1,568,097**	**1,469,524**	**1,429,633**	**1,355,976**	**965,386**	**24,518,218**

TAB 6

			Loss of Persistence in 2006-2016 Gross CDM Savings								
Program	**Calendar Year**										
Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
2006	56,010	56,010	56,010	56,010	56,010	56,010	56,010	56,010	56,010	56,010	56,010
2007		325,918	325,918	325,918	325,918	325,918	325,918	325,918	325,918	325,918	325,918
2008			198,427	198,427	198,427	198,427	198,427	198,427	198,427	198,427	198,427
2009				207,499	207,499	207,499	207,499	207,499	207,499	207,499	207,499
2010					412,648	412,648	412,648	412,648	412,648	412,648	412,648
2011						290,029	290,029	290,029	290,029	290,029	290,029
2012							148,470	148,047	148,047	148,047	148,047
2013								185,316	185,316	185,316	185,316
2014									301,636	301,636	301,636
2015										404,267	404,267
2016											390,281
Total First Year IESO Verified Results[1]	56,010	381,928	580,355	787,854	1,200,502	1,490,531	1,639,001	1,823,894	2,125,530	2,529,797	2,920,078
Persisting IESO Savings per VECC 79 b) - App. A - Table 1	56,010	381,928	492,314	686,443	1,028,306	1,282,183	1,236,660	1,410,555	1,671,655	1,936,239	2,199,818
Calculated Loss of Persistence (Difference)	-	-	88,041	101,411	172,196	208,348	402,341	413,339	453,875	593,558	720,260
Loss of Persistence per VECC 79 b) - App. A- Table 3	0	0	88,040	101,199	151,343	151,350	344,677	355,618	395,250	534,933	661,635
Notes:	1) Based on sum of first year annualized results for current and previous years per VECC 79 b) - Appendix A, Table 1										

TAB 7

RESPONSES TO VULNERABLE ENERGY CONSUMERS COALITION INTERROGATORIES

INTERROGATORY 78:

Reference(s): **Exhibit U, Tab 3, Schedule 1, pp. 2-3;**
Exhibit U, Tab 3, Schedule 1, Appendix B and Appendix D

a) Are the 2018-2020 planned CDM results (per Appendix B) comparable (in terms of definition) to the values set out in Appendix D, Tables 1-7?
   i) If yes, please reconcile the savings values shown in Table 7 for program years 2019 and 2020 with the total savings shown in Appendix B for the same years
   ii) If no, please provide a schedule that reconciles the savings values shown in Table 7 for program years 2019 and 2020 with the total savings shown in Appendix B for the same years and that explains the sources of the differences.

b) What is the source/basis for the non-verified 2018 CDM results?

c) Please provide a schedule that compares by customer class the non-verified 2018 CDM results (per Appendix D, Tables 1-6) with the 2018 planned results as set out in the THESL's latest CDM Plan (Appendix B). In doing so, please adjust the results as set out in the CDM Plan (as required) so that they are comparable, in terms of definition, with the unverified CDM results as shown in Tables 1-6 of Appendix D and explain the basis/reasons for the adjustments.

d) How does THESL deliver each of the CDM programs set out in its CDM plan – as submitted to the IESO (i.e., does it use third party contractors and/or other contracts with third parties)?

e) With respect to the 2019-2020 CDM programs set out in Appendix B, please indicate which ones THESL already has third-party contracts in place to deliver and outline whether or not there are any penalties for terminating the contracts.

RESPONSE:

a)

i) The 2018-2020 planned CDM results (per Appendix B) are not comparable to the values set out in Appendix D, Tables 1-7 because the values provided by the IESO in the originally filed Appendix B as part of the Application Update were incorrect. Please refer to a corrected version of Exhibit U, Tab 3, Schedule 1, Appendix B, appended to this response. The corrected Appendix B is the source of the 2018-2020 data for Appendix D.

ii) Please refer to Table 1 for a reconciliation between the savings values in Table 7 and the update to Appendix B.

Table 1: Reconciliation between the savings values shown in Table 7 for program years 2019 and 2020 and the total savings in Appendix B

	CDM Load Forecast (MWh) (Appendix D)	Persistence Removed (MWh)	CDM Load Forecast (Persistence from Previous Years Removed)	Net-to-Gross Ratios	CDM Planned Savings (Net MWh) (Appendix B)
2019	1,034,023	726,232	307,791	88%	269,609
2020	1,483,703	1,046,450	437,253	87%	381,414

b) Toronto Hydro tracks all project completions and savings results per program and uses them as the basis for the estimated 2018 savings. This includes adjustments for net to gross ratios based on historical values.

c) Please refer to Table 2 for a schedule that compares the non-verified 2018 CDM results (Appendix D) with the total savings in the corrected Appendix B.

Table 2: Comparison between the non-verified 2018 CDM results (per Appendix D, Tables 1-6) with the total savings in Appendix B

	CDM Load Forecast (MWh) (Appendix D)	Persistence Removed (MWh)	CDM Load Forecast (Persistence from Previous Years Removed)	Net-to-Gross Ratios	CDM Planned Savings (Net MWh) (Appendix B)
Residential	201,939	149,145	52,794	115%	60,912
CSMUR	8,898	6,410	2,488	120%	2,982
GS<50 kW	56,196	17,945	38,251	91%	34,773
GS50 -999 kW	302,606	146,150	156,456	86%	134,818
GS1,000 – 4,999 kW	100,405	39,247	61,158	84%	51,524
LU	56,187	23,554	32,633	84%	27,513
Total	**726,232**	**382,450**	**343,782**	**91%**	**312,521**

d) Toronto Hydro delivers all of the programs noted in its CDM plan while using third parties to support varying portions of the work depending on the requirements of the program and to supplement the skill of the Toronto Hydro CDM team. For example, for direct install programs Toronto Hydro contracts the installation of the work to a contractor due to the specialized work involved.

e) In accordance with the OEB rules requiring accounting separation between CDM costs and rate regulated distribution costs, Toronto Hydro ratepayers are insulated from

any costs or penalties associated with CDM contract termination that are not recovered from the IESO.

TAB 8

ONTARIO ENERGY BOARD

FILE NO.:	**EB-2018-0165**	**Toronto Hydro Electric System Limited**

VOLUME:	**6**	
DATE:	**July 8, 2019**	
BEFORE:	**Lynne Anderson**	**Presiding Member**
	Michael Janigan	**Member**
	Susan Frank	**Member**

MR. MILLAR: Okay.

MR. SEAL: But it is the same format, the same table that indicates the programs and the savings that are associated with each of the programs.

MR. MILLAR: Indeed, many of the programs that you I tend to participate in for the test period are these province-wide programs run by the IESO?

MR. SEAL: That's correct. That was what was embedded in the CDM forecast.

MR. MILLAR: Right. And you are aware that in March of this year, the Minister issued a directive revoking the IESO's conservation first framework?

MR. SEAL: Yes, I am.

MR. MILLAR: And that many or all of these programs were part of that conservation first framework?

MR. SEAL: There are a number of these programs that were part of that framework, yes.

MR. MILLAR: So what impact -- how does that impact your load forecast? I will just cut right to the chase.

MR. SEAL: So our assessment, early assessment, admittedly, because this is fairly recent information, we did look at the programs and which ones were cut from the conservation -- well, I guess, from the IESO's plans.

We looked at the historical CDM that we have included, and at the end of the day, and I will cut to the chase, our analysis is that the impact on our forecast as we have provided as part of the update would be minimal.

MR. MILLAR: What does minimal mean? Did you actually

run the numbers?

MR. SEAL: Again, we -- recognizing that this was fairly new news to us, for the 2020 test year we estimated the impact on overall load, kilowatt-hours, was less than .2 percent, and on the demand-based billing units was less than, I believe, .4 percent.

MR. MILLAR: If you've done that analysis, can I ask you to file it?

MR. SEAL: Again, it is high-level estimates.

MR. MILLAR: So at the end of the day --

MR. SEAL: It's not the same as our load forecasting models, where I have gone through the models.

MR. MILLAR: Okay. So I think we're looking for the same thing here, is to make sure that the fact that the conservation-first framework is no more and that things that aren't already contracted aren't expected to go forward. Is it your answer that that will not have any material impact on the load forecast as it was -- as it is presented in the update?

MR. SEAL: I think what I have said is we've looked at the programs that were cancelled and the impact of those. Whether the actual CDM and what CDM activities go forward, that is unknown at this point. We do know the programs the IESO is not going to be doing, that they've said for now they're not going to be doing, but overall, especially for over the term of our forecast, we don't know if there's going to be new programs developed beyond the 2020 test year or not.

MR. MILLAR: Right. But the impact of the cancelled programs, are you assuming those would be replaced by something else? Or it is that if you take those out it is not likely to have a material impact on your load forecast?

MR. SEAL: The impact that I mentioned to you is taking those out.

MR. MILLAR: Okay. And not assuming that they're replaced by something else?

MR. SEAL: No.

MR. MILLAR: Okay. I think that's fine. Thank you.

Okay. Some questions about some of your DVAs and the balances that you propose to dispose of through this proceeding.

Why don't we turn to page 109 of the compendium. This is a list of the balances in your deferral accounts. One of the ones we see there is the impact of U.S. GAAP deferral account. Do you see that? You are familiar with that account?

MS. CHAN: Yes.

MR. MILLAR: And I want to see if I understand how this works, and you can tell me if I've got it wrong, because there is a bit of a history to this account, I understand, so I will walk you through some things, and if I am wrong you will let me know.

So initially in 2012 this account was there to capture the actuarial gains and losses on your OPEBs under U.S. GAAP, that they were recognized under other comprehensive income instead of as an expense, and then were amortized to

TAB 9

Energy Efficiency Interim Framework Program Plan

June 2019

The Interim Framework Program Plan is an overview of energy-efficiency programs IESO is offering in Ontario from April 2019 to December 2020. It sets out forecast budgets and, where applicable, targets and expected cost-effectiveness for Save on Energy programs. Details about incentives and how to apply for programs are available at www.SaveonEnergy.ca.

The IESO will report on the progress of the Interim Framework on a quarterly and annual basis.

Budget and Targets:

The plan, which is subject to changes and revisions over time, allocates the Interim Framework budget of $353 million over the suite of programs to create a cost-effective portfolio that is expected to achieve 1.4 TWh of electricity savings, and 189 MW of demand savings at a Levelized Unit Energy Cost (LUEC) of two cents per kWh. This budget represents a savings of up to $442 million from the previous Conservation First Framework.

Cost Effectiveness:

Program cost-effectiveness under the Interim Framework is assessed using forecasted program participation and supply side avoided costs – which estimate the cost of supplying that same amount of energy from the current electricity generation mix. An updated cost-effectiveness tool reflecting updated projections of avoided costs for 2019-2040 is available on the IESO website.

Reporting:

As part of its responsibilities, the IESO will publish the results of its Evaluation, Measurement, and Verification (EM&V) of the activities of the Interim Framework, as well as costs related to audits, capability building and training. The IESO will publish verified results on a yearly basis, as well as quarterly program updates, to inform the sector on the progress to meet the targets over the Interim Framework.

Interim Framework Summary	2019-2020			Cost-Effectiveness Tests		
	Budget ($M)	Energy Savings (TWh)	Demand Savings (MW)	Total Resource Cost Test (TRC)	Program Administrator Cost Test (PAC)	Levelized Unit Energy Cost ($/kWh)
Business Programs						
Retrofit	141	0.925	144	1.28	2.99	0.02
Small Business Lighting	16	0.066	8.3	1.74	1.39	0.03
Energy Managers	17	0.151	7.6	1.18	2.21	0.02
Process and Systems Upgrades	52	0.210	21.1	1.45	2.68	0.02
Energy Performance Program	6	0.024	2.8	1.20	1.09	0.02
Total Business Programs	***232***	***1.35***	***184***	***1.22***	***2.36***	***0.02***
Low Income and Indigenous programs						
Home Assistance	50	0.035	3.6			
Indigenous Programs	16	0.014	1.4			
Total Low Income & Indigenous Programs	***66***	***0.05***	***5***	-	-	-
LDC Local Program Fund	27					
IESO Central Services Costs	28					
Total Interim Framework	**353**	**1.4**	**189**	-	-	-

The "-" symbol signifies that those programs are not required to be cost effective as per the directive.

TAB 10

Update to IR 3-VECC-26

Table 1: Residential Gross Annualized CDM Savings (MWh)

Program Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2017	149,145	149,145	149,145	149,145	149,145	149,145	149,145	149,145
2018		52,794	52,794	52,794	52,794	52,794	52,794	52,794
2019			17,323	17,323	17,323	17,323	17,323	17,323
2020				12,049	12,049	12,049	12,049	12,049
2021					12,049	12,049	12,049	12,049
2022						12,049	12,049	12,049
2023							12,049	12,049
2024								12,049
Total	149,145	201,939	219,262	231,311	243,359	255,408	267,457	279,506

Table 2: CSMUR Gross Annualized CDM Savings (MWh)

Program Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2017	6,410	6,410	6,410	6,410	6,410	6,410	6,410	6,410
2018		2,488	2,488	2,488	2,488	2,488	2,488	2,488
2019			1,914	1,914	1,914	1,914	1,914	1,914
2020				1,670	1,670	1,670	1,670	1,670
2021					1,670	1,670	1,670	1,670
2022						1,670	1,670	1,670
2023							1,670	1,670
2024								1,670
Total	6,410	8,898	10,812	12,482	14,152	15,821	17,491	19,161

Table 3: GS <50 kW Gross Annualized CDM Savings (MWh)

Program Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2017	17,945	17,945	17,945	17,945	17,945	17,945	17,945	17,945
2018		38,252	38,252	38,252	38,252	38,252	38,252	38,252
2019			27,966	27,966	27,966	27,966	27,966	27,966
2020				25,679	25,679	25,679	25,679	25,679
2021					25,165	25,165	25,165	25,165
2022						25,165	25,165	25,165
2023							25,165	25,165
2024								25,165
Total	17,945	56,196	84,162	109,841	135,006	160,170	185,335	210,500

Table 4: GS 50 -999 kW Gross Annualized CDM Savings (MWh)

Program Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2017	146,150	146,150	146,150	146,150	146,150	146,150	146,150	146,150
2018		156,457	156,457	156,457	156,457	156,457	156,457	156,457
2019			160,578	160,578	160,578	160,578	160,578	160,578
2020				161,578	161,578	161,578	161,578	161,578
2021					131,156	131,156	131,156	131,156
2022						131,156	131,156	131,156
2023							131,156	131,156
2024								131,156
Total	146,150	302,606	463,184	624,762	755,918	887,073	1,018,229	1,149,385

Update to IR 3-VECC-26

Table 5: GS 1,000 – 4,999 kW Gross Annualized CDM Savings (MWh)

Program Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2017	39,247	39,247	39,247	39,247	39,247	39,247	39,247	39,247
2018		61,159	61,159	61,159	61,159	61,159	61,159	61,159
2019			61,404	73,831	73,831	73,831	73,831	73,831
2020				67,888	67,888	67,888	67,888	67,888
2021					56,235	56,235	56,235	56,235
2022						56,235	56,235	56,235
2023							56,235	56,235
2024								56,235
Total	39,247	100,405	161,810	242,125	298,359	354,594	410,829	467,064

Table 6: Large Use Gross Annualized CDM Savings (MWh)

Program Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2017	23,554	23,554	23,554	23,554	23,554	23,554	23,554	23,554
2018		32,633	32,633	32,633	32,633	32,633	32,633	32,633
2019			38,606	38,606	38,606	38,606	38,606	38,606
2020				168,390	168,390	168,390	168,390	168,390
2021					44,425	44,425	44,425	44,425
2022						44,425	44,425	44,425
2023							44,425	44,425
2024								44,425
Total	23,554	56,187	94,794	263,184	307,608	352,033	396,458	440,883

Table 7: Total Gross Annualized CDM Savings (MWh)

Prog.Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2017	382,450	382,450	382,450	382,450	382,450	382,450	382,450	382,450
2018	-	343,782	343,782	343,782	343,782	343,782	343,782	343,782
2019	-	-	307,791	320,218	320,218	320,218	320,218	320,218
2020	-	-	-	437,253	437,253	437,253	437,253	437,253
2021	-	-	-	-	270,699	270,699	270,699	270,699
2022	-	-	-	-	-	270,699	270,699	270,699
2023	-	-	-	-	-	-	270,699	270,699
2024	-	-	-	-	-	-	-	270,699
Total	382,450	726,232	1,034,023	1,483,703	1,754,402	2,025,101	2,295,800	2,566,498

Table 8: Cumulative Gross CDM Savings (MWh)

Year	CUMULATIVE GROSS CDM SAVINGS (MWh)						
	Residential	CSMUR	GS<50 kW	GS50 -999 kW	GS1,000 – 4,999 kW	LU	Total
2017	674,883,556	9,187,997	452,975,585	961,316,571	594,400,720	456,748,516	**3,149,512,945**
2018	775,731,922	13,641,844	482,555,931	1,117,414,607	646,789,310	485,614,048	**3,521,747,663**
2019	810,683,363	15,889,275	516,310,319	1,280,740,887	709,886,468	522,036,360	**3,855,546,672**
2020	825,632,666	17,726,295	543,850,402	1,446,602,804	776,648,270	631,440,077	**4,241,900,514**
2021	838,036,838	19,445,512	570,005,687	1,596,308,583	840,165,544	735,737,120	**4,599,699,283**
2022	850,441,009	21,164,728	595,912,691	1,731,333,441	898,059,207	780,926,170	**4,877,837,246**
2023	862,845,180	22,883,944	621,819,695	1,866,358,299	955,952,870	826,115,220	**5,155,975,208**
2024	875,249,351	24,603,160	647,726,699	2,001,383,157	1,013,846,533	871,304,269	**5,434,113,170**

Update to IR 3-VECC-26

Table 9: Residential – Gross Annual CDM Savings (MWh)

Prog. Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2006-2016	593,370	593,370	593,370	593,370	593,370	593,370	593,370	593,370
2017	81,579	153,560	153,560	153,560	153,560	153,560	153,560	153,560
2018		28,877	54,357	54,357	54,357	54,357	54,357	54,357
2019			9,475	17,836	17,836	17,836	17,836	17,836
2020				6,590	12,405	12,405	12,405	12,405
2021					6,590	12,405	12,405	12,405
2022						6,590	12,405	12,405
2023							6,590	12,405
2024								6,590
Total	674,949	775,807	810,762	825,713	838,118	850,524	862,929	875,334

Table 10: CSMUR – Gross Annual CDM Savings (MWh)

Prog. Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2006 - 2016	5,683	5,683	5,683	5,683	5,683	5,683	5,683	5,683
2017	3,506	6,599	6,599	6,599	6,599	6,599	6,599	6,599
2018		1,361	2,561	2,561	2,561	2,561	2,561	2,561
2019			1,047	1,971	1,971	1,971	1,971	1,971
2020				913	1,719	1,719	1,719	1,719
2021					913	1,719	1,719	1,719
2022						913	1,719	1,719
2023							913	1,719
2024								913
Total	9,189	13,643	15,891	17,728	19,447	21,167	22,886	24,606

Table 11: GS < 50kW – Gross Annual CDM Savings (MWh)

Prog. Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2006 - 2016	443,204	443,204	443,204	443,204	443,204	443,204	443,204	443,204
2017	9,815	18,476	18,476	18,476	18,476	18,476	18,476	18,476
2018		20,923	39,384	39,384	39,384	39,384	39,384	39,384
2019			15,297	28,793	28,793	28,793	28,793	28,793
2020				14,046	26,439	26,439	26,439	26,439
2021					14,046	26,439	26,439	26,439
2022						14,046	26,439	26,439
2023							14,046	26,439
2024								14,046
Total	453,020	482,603	516,360	543,903	570,342	596,782	623,221	649,660

Table 12: GS 50-999 kW – Gross Annual CDM Savings (MWh)

Prog. Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2006 - 2016	881,470	881,470	881,470	881,470	881,470	881,470	881,470	881,470
2017	79,940	150,476	150,476	150,476	150,476	150,476	150,476	150,476
2018		85,578	161,088	161,088	161,088	161,088	161,088	161,088
2019			87,832	165,331	165,331	165,331	165,331	165,331
2020				88,379	166,360	166,360	166,360	166,360
2021					88,379	166,360	166,360	166,360
2022						88,379	166,360	166,360
2023							88,379	166,360
2024								88,379
Total	961,410	1,117,523	1,280,865	1,446,743	1,613,104	1,779,464	1,945,824	2,112,185

Update to IR 3-VECC-26

Table 13: GS 1,000 – 4,999 kW – Gross Annual CDM Savings (MWh)

Prog. Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2006-2016	572,991	572,991	572,991	572,991	572,991	572,991	572,991	572,991
2017	21,467	40,408	40,408	40,408	40,408	40,408	40,408	40,408
2018		33,452	62,969	62,969	62,969	62,969	62,969	62,969
2019			33,587	63,222	63,222	63,222	63,222	63,222
2020				37,133	69,897	69,897	69,897	69,897
2021					37,133	69,897	69,897	69,897
2022						37,133	69,897	69,897
2023							37,133	69,897
2024								37,133
Total	594,458	646,852	709,955	776,724	846,621	916,519	986,416	1,056,314

Table 14: Large Use – Gross Annual CDM Savings (MWh)

Prog. Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2006-2016	444,020	444,020	444,020	444,020	444,020	444,020	444,020	444,020
2017	12,728	23,959	23,959	23,959	23,959	23,959	23,959	23,959
2018		17,635	33,195	33,195	33,195	33,195	33,195	33,195
2019			20,862	39,270	39,270	39,270	39,270	39,270
2020				90,996	171,286	171,286	171,286	171,286
2021					90,996	171,286	171,286	171,286
2022						90,996	171,286	171,286
2023							90,996	171,286
2024								90,996
Total	456,749	485,614	522,036	631,440	802,726	974,012	1,145,298	1,316,584

Table 15: Total – Gross Annual CDM Savings (MWh)

Prog. Year	Calendar Year							
	2017	2018	2019	2020	2021	2022	2023	2024
2006-2016	2,940,739	2,940,739	2,940,739	2,940,739	2,940,739	2,940,739	2,940,739	2,940,739
2017	209,035	393,478	393,478	393,478	393,478	393,478	393,478	393,478
2018	-	187,825	353,553	353,553	353,553	353,553	353,553	353,553
2019	-	-	168,100	316,423	316,423	316,423	316,423	316,423
2020	-	-	-	238,057	448,108	448,108	448,108	448,108
2021	-	-	-	-	238,057	448,108	448,108	448,108
2022	-	-	-	-	-	238,057	448,108	448,108
2023	-	-	-	-	-	-	238,057	448,108
2024	-	-	-	-	-	-	-	238,057
Total	3,149,775	3,522,043	3,855,870	4,242,251	4,690,359	5,138,467	5,586,575	6,034,683

TAB 11

INNOVATIVE RESEARCH GROUP

CUSTOMER ENGAGEMENT

2020 CIR Application

June 15, 2018

Prepared for:

Toronto Hydro

14 Carlton Street

Toronto, Ontario M5B 1K5

TORONTO HYDRO®

1. Introduction

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

The Ontario Energy Board's (OEB) "consumer-centric" approach to rate applications contained in the *Renewed Regulatory Framework for Electricity (RRFE)* requires Local Distribution Companies (LDCs) to demonstrate that their services are provided in a manner that responds to identified customer needs and preferences.[1] LDCs are required to provide an overview of customer engagement activities that they have undertaken with respect to their plans and how customer needs and preferences have been reflected in the LDCs' application. The Handbook for Utility Rate Applications notes the following: *"The OEB expects a utility's rate application to provide an overview of customer needs, preferences and expectations learned through the utility's customer engagement activities."*[2] These requirements have the effect of bringing customers feedback data and actionable intelligence to bear on utility planning.

The OEB does not specify how customer engagement should be conducted or how customer feedback should be received. However, it has encouraged utilities to use *"both existing and new processes."*[3] THESL's customer engagement was designed with this in mind, where customer feedback was collected using multiple methodologies, including: an online customer feedback portal, focus groups, one-on-one interviews, telephone surveys and online surveys.

New customer engagement elements in this consultation included:

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

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

[1] OEB Renewed Regulatory Framework for Electricity Sections 2.4.2, 5.0, and 5.0.4.

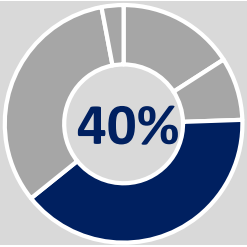
[2] Handbook for Utility Rate Applications, p. 12 (October 13, 2016)

[3] Handbook for Utility Rate Applications (October 13, 2016)

Appendix 2.1

Toronto Hydro 2018 Customer Engagement

Customer Feedback Portal Report



Dealing with complicated projects in built up areas

Should we spend more now to avoid increased cost and disruption later?

In order to keep rate increases down, Toronto Hydro has focused its spending on dealing with more urgent and immediate needs. However, with the current pace of growth in Toronto, there are a number of locations where Toronto Hydro knows that it will need to conduct work within a few years and where planned and current development will make those projects more expensive and more disruptive if Toronto Hydro waits.

Paper Insulated Lead Covered (PILC) Cable

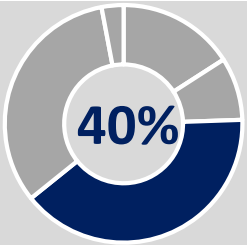
One major example of this is PILC cable. PILC cable was the first type of underground cable installed as part of Toronto Hydro's grid and a lot of it is still providing electricity to the downtown core.

While this is a resilient type of equipment, all of these cables were installed more than 20 years ago. As these cables begin to age, the outer lead covers can begin to crack and leak oil.

Environmental regulations have changed, making it more costly and difficult to remove and replace these cables. As workers who first installed these types of cables continue to retire, fewer trades people have the expertise to deal with this equipment.

Toronto Hydro has a long-term plan to remove and replace PILC cable by 2049 while still meeting legal, safety, and regulatory obligations. However, as the downtown core becomes more densely populated, it becomes increasingly more difficult, complex, and expensive to complete this type of work.

Toronto Hydro has identified an opportunity to replace all of this cable by 2039 by replacing these assets proactively, instead of relying solely on maintenance, refurbishment, and reactive replacement. This will improve reliability, reduce risks to the public, and avoid additional expense and disruption in the future.



Dealing with types of lines that fail more often with more problems

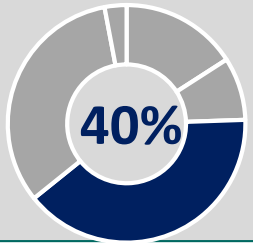
Should we spend more to replace lines that cause more complicated problems more often?

While this is a general question, there are two particular types of neighbourhood power lines where there is a pressing issue - Rear-Lot Feeders and Direct Buried Cable. These are old technologies that have been in use for more than 50 years. While initially they served Toronto Hydro customers well, they now pose reliability and safety concerns. Customers served by these lines are more likely to experience power outages, and when they do those outages are more likely to last longer and be more expensive to fix.

- **Rear-Lot** refers to a type of overhead construction installed in residential backyards during the 1950s and 1960s. Because rear-lot lines are in customers' backyards, they are often difficult for crews to reach and have more exposure to risks such as falling trees and branches. Working on these lines often causes additional disruption and inconvenience to customers. Outages on rear-lot lines are about 1.3 hours longer on average as compared to outages on other power lines.

- **Direct Buried Cable** refers to a legacy type of underground construction where cables are laid directly in underground trenches without a protective barrier. While equipment failure causes 36% of outages across the system, cable failure accounts for 70% of all outages on the underground system. Once these cables start to fail, they tend to experience a rash of failures. On average 800 customers are affected by each buried cable failure and the outages last longer than average (between 4 and 24 hours).

Toronto Hydro's initial plan will phase out rear-lot feeders by 2033 and a quarter of the highest risk direct buried cable by 2024. Converting these lines faster will improve reliability for customers served by this type of equipment.



Dealing with more frequent extreme weather events

Should we spend more to make the distribution system more resilient to the effects of major storms?

Toronto Hydro's distribution system is exposed to the elements: strong winds, freezing rain, and severe flooding have all caused at least one wide-spread outage in Toronto in recent years. While it may be impossible or impractical to completely guard against extreme weather, steps can be taken to "harden" the distribution system. Toronto Hydro is proposing a variety of enhancements to continue to build resiliency. Toronto Hydro is looking for your opinion on whether it should do more in one area in particular: the overhead system outside of the downtown core.

System Restoration Improvements

This type of work makes it easier for Toronto Hydro to restore power customers outside of the downtown following an outage. By adding remotely-operated technology, more back-up links within the grid, and other improvements, Toronto Hydro can better isolate the problem and get more customers' power back on faster.

Given customer desires to keep rate increases down, Toronto Hydro is currently proposing to reduce spending in this category. Improvements have already been made to some parts of the City and the reliability of this part of the overhead system has shown improvement in recent years. It is possible for Toronto Hydro to address more areas during 2020 to 2024 not yet benefiting from these improvements.

Q29. Should Toronto Hydro spend more now to speed up the pace of reducing outage times by up to 50% in neighbourhoods outside of downtown?

- □ Yes, I would be willing to accept an increase to my monthly bill of $0.02 in each of the five years of the plan ($0.09 more by 2024) so more customers can get their power back on quicker during outages caused by storms and other events.
- □ No, I'm comfortable knowing that some of this work is already planned and would prefer to keep my bill lower.
- □ Don't know

Q30. Additional Feedback *(Optional)*

Web page break

TAB 13

INNOVATIVE RESEARCH GROUP

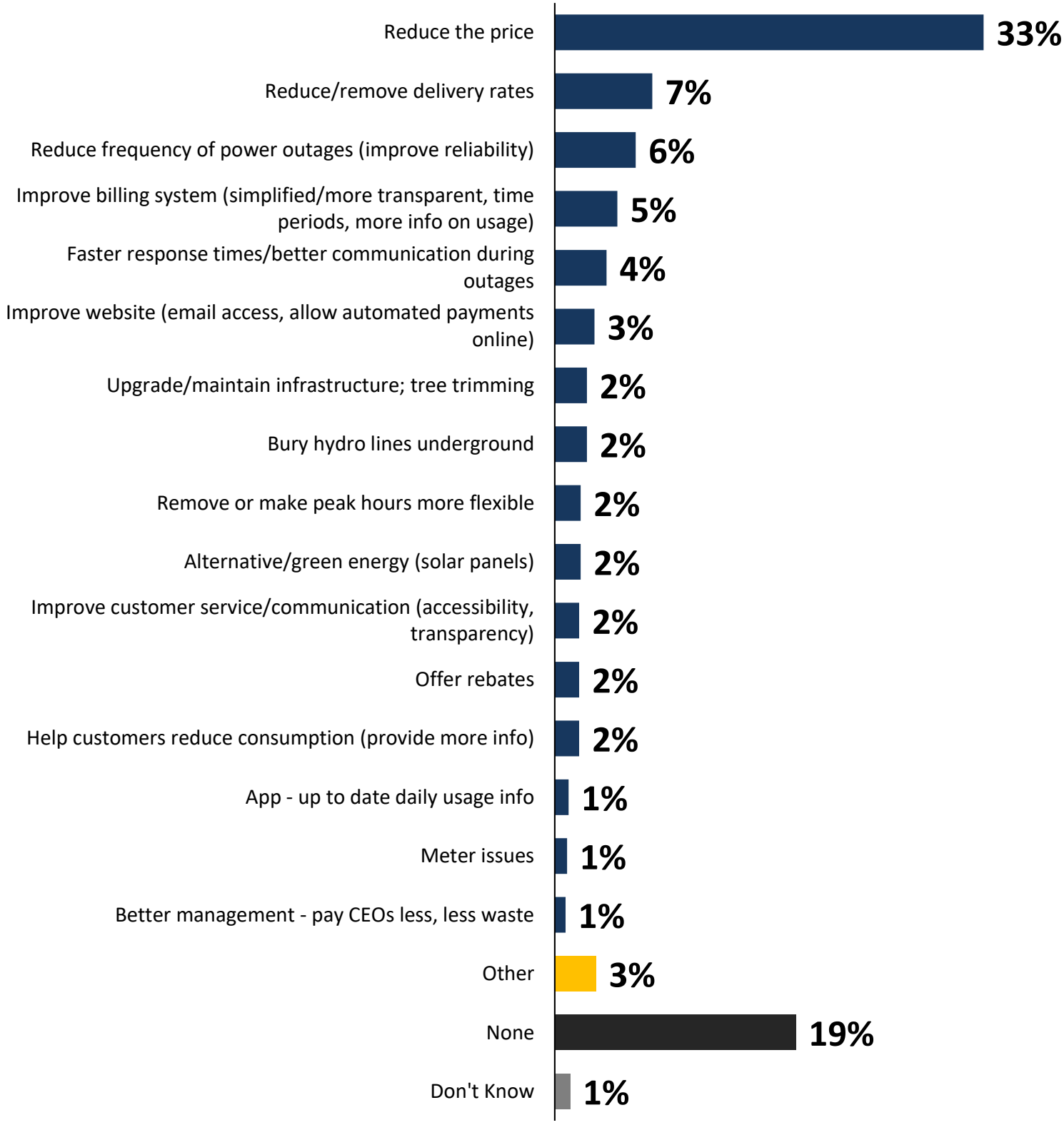
Segmentation and Demographics

TORONTO HYDRO®

Suggestions for Improved Services

Q Is there anything in particular that **Toronto Hydro** can do to improve its services to you?

[asked all respondents, n=854]



Note: "Refused" (1%) not shown.

Initial Feedback on Proposed Plan

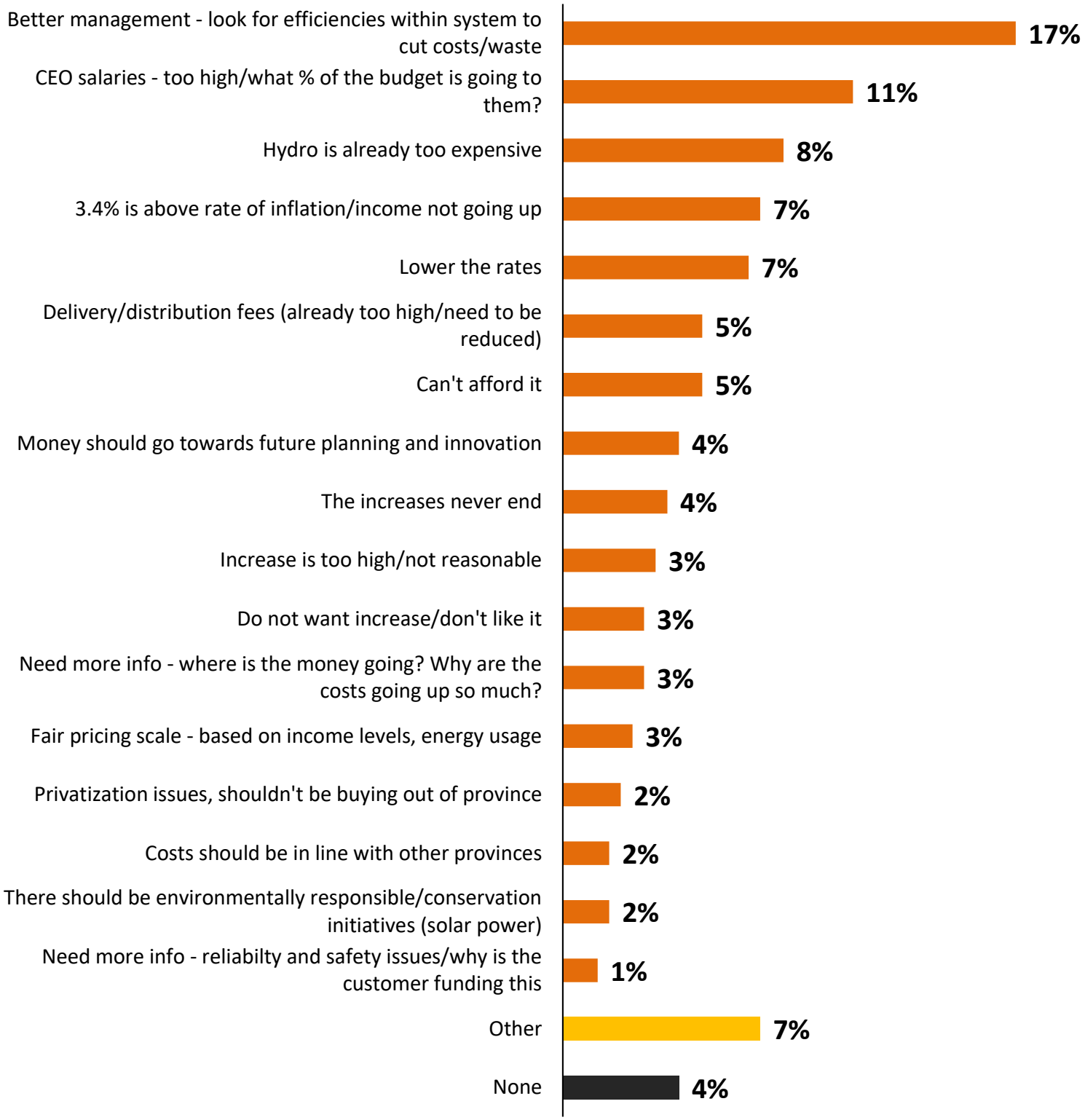
Additional Comments

Q

Do you have any comments you wish to add?

[asked all respondents, n=233]

*Those who say "**I oppose it**":*

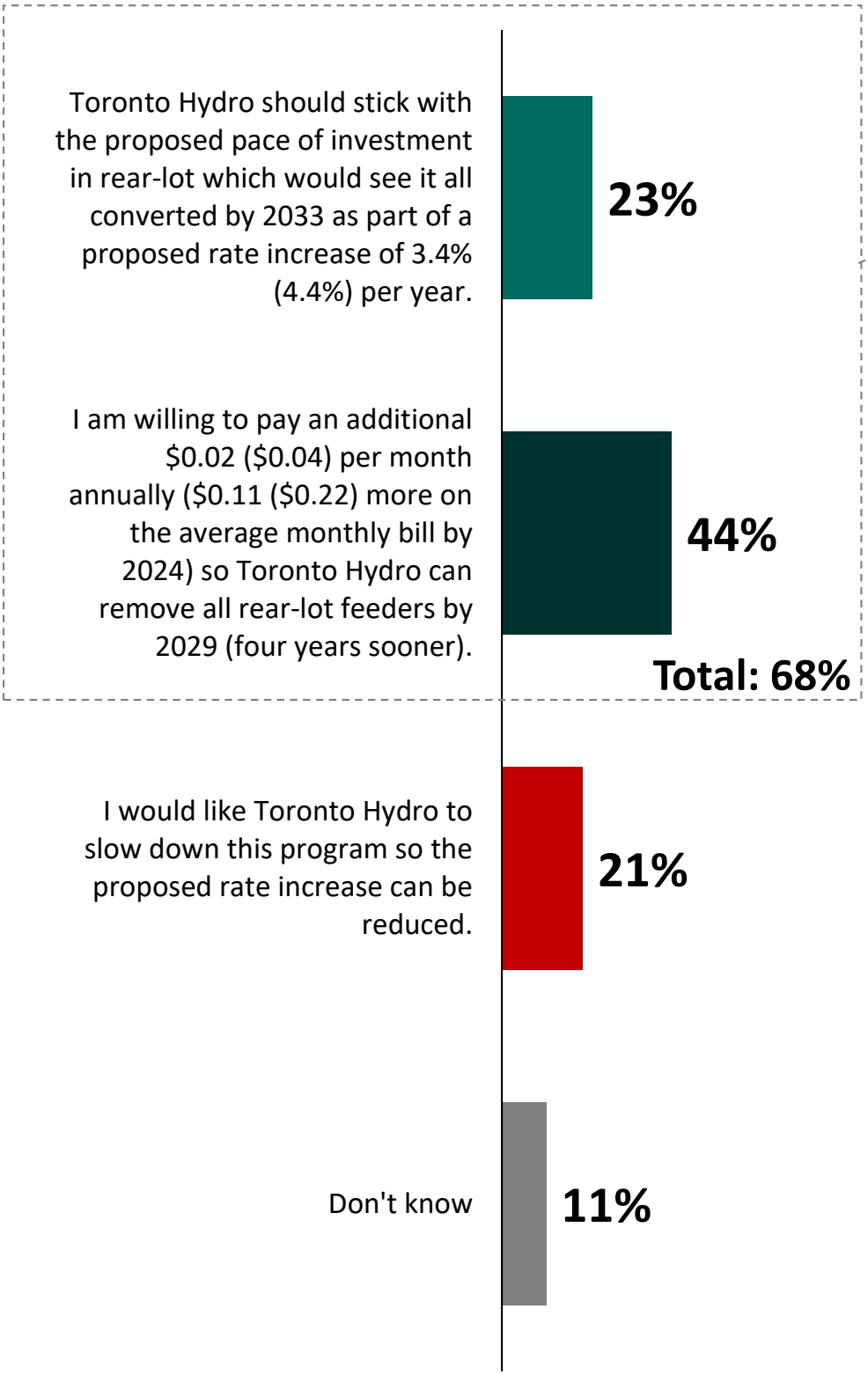


Note: "Refused" (1%) not shown.

Rear-lot Replacement Programs

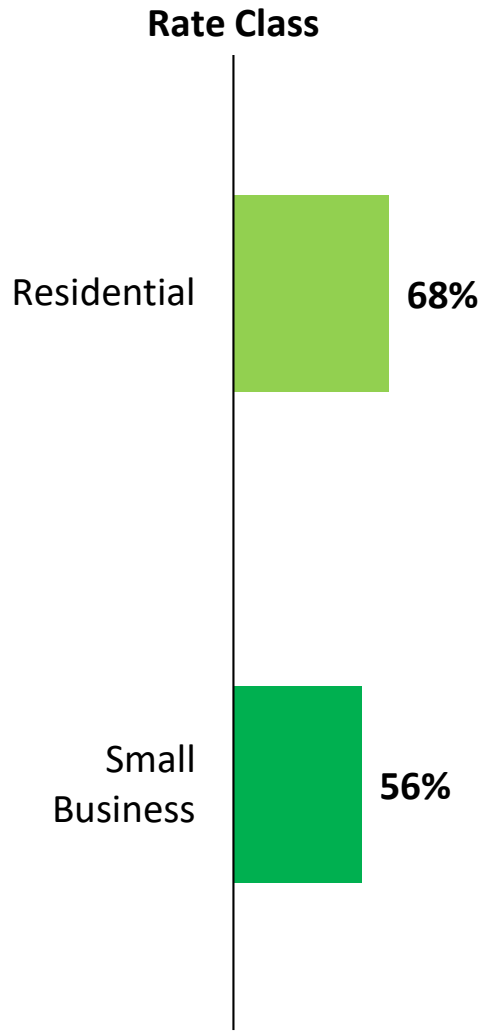
Q Which of the following is closest to your point of view regarding Toronto Hydro's rear-lot replacement programs?

[asked all respondents, n=10,346]



Segmentation

*Those who say "**willing to pay an additional fee**" or "**stick with the proposed pace**":*



TAB 14

Appendix 2-AA – Abridged

From Exhibit U, Tab 2, Schedule 2, Appendix B, pg 1 of 1

	Historical												Bridge			2015-2018 Total Plan	2015-2018 Total Actual
	2015			2016			2017			2018			2019				
Category	**Plan**	**Act.**	**Var.**	**Plan**	**Act.**	**Var.**	**Plan**	**Act.**	**Var.**	**Plan**	**Act.**	**Var.**	**Plan**	**For.**	**Var.**		
System Access	86.1	58.3	(32%)	95.3	79.0	(17%)	104.9	65.5	(38%)	95.8	88.0	(8%)	92.3	112.1	21%	382.1	290.8
System Renewal	251.7	304.1	21%	239.6	266.1	11%	256.2	250.3	(2%)	275.9	245.5	(11%)	287.3	244.2	(15%)	1023.4	1066.0
System Service	76.5	37.9	(50%)	70.7	53.3	(25%)	65.1	72.4	11%	52.6	31.0	(41%)	80.2	41.5	(48%)	264.9	194.6
General Plant	104.6	79.4	(24%)	101.5	109.5	8%	30.3	98.9	226%	34.2	58.4	71%	30.3	46.4	53%	270.6	346.2
Other	12.2	11.6	(5%)	11.6	3.7	(68%)	10.8	10.7	(1%)	11.5	12.7	10%	12.1	(1.3)	(111%)	46.1	38.7
Total CAPEX	**531.1**	**491.4**	**(7%)**	**518.8**	**511.6**	**(1%)**	**467.4**	**497.8**	**7%**	**470.0**	**435.6**	**(7%)**	**502.2**	**443.0**	**(12%)**	**1987.1**	**1936.3**
																50.8	Actual to forecast 4 year difference

1 **Table 3: CRRVA Balance**

	2015 Historical	2016 Historical	2017 Historical	2018 Bridge	2019 Bridge	Total
Proposed Capital-Related RR, 2015-2019 CIR (1B-T2-S3-P10, Table 3)	437.8	465.0	517.3	567.2	607.3	2,594.6
RR impact from 10% reduction in capital spending	(7.3)	(8.7)	(10.7)	(17.7)	(24.1)	(68.6)
Capital-Related RR (Rate Order, Feb. 29, 2016 - Table 2)	430.5	456.3	506.6	549.5	583.2	2,526.0
RR impact from the application of stretch factor to capital funding[3]	-	(2.6)	(5.4)	(8.4)	(11.7)	(28.1)
Capital-Related RR in Approved 2015-2019 Rates	430.5	453.7	501.2	541.0	571.5	2,497.9
Sub-account 1508 - Externally Driven Capital Variance Account	(0.2)	(0.5)	(0.7)	(0.6)	(0.3)	(2.2)
Sub-account 1508 - Derecognition Variance Account	(12.9)	1.3	(3.9)	(10.4)	(14.8)	(40.8)
Other Adjustments[4]	(1.2)	0.6	(1.4)	(4.3)	0.2	(6.1)
Capital-Related RR in Approved Rates eligible for CRRRVA	416.2	455.1	495.3	525.6	556.6	2,448.8
Actual Historic & Forecast Bridge Capital-Related RR	413.6	449.3	481.0	503.7	543.6	2,391.2
Sub-account 1508 - CRRRVA	(2.7)	(5.8)	(14.3)	(21.9)	(13.0)	(57.6)

Note: Rounding differences may exist.

[3] Decision on Draft Rate Order, February 25, 2016, p. 3; Draft Rate Order, February 29, 2016, p. 5.
[4] These adjustments are primarily to account for variances in opening 2015 rate base and disposals. As is the case for Externally Driven Capital and Derecognition, these capital-related variances are outside the OEB-approved scope of the CRRRVA.

TAB 12

OEB Appendix 2-AA
Capital Programs Table

Programs ($M)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS	MIFRS
Customer and Generation Connections	31.7	40.1	21.9	44.0	39.8	42.9	43.9	44.8	45.6	46.3
Externally Initiated Plant Relocations & Expansion	2.2	2.6	2.6	5.0	11.9	11.4	20.8	4.6	4.7	4.5
Generation Protection, Monitoring and Control	-	2.1	0.0	0.6	10.9	3.7	2.3	2.4	2.5	2.7
Load Demand	9.9	16.8	16.2	16.4	23.5	11.3	11.4	18.5	22.6	23.6
Metering	14.5	17.4	24.8	22.0	26.1	22.6	14.8	23.6	30.6	39.2
System Access Total	**58.3**	**79.0**	**65.5**	**88.0**	**112.1**	**91.8**	**93.3**	**93.9**	**106.0**	**116.4**
Area Conversions	46.3	28.2	26.9	34.4	36.0	41.4	47.2	46.3	50.4	35.6
Network System Renewal	10.2	16.8	14.7	18.8	32.2	18.6	19.3	18.5	17.7	18.3
Reactive and Corrective Capital	42.0	54.3	55.5	66.1	63.7	61.2	62.4	63.5	64.4	65.8
Stations Renewal	11.3	11.6	19.0	21.9	22.0	27.5	35.3	29.4	27.0	22.4
Underground Renewal - Downtown	-	-	-	(0.0)	-	15.1	22.5	23.9	30.0	30.6
Underground Renewal - Horseshoe	115.5	80.7	83.1	69.1	55.8	93.0	88.7	90.3	93.1	95.2
Overhead Infrastructure Relocation	0.9	3.1	2.6	0.3	1.6	-	-	-	-	-
SCADAMATE R1 Renewal	3.5	4.9	2.1	1.1	1.9	-	-	-	-	-
PILC Piece Outs & Leakers	6.0	5.7	1.8	0.8	0.1	-	-	-	-	-
Underground Legacy Infrastructure	7.4	9.9	9.0	2.7	6.0	-	-	-	-	-
Overhead System Renewal	61.0	51.0	35.7	30.4	24.8	49.8	50.4	51.3	56.5	57.7
System Renewal Total	**304.1**	**266.1**	**250.3**	**245.5**	**244.2**	**306.6**	**325.7**	**323.1**	**339.0**	**325.5**
Energy Storage Systems	-	-	-	0.1	7.9	1.0	3.7	3.8	1.0	1.0
Network Condition Monitoring and Control	-	-	-	-	-	7.6	10.2	12.6	15.3	17.4
Overhead Momentary Reduction	0.0	-	-	-	0.3	-	-	-	-	-
Stations Expansion	23.0	34.5	59.4	21.0	29.1	19.5	40.0	49.3	12.5	15.2
System Enhancements	7.1	17.2	12.2	9.4	4.0	6.2	6.2	5.6	4.8	4.9
Handwell Upgrades	4.7	0.8	0.8	0.0	-	-	-	-	-	-
Polymer SMD-20 Renewal	3.0	0.3	0.0	0.4	-	-	-	-	-	-
Design Enhancement	0.0	0.6	(0.0)	0.0	0.2	-	-	-	-	-
System Service Total	**37.9**	**53.3**	**72.4**	**31.0**	**41.5**	**34.2**	**60.1**	**71.3**	**33.6**	**38.5**
Facilities Management and Security	15.4	9.0	6.3	1.7	3.5	11.6	11.8	12.1	12.3	12.6
Fleet and Equipment	4.1	3.7	4.7	2.9	3.6	8.6	8.9	8.5	8.7	7.8
IT/OT Systems	28.4	48.6	55.4	53.7	39.3	54.8	55.7	49.5	56.6	64.8
Control Operations Reinforcement	-	-	-	-	-	3.9	17.4	18.9	-	-
Operating Centers Consolidation Plan	31.6	48.3	32.2	-	-	-	-	-	-	-
Program Support	-	0.0	0.4	-	-	-	-	-	-	-
General Plant Total	**79.4**	**109.5**	**98.9**	**58.4**	**46.4**	**78.8**	**93.7**	**89.0**	**77.7**	**85.2**
AFUDC	10.8	12.5	9.8	8.9	4.0	6.0	8.2	8.7	8.9	7.7
Miscellaneous	0.8	(8.8)	0.9	3.8	(5.3)	1.0	0.8	1.2	0.6	1.0
Other Total	**11.6**	**3.7**	**10.7**	**12.7**	**(1.3)**	**7.0**	**9.0**	**9.8**	**9.5**	**8.7**
Subtotal	**491.4**	**511.6**	**497.8**	**435.6**	**443.0**	**518.4**	**581.8**	**587.1**	**565.7**	**574.4**
Less Renewable Generation Facility Assets and Other Non Rate-Regulated Utility Assets (input as negative)	(0.8)	(3.2)	(1.2)	(0.7)	(17.7)	(4.4)	(3.1)	(3.2)	(3.3)	(3.5)
Total	**490.6**	**508.4**	**496.6**	**434.9**	**425.3**	**514.0**	**578.8**	**583.9**	**562.4**	**570.9**

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**