August 10, 2018

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319, 27th Floor
2300 Yonge Street
Toronto, ON M4P 1E4

Re: EB-2017-0049 Hydro One Networks Inc. (HONI) 2018-2022 Custom IR Application
AMPCO Final Submissions

Dear Ms. Walli:

Attached please find AMPCO's final submissions in the above proceeding.

Please do not hesitate to contact me if you have any questions or require further information.

Sincerely yours,

(Original Signed By)

Colin Anderson
President
Association of Major Power Consumers in Ontario

Encl.

Copy to: HONI

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Hydro One Networks Inc.

Application for electricity distribution rates beginning January 1, 2018 until December 31, 2022

EB-2017-0049

AMPCO Submissions

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Hydro One Networks Inc.
Application for electricity distribution rates beginning
January 1, 2018 until December 31, 2022

AMPCO Submissions

Hydro One Networks Inc. (Hydro One) filed a 5-year Custom Incentive Regulation (Custom IR) application with the Ontario Energy Board (OEB) on March 31, 2017 under section 78 of the Ontario Energy Board Act, 1998, S.O. 1998, c. 15, (Schedule B), seeking approval for changes to its distribution rates, to be effective January 1, 2018 to December 31, 2022.

Hydro One seeks approval of revenue requirements of $1,467.2 million for 2018 and approval of its proposed Custom IR rate model to determine revenue requirements for the subsequent years, 2019 to 2022.[1] In 2018, the increase in revenue requirement is 3.7% compared to 2017 Board Approved revenue requirement of $1,414.9 million.

Table 1 (updated): Revenue Requirement ($ Millions)

Description	2017 OEB Approved	2018 Forecast	2018 vs. 2017 Change (%)
OM&A	593.0	576.7	(1.1)
Depreciation and Amortization	390.2	398.2	0.6
Income Taxes	48.7	65.2	1.2
Return on Capital	435.8	474.0	2.7
Total Revenue Requirement	**1,467.6**	**1,514.2**	**3.3**
Deduct External Revenues and Other	(52.7)	(47.0)*	0.4
Rates Revenue Requirement	**1,414.9**	**1,467.2**	**3.7**
Regulatory Deferral and Variance Accounts Disposition	11.1	8.3**	(0.2)
Rates Revenue Requirement (with Deferral and Variance Accounts)	**1,426.0**	**1,475.5**	**3.5**

After adjusting for a reduced load forecast (3%), the resulting average impact on distribution rates (with deferral accounts included) is an increase of 6.5% in 2018, and an average increase of 3.4% per annum over the Term.

The table below shows that Hydro One proposes to spend $336.4 million more on capital and $30 million less on OM&A over the 2018 to 2022 period for a net increase of $306.4 million over the Term compared to the previous 5 years.

[1] 2018 External Revenue updated as part of J11.02

Capital & OM&A															
$ M	2013	2014	2015	2016	2017	Total	5 yr Avg	2018	2019	2020	2021	2021	Total	5 yr Avg	Total Variance
System Renewal (SR)	265.7	262.7	308.4	288.3	214.3	**1339.4**	**267.9**	248.6	318.7	336.7	362.5	451.1	**1717.6**	**343.5**	378.2
Capital	637.0	647.5	678.3	694.2	577.9	**3234.9**	**647.0**	628.1	736.4	699.3	711.0	796.5	**3571.3**	**714.3**	336.4
% SR	41.7%	40.6%	45.5%	41.5%	37.1%	41.4%		39.6%	43.3%	48.1%	51.0%	56.6%	48.1%		
OM&A	610.6	674.5	572.5	562.6	558.7	**2978.9**	**595.8**	576.7	581.1	585.4	600.6	605.1	**2948.9**	**589.8**	-30.0
TOTAL	1247.6	1322.0	1250.8	1256.8	1136.6	**6213.8**	**1242.8**	1204.8	1317.5	1284.7	1311.6	1401.6	**6520.2**	**1304.0**	306.4
% Capital	51.1%	49.0%	54.2%	55.2%	50.8%	52.1%		52.1%	55.9%	54.4%	54.2%	56.8%	54.8%		
% OM&A	48.9%	51.0%	45.8%	44.8%	49.2%	47.9%		47.9%	44.1%	45.6%	45.8%	43.2%	45.2%		
Ref: K6.1 P3, 5															

The increase in total revenue requirement is largely attributable to the impact of rate base growth (increases in depreciation, return on capital and income tax expenses)[2], and lower external revenue.

AMPCO's submissions are largely focussed on Hydro One's proposed capital spend over the test period as well as the following three elements that HONI is relying on to support its requested investment levels: Customer Engagement, Unit Cost Benchmarking, Reliability Analysis. In addition, AMPCO makes submissions on Hydro One's reliability indices and data quality.

Hydro One is the largest electricity distributor in Ontario serving 1.3 million distribution customers. Many of AMPCO's members are Distribution level customers. The two largest concerns of AMPCO members are affordability and reliability of electricity service, with affordability being paramount, given the rapid rise in industrial rates in recent years. AMPCO's submissions are focussed on these two issues as they relate to Hydro One's proposed 5-year Distribution System Investment Plan. AMPCO's principal interest is to be of assistance to the Board in determining if Hydro One has struck an appropriate balance between risk, reliability and customer cost in respect of both the quantum and the timing of capital spend in its investment plan. Cost containment is a central theme in AMPCO's submissions in favour of a more thoughtfully paced capital spending plan that preserves reliability. This approach aligns with the clear preference of Hydro One's customers to keep electricity costs as low as possible[3] while maintaining reliability.

AMPCO proposes the following reductions to Capital and OM&A:

[2] A-3-1 P2
[3] A-3-1 P14

Proposed Reductions	$ M
Capital	
SR-09 Poles	247.0
SR-06 Stations	50.7
SR-12 Lines Sustainment	60.2
SR-07 Trouble Calls	12.0
SR-14 Smart Meters	80.9
P50	20.3
Pension	20.0
Vacancy	5.0
TOTAL	496.1

Proposed Reductions	$ M
OM&A	
Trouble Calls	6.4
Vegetation Management	9.6
P50	17.5
Pension	17.0
Vacancy	4.3
TOTAL	54.8

A. Custom Incentive Rate-Setting (Custom IR) Proposal

Hydro One filed a Custom IR application for a 5-year period (2018 to 2022) on the basis that it is required to make large and recurring capital investments over the plan term.[1]

The revenue requirement for the first year 2018 is set based on a cost of service and then for the subsequent years, Hydro One is proposing a Revenue Cap IR, whereby the revenue is adjusted annually by a Revenue Cap Index (RCI).

Hydro One proposes the RCI as follows:

RCI = I – X + C

- I is the inflation factor (determined annually by the OEB)
- X is the Productivity Factor = Custom Industry Total Factor Productivity measure + Hydro One's Custom Productivity Stretch Factor
- C is Hydro One's Custom Capital Factor

The inflation factor is an industry-specific inflation factor that is set annually by the OEB. Hydro One proposes to update the inflation factor annually. The Productivity Factor is a 0% custom industry total factor productivity measure. The custom productivity stretch factor is an explicit revenue reduction applied each year supported by empirical evidence.

Hydro One proposed a stretch factor of 0.6% to apply over the Term, the highest OEB stretch factor. In response to Hydro One Distribution's audited 2016 actual financial results, Hydro One updated its total cost performance and proposed a change to its Stretch Factor to 0.45%. The Board's September 14, 2017 letter setting out updated stretch factor assignments found that Hydro One should be moved from cohort 5 (0.6 stretch factor) to cohort (0.45 stretch factor).[2] AMPCO takes no issue with Hydro One's proposed stretch factor of 0.45% but submits an adjustment should be made if Hydro One moves into another cohort over the planning period.

Under Hydro One's proposal, the revenue requirement will be adjusted annually by the proposed RCI and rates for the subsequent year will be calculated taking into account the OEB approved load forecast for each year.

Hydro One selected an RCI over a Price Cap IR model to provide flexibility to allow the integration of six new rate classes on January 1, 2021 when the costs of the three Acquired Utilities, Norfolk Power Distribution Inc., Haldimand County Hydro Inc. and Woodstock Hydro Services Inc. are incorporated into revenue requirement ($10.7 million in OM&A and the capital costs of the Acquired Utilities will be incorporated into the Custom Capital Factor). AMPCO agrees Hydro One's proposed RCI model provides the needed flexibility.

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[1] AIC P 8

[2] EB-2010-0379 OEB letter dated September 14, 2017 Re: Incentive Rate-Setting:2016 Benchmarking Update for Determination of 2017 Stretch Factor Rankings,

RCI Updates

Hydro One proposes to update key inputs of the cost allocation model in its 2021 application, namely those related to load forecast (billing determinants) and all components of the cost of capital; Hydro One is proposing to simply apply the Board's cost of capital parameters as set for 2021 and 2022. AMPCO does not support Hydro One's proposed updates.

The Rate Handbook states the OEB does not expect to address annual rate applications for updates for cost of capital, working capital allowances, or sales volume.[3] A utility applying under Custom IR should be committed to that method for the duration of the approved term.[4]

Hydro One indicates integration of the Acquired Utilities represents exceptional circumstances that justify an update to the load forecast and Return on Equity. AMPCO disagrees. Hydro One should not be permitted to reset its return on equity and load forecast for the last two years of the plan.

Custom Capital Factor

The Custom Capital Factor provides the incremental revenue requirement associated with new capital placed into service each year of the custom IR term. Hydro One's proposed Capital Factors for each of the years 2019 to 2022 are shown in the table below. The Capital Factors reflect the growth in capital provided by the RCI formula in I-X.

Line		Reference	2018	2019	2020	2021	2022
1	Rate Base	D1-1-1	7,649.9	8,009.4	8,412.0	8,940.7	9,306.4
2	Return on Debt	E1-1-1	198.6	208.0	218.4	232.0	241.5
3	Return on Equity	E1-1-1	275.4	288.3	302.8	321.7	334.9
4	Depreciation	C1-6-2	398.2	419.3	434.1	453.1	466.8
5	Income Taxes	C1-7-2	65.2	68.7	71.3	78.6	79.2
6	Capital Related Revenue Requirement		937.4	984.3	1,026.6	1,085.4	1,122.4
7	Less Productivity Factor (0.45%)			(4.4)	(4.6)	(4.9)	(5.1)
8	**Total Capital Related Revenue Requirement**		**937.4**	**979.9**	**1,022.0**	**1,080.5**	**1,117.3**
9	OM&A	C1-1-1	576.7	581.1	585.4	589.8	605.1
10	Integration of Acquired Utilities	A-7-1				10.7	
11	**Total Revenue Requirement**		**1,514.2**	**1,561.0**	**1,607.4**	**1,681.0**	**1,722.4**
12	Increase in Capital Related Revenue Requirement			42.5	42.1	58.5	36.8
13	Increase in Capital Related Revenue Requirement as a percentage of Previous Year Total Revenue Requirement			2.80%	2.70%	3.64%	2.19%
14	Less Capital Related Revenue Requirement in I-X			0.46%	0.47%	0.48%	0.48%
15	**Capital Factor**			**2.34%**	**2.23%**	**3.16%**	**1.71%**

Based on AMPCO's proposed capital reductions, the proposed 2018 to 2022 Capital Factors will be lower.

[3] Handbook P26
[4] Handbook P26-27.

Given the increasing uncertain nature of the job estimates for some projects and programs beyond 2020, AMPCO submits that if the Board determines that an update is appropriate in 2021 to coincide with the integration of the Acquired Utilities, the proposed Capital Factors for 2021 and 2022 should be reviewed in the context of the performance of the capital plan over the previous three previous, to determine if a reset of the Capital Factors in 2021 and 2022 is appropriate.

Capital In-Service Variance Account (CISVA)

Hydro One proposes a CISVA to track the cumulative difference over the Term between the revenue requirement associated with actual in-service capital additions during a rate year and the revenue requirement associated with the OEB approved forecast for in-service capital additions for that year, for any capital in-service additions that are 98% or lower than the OEB approved level.

Hydro One believes that a dead band is appropriate for the CISVA in order to ensure alignment between the behaviours that are incented by the account and the outcomes that rate payers value. The in-service variance account should incent Hydro One to cost-effectively deliver on its plans in a timely fashion while providing rate payers with protection from over-paying in the instance that Hydro One does not substantially deliver on its proposed in-service targets.[5]

AMPCO submits if the capital in-service additions are more than 2% over the OEB approved in-service additions, Hydro One should be required to notify the OEB of the overspend and the reasons for the variance. This will ensure that appropriate behaviours are being incented for Hydro to cost-effectively deliver on its plans.

[5] I-17-EP-14

B Alternative Candidate Investments

Hydro One developed four different alternative candidate investment plans (A, B, C & B-Modified) with differing reliability and bill impact outcomes. The reliability outcomes were based upon the impact of different investment levels for poles, stations, other line components, and vegetation management and their impact on SAIDI and SAIFI. Hydro One indicates it considers the three investment areas for vegetation management, pole replacement and stations to be the most significant predictable drivers of reliability.[1]

The expected SAIDI and SAIFI outcomes of the four plans as provided to Hydro One's executive leadership team are provided in the two tables below.

Table 4: SAIDI Projection for Investment Plan Options

SAIDI[1]:	Avg. 2013-15: 7.3 hours/year	Average Number of Hours that a Customer is Interrupted					
	Assumptions			Forecasted Impact on SAIDI [2]			
	Failure Rate/Impact	Contribution to SAIDI	SAIDI Contribution (based on 2013-15)	Plan A	Plan B	Plan C	Plan B-M
Poles	• 345 outages/year • 180 customers/outage • 10 hours/outage	3%	0.2	20%	15%	(15)%	7%
Stations	• 16 failures (outages) /year • 1200 customers/outage • 24 hours/outage	4%	0.2	14%	5%	(4)%	0%
Other Line Components	• 2070 outages/year • 180 customers/outage • 4 hours/outage	23%	1.5	10%	0%	(10)%	(5%)
Vegetation	• 15,530 outages/year	27%	1.8	8%	8%	4%	8%
Estimated Impact to SAIDI				**6%**	**3%**	**(2)%**	**0%**
Forecasted SAIDI (hours)				**6.9**	**7.1**	**7.4**	**7.3**

Exhibit Reference: B1-1-1

1- Excludes force majeure and loss of supply events

2 – These columns reflect the forecasted impact on SAIDI by the end of 2022. Estimated performance improvement is expressed as a positive value; performance deterioration is expressed as a negative value.

[1] A-3-1 P15

Table 5: SAIFI Projection for Investment Plan Options

SAIFI [1]:	Avg. 2013-15: 2.6 outages/year	Average Number of Times a Customer is Interrupted					
	Assumptions			Forecasted Impact on SAIFI[2]			
	Failure Rate/Impact	Contribution to SAIFI	SAIFI Contribution (based on 2013-15)	Plan A	Plan B	Plan C	Plan B-M
Poles	• 345 outages/year • 180 customers/outage • 10 hours/outage	2%	0.1	20%	15%	(15)%	7%
Stations	• 16 failures (outages) /year • 1200 customers/outage • 24 hours/outage	3%	0.1	14%	5%	(4)%	0%
Other Line Components	• 2070 outages/year • 180 customers/outage • 4 hours/outage	18%	0.5	10%	0%	(10)%	(5%)
Vegetation	• 15,530 outages/year	16%	0.4	8%	8%	4%	8%
Estimated Impact to SAIFI				**4%**	**2%**	**(2)%**	**0%**
Forecasted SAIFI (instances)				**2.5**	**2.6**	**2.6**	**2.6**

Exhibit Reference: B1-1-1

1-Excludes force majeure and loss of supply events

2 – These columns reflect the forecasted impact on SAIFI by the end of 2022. Estimated performance improvement is expressed as a positive value; performance deterioration is expressed as a negative value.

The investment levels under each of the above investment plan options are shown in the table below.[2]

	2014-2017 ($M - Average)	2018 ($M)	2019 ($M)	2020 ($M)	2021 ($M)	2022 ($M)
Plan A	663.4	783.5	818.6	749.6	759.6	863.6
Plan B		685.0	742.4	713.3	730.1	821.5
Plan B modified		633.9	756.8	719.0	740.7	827.2
Plan C		603.9	644.3	605.6	622.8	716.0

Hydro One's executive leadership team approved Plan B-Modified which forecasts a 0% impact on SAIDI and SAIFI, consistent with customer preferences to minimize costs and maintain reliability.

Plan B-Modified reflects a capital budget in 2018 that is approximately 9% above 2017 actuals of $577.9 million, with significant increases thereafter. The Capital Factors proposed by Hydro One for each of the years 2019 to 2022 are intended to recover this incremental capital in each year.

A 0% impact on SAIDI and SAIFI as per Plan B-Modified is based on the following[3]:

- **Poles:** 72,151 poles replaced; 6.6% improvement in level of poles in need of replacement (from 106,000 to 99,000)

- **Stations:** 73 stations refurbished; maintain 70 stations in poor condition

[2] I-29-AMPCO-27

[3] J6.01.01

- **Other Line Components**: 1.7% decline in maintaining a level of 300,000 defects in need of replacement[4] from 300,000 to 305,000 defects

- **Vegetation Management:** 1% decline in maintaining 104,000 km rights of way classified as low or medium-priority kilometers to 103,000 km

At the end of 2017, Hydro One made a change to its vegetation management program and is now forecasting a 20% to 40% improvement in overall system reliability over 5 years for the same costs.[5] Investment levels under Plan B-Modified approved by Hydro One's executive leadership team did not reflect this significant change in reliability impact.

If a 40% improvement in reliability from vegetation management is factored into the analysis, AMPCO calculates that the overall impact on SAIDI and SAIFI increases to 10% and 7%, respectively.[6] AMPCO submits this increase in reliability in vegetation management provides flexibility and allows for offsetting reductions in capital spending in other areas to arrive at an investment level that contains costs while maintaining reliability consistent with customer preferences. AMPCO's proposed system renewal capital reductions are consistent with this approach.

[4] Capital funding available to address other line components is covered under the Planned Component Replacement investment (SR-10), budget of $45.2 million
[5] Q-1-1 Att#2 P4
[6] J6.01.01

C. Reliability

Reliability is measured in terms of the duration of outages (SAIDI), the frequency of outages (SAIFI) and the average interruption time (CAIDI).

Hydro One developed candidate investment plans (Plan A, Plan B, Plan C & Plan B-Modified) for consideration by its senior leadership team and Board of Directors that assessed the reliability and bill impacts of varying investment levels for vegetation management, pole replacement and stations. Hydro One sees these three investment areas as the most significant, predictable drivers of reliability.[1]

Inputs to the SAIDI and SAIFI projections for each of the Investment Plan Options above reflect Hydro One's methodology of tracking Interruption data that its uses to calculate the OEB reliability indices.

As discussed below AMPCO has some concerns regarding the methodology used by Hydro One to record interruptions in that it does not appear consistent with OEB requirements.

Monitoring of Cause Codes not consistent with OEB Requirements

Hydro One's methodology to track the cause of interruptions is in part not consistent with the requirements of the 2006 Electricity Distribution Handbook and the Electricity Reporting & Record Keeping Requirements (RRR) and as a result distorts the contribution of defective equipment and tree related outages to SAIDI & SAIFI; two key data trends used by Hydro One to prioritize capital and maintenance plans.

The 2006 Electricity Distribution Rate Handbook provides nine causes of service interruptions that a distributor is required to monitor monthly and report to the OEB annually. [2] The Handbook indicates that monitoring the cause of outages, in addition to monitoring the system reliability indices, provides valuable information as to the remedial work required. An additional Cause Code "Major Event" has since been added as reflected in the RRR.

The 10 Cause Codes are as follows:[3]

Code	Cause of Service Interruption
0	Unknown/Other
1	Scheduled Outage
2	Loss of Supply
3	Tree Contacts
4	Lightning
5	Defective Equipment
6	Adverse Weather
7	Adverse Environment
8	Human Element
9	Foreign Interference
10	Major Event

[1] A-3-1 P14
[2] K8.3 P44
[3] K8.3 P47

Hydro One does not use either Adverse Weather or Lightning as Cause Codes. Instead Hydro One captures Adverse Weather and Lightning related incidents within Defective Equipment and Tree Contacts.[4]AMPCO submits the unfortunate outcome of this practice is that it misrepresents the true contribution of defective equipment and tree contact outages to the reliability indices (SAIDI, SAIFI & CAIDI) which in turn could lead to less than optimal maintenance and renewal planning.

Defective Equipment is expected to capture customer interruptions resulting from equipment failures. Tree Contacts is expected to capture customer interruptions caused by faults resulting from tree contact with energized circuits. Adverse weather captures customer interruptions resulting from rain, ice storms, snow, winds, extreme temperatures, freezing rain, frost or other extreme weather conditions (exclusive of tree contacts and lightning). Lighting captures customer interruptions due to lightning striking the distribution system resulting in an insulation breakdown and/or flash-overs.

In order to isolate reliability performance to the distribution system, interruptions under Adverse Weather and Lightning which are out of Hydro One's control, should not be captured under Defective Equipment and Tree Contacts. With the data separated, Hydro One can determine more meaningful insights into the causes of interruptions on its system to support its investment planning process.

For Hydro One, Tree Contacts, Defective Equipment and Scheduled Outages are the three contributors to SAIDI and SAIFI for the years 2012 to 2017.[5] If Adverse Weather and Lightning were excluded from Tree Contacts and Defective Equipment, these rankings may change.

As an example, AMPCO looked at the 2016 reliability for Greater Sudbury Hydro Inc. (Greater Sudbury), an LDC within Hydro One's service territory. Greater Sudbury tracks interruption data using all ten cause codes. The breakdown of Greater Sudbury's data in terms of Frequency by Cause and Frequency by Duration for Defective Equipment, Adverse Weather and lightning is provided in the Table below.[6]

Cause of Interruption	**Frequency by Cause % of Total**	**Duration by Cause % of Total**
Defective Equipment	18%	16%
Tree Contacts	<1%	<1%
Adverse Weather	14%	10%
Lighting	13%	12%

If Greater Sudbury included Adverse Weather and Lighting in Defective Equipment and Tree Contacts as per Hydro One's practice, the contribution of Defective Equipment and Tree Contacts to SAIDI, SAIFI and CAIDI would be significantly altered and inflated. This is significant because this data drives investment decisions.

Hydro One's distribution service territory is 99% rural and less than 1% urban, and service to its customers is susceptible to a variety of weather conditions in Ontario including such extremes as blizzards, hail, ice storms, lightning and thunderstorms including tornadoes.[7]

[4] JT3.1-4
[5] K 8.3 P26
[6] K 8.3 P50
[7] K 8.3 P41

The OEB has cause codes that separate major weather events (force majeure), other storms and lightning from the other cause codes for a reason. The OEB recently revised the reporting methodology for SAIDI and SAIFI to exclude Force Majeure (FM) and Loss of Supply (LOS) interruptions that are outside of a distributor's control to allow for a better view of system performance. Over the period 2012 to 2016, Force Majeure events have increased Hydro One's reliability statistics, on average, by 90% for SAIDI and 25% for SAIFI.[8]

Specifically, for the Defective Equipment Cause Code, the impact of removing FM is shown in the table below. On average over the 5-year period SAIDI is reduced by 1.6 hours (43%) and SAIFI is reduced by 22%.

Defective Equipment	2012	2013	2014	2015	2016	5 yr Avg	Ref
SAIDI including FM	2.57	6.59	3.03	3.55	3.00	3.7	K8.3 P5
SAIDI excluding FM	1.80	1.87	2.56	2.58	1.92	2.1	K8.3 P31
	0.77	4.72	0.47	0.97	1.08	1.60	
SAIFI including FM	0.73	1.07	0.83	0.88	0.75	0.9	DSP 1.4 P25
SAIFI excluding FM	0.59	0.62	0.74	0.77	0.61	0.7	K8.3 P31
	0.14	0.45	0.09	0.11	0.14	0.2	

For the Tree Contacts Cause Code, the impact of removing FM is shown in the table below. On average over the 5-year period SAIDI is reduced by 4.52 hours (34%) and SAIFI is reduced by 44%.

Tree Contacts	2012	2013	2014	2015	2016	5 yr Avg	Ref
SAIDI including FM	4.24	14.67	3.36	5.53	6.17	6.8	K8.3 P5
SAIDI excluding FM	2.16	1.94	2.03	2.26	2.98	2.3	K8.3 P31
	2.08	12.73	1.33	3.27	3.19	4.52	
SAIFI including FM	0.80	1.36	0.62	0.78	0.81	0.9	DSP 1.4 P25
SAIFI excluding FM	0.55	0.44	0.48	0.50	0.60	0.5	K8.3 P31
	0.25	0.92	0.14	0.28	0.21	0.4	

This demonstrates that the contribution to SAIDI and SAIFI from the Defective Equipment and Tree Contacts Cause Codes would be even less if Adverse Weather and Lighting interruptions were removed.

By not separating out interruptions due to Adverse Weather and Lightning from Defective Equipment and Tree Contacts, AMPCO submits that Hydro One does not have the most accurate view of system

[8] B1-1-1 DSP Section 1.4 P20

performance upon which to drive asset strategies and base maintenance and capital investment decisions.

Hydro One's analysis of Investment Options A, B, C and Plan B-Modified and their impact on reliability are based on an inflated view of Defective Equipment and Tree Contact interruptions because Adverse Weather and Lightning are included in the interruptions. As such, a higher failure rate is being used.

AESI's Recommendation

In its review of Hydro One's DSP, AESI identified areas of opportunity for Hydro One to better demonstrate alignment with the OEB requirements. AESI pointed out that Hydro One only uses 8 causes rather than the 10 causes prescribed by the OEB. AESI stated that Hydro One recognizes this difference in reporting and is working on correcting its outage cause data. In response to AESI's recommendations, Hydro One stated: [9]

> MR. JESUS: I think, obviously because we are only reporting on the 8 factors, we're looking at improving our outage reporting system across the board. And if it's -- if it makes sense to capture these additional risk factors or these additional causes, cause codes, then we will do so.

In an interrogatory response, Hydro One responded that it is satisfied that the current methodology provides meaningful insight to support the investment planning process and plans to continue with the process in place rather than spending significant funds on software upgrades.[10]

AMPCO submits the OEB should direct Hydro One to use the 10 Cause Codes as per the OEB requirements. Further, While AMPCO does not make a specific recommendation regarding capital budget reductions as a direct result of this inaccuracy, it submits that the OEB should take this into consideration in its consideration of Hydro One's capital investment levels.

Other Reliability Observations

AMPCO has reviewed Hydro One's overall reliability data in detail and notes the following:

- Reliability Indicators are Stable since 2002
- Number of Interruptions on the System has Decreased over time
- Historical 5-year SAIDI & SAIFI results are Constant

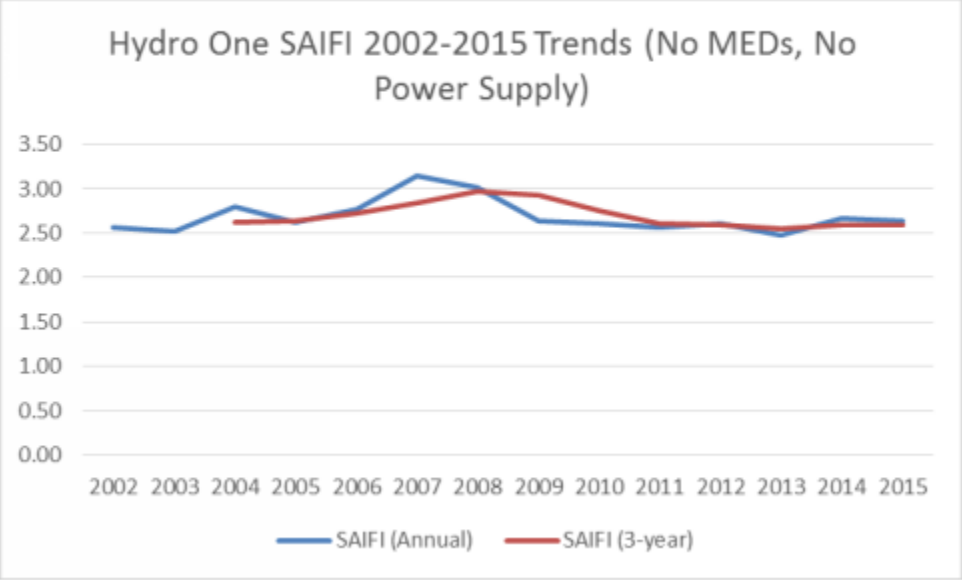
[9] Transcript Volume 8 P177
[10] I-24-AMPCO-16 (b)

- Hydro One is not able to breakdown causes of Defective Equipment
- Predictive Value of Reliability Indices

1. Reliability Indicators are Stable

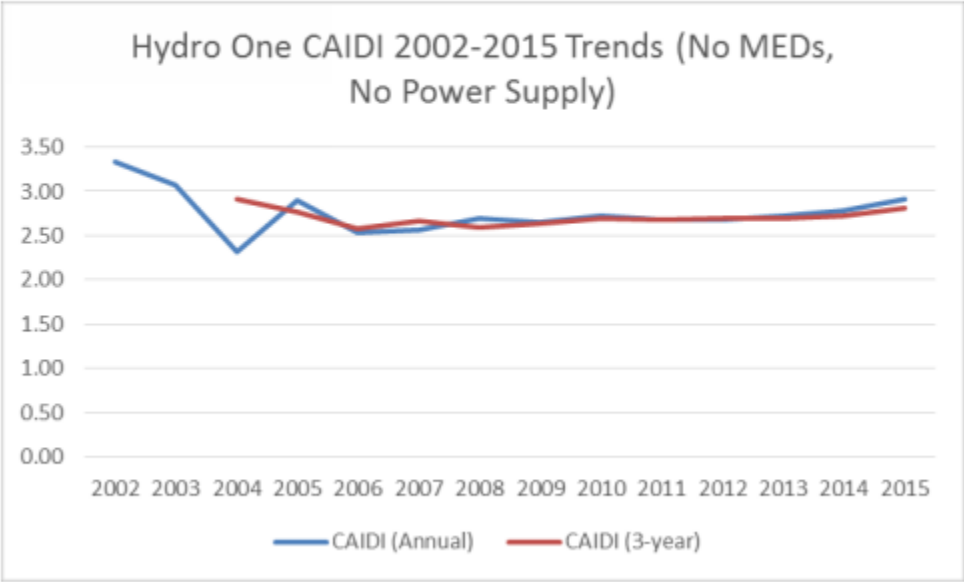
Based on data provided by Hydro One to PSE, PSE concludes that Hydro One's reliability (excluding Major Event Days and power supply outages) over the years 2002 to 2015, shows minimal change in SAIFI and CAIDI as shown in Figures 4 and 5 below. [11]

Figure 4 Hydro One Historical SAIFI



[11] A-3-2 Attachment #1 P15

Figure 5 Hydro One Historical CAIDI



2. Number of Interruptions on the System has Decreased over Time

Interruption data is used to calculate the OEB reliability indices. Trends of frequency, duration, cause of interruptions, feeders, location, etc. are analyzed by Hydro One to allow prioritization of maintenance and capital programs on the distribution system.[12]

The number of interruptions on the system[13] decreases over time by 13% from 40,927 interruptions in 2011 to 35,720 interruptions in 2017. Since 2014, the number of interruptions has been stable. The peak in 2013 can be explained by the Major Event Days in that year which included the ice storm.[14]

Year	2011	2012	2013	2014	2015	2016	2017
Number of Interruptions	40,927	35,013	44,834	33,200	35,074	35,762	35,720

3. Historical 5-year SAIDI & SAIFI Results are Constant

From 2012 to 2016, SAIDI and SAIFI excluding FM and LOS has generally been constant at 7.4 hours and 2.6 timers per customer per year.[15]

[12] A-18-1 P2
[13] Includes MED & Loss of Supply
[14] I-24-AMPCO-13
[15] B1-1-1 DSP Section 1.4 P20

Reliability Statistics (excluding FM & LOS)

	2012	2013	2014	2015	2016	5 yr Avg	2017	2018	2019	2020	2021	2022
SAIDI Target							7.50	7.00	6.70	6.40	6.10	5.80
SAIDI Actual	6.98	6.88	7.49	7.65	7.83	7.4	7.90					
SAIFI Target							2.60	2.40	2.30	2.20	2.10	2.00
SAIFI Actual	2.61	2.49	2.70	2.63	2.47	2.6	2.30					
Ref: I-18-SEC-29												

AMPCO submits that Hydro One's stable reliability results over time aligns with AMPCO's proposed capital reductions. Past capital investment levels were adequate to maintain system reliability.

4. Hydro One is no longer able to breakdown causes of Defective Equipment

In EB-2014-0416, Hydro One provided a breakdown of the contribution to SAIDI and SAIFI of Defective Equipment by equipment type.[16] For SAIDI and SAIFI, conductors, poles and insulators were the top three contributors.

In this application, in response to AMPCO's requests for the same data, Hydro One was not able to provide this data. Hydro one indicates it does not report customer interruptions to the level of granularity required for equipment subcomponent failures. Only system level numbers can accurately be provided.[17] Hydro One views the data provided in EB-2014-0416 as inaccurate. (get Transcript)

As discussed below, AMPCO submits equipment performance data over time is key in determining asset strategies and in evaluating the prioritization of assets in need of maintenance and capital investment. In AMPCO's view, equipment performance is the leading indicator of future reliability performance. The fact that Hydro One is unable to provide subcomponent equipment performance data is concerning.

5. Predictive Value of Reliability Indices

Hydro One indicates that SAIDI and SAIFI are lagging indicators with limited predictive value because once the impact is seen in SAIDI and SAIFI it's too late to make a difference to SAIDI and SAIFI in a timely manner.[18] AMPCO supports this view and notes it is consistent with Hydro One's view in the last Hydro One Transmission case (EB-2016-0160), that T-SAIDI and T-SAIFI are lagging indicators of system reliability performance.

In this application, Hydro One uses condition of assets as a leading indicator of reliability.[19] AMPCO wishes to point out that in the last Transmission case, Hydro One did not see asset condition as a leading indicator of reliability as it provides a static view that is insufficient to predict future reliability.[20] Instead Hydro One relied on past equipment performance as the leading indicator of future reliability performance for Transmission, as the equipment performance perspective enables Hydro One to assess

[16] K8.3 P12
[17] I-24- AMPCO-13 (o)
[18] Transcript Volume 9 P137
[19] Transcript Volume 9 P137
[20] EB-2018-0160 B1 T2 S4 Page 6

past and future operational performance of specific assets. As trends in major equipment performance begin to shift, there is a lagging effect on broader system reliability metrics SAIDI and SAIFI.

AMPCO struggles to understand why the leading indicator of system performance reliability would differ between the distribution and transmission systems. It seems to AMPCO that Hydro One is taking the position that asset condition is the leading indicator in distribution because Hydro One does not have sufficient and accurate equipment performance data.

AMPCO agrees with the perspective that asset condition is a static view and past equipment performance is a superior leading indicator of future reliability. In this application, the quantity of assets to be replaced is derived from fixed 2016 condition data. AMPCO is concerned that Hydro One's proposed investment plan out to 2022 based on 2016 asset condition data is suboptimal in that it does not adequately consider changes in condition over time and equipment performance over time for all asset groups.

AMPCO submits Hydro One needs to accurately track and monitor equipment performance by asset type so that it can better support its individual asset investment decisions in future applications, and AMPCO respectfully suggests that the OEB should require this, going forward. An example of this is the Worst Performing Feeder Program. Hydro One indicates it is a new program that has been developed as a part of Hydro One's renewed focus on reliability and continuous improvement. It has been made possible by the availability of more specific reliability data.

D. Investment Planning

Hydro One's Planning Process consists of the following seven stages:

- Strategic Context
- Planning Assumptions
- Needs Assessment
- Investment Development
- Investment Optimization
- Investment Approval and Implementation
- Performance Reporting

AMPCO makes the following comments regarding Asset Needs, Asset Performance Risk and Investment Optimization.

Asset Needs

To assess asset needs Hydro One relies in part on asset condition, demographics and asset performance. SAP is Hydro One's asset registry with some supplemental asset information being extracted from GIS. Individual asset needs are determined in part by performing an asset risk assessment (ARA) which relies on analysis of this asset data. Data inputs come from 9 live data interfaces with various corporate databases and 10 rationalized data interfaces with decommissioned databases.[21]

Results of Hydro One's internal audit reports and a report from the Auditor General (AG) highlighted ongoing data quality issues with respect to accuracy, completeness, consistency.

Hydro One's Internal Audit Report on Investment Planning dated January 30, 3015 first raised concerns about the quality of Hydro One's data as follows:

- There is inconsistent documentation and tracking of asset and system needs[22]
- There is inconsistent use of Asset Analytics data to assess individual asset needs[23]
- The quality of the data (accuracy, completeness and timely availability of recent data) being used in SAP and other databases for risk calculations is unknown as only 44% of Distribution data is considered normal[24]
- Absence of well-understood and quality asset information increases the risk of inadequate need assessment resulting in less than optimal investment decisions[25]
- Internal Audit rated the data quality issue as "high risk"

In December 2015, the Auditor General raised similar concerns as follows:[26]

- Asset Analytics System Incomplete and Inaccurate (Finding #5)

[21] P23
[22] P7
[23] P7
[24] P7
[25] P8
[26] A-3-1 Att#4 P1

- Inaccurate Information Provided to OEB in Rate Applications (Finding #6)

- Information on Condition of Key Distribution System Assets Not Reliable (Finding #11)

The AG made the following recommendations to ensure Hydro One was replacing assets at the highest risk of failure as determined through accurate asset condition rating:[27]

- Enhance the Asset Analytics system to include information on all key factors that affect asset investment decisions, including those related to technological/manufacturer obsolescence, known defects, environmental impact and health and safety.

- Review and adjust current weighting assigned to risk factors in Asset Analytics to more accurately reflect their impact of asset condition and risk of failure.

- Make changes to its Asset Analytics system and procedures so that updates to its data are complete, timely and accurate.

- Conduct a comprehensive review of the data quality in Asset Analytics to update any incomplete or erroneous information on its assets and to ensure the information can support its asset replacement decision making process.

- Investigate why known deficiencies in the reliability of the Asset Analytics system, such as those found two years earlier by internal audits, have not been corrected by management in a timely manner.

Hydro One's Internal Audit group issued follow-up reports on the AG's recommendations on March 31, 2017, the date this application was filed, and November 28, 2017. The reports raised the following issues with respect to the data quality issues:[28]

- Recent data remediation efforts were primarily focussed on transmission but did not adequately address distribution data integrity issues[29]
- Current data governance is not adequate to provide ongoing data completeness and data quality monitoring[30]
- Data points were found to be missing or incomplete[31]
- Asset counts across multiple systems differ at present (i.e. poles, pole-top transformers in GIS, SAP differ)[32]
- The data remediation effort has not adequately addressed distribution data completeness[33]

[27] K1.7 P7
[28] A-3-1 Att#3
[29] A-3-1 Att#3 P5
[30] A-3-1 Att#3 P5
[31] A-3-1 Att#3 P8
[32] P9
[33] K1.7 P17

- There is a lack of sustainable approach over the long term to manage data completeness and data quality[34]
- Based on the evidence gathered on the distribution data remediation efforts, this project is currently running on an ad-hoc basis with a lack of implementation schedule nor the establishment of the data completeness and accuracy targets

On September 6, 2017, Hydro One's Internal Audit group issued a follow-up report to the Investment Planning Report issued on January 30, 2015 that shows that data quality continued to be an issue after this application was filed:[35]

- Hydro One continues to identify and correct issues with Asset Analytics input data and risk factor algorithms that will affect the degree to which the output results can be used to influence investment decisions[36]
- Control improvements are needed to effectively identify, develop, prioritize and select investments in support of the Hydro One business plan and work program[37]
- Management has not implemented any of the requirements identified in the AA workshops; Internal Audit remains concerned about the data quality from supporting systems such as SAP that are used as inputs to Asset Analytics[38]

- Internal Audit rates this issue as high and states the absence of well-understood and quality asset information increases the risk of inadequate asset need assessment which can result in diminished confidence in the process involving the AA tool and the potential for less than optimal investment decisions[39]

In considering the above, AMPCO submits that data quality issues identified first by Hydro One back in early 2015 have not been fully corrected. Hydro One indicates that data quality improvement is an ongoing activity and will require ongoing focus and continuous improvement.[40] As part of this application, Hydro One is implementing a formal data governance process for equipment data.[41] Hydro One is also requesting funding for an Asset Analytics Risk Factor project which will improve the quality of the asset risk model.[42]

AMPCO submits these initiatives will help mitigate the risk of continuing data integrity issues but in terms of the investment plan to be approved in this application for the years 2018 to 2022, AMPCO submits it is likely that less than optimal investment decisions have been made given the data integrity issues that existed at the time the investment planning process was undertaken. Unavailability of required data in Asset Analytics and Asset Investment Planning tools may result in incorrect/inconsistent

[34] K7.1 P17
[35] JT3.2 Att#2
[36] JT3.2 Att#2 P2
[37] JT3.2 Att#2 P3
[38] JT3.2 Att#2 7
[39] JT3.2 Att#2 P7
[40] I-1-BOMA-49
[41] B1-1-1 DSP Section 1.1 P11
[42] ISD GP-35

decision making. AMPCO submits the Board should take this into consideration in setting investment levels for 2018 to 2022.

Asset Performance Risk

Asset performance risk is an input to Asset Risk Assessment to reflect the historical performance of an asset. Hydro One was only able to provide failure data for substations and poles.[43] Hydro One explained that for the majority of asset subcomponents, Hydro One does not report interruptions to the level of granularity required for asset subcomponents to be identified during an equipment failure. Hydro One tracks asset the age of failures for station transformers and mobile unit substations asset groups only.[44]

AMPCO submits that Hydro One should be collecting more failure information so failure models can be developed for individual assets and used in future assessments. Past performance is good indicator of expected future performance.

Investment Optimization

Hydro One aggregates all candidate investments into a consolidated investment plan for prioritization and optimization using the following prioritization criteria that are assigned weights based on their relative importance within the Business Objectives to prioritize the investments.

Through an iterative process Hydro One arrived at the investment levels for Plan, A, B, C and B-Modified. The purpose of the prioritization process is to find the combination of investment options that maximize investment benefit without exceeding the defined funding constraints.

As shown in the Table below, the relative weightings have changed since Hydro One's last application.

[43] 24-AMPCO-24
[44] JT3.1-6

Hydro One Prioritization Criteria & Weighting			
Criteria	Weighting (%) (EB-2017-0049)	Weighting (%) (EB-2014-0316)	Variance
Customer	17	15	2
Safety	17	20	-3
Reliability	13	20	-7
Productivity	13	15	-2
Employee	9	5	4
Shareholder Value	9	5	4
Environment	9	5	4
Financial Benefit	13	15	-2
	100	100	
References:	B1-1-1-2.1 P27	TCJ1.21	

The most notable changes are Reliability risk has decreased by 7%; and Employee and Shareholder Value has increased by 4%.

A criticism identified in HONI's Internal Audit Report on Investment Planning[45] was inefficient investment plan optimization. At that time only 30% of the plans in 2015-2019 Investment Plan Proposal were optimizable within Asset Investment and Internal Audit rated this a risk as high.[46] An insufficient number of optimizable plans defeat the benefits of overall plan optimization and increases the risk of having less than an optimal plan. The Auditor recommended that HONI increase the number of plans that are optimizable.

The percentage of plans optimizable in the 2017-2022 plan before the OEB is 23%.[47]

Hydro One has gotten significantly worse with respect to optimization. AMPCO submits the Board should take this into consideration in setting investment levels for 2018 to 2022.

[45] J3.2-01 P28
[46] JT3.2 Att#1 P29
[47] I- 24-AMPCO-36 (e)

E. Capital

Over the 5-year period 2013 to 2017, Hydro One spent $3,235 million on Capital & $2,979 million on O&M. The average annual Capital spend was $647 million and the average annual O&M spend was $596 million.[48]

Category	Historical and Bridge (previous plan and actual)										
	2013*	2014*	2015			2016			2017 Bridge		
	Actual	Actual	Plan	Actual	Var	Plan	Actual	Var	Plan	Actual	Var
	$M	$M	$M	$M	%	$M	$M	%	$M	$M	%
System Access	159.5	199.4	183.3	188.1	2.6	182.6	182.7	0.0	176.1	181.9	3.3
System Renewal	265.7	262.7	250.7	308.4	23.0	265.4	288.3	8.6	285.0	214.3	(24.8)
System Service	80.4	71.0	95.4	69.8	(26.8)	89.7	78.9	(12.1)	86.0	80.1	(6.9)
General Plant	131.4	114.4	119.5	112.0	(6.3)	117.0	144.3	23.3	114.3	101.7	(11.1)
Total	637.0	647.5	648.9	678.3	4.5	654.7	694.2	6.0	661.4	577.9	(12.6)
System OM&A**	610.6	674.5	543.1	572.5	5.4	589.1	562.6	(4.5)	593.0	558.7	(5.8)

** 2013 and 2014 were IRM years and therefore do not have Board-approved capital expenditure figures.*
*** System OM&A values include all Operations, Maintenance and Administration expenses.*

5 yr Capital Spend	$3,235	Average Capital Spend	$647
5 yr O&M Spend	$2,979	Average O&M	$596

In this application, Hydro One forecasts to spend $3,571 million in Capital over the 5-year period 2018 to 2022 (average $714 per year). This represents an increase of approximately 10.4% or $336 million over the Term.[49] Hydro One forecasts to spend $2,949 million in O&M over the Term consistent with the level of spending over the previous five years.

Category	Forecast (Planned $M)				
	2018	2019	2020	2021	2022
System Access	154.6	157.6	160.9	165.9	170.0
System Renewal	248.6	318.7	336.7	362.5	451.1
System Service	81.8	91.6	85.6	78.8	69.5
General Plant	143.3	168.5	116.2	103.7	105.9
Total	628.1	736.4	699.3	711.0	796.5
System OM&A*	576.7	581.1	585.4	600.6	605.1

** System OM&A values include all Operations, Maintenance and Administration expenses.*
Updated 2018 OM&A for Fair Hydro Plan by ($2.9M), future years based on Custom IR Formula
2021 and 2022 include Acquired Utilities

5 yr Capital Spend	$3,571	Average Spend	$714
5 yr O&M Spend	$2,949	Average Spend	$590

[48] I-24-SEC-38 Att#1
[49] ibid

Within the Capital categories, the most significant changes in the forecast 5-year period compared to the previous 5-year period is a decrease in non-discretionary System Access work and a large increase in System Renewal work.

As shown on the Table below, forecast spending under System Renewal increases by $378 million or 28% from 2018 to 2022 compared to the previous 5 years.[50]

Category	Actual ($M)					
	2013	2014	2015	2016	2017	Total
System Renewal	265.7	262.7	308.4	288.3	214.3	1,339.4
	Forecast (Planned $M)					
	2018	2019	2020	2021	2022	Total
System Renewal	248.6	318.7	336.7	362.5	451.1	1,717.6
						378.2

AMPCO reviewed System Renewal Spending in detail and is proposing a $450.8 million in System Renewal capital over the Term related to Investments SR-06, SR-07, SR-09, SR-12 and SR-14. .

Historical Performance

In Hydro One's last application, the OEB determined that Hydro One's proposed capital spending plan was justified for the 3-year period 2015 to 2017.[51] Accordingly, the OEB approved $1,965 million in Capital and $1974.4 million in in-service additions over the same 3-year period.[52]

Table 1: In-Service Capital Additions 2013-2017 ($M)
OEB Approved and Actual/Forecast (updated for 2017 Actuals)

	Historic								Bridge		
	2013	2014	2015			2016			2017		
	Actual		OEB Approved	Actual	Variance	OEB Approved	Actual	Variance	OEB Approved	Actual	Variance (Act)
Sustaining	296.6	324.8	294.2	420.2	126.0	311.9	371.1	59.2	335.7	322.8	-13.0
Development	194.1	187.6	218.9	216.9	-2.0	200.8	168.3	-32.5	211.2	216.5	5.3
Operations	1.4	5.0	11.1	7.0	-4.1	8.1	-0.3	-8.4	16.4	14.0	-2.4
Customer Service	13.9	1.4	46.0	16.6	-29.4	20.6	6.5	-14.1	27.7	10.9	-16.7
Common & Other	223.4	96.6	86.5	100.5	14.1	80.4	109.3	28.9	105.0	116.8	11.8
Total	**729.3**	**615.3**	**656.7**	**761.3**	**104.6**	**621.8**	**654.9**	**33.2**	**696.0**	**681.0**	**-15.0**

Although the OEB gave Hydro One 100% of the Capital budget it was seeking, Hydro One brought into service an additional $122.5 million or 6.2% more than what was approved as shown in the

[50] I-24-SEC-38 Att#1
[51] EB-2013-0416 Hydro One Decision P9
[52] EB-2013-0416 Hydro One Decision P35

Table above[53], which Hydro One seeks to add to rate base as part of this application. For the reasons discussed below, AMPCO submits that ratepayers should not be required to cover these additional costs and the Board should not allow the $122.5 million additional increase to rate base.

Hydro One accomplished less asset units than forecast in the last proceeding for the years 2015 to 2017 and spent more to do less, and in many cases at a higher unit cost. In response to 24-AMPCO-22, Hydro One provided a comparison of the asset unit accomplishments reflected in Hydro One's last custom distribution application (EB-2013-0416) and actual accomplishments, as shown in the Table below.

Table 1

Asset/Project Type	ISD	2015 Variance	2016 Variance	2017 Variance
Transformer Replacements	S-01	2	-3	-1
Transformer Spares	S-01	14	-20	-21
MUS Trailer Replacements	S-02	-2	-3	-1
MUS Purchases	S-02	-1	-1	0
Stations targeted for Spill Containment	S-03	-1	-1	-2
Feeders identified for Recloser Upgrades	S-05	-13	-9	-8
Station Refurbishments	S-07	-8	-27	-29
Pole Replacements	S-10	237	-903	-3558
PCB Lines Equipment Replacements	S-11	-366	-653	-2200
Large Sustainment Initiatives	S-12	1	-5	-9
Development Capital - New Connections	D-01	-2391	87	1423
Development Capital - Service Upgrades	D-01	-594	-424	-719
Development Capital - Service Cancellations	D-01	-911	1670	-1556
Upgrades Driven by Load Growth	D-02	-9	-6	2
Asset Life Cycle Optimization and Operational Efficiency	D-05	-5	-3	0
Reliability Improvements	D-06	-1	-2	-1
Distribution Station Security Upgrades	C-05	-3	0	-3

For each year the above comparison shows that Hydro One accomplished less units in most Sustaining (System Renewal) projects and it got worse as time went on:

- 2015: 137 less units
- 2016: 1,625 less units
- 2017: 5,829 less units

[53] I-33-AMPCO-52

Hydro One did less transformer replacements, less transformer spares, less station refurbishments, less MUS trailer replacements, less MUS purchases, less stations targeted for spill containment, less feeders identified for recloser upgrades, less pole replacements, less PCB lines equipment replacements and less large sustainment initiatives, than it received funding for in the last proceeding.

In the Development category, Hydro One did less new connections, less service upgrades and less service cancellations, less upgrades driven by load growth, less asset life cycle optimization, less reliability improvements, and less distribution station security upgrades.

In total, AMPCO calculates that Hydro One accomplished 8% less asset units than forecast in EB-2013-0416.[54] The outcome of not accomplishing this work over the 2015 to 2017 period is that the work was deferred, most logically to the current application.

	EB-2013-0416 Forecast [# Asset/Project]					EB-2013-0416 Actual [# Asset/Project]			
Asset/Project Type	**ISD**	**2015F**	**2016F**	**2017F**	**Total**	**2015A**	**2016A**	**2017A**	**Total**
Transformer Replacements	S-01	6	6	6	18	8	3	5	16
Transformer Spares	S-01	26	27	26	79	40	7	5	52
MUS Trailer Replacements	S-02	2	3	1	6	0	0	0	0
MUS Transformer Replacements	S-02	0	0	0	0	0	0	0	0
MUS Purchases	S-02	1	1	1	3	0	0	1	1
Stations targeted for Spill Containment	S-03	2	2	2	6	1	1	0	2
Feeders identified for Recloser Upgrades	S-05	17	22	18	57	4	13	10	27
Station Refurbishments	S-07	36	38	38	112	29	11	9	49
Pole Replacements	S-10	11,600	12,200	13,200	37,000	11,837	12,355	9,642	33834
PCB Lines Equipment Replacements	S-11	400	1,000	2,200	3,600	34	347	0	381
Large Sustainment Initiatives	S-12	11	11	11	33	12	6	2	20
Development Capital - New Connections	D-01	15530	15570	15850	46,950	13,139	15,657	17,273	46069
Development Capital - Service Upgrades	D-01	4554	4604	4654	13,812	3,960	4,180	3,935	12075
Development Capital - Service Cancellations	D-01	6230	6300	6360	18,890	5,319	7,970	4,804	18093
Upgrades Driven by Load Growth	D-02	9	14	13	36	4	8	15	27
Asset Life Cycle Optimization and Operational Efficiency	D-05	5	3	5	13	1	0	5	6
Reliability Improvements	D-06	2	2	1	5	0	1	0	1
Distribution Station Security Upgrades	C-05	3	3	3	9	0	3	0	3
Source: D2-2-3	**TOTAL**				**120,629**				**110,656**
									92%

And for many of the above projects, Hydro One completed the asset unit accomplishments at a higher unit cost than forecast.[55] The Table below shows that total spending for the above projects where total asset unit accomplishments was less than planned, was approximately $165 million or 16% greater than budget meaning Hydro One accomplished less for significantly more money.

[54] I-29-SEC-52
[55] K5.1 P32

EB-2013-0416 - Ex.D2-02-02

LIST OF CAPITAL EXPENDITURE PROGRAMS/PROJECTS IN EXCESS OF $1M

		2015	2016	2017		2015A	2016A	2017A	
S1	Transformer Spares and Replacements	18.0	18.4	17.9	54.3	20.4	7.6	5.2	33.3
S2	Mobile Unit Substations	4.6	3.6	3.7	11.9	0.3	0.9	2.8	4.0
S3	Spill Containment	1.1	1.1	1.2	3.4	1.1	0.9	0.6	2.6
S5	Recloser Upgrades	1.4	1.4	1.4	4.2	0.7	3.0	2.6	6.3
S7	Station Refurbishments	34.6	39.0	40.0	113.6	58.9	48.9	19.8	127.6
S10	Pole Replacements	88.7	95.1	105.0	288.8	87.4	90.9	72.4	250.7
S11	PCB Lines Equipment Replacements	1.9	5.0	10.6	17.5	0.2	1.4	0.0	1.6
S12	Large Sustainment Initiatives	33.4	39.5	42.9	115.8	44.0	35.1	17.5	96.7
D1	New Connections, Upgrades and Service Cancellations	108.9	112.1	115.8	336.8	114.2	110.1	131.7	356.0
D2	Upgrades Driven by Load Growth	20.1	26.4	28.5	75.0	63.7	96.6	160.3	320.6
D5	Asset Lifecycle Optimization and Operational Efficiency	8.1	9.7	8.9	26.7	4.9	8.3	5.9	19.2
D6	Reliability Improvements	2.7	2.0	2.6	7.3	1.2	0.5	0.3	1.9
	Total				**1,055**				**1,220**

Hydro One indicates its past performance over the last few years is not the performance anticipated going forward.[56]

Hydro One acknowledges the inaccuracy of its 2015 in-service additions and states “That was unacceptable from our perspective, and that's why we put in a much more robust process in redirection.[57]

AMPCO agrees with Hydro One’s point below that not adhering to approved in-service addition amounts and asking for the additional amounts in a subsequent proceeding puts the whole process in a difficult position with respect to approving or denying work that’s already been completed.[58]

MR. BOWNESS: I think there's two reasons from my perspective as to why it's appropriate to manage to a capital envelope.

The first one is the rates that we've asked for are encompassing based on a financial cost of doing work. And if we don't adhere to those costs, and we come into the subsequent rate hearing and we say we've spent X amount of dollars over that envelope, we're retroactively asking the OEB to approve that, and I think it puts the whole process in a difficult position with respect to approving or denying work that's already been completed, so I think managing within the envelope is important to make sure that we're staying true to what we asked for.

[56] Transcript Volume 6 P150
[57] Transcript Volume 9 P135
[58] Transcript Volume 9 Page 136

AMPCO submits based on Hydro One's under-accomplishments, higher project costs and overall poor historical performance, ratepayers should not be on the hook for the additional $122.5 million Hydro One seeks to add to rate base.

AMPCO further submits that in the future, if Hydro One expects to be more than 2% over the OEB approved in-service additions budget moving forward, Hydro One should be required to notify the OEB of the overspend and the reasons for the variance. The 2% mirrors the 2% deadband associated with Hydro One's proposed CISVA to track underspending in actual in-service capital additions during the rate year. This will ensure that appropriate behaviours are being incented.

F Review of Individual Investments

AMPCO has reviewed the following investments and proposes the following reductions as described below.

Proposed Reductions	$ M
Capital	
SR-09 Poles	247.0
SR-06 Stations	50.7
SR-12 Lines Sustainment	60.2
SR-07 Trouble Calls	12.0
SR-14 Smart Meters	80.9
	450.8

SR-09 Pole Replacement Program

Hydro One has 1,607,000 poles on its system and wood poles make up the vast majority (1,597,000 or 99.4%).[1]

Hydro One indicates it currently has approximately 67,000 poles[2] or 4% in poor condition.[3] In addition, there are approximately 39,000 red pine poles[4] that do not meet the CSA standard for penetration and retention of treatment.[5] This brings the total number of poor condition poles to 106,000.[6]

Hydro One has a Proactive Pole Replacement Program which is the largest System Renewal Program within its capital budget. Under this Program, Hydro One proposes to replace 72,151 poles over the period 2018 to 2022 at a cost of $579 million.[7]

($ Millions)	2018	2019	2020	2021	2022	Total
Capital* and Minor Fixed Assets	83.8	127.4	145.3	149.2	152.1	657.8
Less Removals	10.1	15.3	17.4	17.8	18.2	78.8
Gross Investment Cost	**73.8**	**112.1**	**127.9**	**131.3**	**133.9**	**579.0**
Less Capital Contributions	0.0	0.0	0.0	0.0	0.0	0.0
Net Investment Cost	**73.8**	**112.1**	**127.9**	**131.3**	**133.9**	**579.0**

**Includes Overhead at current rates.*

The 72,151 poles to be replaced over 5-years consists of the 67,000 poles in poor condition plus 5,151 red pine poles at high risk.[8] Based on 2016 data, Hydro One estimates that approximately 7,000 or 20% of the 39,000 red pine poles are at high risk[9] and Hydro One has targeted a subset of high risk red pine poles for replacement.

<u>Historical Replacement Rates</u>

As shown in the Tables below, historically Hydro One replaced 85,470 poles over the period 2009 to 2017, on average 9,500 poles per year. Over the same period, the percentage of wood poles in poor condition has improved from 5% in 2008[10] to 4% in 2017.[11]

[1] B1-1-1 Section 2.3 P32
[2] Transcript, Day 7, p 147, line 24 to p 148, line 3.
[3] Based on 2016 data used to develop investment plan
[4] 38,877 poles
[5] I-24-AMPCO-23 Att#1
[6] 67,000 + 39,000 = 106,000
[7] ISD:SR-09
[8] Transcript Volume P90
[9] Transcript Volume P91
[10] EB-2009-0096 D1-2-1 P14
[11] I-24-AMPCO-23 Att#1

Pole Replacement Quantities										
	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
Actual	7,485	7,518	7,282	7,452	10,720	11,179	11,837	12,355	9,642	**85,470**
Average #/year										**9,497**
Ref:	A-4-4 P8	A-4-4 P8	A-4-4 P8	A-4-4 P8	A-4-4 P8	A-4-4 P8	K6.1 P 32	K6.1 P 32	K6.1 P 32	

For the period, 2018 to 2022, Hydro One proposes to replace on average 14,430 poles per year, an increase of over 50% compared to historical levels.

	2018	2019	2020	2021	2022
Number of Poles Replaced	9,600	14,300	16,000	16,123	16,128

For the following reasons, AMPCO does not support such a significant increase in pole replacements beginning in 2019. AMPCO submits Hydro One should continue the replacement of poles at the historical average rate of replacement (9,500) consistent with the levels replaced in 2017 (9,642) and forecast to be replaced in 2018 (9,600). If Hydro One was to adopt such an approach, it would result in an estimated $200 million capital reduction over 5 years.

The following points support AMPCO's approach:

- The condition of poles has improved between 2008 and 2017 based on an average replacement rate of 9,500 poles per year
- There is no evidence that pole performance is deteriorating over time
- Unit cost benchmarking results show:
    - Hydro One's average three-year pole replacement costs from 2012 to 2014 are 16% percent higher than the mean of the comparison group
    - Hydro One is the only peer company in the benchmarking sample that does not undertake more accurate physical pole testing
    - Hydro One does not have a Pole Refurbishment Program
- Hydro One replaces additional poor condition poles outside of the Pole Replacement Program

Additional detail on each point above is provided below.

Pole Condition

Hydro One's asset strategy for poles centres on condition information collected through the line patrol program. Once a pole has been assessed to be in poor condition it is planned for replacement.[12]

The percentage of poles in poor condition is improving over time. The proposed level of spending on poles is driven by 2016 asset condition information. AMPCO wishes to point out that Hydro One has reduced the number of wood poles in poor condition over the last decade. At the end of 2008,

[12] B1-1-1 DSP Section 2.3 P32

approximately 5% of wood poles in the system were found to be in poor condition, based on inspection and test results.[13] In 2016 and 2017, the number of poles in poor condition remains at 4%, consistent with 2014 and 2015.

AMPCO submits, the improved trend of pole condition does not support a significant increase in pole replacements from 9,600 in 2018 to 16,128 by 2022.

Pole Performance

There is no evidence that pole outages are increasing over time. In response to I-24-AMPCO-25, Hydro One provided the number of pole failures for the years 2011 to 2017 which shows the number of failures remains stable over the period 2011 to 2017; 2,512 pole failures in 2017 is consistent with 2,588 pole failures in 2011.[14] Hydro One further notes that these failures may not directly result in an outage[15] so pole interruptions that contribute to SAIDI and SAIFI are a subset of this data.

In response to I-29-AMPCO-28, Hydro One provided information on the contribution of poles to SAIDI and SAIFI which shows the contribution of poles is stable over the period 2012 to 2016.

As discussed under the reliability section, AMPCO sought to get actual data through interrogatories[16] on the annual contribution of sub-equipment types such as poles to the Defective Equipment reliability cause code to determine if the number of pole interruptions and length of pole interruptions was increasing or decreasing over time relative to other equioment. Hydro One indicated it does not currently have this information at the requested level of granularity.

In addition, Hydro One does not have the ability[17] to report pole failures by pole type. Thus, Hydro One does not have data on the failure rate of red pine poles compared to the rest of the pole population. Further, Hydro One does not track the age at which a pole fails.[18] Rather, Hydro One tracks the age of poles that fail condition testing; of the 67,000 poles that failed based on testing, their average age is 45 years.[19]

Statistical analysis of the wood pole population indicates the expected service life of Hydro One's population of wood poles is approximately 62 years. Hydro One does not use hazard rates or curves to justify making specific asset replacements. All planned wood pole replacements are made strictly based on asset condition assessment results. Assets that are in poor condition are candidates for replacements and are prioritized based on the risk posed to the system.[20]

In AMPCO's submission, past equipment performance, is a better indicator than condition to predict future reliability performance, consistent with Hydro One's view in its Transmission Application (EB-

[13] EB-2009-0096 D1-2-1 P14
[14] I-24-AMPCO-25
[15] I-24-AMPCO-25 (b)
[16] I-AMPCO
[17] I-24-AMPCO-25
[18] JT3.1-6
[19] P 183
[20] J 7.3

2016-0160). AMPCO submits there is no evidence to suggest pole performance is deteriorating over time and that pole replacement rates should be increased.

AMPCO submits Hydro One should consider collecting more pole failure data such as the age at which the pole fails and the type of pole that fails so that this data can be used to refine future asset strategies for poles.

Unit Cost Benchmarking

Navigant Consulting Ltd. with First Quartile Consulting was retained by Hydro One to conduct a unit cost benchmarking study for its pole and station management programs pursuant to the Board's direction from EB-2013-0416. The Navigant study filed on October 16, 2016 provides insights into both the costs incurred by Hydro One and the practices used by the comparison group for the execution of the programs.

Navigant found Hydro One's unit costs to replace poles are 16% higher than the peer group. The Navigant benchmarking study concludes Hydro One's average three-year pole replacement costs from 2012 to 2014 was $8,266, 16% percent higher than the mean of the comparison group, which was $7,105.[21]

Navigant found that Hydro One is the only company that does not include more complete pole inspections.[22] Hydro One inspects its poles more frequently than most utilities, using mostly visual inspections with some light physical inspections, while all other comparators typically perform more rigorous physical inspections and testing. Specifically, Navigant stated that Hydro One does not have a comprehensive program for physical inspections of poles[23] and Hydro One is the only company that does not use bore, excavation or ultrasonic methods on a dedicated schedule (7 to 20 years).[24]

Navigant recommended Hydro One consider modifying the pole replacement program to include more comprehensive pole inspections (sound, bore, excavation) and a longer (approximately 10-year) inspection cycle, noting the OEB would need to approve the change in inspection cycle. Currently Hydro One inspects rural areas on a six-year cycle and urban areas on a three-year cycle as required by the Distribution System Code (DSC).[25]

Hydro One's response is that it is investigating improvements that can be made to its pole testing process to augment the current process by including more thorough testing methods.[26] Hydro One is considering a strategy of alternating detailed pole testing (for example: drilling and shell thickness measurements) with visual inspections.[27]

[21] B-1-1, DSP Section 1.6 Att #1
[22] B-1-1, DSP Section 1.6 Att #1 Pi
[23] B-1-1, DSP Section 1.6 Att #1 P11
[24] B-1-1, DSP Section 1.6 Att #1 P8
[25] DSC Appendix C Minimum Inspection Requirements
[26] AIC P134
[27] I-25-Board Staff-126

With respect to the outcomes and benefits of more rigorous pole testing, Navigant makes the point that there is a trade-off between quality of data and the cost of the inspection program and is there is a way to strike a balance. Generally speaking, an entity can amass better data on the poles and make better decisions around pole replacement by using more invasive testing, recognizing though, that invasive testing costs more to implement - and so to manage that, the cycle has to be extended.[28]

Further Navigant states "Individual inspections will be more expensive. Individual ones. By doing them less frequently you can counter-balance that. So in the net, the inspection program, the inspection part of the pole program is likely to be slightly more expensive, but not very much. And then you will have noticeably better information to make your decisions on what poles to do things about."[29]

Further testimony below indicates more rigorous pole testing would likely affect the number needing replacement and the number to be refurbished, potentially reducing costs later by refurbishing instead of replacing.[30]

MR. SIDLOFSKY: And do you have any sense of whether upgrading visual inspections to those more complete inspections of, you know, sound, bore, excavation type inspections, do you expect that that would affect the number of poles identified as needing replacement?

MR. BUCKSTAFF: It is likely to affect the number needing replacement, and it also gives you a window into, maybe we could refurbish some, so it helps on that, which at the time was not an option at Hydro One, but which they're, you know, likely to be considering for future.

MR. SIDLOFSKY: So it is possible by being more proactive in the inspections you could reduce costs later by refurbishing instead of replacing?

MR. BUCKSTAFF: Yes.

Although Hydro One has had 21 months to consider Navigant's recommendation, Hydro One has not yet implemented more detailed pole testing into its inspection process and is not seeking approval from the

[28] Transcript Volume 6 P77 l18-28
[29] Transcript Volume 6 P78 l25-28 to P79 l1-4
[30] Transcript Volume 6 P7 l14-27

OEB in this proceeding to extend its pole inspection cycle. In AMPCO's view, Hydro One has missed a key opportunity for improvement.

At the oral hearing, AMPCO explored the perspective of another consultant, Kinectrics Inc., who undertook an Asset Condition Assessment of Thunder Bay Hydro's assets as part of Thunder Bay Hydro's 2016 Cost of Service application. Kinectrics provided a similar view to Navigant with respect to the value of more complete pole strength testing.

In the case of Thunder Bay Hydro, Kinectrics identified the same data gaps with respect to pole information that Navigant found in the case of Hydro One. The data gaps found by Kinectrics included the need for more detailed inspection records and pole strength tests that give an objective, quantified assessment of the condition of the wood poles.[31] Kinectrics ranked the priority importance of the missing information as Medium for the inspection records and High for the pole strength tests.[32] High priority means the data is critical data and is most useful as an indicator of asset degradation.[33]

Kinectrics' view is that if there are numerous data gaps, the degree of confidence that the asset condition[34] reflects true condition may be low. Kinectrics recommended that Thunder Bay Hydro close these data gaps and undertake pole strength testing. This underscores the importance of having the best data to assess asset degradation to ensure the best decisions are made regarding which poles to replace.

Impact of Additional Pole Strength Testing on Condition Algorithms

For poles, Hydro One has an Asset Analytics algorithm for the condition risk factors that are used to determine asset needs. The Supporting Factors for poles are Shell Thickness, Hammer Test, Visual Damage Assessment, Woodpecker Damage and Pole Defects.

Wood Pole*	Shell Thickness	N/A	Thickness of shell.
	Hammer Test	N/A	Results of latest hammer test.
	Visual Damage Assessment	N/A	Results of latest visual assessment.
	Woodpecker damage	N/A	Results of latest visual assessment.
	Pole Defects	N/A	Number of defect notifications for a given asset.

Unlike other asset groups[35], Hydro One has not assigned relative weights to the above five supporting factors.[36] If Hydro One were to undertake more rigorous pole strength testing, AMPCO submits it would make sense that a higher relative weighting be given to more complex testing compared to visual inspections to reflect the quantitative nature of the data, thereby improving decisions on which poles to replace.

[31] K8.3 P87
[32] K8.3 P88
[33] K8.1 P77
[34] Determined by the Health Index
[35] Station Transformers, Station Reclosers & Station Site Structures (I-24-Staff-119 (b))
[36] I-24-Staff-119 (b)

Hydro One has not justified its updated forecast of the number of poles that will be found to be in poor condition over the next 5 years. Hydro One's pre-filed evidence indicates that approximately 9,000 more poles are identified as being in poor condition each year.[37] This is consistent with the first testimony given by Hydro One below.

> MS. GARZOUZI: Because -- so let's look at wood poles. It is our largest capital planned program.
>
> So we have 106 wood poles that are -- 106,000 wood poles that are in poor condition. Over the plan, we are seeking to replace 72,152 wood poles, so we are not doing them all. Every year when we do testing, we find more. We find, on average 9,000. So we are actually maintaining the population.

Later Hydro One revised its testimony and indicated that since then, the trend has increased based on condition testing, and so now it is closer to 13,400 a year. "That's a forecasted trend based on what we're finding."[38] It's not clear what Hydro One is finding. Coincidentally, over the five years of the investment plan, based on Hydro One's change in condition trend, the number of poles that will be found to be in poor condition (67,000) now coincides exactly with the number of poles planned to be replaced (67,000). And Hydro One makes the claim the Pole Replacement Program is designed to maintain the condition of Hydro One's pole population, and not improve it.[39]

Hydro One has not provided any underlying empirical evidence on the testing results that Hydro One is now finding and relying on to increase the number of poles forecast to found to be in poor condition over the next five years. Furthermore, based on the Hydro One's current lack of more accurate quantitative strength testing of poles, AMPCO submits the OEB cannot be certain about Hydro One's updated evidence that the percentage of wood poles that will be found to be of poor condition each year will now increase by almost 50%.

Under the first forecast (9,000 poles/year), the number of poles that will be found to be in poor condition over the 5 years is 45,000. Under AMPCO's proposal to keep pole replacements at historical levels (9,500 per year or 47,500 over 5 years), the population of poor condition wood poles will be maintained.

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[37] B1-1-1 DSP Section 3.3 Page 8
[38] Transcript Volume 7 P153
[39] AIC P102

Pole Refurbishment

Navigant found that Hydro One does not employ a formal pole refurbishment program, whereas most of the companies in the comparator group do. 13 of 17 companies in the comparison group do a pole refurbishment program in an effort to postpone premature replacement of poles.[40] Navigant recommended that Hydro One consider modifying the program to include a rigorous pole refurbishment option, when appropriate.[41]

Based on its review and observations from other utilities, Navigant indicates there could be an opportunity for improved cost performance through pole refurbishment.[42] At the oral hearing Navigant clarified that typically refurbishment is targeted at younger poles that are at risk of premature failure and this could be remedied through various refurbishment activities, and the cost of refurbishing that pole could be lower and could yield better total life-cycle costs for that pole than replacing it outright.[43] A pole refurbishment program can potentially increase the life of a pole anywhere from 20 to 40 years.[44] Navigant concludes, based on the mean of the study sample, that the cost to refurbish a pole 1/7th of the cost of replacement.[45]

Out of the 106,000 poor condition poles[46], Hydro One identifies 10,000 as candidates for refurbishment.[47] Using Hydro One's average cost to replace a pole over the period 2018 to 2022 ($9,082)[48], less 16% to bring costs inline with its peers, AMPCO calculates $65.39 million in capital savings to refurbish 10,000 poles over the Term instead of replacing them.[49] Pole refurbishment allows Hydro One to defer future capital expenditures.

Hydro One has not yet implemented a Pole Refurbishment Program. Hydro One indicates it is exploring pole refurbishment in two ways, chemical refurbishment and mechanical refurbishment in order to lengthen the life of certain poles.[50]

Pole Refurbishment is not a new concept. Hydro One has had almost two years to investigate and commit to a Pole Refurbishment Program that would benefit customers. By not including some savings from Pole Refurbishment Program in this application, Hydro One has missed a key opportunity for improvement and cost savings for customers. AMPCO submits the OEB should reduce Hydro One's capital budget by $30 million to incent Hydro One to implement a Pole Refurbishment Program during the Term.

Hydro One indicates Pole Refurbishment is an expense.[51] Implementation of a wood pole refurbishment program would require an incremental OM&A budget of $10.9 million[52] per year. Hydro One indicates it would defer other OM&A work to accommodate this work within the forecast budget.[53]

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[40] DSP Section 1.6, Attachment 1, p i.
[41] DSP Section 1.6, Attachment 1, p ii
[42] Transcript Volume 5 Page 155 lines 10-13
[43] Transcript Volume 6 P13 lines 8-22
[44] B1-1-1 DSP Section 1.6 Att#1 P16
[45] Transcript Volume 6 Page 40
[46] Red pine poles not candidates
[47] Transcript Volume 8 P28
[48] AIC P54
[49] 10,000 x $7,629 - 10,000 x $1,090 = $65.39 million
[50] Transcript Volume 8 P28

Additional Poles Replaced Outside of Pole Replacement Program

Hydro One replaces additional poles outside of the Planned Pole Replacement Program. Hydro One forecasts that an additional 60,000 poles, 12,000 poles per year, are replaced outside of the Planned Pole Replacement Program.[54] for a total of 132,151[55] poles to be replaced over the Term. Hydro One estimates that approximately 4% of the 12,000 poles replaced each year are poles in poor condition. This brings the average number of poles forecast to be replaced each year to 26,430.

In addition to Hydro One's Proactive Pole Replacement Program (SR-09), AMPCO's review indicates poles are also replaced under the following investment categories:

- SA-01 Joint Use and Line Relocations Program
- SA-04 New Load Connections, Service Upgrades, Cancellations and Metering
- SR-01 Distribution Stations Demand Capital Program
- SR-04 Distribution Station Planned Component Replacement Program
- SR-08 Distribution Lines PCB Equipment Replacement Program
- SR-10 Distribution Lines Planned Component Replacement Program
- SR-12 Distribution Lines Sustainment Initiatives
- SR-13 Life Cycle Optimization & Operational Efficiency Projects
- SS-02 System Upgrades Driven by Load Growth

AMPCO submits the Board needs to take into consideration Hydro One's replacement of an additional 60,000 poles over the Term and 2,400 of them in poor condition, in determining the appropriate pole replacement rate for 2018 to 2022. If the Board approves a historical pole replacement rate of 9,500 as recommended by AMPCO, the actual number of poles replaced in poor condition will be closer to 11,900 when the poor condition poles replaced under other programs is included.

Navigant did not recommend that Hydro One increase the replacement pace or spending of its Pole Replacement Program. Hydro One makes the point often that the Navigant benchmarking study shows Hydro One's pole replacement rate has been slower than for the comparison utilities, with the result that Hydro One's pole inventory is the oldest".[56] On average Hydro One's poles are eight years older than the rest of the utilities in the comparison group. Navigant further explains that Hydro One's pole replacement rate matches Hydro One's planned life of poles of 62 years which is also about 10 years longer for Hydro One than the comparator group.[57] Navigant does not recommend that Hydro One increase the pacing of its pole replacement. Navigant does not recommend that Hydro One increase its spending on pole replacements.[58]

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[51] Transcript Volume 9 P87
[52] $1,090 x 10,000 = $10,900,000
[53] Transcript Volume
[54] Transcript Volume 6 P151
[55] 72,151 + 60,000 poles = 132,151
[56] J 7.3 P1
[57] B-1-1, DSP Section 1.6 Att #1 Pi
[58] Transcript Volume P

AMPCO Position - Summarized

AMPCO submits Hydro One needs to close the data gap regarding pole information as soon as possible to ensure Hydro One has the best physical testing information to make decisions on which poles to replace. AMPCO further submits that Hydro One needs to develop a more comprehensive program for physical inspections of poles and apply to the OEB for a longer inspection cycle. Without this more rigorous testing, Hydro One is not using the best indicators of asset degradation and as a result AMPCO does not have sufficient confidence that the current condition of poles reflects actual condition and that Hydro One is making the best possible decisions on which poles to replace.

In the absence of more rigorous pole testing, AMPCO cannot accept Hydro One's updated forecast that the number of poles that will be found to be in poor condition over the next 5 years has increased from 9,000 per year to 13,400 per year. Hydro One did not provide any empirical evidence at the oral hearing to support this.

Hydro One's asset strategy to replace poles for the period 2018 to 2022 is based on a static view of asset condition in 2016. AMPCO submits the condition of poles and the performance of poles over time does not justify an increase.

AMPCO submits Hydro One should continue the replacement of poles at the historical average rate of replacement (9,500) consistent with the actual level replaced in 2017 (9,642) and forecast to be replaced in 2018 (9,600). At this level of replacement, AMPCO calculates a Pole Replacement budget of $362 million using the average unit pole replacement rate (2018 to 2022) of $9,082[59] less 16% ($7,629). This represents a capital reduction of $217 million. AMPCO submits this approach better controls costs and bill impacts over the test period, consistent with customer preferences.

AMPCO submits Hydro One should implement a Pole Refurbishment program to postpone the premature replacement of poles.

[59] Average 2013 to 2017 ($8,374)

SR-06 Distribution Station Refurbishment

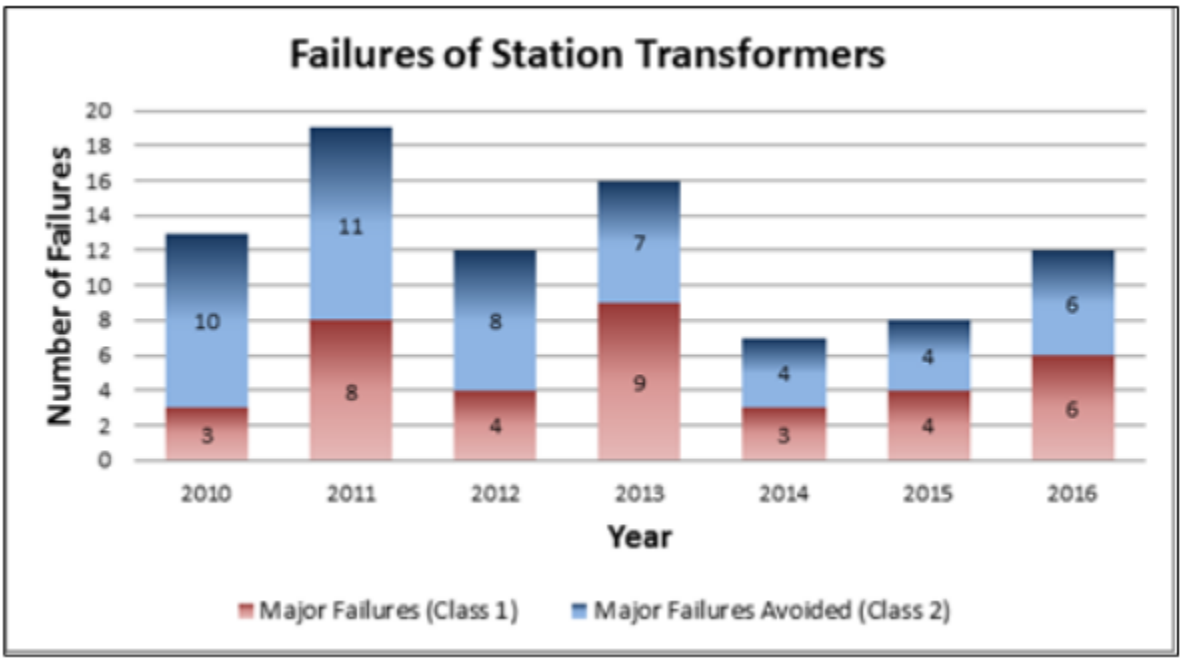
Hydro One operates 1,005 distribution stations. Hydro One indicates 70 (7%) are in poor condition.[1] Hydro One proposes to refurbish 73 total stations[2] at a cost of $148.1 million (Plan B Modified), on average 15 distribution stations per year over the 5-year period, to maintain the current level of transformers in poor condition at 23%.

Station Refurbishment	2018F	2019F	2020F	2021F	2022F	Total
# Projects	8	15	15	17	18	73
$ Millions	15.0	29.6	33.8	34.5	35.2	148.1

Over the period 2015 to 2017, Hydro One received funding to refurbish 112 stations, but only 49 were done (44%). Hydro One indicates work was deferred due to a reprioritization of investments, however, Hydro One also indicates that each year, approximately 30% of planned station work is deferred due to an insufficient number of available MUSs.[3]

Over the period 2013 to 2016, the contribution of distribution stations to SAIDI and SAIFI is consistent.[4] With respect to transformers, total failures have gone down on the system since 2013,[5] and the condition of transformers over time has been stable.[6]

[1] B1-1-1 DSP Section 2.4 P4
[2] I-29-SEC-52
[3] ISD SR-02 P2
[4] I-29-AMPCO-28
[5] B1-1-1 DSP Section 2.3 P12
[6] I-24-AMPCO-23



As part of the Unit Cost Benchmarking analysis, Navigant observed that the use of testing results and maintenance history records could be improved in making replace versus repair decisions for certain substation equipment.[7]

Navigant noted that the key difference between most comparison utilities and Hydro One is that Hydro One does not evaluate testing results and/or maintenance history records as a primary driver when making replace versus repair decisions for switching and protection equipment or relays. The leading practice of most other comparison utilities was to consider maintenance history & costs when making replace versus repair decisions. Hydro One is one of only two companies in the comparison group that listed safety concerns as an important evaluation factor when evaluating switching and protection equipment.

Navigant recommended that Hydro One consider implementing a formal data governance process for equipment performance and maintenance data and incorporate that information into the asset condition scoring and project planning process.[8] This suggests Hydro One's past substation equipment asset management strategy may have been less than optimal.

AMPCO shares Board Staff's concerns that Hydro One does not have defined scopes or confidence in the accuracy of cost estimates for distribution station refurbishment projects that are beyond the 12-18 month planning horizon[9], and that this is problematic in the context of a Custom IR application because the OEB is being asked to approve five years of defined capital expenditures without an adequate scope for each project.[10]

[7] B1-1-1 Section 1.6 Att#1 Pii
[8] B1-1-1 Section 1.6 Att#1 P26
[9] Board Staff Submission P80
[10] Board Staff Submission P81

Hydro One completed 11 station refurbishments in 2016 and 9 station refurbishments in 2017.[11] Hydro One proposes to replace 8 stations in 2018. For the years 2010 to 2013, Hydro One completed on average 5 station refurbishments per year. Distribution station equipment is also replaced under SR-01 Distribution Stations Demand Capital Program ($12.3 million), SR-04 Distribution Station Planned Component Replacement Program ($11 million).

Given the total number of major transformer failures has been trending lower since 2013 and planned station work is often deferred due to an insufficient number of available MUSs, AMPCO submits that the proposed replacement rate for stations should be reduced to 10 per year beyond 2018, consistent with 2016 and 2017 levels. This results in a capital budget of $97.4 million[12] over the period 2018 to 2022, and a capital reduction of $50.7 million. AMPCO submits this capital reduction is appropriate as it better paces renewal investments to achieve customer preferences to minimize costs and maintain reliability.

[11] I-29-SEC-52

[12] 48/73 x $148.1 million = $$97.4 million

SR-12 Distribution Lines Sustainment Initiatives

This investment addresses the refurbishment of entire feeders or feeder sections to address distribution line equipment with a high likelihood of failure.[1]

As shown in the table below, Hydro One proposes to undertake 58 projects[2] over the 2018 to 2022 period at a cost of $151.8 million.

Large Sustainment Initiatives	2015F	2016F	2017F	2015A	2016A	2017A	2018F	2019F	2020F	2021F	2022F	Total
# Projects	11	11	11	12	6	2	7	13	13	13	12	58
$ Millions	33.4	39.5	42.9	44	35.1	17.5	22.3	31.1	30.9	33.8	33.7	151.8
Cost/Project $	3.0	3.6	3.9	3.7	5.9	8.8						
Average Cost/Project $			3.5			6.1						

In EB-2013-0416, Hydro One proposed to undertake 33 projects over the 2015 to 2017 period at a cost of $115.8 million. Hydro One accomplished 20 projects (60%) at a cost of $96.6 million.[3] The average cost per project (2015 to 2017) was double the forecast. This further highlights the need for better job estimating.

With respect to reliability, AMPCO notes the contribution of other lines equipment to SAIDI and SAIFI has been constant over the years 2012 to 2016.[4]

Hydro One undertook 6 projects in 2016 and 2 projects in 2017. In 2018, Hydro One forecasts 7 projects. Distribution line equipment is also replaced under SR-10 Distribution Lines Planned Component Replacement Program ($35.5 million).

AMPCO submits the project forecast for the 2018 to 2022 period is too high given historic accomplishments and stable reliability results over time. Hydro One has not sufficiently justified a ramp up in the number of projects to 13 beyond 2018. AMPCO submits 7 projects per year consistent with historic actuals and the 2018 forecast is more reasonable. On this basis, AMPCO proposes a capital budget of $91.6 million[5], and a capital reduction of $60.2 million. AMPCO submits this level of work better paces renewal investments to achieve customer preferences to minimize costs and maintain reliability.

[1] ISD SR-12
[2] Projects with capital investment exceeding $1 million
[3] I-29-SEC-52; 24-SEC-42
[4] I-29-AMPCO-28
[5] 35/58 x $151.8 million = $91.6 million

SR-07 Distribution Trouble Calls and Storm Damage Response Program

Hydro One's budget for Trouble Calls and Storm Damage Response Programs totals $431 over the period.

Hydro One indicates a restructured vegetation management plan should reduce the impact of vegetation caused outages by 20-40% over the next five years, and this will ultimately lead to lower program and trouble call related costs after the second vegetation cycle.[1]

Clear Path indicates that improvements in tree-related reliability can lead to significant savings in other lines of business. A reduction in the number of outages results in less straight-time and overtime payroll for call center staff, trouble men and line crews. Additionally, there are avoided costs associated with a reduced number of damaged facilities.[2] Clear Path confirms there is a strong potential for savings[3] as there will be less poles and wires down particularly during storm events.[4]

At the hearing Hydro One explained it expects the trouble budget to come down marginally over this planning period and it is committed to $6 to $12 down the road plus an incremental $23 million in savings starting in 2023.[5] [6] Further, some savings are expected during the planning period.

MR. RUBENSTEIN: So in 2021, 2022, we'll have an amount of, you expect something less than $6 million, correct?

MR. BOWNESS: That's correct.

Based on the high potential for savings and the expectation that some savings will take place over the planning period and these savings are not reflected in the current budget, AMPCO submits the Trouble Calls and Storm Damage Response Programs budget should be reduced by $12 million: $3 million in 2020; $4 million in 2021 and $5 million in 2022. In AMPCO's view, it is reasonable to expect some savings to occur in 2020 as reliability improves, 3 years after implementation of the new strategy and that the savings would grow incrementally.

[1] I-23-EP-31
[2] Q-1-1 Att#2 P12
[3] Transcript Volume 5 P171
[4] Transcript Volume 6 P104
[5] Transcript Volume 7 P118-119
[6] Transcript Volume 7 P120

SR-14 Advanced Meter Infrastructure Hardware Refresh

Hydro One is planning to replace all smart meters that reach their expected end of life. Hydro One plans to begin replacing meters with 3,621 in 2021 and another 206,119 replacements in 2022. Meter replacements costs in 2021 and 2022 are $1.4 million and $78.5 million, respectively. Most of these costs are to replace smart meters.

The following points were discussed at the oral hearing:[7]

- All meters are currently in working order as Hydro One has a separate program to replace defective meters
- Smart meters are a new technology and there is insufficient data to determine if the expected service life can be exceeded or to allow comparison with other distributors
- The vendor's expected service life is 15 years
- Hydro One is not doing any independent analysis to determine whether they can last longer

AMPCO submits it is premature to opt to replace all smart meters that have reached the manufacturer's expected service with independent testing to verify the condition of the meters and if they can remain in-service. AMPCO submits the Advanced Meter Infrastructure Hardware Refresh budget should be reduced by $1.23 million in 2021[8] and $79.7 million in 2022.[9]

[7] Transcript Volume 8 P13-17
[8] 3621/4134 x $1.4 = $1.23 million
[9] 206,119/206,632 x $79.9 = $79.7

G. Customer Engagement

Hydro One conducted its formal Customer Engagement in July 2016 with the assistance of Ipsos. The top three results of customer engagement are:[1]

- controlling cost is the top priority for customers;
- customers want to see Hydro One demonstrate greater fiscal management and operational efficiency before considering rate increases;
- maintaining reliable electricity service is consistently second, after cost control, in terms of priority.

AMPCO makes the following comments on the limitations of the information provided to customers.

Hydro One provided customers with a static view of power outage causes.[2] Hydro One provided power outage data by cause as an average of the years 2013 to 2015. Hydro One did not provide the data for each year in order for customers to understand the power outage trends over time, i.e are outages due to trees falling on lines during storms getting worse or improving over time or staying the same, in order for customers to better express a preference on types of reliability improvements needed, investment levels and the associated reliability outcomes.

Hydro One provided information on the need to maintain assets in poor condition related to wood poles and distribution stations, that was based solely on the Expected Service Life of the assets and not on actual asset condition.[3] More specific information on the condition trend of Hydro One's assets over time would better assist customers in understanding the needs of the system.

Hydro One provided three illustrative Scenarios differentiated by varying OM&A and capital investment levels, corresponding directional impacts on distribution system reliability and customer service, and rate impacts.[4] The three scenarios reflected declining, maintained and improved reliability performance. From this, customers were expected to convey their needs and preferences to inform Hydro One's 5-year Distribution Investment Plan.

AMPCO has reviewed the submissions of CME and supports the following points:

- All customers were asked whether or not they disagree with Hydro One's determination that rate increases were required at certain levels to provide increased, constant or decreased performance. A survey respondent who rejected a rate increase would be rejecting a "determination" made by Hydro One without having information about how that determination was made.

[1] A-3-1 P14
[2] B1-1- Section 1.3 Att#1 P233
[3] B1-1- Section 1.3 Att#1 P236
[4] B1-1- Section 1.3 Att#1 P242-243

- These questions are clearly inappropriate and misleading. CME submits that the Board should not rely upon the answers to these questions to conclude that customers of Hydro One are supportive of a rate increase.

- Hydro One and IPSOS never presented customers with a scenario that involved no rate increases with reliability and customer service remaining the same.

AMPCO agrees with CME that the IPSOS report does not support a finding that customers would accept a bill increase to at least maintain reliability and customer service levels.

Customer Needs & Preferences and the DSP

AMPCO submits the DSP does not adequately reflect customer needs and preferences. Hydro One's new vegetation management strategy results in a significant increase in reliability. As a result, AMPCO submits there is room to adjust the system renewal capital budget to better balance reliability improvements and realign with customer preferences to minimize costs and maintain reliability. An investment plan that better paces renewal investments is needed to achieve this outcome. Under the Capital Section AMPCO makes recommendations on areas where system renewal capital could be less, taking into account current reliability trends.

Large User Consultation

The Customer Engagement process indicates a top priority for Large Customers is to improve power quality.[5]

In response to this Hydro One has created an OM&A program to assist Large Distribution Account customers with investigations to determine the source of the power quality issue. In addition, Hydro One has included a capital power quality program to install power quality meters, surge arrestors, and/or improve grounding to assist in power quality investigations. AMPCO supports Hydro One's investments related to power quality improvements.

[5] B1-1-1 DSP Section 1.3 P19

H. Outcomes and Scorecards

Hydro One has three primary scorecards:

- Electricity Distributor Scorecard;
- Distribution OEB Scorecard; and
- Team Scorecard.

The Distribution OEB Scorecard proposed in this application contains the following measures:

- Number of Line Equipment Caused Interruptions
- Number of Substation Caused Interruptions
- Number of Vegetation Caused Interruptions

For many of the measures, targets are only set for the first two years and future targets have been set at a level that exceeds the average of 5 years of historical data. Examples are provided below.

Number of Line Equipment Caused Interruptions

Over the last 5 years (2013 to 2017), the average number of line equipment caused interruptions is 8,040. For each of the years 2018 and 2019, Hydro One has set a target of 8,200 line equipment caused interruptions. Targets beyond 2019 will be determined.

Number of Substation Caused Interruptions

Over the last 5 years (2013 to 2017), the average number of substation caused interruptions is 130. For each of the years 2018 and 2019, Hydro One has set a target of 145 substation caused interruptions. Targets beyond 2019 will be determined.

Number of Vegetation Caused Interruptions

Over the last 5 years (2013 to 2017), the average number of vegetation caused outages is 6,903. For the years 2018 and 2019, Hydro One has set targets of 6,900 and 6,500, respectively. Targets beyond 2019 will be determined.

Overall, AMPCO submits Hydro One's lack of targets beyond 2019 for the above measures weakens Hydro One's overall Custom IR plan and its stated outcomes regarding operational effectiveness over the 5 years of the plan.

With respect to vegetation management, Hydro One indicates a restructured vegetation management plan should reduce the impact of vegetation caused outages by 20-40% over the next five years. AMPCO submits Hydro One should be required to set targets for each of the 5 years for Number of Vegetation Caused Interruptions to align with this outcome.

Recommendations

- Clear Path indicates that in addition to SAIDI/SAIFI reliability metrics, "Outages per km" and "Cost per km" are two good performance metrics for vegetation management that should be used together. Hydro One tracks Gross Cyclical Cost per km. AMPCO submits Hydro One should add

Outages per km and Cost per km to its Distribution OEB Scorecard to further track the performance of Hydro One's new vegetation management strategy.[1]

- Hydro One's analysis to support its investment alternatives (Plans A, B, C & B-Modified) separated the impact of poles and Other Line Equipment on SAIDI and SAIFI, whereas Hydro One has only one measure, Number of Line Equipment Caused Interruptions to track reliability performance.

  AMPCO submits Hydro One should add a measure "Number of Pole Caused Interruptions" and separate this data from Number of Line Equipment Caused Interruptions so that Hydro One can better track its reliability performance related to these two drivers, consistent with its investment plan options analysis.

Pole Replacement – Unit Cost

With respect to Cost Control, Hydro One has a unit cost target for pole replacement (Gross Cost per unit $). In 2017, the unit cost for pole replacement was $8,640. In 2018, Hydro One set a target of $8,733. By 2022, the unit cost target is $9,437. AMPCO submits the targets set by Hydro One are a disincentive to continuous improvement. Hydro One should be challenging itself more to contain costs. In EB-2013-0416, Hydro One's goal was to achieve top-quartile unit costs against comparable utilities.[2]

Large Customer Interruption Frequency Large Distribution Accounts (LDAs) Measure

Hydro One proposes a new metric as part of this application to track the total number of sustained interruptions to all LDA customers connected to Hydro One as follows:

$$= \frac{Total\ Interruptions\ for\ Large\ Distribution\ Customers}{Total\ Large\ Distribution\ Customers\ Served}$$

AMPCO supports this new metric noting that in the future once Hydro One is able to track data on momentary interruptions, a metric that tracks the total number of momentary interruptions to all LDA customers connected to Hydro One would be very meaningful to Large Users and AMPCO members connected to Hydro One Distribution.

Job Estimate to Actual Measure

AESI suggested Hydro One consider a new reporting metric, "job estimate to actual".[3]
Hydro One acknowledged that this was a meaningful metric and stated that it would be considered in the future.

[1] Transcript Volume 6 P73-74
[2] EB-2013-0416 A-6-1 P4
[3] B1-1-2 P3

Hydro One provided details on 13 projects with variances in cost, scope or schedule or both cost and schedule for the years 2014 to 2017.[4]

As shown in the Table below, the total cost variance was $11 million or 137% more than budgeted and the total schedule variance was 6739 days or 18.5 years. Project delays can affect the value or benefit of the scope of work, result in missing critical commitments to customers or result in a failure to meet a key system need.

	Project	Ref	Estimate	Budget	Actual	Variance $	Variance %	Planned IS Date	Actual IS Date	Variance (days)
1	Brant TS	JT3.1-8		$ 400,000	$ 1,110,000	$ 710,000	278%	2015-12-13	2018-12-01	1084
2	Sturgeon Falls DS	JT3.1-8		$ 958,000	$ 2,299,000	$ 1,341,000	240%	2014-10-01	2016-01-15	471
3	Striker HVDS	JT3.1-8		$ 1,097,000	$ 330,000	-$ 767,000	30%	2015-09-25	2015-11-30	66
4	Warren HVDS	JT3.1-8		$ 761,000	$ 272,000	-$ 489,000	36%	2014-12-01	2015-11-26	360
5	Beamlight LP	JT3.1-8	$ 111,000	$ 3,796,000	$ 4,521,000	$ 725,000	119%	2013-06-04	2015-05-14	709
6	Commerce Way TS	JT3.1-9		$ 1,522,000	$ 2,251,000	$ 729,000	148%	2014-07-05	2016-07-14	740
7	Beckwith DS	JT3.1-9	$ 20,000	$ 3,000,000	$ 2,700,000	-$ 300,000	90%	2016-05-15	2016-05-16	1
8	Pilot iMDS	JT3.1-9		$ 3,900,000	$ 7,600,000	$ 3,700,000	195%	2013-07-01	2015-08-15	775
9	Commerce Way New Feeder	JT3.1-9		$ 2,250,000	$ 2,979,000	$ 729,000	132%	2014-12-01	2016-03-01	456
10	Bob-Lo DS	JT3.1-9	$ 30,000	$ 2,100,000	$ 3,032,000	$ 932,000	144%	2014-12-01	2017-06-30	942
11	Belle River DS	JT3.1-9	$ 30,000	$ 1,840,000	$ 2,871,000	$ 1,031,000	156%	2015-06-30	2017-06-30	731
12	Nevo TS	JT3.1-9	$ 10,000	$ 4,100,000	$ 5,634,000	$ 1,534,000	137%	2015-12-21	2016-06-30	192
13	Nobelton DS	JT3.1-9	$ 80,000	$ 3,600,000	$ 4,700,000	$ 1,100,000	131%	2016-11-30	2017-06-30	212
			$ 281,000	$ 29,324,000	$ 40,299,000	**$ 10,975,000**	137%			**6739**
										18.5

AMPCO submits given the noted variances in job estimate to actuals Hydro One should implement a job estimate to actual measure as recommended by AESI or Earned Value metrics.

[4] I-24-AMPCO-21 (b) & I-25-Energy Probe-38

I. Operations, Maintenance & Administration (OM&A)

Hydro One's forecast 2018 OM&A budget is $576.7 million[1] as shown in the table below. For the years 2019 to 2022, Hydro One increases its OM&A annually by the Inflation Factor less a Productivity Factor.

Based on 2017 actuals, Hydro One's latest 2018 OM&A budget represents an $18 million (3.2%) increase in spending over 2017. Most of the increase is in the Sustainment category.

Table 1: Summary of Recoverable OM&A Expenses ($ Millions)

Description	Historic					Bridge		Test
	2014 IRM	2015		2016		2017		2018
	Actual	Actual	Approved	Actual	Approved	Actual	Approved	Forecast
Sustainment	325.7	304.6	316.5	323.7	361.4	304.7	367.1	346.7
Development	11.0	10.9	15.4	11.9	17.8	8.8	17.0	11.0
Operations	29.5	27.6	35.8	31.5	39.4	31.9	37.5	36.7
Customer Care	209.3	155.4	111.7	118.8	110.9	123.4	111.6	128.7*
Common Corporate Costs and Other	94.4	69.1	59.0	72.0	54.8	84.9	54.7	48.7 **
Property Taxes & Rights Payments	4.6	4.8	4.7	4.6	4.9	5.0	5.0	4.9
Total	**674.5**	**572.5**	**543.1**	**562.6**	**589.1**	**558.7**	**593.0**	**576.7**
% Change (year-over-year)		*-15.1%*	*-19.5%*	*-1.7%*	*8.5%*	*-0.7%*	*0.7%*	*3.2%*
% Change (Test vs. 2016 Actual)						*-0.7%*		*2.5%*

* Reflects reduction of bad debt based on the Fair Hydro Plan.
** Reflects reduction of transformation costs and OPEB OM&A as described in Exhibit Q.

Historic Underspending

Hydro One has a history of underspending on OM&A. In 2016, Hydro One underspent OM&A by $26.5 million (4.5%). In 2017, Hydro One underspent by $34.3 (5.8%) million. Over this two-year period, Hydro One has underspent by 5.2%.[2]

If a 5.2% reduction is applied to 2018 OM&A to reflect past spending performance, recognizing that many 2018 budgets are built on historic spending, OM&A is $546.6, $30 million less. AMPCO submits at a minimum Hydro One's 2018 OM&A budget should be reduced by $30 million.

AMPCO's has reviewed individual aspects of Hydro One's OM&A costs and proposes a $54.8 million reduction that consists of the following:

- $6.4 million reduction to Trouble Calls
- $9.6 million reduction to Vegetation Management
- $17.5 million reduction to compensation (market median)
- $17 million reduction to compensation (pension)
- $4.3 million reduction for vacancies

[1] I-38-SEC-70 updated June 11, 2018
[2] $$1121.3/$1182.1 = 94.8%

Drivers of the Increase in OM&A

The sustainment category of spending represents 60% of the total 2018 OM&A budget[3] and most of the OM&A increases fall under this category. Sustainment OM&A includes spending on: Stations, Lines, Meters, Telecom and Control and Vegetation Management.

Based on Hydro One's earlier forecast of $334.5 million for 2017 Sustaining OM&A, Hydro One was proposing a 10.96 million increase or 3.6%. With 2017 actuals much lower than forecast ($304.7 million) the increase in 2018 Sustaining OM&A is now $42 million (14%) over 2017.

Table 1: Summary of Sustaining OM&A ($ Millions)

Description	Historic					Bridge		Test
	2014	2015		2016		2017		2018
	Actual	Actual	Approved	Actual	Approved	Actual	Approved	Forecast
Stations	25.7	25.3	27.6	23.8	28.4	23.9	28.9	24.8
Lines	145.2	144.7	141.3	141.4	149.7	135.5	152.4	153.8
Meters, Telecom and Control	14.2	16.6	18.5	16.2	18.7	18.4	18.5	18.6
Vegetation Management	140.6	118.0	129.0	142.3	164.6	126.9	167.3	149.6
Total	**325.7**	**304.6**	**316.5**	**323.7**	**361.4**	**304.7**	**367.1**	**346.7**

AMPCO's comments are focussed on Sustainment Lines and Vegetation Management.

Lines (44% of Sustainment budget)

Hydro One's spent $135.5 million in 2017, $13.9 million less than its 2017 forecast of $149.4 million. Most of the variance is due to underspending on Trouble Calls.

Hydro One indicates the Trouble Call program is forecasted based on historic spending.[4] Hydro One's actual spend in 2017 ($67.3 million) on Trouble Calls is $9.2 million less than the $76.5 million forecast. For the four-year period 2014 to 2017, Hydro One spent on average $71.5 million on Trouble Calls. In 2018, Hydro One forecasts to spend $77.9 million.

[3] $346.7/$576.7 = 60%
[4] I-38-Staff-188 (c)

Table 3: Lines Sustaining OM&A ($Millions)

Description	Historic					Bridge		Test
	2014	2015		2016		2017		2018
	Actual	Actual	Approved	Actual	Approved	Actual	Approved	Forecast
Trouble Calls	77.1	72.9	64.8	68.8	65.9	67.3	67.7	77.9
Underground Cable Locates	23.8	20.9	17.9	10.9	17.4	11.6	16.9	14.6
Disconnects/ Reconnects	11.9	12.5	9.7	13.5	9.9	13.9	10.1	12.5
Line Maintenance	12.3	14.9	23.5	19.1	23.9	11.1	24.4	17.5
PCB Equipment and Waste Storage	5.1	7.7	11.3	10.8	18.3	12.7	18.7	15.4
Other Services	15.0	15.8	14.1	18.4	14.3	18.9	14.7	15.8
Total	**145.2**	**144.7**	**141.3**	**141.4**	**149.7**	**135.5**	**152.4**	**153.8**

AMPCO submits the forecast for 2018 is too high given historic spending. In addition, the new vegetation management strategy will have a positive impact on Trouble Call costs towards the end of the planning period. AMPCO submits the 2018 Trouble Calls budget should be reduced by $6.4 million.

Vegetation Management (43% of Sustainment budget)

Historically, Hydro One's vegetation management program has been the subject of extensive review given the size of the program (over 20% of OM&A & 43% of Sustaining OM&A[5]), and Hydro One's inability to achieve an 8-year cycle cost effectively.

In EB-2013-0416, the OEB reduced Hydro One's vegetation management budget by $39 million for the 2015 to 2017 period because the budget showed no achieved efficiencies or productivity.[6] Unit costs related to tree line clearing were increasing. The OEB directed Hydro One to undertake a comprehensive trend analysis of its vegetation management program showing year over-year comparisons in unit costs in its next rates application. The OEB's view is that Hydro One needs to manage this program more cost effectively. Hydro One retained CN Utility Consulting (CN) to do the above review.

CN Utility completed a study similar to the study it conducted for Hydro One in the 2009. Both studies conclude Hydro One's cost per unit of work are very high in comparison to peers.[7]

At the end of 2017, Hydro One made changes to its vegetation management program based on a new study completed by Clear Path Utility Solutions LLC (Clear Path).[8] The new strategy maintains corridors on a shorter cycle (three years), focusing on defects rather than completely clearing vegetation in a corridor. Hydro One's original vegetation management strategy was focused on clearing high impact

[5] 2014 Vegetation Management Actuals
[6] EB-2013-0416 OEB Decision P26
[7] DSP Section 1.6 Att#2 P2
[8] Q-1-1 Att#2

right-of-way corridors completely on a cycle of four to eight years (8,500 km per year), with tactical maintenance on lower impact right-of-ways (4,250km per year) and removal of hazard trees.[9]

Given Hydro One's past issues and performance in vegetation management, AMPCO supports Hydro One's proposed new direction to manage vegetation. Clear Path made observations regarding Hydro One's current vegetation management practices. Clear Path noted that Hydro One's current vegetation management work scope is not aligned with the maintenance cycle and the current work scope is not aligned with the program objectives. Clear Path concluded that approximately 30 to 50% of the work performed has little or no material impact on the key objectives of public safety and system reliability and is considered "gold plating" relative to typical industry practices on distribution facilities.[10] In AMPCO's view, a new strategy is warranted.

Hydro One is not proposing a change in the vegetation management budget of $149.6 million to implement the new strategy compared to the old strategy.

Clear Path provided preliminary information on costing. Clear Path indicates there is a reasonable probability, assuming that work scope is managed through a quality control effort, that the first 3-year maintenance cycle can be performed within existing funding levels. Cost for subsequent cycles may be significantly less as hazard trees and contact defects are controlled. With input from Hydro One, Clear Path made workload and cost projections by zone for a three-year cycle that reflect an annual cost of $108 million and a 3-year cost of $325.2 million.[11]

Hydro One has a history of underspending on vegetation management. Over the period 2015 to 2017, Hydro One spent $387.2 million (84%) of its $460.9 million budget.

AMPCO struggles to accept that the vegetation management budget will not change as a result of the new strategy. In considering the above, AMPCO submits the 2018 budget for vegetation management should be set at $140 million. This represents a $9.6 million reduction in vegetation management.

Compensation

Compensation includes base salary, overtime, short and long-term incentives, and pensions and benefits. The proportional mix of FTEs (regular, temporary (non-regular) and casual)) directly affects total compensation costs.

As per the original evidence, the forecast increase in compensation costs in 2018 compared to 2017 is 5.1%.

[9] Q-1-1 Attach #2 P12
[10] I-38-CCC-44
[11] Q-1-1 Att#2 P13-14

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Regular Employees	520,886,246	527,435,190	528,333,209	505,694,744	531,422,777	538,447,103	526,619,992	510,994,519	515,445,814
Temporary Employees	15,566,142	10,928,538	12,259,658	8,216,054	7,682,042	7,475,161	7,328,033	7,047,575	7,137,521
Casual Employees	92,234,698	86,933,782	98,411,759	92,837,686	98,673,687	96,608,455	97,327,325	98,206,648	99,425,885
Distribution Total Compensation	**628,687,087**	**625,297,510**	**639,004,626**	**606,748,484**	**637,778,506**	**642,530,718**	**631,275,350**	**616,248,742**	**622,009,219**

Hydro One updated its compensation costs as follows to align with the reporting provided in EB-2016-0160:

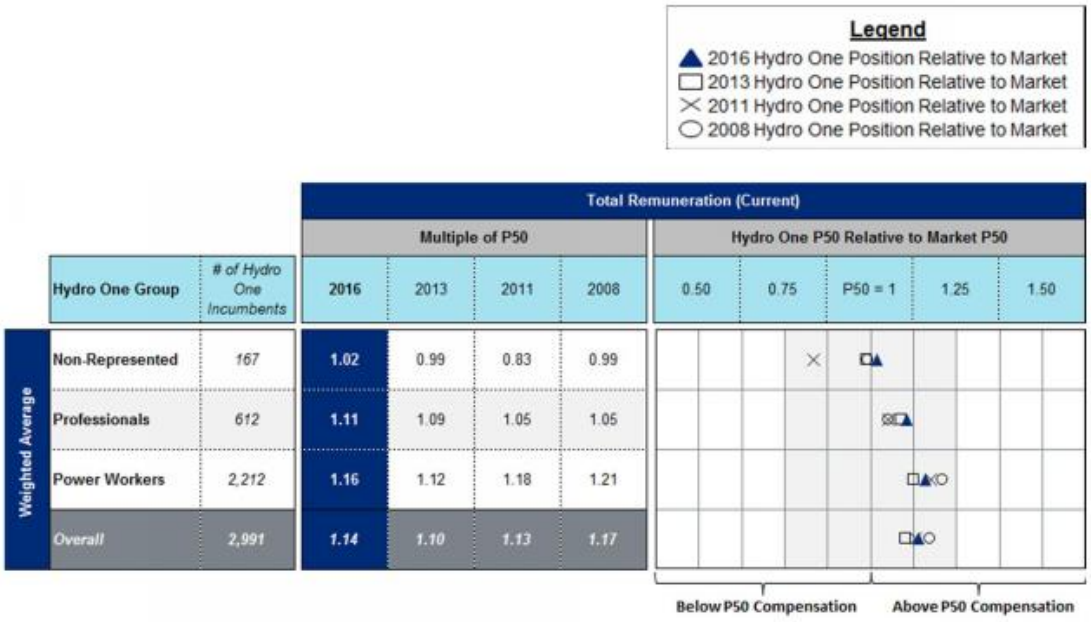
Distribution Total Compensation	**595,670,336**	**596,623,428**	**602,556,339**	**569,704,850**	**555,416,609**	**609,689,925**

	2013	2014	2015	2016	2017	2018
Estimated Labour in Capital Exp	397,156,988	413,728,721	422,168,870	417,078,156	365,421,945	408,318,112
Estimated Labour in OM&A	198,513,348	182,894,707	180,387,470	152,626,694	189,994,665	201,371,813
Distribution Total Compensation	**595,670,336**	**596,623,428**	**602,556,339**	**569,704,850**	**555,416,609**	**609,689,925**

The OEB has made compensation reductions in previous Hydro One proceedings[12] due to high compensation levels. Most recently in EB-2013-0416 (2015-2017 distribution rates), the Mercer Study, commissioned by Hydro One showed that Hydro One's compensation is about 10% higher than industry comparators at the market median, and bringing the compensation to the market median would result in a reduction of $15.4 million per year. The OEB disallowed half of the $15.4 million ($7.7 million per year) to recognize the progress Hydro One has made since 2008 to get closer to market median.[13]

As directed by the OEB in EB-2013-0416, Hydro One filed a Mercer compensation study as part of this application. The table below summarizes the results of the 2016 Compensation Cost Benchmarking Study compared to the results of the 2013, 2011 and 2008 Mercer studies.[14]

[12] EB-2009-0096 (2010/2011 Dx Rates)
[13] EB-2013-0416 OEB Decision P24
[14] C1-2-1 Att#5 P2



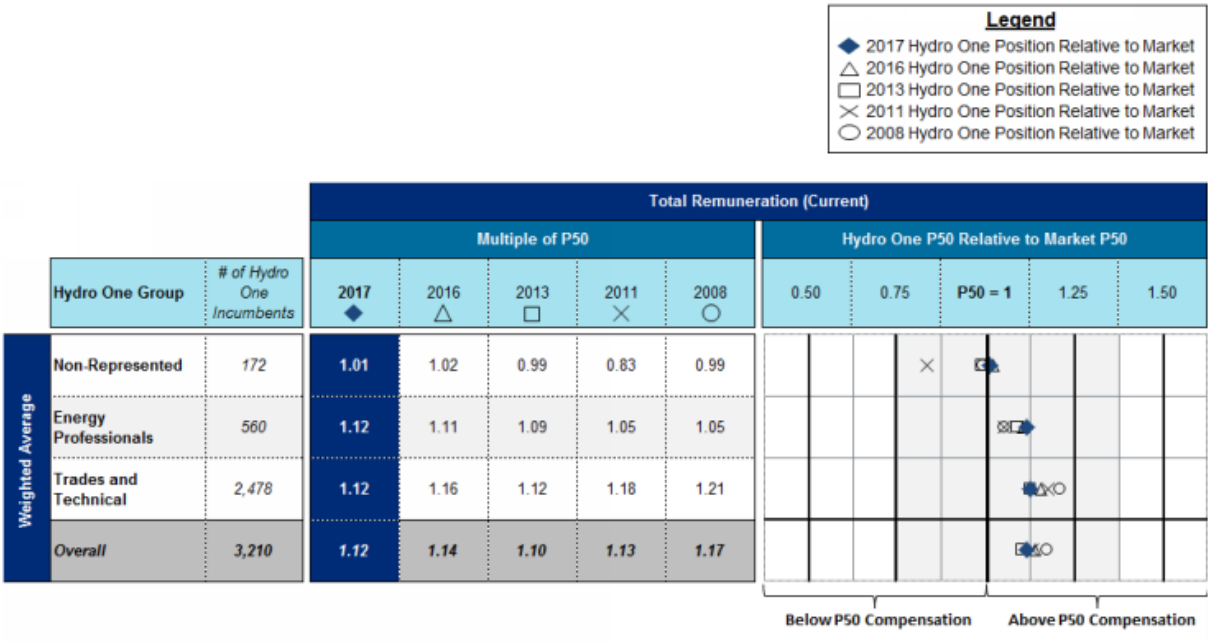
The 2016 study findings show that on an overall weighted average, Hydro One is positioned approximately 14% above market median. This represents a decline relative to the 2013 Mercer study where Hydro One's overall weighted average was found to be 10% above market median. The most significant trend reversal is the Power Workers Group which is positioned 16% above the market median in 2016 compared to 12% in 2013.

The total dollar amount for all groups over market median in 2018 is $71 million. After applying the transmission-distribution ratio and the OM&A-capital ratio, the allocation to Dx OM&A is $17.5 million and the allocation to Dx Capital is $20.3 million.[15] AMPCO submits the OEB should disallow 100% of the above OM&A and capital amounts over market median to recognize that Hydro One's compensation costs have worsened relative to 2013.

Since the 2016 study was released there have been updates:

[15] I-40-SEC-84

- Mercer filed an updated 2017 Compensation Benchmarking Study that positions Hydro One 12% above market median.[16]



- Hydro One reached an agreement with the Power Workers' Union for a two-year collective agreement (April 1, 2018 to March 31, 2020) for a 1.8% increase in 2018, a 2.0% increase in 2019 and a 0.6% increase in 2020[17], which is higher than the 1% increases[18] built into the OM& forecast.

Both the 2016 and 2017 Mercer Compensation Studies show that Hydro One's there has been a reversal in progress toward market median compared to 2013 results. In the 2017 study Mercer revised the comparator organizations and survey jobs included in the study. Approximately 77% of peers and 91% of jobs from the 2016 Mercer Study are included. Mercer recognizes that this may have an impact on the study-over-study comparison.[19] Because of this and the recent PWU negotiations which reflect a further increase in compensation costs, AMPCO submits the OEB should reduce Hydro One's compensation to market median in accordance with the first study filed by Mercer where Hydro One is 14% above market median. This results in a $17. 5 million reduction in OM&A and $20.5 million reduction in capital.

Headcount

In this application, Hydro One reported its mix of employees on an FTE basis. Hydro One's forecast FTE count is stable over the term of the Custom IR. As shown in the table below, Hydro One's FTE count decreases by 1.6% from 8,606 FTEs in 2018 to 8,467 FTEs in 2022.[20]

[16] Additional Compensation Evidence dated April 20, 2018.
[17] Letter dated July 11, 2018
[18] C1-2-1 P29
[19] Additional Compensation Evidence dated April 20, 2018 P4
[20] K3.5 AMPCO Compendium Panel #2 P16

Hydro One's evidence is that total regular FTEs and total FTEs in 2022 are expected to be 2.0% and 1.3% lower respectively than in 2017.[21]

AMPCO wishes to point out that in response to J3.7, Hydro One indicates the 2017 FTE data in the table below is not on an actual basis but a forecast basis.[22] This is important because over the previous two-year period (2016 to 2017) Hydro One adds 504 FTEs (6.2%): 287 in 2016 and 217 in 2017.

AMPCO submits Hydro One should provide the actual number of Regular, Non-Regular and Casual FTEs in 2017 in its reply submission, to provide the OEB with the proper staring point to assess the reasonableness of level of FTES over the planning period.

Full Time Equivalents (FTE) 2012-2022
C1-2-1 Page 9 & AMPCO 47 (h)

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Regular	MCP	655	634	605	597	611	679	675	671	669	668	668
	Society	1342	1318	1291	1282	1267	1375	1380	1376	1370	1763	1363
	PWU	3476	3396	3342	3356	3391	3480	3444	3423	3413	3403	3395
	Total	**5473**	**5348**	**5238**	**5235**	**5269**	**5534**	**5499**	**5470**	**5452**	**5434**	**5426**
Non-Regular	MCP	19	23	29	29	33	29	28	28	28	27	27
	Society	56	55	56	55	47	51	46	41	41	41	41
	PWU	259	321	328	212	230	165	140	138	138	137	137
	Total	**334**	**399**	**413**	**296**	**310**	**245**	**214**	**207**	**207**	**205**	**205**
Casual	PWU HH	1301	1330	1338	1188	1383	1374	1465	1400	1401	1407	1408
	Casual Co	1104	1116	1319	1358	1402	1428	1428	1428	1428	1428	1428
	Total	2405	2446	2657	2546	2785	2802	2893	2828	2829	2835	2836
Total FTE's		**8212**	**8193**	**8308**	**8077**	**8364**	**8581**	**8606**	**8505**	**8488**	**8474**	**8467**
			-19	***115***	***-231***	***287***	***217***	***25***	***-101***	***-17***	***-14***	***-7***

<u>Pension & OPEBs</u>

AMPCO agrees with Board Staff that the proposed pension fund contributions should not be allowed in rates given that the actuarial valuation provided by Hydro One indicates that no employer contributions are presently required as the fund is in a significant surplus position. This results in an additional $17 million proposed reduction in OM&A and $20 million in capital.[23]

<u>H/R Metrics</u>

Hydro One developed seven new H/R Metrics in 2017 as follows: Attendance Management, Grievances, Years of Service, Turnover, Age Breakdown, Retirement Eligibility, and Performance Distribution. Hydro One has not set any targets for these metrics over the Custom IR term.[24]

With respect to the Turnover metric, Hydro One provides turnover data on a headcount basis. AS shown in the table below, due to retirements and terminations (voluntary, involuntary & death), AMPCO calculated Hydro One's 2017 annual Turnover rate as 8%[25] based on a total of 457 retirements/terminations in 2017 and an average Regular headcount of 5,711 in 2017.[26]

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[21] C1-2-1 P9
[22] C1-2-1 P9; J3.7
[23] Staff Submission P5
[24] Transcript Volume 3 P134
[25] J3.4
[26] 457/5711 = 8%

With respect to a vacancy rate, Hydro One applies a vacancy rate to only one area, the Corporate Common groups, and a 7% vacancy rate is used.[27] At the oral hearing AMPCO sought information to determine a vacancy rate that could be applied to other groups.

Based on information provided in J3.4, AMPCO calculates a monthly headcount for 2017 and based on the headcount variance month over month, AMPCO arrives at a vacancy rate of 3% based on an average headcount of 5,711 as shown in the table below.

Turnover

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	%
Attrition	44	33	24	30	49	30	62	47	34	22	29	53	457	8.0%
% Headcount	9.17	6.89	5.00	6.28	10.12	6.21	12.94	9.87	7.25	4.68	6.20	11.40		
	0.0076	0.0057	0.0042	0.0052	0.0084	0.0052	0.0108	0.0082	0.0060	0.0039	0.0052	0.0095		
Monthly Headount	5758	5747	5760	5732	5810	5797	5750	5714	5628	5641	5613	5579	5711	
Headcount Variance		-10	13	-28	78	-13	-47	-35	-87	13	-28	-34	-179	-3.1%

Hydro One confirms its compensation amounts are based on all FTE positions being filled for the entire year for each year.[28] Assuming a vacancy rate of 3% in 2018, AMPCO calculates an $18.3 million reduction in compensation.[29]

Hydro One noted that its Turnover metric is an enterprise-level metric and as such the attrition and headcount data includes Hydro One Networks, Hydro One Telecom and Hydro One Remotes.[30] For the purposes of applying a vacancy rate to Hydro One Networks, AMPCO assumes that 95% of the headcount is Hydro One Networks. This reduces the $18.3 million to $17.4 million. After applying the transmission-distribution ratio and the OM&A-capital ratio[31], the reduction allocation to Dx OM&A is $4.3 million and Dx Capital is $5 million. AMPCO submits the OEB should make these adjustments to account for vacancies throughout the year.

[27] J3.5
[28] Transcript Volume 3 P142
[29] $609 million x 3% = $18.3 million
[30] J3.4
[31] I-40-SEC-83