



July 14, 2017

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

Re: Thunder Bay Hydro Electricity Distribution Inc. 2017 Electricity Rate Application
AMPCO Submission
Board File No. EB-2016-0105

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

Copy to: Thunder Bay Hydro Electricity Distribution Inc.

**Thunder Bay Hydro Electricity Distribution Inc.
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Thunder Bay Hydro Electricity Distribution Inc. (Thunder Bay Hydro) filed a cost of service application with the Ontario Energy Board (OEB) on September 9, 2016 under section 78 of the Ontario Energy Board Act, 1998, S.O. 1998, c. 15, (Schedule B), seeking approval for changes to the rates that Thunder Bay Hydro charges for electricity distribution, to be effective May 1, 2017.

A Partial Settlement Proposal approved by the Board on May 4, 2017 identifies key areas that were not settled by the Parties: Capital (Issues 1.1 and 2.1); OM&A (issues 1.2 and 2.1); and Cost of Capital (Issue 2.1). AMPCO's submission responds to each of these three areas that were the subject of an oral hearing on June 29 and 20, 2017.

Thunder Bay Hydro indicates the need for the rate increases in 2017 is due to the following:¹

- Infrastructure investments \$2.8 million (68%)
- New targeted maintenance programs related to insulators and increased forestry activity \$250,000 (6.4%)
- Move to monthly customer billing \$234,000 (5.6%)
- Increased regulatory expenses \$168,000 (4.1%)
- Other inflationary cost increases (15.6%)

AMPCO's submissions below are primarily focussed on Thunder Bay's proposed capital and new targeted maintenance programs. The large increase in infrastructure investments is driven by the results of a recent Asset Condition Assessment (ACA) undertaken by Kinectrics Inc.

Reliability

Thunder Bay Hydro's reliability statistics for the five-year period 2011 to 2015 indicate for both SAIDI and SAIFI, Thunder Bay Hydro's reliability has improved.² In 2016, SAIDI improves but SAIFI was slightly worse.³

Reliability improvement is not driving Thunder Bay Hydro's proposed capital investments; the ACA is.⁴

Thunder Bay Hydro has Ongoing Challenges Recording the Cause of an Outage. The Chart below⁵ shows a sample of specific cause codes and a breakdown of the % contribution to SAIDI for 2012-2015 and each year separately for 2012 to 2016.

¹ K2.2 P1

²

³ J2.2

⁴ Transcript Volume 2 P132 line 13

⁵ K2.2 P42 (2-AMPCO-6)

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Reliability Statistics						
2-AMPCO-6						
%	2012-2015	2012	2013	2014	2015	2016
Tree Contact	7	2	17	48	48	35
Adverse Weather	0	0	1	0	0	1
Defective Equip	24	38	45	12	28	24
Major Event		0	0	0	0	0
Lightning	7	8	2	2	2	1
Unknown	25	3	2	2	0	8

Overall, Thunder Bay Hydro characterizes its reliability challenges as primarily weather related⁶ yet the outage code Adverse Weather has zero percentage for the years 2012 to 2015, and 2016 has 1%.

Adverse weather captures interruptions from rain, ice storms, snow, winds, extreme temperatures, freezing rain, frost or other extreme weather conditions (exclusive of Code 3 or Code Events).⁷ Clearly, adverse weather is not being recorded under the correct cause code.

Thunder Bay Hydro explained that during a storm, a branch may be down but it could get recorded as Other/Unknown, Foreign Influence or Trees. If a Tree comes down and damages equipment it can get recorded as defective equipment.⁸ Adverse weather could get recorded as a Tree Contact. Recording information differently across several cause codes distorts the data and the trends and conclusions that can be drawn from the data.

Recording outages under the correct cause code is critical to understanding and monitoring system performance. AMPCO submits that Thunder Bay Hydro needs to develop and implement a plan to ensure outages are consistently recorded under the correct cause codes. For the purposes of this application, AMPCO submits that the Board should look at SAIDI and SAIFI data but not put significant weight on individual cause code trends, such as Tree Contact and Defective Equipment, that are being used to justify capital or maintenance project spending, as the data may not be accurate.

⁶ Transcript Volume 2 P63 line 15

⁷ Electricity Reporting and Record Keeping Requirements P13

⁸ Transcript Volume 2 P64 line 23

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CAPITAL

Thunder Bay Hydro seeks approval of \$12,525,733 in capital for 2017.

In addition, Thunder Bay Hydro seeks approval of its Distribution System Plan (DSP) at Exhibit 2, Attachment 2-B. AMPCO submits the Board should consider the DSP in determining an appropriate level of capital spend for 2017 but the Board is not required to approve the DSP.

Table 1: Forecast Capital Spend 2017 to 2021

CATEGORY	Forecast Period (planned)				
	2017	2018	2019	2020	2021
	\$ '000				
System Access	2,662	2,422	2,432	2,445	2,505
System Renewal	8,380	8,818	8,976	9,217	9,261
System Service	230	300	280	280	300
General Plant	1,253	1,360	946	901	969
TOTAL EXPENDITURE	\$12,526	\$12,900	\$12,634	\$12,842	\$13,036

Historical Spending

As shown in the below, updated for 2016 Actuals, Thunder Bay Hydro has underspent on the delivery of its capital program: 5.5% less in 2013; 11.1% less in 2014; and 6.4% less in 2015⁹ and 5.9% less in 2016. On aggregate over the five-year period 2012 to 2016, Thunder Bay Hydro has underspent by 5.6%. AMPCO submits at a minimum, a reduction of \$700,000¹⁰ in capital spending in 2017 is justified to account for a history of underspending on capital.

CATEGORY	Historical Period (previous plan ⁹ & actual)															2017
	2012			2013			2014			2015			2016			
	Plan	Actual	Var	Plan	Actual	Var	Plan	Actual	Var	Plan	Actual	Var	Plan	Revised Capital J2.1	Var	
	\$ '000		%	\$ '000		%	\$ '000		%	\$ '000		%	\$ '000		%	
System Access	2,032	\$2,864	40.9%	1,963	\$2,154	9.7%	3,556	\$2,937	-17.4%	3,812	\$2,412	-36.7%	2,795	2,516	-10.0%	2,662
System Renewal	7,118	\$6,664	-6.4%	6,596	\$5,888	-10.7%	6,402	\$5,994	-6.4%	6,770	\$7,413	9.5%	7,090	7,184	1.3%	8,380
System Service	-	\$0	-	-	\$0	-	-	\$0	-	-	\$0	-	-	1	-	230
General Plant	1,097	\$877	-20.0%	4,443	\$4,246	-4.4%	1,199	\$989	-17.5%	1,357	\$1,345	-0.9%	2,059	1,538	-25.3%	1,253
TOTAL EXPENDITURE	\$ 10,247	\$10,405	1.5%	\$ 13,003	\$12,287	-5.5%	\$ 11,157	\$9,920	-11.1%	\$ 11,938	\$11,171	-6.4%	\$ 11,944	\$11,239	-5.9%	\$12,526
System O&M	6,594	6,998	6.1%	7,064	\$6,803	-3.7%	6,959	\$7,316	5.1%	7,229	\$7,441	2.9%	7,675	\$8,034	4.7%	

⁹ Appendix 2-AB?

¹⁰ 5.6% of \$12.526 million

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As shown in Table 1 above, Thunder Bay Hydro proposes to spend approximately \$64 million (\$63.938 million) on capital over the five-year period 2017 to 2021, on average \$12.8 million per year. Compared to the capital spend for the previous five-year period (2012 to 2016) of \$51.8 million¹¹, the average is \$10.4 million per year, an increase in capital spending of \$2.4 million per year over the 2017 to 2021 period. As part of this calculation, AMPCO has normalized 2013 Actual to \$9.030 million to account for the one-time construction of the new fleet garage in 2013 in the amount of \$3.257 million.¹²

Thunder Bay Hydro is ramping up its spending in distribution system replacement to keep pace with recommendations in the ACA. Thunder Bay Hydro has paced the alignment with Kinectrics suggested renewal quantities over a 3-year period and expects to reach the renewal quantities suggested by Kinectrics in 2019.

AMPCO submits this pace and level of increase in a short period of time is not affordable for customers whose preference is low electricity rates. Affordability is AMPCO's paramount concern given the rapid rise in Industrial rates in recent years.

For the following reasons below, AMPCO submits Thunder Bay Hydro's evidence does not justify a ramp up of capital spend in 2017 and beyond:

- Reliability is improving over time
- The capital increase flows directly from the ACA and there are significant data gaps in the ACA
- For some asset groups the quantity proposed for replacement in year one exceeds the % in very poor condition (wood poles/pad mounted transformers)
- The proposed pace of work is not reasonable
- Thunder Bay Hydro has a history of underspending on its capital plan
- General Plant spending is uncertain and may not occur as proposed
- The proposed expenditures do not keep electricity rates as low as possible; a preference expressed by customers

The average capital spend over the past 5 years is \$11 million. AMPCO submits the Board should approve capital spending in 2017 that is in line with historical spending. AMPCO proposes that the 2017 capital budget be \$11 million.

AMPCO's comments below on the ACA and specific projects in the capital plan support AMPCO's proposed capital reduction of \$1.5 million. The reductions reflect a cost containment approach in favour of a more streamlined capital spending plan that preserves reliability.

¹¹ Capital 2012 to 2016 = \$53 million with 2013 reduced from \$12.287 million to \$9.03 million to account for one-time fleet garage expenditure of \$3.257 million

¹² Ex 2 P38

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Asset Condition Assessment

The total number of assets replaced in 2013 was 550. As a result of Kinectrics' ACA, the total number of assets proposed to be replaced in 2017 is 868, an increase of 60% over 2013.¹³

The ACA provides a Health Index for the entire asset base using 2015 condition data. The Health Index, expressed as a percentage, quantifies equipment condition based on the categories of very poor, poor, fair, good and very good. Based on these quantities and probability of failure and criticality, Kinectrics developed a 10-year Un-Levelized and Levelized Flagged for Action Plan that was utilized by Thunder Bay Hydro to set its asset renewal rate and budget for 2017 to 2021.

AMPCO submits the determination of the optimal timing of when an asset should be replaced in order to derive the maximum value of the asset is critical. Replacing an asset too soon and ahead of an optimal intervention time risks wasting the remaining useful life of the asset.

AMPCO supports Thunder Bay Hydro's approach to better understand the condition of its assets. Kinectrics' ACA provides Thunder Bay Hydro with a good baseline and reference point for the current condition of its assets. However, due to the significant data limitations discussed below, AMPCO submits Thunder Bay Hydro's ACA requires further refinement including closing the identified data gaps before it can be relied upon to drive a significant increase in asset quantity replacements and budget to the levels proposed in 2017 and subsequent years.

Data Limitations

Asset failure rates were assumed due to limited availability of failure statistics. To develop a Flagged for Action Plan, the risk of failure of each asset unit must be quantified.¹⁴ For most assets, failure statistics is not available.¹⁵ Currently, Thunder Bay Hydro only has failure statistics for distribution transformers.¹⁶ Where failure data is not available, an exponentially increasing failure rate with age and corresponding probability of failure model were assumed in the study and determined based on engineering judgement.¹⁷

Kinectrics recommends that Thunder Bay Hydro begin collecting failure information so failure models can be developed and used in future assessments.¹⁸ Thunder Bay Hydro confirmed it plans to begin tracking failure statistics for other asset groups, beyond distribution transformers.¹⁹ AMPCO submits this

¹³ 2-AMPCO-15 (b) & (c)

¹⁴ Appendix C 2015 ACA Page 8

¹⁵ Failure data only available for distribution transformers

¹⁶ Transcript Volume 2 Page 98

¹⁷ Transcript Volume 2 Page 112

¹⁸ Appendix C 2015 ACA Page P23

¹⁹ Transcript Volume 2 Page 99

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information is critical as asset groups in Thunder Bay Hydro's territory may experience different failure rates than those assumed in the study which could impact the Flagged for Action Plan.

Asset removal data is not available. The asset degradation curves that were created depended on engineering judgment because Thunder Bay Hydro did not have the removal statistics. Mr. Tsimberg confirmed that if you have sufficient removal records, your linkage between condition and probability of failure will be more credible.²⁰ Thunder Bay Hydro intends to collect removal data moving forward.²¹

Many asset groups have low Data Availability Indicators (DAI). DAI measures the amount of condition parameter data Thunder Bay has for an asset, based on information Thunder Bay Hydro currently collects. An asset with all condition data represented will have a DAI of 100%. Many asset categories have DAI scores of less than 50%. A group of Overhead Switches (12 and 25 kV Motorized Load Break) had the lowest DAI at 26%.²² The lower the DAI the lower the confidence.²³ Kinectrics recommends that the DAI for each asset category be brought to 100% and maintained at that level, meaning that all data for all condition parameters used in the Health Index formulas should be collected for all assets.

All asset groups have data gaps. Data gap results reflect condition data for information that Thunder Bay Hydro does not collect. There are additional condition parameters or tests that Thunder Bay Hydro could undertake that are important indicators of the deterioration and degradation of assets. As shown in the table below, no asset group was identified as having absolute "Low" data gaps. High data gaps exist for Overhead Switches, Underground Switches and Underground Cable. Medium to High data gaps exist for Wood Poles and Pole and Vault Transformers. Low to Medium data gaps for Station Transformers, Circuit Breakers and Pad Mounted Transformers.²⁴

If there are high data gaps, the degree of confidence that the Health Index reflects true condition may be low. As shown in the Table below, over 90% of Thunder Bay's assets have data gaps in the Medium High to High range. Based on these significant data gaps, AMPCO submits the credibility of the Health Index for many assets is questionable.

Kinectrics recommends that the missing data be gathered for each asset group in a prioritized way, the highest priority being the most indicative of asset degradation.²⁵ Thunder Bay Hydro plans to address the data gaps identified as Medium-High to High.²⁶ For assets with low DAI scores and high data gaps there is even less confidence in the results.

²⁰ Transcript Volume 2 Page 86

²¹ Transcript Volume 2 Page 86

²² Appendix C 2015 ACA P22

²³ Transcript Volume 2 Page 144

²⁴ Appendix C 2015 ACA P22

²⁵ Appendix C 2015 ACA P23

²⁶ ER-VECC-7

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Mr. Tsimberg confirms that if you improve the input data, the data availability indicator, and if you close some of the high level data gaps, the credibility of results will be better. “And the same goes for when you use removal statistics in generating degradation curves. Instead of basically the educated opinion of experts, again your link between health index and probability of failure will be more reliable. But in absence of that, that's the best assumptions that could be made.”²⁷ Further “Based on the Health Index and probability of failure curves developed, it is quite possible that some of the assets flagged for action in year one may be in actually the fair or even good category.”²⁸

In considering the above data issues, AMPCO submits the asset quantities proposed for replacement in 2017 are too high.

Other Issues

Only asset age was available for certain assets. Only age was available for approximately 20% of the assets: Pole-mounted Transformers, Vault Transformers, Overhead and Underground Switches and Underground Cables. Age was only available for less than half of the Switches and Cable. As discussed in the project details below, AMPCO submits age should not be used as a proxy for asset condition and the basis for a ramp-up of asset replacement quantities.

Kinectrics used the condition data provided by Thunder Bay Hydro and did not verify the quality of the data. Kinectrics did not review the available asset records to verify if they accurately reflected the condition of the assets in service. AMPCO is not suggesting this is a limitation of the ACA but recommends that as part of next ACA, a sample of assets is reviewed to verify that the information available accurately reflects the condition of the assets in service.

Benchmarking analysis needs to consider more years of data. Kinectrics concludes Thunder Bay Hydro is underspending on its lines assets compared to three comparator LDCs based on \$/km and SAIFI and SAIDI. The benchmarking only considers Thunder Bay Hydro's 2015 reliability compared to its peers. AMPCO submits that when examining \$/km and SAIDI and SAIFI, several years of data needs to be considered before any conclusions on reliability and spending can be drawn. For 2013, Thunder Bay Hydro experienced the second lowest outage and frequency and lowest duration outage compared to its peers.²⁹ AMPCO submits the Board should not place significant weight on this conclusion.

Kinectrics did not consider historical asset replacement rates in setting the pace for assets flagged for action in 2017 and beyond. In AMPCO's view the comparison between historical replacement rates and the proposed replacement rates is important in determining the appropriate level of investment.

²⁷ Transcript Volume 2 Page 114

²⁸ Transcript Volume 2 Page 116

²⁹ K2.2 Page 45

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Prioritization Process is subjective and needs improvement. The overall ranking of each project is a result of the composite of the project priority and the project score. The proposed plan is then reviewed by Senior Management and finalized.³⁰ Mr. Tsimberg noted that Thunder Bay Hydro's prioritization process is subjective and improvements are needed.

Thunder Bay Hydro agrees and plans to re-evaluate the way they prioritize investments and potentially refine the process going forward. Mr. Tsimberg assumes the next version of Thunder Bay's prioritization will be less subjective.³¹

AMPCO submits the Board should consider the above in its review of project priorities.

Project Details

The forecast System Renewal spend in 2017 is \$2.492 million more than 2013 actuals.

AMPCO has reviewed the key System Renewal projects and has identified areas where potential reductions in spending could be made. These reductions exceed AMPCO's proposed \$1.5 million capital reduction but demonstrate that the number of assets forecast to be replaced is excessive and better cost containment can be achieved.

The ACA Health Index results show that the following three asset categories have the worst scores:

- Underground Cables (particularly 4kV)
- Overhead Switches
- Distribution Transformers (Pole Mounted, Pad Mounted and Vault)

Based on the Health Index scores, Thunder Bay Hydro is proposing to increase the quantity of assets replaced under each asset category. However, AMPCO notes only age data is available for the above three asset categories, which decreases confidence in the worst score results.

Kinectrics has identified the data gap for Underground Cables and Overhead Switches as High. For Pad Mounted, Pole Mounted and Vault Transformers, the data gap is Low-Medium, Medium-High and Medium-High, respectively.

Based on the above results and the uncertainty that exists due to the lack of available condition information, AMPCO does not support a change in Thunder Bay Hydro's approach to managing these assets and the significant increases in capital spending proposed at this time. As Thunder Bay Hydro collects the needed information and fills in the data gaps, AMPCO submits this updated information should be used in future assessments to consider if a higher asset renewal rate is appropriate.

³⁰ Appendix 2-B Page 116

³¹ Transcript Volume 2 Page 127

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System Renewal	A 16	Small Pole Replacements	\$342,512	OH Renewal	P2	3
	A 17	Lines Safety Reports	\$761,834	Safety	P2	1
	A 18	Transformer and Switch Replacements	\$756,484	Asset Failure Renewal	P2	2
	B11140	25kV Pole Replacements	\$584,384	OH Renewal	P4	12
	B12111	Black Bay-Dewe Voltage Conversion	\$1,174,112	OH Renewal	P4	14
	B12112	Dewe-Rita Voltage Conversion	\$1,489,302	OH Renewal	P4	15
	B1270	Cumming-Brodie Voltage Conversion	\$580,677	OH Renewal	P4	16
	B1277	Donald-Mountdale Voltage Conversion	\$310,256	OH Renewal	P4	13
	B1298	McDougall-Court Voltage Conversion	\$789,716	OH Renewal	P4	19
	B12135	Finlayson - Brodie Voltage Conversion	\$893,725	OH Renewal	P4	17
	B14129	Underground Replacements	\$376,868	UG Renewal	P4	18
System Service	A	Grid Modernization	\$230,375	Reliability	P5	21
General Plant	C	Fleet - Double Bucket Replacement	\$450,000	System Maintenance Support	P5	20

Table 5.4.5-5 2017 Material Capital Projects and Programs

Underground Cable Replacement. Thunder Bay Hydro proposes to spend \$376,868 in 2017 on Underground Replacements (Project B14129). The Priority Level for this project is P4 and in terms of overall priority the project is ranked #19 out of 21. It appears Thunder Bay Hydro has spent little in the past 5 years on targeted underground cable replacement work. Thunder Bay Hydro spent \$213,160 in 2012 on Underground Installations/Replacements (B 14) with no expenditures in 2013 to 2016.

Kinectrics noted that the low DAIs for cables are of particular concern.³²

Given the uncertainty surrounding the underground cable input data (Data Gap is high and overall DAI is 48%, AMPCO does not accept that this level of expenditure in 2017 is prudent.

For underground cable the Health Index was based solely on age and the failure statistics of the broad population is not known. Given there is no conditional data available for the underground cable asset class, the level of confidence in the results for this asset group is less than that of wood poles, which was rated fair.³³

The Underground Renewal budget increases to \$800,000 in 2018, \$1,300,000 in 2019, \$1,400,000 in 2020 and \$1,400,000 in 2020. AMPCO submits Thunder Bay Hydro has not justified this level of spending for the Test year and beyond. AMPCO proposes that targeted work on Underground Cable be

³² Appendix C 2015 ACA P23

³³ 2-VECC-15

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reduced to \$200,000 allowing for 1 km of replacement³⁴ consistent with the kilometres replaced in 2016. This represents a capital reduction of \$176,868.

Transformer and Switch Replacements. Thunder Bay Hydro forecast spending in 2017 is \$756,484 for Switch and Transformer replacements (Project A 18). The Priority Level for Transformer and Switch Renewal, (on a failure basis) is P2 and the overall project priority is #2 out of 21. Given that this category of spending has typically been used to respond to asset failures, the priority rankings seem appropriate.

For the years 2012 to 2014, the average annual spend was approximately \$230,000 on the replacement/renewal of failed assets. In 2015, Thunder Bay Hydro experienced a situation with leaking transformers³⁵ and \$932,264 was spent. The activity continued in 2016 (\$816,936 spent) but Thunder Bay Hydro expects it to taper off in 2017.³⁶

In 2016, Thunder Bay Hydro replaced the following quantities under this category of spending: 37 Padmount Transformers, 37 Polemount Transformers, and 6 Switches.

In 2017, Thunder Bay Hydro proposes to replace 44 Padmount Transformers, 57 Polemount Transformers, and 10 Switches. It appears the increase in asset renewal is driven by a targeted replacement of Overhead Switches and Transformers.

AMPCO supports the need and continuation of a budget for the replacement of overhead switches and transformers that are damaged as a result of storms or other issues and require immediate replacement, but until such time as the data gaps identified by Kinectrics have been sufficiently closed for Overhead Switches (Data Gap High and Overall DAI=42%) and Transformers (Data Gap Low-Medium to Medium-high and overall DAI 85% to 100%), AMPCO does not support this increased level of investment. Kinectrics noted that the low DAIs for switches are of particular concern.³⁷

In considering the above, AMPCO submits the budget for the replacement of asset failures should be reduced to \$500,000 to be more in line with historical spending prior to 2015. This represents a capital reduction of \$256,484.

Wood Poles. Kinectrics concludes that although Underground Cables, Overhead Switches and Distribution Transformers discussed above have the highest percentage of assets in very poor or poor condition, 25 kV wood poles require the most attention.³⁸

³⁴ Cable replacement cost is approximately \$200,000 per km Transcript Volume 2 Page 26

³⁵ Transcript Volume 2 Page 37

³⁶ Transcript Volume 2 Page 38

³⁷ Appendix C 2015 ACA P23

³⁸ Appendix C 2015 ACA Summary P v

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For wood poles the Health Index was calculated using age and an overall risk determined from visual inspections. The level of confidence in the Health Index results is fair.³⁹ The data gap for wood poles is Medium-High and the DAI is 100%. To address this data gap, Thunder Bay Hydro plans to incorporate objective pole testing into risk assessments.⁴⁰ The current visual inspection methodology is subjective.⁴¹ Thunder Bay Hydro does not have failure statistics for wood poles.

In 2013, 88 25 kV poles and 375 4 kV poles were replaced. For the years 2012 to 2016 Thunder Bay's focus has been on 4 kV replacements.

From 2017 to 2021 the trend shifts over time and the number of 4 kV wood poles forecast for replacement decreases and the forecast number of 25 kV wood pole replacements increases. By 2021, Thunder Bay Hydro forecasts the replacement of 395 25 kV poles and 222 4kV poles.⁴²

For the Test Year, Thunder Bay Hydro proposes to replace 193 25 kV poles and 385 4 kV poles for a total of 578 wood poles. Less than 1% of 25 kV wood poles (83) and 4% of 4 kV wood poles (136) are classified by Kinectrics as being in very poor condition.⁴³ The forecast quantities to be replaced in 2017 greatly exceed the quantities in very poor condition. Typically, assets found in poor condition would generally be flagged for action within 5 years.⁴⁴ Given the input data limitations, AMPCO does not support an accelerated replacement of 25 kV pole replacements.

The replacement of 25 kV wood poles replacements occurs under three capital projects and 4 kV wood poles are primarily replaced under Voltage Conversion projects as follows:

³⁹ 2-VECC-15

⁴⁰ ER-VECC-7

⁴¹ Transcript Volume 2 Page 137

⁴² 2-VECC-13 revised June 21, 2017

⁴³ Appendix C 2015 ACA Page 14

⁴⁴ ER-AMPCO-30

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2017 Projects with Pole Replacement Work		
		Forecast # Poles Replaced in 2017 (Appendix J)
25 kV Wood Poles	\$	
Small Pole Replacements (A1716)	342,512	40
Lines Safety Reports (A1717)	761,834	90
25 kV Pole Replacements (B11140)	584,384	60
	1,688,730	190
4 kV Wood Poles		
4 kV Voltage Conversions (B12)	5,367,788	391
		581

AMPCO's comments on the proposed spending under each project is below.

Small Pole Replacements⁴⁵

In reviewing the evidence, AMPCO noted that the historical spending for two capital projects differs between Appendix 2-AA and the 2017 Capital Project Summaries: Small Pole Replacements and Lines Safety Reports.

Appendix 2-AA

Small Pole Replacements A1716	2012	2013	2014	2015	2016	2017
Capital Cost	\$160,400	\$236,494	\$276,593	\$1,028,300	\$379,573	\$342,512

Appendix J Project A1716

Small Pole Replacements (A 16)	160,400			130,406	557,464	342,512
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For the years 2012 to 2014, on average 25 poles in very poor or poor condition were replaced under the Small Pole Replacement Project. 2015 was an outlier year and 139 poles were replaced.⁴⁶ In 2016, 42 poles were replaced. In 2017 Thunder Bay's forecast spending is based on the replacement of 40 poles.

⁴⁵ Appendix J Project A1716

⁴⁶ 2-AMPCO-12

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AMPCO takes no issue with the proposed spending under Small Pole Replacements in the amount of \$342,512.

Lines Safety Reports⁴⁷

The historical spending for Lines Safety Reports from Appendix 2-AA and the 2017 Capital Project Summary is provided below and shows that the data for 2016 is inconsistent.

Appendix 2-AA

Lines Safety Reports A1717	2012	2013	2014	2015	2016	2017
Capital Cost	\$468,445	\$625,723	\$567,743	\$495,879	\$732,775	\$761,834

Appendix J Project A1717

Lines Safety Reports (A 17)	468,445	625,723	567,743	495,879	571,492	761,834
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Thunder Bay Hydro proposes to spend \$761,834 under Lines Safety Reports in 2017. The assets replaced in this project are identified through field inspections and lines safety reports submitted from customers and internal staff.

AMPCO supports spending in 2017 that reflects historical spending given the data gaps that currently exist for wood poles. An increase in the replacement of 25kV poles under this project has not been justified. AMPCO submits that an appropriate level of spending for 2017 is \$540,000 consistent with the average spend for the years 2012 to 2015 (excluding 2016 due to above data issues). This represents a capital reduction of \$221,834.

25 kV Pole Replacements (Project B11140)

In 2017, Thunder Bay Hydro has established a new targeted 25 kV wood pole replacement project to proactively replace 60 25 kV poles with a budget of \$584,384. This project has a priority ranking of P4 – Medium Priority and is #12 out of 21 projects. In 2015, 83 poles were classified in very poor condition.

Thunder Bay Hydro historically completed 25kV pole replacements in the reactive Lines Safety Reports and Small Unplanned Capital accounts.⁴⁸ Over the period 2012 to 2016, Thunder Bay Hydro replaced on average 109 25 kV wood poles per year⁴⁹, reflecting an asset replacement rate of 0.6%. With the addition of this planned project in 2017, Thunder Bay Hydro proposes to replace 190 25 kV wood poles (74% more), reflecting an asset replacement rate of 1.1% or almost two times its historical rate.

⁴⁷ Appendix J Project A1717

⁴⁸ Appendix J Project B11140

⁴⁹ 2-VECC-13

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Thunder Bay Hydro indicates the assets targeted for proactive replacement are at or beyond their useful life as determined through the ACA process. Given the input data gap for wood poles, AMPCO does not support the quantity of poles to be replaced in one year under this project. The information needed to close the gap for wood poles is important to the credibility of the health index score. To proceed in the absence of this information could mean that poles in fair and good condition are replaced prematurely. AMPCO proposes that 50% of the budget is appropriate. This represents a capital reduction of \$292,192.

4 kV Voltage Conversions (includes 4 kV wood pole replacements)

In 2017, 4 kV Voltage Conversion projects represent approximately 64% of the System Renewal budget.

Thunder Bay Hydro's DSP shows \$5,367,788 in proposed spending in Voltage Conversion projects in 2017⁵⁰, however AMPCO notes the total amount for the B 12 projects listed below is \$5,237,786.⁵¹ It appears that Thunder Bay Hydro has included two additional expenditures under Voltage Conversion Projects: Forestry for Future Projects and Pole Butt and 4kV Removal totalling \$130,000. These items were not visible in the Appendix 2-AA Capital Projects Table.

Pole Butt and 4kV Removals (line 64) has expenditures in the historical years 2012 to 2016. However, Forestry for Future Projects (line 74) is a new expenditure in 2017 in the amount of \$100,000. AMPCO asks that Thunder Bay explain the nature of this forestry work in its reply submission and clarify if this work is connected to Thunder Bay Hydro's Forestry Management Plan and if it should be considered by the Board in conjunction with Thunder Bay Hydro's Tree Trimming budget under OM&A.

SYSTEM RENEWAL	2017
Line Voltage Conversions (B 12)	
Black Bay-Dewe Rebuild	1,174,110
Dewe-Rita Rebuild	1,489,302
Donald-Mountdale	310,256
MacDougall-Court	789,716
Finlayson - Brodie Conversion	893,725
Cumming - Brodie Street	580,677
Total	5,237,786
Forestry for future Projects	100,000
Pole Butt and 4kV Removal	30,000
	5,367,786

⁵⁰ Ex 2 Appendix 2-B P129

⁵¹ Appendix 2-AA Capital Projects Table

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In 2018, Thunder Bay Hydro begins to shift expenditures away from 4kV Voltage Conversions and forecast spending in 2018 decreases to \$3.924 million, \$1.443 million less than 2017. At the same time Thunder Bay is increasing expenditures in other areas (Underground and 25kV Pole Replacement projects) in an effort to reach the asset levels proposed by Kinectrics, resulting in an overall increase in System Renewal spending in 2018.

In AMPCO's view, the shift away from Voltage Conversion projects is appropriate given the new Health Index information calculated by Kinectrics for Thunder Bay Hydro's 23 Station Transformers. With Low-Medium data gaps for this asset, this approach has credibility. However, given this new plan, AMPCO submits the proposed pace of Voltage Conversion work in 2017 is excessive. For the period 2012 to 2016, the average annual spend is approximately \$4.6 million.⁵² In 2017, AMPCO Thunder Bay has put forward six Voltage Conversion projects, two of which had expenditures in 2016: Black Bay-Dewe Rebuild and Dewe-Rita Rebuild. For the period 2018 to 2021, the average annual spend is \$3.2 million. The 2017 Voltage Conversion projects have a P4 priority level (medium priority) and are ranked #13, 14, 15, 16, 17 and 19 out of 21 projects.

In considering the above, AMPCO submits the level of investment in 2017 should not be ramped up and a slower pace should be implemented. To keep electricity rates as low as possible, AMPCO submits the budget for Voltage Conversion work should not exceed the historical average (2012 to 2015 actuals) of \$4.6 million. This represents a capital reduction of \$868,000.

System Service

The \$230,375 increase in spending in 2017 is for an initiative under Grid Modernization to implement smart devices on selected feeders in strategic areas with large densities of small commercial and large users. This initiative was developed in response to customer feedback from these customers and the priority they place on reliability. Thunder Bay Hydro ranked this project a P5 or Low Priority and the overall project ranking is #21 out of 21 projects. Thunder Bay Hydro indicates that if the Board does not approve Thunder Bay Hydro's capital budget, this will be the first project cut.

AMPCO questions Thunder Bay Hydro's logic in this regard given that this initiative is intended to reduce outages and increase reliability for affected customers. Ranking this project as the lowest priority undermines the merit of Thunder Bay Hydro's customer engagement process and its usefulness in shaping the planning, prioritization and justification of proposed capital expenditures. P5 is described as generally new equipment or work that is not tied to a specific goal or milestone. A P5 priority ranking does not fit for this project as it is clearly tied to a specific distribution system goal to positively impact reliability for targeted customers. In AMPCO's view this ranking is subjective. AMPCO submits the Board should approve this project given the benefits it delivers to customers.

⁵² 2-VECC-13

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General Plant

For the years 2012 to 2016, the General Plant budget has been underspent: 20% in 2012; 4% in 2013; 17.5% in 2014; 0.9% in 2015 and 25.3% in 2016.⁵³ On aggregate over the five-year period 2012 to 2016, Thunder Bay Hydro has underspent on General Plant by approximately 11%. Thunder Bay Hydro's 2017 General Plant forecast is \$1.253 million. Given the uncertainty in the General Plant category, AMPCO submits an 11% reduction in Thunder Bay Hydro's 2017 budget is appropriate. This represents a reduction of \$138,000.

As shown in 2-AMPCO-18, Thunder Bay Hydro proposes to replace its fleet once it reaches its expected service life regardless of the utilization rate of the vehicle, a metric Thunder Bay Hydro does not record or track.⁵⁴ Thunder Bay Hydro indicates repair costs and total km are considered but it is primarily vehicle age that determines a replacement.⁵⁵ AMPCO submits this practice can lead to the premature replacement of vehicles and does not fully optimize the life of the asset. AMPCO submits Thunder Bay Hydro should begin to formally record, track and analyze the utilization rates of its fleet to ensure assets are not being replaced too soon.

Thunder Bay Hydro proposes a Double Bucket truck replacement in 2017 at a cost of \$450,000 split between two projects: \$325,000 to complete the purchase to replace truck #5 (2002) and the second is a \$125,000 expenditure for the initial purchase to replace Truck#3 (2001). The driver for the replacement is system maintenance support. Thunder Bay Hydro has ranked the priority of the project at P5 – Low Priority with an overall project ranking of #20 out of 21 projects. Thunder Bay Hydro considers this expenditure to be discretionary in nature. Not knowing the utilization details of Truck #3, AMPCO questions whether 2017 is the correct timing for the replacement of Truck#3 and if the expenditure of \$125,000 in 2017 could be deferred.

Summary

AMPCO's proposed capital reductions under each project above total \$1.95 million. AMPCO is not proposing that the 2017 capital budget be reduced by \$1.95 million. Rather AMPCO submits that its analysis supports a capital budget in 2017 that is consistent with historical spending levels and also reflects stable system reliability. In AMPCO's view, Thunder Bay Hydro has not adequately justified that an accelerated pace of asset renewal is required.

⁵³ Chapter 2 Appendix 2-AB updated with 2016 Actual

⁵⁴ 2-AMPCO-18

⁵⁵ Appendix J Project C

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AMPCO Proposed Capital Reductions

System Renewal

FW TS Exit Cable Replacement	\$176,868
Transformer/Switch/Switchgear Replacements (A 18)	\$256,484
Small Pole Replacements	\$0
Lines Safety Reports	\$221,834
25 kV Pole Replacements	\$292,192
4 kV Voltage Conversions	\$868,000
Sub-total	\$1,815,378

General Plant

Underspend	\$138,000
Total	\$1,953,378

Performance Metrics

AMPCO submits that a metric that tracks the # of equipment failures over time would be valuable in monitoring Thunder Bay Hydro's distribution system performance.

SAIDI and SAIFI are considered lagging indicators. # of equipment failures is seen as a leading indicator of system performance.

OM&A

Thunder Bay Hydro seeks approval of \$15,729,872 in OM&A in 2017. This represents a \$1,429,872 increase over 2013 Board approved; a 9.9% increase and a 2.41% Compound Annual Growth Rate (CAGR).

Compared to 2013 Actual, the increase in 2017 OM&A is \$2,496,988, reflecting an increase of 18.9% and a CAGR of 4.4%. In 2013, Thunder Bay Hydro underspent on OM&A by \$1,067,116.

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Table 4 – 1 : Summary of OM&A Expenses 2013- 2017 Test Year Reflecting 2016 Actuals
OEB Accounts 5005- 5695

04-Jul-17 UPDATE

Line No.		Last Rebasing Year (2013 Board-Approved)	Last Rebasing Year (2013 Actuals)	2014 Actuals	2015 Actuals	2016 Actuals	2017 Test Year
1							
2	Operations	\$3,495,297	\$3,356,496	\$3,166,762	\$3,167,155	\$3,475,223	\$3,322,661
3	Maintenance	\$3,780,833	\$3,446,710	\$4,148,144	\$4,274,077	\$4,896,395	\$4,703,516
4	Billing and Collecting	\$2,116,128	\$1,900,963	\$1,883,864	\$2,032,711	\$2,027,351	\$2,251,439
5	Community Relations	\$253,133	\$186,349	\$205,756	\$205,161	\$229,471	\$222,078
6	Administrative and General	\$4,654,608	\$4,339,346	\$4,416,991	\$4,564,900	\$4,927,434	\$5,230,177
7	Total	\$ 14,300,000	\$ 13,232,884	\$ 13,822,518	\$ 14,244,004	\$ 15,455,874	\$ 15,729,872
8	%Change (year over year)			4.46%	3.05%	8.51%	1.77%

The OM&A cost per customer increase from 2013 Actual is 17.3%.⁵⁶ In AMPCO's view, this level of increase is too high. AMPCO supports SEC's top-down analysis and proposed OM&A budget of \$14.5 million in 2017 based on the outcome of the Aiken model.

The areas with significant cost increases compared to 2013 Actual are as follows⁵⁷:

- Salaries, Wages & Benefits: \$820,367
- Administrative: \$397,503
- Outside Services: \$328,852
- Postage: \$241,077
- Trucking: \$208,131

AMPCO has reviewed certain cost drivers and provides the following comments.

Salaries, Wages & Benefits

Overtime budget is excessive. For the years 2015 and 2016, Thunder Bay Hydro underspent on overtime by 4% and 14%, respectively. In 2017, Thunder Bay Hydro has forecast \$886,781 in overtime in 2017, which is almost \$150,000 more than 2016 Actuals (\$736,857). AMPCO submits Thunder Bay Hydro's evidence does not support this significant increase and given the recent historical underspend, the 2017 overtime budget should be set at 2016 actuals. This represents a reduction of \$150,000 in OM&A.

OM&A budget needs to account for vacancies. Thunder Bay Hydro has experienced close to \$100,000 in savings in FTE costs every year for the period 2013 to 2016 due to vacancies as a result of internal staff movement, vacancies more challenging to fill, long-term sick leave and staff reductions due to

⁵⁶ 4-SEC-21

⁵⁷ K2.3 P

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retirement. AMPCO submits these circumstances are not unusual and are likely to continue. Thus, a \$100,000 reduction in 2017 OM&A costs is warranted to account for vacancies in 2017.

Outside Services

Most of the increase in Outside Services is due to increased contractor costs related to a new Insulator Replacement Program and Tree Trimming.

Proactive Replacement of Insulators is not justified. In 2017, Thunder Bay Hydro is seeking \$100,000 in additional budget to undertake a new program to proactively replace insulators.

Historically, Thunder Bay Hydro has replaced glass insulators, glass cut-outs and porcelain insulators on a reactive basis.

Thunder Bay Hydro has approximately 2,800 insulators.⁵⁸ In 2017, Thunder Bay Hydro proposes to replace 200 insulators under this program.

Thunder Bay Hydro indicates it is currently experiencing a higher failure rate from these materials (insulators, glass cutouts and arrestors), however, the data for 2012 to 2015 that was considered in establishing this program shows that outages decline over this period. The number of outages in 2014 and 2015 are below 2012.⁵⁹ Thunder Bay Hydro was unable to provide failure data for insulators separately. AMPCO submits there is no evidence on the record that shows that insulators are now failing at a higher rate.

Thunder Bay Hydro did not provide any data to support the statement that reactive replacement of insulators will result in additional costs due to potential overtime and other consequences of the failure.

In its Argument in Chief Thunder Bay Hydro references a comment in the Tsimberg Expert Report “that these planned replacements represent a much more efficient use of capital funds”. Mr. Tsimberg was not specifically referring to insulators as insulators were not included in Mr. Tsimberg’s review.

Given the lack of specific information on failure rates, AMPCO submits Thunder Bay Hydro has not put forward a strong case to support a change in the way Thunder Bay Hydro maintains insulators from reactive to proactive. In EB-2012-0167, Thunder Bay Hydro explains that reactive maintenance is most cost effective for low cost equipment such as insulators noting the equipment is not critical should it fail.⁶⁰

AMPCO submits an incremental cost of \$100,000 in 2017 has not been justified. Insulators should continue to be maintained as part of the Reactive Maintenance budget.

⁵⁸ Transcript Volume 2 Page 139

⁵⁹ 4-AMPCO-19

⁶⁰ REB-2012-0167 Ex 4 T2 S1 Page 1

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AMPCO notes that in addition to insulators replaced reactively, targeted insulators are identified for replacement under the following projects in 2017:⁶¹

- A1717
- B11140
- B12135
- B1298
- B1277
- B1270
- B12111

Tree Trimming

Thunder Bay Hydro seeks an additional \$200,000 in Tree Trimming in 2017 (\$888,237) compared to 2013 Board Approved (\$689,884) and 2013 Actual (\$684,873).⁶²

Thunder Bay Hydro uses a forestry contract for tree trimming services and \$150,000 of the increase is for external contractor costs (Outside Services).

Thunder Bay Hydro's as filed evidence on Tree Trimming was very brief⁶³ and did not include a Tree Trimming strategy, historical achievements or any other details to support its request for incremental funding. Through interrogatories and the oral hearing, the following points have emerged.

Thunder Bay Hydro has been working to achieve a 7-year trimming cycle for some time. In 4-VECC-38 Thunder Bay Hydro indicates that due to an increase in the number and duration of outages caused by trees it is prudent to formulate a plan and timeline now to re-establish right-of-way's clear of vegetation and an ongoing maintenance cycle to prevent encroachment levels from reaching the current state.

In 4-AMPCO-20 Thunder Bay Hydro explains it is currently working on the backlog of overgrowth and has not achieved an industry standard 7-year trimming cycle, and increased funding over the next 10 years (to 2026) will be required to achieve this standard.⁶⁴

Firstly, AMPCO submits the tree outage statistics used to justify an increase in Tree Trimming spending should not be relied upon as there are other outage causes that have been assigned to the tree outage cause code which means the number and duration of tree outages is likely overstated.

Secondly, AMPCO wishes to point out that Thunder Bay's 2013 Cost of Service application included a Forestry Management Program⁶⁵ with an escalated strategy to address areas of significant vegetation

⁶¹ DSP Appendix J

⁶² K3.2 P4

⁶³ Ex 4 P23

⁶⁴ 4-AMPCO-20 (b)

⁶⁵ EB-2012-0167 2-6 Appendix 2-A Section 2 P79

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overgrowth and to return vegetation management to sustainable levels. Thunder Bay Hydro established at that time that this can be achieved in a 10-year period, following a vegetation risk assessment in 2007. The Figure below shows the escalation in spending beginning in 2007 and further escalation at or above \$700,000 over the period 2009 to 2011. Earlier spending over the period 2000 to 2006 was on an as needed basis and did not address Thunder Bay Hydro's vegetation management requirements at a sustainable level.

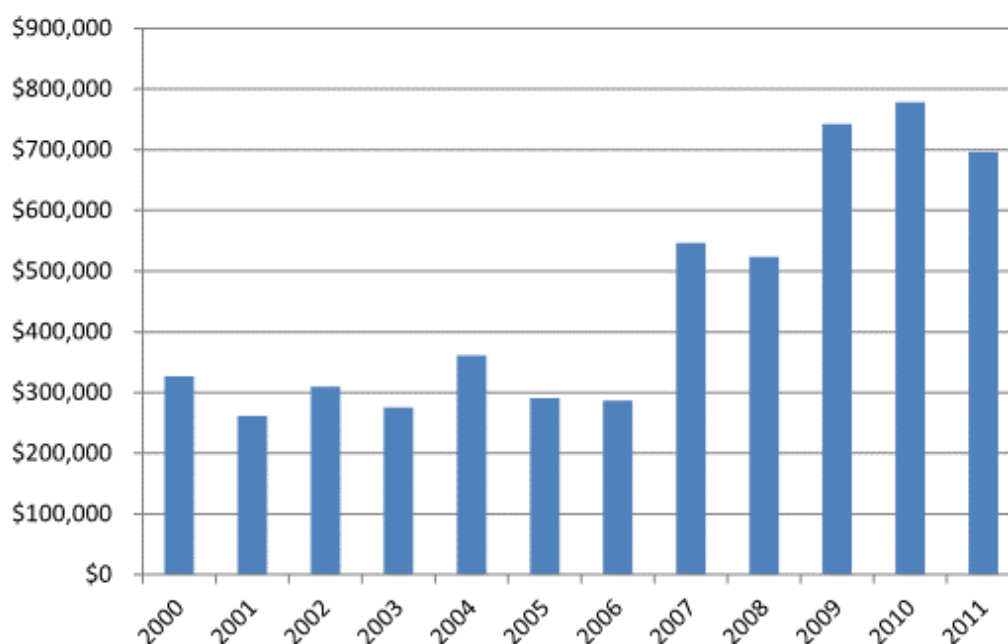


Figure 35 - TBHEDI Vegetation Management Budget Escalation

In 2012, the Forestry Management budget was set at \$720,000.⁶⁶ Forecast spending in 2013 was consistent with 2012 to keep pace with the Forestry Plan. The Program anticipated a focus on areas with substantial overgrowth with funding levels to remain constant for 4 or 5 years beyond 2013. Even though Thunder Bay Hydro has ramped up its Tree Trimming budget it has not yet achieved a 7-year trimming cycle as planned. More funding is being asked for now, and achievement of a 7-year trimming cycle is still 10 years away or more. It is unclear what the additional budget is needed for given that the Thunder Bay Hydro has been working on reaching a 7-year cycle for the past few years.

Thunder Bay Hydro seeks approximately \$890,000 in 2017 for Tree Trimming. In AMPCO's view this increase in spending has not been justified. In previous years Thunder Bay Hydro requested more

⁶⁶ K2.3 Page 40

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funding to address the backlog of overgrowth and funding was received and spent. It is unclear from the evidence why Thunder Bay Hydro has not been able to achieve a 7-year trimming cycle.

In EB-2012-0167, Thunder Bay Hydro had proposed physical accomplishments underlying its 2013 budget request. Thunder Bay indicated its overhead lines occupy a linear throughfare of approximately 869 km and 695.2 km (80%) of all overhead lines are exposed to potential interference by vegetation. Thunder Bay Hydro calculated a total Estimated Vegetation Management Cost of \$7.667 million to address the 695.2 km of lines exposed to vegetation allowing for a greater cost per metre to account for the substantial amount of vegetation trimming and clearing to be done. This equated to an annual cost of \$767,000 over a 10-year period to allow for the 7-year standard.⁶⁷

In 4-VECC-38, Thunder Bay Hydro provided total Vegetation Clearing costs of \$4,761,454 to address 210 km⁶⁸ or \$748,228 annually (w/10% contingency) for a 7-year cycle. This budget and timeline information is confusing and does not align with the data underlying Thunder Bay Hydro's 2012 Forestry Management Plan. It is unclear why the total km to be addressed in the 7-year cycle has changed in the latest Tree Trimming estimate to 201 km in EB-2016-0105 from 695.2 km in EB-2012-0167. Also, the budget estimate provided is for a 7-year cycle and given Thunder Bay Hydro is not yet on a 7-year cycle, it is unclear what the Tree Trimming budget for 2017 is based on.

No unit cost data. Thunder Bay Hydro indicates it only began tracking unit cost tree trimming data at the end of 2016 so the utility has not been adequately tracking historical progress and productivity related to Tree Trimming.

AMPCO Position. In the absence of a comprehensive Tree Trimming strategy, informed by unit cost data and accurate tree outage data over time, AMPCO submits the Board should deny Thunder Bay Hydro's request for \$150,000 in additional Tree Trimming funding. In AMPCO's view, the Board has insufficient information to approve this request.

AMPCO submits the Board should require Thunder Bay Hydro to file a detailed Forestry Management Strategy in its next Cost of Service application that informs the Board of the accomplishments to date, status of the 7-year cycle goal, associated costs and future objectives.

In its Argument in Chief, Thunder Bay Hydro states "In the industry tree-trimming cycles range between 5-7 years. Thunder Bay Hydro is proposing to meet the lower end of this range."⁶⁹ This is the first time Thunder Bay Hydro has identified its intention to achieve a 5-year cycle. AMPCO submits this information confuses Thunder Bay Hydro's request.

⁶⁷ K3.2 P38

⁶⁸ K3.2 P32 (Total Length: 29707 + 136430 + 34223 + 10262 = 210622 m)

⁶⁹ AIC P20

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As discussed on page 14 of AMPCO's submission, Thunder Bay Hydro has an additional \$100,000 under its Voltage Conversion project for Forestry for Future Projects. This takes Thunder Bay Hydro's proposed Forestry budget to almost \$1 million. Thunder Bay Hydro has not justified this new expenditure in 2017.

Conclusions

Customers identified reducing/stabilizing cost as the top priority.⁷⁰ AMPCO submits its proposed capital and OM&A budgets are in line with customers' preferences and reflect cost containment measures that improve affordability for customers.

AMPCO proposes a capital budget of \$11 million and an OM&A budget of \$14.5 million in 2017.

⁷⁰ Appendix 2-B Page 23