Empirical Research in Support of Incentive Rate-Setting: 2019 Benchmarking Update

Report to the Ontario Energy Board

August 2020

Pacific Economics Group Research, LLC

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1. Introduction

In 2013, the Ontario Energy Board (OEB) issued a report titled "Rate Setting Parameters and Benchmarking under the Renewed Regulatory Framework for Ontario's Electricity Distributors"[1] (Board Report) in which it set forth the framework for setting rate adjustment formulas for local distribution companies (LDCs or "distributors"). The Board Report provides the OEB's final determination on its policies and approaches to the distributor rate adjustment parameters and the benchmarking of electricity distributor total cost performance. This 2019 Benchmarking Update determines the 2020 stretch factor assignments for distributors in relation to the 2021 rate year.

According to the Board Report, rates will be indexed by a formula "which is used to adjust the distribution rates to reflect expected growth in the distributors' input prices (the inflation factor) less allowance for appropriate rates of productivity and efficiency gains (the X-factor)."[2] The productivity part of the X-Factor is the same for all LDCs. The efficiency gains part of the X-Factor is called the stretch factor and can vary by company. This stretch factor reflects the potential for incremental productivity gains by a given LDC under incentive regulation (i.e., incentive rate mechanism or IRM) which in turn depends on an individual distributor's level of cost efficiency.

These stretch factor assignments are based on the results of a statistical cost benchmarking study designed to make inferences on individual distributors' cost efficiency. An econometric model is used to predict the level of cost associated with each distributor's operating conditions. Distributors that had actual cost that was lower than that predicted by the model were assigned lower stretch factors than those that did not. The October 18, 2013 report by Pacific Economics Group (PEG) titled "Productivity and Benchmarking Research in Support of Incentive Rate Setting in Ontario" describes the model used to produce the benchmarking results. The work was subsequently updated to include 2013 data in July of 2014[3] and has been updated

[1] Issued on November 21, 2013 and corrected on December 4, 2013.

[2] Board Report, page 5.

[3] "Empirical work in Support of Incentive Rate Setting: 2013 Benchmarking Update".

each year since. This report presents updated benchmarking results that incorporates 2019 data to update the stretch factors.

Section 2 of this report discusses the methodology used for the 2019 update. Section 3 discusses the data used. Section 4 presents the benchmarking results and updated stretch factors. Section 5 discusses additional resources available to distributors to validate the results contained in this report.

2. Benchmarking Methodology

The model used to determine the cost efficiency of distributors is based on econometrics. Distributor cost in this model is estimated as a function of business conditions faced by each distributor. These business conditions include the number of customers served and the price of inputs such as labor and capital. The parameters of this model establish the relationship between each business condition and distributor cost. These parameters were estimated using Ontario LDC data from 2002-2012.

The model can make a prediction of each distributor's cost given its business conditions by multiplying the company's business condition variables by the model parameters and summing the results[4]. The distributor's actual cost is then compared to that predicted by the model. The percentage difference between actual and predicted cost is the measure of cost performance. Companies with larger negative differences between actual and predicted costs are considered to be better cost performers and therefore eligible for lower stretch factors. A

[4] The table of parameters published in the PEG report was for the full sample. When making predictions of cost for each company, the econometric program estimated the model without including the subject of benchmarking in the sample. Therefore, there exist 59 different sets of parameters which are very similar to each other. For ease of presentation, the PEG report did not present the parameters specific to each distributor. These company-specific parameters are necessary for the 2013 calculations and are contained within the working papers associated with this report.

detailed description of the econometric model including estimation technique and other technical details are contained in sections 6 and A2.1 of the PEG report.

The econometric model used to obtain the updated stretch factors is identical to the model described in the PEG report. The OEB intentionally decided not to update the parameters of the econometric model to include future data. The goal was to establish a fixed benchmark that would allow companies a fair opportunity to demonstrate continuous improvement of cost performance and earn a lower stretch factor. The parameters from the previous model were combined with each company's data – including 2013-2019 data - to produce 2019 predicted cost. The rationale for this decision is discussed in the Board Report and in a memorandum by PEG that also makes some corrections to the 2012 results.[5] The PEG memorandum contains the corrected final results of the 2010-2012 benchmarking model used in this update.

To apply the 2019 values to the model parameters, the data must be transformed to be consistent with how the data were specified for the estimated econometric model. One example of a transformation is that many of the explanatory variables were expressed as logarithms prior to the model being estimated. The PEG report describes the details of the estimation process in section A2.1. The spreadsheet model and associated documentation discussed in section 5 contain the calculations leading to the cost benchmarking results.

The purpose of the benchmarking work is to evaluate the total cost incurred by each distributor. Table 1 shows the formulas used to calculate the measure of total cost used in PEG's benchmarking analysis. As described in the PEG benchmarking report, adjustments were undertaken with the purpose of standardizing cost to facilitate more accurate cost comparisons among distributors. These adjustments included the treatment of high voltage and low voltage costs.

The variables used to explain total cost are the same as in the previous PEG report. They include outputs such as customers, kWh deliveries, and capacity. Prices for capital and OM&A along with other business conditions such as customer growth and average length of lines are also included. A complete discussion of the explanatory variables can be found in section 6 of the PEG report and the documents discussed in section 5. The explanatory variables are used to

[5] Available on the OEB website in the file "PEG_Memorandum_OEB on_corrections_20131220.pdf"

explain the level of cost incurred by each LDC. Cost that is not explained by the variables is deemed to be due to management performance.

3. Benchmarking Data

The source of the cost and output data used in the calculations is from the distributors as reported in the reporting and record-keeping requirements (RRR) filings. The study assumes that the data as reported by the distributors conforms to accounting policies and procedures described in the Accounting Procedures Handbook for Electricity Distributors that includes the Uniform System of Accounts and other instructions contained within the RRR filing system. It is also assumed that the LDCs have taken ownership of the data provided to the OEB and significant revisions are not anticipated.[6]

Data sources apart from the RRR are related to input prices. OEB-approved rates of return were obtained from OEB Staff. The source for other input price data was Statistics Canada. The input price indexes used were the same as those used in PEG's original study with one exception. Statistics Canada no longer calculates the Electric Utility Construction Price Index (EUCPI). The growth in the GDPIPI (FDD) was used to escalate the EUCPI values used the calculations.[7]

The update was done in the same manner as the original work with a few exceptions. The first is that the OEB has improved the quality of the guidance given to distributors related to capital additions data. As a result, improved data are available for 2013-2019. PEG has accordingly relied upon these newly-available capital additions data instead of inferring these

[6] The Ontario Energy Board (OEB) released the Report of the Board on Scorecard (EB-2010-0379) on March 5, 2014 (the "Scorecard Report") states that: '*While the Board will create consistent Scorecard reports for distributors, ownership of the data and Scorecard resides with the distributor.*'

[7] GDPIPI (FDD) is the Gross Domestic Product Implicit Price Index for Final Domestic Demand.

data from changes in gross plant[8]. The second exception is related to the treatment of deferred smart meter OM&A expenses. In the original PEG report, an adjustment was made for the estimated amount of amortization that was included in the reported OM&A expenses as a result of clearing amounts from account 1556. In 2014, OEB staff had advised that due to improved reporting requirements, this adjustment is no longer necessary.

The calculations have also been adjusted for amalgamations that have taken place since the original study was done. The historical cost performance of the combined entity was calculated from the historical results of the predecessor distributors that were amalgamated or acquired.[9] The most recent amalgamations are the integration of Guelph Hydro into Alectra, Thunder Bay and Kenora Hydro into Synergy North, Erie Thames and West Coast Huron into ERTH, and Veridian and Whitby Hydro into Elexicon. The net effect of these amalgamations reduces the number of distributors benchmarked to 59 from 63 in the previous benchmarking update.

This report also addresses the impact of data revisions by LDCs for informational purposes only. The OEB requires distributors to be accountable for the integrity of their reported data. As part of its procedures to improve data quality, the OEB invited distributors to submit corrections to previously provided data. However, a key determination is that already established and published benchmarking results for prior years would not be modified as a result of the new data. This includes any year that comprised the three-year average used to determine the current year's stretch factor. As stretch factors are used directly to set the distribution rates of distributors, they are not subsequently adjusted to avoid retroactive rate setting (i.e., rates are

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[8] This improvement in data quality also extends to the collection of smart meter capital additions. The previous study estimated capital additions for distribution capital exclusive of meters for the period 2006-2012 in order to be able to isolate the accounting treatment of smart meters. The capital expenditures on smart meters were gathered for each company via a supplemental data request. These capital expenditures were then used as a proxy for capital additions and added to the total. A survey of the composition of the reported gross capital additions has revealed that some distributors have included amounts cleared from account 1555. The capital additions data for these companies has been adjusted to remove the cleared smart meter capital additions to avoid double counting.

[9] The method used to calculation the hypothetical historical cost performance of the combined entity is to sum the actual costs, sum the costs predicted by the model, and calculate the percentage difference. This method is essentially a cost-weighted average of the historical cost performances of the amalgamated distributors.

final once set unless approved on an interim basis). Consequently, the three years of data used to derive the three-year average for any year's stretch factors are locked-in such that the underlying data used do not change due to any subsequent data revisions. [10]

However, to show the impacts of data changes on the stretch factors, revised data have been incorporated into the benchmarking databases and model to allow previous results to be recalculated. The revised 2018 and 2017 results are presented only for the purposes of showing the impact of the data changes but were not used as discussed above to calculate the new 2017-2019 average cost performance used to determine the 2020 stretch factors assignments.

Several tables are included at the end of this report. Table 1 describes the calculation of total cost. Table 2 shows each distributor's growth in total cost from 2018 to 2019. Table 3 (A) presents the 2019 benchmarking results and a comparison to prior years' results. Table 3 (B) summarizes data revision impacts on cost performance although they have no bearing on the derivation of the current stretch factors. Table 4 presents average cost performance and associated stretch factors. Table 5 presents the companies assigned to each cohort according to their updated stretch factors. Changes from the previous year's assignments are shown in bold.

The goal of the benchmarking work is to evaluate levels of distributor cost. Table 2 presents the actual OM&A, Capital, and Total cost for each distributor for 2018 and 2019. As can be seen, industry total cost increased by 3.09% on average from 2018-2019. Whereas OM&A cost grew on average by 1.53%, capital cost increased on average by 4.29%.

The econometric model estimates LDCs' costs as a function of distributor output, input price growth, and other business condition variables beyond management control. It will also produce a prediction of the level of cost consistent with these business conditions and thus "explain" some of the observed cost level. As described in the PEG benchmarking report, changes not accounted for by these factors are deemed to be due to management performance. The parameter estimates measure the cost impact of the different business conditions and are

[10] The previous results were "locked-in" by pasting the values of previous cost performance into the 2019 part of the calculations. This means that these values are will not be affected by subsequent data revisions. This allows for the calculation of a new three-year average of the new 2019 result consistent with the previously published 2017-2019 results while still allowing the calculation of revised results for previous years, if applicable, to show the impact of any data revision.

presented on Table 16 of the PEG benchmarking report. The discussion below provides some details about the parameters and their associated impacts established for the 2002 to 2012 period.

The first of the cost drivers is output quantity. The model uses three measures for the quantity of distributor output. The first is the number of customers served and the second is kWh delivered. The third is a proxy for the capacity of the distribution system. The capacity variable is described in the PEG report and is equal to the largest peak load experienced as of the current year of data. For example, the 2012 value for the capacity variable is equal to largest reported system summer or winter kW in all the years 2002-2012. Therefore, for 2013, this capacity variable only increased if the distributor's kW demand in that year exceeded kW demand in every year between 2002 and 2012. Of the three output variables, the model estimates that the number of customers has the largest impact on cost, followed by the system capacity variable. The kWh delivered was the least important of the output variables. For the average company, the number of customers was found to be a more important cost driver than the other two combined. For each 1% change in number of customers, cost was estimated to change by 0.44%.

The second group of cost drivers were the input prices for capital and OM&A. For the average company, the cost impact of changes in the capital price was found to be almost twice as important as that for OM&A. For every 1% change in capital price, the impact on total cost was about 0.63%. The corresponding impact for changes in the OM&A price was 0.37%. The relevant indexes were updated to include 2019 data. For the OM&A price, the growth in average weekly earnings and that for the GDP implicit price index for final domestic demand ("GDPIPI (FDD)") were calculated. The 2019 growth in the OM&A price index is calculated as 70% times average weekly earnings growth plus 30% times GDPIPI (FDD) growth. The 2018 values for the OM&A price index from the previous report were escalated by the growth that occurred in 2019.

The capital price calculation is based upon an asset price index, an economic depreciation rate, and a rate of return. The asset price index was the Electric Utility Construction Price Index as calculated by Statistics Canada. As this index is no longer available, the previous values are escalated by an alternate index. The index chosen was the GDPIPI (FDD) which is the same index used to represent all non-labour price inflation in the Board-approved inflation measure formula[11]. The depreciation rate is fixed at 4.59% consistent with the previous work. The rate of return is a weighted average of the rates for return on equity, long-term debt, and short-term debt as approved by the OEB. The capital price used to calculate total cost is also used as an explanatory variable. Therefore, any changes in the rate of return or asset price index that affect the cost calculation will also affect the price calculation which will in turn "explain" the observed changes in cost.

The last group of cost drivers consists of other business condition variables. The first was the percentage of customers added over the last ten years. The second was the average km of distribution line. For each 1% change in line length, total cost was estimated to increase by 0.29%. The model also contains a time trend that accounts for changes in cost over time that are not accounted for by the other cost drivers. This variable estimates that cost should rise by 1.7% per year for reasons not identified by other variables in the model. All of these business condition variables were updated to include 2019 data.

4. Benchmarking Results and Updated Stretch Factors

Table 3 (A) presents a summary of the current benchmarking results for each distributor from 2017-2019. The updated average cost performance is based on a three-year rolling average calculated from the 2017-2019 values and is used to assign updated stretch factors to distributors. The last column presents the difference between the updated average cost performance and the previous one (2016-2018).[12] The electricity distributor sector has shown consistent year-over-year cost performance improvements. The average level of cost performance in 2019 for the 59 distributors is 7.8% lower than forecast (or predicted) cost that builds upon cost performance improvement in previous years. Previous years also have shown lower levels of performance

[11] The weight given to the non-labour index in the inflation formula includes capital cost.

[12] Changes in average cost performance are due to not only the addition of 2019 results, but the removal of 2016 results. It is therefore possible to simultaneously have improved 2019 cost performance and deteriorating average performance.

improvements for the currently benchmarked distributors but not as good compared to 2019 (i.e., lower than forecast cost of 6.2% in 2018, 4.9% in 2017 and 3.4% in 2016).

As discussed above, the OEB requires distributors to be accountable for the integrity of their reported data and sets out reporting procedures to improve data quality. OEB Staff reviewed and approved distributors' data corrections requests to previously filed data when reasonable justification is provided. The revised data were incorporated into the benchmarking databases and the 2017 and 2018 results were recalculated to demonstrate the impact on the previously published 2016-2018 average cost performance. Table 3 (B) shows the impact of LDC data revisions on 2017 and 2018 cost performance for those companies that had approved changes since the previous update[13]. No revisions would have changed previously determined cohort placement.

Updated stretch factors are assigned based on a three-year average of actual less predicted cost over the 2017-2019 period. As discussed in the Board Report, distributors that averaged 25% or more below cost received the lowest stretch factor of 0%. Those that averaged in excess of 10% and up to 25% below cost received a stretch factor of 0.15%. Those within 10% of predicted cost received a stretch factor of 0.30%. Those distributors that had cost in excess of 10% and up to 25% of that predicted received a stretch factor of 0.45%. Any distributors that had cost in excess of 25% more than predicted were assigned the highest stretch factor of 0.60%.

Table 4 presents a summary of the current and previous years' cost performance results and corresponding stretch factors. The assigned stretch factor for most companies was not affected by the 2019 update. A total of seven companies have been assigned different stretch factors and all six of the seven now have lower stretch factors. Table 5 presents the updated stretch factor assignments in the format of Appendix D of the Board report.

5. Validation and Other Supporting Documents

As part of their reporting requirements, distributors are asked to validate the numbers contained in their scorecard. The Spreadsheet Model as updated produces the updated

[13] There were no accepted revisions to 2016 data since the previous update.

benchmarking results contained in this report. It builds on the previous version by adding additional worksheets related to the 2019 calculations.

The format of the additional worksheets used in the update are similar to those provided earlier and the User's Guide will be applicable to the new worksheets. The guide is intended to serve as a tool for distributors to better understand these calculations and their cost performance. The spreadsheet model and users guide are available in the Total cost benchmarking – updates section of Performance Assessment page on the OEB's website.

Table 1

Calculation of 2019 Total Cost

Variable		Reference	Formula	Source
Total Cost			= OM&A + Capital Cost	Formula
OM&A			= A+B+C+D+E+F+G-I+J	Formula
2019	Operation	A		RRR
2019	Maintenance	B		RRR
2019	Billing and Collection	C		RRR
2019	Community Relations	D		RRR
2019	Administrative and General Expenses	E		RRR
2019	Insurance Expense	F		RRR
2019	Advertising Expenses	G		RRR
Adjustments to OM&A				
2019	HV Adjustment	I		RRR
2019	LV Adjustment	J		Hydro One Networks
Capital				
2018	Asset Price Index	K		Previous Year Calculations
2018	Capital Price	L		Previous Year Calculations
2018	Capital Quantity	M		Previous Year Calculations
2018	Capital cost	N		Previous Year Calculations
2019	Asset Price Index	O	=K x (GDPPI-FDD 2016 / GDPPI-FDD 2015)	Formula, Statistics Canada
2019	Capital Additions	P		RRR
2019	HV Capital Additions	Q		RRR
2019	Quantity of Capital Additions	R	=(P-Q) / O	Formula
	Depreciation Rate	S	Fixed at 4.59% for All Years	PEG Report
2019	Capital Quantity	T	= M - S x M + R	Formula
2019	Rate of Return	U		OEB Staff
2019	Capital Price	V	=U x K + S x O	Formula
2019	Capital Cost	W	= V x T	Formula

Table 2

Total Cost by Distributor: 2018 vs. 2019

	OM&A Cost			Capital Cost			Total Cost		
	2018	2019	Percent Change	2018	2019	Percent Change	2018	2019	Percent Change
Alectra Utilities Corporation	243,197,452	257,552,392	5.73%	469,515,340	497,115,696	5.71%	712,712,792	754,668,089	5.72%
Algoma Power Inc.	11,930,620	11,990,934	0.50%	13,643,491	14,233,881	4.24%	25,574,112	26,224,815	2.51%
Atikokan Hydro Inc.	1,087,097	1,083,377	-0.34%	588,363	602,858	2.43%	1,675,460	1,686,235	0.64%
Bluewater Power Distribution Corporation	13,754,074	13,313,535	-3.26%	13,013,655	13,641,782	4.71%	26,767,729	26,955,317	0.70%
Brantford Power Inc.	9,964,565	10,071,915	1.07%	11,058,211	11,698,662	5.63%	21,022,776	21,770,577	3.50%
Burlington Hydro Inc.	18,025,935	19,043,936	5.49%	24,594,385	26,038,314	5.71%	42,620,320	45,082,250	5.62%
Canadian Niagara Power Inc.	10,228,808	10,005,216	-2.21%	15,124,610	16,301,129	7.49%	25,353,418	26,306,344	3.69%
Centre Wellington Hydro Ltd.	2,464,520	2,602,317	5.44%	2,521,655	2,628,436	4.15%	4,986,175	5,230,753	4.79%
Chapleau Public Utilities Corporation	744,872	819,048	9.49%	230,567	236,825	2.68%	975,438	1,055,873	7.92%
Cooperative Hydro Embrun Inc.	689,126	691,107	0.29%	510,711	516,778	1.18%	1,199,837	1,207,886	0.67%
Elexicon Energy Inc.	38,584,591	40,136,684	3.94%	64,138,025	68,419,347	6.46%	102,722,616	108,556,031	5.52%
E.L.K. Energy Inc.	2,605,463	2,787,808	6.76%	2,383,382	2,428,307	1.87%	4,988,845	5,216,115	4.45%
Energy+ Inc.	17,677,971	18,361,849	3.80%	25,642,530	26,671,125	3.93%	43,320,501	45,032,974	3.88%
Entegrus Powerlines Inc.	13,576,025	13,298,368	-2.07%	19,719,965	20,560,306	4.17%	33,295,990	33,858,674	1.68%
EnWin Utilities Ltd.	25,555,586	24,432,745	-4.49%	38,208,169	39,064,214	2.22%	63,763,755	63,496,959	-0.42%
EPCOR Electricity Distribution Ontario Inc.	4,816,102	6,529,883	30.44%	4,507,376	4,953,086	9.43%	9,323,478	11,482,969	20.83%
ERTH Power Corporation	7,895,692	7,261,722	-8.37%	8,351,982	8,903,938	6.40%	16,247,674	16,165,660	-0.51%
Espanola Regional Hydro Distribution Corporation	1,482,629	1,709,667	14.25%	773,750	798,526	3.15%	2,256,379	2,508,193	10.58%
Essex Powerlines Corporation	7,545,389	7,356,413	-2.54%	9,802,132	10,269,224	4.66%	17,347,521	17,625,637	1.59%
Festival Hydro Inc.	6,168,269	5,855,853	-5.20%	7,900,687	8,034,350	1.68%	14,068,956	13,890,203	-1.28%
Fort Frances Power Corporation	1,619,179	1,629,256	0.62%	910,944	931,036	2.18%	2,530,123	2,560,292	1.19%
Greater Sudbury Hydro Inc.	14,687,809	14,566,546	-0.83%	17,287,490	17,850,661	3.21%	31,975,298	32,417,207	1.37%
Grimsby Power Incorporated	3,128,103	3,151,551	0.75%	3,619,182	3,758,286	3.77%	6,747,285	6,909,837	2.38%
Halton Hills Hydro Inc.	6,069,683	6,215,697	2.38%	11,751,841	12,189,535	3.66%	17,821,525	18,405,232	3.22%
Hearst Power Distribution Company Limited	1,135,359	1,086,335	-4.41%	360,263	368,522	2.27%	1,495,622	1,454,857	-2.76%
Hydro 2000 Inc.	546,524	506,164	-7.67%	140,259	152,566	8.41%	686,783	658,731	-4.17%
Hydro Hawkesbury Inc.	1,120,620	991,638	-12.23%	614,206	613,884	-0.05%	1,734,826	1,605,522	-7.75%
Hydro One Networks Inc.	535,524,472	538,618,195	0.58%	827,969,995	874,005,188	5.41%	1,363,494,467	1,412,623,382	3.54%
Hydro Ottawa Limited	81,806,255	78,332,371	-4.34%	153,288,862	170,827,554	10.83%	235,095,117	249,159,924	5.81%
Innpower Corporation	5,758,129	5,765,661	0.13%	9,387,602	10,012,926	6.45%	15,145,732	15,778,587	4.09%
Kingston Hydro Corporation	7,381,155	6,960,489	-5.87%	8,730,212	8,971,880	2.73%	16,111,367	15,932,369	-1.12%
Kitchener-Wilmot Hydro Inc.	17,517,341	17,521,849	0.03%	32,715,645	33,707,186	2.99%	50,232,987	51,229,035	1.96%
Lakefront Utilities Inc.	2,607,882	2,618,296	0.40%	2,590,014	2,660,380	2.68%	5,197,896	5,278,677	1.54%
Lakeland Power Distribution Ltd.	5,311,137	4,991,820	-6.20%	4,836,119	5,058,682	4.50%	10,147,256	10,050,502	-0.96%
London Hydro Inc.	37,400,594	37,864,464	1.23%	50,450,167	53,390,903	5.67%	87,850,760	91,255,367	3.80%
Milton Hydro Distribution Inc.	9,389,991	9,936,414	5.66%	17,637,631	18,354,678	3.98%	27,027,622	28,291,092	4.57%
Newmarket-Tay Power Distribution Ltd.	11,281,977	12,351,094	9.05%	17,318,142	17,444,218	0.73%	28,600,118	29,795,312	4.09%
Niagara Peninsula Energy Inc.	17,326,922	18,348,752	5.73%	24,661,333	25,695,030	4.11%	41,988,255	44,043,783	4.78%
Niagara-on-the-Lake Hydro Inc.	2,850,813	2,774,720	-2.71%	4,349,050	4,466,080	2.66%	7,199,863	7,240,800	0.57%
North Bay Hydro Distribution Limited	6,070,898	6,567,534	7.86%	10,723,875	11,154,005	3.93%	16,794,774	17,721,539	5.37%
Northern Ontario Wires Inc.	2,651,283	2,790,464	5.12%	1,450,162	1,483,588	2.28%	4,101,445	4,274,052	4.12%
Oakville Hydro Electricity Distribution Inc.	17,915,297	17,906,962	-0.05%	33,898,412	35,941,071	5.85%	51,813,709	53,848,033	3.85%
Orangeville Hydro Limited	3,204,308	3,419,294	6.49%	3,729,338	3,763,494	0.91%	6,933,646	7,182,788	3.53%
Orillia Power Distribution Corporation	4,916,240	4,906,135	-0.21%	4,474,802	4,807,450	7.17%	9,391,042	9,713,585	3.38%
Oshawa PUC Networks Inc.	13,100,434	12,607,249	-3.84%	20,306,089	22,784,128	11.51%	33,406,523	35,391,377	5.77%

Table 2

Total Cost by Distributor: 2018 vs. 2019

	OM&A Cost			Capital Cost			Total Cost		
	2018	2019	Percent Change	2018	2019	Percent Change	2018	2019	Percent Change
Ottawa River Power Corporation	2,855,216	3,337,203	15.60%	2,585,948	2,666,141	3.05%	5,441,164	6,003,344	9.83%
Peterborough Distribution Incorporated	8,748,446	8,467,413	-3.27%	13,244,855	13,382,600	1.03%	21,993,301	21,850,013	-0.65%
PUC Distribution Inc.	10,701,655	10,740,394	0.36%	12,488,359	12,709,727	1.76%	23,190,013	23,450,122	1.12%
Renfrew Hydro Inc.	1,440,446	1,355,865	-6.05%	1,226,241	1,269,531	3.47%	2,666,687	2,625,396	-1.56%
Rideau St. Lawrence Distribution Inc.	2,184,478	2,242,574	2.62%	1,181,665	1,206,954	2.12%	3,366,143	3,449,528	2.45%
Sioux Lookout Hydro Inc.	1,454,263	1,546,224	6.13%	919,053	929,922	1.18%	2,373,316	2,476,146	4.24%
Synergy North Corporation	17,752,308	16,857,004	-5.17%	20,539,891	21,435,307	4.27%	38,292,198	38,292,311	0.00%
Tillsonburg Hydro Inc.	2,854,683	2,767,763	-3.09%	2,261,637	2,565,809	12.62%	5,116,320	5,333,572	4.16%
Toronto Hydro-Electric System Limited	249,021,330	253,196,236	1.66%	618,658,249	652,375,141	5.31%	867,679,579	905,571,377	4.27%
Wasaga Distribution Inc.	3,166,523	3,432,078	8.05%	2,833,751	3,120,995	9.66%	6,000,274	6,553,073	8.81%
Waterloo North Hydro Inc.	13,837,414	13,878,886	0.30%	33,242,872	34,310,088	3.16%	47,080,286	48,188,974	2.33%
Welland Hydro-Electric System Corp.	6,608,044	6,757,918	2.24%	5,106,103	5,352,055	4.70%	11,714,147	12,109,973	3.32%
Wellington North Power Inc.	1,702,863	1,806,902	5.93%	1,408,362	1,436,725	1.99%	3,111,224	3,243,627	4.17%
Westario Power Inc.	5,431,298	5,927,808	8.75%	8,111,767	8,361,826	3.04%	13,543,065	14,289,635	5.37%
Average			1.53%			4.29%			3.09%
Median			0.50%			3.93%			3.50%

Note: The 2018 values for Alectra, ERTH, Synergy, Elexicon have been adjusted for the cost impact of their amalgamations.

Table 3 (A)

Summary of Cost Performance Results

	Cost Efficiency Assessment							
	2015	2016	2017	2018	2019	2016-2018	2017-2019	Difference from 2016-2018
Alectra Utilities Corporation	0.0%	-0.1%	4.1%	-0.8%	0.1%	1.1%	1.2%	0.1%
Algoma Power Inc.	70.6%	69.8%	68.9%	66.1%	64.3%	68.2%	66.4%	-1.8%
Atikokan Hydro Inc.	9.7%	11.9%	12.6%	9.6%	6.6%	11.3%	9.6%	-1.8%
Bluewater Power Distribution Corporation	0.8%	2.1%	4.0%	3.7%	0.3%	3.2%	2.7%	-0.6%
Brantford Power Inc.	-6.1%	-4.4%	-8.2%	-9.4%	-10.2%	-7.3%	-9.3%	-2.0%
Burlington Hydro Inc.	-10.3%	-11.1%	-11.9%	-13.9%	-11.7%	-12.3%	-12.5%	-0.2%
Canadian Niagara Power Inc.	13.0%	13.5%	11.2%	17.1%	15.6%	13.9%	14.6%	0.7%
Centre Wellington Hydro Ltd.	-1.2%	0.4%	1.0%	-0.3%	-1.1%	0.4%	-0.1%	-0.5%
Chapleau Public Utilities Corporation	23.9%	21.0%	17.0%	24.2%	25.4%	20.7%	22.2%	1.5%
Cooperative Hydro Embrun Inc.	-33.2%	-38.2%	-41.1%	-44.8%	-51.3%	-41.4%	-45.7%	-4.4%
E.L.K. Energy Inc.	-34.7%	-39.4%	-44.5%	-47.8%	-47.4%	-43.9%	-46.6%	-2.7%
Elexicon Energy Inc.	-2.7%	-1.7%	-2.8%	-5.5%	-1.0%	-3.3%	-3.1%	0.2%
Energy+ Inc.	-5.3%	-9.9%	-11.1%	-13.1%	-14.1%	-11.4%	-12.8%	-1.4%
Entegrus Powerlines Inc.	-15.4%	-13.5%	-16.8%	-16.0%	-21.0%	-15.4%	-17.9%	-2.5%
ENWIN Utilities Ltd.	9.9%	9.6%	5.3%	-2.7%	-10.1%	4.1%	-2.5%	-6.6%
EPCOR Electricity Distribution Ontario Inc.	-14.2%	-13.2%	-18.4%	-19.3%	-3.9%	-17.0%	-13.9%	3.1%
ERTH Power Corporation	11.9%	11.9%	11.2%	6.6%	1.3%	9.9%	6.4%	-3.5%
Espanola Regional Hydro Distribution Corporation	-20.4%	-20.9%	-23.1%	-24.8%	-17.2%	-22.9%	-21.7%	1.2%
Essex Powerlines Corporation	-13.5%	-14.3%	-14.1%	-12.3%	-19.2%	-13.6%	-15.2%	-1.6%
Festival Hydro Inc.	14.0%	13.4%	8.8%	10.8%	5.9%	11.0%	8.5%	-2.5%
Fort Frances Power Corporation	5.1%	6.8%	2.4%	-0.8%	-5.1%	2.8%	-1.2%	-4.0%
Greater Sudbury Hydro Inc.	8.0%	9.6%	7.1%	7.6%	5.1%	8.1%	6.6%	-1.5%
Grimsby Power Incorporated	-17.0%	-13.0%	-24.9%	-27.6%	-31.8%	-21.8%	-28.1%	-6.3%
Halton Hills Hydro Inc.	-28.2%	-27.5%	-28.4%	-29.2%	-30.3%	-28.4%	-29.3%	-0.9%
Hearst Power Distribution Company Limited	-7.4%	-21.3%	-20.1%	-21.3%	-28.7%	-20.9%	-23.4%	-2.5%
Hydro 2000 Inc.	-6.2%	-19.6%	-23.0%	-15.4%	-22.4%	-19.4%	-20.3%	-0.9%

Table 3 (A)

Summary of Cost Performance Results

	Cost Efficiency Assessment							
	2015	2016	2017	2018	2019	2016-2018	2017-2019	Difference from 2016-2018
Hydro Hawkesbury Inc.	-68.1%	-66.4%	-56.3%	-57.7%	-69.3%	-60.1%	-61.1%	-1.0%
Hydro One Networks Inc.	19.7%	15.6%	17.0%	16.0%	16.3%	16.2%	16.4%	0.3%
Hydro Ottawa Limited	15.2%	15.7%	16.5%	18.2%	20.4%	16.8%	18.4%	1.6%
Innpower Corporation	8.5%	9.1%	4.7%	-2.2%	-5.3%	3.8%	-0.9%	-4.8%
Kingston Hydro Corporation	-3.1%	-2.9%	-1.4%	1.3%	-3.8%	-1.0%	-1.3%	-0.3%
Kitchener-Wilmot Hydro Inc.	-22.3%	-20.4%	-19.9%	-19.2%	-21.1%	-19.8%	-20.1%	-0.3%
Lakefront Utilities Inc.	-22.1%	-18.8%	-23.5%	-21.0%	-24.4%	-21.1%	-23.0%	-1.9%
Lakeland Power Distribution Ltd.	-7.6%	-11.6%	-16.1%	-9.2%	-14.2%	-12.3%	-13.2%	-0.8%
London Hydro Inc.	-9.9%	-8.0%	-7.1%	-5.9%	-5.8%	-7.0%	-6.2%	0.8%
Milton Hydro Distribution Inc.	2.7%	-0.6%	-14.4%	-17.4%	-18.7%	-10.8%	-16.8%	-6.1%
Newmarket-Tay Power Distribution Ltd.	-13.7%	-11.9%	-8.6%	-10.0%	-9.8%	-10.2%	-9.5%	0.7%
Niagara Peninsula Energy Inc.	4.5%	3.5%	4.9%	1.3%	1.1%	3.2%	2.4%	-0.8%
Niagara-on-the-Lake Hydro Inc.	-6.6%	-6.4%	-9.2%	-5.2%	-9.5%	-6.9%	-8.0%	-1.0%
North Bay Hydro Distribution Limited	7.0%	3.2%	5.5%	3.3%	4.9%	4.0%	4.6%	0.6%
Northern Ontario Wires Inc.	-42.2%	-38.5%	-36.0%	-37.3%	-38.2%	-37.3%	-37.2%	0.1%
Oakville Hydro Electricity Distribution Inc.	6.9%	4.5%	2.6%	1.0%	0.3%	2.7%	1.3%	-1.4%
Orangeville Hydro Limited	-7.6%	-10.2%	-14.3%	-20.0%	-20.7%	-14.8%	-18.3%	-3.5%
Orillia Power Distribution Corporation	-8.0%	-2.5%	-3.8%	-5.7%	-7.4%	-4.0%	-5.6%	-1.6%
Oshawa PUC Networks Inc.	-14.9%	-15.4%	-16.3%	-14.4%	-12.0%	-15.4%	-14.2%	1.1%
Ottawa River Power Corporation	-9.3%	-9.8%	-10.4%	-21.9%	-18.9%	-14.0%	-17.0%	-3.0%
Peterborough Distribution Incorporated	11.0%	12.6%	8.2%	5.8%	1.5%	8.9%	5.2%	-3.7%
PUC Distribution Inc.	16.2%	14.0%	11.2%	8.2%	5.5%	11.1%	8.3%	-2.8%
Renfrew Hydro Inc.	10.6%	10.6%	7.7%	7.2%	1.1%	8.5%	5.3%	-3.1%
Rideau St. Lawrence Distribution Inc.	-4.8%	-8.1%	-4.1%	-9.4%	-11.2%	-7.2%	-8.3%	-1.0%
Sioux Lookout Hydro Inc.	-4.3%	-3.4%	-7.9%	-16.9%	-19.0%	-9.4%	-14.6%	-5.2%
Synergy North Corporation	7.3%	9.8%	9.1%	7.4%	6.2%	8.8%	7.6%	-1.2%

Table 3 (A)

Summary of Cost Performance Results

	Cost Efficiency Assessment							
	2015	2016	2017	2018	2019	2016-2018	2017-2019	Difference from 2016-2018
Tillsonburg Hydro Inc.	-0.5%	1.6%	-1.2%	3.2%	3.7%	1.2%	1.9%	0.7%
Toronto Hydro-Electric System Limited	51.5%	52.3%	52.9%	53.0%	52.8%	52.7%	52.9%	0.2%
Wasaga Distribution Inc.	-45.6%	-44.9%	-45.7%	-46.7%	-42.9%	-45.8%	-45.1%	0.7%
Waterloo North Hydro Inc.	8.2%	9.9%	9.5%	9.7%	8.1%	9.7%	9.1%	-0.6%
Welland Hydro-Electric System Corp.	-18.7%	-17.4%	-19.6%	-24.0%	-25.4%	-20.3%	-23.0%	-2.7%
Wellington North Power Inc.	11.8%	16.2%	12.7%	8.7%	6.7%	12.5%	9.4%	-3.1%
Westario Power Inc.	-6.0%	-2.7%	-1.5%	-8.5%	-7.7%	-4.2%	-5.9%	-1.7%
Average	-3.1%	-3.4%	-4.9%	-6.2%	-7.8%	-4.8%	-6.3%	-1.5%
Median	-4.3%	-2.7%	-3.8%	-5.7%	-7.4%	-4.2%	-5.9%	-1.2%
Max	70.6%	69.8%	68.9%	66.1%	64.3%	68.2%	66.4%	3.1%
Min	-68.1%	-66.4%	-56.3%	-57.7%	-69.3%	-60.1%	-61.1%	-6.6%

Table 3 (B)

Summary of the Impact of Revised Data on Cost Performance Results

LDCs with approved 2017 and/or 2018 data revisions for the 2019 data update	2017 Cost Performance			2018 Cost Performance			2016-2018 Average Cost Performance*		
	As Previously Calculated	As Revised	Difference	As Previously Calculated	As Revised	Difference	As Previously Calculated	As Revised	Difference
Bluewater Power Distribution Corporation	4.0%	4.0%	0.00%	3.7%	3.7%	0.00%	3.2%	3.2%	0.000%
Burlington Hydro Inc.	-11.9%	-10.9%	-1.00%	-13.9%	-12.9%	-1.02%	-12.3%	-11.6%	0.671%
E.L.K. Energy Inc.	-44.5%	-44.5%	0.00%	-47.8%	-47.6%	-0.19%	-43.9%	-43.8%	0.063%
Energy+ Inc.	-11.1%	-11.1%	0.00%	-13.1%	-13.5%	0.35%	-11.4%	-11.5%	-0.116%
Essex Powerlines Corporation	-14.1%	-14.1%	0.00%	-12.3%	-12.3%	0.00%	-13.6%	-13.6%	0.000%
Hydro One Networks Inc.	17.0%	17.0%	0.00%	16.0%	16.0%	-0.01%	16.2%	16.2%	0.004%
Northern Ontario Wires Inc.	-36.0%	-36.0%	0.00%	-37.3%	-37.6%	0.23%	-37.3%	-37.4%	-0.078%
Waterloo North Hydro Inc.	9.5%	9.5%	0.05%	9.7%	9.6%	0.12%	9.7%	9.6%	-0.055%

* There were no new revisions to 2016 data. Essex had approved revisions to data that are collected but not used in the current analysis. Bluewater had revisions to O&M data that reallocated expenses among accounts that did not affect the total OM&A cost used in the analysis. The impact of revisions are not cumulative with revisions from previous updates.

Table 4

Summary of Stretch Factor Assignments

	2016-2018		2017-2019		Change in Stretch Factor
	Benchmarking Performance	Stretch Factor	Benchmarking Performance	Stretch Factor	
Alectra Utilities Corporation	1.1%	0.30	1.2%	0.30	NO
Algoma Power Inc.	68.2%	0.60	66.4%	0.60	NO
Atikokan Hydro Inc.	**11.3%**	**0.45**	**9.6%**	**0.30**	**YES**
Bluewater Power Distribution Corporation	3.2%	0.30	2.7%	0.30	NO
Brantford Power Inc.	-7.3%	0.30	-9.3%	0.30	NO
Burlington Hydro Inc.	-12.3%	0.15	-12.5%	0.15	NO
Canadian Niagara Power Inc.	13.9%	0.45	14.6%	0.45	NO
Centre Wellington Hydro Ltd.	0.4%	0.30	-0.1%	0.30	NO
Chapleau Public Utilities Corporation	20.7%	0.45	22.2%	0.45	NO
Cooperative Hydro Embrun Inc.	-41.4%	0.00	-45.7%	0.00	NO
E.L.K. Energy Inc.	-43.9%	0.00	-46.6%	0.00	NO
Elexicon Energy Inc.	-3.3%	0.30	-3.1%	0.30	NO
Energy+ Inc.	-11.4%	0.15	-12.8%	0.15	NO
Entegrus Powerlines Inc.	-15.4%	0.15	-17.9%	0.15	NO
ENWIN Utilities Ltd.	4.1%	0.30	-2.5%	0.30	NO
EPCOR Electricity Distribution Ontario Inc.	-17.0%	0.15	-13.9%	0.15	NO
ERTH Power Corporation	9.9%	0.30	6.4%	0.30	NO
Espanola Regional Hydro Distribution Corporation	-22.9%	0.15	-21.7%	0.15	NO
Essex Powerlines Corporation	-13.6%	0.15	-15.2%	0.15	NO
Festival Hydro Inc.	**11.0%**	**0.45**	**8.5%**	**0.30**	**YES**
Fort Frances Power Corporation	2.8%	0.30	-1.2%	0.30	NO
Greater Sudbury Hydro Inc.	8.1%	0.30	6.6%	0.30	NO
Grimsby Power Incorporated	**-21.8%**	**0.15**	**-28.1%**	**0.00**	**YES**
Halton Hills Hydro Inc.	-28.4%	0.00	-29.3%	0.00	NO

Table 4

Summary of Stretch Factor Assignments

	2016-2018		2017-2019		Change in Stretch Factor
	Benchmarking Performance	Stretch Factor	Benchmarking Performance	Stretch Factor	
Hearst Power Distribution Company Limited	-20.9%	0.15	-23.4%	0.15	NO
Hydro 2000 Inc.	-19.4%	0.15	-20.3%	0.15	NO
Hydro Hawkesbury Inc.	-60.1%	0.00	-61.1%	0.00	NO
Hydro One Networks Inc.	16.2%	0.45	16.4%	0.45	NO
Hydro Ottawa Limited	16.8%	0.45	18.4%	0.45	NO
Innpower Corporation	3.8%	0.30	-0.9%	0.30	NO
Kingston Hydro Corporation	-1.0%	0.30	-1.3%	0.30	NO
Kitchener-Wilmot Hydro Inc.	-19.8%	0.15	-20.1%	0.15	NO
Lakefront Utilities Inc.	-21.1%	0.15	-23.0%	0.15	NO
Lakeland Power Distribution Ltd.	-12.3%	0.15	-13.2%	0.15	NO
London Hydro Inc.	-7.0%	0.30	-6.2%	0.30	NO
Milton Hydro Distribution Inc.	-10.8%	0.15	-16.8%	0.15	NO
Newmarket-Tay Power Distribution Ltd.	**-10.2%**	**0.15**	**-9.5%**	**0.30**	**YES**
Niagara Peninsula Energy Inc.	3.2%	0.30	2.4%	0.30	NO
Niagara-on-the-Lake Hydro Inc.	-6.9%	0.30	-8.0%	0.30	NO
North Bay Hydro Distribution Limited	4.0%	0.30	4.6%	0.30	NO
Northern Ontario Wires Inc.	-37.3%	0.00	-37.2%	0.00	NO
Oakville Hydro Electricity Distribution Inc.	2.7%	0.30	1.3%	0.30	NO
Orangeville Hydro Limited	-14.8%	0.15	-18.3%	0.15	NO
Orillia Power Distribution Corporation	-4.0%	0.30	-5.6%	0.30	NO
Oshawa PUC Networks Inc.	-15.4%	0.15	-14.2%	0.15	NO
Ottawa River Power Corporation	-14.0%	0.15	-17.0%	0.15	NO
Peterborough Distribution Incorporated	8.9%	0.30	5.2%	0.30	NO
PUC Distribution Inc.	**11.1%**	**0.45**	**8.3%**	**0.30**	**YES**

Table 4

Summary of Stretch Factor Assignments

	2016-2018		2017-2019		Change in Stretch Factor
	Benchmarking Performance	Stretch Factor	Benchmarking Performance	Stretch Factor	
Renfrew Hydro Inc.	8.5%	0.30	5.3%	0.30	NO
Rideau St. Lawrence Distribution Inc.	-7.2%	0.30	-8.3%	0.30	NO
Sioux Lookout Hydro Inc.	**-9.4%**	**0.30**	**-14.6%**	**0.15**	**YES**
Synergy North Corporation	8.8%	0.30	7.6%	0.30	NO
Tillsonburg Hydro Inc.	1.2%	0.30	1.9%	0.30	NO
Toronto Hydro-Electric System Limited	52.7%	0.60	52.9%	0.60	NO
Wasaga Distribution Inc.	-45.8%	0.00	-45.1%	0.00	NO
Waterloo North Hydro Inc.	9.7%	0.30	9.1%	0.30	NO
Welland Hydro-Electric System Corp.	-20.3%	0.15	-23.0%	0.15	NO
Wellington North Power Inc.	**12.5%**	**0.45**	**9.4%**	**0.30**	**YES**
Westario Power Inc.	-4.2%	0.30	-5.9%	0.30	NO

Table 5

Stretch Factor Assignments by Group

Group I (7 Distributors)	Group II (17 Distributors)		Group III (29 Distributors)		Group IV (4 Distributors)	Group V (2 Distributors)
Stretch Factor = 0%	Stretch Factor = 0.15%		Stretch Factor = 0.30%		Stretch Factor = 0.45%	Stretch Factor = 0.60%
Cooperative Hydro Embrun Inc.	Burlington Hydro Inc.	Lakefront Utilities Inc.	Alectra Utilities Corporation	Newmarket-Tay Power Distribution Ltd.	Canadian Niagara Power Inc.	Algoma Power Inc.
E.L.K. Energy Inc.	Energy+ Inc.	Lakeland Power Distribution Ltd.	Atikokan Hydro Inc.	Niagara Peninsula Energy Inc.	Chapleau Public Utilities Corporation	Toronto Hydro-Electric System Limited
Grimsby Power Incorporated	Entegrus Powerlines Inc.	Milton Hydro Distribution Inc.	Bluewater Power Distribution Corporation	Niagara-on-the-Lake Hydro Inc.	Hydro One Networks Inc.	
Halton Hills Hydro Inc.	EPCOR Electricity Distribution Ontario Inc.	Orangeville Hydro Limited	Brantford Power Inc.	North Bay Hydro Distribution Limited	Hydro Ottawa Limited	
Hydro Hawkesbury Inc.	Espanola Regional Hydro Distribution Corporation	Oshawa PUC Networks Inc.	Centre Wellington Hydro Ltd.	Oakville Hydro Electricity Distribution Inc.		
Northern Ontario Wires Inc.	Essex Powerlines Corporation	Ottawa River Power Corporation	EnWin Utilities Ltd.	Orillia Power Distribution Corporation		
Wasaga Distribution Inc.	Hearst Power Distribution Company Limited	Sioux Lookout Hydro Inc.	Elexicon Energy Inc.	Peterborough Distribution Incorporated		
	Hydro 2000 Inc.	Welland Hydro-Electric System Corp.	ERTH Power Corporation	PUC Distribution Inc.		
	Kitchener-Wilmot Hydro Inc.		Festival Hydro Inc.	Renfrew Hydro Inc.		
			Fort Frances Power Corporation	Rideau St. Lawrence Distribution Inc.		
			Greater Sudbury Hydro Inc.	Synergy North Corporation		
			Innpower Corporation	Tillsonburg Hydro Inc.		
			Kingston Hydro Corporation	Waterloo North Hydro Inc.		
			London Hydro Inc.	Wellington North Power Inc.		
				Westario Power Inc.		