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Report for

Ontario Energy Board

Third Generation Incentive Regulation Stretch Factor Updates for 2013

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PSE

Table of Contents

Tables

Figures

Executive Summary

In November 2009, the Ontario Energy Board ("OEB") selected Power System Engineering, Inc. ("PSE") to provide cost performance evaluations of power distributors in the province of Ontario. PSE used statistical benchmarking methods to evaluate and compare the spending efficiency levels of these power distributors in three areas: distribution operations, distribution maintenance, and distribution administration. These three areas are collectively known as "distribution OM&A." The total spending level in these three areas is measured by evaluating data supplied to the OEB by each power distributor.

PSE provided the 2010 rate year benchmarking results in the report "Third Generation Incentive Regulation Stretch Factor Updates for 2010," dated February 17, 2010. PSE provided 2011 benchmarking results in the report "Third Generation Incentive Regulation Stretch Factor Updates for 2011," dated March 7, 2011.[1] PSE provided 2012 rate year benchmarking results in the report "Third Generation Incentive Regulation Stretch Factor Updates for 2012," dated December 1, 2011.[2]

The present report (the "2013 Report," or the "Report") provides a benchmarking update for the 2013 rate year. The 2013 Report presents the results of PSE's most recent Ontario benchmarking study, which identifies the 2013 rate year efficiency cohort groupings. The Report also describes the methodology used to identify the cohorts. These efficiency cohort groupings are used in the calibration of the Third Generation Incentive Regulation stretch factors for Ontario's power distribution industry.

The 2013 updated study results are the product of incorporating new 2011 data and industry amalgamations into a pre-established benchmarking paradigm. The methodologies employed in the 2013 benchmarking study, described in Section 2 of this Report, are exactly the same as those employed in the previous updates, and are founded on methods developed in preceding consultations on the topic.[3] Similarly, the method of determining efficiency cohort groupings is the same method that was used in the previous reports. This method is described in the July 14, 2008 Report of the Board on Third Generation Incentive Regulation for Ontario's Electricity Distributors, pp. 21-23.[4] It is also summarized in Section 3 of this Report.

Based on the benchmarking results, PSE divides the Ontario local distribution companies ("Distributors") into three efficiency cohorts. These cohorts are based on two separate benchmarking analyses that are performed on the distribution OM&A data for the Distributors—an econometric benchmarking study and a cost index benchmarking study. For each benchmarking study, the Distributors are grouped into top performers, bottom performers, and middle performers.

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[1] http://www.oeb.gov.on.ca/OEB/_Documents/EB-2009-0392/Report_2010_Stretch_Factor_Updates.pdf
and http://www.ontarioenergyboard.ca/OEB/_Documents/Documents/Report_2011_Stretch_Factor_Updates.pdf

[2] http://www.ontarioenergyboard.ca/OEB/_Documents/Documents/Report_2012_Stretch_Factor_Updates.pdf

[3] http://www.oeb.gov.on.ca/documents/cases/EB-2006-0268/PEG_Final_Benchmarking_Report_20080320.pdf

[4] http://www.oeb.gov.on.ca/OEB/_Documents/EB-2007-0673/Report_of_the_Board_3rd_Generation_20080715.pdf

The 2013 efficiency cohorts are summarized below. There are ten members in Cohort 1, fifty-four members in Cohort 2, and eleven members in Cohort 3. Table 8, found in Section 3, displays the full list of companies with their corresponding cohort grouping. The methods by which the cohorts are determined are described briefly below Figure 1, and in more detail in Sections 1 and 2 of this Report.

Figure 1: Cohort Members

Cohort 1

- Entegrus Powerlines Inc. (Chatham-Kent Hydro Inc.)*
- Festival Hydro Inc.
- Grimsby Power Incorporated
- Hydro Hawkesbury Inc.
- Hydro One Brampton Networks Inc.
- Kitchener-Wilmot Hydro Inc.
- Entegrus Powerlines Inc. (Middlesex Power Distribution Corporation)*
- North Bay Hydro Distribution Limited
- Northern Ontario Wires Inc.
- Renfrew Hydro Inc.

Cohort 2

- All Distributors not in Cohorts 1 or 3

Cohort 3

- Algoma Power Inc.
- Brant County Power Inc.
- Centre Wellington Hydro Ltd.
- COLLUS Power Corp.
- Erie Thames Powerlines Corporation
- Orillia Power Distribution Corporation
- Port Colborne (CNP)
- Tillsonburg Hydro Inc.
- Toronto Hydro-Electric System Limited
- Wellington North Power Inc.
- West Coast Huron Energy Inc.

* The Board issued an amended licence to Entegrus Powerlines Inc. on February 24, 2012. The amalgamation of Chatham-Kent Hydro Inc. and Middlesex Power Distribution Corporation was completed in January 2012. Separate 2013 rate applications have been filed for each rate zone or service area.

The overall cohort into which a particular Distributor falls is based on the results of the two benchmarking studies for that Distributor. The first cohort comprises Distributors that have been identified as top performers by **both** benchmarking methods. Distributors in the third cohort group have been designated as bottom performers by **both** methods. All other Distributors are placed in the middle cohort.[5]

The remainder of this report provides a narrative of the two benchmarking methodologies and displays the research results. Following the Introduction, Section 2 offers a summary of the two benchmarking approaches used in designating efficiency cohort groupings. Section 2 also reveals the results for each benchmarking technique. Section 3 uses the results from the two benchmarking approaches to sort the Distributors into three efficiency cohort groupings.

[5] Hydro One Networks Inc. is automatically placed in Cohort 2 due to the unavailability of a proper peer group for the company.

1 Introduction

This report presents the methodologies and results of a benchmarking study that identifies the 2013 rate year efficiency cohort groupings for Ontario's power distribution industry. This study will be used to determine the Third Generation Incentive Regulation stretch factors for the 2013 rate year. The study results divide the Ontario industry into three efficiency cohorts, which are based on the results of two distinct benchmarking methods (econometric and unit cost index).

As a result of this study, each Ontario local Distributor will be assigned a productivity stretch factor for the 2013 rate year commensurate with their efficiency cohort group. The assigned stretch factor will be the same for all firms in a given cohort but will differ between cohorts. Those Distributors designated in Cohort 1, Cohort 2, and Cohort 3 will be assigned a stretch factor of 0.2%, 0.4%, 0.6%, respectively. A full list of cohort groupings can be found in Section 3, Table 8 of this report.

1.1 Stretch Factor Incentive Regulation

Under incentive regulation, the allowed rate of change in the price of electricity distribution rates is generally restricted by the growth in an inflation factor, minus (1) a productivity offset, and (2) a stretch factor. A lower stretch factor therefore allows a utility to raise its rates at an amount closer to the rate of inflation. Top performers are rewarded with a lower stretch factor (relative to middle and bottom performers).

The OEB incentive regulation stretch factor calculation process is similar to the benchmarking improvement progression PSE employs with its utility benchmarking clients. Data inputs are gathered from the Distributors operating in Ontario, statistical benchmarking models and peer groups are created, and a report is generated from the results, leading to the designation of stretch factors reflective of the Distributors' performances.

It is important to note that Distributors are not locked into a particular cohort designation for the life of the Third Generation Incentive Regulation plan. They have an opportunity to improve cost performance annually and have this improvement reflected in updated benchmarking results and resultant stretch factors. A number of Distributors have shifted cohort groups over the last few years.

As previously indicated, both econometric and unit cost index benchmarking methods were applied to the Distributors' distribution costs. The **econometric method** uses regression analysis to fashion expected costs ("benchmark costs") after accounting for the external circumstances that vary with each Distributor. Performance is then measured by calculating the ratio of a Distributor's actual cost to the overall benchmark cost. Statistical significance is assessed to determine statistically superior and inferior cost performers.

The **unit cost indexing method** separates the Ontario Distributors into twelve peer groups based on characteristics found to be significant cost drivers in the econometric research. Examples of these characteristics include the relative sizes of the Distributors, the percentage of the Distributors' lines that are underground, and whether the Distributors are situated on the

Canadian Shield.[6] A unit cost metric is then calculated for each Distributor by dividing OM&A cost by a comprehensive output index. The unit cost for each Distributor is compared to the mean of its respective peer group to determine the OM&A cost performance of each company. Based on this comparison, top and bottom quartile cost performers are identified.

Cohort groupings are directly determined by the two benchmarking results. To be in efficiency Cohort 1, a Distributor is required to attain:

- A statistically superior econometric benchmark, **and**
- A top quartile result in the unit cost index benchmarking study.

Similarly, efficiency Cohort 3 members are those utilities that are deemed statistically inferior by the econometric approach, **and** are in the bottom quartile of the indexing results. All remaining utilities are placed in Cohort 2.

1.2 About PSE

PSE staff has extensive experience in utility performance benchmarking. Mr. Fenrick, the lead author of this Report, heads PSE's regulatory and internal management improvement benchmarking practice. He has authored numerous reports evaluating the cost and reliability levels of electric utilities, and has also testified on these subjects. He has presented company-specific results to utility managers, assisting them in measuring and improving the performance levels and productivity trends of their utilities. Utilities have used PSE's benchmarking research to formulate strategic plans, present results to their Board of Directors, inform compensation mechanisms, and set performance goals.

PSE's performance evaluation studies have included examinations of power distribution reliability, productivity trends, OM&A costs, total costs, and more detailed expenses. Our benchmarking team includes professionals in the areas of economics, smart grid technologies, and professional engineers. These studies have been sponsored by utilities, regulatory commissions, and consumer advocates.

[6] The Canadian Shield is a "shield" of Precambrian igneous rock that affects the cost of providing electricity service; the shield makes installation of distribution infrastructure more difficult. A shield is a large plate of mostly solid and continuous rock that is close to the earth's surface.

2 Research Methodologies and Results

This section provides an overview of performance benchmarking, the data sample, definition of OM&A cost, and descriptions of the econometric and unit cost benchmarking methods, procedures, and results.

2.1 Overview of Benchmarking

Economic benchmarking studies allow regulators to objectively compare performance across utilities and jurisdictions.[7] The basic idea behind benchmarking is to compare an actual result with an "expected" result. For example, a company could compare its actual salary levels with "expected" salary levels for a hypothetical company with similar relevant characteristics. The expected levels are typically determined by examining a peer group of companies. The benchmarking analysis is intended to equalize the varying factors that can influence salary, such as regional differences in cost of living, local taxes, labor pool, etc.

Regulators can use benchmarking when assessing electric reliability, determining appropriate cost or salary levels, and establishing escalation provisions of multi-year rate or revenue caps. Utility managers can use general performance benchmarking to determine their utility's overall performance compared to their peers within the industry. Specific benchmarking studies allow utilities to pinpoint areas where cost-effective improvements can be made and develop business cases for specific technologies.

Performance cost benchmarking enables a comparison between a utility's actual costs and a customized expectation of those costs. Relatively good cost performers will have actual costs below the expected amounts, whereas poor performers will have actual costs above the expected amounts.

$$Performance = \frac{Costs^{Actual}}{Costs^{Expected}} \qquad \textbf{[Equation 1]}$$

Equation 1 shows performance to be a function of two terms. Actual costs are reported directly from the utility, whereas expected costs must be estimated. If the performance is less than one, the Distributor is a better performer than predicted. Recall that the predicted value for a given utility is based on the particular circumstances for that utility—for example, if a Distributor is on the Canadian Shield, its OM&A costs will tend to be higher, and so its expected costs will be higher.

The research challenge is to calculate expected costs in a fair and accurate way, accounting for the specific advantages and disadvantages inherent in the operating circumstances of each utility. This last point is crucial. For benchmarking to accurately evaluate cost management performance, the relevant external operating conditions encountered by each utility must be

[7] The term "benchmarking" originates with the practice of cobblers, who would draw an outline of a foot on a board or bench, so that they could compare the shoe they were making to the desired foot size.

adjusted for the differences among sample members. For econometric benchmarking, these differences are adjusted for through the use of regression analysis. The regression analysis determines which factors or conditions are the drivers of cost. In unit cost index benchmarking, external operating conditions are controlled by stratifying the utilities into separate peer groups.

2.2 Ontario Data Sample

For the 2013 update, the study includes 75 utilities, which are listed in Table 1. This sample size is two fewer than the 2012 update. The reduction in number from the 2012 update is due to mergers of industry members. In such cases, data for the individual companies have been combined to form one successor firm. The individual merged companies cease to be included in the benchmarking analysis.

The sample period for the 2013 update is 2002-2011. This ten-year period allows a large sample to be developed, which increases the precision of the parameter estimates in the econometric model.

Table 1: Ontario Power Distributors Included in this Report

List of Ontario Power Distributors

Algoma Power Inc.
Atikokan Hydro Inc.
Bluewater Power Distribution Corporation
Brant County Power Inc.
Brantford Power Inc.
Burlington Hydro Inc.
Cambridge and North Dumfries Hydro Inc.
Centre Wellington Hydro Ltd.
Chapleau Public Utilities Corporation
COLLUS Power Corp.
Cooperative Hydro Embrun Inc.
E.L.K. Energy Inc.
Enersource Hydro Mississauga Inc.
Entegrus Powerlines Inc. (Chatham-Kent Hydro, Inc.)*
Entegrus Powerlines Inc. (Middlesex Power Dist. Corp.)*
EnWin Utilities Ltd.
Erie Thames Powerlines Corporation
Espanola Regional Hydro Distribution Corporation
Essex Powerlines Corporation
Festival Hydro Inc.
Fort Erie - Eastern Ontario Power (CNP)
Fort Frances Power Corporation
Greater Sudbury Hydro Inc.
Grimsby Power Incorporated
Guelph Hydro Electric Systems Inc.
Haldimand County Hydro Inc.
Halton Hills Hydro Inc.
Hearst Power Distribution Company Limited
Horizon Utilities Corporation
Hydro 2000 Inc.
Hydro Hawkesbury Inc.
Hydro One Brampton Networks Inc.
Hydro One Networks Inc.
Hydro Ottawa Limited
Innisfil Hydro Distribution Systems Limited
Kenora Hydro Electric Corporation Ltd.
Kingston Hydro Corporation
Kitchener-Wilmot Hydro Inc.
Lakefront Utilities Inc.
Lakeland Power Distribution Ltd.
London Hydro Inc.
Midland Power Utility Corporation
Milton Hydro Distribution Inc.
Newmarket - Tay Power Distribution Ltd.
Niagara Peninsula Energy Inc.
Niagara-on-the-Lake Hydro Inc.
Norfolk Power Distribution Inc.
North Bay Hydro Distribution Limited
Northern Ontario Wires Inc.
Oakville Hydro Electricity Distribution Inc.
Orangeville Hydro Limited
Orillia Power Distribution Corporation
Oshawa PUC Networks Inc.
Ottawa River Power Corporation
Parry Sound Power Corporation
Peterborough Distribution Incorporated
Port Colborne (CNP)
PowerStream Inc.
PUC Distribution Inc.
Renfrew Hydro Inc.
Rideau St. Lawrence Distribution Inc.
Sioux Lookout Hydro Inc.
St. Thomas Energy Inc.
Thunder Bay Hydro Electricity Distribution Inc.
Tillsonburg Hydro Inc.
Toronto Hydro-Electric System Limited
Veridian Connections Inc.
Wasaga Distribution Inc.
Waterloo North Hydro Inc.
Welland Hydro-Electric System Corp.
Wellington North Power Inc.
West Coast Huron Energy Inc.
Westario Power Inc.
Whitby Hydro Electric Corporation
Woodstock Hydro Services Inc.

* The Board issued an amended licence to Entegrus Powerlines Inc. on February 24, 2012. The amalgamation of Chatham-Kent Hydro Inc. and Middlesex Power Distribution Corporation was completed in January 2012. Separate 2013 rate applications have been filed for each rate zone or service area.

2.3 Definition of Cost

The costs examined in this report are defined as total distribution OM&A expenses. This data was provided to PSE by the Ontario Energy Board. The data source was built from information submitted by each utility via the OEB Reporting and Record-keeping Requirements ("RRR").[8]

2.4 Econometric Benchmarking Methods and Results

This section begins with a brief overview, in general terms, of the econometric benchmarking approach. It is followed by the benchmarking results.

2.4.1 Econometric Benchmarking 101

The econometric approach to benchmarking allows the researcher to fashion an appropriate target (or benchmark) for an examined metric. Econometric benchmarking predicts costs which are customized for the specific operating conditions encountered by each utility. This prediction is interpreted as the expected costs of a utility with identical characteristics, and "average" relative performance.

The established benchmark target cost (i.e., the predicted cost) can be compared to a company's **actual** cost, to determine performance, as shown in Equation 2 below.

$$Performance = \frac{OM\ \&\ A\ Cost^{Actual}}{OM\ \&\ A\ Cost^{\text{Model Prediction}}} \qquad \textbf{[Equation 2]}$$

The model prediction of the cost level is attained by choosing a functional form, based on statistical theory, and using regression analysis to estimate the parameters embedded within this functional form. This approach not only allows for simultaneous consideration of multiple cost drivers, but also permits statistical testing of these variables and estimation of their respective impact on cost. A *simplified* illustrative functional form is offered below.

$$Expected\ \ Cost = a + b * No.of\ Customers + c * Percent\ \ undergrounding \qquad \textbf{[Equation 3]}$$

Assume the researcher postulates that OM&A costs were only linearly influenced by (1) the number of customers, and (2) the percent of lines underground. In that hypothetical case, Equation 3 would be the functional form. (In the actual analysis, costs are influenced by many factors, not just these two.) The coefficient "*a*" is the intercept term; its interpretation is that it costs money to be in business even if output is zero. The coefficient "*b*" signifies the cost of adding an additional customer, and the coefficient "*c*" shows the cost of increasing the percentage of undergrounded lines.

The researcher would then collect a data sample and use regression analysis to estimate the values of these model parameters. The signs[9] of the estimates would need to conform to theory,

[8] http://www.oeb.gov.on.ca/OEB/Industry/Media+Room/Publications/RRR+Reports/Yearbook+of+Distributors

[9] In our example, a positive sign for *b* would indicate that as the number of customers goes up, the expected total cost also goes up. A negative sign would indicate that as that value rises, the expected total cost decreases. The

and hypothesis testing would be conducted to assure the researcher that these variables are indeed statistically significant cost drivers. The values of *a*, *b*, and *c* serve as "weights" to determine the magnitude of the impact of each variable on expected cost.

Equation 3, although simplified for our hypothetical, shows the advantage of the econometric benchmarking approach, because it permits the simultaneous consideration of multiple variables. The researcher can test the significance of hypothetical cost drivers and incorporate them into the analysis. The econometric approach can also be used to better inform peer group selection.

For a more concrete example, consider the cost driver of "% of line undergrounded." The graph below depicts the impact of undergrounding on O&M cost.[10] The x-axis is a measure of the amount of undergrounding; the y-axis is cost per customer. Each point represents one distributor's results for these two values. The line in the figure, which is calculated by statistical modeling, reveals the statistical relationship between undergrounding and distribution O&M expenses for the selected group. As undergrounding increases, cost per customer tends to decline. The econometric method is able to capture this tendency and incorporate it in the expected cost value of each company.

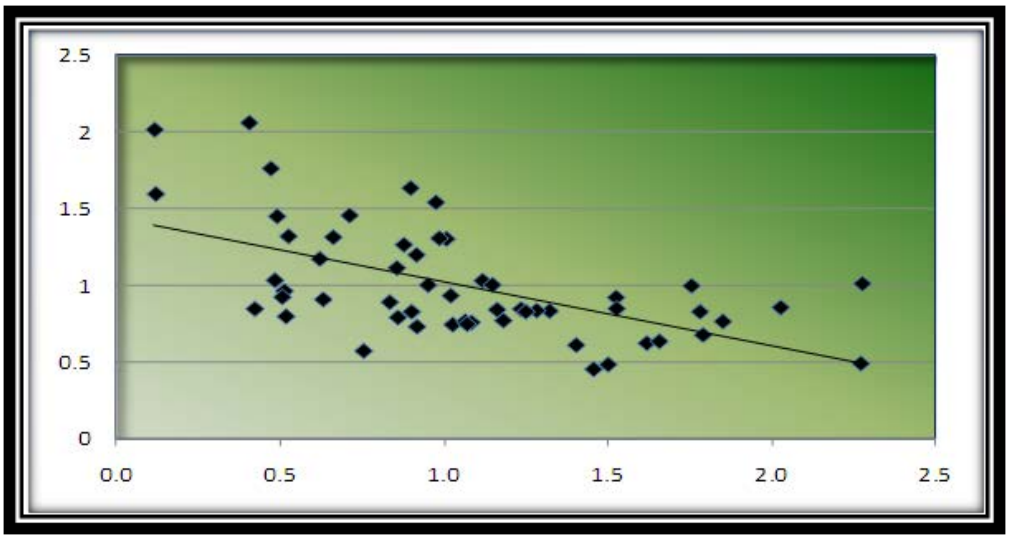

Figure 2: O&M Cost Impacts of Underground Lines

The estimation process is enhanced by taking the natural log of each variable. This transforms the parameter estimates from marginal cost to cost elasticity estimates. Cost elasticity measures the *percentage* change in cost relative to a *percentage* change in the cost driver. For example, with this transformation, the interpretation of *b* in Equation 3 is: if the number of customers increases by 10 percent, then cost is predicted to increase by *b* times 10 percent. If *b* equals 0.5, then a 10 percent increase in customers is estimated to increase cost by 5 percent.

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coefficient on the number of customers would always have a positive sign, but those for other variables (e.g. "percentage of line undergrounded") might have negative signs. See Figure 2.

[10] This graph is based on undergrounding and operation and maintenance expenses of U.S. investor-owned power distributors. Recent research by PSE has quantified the impact of underground lines on both cost and reliability levels.

Econometric benchmarking identifies and models the relevant variables that affect OM&A costs. Each explanatory variable allows for an explicit adjustment of the differing circumstances found within the sampled utilities. In the econometric model estimated for this report, seven distinct variables are used to formulate the estimated benchmark OM&A level. These factors reflect business or service territory conditions, and they are shown in Figure 3.

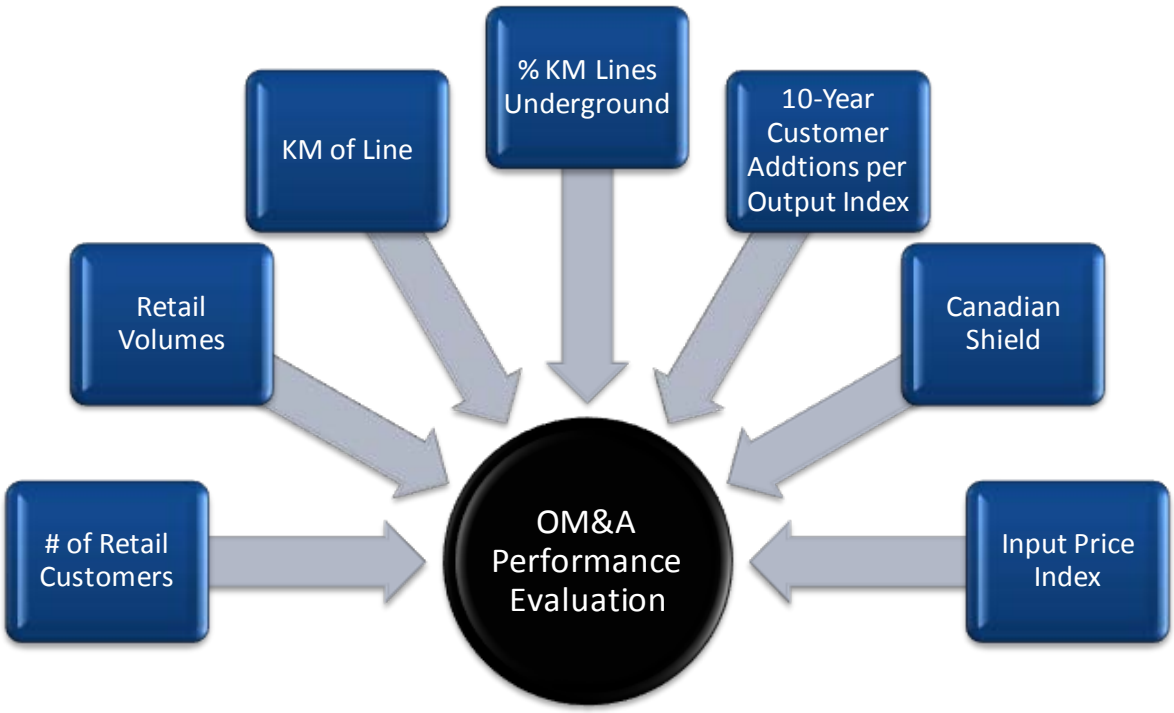

Figure 3: Variables Used to Estimate OM&A Level

After the variables are chosen, industry data is collected. The econometric approach enables a large sample, since utilities with vastly differing operating conditions can be integrated into the analysis. As the econometric method adjusts for numerous conditions, a sample with varied operating conditions actually enhances the evaluation.

This contrasts with the unit cost indexing approach, which requires utilities with similar characteristics, so that peer groups can be created. For example, Hydro One Networks in Ontario lacks a suitable comparison group needed to perform benchmarking using the unit cost indexing method. However, Hydro One Networks can be included in the econometric benchmarking study, because that approach can accommodate dissimilar utilities within the analysis.

2.4.2 Methods Used in this Report

The exact methods used in this report are detailed in previous reports. The methods are reiterated in this section in a compressed format.[11] This section discusses items such as the

[11] For more detail on the benchmarking approaches please see: http://www.oeb.gov.on.ca/documents/cases/EB-2006-0268/PEG_Final_Benchmarking_Report_20080320.pdf

functional form of the OM&A econometric model, included variables, estimation procedures, and 2013 rate year parameter estimates.

2.4.2.1 Functional Form

The functional form used in this report is identical to that used in last year's update. It is a "quadratic" functional form, which has the following general formula:

$$\ln C = \alpha_o + \sum_i \alpha_i \ln Y_i + \sum_j \alpha_j \ln W_j + \sum_\ell \alpha_\ell \ln Z_\ell + \alpha_t T + \frac{1}{2}\left[\sum_i \gamma_i \ln Y_i \ln Y_i + \sum_j \gamma_j \ln W_j \ln W_j\right] + \varepsilon. \qquad \textbf{[Equation 4]}$$

Here, Y_i denotes one of several variables that quantify output and W_j denotes the input price. The *Z*-variables denote the additional business conditions, *T* is a trend variable, and ε denotes the error term. The $\alpha's$ and $\gamma's$ represent the econometric model parameter. In this model they are elasticities that capture the impact of each variable on OM&A costs, in percent terms.

2.4.2.2 Included Variables

There are seven explanatory variables included in the OM&A econometric model. These variables can be separated into three categories. The first category is an **output category** which quantifies the amount of output put forth by each Distributor. Explanatory variables in the output category are:

- the number of customers,
- total volumes (kilowatt hours), and
- total kilometers of line.

The second category consists of an **input price index**, which is an external measure of the composite market price of procuring inputs. This input price encapsulates both service area-specific labour and non-labour price estimations. The weighting for the input price index was, on average, a fifty percent weight on a customized estimate of labour price specific to each Distributor, and a fifty percent weight on the non-labour price input price.[12] The non-labour input price is based on the gross domestic product implicit price index ("GDP-IPI") of Ontario.[13] Thus, the non-labour price does not vary by Distributor, but by year. In contrast, the labour price component of the input price index varies by Distributor **and** by year.

The labour price for each Distributor is calculated by averaging employment income, by level of educational attainment, in various Ontario cities. This data was gathered from the 2001 census. A mapping of Distributors to the cities used in the analysis formed the basis for the labour price

[12] Prior to 2010, labor cost data was confidential. This necessitated the 50/50 weighting within the input price index.

[13] The Ontario GDP-IPI for 2011 was not available at the time this research was conducted. This report therefore used the Canadian GDP-IPI FDD for 2011 instead. These indexes historically have grown at similar growth rates.

assignment. Labour price values are then escalated for years subsequent to 2001 by adjusting the index for labour cost trends in Ontario.

The third category of explanatory variables is the **business condition category**, also known as Z-variables. This category consists of:

- the percent of distribution lines underground,
- ten year customer growth divided by an output index,[14] and
- a binary variable reflecting whether most or all of the service territory of the utility is on the Canadian Shield.

The percentage of distribution lines underground is calculated by dividing the reported amount of underground kilometers of line by the total reported kilometers of line. As previously discussed, a higher prevalence of underground lines tends to reduce OM&A unit costs. Thus, the parameter estimate in the econometric model is expected to have a negative sign.

$$\%\ Underground = \frac{KM\ of\ line\ underground}{Total\ KM\ of\ line} \qquad \textbf{[Equation 5]}$$

The second business condition variable is the ten-year customer growth variable. OEB provided data on the number of customers served by each Distributor (or predecessor utilities) in 1992 and 1997. The number of customers in each year was then estimated based on the 1992, 1997, and the sample data of 2002 through 2011.

The higher the value of the ten-year customer growth variable, the higher the number of recent customer additions. This also means that the higher this variable is, the younger the distribution system is (because distribution lines are being built to serve the new customers). Thus this variable also serves as a proxy for the age of the distribution system. We expect OM&A expenses to be lower for a younger system, so the parameter estimate for this variable is hypothesized to be negative. The variable is calculated by taking the current year's number of customers and subtracting the number of customers ten years ago. This difference is then divided by a measure of the size of the utility inclusive of number of customers, volumes, and kilometers of line. This allows us to normalize or scale the ten year customer growth based on the size of each Distributor.

$$Ten\ Year\ Customer\ Growth = \frac{N_t - N_{t-10}}{Output\ Index} \qquad \textbf{[Equation 6]}$$

The third business condition variable, a binary variable, indicates whether most or all of the Distributor's service territory is located on the Canadian Shield. If the Distributor is determined to be on the Canadian Shield, it receives a value of "1", likewise, if it is not on the Shield it receives a value of "0" in the econometric dataset. This variable is developed using a map from an authoritative text on Ontario's geography.[15] The Canadian Shield is a physiographic region

[14] Customer information derived from the prior regulator is assembled to calculate ten year customer growth numbers, which allowed the construction of this variable.

[15] L.J. Chapman and D.F. Putnam, "The Physiography of Southern Ontario," Toronto: University of Toronto Press,

characterized by shallow, rocky soils and numerous lakes. The land is unsuited for agriculture and is typically forested. We would expect OM&A costs to be higher for Distributors located on the Shield. Correspondingly, the estimated model coefficient value should have a positive sign.

The latest available yearly values of the included model variables for each utility are presented in Table 2. This table presents the actual reported data by each company through the latest available year. Please note that OM&A costs are reported in thousands of dollars.

1996.

Table 2: Size and Scope of Included Variables[16]

Size and Scope of Variables Used in Econometric Research by LDC

LDC	OM&A Cost ('000)	Customers	Total Volume (MWh)	Kilometers of Line	Input Price Index	Percent Lines Underground	Canadian Shield	Customer Growth/ Output Index
Algoma Power Inc.	9,807	11,581	189,350	1,848	1.143	0.2%	Yes	203
Atikokan Hydro Inc.	937	1,661	22,384	92	1.213	0.0%	Yes	-1,571
Bluewater Power Distribution Corporation	11,226	35,772	1,025,253	777	1.313	25.2%	No	662
Brant County Power Inc.	3,664	9,741	278,406	332	1.232	12.7%	No	2,059
Brantford Power Inc.	7,020	37,967	919,261	649	1.232	40.1%	No	1,915
Burlington Hydro Inc.	14,760	64,329	1,644,252	1,703	1.384	43.5%	No	2,529
Cambridge and North Dumfries Hydro Inc.	10,762	51,586	1,482,363	1,119	1.345	36.3%	No	2,552
Centre Wellington Hydro Ltd.	1,976	6,496	148,893	161	1.294	43.5%	No	2,580
Chapleau Public Utilities Corporation	547	1,293	26,894	27	1.229	3.7%	Yes	-1,496
COLLUS Power Corp.	4,073	15,723	307,217	339	1.172	38.9%	No	3,283
Cooperative Hydro Embrun Inc.	534	1,954	29,435	27	1.430	44.4%	No	6,004
E.L.K. Energy Inc.	2,404	11,276	242,066	150	1.475	40.7%	No	2,176
Enersource Hydro Mississauga Inc.	47,336	195,381	7,626,204	5,163	1.441	65.2%	No	2,305
Entegrus Powerlines Inc. (Chatham-Kent Hydro Inc.)	6,714	32,132	721,042	811	1.255	28.4%	No	230
Entegrus Powerlines Inc. (Middlesex Power Dist. Corp.)	1,712	7,988	217,137	135	1.255	28.1%	No	1,828
EnWin Utilities Ltd.	23,345	85,083	2,509,471	1,176	1.475	39.7%	No	1,068
Erie Thames Powerlines Corporation	5,743	18,094	500,538	327	1.262	22.3%	No	1,230
Espanola Regional Hydro Distribution Corporation	1,063	3,299	64,497	137	1.229	8.0%	Yes	46
Essex Powerlines Corporation	5,781	28,094	541,574	465	1.475	54.6%	No	1,692
Festival Hydro Inc.	3,987	19,885	582,552	277	1.233	33.2%	No	1,587
Fort Erie - Eastern Ontario Power (CNP)	5,423	19,259	374,160	707	1.215	7.6%	No	431
Fort Frances Power Corporation	1,319	3,775	79,563	74	1.213	10.8%	Yes	-100
Greater Sudbury Hydro Inc.	12,512	46,748	935,255	962	1.229	23.4%	Yes	284
Grimsby Power Incorporated	2,107	10,307	181,225	240	1.384	29.2%	No	3,281
Guelph Hydro Electric Systems Inc.	12,898	50,859	1,676,960	1,084	1.294	60.3%	No	3,069
Haldimand County Hydro Inc.	7,276	21,078	433,877	1,734	1.232	5.3%	No	703
Halton Hills Hydro Inc.	4,792	21,232	495,780	1,464	1.412	39.3%	No	2,226
Hearst Power Distribution Company Limited	829	2,817	78,735	68	1.229	16.2%	Yes	430
Horizon Utilities Corporation	42,687	235,327	5,401,980	3,414	1.384	55.4%	No	1,062
Hydro 2000 Inc.	319	1,208	25,503	21	1.121	14.3%	No	1,508
Hydro Hawkesbury Inc.	924	5,521	154,132	66	1.121	15.2%	No	1,588
Hydro One Brampton Networks Inc.	20,464	137,856	3,842,969	2,896	1.441	72.3%	No	5,447
Hydro One Networks Inc.	548,828	1,211,071	23,561,001	117,385	1.364	6.7%	Yes	1,003
Hydro Ottawa Limited	60,181	305,266	7,607,711	5,606	1.430	48.0%	No	2,676
Innisfil Hydro Distribution Systems Limited	4,207	14,826	231,635	748	1.352	18.9%	No	1,934
Kenora Hydro Electric Corporation Ltd.	2,008	5,572	106,039	98	1.290	10.2%	Yes	-1,168
Kingston Hydro Corporation	6,481	26,844	708,614	362	1.171	35.6%	No	237
Kitchener-Wilmot Hydro Inc.	14,533	87,965	1,833,881	1,878	1.345	44.3%	No	3,179
Lakefront Utilities Inc.	2,286	9,976	232,902	115	1.238	17.4%	No	3,429
Lakeland Power Distribution Ltd.	2,894	9,598	206,425	333	1.249	22.8%	Yes	1,384
London Hydro Inc.	30,876	148,331	3,316,999	2,820	1.262	51.7%	No	2,163
Midland Power Utility Corporation	1,842	6,951	201,044	265	1.151	25.3%	No	1,626
Milton Hydro Distribution Inc.	6,397	30,485	757,337	950	1.384	40.3%	No	8,279
Newmarket - Tay Power Distribution Ltd.	6,740	33,338	679,086	830	1.396	56.7%	No	3,177
Niagara Peninsula Energy Inc.	14,068	51,162	1,186,153	1,975	1.215	24.9%	No	1,797
Niagara-on-the-Lake Hydro Inc.	1,930	8,000	183,888	348	1.215	29.3%	No	2,237
Norfolk Power Distribution Inc.	4,753	19,032	368,064	770	1.232	14.8%	No	1,738
North Bay Hydro Distribution Limited	5,378	23,850	564,905	618	1.146	17.5%	Yes	428
Northern Ontario Wires Inc.	2,136	6,059	115,981	370	1.275	1.4%	Yes	-732
Oakville Hydro Electricity Distribution Inc.	13,226	63,614	1,522,342	1,455	1.412	61.4%	No	3,960
Orangeville Hydro Limited	2,956	11,248	245,499	176	1.396	41.5%	No	2,008
Orillia Power Distribution Corporation	4,506	13,035	307,327	314	1.352	21.0%	No	1,293
Oshawa PUC Networks Inc.	10,214	53,083	1,101,825	987	1.441	42.2%	No	2,165

[16] Values reflect the latest year of available data for each Distributor. For most companies, this is 2011.

Table 2: Size and Scope of Included Variables
Continued

Size and Scope of Variables Used in Econometric Research by LDC

LDC	OM&A Cost ('000)	Customers	Total Volume (MWh)	Kilometers of Line	Input Price Index	Percent Lines Underground	Canadian Shield	Customer Growth/ Output Index
Ottawa River Power Corporation	2,669	10,555	189,603	148	1.055	12.8%	Yes	1,209
Parry Sound Power Corporation	1,304	3,441	85,042	129	1.290	8.5%	Yes	912
Peterborough Distribution Incorporated	6,975	35,270	813,602	553	1.163	30.4%	No	1,463
Port Colborne (CNP)	3,729	9,138	203,577	315	1.215	5.4%	No	-2
PowerStream Inc.	60,831	332,993	8,394,822	7,431	1.441	65.2%	No	3,892
PUC Distribution Inc.	8,621	32,998	702,357	737	1.143	16.3%	Yes	426
Renfrew Hydro Inc.	1,141	4,183	89,846	55	1.055	3.6%	No	901
Rideau St. Lawrence Distribution Inc.	1,626	5,839	108,811	94	1.219	10.6%	No	376
Sioux Lookout Hydro Inc.	1,151	2,755	72,932	283	1.213	2.1%	Yes	96
St. Thomas Energy Inc.	3,741	16,436	295,038	248	1.262	37.1%	No	2,814
Thunder Bay Hydro Electricity Distribution Inc.	11,868	49,765	959,912	1,186	1.213	19.9%	Yes	391
Tillsonburg Hydro Inc.	2,154	6,745	184,311	157	1.300	35.0%	No	1,705
Toronto Hydro-Electric System Limited	233,754	709,323	24,707,586	10,061	1.441	58.6%	No	1,120
Veridian Connections Inc.	20,560	113,709	2,553,129	2,409	1.448	44.7%	No	2,752
Wasaga Distribution Inc.	2,260	12,324	121,665	243	1.352	47.7%	No	6,184
Waterloo North Hydro Inc.	9,976	52,612	1,436,920	1,542	1.345	31.8%	No	2,658
Welland Hydro-Electric System Corp.	5,209	21,768	430,932	300	1.215	29.0%	No	871
Wellington North Power Inc.	1,566	3,626	99,140	76	1.227	13.2%	No	1,600
West Coast Huron Energy Inc.	1,377	3,697	145,110	68	1.345	22.1%	No	74
Westario Power Inc.	4,640	22,257	436,375	515	1.110	28.0%	No	1,761
Whitby Hydro Electric Corporation	8,697	40,337	872,775	1,060	1.448	52.5%	No	4,496
Woodstock Hydro Services Inc.	3,910	15,181	374,272	249	1.300	37.8%	No	1,830

2.4.2.3 Estimation Procedures

Econometric benchmarking performance results are calculated by taking three-year averages of the most recently available scores. For nearly all of the Ontario Distributors, this entails a 2009-2011 average.

The software package used for the econometric modeling, GAUSS, is the same software package used in previous updates. The use of GAUSS allows for custom estimation procedures to be developed. In the case of this research, corrections for groupwise heteroskedasticity were developed. This allowed for more precision in coefficient estimates relative to an Ordinary Least Squares regression.

2.4.2.4 2013 Rate Year Parameter Estimates

Parameter estimates are provided in Table 3. All parameter estimates are correctly signed, and are plausible in magnitude. For example, we would expect the parameter for the number of customers to have a positive value, because OM&A costs rise when the number of consumers goes up. All first order variables are statistically different from zero, at a 95% confidence level.

The model PSE developed quantifies the relationship between OM&A cost and the included variables. As expected, as outputs (customers, volumes, kilometer of line) increase, so does predicted OM&A cost. Similarly, higher input prices result in higher expected OM&A costs, all else being equal. OM&A expenses tend to be higher the older a system is, and if the system is on the Canadian Shield. Expenses tend to decrease as the percent of underground lines increase.

The adjusted R^2 statistic is also reported in Table 3. This is a measure of the explanatory power of the model relative to the overall variation in sampled OM&A costs. A value of 1.0 indicates that all variation in OM&A expenses among Distributors is explained by the model, whereas a value of 0.0 indicates that none of the variation is explained. The R^2 value for the 2013 update is 0.981. The number of observations is calculated by multiplying ten years (2002-2011) by 75 utilities, resulting in 750 observations. Eight observations were either missing data or had implausible data values and so were discarded, leaving 742 observations.

Table 3: Econometric Parameter Estimates

Econometric Model of OM&A Expenses

VARIABLE KEY

N= Number of Customers
V= Total Volumes
M= Total Kilometers of Line
W= Input Price Index
UN= Percent of Distribution Lines Underground
CG= 10 Year Customer Growth / Output Index
CS= Canadian Shield (binary)

EXPLANATORY VARIABLE	PARAMETER ESTIMATE	T-STATISTIC	EXPLANATORY VARIABLE	PARAMETER ESTIMATE	T-STATISTIC
N	0.505	17.56	**W**	0.982	6.94
NN	-0.104	-6.98	**WW**	-2.269	-2.42
V	0.336	12.86	**UN**	-0.127	-13.58
VV	0.090	7.36			
			CG	-0.062	-10.72
M	0.128	6.18			
MM	0.010	1.16	**CS**	0.017	3.27
MCS	0.004	1.83			
Constant	16.442	722.04			
Trend	0.012	3.31			

Other Results

Rbar-Squared	0.981
Sample Period	2002-2011
Number of Observations	742

2.4.3 Econometric Benchmarking Results

The OM&A performance evaluations are presented in Table 4. The table shows the ratio of the average actual OM&A costs of each company in the last three years to the model's benchmark cost projections over the same years. In other words, it indicates how the company's **actual** costs compare to the **predicted** costs for a company with its characteristics.

Table 4 ranks the Distributors according to their ratios. A lower ratio of actual cost to predicted cost implies better performance. The results in Table 4 form the basis for deciding whether a Distributor is a superior performer (shown in green), an average performer, or an inferior performer (shown in red). The cut-off point for calling a Distributor superior or inferior is based on the "p-value" of each Distributor, which is a statistical measure of confidence regarding its rank on the cost performance continuum.

If a Distributor is a good cost performer with a p-value between 0 and 0.10, the hypothesis of average performance is rejected in favor of a statistically superior performer designation. Likewise, if a Distributor is a poor cost performer with a p-value between 0 and 0.10, the hypothesis of average performance is rejected in favor of a "statistically inferior performer" designation. Fourteen Distributors fit into the "statistically superior" classification, while thirteen fall under the "statistically inferior" classification.

As a reminder, Table 4 represents just the first of two benchmarking studies performed on the Distributors. A Distributor must fall into the "superior" group in **both** benchmarking methods to be classified in Cohort 1. Similarly, a Distributor must fall into the "inferior" group in both benchmarking methods to be classified in Cohort 3. Section 2.5 describes the second benchmarking method: unit cost indexing.

Table 4: Econometric Benchmarking Results

Performance Rankings Based on Econometric Benchmarks

	Years Benchmarked	Actual/Predicted[1]	P-Value	Rank[1]
Hydro Hawkesbury Inc.	2009-2011	**0.628**	0.000	1
Northern Ontario Wires Inc.	2009-2011	**0.741**	0.003	2
Hydro One Brampton Networks Inc.	2009-2011	**0.754**	0.005	3
Waterloo North Hydro Inc.	2009-2011	**0.769**	0.009	4
Kitchener-Wilmot Hydro Inc.	2009-2011	**0.788**	0.015	5
Halton Hills Hydro Inc.	2009-2011	**0.794**	0.018	6
Grimsby Power Incorporated	2009-2011	**0.796**	0.019	7
North Bay Hydro Distribution Limited	2009-2011	**0.801**	0.022	8
Entegrus Powerlines Inc. (Chatham-Kent Hydro Inc.)	2009-2011	**0.812**	0.029	9
Festival Hydro Inc.	2009-2011	**0.850**	0.070	10
Renfrew Hydro Inc.	2009-2011	**0.853**	0.074	11
Cambridge and North Dumfries Hydro Inc.	2009-2011	**0.854**	0.075	12
Entegrus Powerlines Inc. (Middlesex Power Dist. Corp.)	2009-2011	**0.856**	0.079	13
Oshawa PUC Networks Inc.	2009-2011	**0.857**	0.080	14
Hydro 2000 Inc.	2009-2011	**0.881**	0.124	15
Veridian Connections Inc.	2009-2011	**0.881**	0.125	16
Peterborough Distribution Incorporated	2009-2011	**0.893**	0.153	17
Niagara-on-the-Lake Hydro Inc.	2009-2011	**0.906**	0.184	18
E.L.K. Energy Inc.	2009-2011	**0.908**	0.191	19
Lakefront Utilities Inc.	2009-2011	**0.914**	0.205	20
Greater Sudbury Hydro Inc.	2009-2011	**0.915**	0.209	21
Horizon Utilities Corporation	2009-2011	**0.920**	0.224	22
Oakville Hydro Electricity Distribution Inc.	2009-2011	**0.934**	0.267	23
Essex Powerlines Corporation	2009-2011	**0.945**	0.305	24
Newmarket - Tay Power Distribution Ltd.	2009-2011	**0.947**	0.311	25
Sioux Lookout Hydro Inc.	2009-2011	**0.960**	0.355	26
Milton Hydro Distribution Inc.	2009-2011	**0.961**	0.360	27
Espanola Regional Hydro Distribution Corporation	2009-2011	**0.962**	0.361	28
Haldimand County Hydro Inc.	2009-2011	**0.963**	0.363	29
Hydro Ottawa Limited	2009-2011	**0.965**	0.373	30
Westario Power Inc.	2009-2011	**0.966**	0.376	31
Wasaga Distribution Inc.	2009-2011	**0.970**	0.392	32
Norfolk Power Distribution Inc.	2009-2011	**0.970**	0.392	33
Brantford Power Inc.	2009-2011	**0.977**	0.415	34
PUC Distribution Inc.	2009-2011	**0.977**	0.416	35
Hearst Power Distribution Company Limited	2009-2011	**0.979**	0.424	36
Burlington Hydro Inc.	2009-2011	**0.987**	0.454	37
Enersource Hydro Mississauga Inc.	2009-2011	**0.988**	0.455	38
Rideau St. Lawrence Distribution Inc.	2009-2011	**0.993**	0.474	39
Kingston Hydro Corporation	2009-2011	**0.993**	0.474	40
Ottawa River Power Corporation	2009-2011	**0.996**	0.486	41
Guelph Hydro Electric Systems Inc.	2009-2011	**0.998**	0.494	42

[1] Lower values imply better performance.

(continued from previous page)

Performance Rankings Based on Econometric Benchmarks

	Years Benchmarked	Actual/Predicted[1]	P-Value	Rank[1]
Thunder Bay Hydro Electricity Distribution Inc.	2009-2011	**0.999**	0.498	43
Fort Erie - Eastern Ontario (CNP)	2009-2011	**1.009**	0.468	44
Innisfil Hydro Distribution Systems Limited	2009-2011	**1.011**	0.461	45
Welland Hydro-Electric System Corp.	2009-2011	**1.016**	0.444	46
PowerStream Inc.	2009-2011	**1.027**	0.404	47
Orangeville Hydro Limited	2009-2011	**1.042**	0.353	48
St. Thomas Energy Inc.	2009-2011	**1.054**	0.315	49
Atikokan Hydro Inc.	2009-2011	**1.058**	0.306	50
Kenora Hydro Electric Corporation Ltd.	2009-2011	**1.063**	0.289	51
Whitby Hydro Electric Corporation	2009-2011	**1.065**	0.284	52
Woodstock Hydro Services Inc.	2009-2011	**1.077**	0.249	53
Midland Power Utility Corporation	2009-2011	**1.085**	0.228	54
Parry Sound Power Corporation	2009-2011	**1.099**	0.197	55
London Hydro Inc.	2009-2011	**1.100**	0.194	56
Chapleau Public Utilities Corporation	2009-2011	**1.102**	0.188	57
Lakeland Power Distribution Ltd.	2009-2011	**1.116**	0.159	58
Cooperative Hydro Embrun Inc.	2009-2011	**1.119**	0.153	59
EnWin Utilities Ltd.	2009-2011	**1.125**	0.143	60
Niagara Peninsula Energy Inc.	2009-2011	**1.147**	0.106	61
Bluewater Power Distribution Corporation	2009-2011	**1.150**	0.101	62
Fort Frances Power Corporation	2009-2011	**1.167**	0.080	63
Port Colborne (CNP)	2009-2011	**1.219**	0.036	64
Orillia Power Distribution Corporation	2009-2011	**1.229**	0.030	65
Centre Wellington Hydro Ltd.	2009-2011	**1.232**	0.029	66
West Coast Huron Energy Inc.	2009-2011	**1.262**	0.017	67
COLLUS Power Corp.	2009-2011	**1.264**	0.017	68
Tillsonburg Hydro Inc.	2009-2011	**1.265**	0.016	69
Erie Thames Powerlines Corporation	2009-2011	**1.270**	0.015	70
Wellington North Power Inc.	2009-2011	**1.304**	0.008	71
Toronto Hydro	2009-2011	**1.381**	0.002	72
Hydro One Networks Inc.	2009-2011	**1.412**	0.001	73
Brant County Power Inc.	2009-2011	**1.432**	0.001	74
Algoma Power Inc.	2009-2011	**1.493**	0.000	75

[1] Lower values imply better performance.

2.5 Unit Cost Indexing Methods and Results

This section begins with a brief overview, in general terms, of the unit cost benchmarking approach. It is followed by information specific to the benchmarking methods found in this report.

2.5.1 Unit Cost Benchmarking 101

When implementing the unit cost index benchmarking approach, for each Distributor we calculated the ratio of the relevant statistic being measured (e.g., OM&A cost) to a measure of output (e.g., number of customers). This results in (e.g.) the actual OM&A unit cost for the Distributor in question.

This **actual** unit cost is then compared to the **peer group average** unit cost. The peer group is a group of firms sharing similar business and operating conditions to the company being investigated. The peer group's mean (average) serves as an estimate for the expected unit cost of the target utility. If a firm's unit cost ratio is below the peer group average, it is classified as an above average performer, but if the unit cost ratio of a company is above the peer group average, it is classified as a below-average cost performer.

$$Performance = \frac{OM\ \&\ A\ Unit\ Cost^{\ Actual}}{OM\ \&\ A\ Unit\ Cost^{\ Peer\ Group\ \ Average}} \qquad \textbf{[Equation 7]}$$

As is the case for the econometric approach, multiple outputs can be measured when comparing firms to each other, instead of just unit cost. Thus, multiple outputs can be aggregated into one output index. A multi-output index can incorporate the cost impacts inherent in multiple output measures such as the number of customers, volumes, or kilometers of line. The weights for each individual output measure can be derived from the cost elasticity measurements of the econometric model. A multi-output index is used in this research, and will be discussed in further detail in Section 2.5.2.

It should be noted that the unit cost indexing approach does not explicitly adjust for the fact that utilities encounter significantly different external circumstances. Adjustments for heterogeneous conditions rest solely upon the selection of an appropriate peer group. Therefore, peer group selection must be done with care. This is the reason for dividing the Ontario industry into twelve peer groups. These groups are based on significant cost drivers which are identified in the econometric research.

2.5.2 Methods Used in this Report

The Ontario power distribution industry is divided into twelve separate peer groups.[17] The peer groups were based on the criteria of location, size, geography, percent undergrounding, and customer growth. The original determination of peer groups was based on 2002 through 2006

[17] This number includes the "Large Northern" peer group which only consists of one utility, Hydro One Networks. No other Ontario power Distributors are similar enough to offer a fair comparison to Hydro One Networks using the unit cost indexing approach.

data, and will remain constant through the end of the Third Generation Incentive Regulation plan, except where industry amalgamations necessitate adjustments. These variables were identified on the basis of the previously estimated OM&A econometric model. Table 5 displays the peer groups and the variable data that is used in the development of peer group divisions.

A unit cost index is constructed for each Distributor and for each year of available data. The construction of this index has total OM&A expenses as the numerator and a multi-output index as the denominator. This unit cost index is constructed according to Equation 8 for utility *h* in year *t*.

$$\text{Unit Cost}_{h,t} = Cost_{h,t} / Output\ Index_{\text{h,t}} \quad \textbf{[Equation 8]}$$

The output index in Equation 8 is calculated by weighting up the identified outputs and creating a composite output index. The estimated output elasticities for customers, volumes, and kilometers of lines are 0.51, 0.33, and 0.13, respectively. The corresponding elasticity weights are 0.53, 0.34, and 0.13 and sum to 1.[18] Equation 9 offers the formula for calculating this output index.

$$\ln \text{Output } Index_{\text{h,t}} = \sum_i se_i \cdot (\ln Y_{i,h,t} . - \overline{\ln Y_{i,t}}) \quad \textbf{[Equation 9]}$$

Here for each company h in year *t*,

$Y_{i,h,t}$ = quantity of output dimension *i*

$\overline{\ln Y_{i,t}}$ = sample mean of the logged quantity of output dimension *i* provided by all utilities

se_i = share of output dimension *i* in the sum of the econometric estimates of the cost elasticities of the output quantities.

[18] The weights are derived by summing the output elasticities and dividing each component output elasticity by this sum.

Table 5: Peer Group Divisions

Peer Groups for Ontario LDCs

Peer Group Designation & Distributor	Customers[1]	% Under-grounding[1]	Canadian Shield	Customer Growth/Output Index[1]
Small Northern Low Undergrounding				
Algoma Power Inc.	11,581	0.2%	Yes	203
Atikokan Hydro Inc.	1,661	0.0%	Yes	-1,571
Chapleau Public Utilities Corporation	1,293	3.7%	Yes	-1,496
Espanola Regional Hydro Distribution Corporation	3,299	8.0%	Yes	46
Fort Frances Power Corporation	3,775	10.8%	Yes	-100
Northern Ontario Wires Inc.	6,059	1.4%	Yes	-732
Parry Sound Power Corporation	3,441	8.5%	Yes	912
Renfrew Hydro Inc.	4,183	3.6%	No	901
Sioux Lookout Hydro Inc.	2,755	2.1%	Yes	96
Small Northern Medium Undergrounding				
Hearst Power Distribution Company Limited	2,817	16.2%	Yes	430
Kenora Hydro Electric Corporation Ltd.	5,572	10.2%	Yes	-1,168
Lakeland Power Distribution Ltd.	9,598	22.8%	Yes	1,384
Ottawa River Power Corporation	10,555	12.8%	Yes	1,209
Mid-Size Northern				
Greater Sudbury Hydro Inc.	46,748	23.4%	Yes	284
North Bay Hydro Distribution Limited	23,850	17.5%	Yes	428
PUC Distribution Inc.	32,998	16.3%	Yes	426
Thunder Bay Hydro Electricity Distribution Inc.	49,765	19.9%	Yes	391
Large Northern				
Hydro One Networks Inc.	1,211,071	6.7%	Yes	1,003
Small Southern Low & Medium Undergrounding				
Brant County Power Inc.	9,741	12.7%	No	2,059
Hydro 2000 Inc.	1,208	14.3%	No	1,508
Hydro Hawkesbury Inc.	5,521	15.2%	No	1,588
Lakefront Utilities Inc.	9,976	17.4%	No	3,429
Port Colborne (CNP)	9,138	5.4%	No	-2
Rideau St. Lawrence Distribution Inc.	5,839	10.6%	No	376
Wellington North Power Inc.	3,626	13.2%	No	1,600
Small Southern Medium-High Undergrounding				
Entegrus Powerlines Inc. (Middlesex)	7,988	28.1%	No	1,828
Midland Power Utility Corporation	6,951	25.3%	No	1,626
Tillsonburg Hydro Inc.	6,745	35.0%	No	1,705
West Coast Huron Energy Inc.	3,697	22.1%	No	74
Small Southern Medium-High Undergrounding with Rapid Growth				
Centre Wellington Hydro Ltd.	6,496	43.5%	No	2,580
Cooperative Hydro Embrun Inc.	1,954	44.4%	No	6,004
Grimsby Power Incorporated	10,307	29.2%	No	3,281
Niagara-on-the-Lake Hydro Inc.	8,000	29.3%	No	2,237
Orangeville Hydro Limited	11,248	41.5%	No	2,008
Mid-size Southern Low & Medium Undergrounding				
Fort Erie - Eastern Ontario Power (CNP)	19,259	7.6%	No	431
Haldimand County Hydro Inc.	21,078	5.3%	No	703
Innisfil Hydro Distribution Systems Limited	14,826	18.9%	No	1,934
Norfolk Power Distribution Inc.	19,032	14.8%	No	1,738
Orillia Power Distribution Corporation	13,035	21.0%	No	1,293

(continued)

Peer Groups for Ontario LDCs

Peer Group Designation & Distributor	Customers[1]	% Under-grounding[1]	Canadian Shield	Customer Growth/Output Index[1]
Mid-size Southern Medium-High Undergrounding				
Bluewater Power Distribution Corporation	35,772	25.2%	No	662
COLLUS Power Corp.	15,723	38.9%	No	3,283
E.L.K. Energy Inc.	11,276	40.7%	No	2,176
Entegrus Powerlines Inc. (Chatham-Kent)	32,132	28.4%	No	230
Erie Thames Powerlines Corporation	18,094	22.3%	No	1,230
Essex Powerlines Corporation	28,094	54.6%	No	1,692
Festival Hydro Inc.	19,885	33.2%	No	1,587
Kingston Hydro Corporation	26,844	35.6%	No	237
Niagara Peninsula Energy Inc.	51,162	24.9%	No	1,797
Peterborough Distribution Incorporated	35,270	30.4%	No	1,463
St. Thomas Energy Inc.	16,436	37.1%	No	2,814
Wasaga Distribution Inc.	12,324	47.7%	No	6,184
Welland Hydro-Electric System Corp.	21,768	29.0%	No	871
Westario Power Inc.	22,257	28.0%	No	1,761
Woodstock Hydro Services Inc.	15,181	37.8%	No	1,830
Large City Southern Medium-High Undergrounding				
EnWin Utilities Ltd.	85,083	39.7%	No	1,068
Hydro Ottawa Limited	305,266	48.0%	No	2,676
Toronto Hydro-Electric System Limited	709,323	58.6%	No	1,120
Veridian Connections Inc.	113,709	44.7%	No	2,752
Large City Southern High Undergrounding				
Enersource Hydro Mississauga Inc.	195,381	65.2%	No	2,305
Horizon Utilities Corporation	235,327	55.4%	No	1,062
Hydro One Brampton Networks Inc.	137,856	72.3%	No	5,447
London Hydro Inc.	148,331	51.7%	No	2,163
PowerStream Inc.	332,993	65.2%	No	3,892
Mid-size GTA Medium-High & High Undergrounding				
Brantford Power Inc.	37,967	40.1%	No	1,915
Burlington Hydro Inc.	64,329	43.5%	No	2,529
Cambridge and North Dumfries Hydro Inc.	51,586	36.3%	No	2,552
Guelph Hydro Electric Systems Inc.	50,859	60.3%	No	3,069
Halton Hills Hydro Inc.	21,232	39.3%	No	2,226
Kitchener-Wilmot Hydro Inc.	87,965	44.3%	No	3,179
Milton Hydro Distribution Inc.	30,485	40.3%	No	8,279
Newmarket - Tay Power Distribution Ltd.	33,338	56.7%	No	3,177
Oakville Hydro Electricity Distribution Inc.	63,614	61.4%	No	3,960
Oshawa PUC Networks Inc.	53,083	42.2%	No	2,165
Waterloo North Hydro Inc.	52,612	31.8%	No	2,658
Whitby Hydro Electric Corporation	40,337	52.5%	No	4,496

[1] Peer groups are identical to those proposed in the Original Report (some names may change due to mergers).

2.5.3 Unit Cost Indexing Results

The OM&A performance evaluations for each year of available data are presented in Table 6. That table reports the ratio of the average actual OM&A unit cost index of each company in the last three years to the peer group's average OM&A unit cost index over the same years. A lower ratio of actual unit cost to peer group unit cost implies better performance. Table 7 ranks each power Distributor according to this ratio.

Two lines have been drawn on Table 7, demarcating the first quartile and the fourth quartile. The utilities on the top (efficiency rankings 1-18) are labeled as top quartile cost performers. The utilities on the bottom (efficiency rankings 57-74) are classified as bottom quartile cost performers according to the unit cost benchmarking method.[19] Hydro One Networks is not included in Table 7, given its lack of suitable peers in Ontario.

The overall process used to calculate the unit cost indexing results is shown in Figure 4 below.

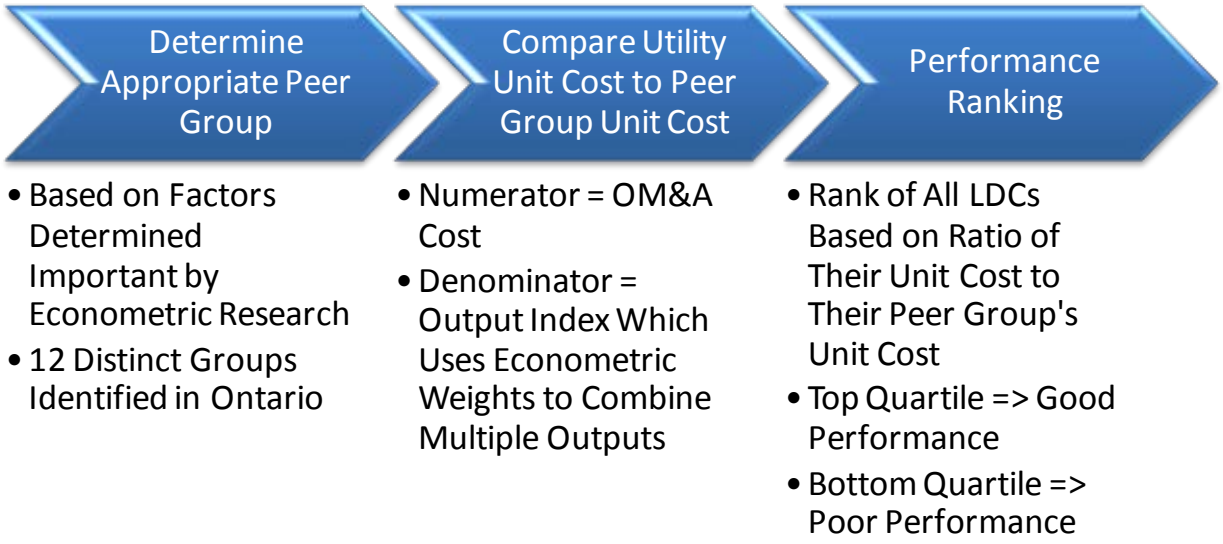

Figure 4: Process for Calculating Unit Cost Indexing Results

[19] This is calculated by dividing 74 by 4. This puts 18 Distributors (rounded) in each of the four quartiles.

Table 6: Unit OM&A Cost Indexes by Peer Group

Unit OM&A Cost Indexes

	2006	2007	2008	2009	2010	2011	Average of Last 3 Available Years[1]	Average / Group Average[1] [A]	Percentage Differences[1] [A - 1]
Small Northern Low Undergrounding									
Renfrew Hydro Inc.	0.958	1.051	1.168	1.174	1.194	1.333	1.234	**0.684**	-31.6%
Northern Ontario Wires Inc.	1.115	1.203	1.308	1.357	1.375	1.464	1.398	**0.775**	-22.5%
Espanola Regional Hydro Distribution Corporation	1.321	1.310	1.344	1.457	1.403	1.397	1.419	**0.787**	-21.3%
Parry Sound Power Corporation	1.227	1.205	1.382	1.426	1.431	1.536	1.464	**0.812**	-18.8%
Sioux Lookout Hydro Inc.	1.263	1.386	1.471	1.496	1.531	1.447	1.491	**0.827**	-17.3%
Fort Frances Power Corporation	1.253	1.348	1.478	1.593	1.597	1.630	1.607	**0.891**	-10.9%
Chapleau Public Utilities Corporation	1.718	2.229	2.078	1.735	1.981	1.968	1.894	**1.050**	5.0%
Atikokan Hydro Inc.	1.455	1.786	2.267	2.520	2.849	2.681	2.683	**1.488**	48.8%
Algoma Power Inc.	2.698	2.762	2.943	2.923	2.938	3.272	3.044	**1.688**	68.8%
Group Average							**1.804**		
Small Northern Medium Undergrounding									
Ottawa River Power Corporation	1.010	1.136	1.154	1.184	1.142	1.303	1.210	**0.900**	-10.0%
Hearst Power Distribution Company Limited	0.831	0.869	1.002	1.247	1.220	1.211	1.226	**0.912**	-8.8%
Lakeland Power Distribution Ltd.	0.949	0.854	1.183	1.302	1.402	1.296	1.333	**0.992**	-0.8%
Kenora Hydro Electric Corporation Ltd.	1.070	1.203	1.357	1.559	1.500	1.768	1.609	**1.197**	19.7%
Group Average							**1.344**		
Mid-Size Northern									
North Bay Hydro Distribution Limited	1.073	0.943	0.962	0.924	0.901	0.974	0.933	**0.872**	-12.8%
Greater Sudbury Hydro Inc.	1.000	1.658	1.101	1.153	0.770	1.263	1.062	**0.992**	-0.8%
Thunder Bay Hydro Electricity Distribution Inc.	0.981	1.080	1.093	1.122	1.154	1.118	1.132	**1.057**	5.7%
PUC Distribution Inc.	0.957	1.087	1.009	1.097	1.174	1.194	1.155	**1.079**	7.9%
Group Average							**1.071**		
Large Northern									
Hydro One Networks Inc.	1.118	1.311	1.522	1.676	1.761	1.760	1.733	**1.000**	0.0%
Group Average							**1.733**		
Small Southern Low & Medium Undergrounding									
Hydro Hawkesbury Inc.	0.554	0.599	0.643	0.640	0.710	0.756	0.702	**0.535**	-46.5%
Lakefront Utilities Inc.	0.887	0.905	0.911	0.937	1.015	1.107	1.020	**0.777**	-22.3%
Hydro 2000 Inc.	0.886	0.935	0.960	1.053	1.208	1.251	1.171	**0.892**	-10.8%
Rideau St. Lawrence Distribution Inc.	1.135	1.187	1.285	1.395	1.432	1.392	1.406	**1.072**	7.2%
Wellington North Power Inc.	1.143	1.122	1.447	1.420	1.470	1.825	1.572	**1.198**	19.8%
Brant County Power Inc.	1.503	0.653	1.356	1.736	1.619	1.468	1.608	**1.226**	22.6%
Port Colborne (CNP)	1.951	2.129	1.787	1.689	1.686	1.733	1.703	**1.298**	29.8%
Group Average							**1.312**		
Small Southern Medium-High Undergrounding									
Entegrus Powerlines Inc. (Middlesex)	0.930	0.896	0.892	0.957	0.954	0.934	0.948	**0.800**	-20.0%
Midland Power Utility Corporation	1.091	1.066	1.084	1.119	1.107	1.015	1.080	**0.911**	-8.9%
Tillsonburg Hydro Inc.	0.950	0.942	0.975	1.297	1.329	1.331	1.319	**1.112**	11.2%
West Coast Huron Energy Inc.	1.441	1.190	1.272	1.433	1.340	1.412	1.395	**1.177**	17.7%
Group Average							**1.186**		
Small Southern Medium-High Undergrounding with Rapid Growth									
Grimsby Power Incorporated	0.743	0.813	0.867	0.900	0.860	0.993	0.918	**0.826**	-17.4%
Niagara-on-the-Lake Hydro Inc.	0.835	0.926	0.927	0.977	0.915	0.983	0.958	**0.862**	-13.8%
Orangeville Hydro Limited	0.863	0.926	1.026	1.014	1.083	1.248	1.115	**1.003**	0.3%
Centre Wellington Hydro Ltd.	1.035	1.047	1.102	1.186	1.206	1.336	1.243	**1.118**	11.8%
Cooperative Hydro Embrun Inc.	1.040	1.138	1.142	1.153	1.316	1.499	1.323	**1.190**	19.0%
Group Average							**1.111**		

(continued)

Unit OM&A Cost Indexes

	2006	2007	2008	2009	2010	2011	Average of Last 3 Available Years[1]	Average / Group Average[1] [A]	Percentage Differences[1] [A - 1]
Mid-size Southern Low & Medium Undergrounding									
Norfolk Power Distribution Inc.	0.920	1.090	1.237	1.070	1.123	1.091	1.095	**0.877**	-12.3%
Innisfil Hydro Distribution Systems Limited	0.971	1.039	1.134	1.163	1.200	1.297	1.220	**0.978**	-2.2%
Fort Erie - Eastern Ontario Power (CNP)	1.420	1.470	1.336	1.175	1.310	1.244	1.243	**0.996**	-0.4%
Haldimand County Hydro Inc.	1.063	1.344	1.348	1.208	1.233	1.344	1.261	**1.011**	1.1%
Orillia Power Distribution Corporation	1.112	1.197	1.289	1.331	1.416	1.510	1.419	**1.137**	13.7%
Group Average							**1.247**		
Mid-size Southern Medium-High Undergrounding									
Festival Hydro Inc.	0.789	0.780	0.808	0.836	0.869	0.873	0.860	**0.812**	-18.8%
Entegrus Powerlines Inc. (Chatham-Kent)	0.668	0.686	0.748	0.771	0.903	0.923	0.866	**0.818**	-18.2%
Peterborough Distribution Incorporated	0.853	0.882	0.954	0.895	0.840	0.921	0.885	**0.836**	-16.4%
Westario Power Inc.	0.940	0.899	1.073	0.989	0.917	0.976	0.960	**0.907**	-9.3%
Essex Powerlines Corporation	1.091	1.010	0.964	0.933	0.952	1.013	0.966	**0.913**	-8.7%
Kingston Hydro Corporation	0.823	0.820	0.898	0.916	1.005	1.095	1.005	**0.950**	-5.0%
E.L.K. Energy Inc.	0.818	0.851	0.964	1.120	0.905	1.040	1.022	**0.965**	-3.5%
Wasaga Distribution Inc.	0.972	0.952	0.994	1.036	1.100	1.112	1.083	**1.023**	2.3%
St. Thomas Energy Inc.	1.059	1.003	0.977	1.062	1.049	1.162	1.091	**1.031**	3.1%
Woodstock Hydro Services Inc.	0.947	0.979	1.005	1.061	1.094	1.165	1.107	**1.045**	4.5%
Niagara Peninsula Energy Inc.	1.024	0.971	1.061	1.081	1.108	1.135	1.108	**1.047**	4.7%
Welland Hydro-Electric System Corp.	0.742	0.955	0.971	1.097	1.042	1.195	1.111	**1.050**	5.0%
COLLUS Power Corp.	0.960	0.999	1.096	1.212	1.199	1.225	1.212	**1.145**	14.5%
Bluewater Power Distribution Corporation	1.087	1.029	1.053	1.193	1.203	1.298	1.232	**1.163**	16.3%
Erie Thames Powerlines Corporation	1.400	1.470	1.431	1.362	1.388	1.362	1.371	**1.295**	29.5%
Group Average							**1.059**		
Large City Southern Medium-High Undergrounding									
Veridian Connections Inc.	0.835	0.737	0.823	0.803	0.824	0.817	0.815	**0.811**	-18.9%
Hydro Ottawa Limited	0.697	0.668	0.814	0.820	0.815	0.875	0.837	**0.833**	-16.7%
EnWin Utilities Ltd.	1.070	1.030	1.128	1.085	1.124	1.193	1.134	**1.129**	12.9%
Toronto Hydro-Electric System Limited	0.841	0.910	1.053	1.121	1.233	1.348	1.234	**1.228**	22.8%
Group Average							**1.005**		
Large City Southern High Undergrounding									
Hydro One Brampton Networks Inc.	0.548	0.516	0.602	0.595	0.583	0.623	0.600	**0.740**	-26.0%
PowerStream Inc.	0.651	0.697	0.778	0.808	0.854	0.787	0.816	**1.006**	0.6%
Horizon Utilities Corporation	0.653	0.736	0.801	0.835	0.800	0.855	0.830	**1.023**	2.3%
Enersource Hydro Mississauga Inc.	0.819	0.862	0.855	0.966	0.837	0.877	0.893	**1.101**	10.1%
London Hydro Inc.	0.757	0.790	0.838	0.871	0.925	0.955	0.917	**1.130**	13.0%
Group Average							**0.811**		
Mid-size GTA Medium-High & High Undergrounding									
Kitchener-Wilmot Hydro Inc.	0.651	0.661	0.695	0.689	0.678	0.765	0.711	**0.839**	-16.1%
Waterloo North Hydro Inc.	0.743	0.715	0.740	0.723	0.752	0.767	0.747	**0.882**	-11.8%
Oakville Hydro Electricity Distribution Inc.	0.844	0.789	0.725	0.759	0.776	0.910	0.815	**0.962**	-3.8%
Halton Hills Hydro Inc.	0.896	0.809	0.955	0.770	0.826	0.861	0.819	**0.967**	-3.3%
Cambridge and North Dumfries Hydro Inc.	0.585	0.673	0.739	0.821	0.776	0.863	0.820	**0.968**	-3.2%
Milton Hydro Distribution Inc.	0.745	0.756	0.811	0.821	0.794	0.870	0.828	**0.978**	-2.2%
Oshawa PUC Networks Inc.	0.667	0.719	0.822	0.829	0.815	0.909	0.851	**1.004**	0.4%
Guelph Hydro Electric Systems Inc.	0.730	0.834	0.821	0.812	0.785	1.002	0.866	**1.023**	2.3%
Brantford Power Inc.	0.773	0.952	0.949	0.969	0.930	0.837	0.912	**1.077**	7.7%
Newmarket - Tay Power Distribution Ltd.	0.790	0.778	0.877	0.900	0.913	0.925	0.912	**1.077**	7.7%
Burlington Hydro Inc.	0.819	0.848	0.894	0.910	0.912	0.962	0.928	**1.096**	9.6%
Whitby Hydro Electric Corporation	0.897	0.934	0.917	0.953	0.956	0.959	0.956	**1.129**	12.9%
Group Average							**0.847**		
AVERAGE: ALL COMPANIES	**0.995**	**1.036**	**1.100**	**1.136**	**1.151**	**1.211**	**1.166**		

[1] Lower values imply better performance

Table 7: Performance Rankings Based on Unit Cost Indexes

Updated Performance Rankings Based on Unit Cost Indexes

	Average / Group Average[1] [A]	Percentage Differences[1] [A - 1]	Efficiency Ranking [1]
Hydro Hawkesbury Inc.	**0.535**	-46.5%	1
Renfrew Hydro Inc.	**0.684**	-31.6%	2
Hydro One Brampton Networks Inc.	**0.740**	-26.0%	3
Northern Ontario Wires Inc.	**0.775**	-22.5%	4
Lakefront Utilities Inc.	**0.777**	-22.3%	5
Espanola Regional Hydro Distribution Corporation	**0.787**	-21.3%	6
Entegrus Powerlines Inc. (Middlesex)	**0.800**	-20.0%	7
Veridian Connections Inc.	**0.811**	-18.9%	8
Parry Sound Power Corporation	**0.812**	-18.8%	9
Festival Hydro Inc.	**0.812**	-18.8%	10
Entegrus Powerlines Inc. (Chatham-Kent)	**0.818**	-18.2%	11
Grimsby Power Incorporated	**0.826**	-17.4%	12
Sioux Lookout Hydro Inc.	**0.827**	-17.3%	13
Hydro Ottawa Limited	**0.833**	-16.7%	14
Peterborough Distribution Incorporated	**0.836**	-16.4%	15
Kitchener-Wilmot Hydro Inc.	**0.839**	-16.1%	16
Niagara-on-the-Lake Hydro Inc.	**0.862**	-13.8%	17
North Bay Hydro Distribution Limited	**0.872**	-12.8%	18
Norfolk Power Distribution Inc.	**0.877**	-12.3%	19
Waterloo North Hydro Inc.	**0.882**	-11.8%	20
Fort Frances Power Corporation	**0.891**	-10.9%	21
Hydro 2000 Inc.	**0.892**	-10.8%	22
Ottawa River Power Corporation	**0.900**	-10.0%	23
Westario Power Inc.	**0.907**	-9.3%	24
Midland Power Utility Corporation	**0.911**	-8.9%	25
Hearst Power Distribution Company Limited	**0.912**	-8.8%	26
Essex Powerlines Corporation	**0.913**	-8.7%	27
Kingston Hydro Corporation	**0.950**	-5.0%	28
Oakville Hydro Electricity Distribution Inc.	**0.962**	-3.8%	29
E.L.K. Energy Inc.	**0.965**	-3.5%	30
Halton Hills Hydro Inc.	**0.967**	-3.3%	31
Cambridge and North Dumfries Hydro Inc.	**0.968**	-3.2%	32
Milton Hydro Distribution Inc.	**0.978**	-2.2%	33
Innisfil Hydro Distribution Systems Limited	**0.978**	-2.2%	34
Lakeland Power Distribution Ltd.	**0.992**	-0.8%	35
Greater Sudbury Hydro Inc.	**0.992**	-0.8%	36
Fort Erie - Eastern Ontario Power (CNP)	**0.996**	-0.4%	37
Orangeville Hydro Limited	**1.003**	0.3%	38
Oshawa PUC Networks Inc.	**1.004**	0.4%	39
PowerStream Inc.	**1.006**	0.6%	40
Haldimand County Hydro Inc.	**1.011**	1.1%	41

[1] Lower values imply better performance

[2] Hydro One Networks Inc. is alone in their peer group so is omitted here

(continued)

Updated Performance Rankings Based on Unit Cost Indexes

	Average / Group Average[1] [A]	Percentage Differences[1] [A - 1]	Efficiency Ranking [1]
Guelph Hydro Electric Systems Inc.	**1.023**	2.3%	42
Horizon Utilities Corporation	**1.023**	2.3%	43
Wasaga Distribution Inc.	**1.023**	2.3%	44
St. Thomas Energy Inc.	**1.031**	3.1%	45
Woodstock Hydro Services Inc.	**1.045**	4.5%	46
Niagara Peninsula Energy Inc.	**1.047**	4.7%	47
Welland Hydro-Electric System Corp.	**1.050**	5.0%	48
Chapleau Public Utilities Corporation	**1.050**	5.0%	49
Thunder Bay Hydro Electricity Distribution Inc.	**1.057**	5.7%	50
Rideau St. Lawrence Distribution Inc.	**1.072**	7.2%	51
Brantford Power Inc.	**1.077**	7.7%	52
Newmarket - Tay Power Distribution Ltd.	**1.077**	7.7%	53
PUC Distribution Inc.	**1.079**	7.9%	54
Burlington Hydro Inc.	**1.096**	9.6%	55
Enersource Hydro Mississauga Inc.	**1.101**	10.1%	56
Tillsonburg Hydro Inc.	**1.112**	11.2%	57
Centre Wellington Hydro Ltd.	**1.118**	11.8%	58
EnWin Utilities Ltd.	**1.129**	12.9%	59
Whitby Hydro Electric Corporation	**1.129**	12.9%	60
London Hydro Inc.	**1.130**	13.0%	61
Orillia Power Distribution Corporation	**1.137**	13.7%	62
COLLUS Power Corp.	**1.145**	14.5%	63
Bluewater Power Distribution Corporation	**1.163**	16.3%	64
West Coast Huron Energy Inc.	**1.177**	17.7%	65
Cooperative Hydro Embrun Inc.	**1.190**	19.0%	66
Kenora Hydro Electric Corporation Ltd.	**1.197**	19.7%	67
Wellington North Power Inc.	**1.198**	19.8%	68
Brant County Power Inc.	**1.226**	22.6%	69
Toronto Hydro-Electric System Limited	**1.228**	22.8%	70
Erie Thames Powerlines Corporation	**1.295**	29.5%	71
Port Colborne (CNP)	**1.298**	29.8%	72
Atikokan Hydro Inc.	**1.488**	48.8%	73
Algoma Power Inc.	**1.688**	68.8%	74

[1] Lower values imply better performance

[2] Hydro One Networks Inc. is alone in their peer group so is omitted here

3 Efficiency Cohort Groupings

A company will be in efficiency Cohort 1 if it is statistically superior based on the econometric benchmarking results (found in Table 4), **and** in the top quartile of the unit cost benchmarking rankings (found in Table 7). A company will be in efficiency Cohort 3 if it is statistically inferior based on the econometric benchmarking results, **and** in the bottom quartile of the unit cost benchmarking rankings. All remaining companies are placed in efficiency Cohort 2.

PSE's analysis of Distributors' OM&A cost performance indicates that there are ten Distributors in Cohort 1, fifty-four Distributors in Cohort 2, and eleven Distributors in Cohort 3.

No peer group has been identified for Hydro One Networks Inc. for the purposes of unit cost benchmarking. The Board has previously determined that distributors that rank superior or inferior in only one evaluation will be assigned to the middle cohort. For this reason, Hydro One Networks Inc. has been assigned to Cohort 2.[20]

Figure 5 below details the nine companies which changed cohorts from the 2012 update to the 2013 update.

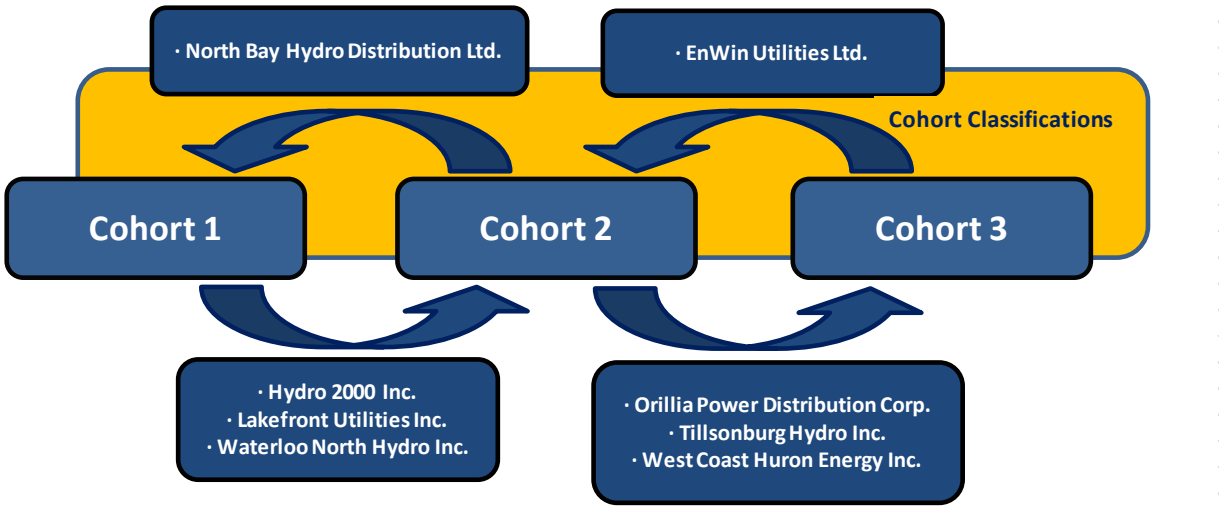

Figure 5: Cohort Changes from 2012 Update to 2013 Update

Table 8 below presents the full sample of Ontario power Distributors and their corresponding efficiency cohorts for the 2013 update.

[20] Please see the Board's report (referenced on page 1) dated July 14, 2008 page 22 regarding this issue.

Table 8: 2013 Efficiency Cohort Groupings

2013 Efficiency Cohort Grouping Results

Company	Cohort
Entegrus Powerlines Inc. (Chatham-Kent Hydro Inc.)	1
Festival Hydro Inc.	1
Grimsby Power Incorporated	1
Hydro Hawkesbury Inc.	1
Hydro One Brampton Networks Inc.	1
Kitchener-Wilmot Hydro Inc.	1
Entegrus Powerlines Inc. (Middlesex Power Distribution Corporation)	1
North Bay Hydro Distribution Limited	1
Northern Ontario Wires Inc.	1
Renfrew Hydro Inc.	1
Atikokan Hydro Inc.	2
Bluewater Power Distribution Corporation	2
Brantford Power Inc.	2
Burlington Hydro Inc.	2
Cambridge and North Dumfries Hydro Inc.	2
Chapleau Public Utilities Corporation	2
Cooperative Hydro Embrun Inc.	2
E.L.K. Energy Inc.	2
Enersource Hydro Mississauga Inc.	2
EnWin Utilities Ltd.	2
Espanola Regional Hydro Distribution Corporation	2
Essex Powerlines Corporation	2
Fort Erie - Eastern Ontario Power (CNP)	2
Fort Frances Power Corporation	2
Greater Sudbury Hydro Inc.	2
Guelph Hydro Electric Systems Inc.	2
Haldimand County Hydro Inc.	2
Halton Hills Hydro Inc.	2
Hearst Power Distribution Company Limited	2
Horizon Utilities Corporation	2
Hydro 2000 Inc.	2
Hydro One Networks Inc.[1]	2
Hydro Ottawa Limited	2
Innisfil Hydro Distribution Systems Limited	2
Kenora Hydro Electric Corporation Ltd.	2
Kingston Hydro Corporation	2
Lakefront Utilities Inc.	2
Lakeland Power Distribution Ltd.	2
London Hydro Inc.	2
Midland Power Utility Corporation	2

(continued from previous page)

2013 Efficiency Cohort Grouping Results

Company	Cohort
Milton Hydro Distribution Inc.	2
Newmarket - Tay Power Distribution Ltd.	2
Niagara Peninsula Energy Inc.	2
Niagara-on-the-Lake Hydro Inc.	2
Norfolk Power Distribution Inc.	2
Oakville Hydro Electricity Distribution Inc.	2
Orangeville Hydro Limited	2
Oshawa PUC Networks Inc.	2
Ottawa River Power Corporation	2
Parry Sound Power Corporation	2
Peterborough Distribution Incorporated	2
PowerStream Inc.	2
PUC Distribution Inc.	2
Rideau St. Lawrence Distribution Inc.	2
Sioux Lookout Hydro Inc.	2
St. Thomas Energy Inc.	2
Thunder Bay Hydro Electricity Distribution Inc.	2
Veridian Connections Inc.	2
Wasaga Distribution Inc.	2
Waterloo North Hydro Inc.	2
Welland Hydro-Electric System Corp.	2
Westario Power Inc.	2
Whitby Hydro Electric Corporation	2
Woodstock Hydro Services Inc.	2
Algoma Power Inc.	3
Brant County Power Inc.	3
Centre Wellington Hydro Ltd.	3
COLLUS Power Corp.	3
Erie Thames Powerlines Corporation	3
Orillia Power Distribution Corporation	3
Port Colborne (CNP)	3
Tillsonburg Hydro Inc.	3
Toronto Hydro-Electric System Limited	3
Wellington North Power Inc.	3
West Coast Huron Energy Inc.	3

[1] Hydro One Networks is only being evaluated by the econometric benchmarking approach and is automatically assigned to Cohort 2.

About PSE's Economics and Market Research Group

Founded in 1974, PSE is a full-service consulting firm. PSE's benchmarking experience includes research for regulatory purposes and utility management improvement. Our benchmarking team consists of economists, planning and design engineers, rate and financial analysts, communications infrastructure consultants, and smart grid technology experts. In addition to our statistical cost research, PSE's Economics and Market Research group has expertise in the areas of demand response, energy efficiency, value-based reliability planning, T&D reliability benchmarking, merger valuations, load forecasting, load research, survey design, alternative regulation, and cost of service studies. For more information on PSE and a full list of services, visit our website at www.powersystem.org.

About the Authors

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Mr. Fenrick has over a decade of consulting experience in the evaluation of utility cost and reliability efficiency. He leads PSE's benchmarking and economic study practice areas. He has provided expert witness testimony on performance benchmarking and authored numerous reports on the topic. He is the conference chair for a semi-annual EUCI conference on measuring and improving the cost and reliability performance of electric distributors. Mr. Fenrick has evaluated performance relating to electric and gas distribution, power transmission, power plant performance, and water distribution. These evaluations have been conducted for utilities, regulatory agencies, and consumer advocates. Mr. Fenrick earned a BS in Economics (Mathematical Emphasis) and a Master's in Applied Economics, both from the University of Wisconsin-Madison.

Lullit Getachew, Senior Economist

Dr. Getachew has experience in conducting research and analysis in support of benchmarking projects for energy utilities. She has written a number of academic journal articles on benchmarking and performance evaluation. She has also prepared studies and reports for performance-based regulation of transmission and distribution energy businesses, undertaken total and operation cost benchmarking, prepared reports for rate settlements, and marketed flexibility in rate designs. Dr. Getachew earned her PhD in Economics at Rice University, her Master's in Law and Diplomacy at the Fletcher School at Tufts University, and her BA *magna cum laude* from Mount Holyoke College.

Jeff Smith, Economist

Mr. Smith earned his Master's in Applied Economics from Marquette University. Since that time, Mr. Smith has been an economist in the utilities industry and has worked on numerous benchmarking and demand-side management projects. He has vast experience in database development and preparation.