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Review of Cost Allocation Policy for Unmetered Loads (EB-2012-0383)

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for the Ontario Energy Board

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Disclaimer

The views expressed in this report are those of Elenchus and do not necessarily represent the views of, and should not be attributed to, the Ontario Energy Board, any individual Board member, or Board Staff.

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EXECUTIVE SUMMARY

The Ontario Energy Board ("Board") initiated a Proceeding to review the Cost Allocation Policy for Unmetered Loads. Unmetered Loads refer to electricity loads such as Street Lighting, Sentinel Lighting and Unmetered Scattered Loads whose consumption is not measured by a meter. A Working Group was established with representatives from distributors, stakeholders and Unmetered Load customers. The Working Group's role was to assist Elenchus (and Board Staff) in identifying and understanding the current issues regarding Cost Allocation as it applies to Unmetered Loads and to also provide input and or suggestions as to possible solutions.

The Working Group met a number of times to review the existing Cost Allocation Methodology and discuss participant's views on the existing approach.

The Working Group discussed various issues related to the allocation of costs to Unmetered Loads and the more material issues are presented in this report. There are differences of opinion amongst the members on some of the issues discussed and notwithstanding these differences of opinion, Elenchus is not recommending at this stage any specific changes to the current Cost Allocation Policy for Unmetered Loads. Instead, instructions and guidance on the use of the Cost Allocation Model are recommended and are discussed in this report. Continued communications between distributors and Unmetered load customers is suggested in order to provide distributors current information to assist in addressing the specific factors used in the allocation of costs for Unmetered Loads and distributors to explain how the charges for Unmetered Loads are derived.

The following recommendations are made by Elenchus for consideration by the Board:

a) Data – Customers' Responsibility

- Municipalities and distributors should establish a channel of communication that will enable the municipalities to bring to the attention of their distributor any technology change(s) that impacts electricity consumption. Municipalities and distributors should be able to determine what the appropriate consumption pattern is for Street Lighting that would reflect the technology used by Streetlights, (e.g. improved energy efficiency, dimming, under-driving, etc.). Elenchus recommends that the Board direct distributors to update Unmetered Load profiles reflecting energy efficiency improvements when they can be supported by evidence presented by Unmetered Load customers. It is the responsibility of the Unmetered Load customer to provide the information to the distributor. The updated consumption estimates should be used by distributors for billing Unmetered Loads as soon as they are validated.

b) Communication – Distributors' Responsibility

- Distributors should continue to work closely with municipalities in order to determine and explain the distribution configuration system used by the distributor to connect Streetlights and other Unmetered Loads. The actual configuration used by the distributors in connecting Unmetered Loads should be reflected in their Cost Allocation Methodology. This leads to different cost

allocation study results from one utility to another as the connection configuration of Unmetered Loads varies.

- Distributors should continue to devote efforts in explaining to their unmetered customers the regulatory process that is followed in Ontario in order to approve distribution rates, including the Board's Cost Allocation Model and how it is used to develop charges for Unmetered Loads. Good utility practice would be that distributors involve their customers in Stakeholder sessions while the distributor is preparing the rate rebasing application to the Board and before it is finalized, in order to allow the customers to understand the assumptions used in the application and the resulting impacts. This would also allow customers to provide distributors the most current information available to be used in the application.
- Distributors should follow a similar approach with unmetered customers that invest in energy efficiency improvements as for metered customers. The new consumption reflecting energy efficiency improvements should be reflected in customers' bills. The consumption pattern used by distributors to bill Unmetered Loads should be updated to reflect energy efficiency improvements undertaken by the customer.

c) Conditions of Service – Distributors' Responsibility

- The Board should require distributors to have Conditions of Service that clearly explain the roles, responsibilities, and expectations of the distributor and customer. The document should serve as a manual for customers. Distributors should continue to work with Unmetered Load customers to ensure that customers understand the roles and responsibilities of Unmetered Load customers and of distributors in determining the load profiles and how Unmetered Loads are being supplied by distributors. The Conditions of Service section dealing with Unmetered Loads should clearly state the roles and responsibilities of the customer and distributor, respectively, with respect to keeping load demand and consumption data current. The process for maintaining accurate Unmetered Load data should be specified in the Conditions of Service document.

  Some of the requirements to be included in the Conditions of Service are listed below, but is not limited to the following:

  - Outlining the process for submitting customer consumption, load, or device-specific data
  - Acceptable forms of testing (e.g. certified lab or in-field metering units)
  - Clarify ownership and maintenance responsibility of assets
  - Clear references to specific external documents (e.g. commercial design specifications, outage protocol, demarcation points)

d) Cost Allocation Model and Results – Board's Responsibility

- Change in demand allocators to use amperage instead of kW demand should only be implemented if it can be determined that the data would be available for

all customer classes, that the new allocator is a better reflection of cost causality, and after the impacts of the change in allocators have been evaluated for all customer classes. A change in demand allocators used in the Cost Allocation Model should not be implemented without input from all affected stakeholders**.**

- Continue using the Minimum System Method in order to classify distribution lines and transformers as customer and demand related. Some distribution assets are used and expenses incurred regardless of how much electricity is consumed and these costs, based on cost causality principles, should be classified as customer-related. A change in the use of the Minimum System Method in the Cost Allocation Model should not be implemented without input from all affected stakeholders, and is outside the scope of this initiative.
- The Board's current Policy with respect to revenue to cost ratio ranges remains appropriate given the quality of the underlying data. Elenchus does not recommend at this time to narrow the range of acceptable revenue to cost ratios for the three Unmetered Loads customer classes without further data collection and analysis.

e) Terminology and Definitions – Board's Responsibility

- Examples of how to develop weighting factors for Services, Billing and Collecting should be brought to the attention of distributors to assist them in developing their own weighting factors for Unmetered Loads. The Board requires that distributors derive their own weighting factors, or demonstrate that the default weighting factor values are appropriate given their specific circumstances.
- The terminology definitions included in this report as well as the different configurations for connecting Unmetered Loads should be added in the introduction sheet of the Cost Allocation Model as examples.
- Additional information sessions for interested Unmetered Load customers should be offered to explain the Board's Cost Allocation Model and the results of this consultation on Unmetered Loads.

This report provides background information on the regulatory process in setting distribution rates for Unmetered Loads and the Cost Allocation Methodology. It also reviews and provides Elenchus' comments and recommendations on issues raised at the Working Group meetings by participants.

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

On October 1, 2012, the Ontario Energy Board (the "Board") initiated a review of the Cost Allocation Policy for Unmetered Loads (EB-2012-0383). This review is a follow-up to a consultation where the Board reviewed certain issues related to the Board's Cost Allocation Methodology for electricity distributors (EB-2010-0219).

The Board established a Working Group in order to assist with the review of the Cost Allocation Policy for Unmetered Loads. The Working Group participants are shown in Appendix A to this report. Participants include representatives of:

- Municipalities representing the City of Toronto, the City of Hamilton and the City of Brampton;
- Cable TV company (Rogers Cable Communications);
- Electricity distributors of varying size and profile;
- The Association of Municipalities of Ontario;
- The Vulnerable Energy Consumer's Coalition;
- Energy Probe Research Foundation;
- Board staff; and
- Elenchus Research Associates.

1.2 PROJECT OBJECTIVES

Board staff identified the following objectives for this project:

- Review and clarify the terminology used to allocate assets and expenses to Unmetered Loads;
- Review and clarify the methodology used to allocate assets and expenses to Unmetered Loads;
- Provide additional guidance to distributors on flexibility of, and further instructions in the current Cost Allocation Model with respect to Unmetered Loads;
- Provide recommendations with respect to updating the Cost Allocation Model with additional worksheets or to make other changes to the model as required.

1.3 STRUCTURE OF REPORT

Section 1 of this report provides the project description and objectives.

Section 2 provides background information on the electricity market in Ontario, cost allocation methodology and regulatory environment.

Section 3 provides definitions of terminology and the data used in the Cost Allocation Methodology.

Section 4 provides description of the distribution configuration used by distributors to connect Unmetered Loads.

Section 5 describes sensitivity analysis done on the Cost Allocation Methodology.

Section 6 addresses certain issues discussed at the Working Group meetings with respect to cost allocation for Unmetered Loads and presents Elenchus' comments and recommendations.

Section 7 includes a summary of Elenchus' recommendations to the Board.

2 BACKGROUND

2.1 ELECTRICITY MARKET IN ONTARIO

The Government of Ontario opened up the Ontario electricity system to competition on May 1, 2002.

Distributors' rates were regulated by Ontario Hydro until April 1999 and since that date the Board has been regulating distributors' rates. Up until May 2002 electricity rates in Ontario were bundled, that is, the rates included the costs of generation, transmission and distribution of electricity.

Since May 2002, separate, (unbundled), rates were established to recover generation, transmission, and distribution costs from customers. There are also rates to recover costs related to the Independent Electricity System Operator, Ontario Power Authority, and Debt Retirement Charges. These rates are now pass-through charges for distributors.

Distribution rates are established based on guidelines developed by the Board. These guidelines were developed in order to set distribution rates based on cost causality principles and to address possible cross-subsidies that may have existed between customer classes to ensure, to the extent feasible, that each customer class is charged for the costs they impose on distributors.

The move from bundled to unbundled rates and applying cost causality principles through the Board approved cost allocation (the "Cost Allocation") has resulted in significant bill impacts especially to Street Lighting and Sentinel Lighting customer classes for some electricity distributors that previously were probably not recovering all the costs of providing electricity to these classes.

2.2 COST ALLOCATION METHODOLOGY

Distributors own assets and incur expenses in delivering electricity to their customers. Most of the assets and expenses related to the delivery of electricity are associated with more than one customer class, that is, they are largely shared assets and expenses.

Cost allocation is commonly used in the utility industry to apportion assets and expenses amongst the customer classes served by the utility. The allocation methodology is based on cost causality principles and is used to apportion assets and expenses in a fair and reasonable manner. The costs of the assets and expenses allocated to each customer class are then the basis for determining the utility's distribution rates.

Traditional cost allocation methodologies involve three steps: Functionalization, Categorization (or Classification), and Allocation.

Functionalization is the process of grouping assets and expenses of a similar nature, and is the first step in cost allocation. For example, functions could be line

maintenance, transformer maintenance, customer service, and meter reading. The assets or expenses contained in each of the distributors chart of accounts is identified so that the costs can be appropriately assigned to the identified functions that the distributors perform to serve its customers.

Categorization or Classification is the process by which the functionalized assets and expenses are classified according to cost drivers. These cost drivers are typically demand, energy and/or factors specifically related to the customer or class. The total costs for each function are the costs the distributor incurs to meet the quantum of system demand, energy throughput or customer specific factors such as the number of customers.

Allocation is the process of attributing the demand, energy, and customer-related assets and expenses to the customer classes being served by the utility. This is the final step to establishing the base costs by class for subsequent rate design purposes. This allocation is accomplished by identifying variables called allocators that are related to demand, energy, or customer counts. For example, if the necessary investment in a particular class of asset (e.g., certain upstream transformers) is caused strictly by the single peak in annual demand, then the relevant costs would be allocated using the estimate of the single system peak demand, which in the Board's Cost Allocation Methodology is the 1-coincident peak (1-CP) method for each class.

The Cost Allocation derives its accounting information on assets and the costs of operations from the Uniform System of Accounts (the "USofA")[1]. In addition the Cost Allocation study makes use of other information such as return on equity, debt costs, capital structure and income taxes, electricity consumption information, and other asset and expense statistics.

The financial, accounting, and related information used in a cost allocation model can be historical information or forecast data for a future test year. In Ontario, the Board's Chapter 2 Guidelines state that distributors use forecast test year data in order to establish their distribution rates[2]. The revenue requirement reflects the expected expenses to be incurred by the distributors in the test year. The allocators are based on the forecast customer counts, loads (kW and kWh) and load profile (hourly demand consumption) by rate class.

The result of applying a Cost Allocation Methodology is a revenue to cost (R/C) ratio determined for each customer class. Revenue in this ratio is determined by multiplying the sales forecast: energy, demand, number of customers, and/or number of connections by the currently Board approved distribution rates for the distributor[3]. A revenue to cost ratio of 1 (100%) or close to 1 is usually interpreted to mean that customer class rates are recovering the costs imposed on distributors. A revenue to cost ratio below one may mean that the customer class rates are not fully recovering

[1] Board's Accounting Procedures Handbook For Electricity Distributors
[2] Chapter 2 of the Filing Requirements for Transmission and Distribution Applications
[3] The revenue at current rates for each class is adjusted on a prorated basis so as to match the test year overall Revenue Requirement

costs while a revenue to cost ratio above 1 may mean that rates could be recovering more than the costs imposed on distributors.

Given the assumptions used in the cost allocation study, the quality of available data and the use of forecast data that may or may not turn out as predicted, a range of values for revenue to cost ratios is generally used as the starting point to designing rates as opposed to using a revenue to cost ratio value of 1.

The Board, in its report "Application of Cost Allocation for Electricity Distributors, Proceeding EB-2007-0667, dated November 28, 2007 summarizes the reasons for using a range of values for revenue to cost ratios:

> *The Board is cognizant of factors that currently limit or otherwise affect the ability or desirability of moving immediately to a cost allocation framework that might, from a theoretical perspective, be considered the ideal. These influencing factors include data quality issues and limited modelling experience, ... The Board also recognizes however, that cost allocation is, by its very nature, a matter that calls for the exercise of some judgment, both in terms of the cost allocation methodology itself and in terms of how and where cost allocation principles fit within the broader spectrum of rate setting principles that apply to – and the objectives sought to be achieved in – the setting of utility rates. The existence of the influencing factors does not outweigh the merit in moving forward on cost allocation. Rather, the Board considers that it is both important and appropriate to implement cost allocation policies at this time, and believes that the policies set out in this Report are directionally sound. With better quality data, greater experience with cost allocation modeling and further developments in relation to other rate design issues, the policies will be refined as required.*[4]

Other factors that impact the development of revenue to cost ratios mentioned in the Board report are the status of current rate classes and managing the movement of rates closer to allocated costs.

Conducting a cost allocation study is a "zero-sum" exercise from the point of view of the distributor. The distributor recovers its approved revenue requirement, and the Cost Allocation apportions the revenue requirement amongst the distributor's customer classes.

The Guidelines developed by the Board for distributors to allocate costs to customer classes based on cost causality principles were developed starting in 2002. The Board created a Technical Advisory Team (the "Team") that initiated the process of collecting the appropriate load data to support cost allocation studies that would apportion distributor's assets and expenses amongst customer classes using costs causality principles. The Team also developed the Cost Allocation Methodology used by distributors. The Board held public consultation on the methodology developed by the Team and the Board issued a report on September 29, 2006 titled "Board Directions on Cost Allocation Methodology for Electricity Distributors"[5] (EB-2005-0317). This report

[4] Section1.3, page 2
[5] http://www.ontarioenergyboard.ca/documents/cases/eb-2005-0317/report_directions_290906.pdf

provides guidelines for distributors when using the Board's Cost Allocation. This methodology has been in use since 2008 for setting electricity distribution rates.

Prior to the Board's Cost Allocation being first used for 2008, the Board also commenced a policy development process to develop generic guidelines for the rate-setting methodology to be used in setting May 1, 2006 rates. These generic rate-setting guidelines were documented in an Electricity Distribution Rate (EDR) Handbook which provided filing requirements for 2006 distribution rate applications. A spreadsheet-based rate model accompanied the EDR Handbook[6].

As distributors started using the Board's Cost Allocation Methodology the revenue to cost ratios for Street Lighting customer class turned out, in some instances, to be very low.[7] In order to mitigate the bill impact for Street Lights and the movement of the revenue to cost ratio to the low-end of the Board's recommended ranges, a phase-in over a number of years was implemented.[8] The increase in Street Lighting rates has had an impact on the budget of those municipalities that own Street Lights.

In 2010/2011, the Board conducted another consultation process in order to address certain issues identified with the Cost Allocation. One of the issues reviewed was the revenue to cost ratio boundaries that the Board considers acceptable for the customer classes that had the widest boundary ranges. This consultation process culminated with a report issued by the Board, dated March 31, 2011, in EB-2010-0219[9].

In that report the Board decided to maintain the revenue to cost ratio range for Street Lighting between 0.7 and 1.2 pending further work on the Cost Allocation for this customer class. The revenue to cost ratio for Sentinel Lighting and Unmetered Scattered Load was narrowed to 0.8 to 1.2.[10]

2.3 REGULATORY PROCESS FOR APPROVING ELECTRICITY DISTRIBUTION RATES

In Ontario, each distributor has to submit an application to the Board and obtain approval for any changes to its rates. Under the current regulatory process once every five years distributors generally have their rates set based on a public review of total costs that comprise the revenue requirement that underpins rates for each customer class. This includes reviewing financial costs, operating costs, and capital expenditures.

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[6] http://www.ontarioenergyboard.ca/OEB/Industry/Regulatory%20Proceedings/Policy%20Initiatives%20and%20Consultations/Archived%20OEB%20Key%20Initiatives/2006%20EDR%20Handbook%20Development/2006%20EDR%20Handbook%20-%20Final%20Report%20and%20Handbook

[7] Revenue to Cost ratios between 10% and 30%, or 0.1 to 0.3 were not uncommon in 2006 cost allocation informational filings from distributors.

[8] In most distribution rate decisions this was a period of 2 or 3 years.

[9] http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/261629/view/Board%20Report_CA%20Policy_for_Distributors_20110331.PDF

[10] ibid

In the intervening years distributors have their distribution rates approved based on an Incentive Regulation Mechanism (IRM), also a public review process that recognizes the effect of inflation adjusted for productivity improvements and exogenous factors beyond the distributors' control.

The regulatory process in Ontario results in each distributor determining its Board-approved distribution rates based on its own assets and expenses as well as other distributor specific factors. Distributors can only charge their customers the Board approved rates, which vary amongst distributors.

There is also a complaints process established by the Board for instances where the customer is of the view that the distributor is not responding to their request in an appropriate manner, for example if updated connection or consumption information has been presented by the Unmetered Load customer to the distributor and the information has not been accepted by the distributor. The customer can file a complaint with the Board and the Board will investigate the matter in keeping with established processes.

3 COST ALLOCATION METHODOLOGY AND DATA REQUIREMENTS

During the Working Group meetings it became apparent that there is confusion and misunderstanding of the various definitions used in the Cost Allocation Methodology and time was devoted in the meetings to clarify or develop proper definitions.

3.1 DEFINITIONS

The following terms are used in the apportionment of assets and expenses related to Unmetered Loads in the Cost Allocation Methodology.

3.1.1 DEVICE

A Device is the electrical equipment of the Unmetered Loads. Examples are individual Streetlights, Cable TV amplifiers, billboard lights, traffic lights and railway crossing signal lights. The identification of the number and types of devices is required in order to determine the electricity use associated with Unmetered Loads.

3.1.2 CONNECTION

A Connection is the physical link between the device and wire which are owned by the utility's customer and the utility's distribution system. A single connection may have one device attached to it or it may have multiple devices attached, in what is sometimes called a "daisy chain" arrangement. Usually multiple connections are utilized in order to serve an Unmetered Load customer.

The term connection also applies in the case of metered loads and refers to physical link where a load is connected to the utility's distribution system.

3.1.3 ACCOUNT

An account is a record of financial transactions over a period of time related to an arrangement between a customer and the local electrical utility company for the purposes of distributing electrical power to that customer.

An account may be a single customer and represent a single connection to the LDC's system as is the case with a typical residential customer. An account can also represent many "customers" as would be the case for a Retail Store with aggregated billing. Alternatively an account could have many connections as is generally the case with the Street Lights of a municipality.

3.1.4 CUSTOMER

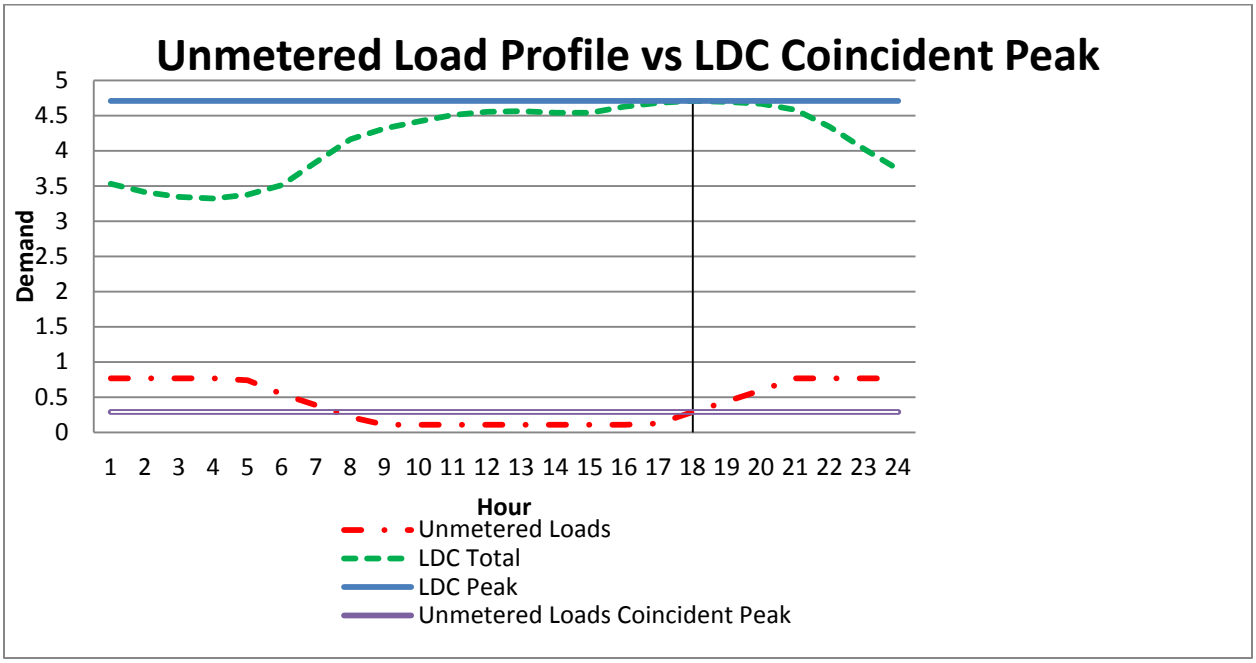
In the Board's Cost Allocation Model as currently constructed each customer is considered to have a service drop (which may be owned by the LDC or the customer) and, if not a USL customer, a meter. This is consistent with the initial Board report (EB-2005-0317) wherein customer is defined as follows:

> *For the purpose of the cost allocation filings, a "customer" is generally defined by a meter point that measures energy consumed over a period of time.*

3.1.5 COINCIDENT DEMAND

Electricity demand varies continuously. The timing of annual maximum hourly electricity demand represents the hour of maximum electricity consumption on a distribution system. The electricity consumption at that maximum hour by each distributor's customer class is called the coincident demand of the class. This coincident demand can be determined annually (1-CP), the highest four months (4-CP), or monthly (12-CP).

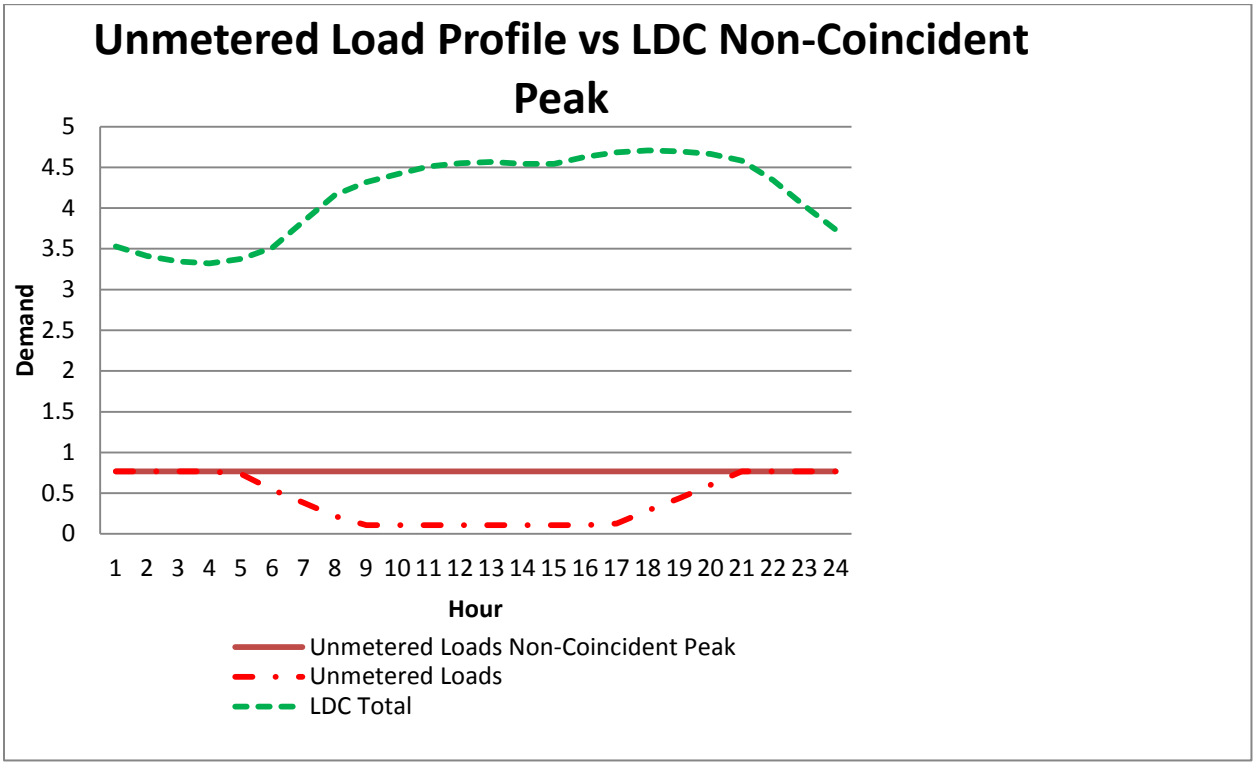
The graph below shows the coincident peak of Unmetered Load at the time (hour 18) of the LDC's maximum demand.



3.1.6 NON-COINCIDENT DEMAND

The maximum electricity consumption for a customer class, regardless of when the maximum demand occurs for the distributor, is called the non-coincident demand of the class.

The graph below shows the maximum demand of the Unmetered Loads (0.8) compared to the LDC's maximum demand (4.7). The LDC's maximum demand occurs at hour 18, while the Unmetered Loads maximum demand occurs from hours 0 to 4 and 21 to 24.



3.1.7 Uniform System of Accounts

The USofA is the chart of accounts found in Chapter II of the Board's Accounting Procedures Handbook (APH) for Electricity Distributors.

3.1.8 Minimum System Method of Categorizing Distribution Costs

In order to categorize distribution lines and transformers between customer-related and demand related, the Cost Allocation Methodology uses the Minimum System Method. The Minimum System Method is a theoretical approach used in cost allocation methodologies in order to determine the proportion of assets and expenses that are customer-related and do not vary with customer demand. The remaining proportion of assets and expenses are assumed to be demand related.

The theory behind this methodology is that distributors own assets and incur expenses when delivering electricity to customers and some of these assets and expenses are not dependent of the amount of electricity consumed. Usually it represents the smallest size conductor or transformer used by the utility to connect customers. Appendix G includes additional information on the Minimum System Method.

3.1.9 UNMETERED LOADS

Unmetered Loads refer to electricity loads such as Street Lighting, Sentinel lighting and Unmetered Scattered Loads whose consumption is not measured by a meter.

3.1.10 STREET LIGHTS

Street Lights are the lights that illuminate streets during hours of darkness, termed "Street Lighting". Street Lights are usually owned by municipalities.

3.1.11 UNMETERED SCATTERED LOADS

Equipment whose electricity consumption is relatively small and predictable is frequently not measured and is called unmetered scattered load. Examples of these types of loads are billboards, phone booths, traffic lights, cable TV amplifiers.

3.1.12 SENTINEL LIGHTING

Similar to Street Lights, Sentinel lights provide light during hours of darkness, usually in parking lots and farm yards.

3.1.13 ELECTRICAL UTILITY COMPANY

The local distribution company that delivers electricity to a consumer's home or business. Also known as "local utility" or "local distribution company".

3.2 LOAD DATA

One important input for allocating costs is the consumption information by customer class.

There are instances when electricity consumption follows a steady pattern and the electricity consumption can be established based on the connected devices and does not require a meter. For example Street Lights and cable TV amplifiers are either on or off with known predictability. If the rated capacity of a device is known and is constant, the electricity consumption, both kW and kWh, can be calculated by multiplying the rated capacity for the device by the number of hours that the device is on.

Meters are not used to measure the electricity consumption of devices with a steady pattern of electricity consumption[11]. The costs of the meters can be avoided by the distributor and therefore unmetered customers are not charged for the cost and maintenance of the meter as well as associated costs such as meter reading and related costs.

For Unmetered Loads, the consumption information used in the Cost Allocation was initially developed for distributors by Hydro One Inc. as part of the Team that developed the Cost Allocation for 2008 (EB-2007-0667). Appendix B includes the report prepared by Hydro One describing the process followed in order to establish the load consumption profiles for Unmetered Loads. Appendix C includes the slides presented by Hydro One to the Unmetered Loads Working Group on the development of the Unmetered Load profiles.

3.3 ASSETS AND EXPENSES DATA

The assets and expenses used in the Cost Allocation is a forecast of assets and expenses for the year that the distributor is establishing distribution rates. The assets and expenses, based on the USofA, reflect assets and expenses of a similar nature that are grouped together. For example for assets, there are accounts for Primary Poles, Towers, Line Transformers. For expenses there are accounts for Operation and Maintenance of Equipment, Office Supplies and Interest on Debt.

Below are examples of Asset accounts:

1830	Poles, Towers and Fixtures
1835	Overhead Conductors and Devices
1840	Underground Conduit
1845	Underground Conductors and Devices
1850	Line Transformers

Below are examples of expense accounts:

5014	Transformer Station Equipment - Operation Labour
5015	Transformer Station Equipment - Operation Supplies and Expenses
5016	Distribution Station Equipment - Operation Labour
5017	Distribution Station Equipment - Operation Supplies and Expenses
5020	Overhead Distribution Lines and Feeders - Operation Labour

[11] Some distributors measure the electricity consumption of Street Lights, cable TV amplifiers and other similar devices. While a very small number of LDCs do meter these loads on a permanent basis, the overwhelming majority are satisfied that the estimation approach gives them a reliable basis for billing and cost allocation, without imposing an unnecessary cost on the customer.

5025	Overhead Distribution Lines & Feeders - Operation Supplies and Expenses
5030	Overhead Subtransmission Feeders - Operation
5035	Overhead Distribution Transformers- Operation
5620	Office Supplies and Expenses
6005	Interest on Long Term Debt

3.4 ALLOCATORS

In cost allocation, allocators are used to apportion the demand and customer-related assets and expenses to all customer classes. The allocators used are number of customers, number of customers weighted by a factor as explained below, number of connections, demand (kW), or energy (kWh). For certain assets and expenses, a composite of other allocators is used.

3.5 WEIGHTING FACTORS

In order to better apportion Services, Meters, Meter Reading, and Billing and Collecting costs amongst customer classes in a cost allocation study, weighted allocators are used to better reflect cost causality. For example, in order to allocate Billing costs to customer classes, weighting factors are used to reflect the complexity of billing for the distributors' customer classes. Instead of using straight number of bills, billing weighting factors are multiplied by the number of bills for each respective customer class to determine the weighted number of bills used to allocate billing costs. The customer classes weighting factors are in relation to the Residential customer class which is assigned a per bill weight of one. Distributors are required to determine the weighting factors applicable to their specific circumstances.

Examples of Services weighting factors used by distributors:

	Residential	GS< 50 kW	GS>50 kW	Street Light	USL
Utility A	1	0	0	0	0
Utility B	1	0.18	0	0.06	0.06
Utility C	1	1.462	6.463	0.423	0.949
Utility D	1	1.4	4.4	0.4	0.9

A weighting factor of "0" reflects the fact that the customer and not the distributor is responsible for the Services assets. The various values shown for distributors in the Table above reflect the distributors' own analysis of the Services for the customer class relative to the Residential customer class.

Examples of Billing weighting factors used by distributors:

	Residential	GS< 50 kW	GS>50 kW	Street Light	USL
Utility A	1	0.89	0.14	1	1.06
Utility B	1	3.42	11.84	7.85	0.73
Utility C	1	1	5.57	3.15	0.57
Utility D	1	1	5	1.8	1.25

The various values shown for distributors in the Table above reflect the distributors' own analysis of the Billing and Collecting effort required for the customer classes relative to the Residential customer class.

Section 6.8 provides an example on developing weighting factors.

4 CONFIGURATION FOR UNMETERED LOADS

Distributors may use different connection configurations in serving Unmetered Loads. There are mainly two types of configurations used by distributors: one device connected directly to the distribution system, or multiple devices connected to the distribution system by way of one common connection, also referred to as “daisy chain” which is owned and maintained by the customer.

The following diagrams illustrate the two types of connections.

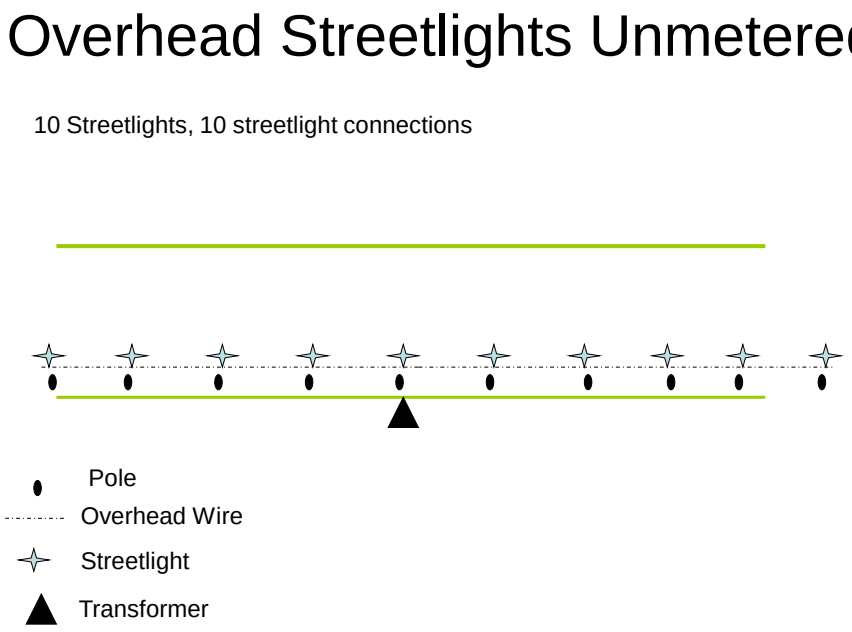


Figure 4.1: 1-to-1 connection-to-device configuration

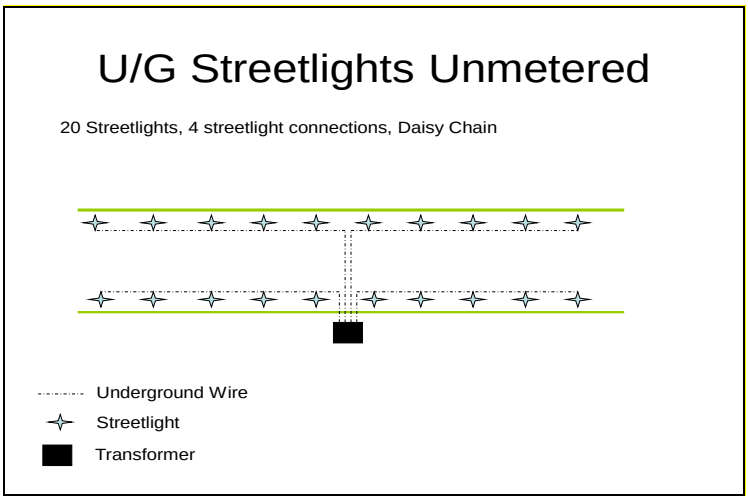


Figure 4.2: 5-to-1, daisy-chain configuration example

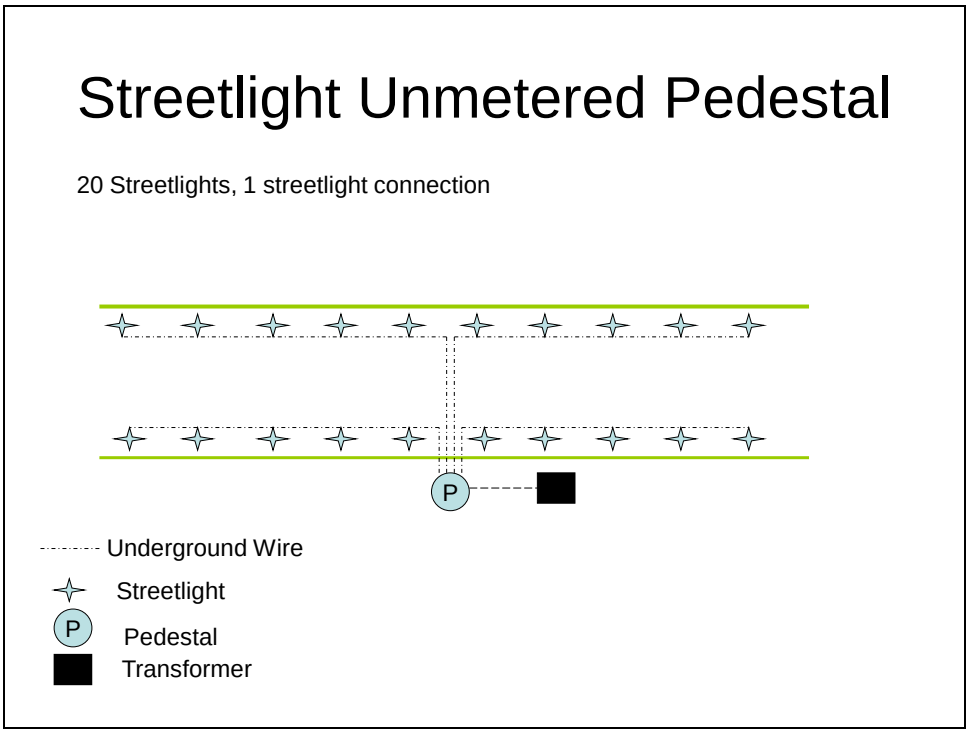


Figure 4.3: 20-to-1, daisy chain configuration example

Appendix D includes pictures of examples of Unmetered Loads.

In the Cost Allocation Methodology a distributor should reflect its own actual configuration used to serve Unmetered Loads.

5 SENSITIVITY ANALYSIS

Elenchus conducted sensitivity analyses based on actual utility data in order to illustrate the impact on the allocated costs for Unmetered Loads of changing a number of assumptions used in the Board's Cost Allocation Model.

The sensitivity analysis was done in response to comments from Work Group members that wanted to better understand the impact on the results of the Cost Allocation Methodology to changes in assumptions. Street Light customer class was used in the example as this is the largest of the three unmetered customer classes and because there is a wide range of device-per-connection ratios amongst distributors. Unmetered Scattered Loads and Sentinel Lights usually have one connection per device.

Such analyses will serve to identify which elements are critical inputs in the allocation of costs to Unmetered Loads. Data from a cost of service application for a distributor was used in the analysis. The slides of the Elenchus presentation are included in Appendix E.

Utility Street Lighting Profile, 'base case':

- 3,703 connections, 55,546 devices[12] (~ 15 devices per connection)
- Services weighting factor = 1 (services function provided by distributor)
- Billing and collecting weighting factor = 1 (function provided by distributor)
- Street Lighting class revenue requirement = $1.18 million
- Distributor total revenue requirement = $168.17 million
- Street Lighting revenue-to-cost ratio = 74.82%

5.1 ONE DEVICE PER CONNECTION (SCENARIO 1)

Assume that each device instead has its own connection (i.e. 55,546 connections and 55,546 devices). The table below shows the results of assuming each device has its own connection compared to the base case of 15 devices per connection.

The Street Lighting revenue requirement in this scenario increases approximately six-fold versus the base case to $6.12 million and the revenue-to-cost ratio decreases 56.7%, from 74.82% in the base case, to 18.15%.

[12] In this instance a "device" is one street lighting light-bulb.

Table 5.1 One Device Per Connection (Scenario 1) Results

	Revenue Requirement Base Case	Rev. Req. One Device per Connection Scenario 1	Rev. Req. Difference Increase/ (decrease)	Revenue to cost ratio (%) Base Case	Revenue to cost ratio (%) Scenario 1
Residential	$94,436,258	$89,700,122	($4,736,136)	97.07	101.96
GS<50 kW	$19,093,962	$18,638,133	($455,829)	114.37	117.06
Large Use	$5,754,313	$5,793,229	$38,916	106.8	106.1
Street Lighting	$1,183,502	$6,123,039	$4,939,537	74.82	18.15
USL	$470,639	$416,561	($54,078)	123.3	138.73
Total	$168,173,609	$168,173,609	$0	100.00	100.00

* Not all customer classes are shown

5.2 SERVICE WEIGHTING FACTOR ZERO (SCENARIO 2)

In this scenario instead of using a weighting factor of one (1) for Services for the Street Lighting class, a value of zero (0) is used. This might occur if the customer provided and maintained the services for the connection, rather than the distributor. The table below shows the results of assuming a value of (0) is used as weighting factor for Services for the Street Lighting customer class compared to the base case of using a value of 1.

Streetlight revenue requirement in this scenario is $1.05 million, and the revenue-to-cost ratio increases roughly 10%, to 84.36%.

Table 5.2 Services Weighting Factor Zero (Scenario 2) Results

	Revenue Requirement Base Case	Rev. Req. Services Weighting Factor (0) Scenario 2	Rev. Req. Difference Increase/ (decrease)	Revenue to cost ratio Base Case	Revenue to cost ratio Scenario 2
Residential	$94,436,258	$94,552,376	$116,118	97.07	96.96
GS<50 kW	$19,093,962	$19,113,503	$19,541	114.37	114.25
Large Use	$5,754,313	$5,754,313	$0	106.8	106.8
Street Lighting	$1,183,502	$1,046,531	($136,971)	74.82	84.36
USL	$470,639	$471,917	$1,278	123.3	123.33
Total	$168,173,609	$168,173,609	$0	100.00	100.00

* Not all customer classes are shown

5.3 BILLING AND COLLECTING WEIGHTING FACTOR ZERO (SCENARIO 3)

In this scenario instead of using a weighting factor of one (1) for Billing and Collecting for the Street Lighting customer class, a value of zero (0) is used. This will test the limits of the impact of changing this factor, although it is expected that distributors will always incur some costs in Billing and Collecting the Street Lighting class. The Streetlight revenue requirement in this scenario is identical, $1.18 million, and the revenue to cost ratio is near identical, at 74.89%.

The table below shows the results of assuming a weighting factor of zero for Billing and Collecting compared to the base case of a weighting factor of one.

Table 5.3 Billing and Collecting Weighting Factor Zero (Scenario 3) Results

	Revenue Requirement Base Case	Rev. Req. Billing and Collecting Weighting Factor (0) Scenario 3	Rev. Req. Difference Increase/ (decrease)	Revenue to cost ratio Base Case	Revenue to cost ratio Scenario 3
Residential	$94,436,258	$94,437,329	$1,071	97.07	97.07
GS<50 kW	$19,093,962	$19,094,141	$179	114.37	114.36
Large Use	$5,754,313	$5,754,314	$1	106.8	106.8
Street Lighting	$1,183,502	$1,182,072	($1,430)	74.82	74.89
USL	$470,639	$470,639	$0	123.3	123.3
Total	$168,173,609	$168,173,609	$0	100.00	100.00

* Not all customer classes are shown

5.4 REDUCING CONSUMPTION BY 50% (SCENARIO 4,"RETROFIT")

In this scenario demand (kW) and energy (kWh) consumption for the Street Lighting class is reduced by 50% assuming energy efficiency improvements in Streetlight devices. The table below shows the results of assuming Streetlight's electricity consumption and demand is reduced by 50% compared to the base case.

The Street Lighting customer class revenue requirement in this scenario decreases by 33 % versus base case, to $0.79 million, and the revenue to cost ratio increases by 6% versus the base case, to 80.91% as revenue also declines.

The revenue requirement for the other customer classes increased slightly to cover the lower revenue requirement allocated to the Street Lighting customer class.

Table 5.4 Reducing Consumption by 50% (Scenario 4) Results

	Revenue Requirement Base Case	Rev. Req. Electricity Consumption (kW and kWh) reduced 50% Scenario 4	Rev. Req. Difference Increase/ (decrease)	Revenue to cost ratio Base Case	Revenue to cost ratio Scenario 4
Residential	$94,436,258	$94,569,736	$133,478	97.07	97.08
GS<50 kW	$19,093,962	$19,141,244	$47,282	114.37	114.25
Large Use	$5,754,313	$5,778,675	$24,362	106.8	106.52
Street Lighting	$1,183,502	$789,254	($392,248)	74.82	80.91
USL	$470,639	$470,949	$310	123.3	123.40
Total	$168,173,609	$168,173,609	$0	100.00	100.00

* Not all customer classes are shown

Most of the savings that can be realized from reducing consumption would be reflected primarily in lower generation and transmission costs, not in lower distributions costs.

5.5 One Device per Connection and Reducing Consumption by 50% (Scenario 5)

In this scenario it is assumed that instead of using 3,703 connections for 55,546 devices, it is assumed that each device has its own connection and that demand (kW) and energy (kWh) consumption for Street Lighting is reduced by 50% assuming energy efficiency improvements in Streetlight devices. This is a combination of scenarios 5.1 and 5.4. The Streetlight revenue requirement in this scenario is $6.09 million and the revenue to cost ratio is 14.35%. Despite the reduction in consumption the result is virtually the same as that of Scenario 1. The inclusion of a 50% reduction in electricity consumption results in a small reduction in the revenue requirement as the impact of the assumption of one device per connection is very significant and is only slightly offset by the reduction in electricity consumption.

Table 5.5 One Device Per Connection and Reducing Consumption by 50% (Scenario 5) Results

	Revenue Requirement Base Case	Rev. Req. Electricity Consumption (kW and kWh) reduced 50% and One Device per Connection Scenario 5	Rev. Req. Difference Increase/ (decrease)	Revenue to cost ratio Base Case	Revenue to cost ratio Scenario 5
Residential	$94,436,258	$89,712,637	($4,723,621)	97.07	102.09
GS<50 kW	$19,093,962	$18,641,815	($452,147)	114.37	117.21
Large Use	$5,754,313	$5,795,781	$41,468	106.8	106.21
Street Lighting	$1,183,502	$6,086,351	$4,902,849	74.82	14.35
USL	$470,639	$416,616	($54,023)	123.3	138.92
Total	$168,173,609	$168,173,609	$0	100.00	100.00

* Not all customer classes are shown

5.6 CONCLUSION OF SENSITIVITY RESULTS

A critical assumption with respect to the inputs for Street Lighting is the number of devices per connection. This assumption has the most significant impact on the revenue requirement for the Street Lighting customer class. The difference in revenue requirement between a 15:1 device per connection ratio versus a 1:1 device per connection ratio is over 400% as can be seen in Table 5.1.

The results of the sensitivity analysis conducted would be applicable to distributors that have a similar ratio of devices per connections, 15 devices per connection.

Assigning a weight of zero (0) instead of using a value of one (1) for Services and Billing and Collecting for the Street Lighting customer class had an impact on the Street Lighting class' revenue requirement. This suggests that Assets and Expenses related to Services and particularly Billing and Collecting costs allocated to the Street Lighting class have only a small impact on Cost Allocation.

The "retrofit" scenario shows that energy efficiency improvements for Streetlight devices, can result in a significant reduction in the Street Lighting distribution revenue requirement but the impact pales in comparison to the sensitivity to a change in the number of devices per connection. Furthermore, the reduction in revenue requirement

from efficiency improvements is dependent on the ratio of devices per connection and at 1:1 ratio the reduction in revenue requirement is small.

The savings to municipalities from reducing Streetlight electricity consumption is primarily in the form of lower generation and transmission charges, not significantly lower distribution charges.

6 WORKING GROUP ISSUES, ELENCHUS COMMENTS AND RECOMMENDATIONS

This section of the report deals with some areas of the Cost Allocation Methodology that were discussed at the Working Group meetings and provides Elenchus' comments on these areas. Elenchus' recommendations with respect to the allocation of costs to Unmetered Loads in the Board's Cost Allocation Methodology are presented here for consideration.

6.1 DISTRIBUTION RATE SETTING

Based on the comments expressed at the Working Group meetings by Unmetered Load customers, there is a lack of understanding of the process that distributors have to follow in order to have their distribution rates approved.

Elenchus recommends that distributors continue to devote efforts in explaining to their unmetered customers the regulatory process that is followed in Ontario in order to approve distribution rates.

Good utility practice would be that distributors involve their customers in Stakeholder sessions while the distributor is preparing the rate rebasing application to the Board and before it is finalized, in order to allow the customers to understand the assumptions used in the application and the resulting impacts. This would also allow customers to provide distributors the most current information available to be used in the application.

The Board may also want to consider hosting more information sessions for Unmetered Load customers outlining the regulatory process in Ontario, including the Board's Cost Allocation Model.

6.2 UNMETERED LOADS DATA AND CONDITIONS OF SERVICE

There seems to be no clear understanding by some Unmetered Load customers of the process used by distributors in establishing the load profiles for Unmetered Loads. There is also a lack of clarity in the process used for keeping up-to-date the estimated Unmetered Load energy consumption and load profile data that is used for billing and cost allocation purposes.

Distributors also have different terms and conditions for connecting Unmetered Loads and this creates confusion on the part of Unmetered Load customers that may be dealing with many distributors. For example, it was also noted that there is a lack of clarity as to what the responsibilities are of municipalities that own Street Lights and the responsibilities of the serving distributor. A clear delineation of customers and distributors' roles and responsibilities in connecting and maintaining the distribution system used to connect Unmetered Loads would assist in improving the understanding of how the Unmetered Loads are treated in the Cost Allocation Model. This can be

addressed by updating the Conditions of Service document and bringing this section of the document to the attention of Unmetered Load customers.

Hydro Ottawa shared with the Working Group the section of their Conditions of Service as an example of how distributors can document the procedure that is followed to establish load profiles for Unmetered Loads and explains the roles of distributors and customers related to Unmetered Loads. Appendix F includes Hydro Ottawa's Conditions of Service Section dealing with Unmetered Loads.

Elenchus recommends that the Board should request distributors to document their own requirements similar to how Hydro Ottawa has done in its Conditions of Service Section and that distributors be required to bring this section to the attention of Unmetered Load customers. Distributors should work with Unmetered Load customers to ensure that these customers are aware and understand the requirements of Unmetered Load customers and of distributors in determining the load profiles and the conditions of service for Unmetered Loads.

The Conditions of Service should clearly state the roles and responsibilities with respect to keeping load consumption data current. The process for maintaining accurate Unmetered Load data should also be specified in the Conditions of Service document.

6.3 CONNECTION CONFIGURATION FOR STREET LIGHTING

As seen in the Sensitivity Analysis, the assumption with respect to the number of devices per connection (Scenario 1) resulted in the largest change in the apportionment of the distributor's revenue requirement to the Street Lighting class. This is the most critical data input in the Cost Allocation for Unmetered Loads. The impact on revenue requirement between a 15:1 device per connection ratio versus a 1:1 device per connection ratio is an over 400% increase in the revenue requirement.

There are different configurations in connecting Street Lights to the distribution system and there isn't one standard that is applied by all distributors.

Each distributor has different configurations on how loads are connected to its own distribution system.

Elenchus recommends that distributors continue to work closely with municipalities in order to determine and explain the distribution configuration system used by the distributor to connect Streetlights. The actual configuration used by the distributors in connecting unmetered loads should be reflected in their cost allocation. This will result in different Cost Allocation impacts and as a result different charges for Unmetered Loads from one utility to another.

It is the responsibility of the unmetered customer to maintain asset inventory and to alert the distributor of material changes, especially where the customer believes such changes may affect its bill. In some instances GIS systems may provide information on Streetlight inventory assets.

6.4 NEW TECHNOLOGY FOR STREET LIGHTING CONSUMPTION

During the Working Group meeting municipalities described new technology that, 1) allows for dimming of Streetlights during periods of low pedestrian traffic, and 2) new LED Street Lighting capable of being under-driven[13] during the first few years of operation while providing sufficient lighting (i.e. device ratings are not reflective of actual electricity demand during these years). Municipalities were interested in finding out how the new technology can be reflected in the load consumption patterns for Street Lighting used by distributors, and what downward pressure retrofit programs might have on municipality bills.

A Municipality shared a study undertaken on behalf of another Municipality in order to measure the electricity consumption of Streetlights. The study concluded that the Municipality was being overcharged, because of out-of-date information, by a weighted average of 10%[14].

It is Elenchus' views that if municipalities have concerns about the consumption estimates used by distributors to bill for Streetlight consumption or if any other Unmetered Load customer has concerns about the estimated electricity consumption used by distributors, studies can be undertaken to determine in an objective manner the electricity consumption of Unmetered Loads. It is the responsibility of the Unmetered Load customer to bring their concern to the attention of the distributor. Municipalities can refer and use as supportive evidence studies done by other municipalities with respect to Street Light consumption if the studies are applicable and would not need to duplicate the same study. Another alternative would be for unmetered customers, as a group, to sponsor a study that demonstrates consumption characteristics and would not require a separate study for each distributor, provided that the consumption characteristics are sufficiently similar across distributors.

A Working Group member pointed out that the Ontario Power Authority maintains data on Street Light consumption that could be of use to assess consumption patterns. Distributors can also undertake special studies on behalf of Unmetered Load customers to establish the electricity consumption of Unmetered Loads. Distributor's expenses resulting from conducting these studies can be recovered from the respective customer classes by directly allocating the costs of the study in the Cost Allocation Model to the corresponding customer class or billing the customer class directly for the cost of the analysis. As an example, meters can be installed on a representative sample to measure Unmetered Load over a certain period of time and the results of the measurement can be used in determining the electricity consumption of Unmetered Loads.

Elenchus recommends that municipalities and distributors establish a channel of communication that will enable the municipalities to bring to the attention of their distributor any technology change that impacts electricity consumption. Municipalities

[13] Being operated at less than rated capacity
[14] City of Oshawa Streetlight Demand Measurement Project, conducted by Finn Projects, July 30, 2012

and distributors should be able to determine what the appropriate consumption pattern is for the Street Lighting class that would reflect the technology used by Streetlights and estimate the bill impact of retrofit programs.

Elenchus recommends that the Board direct distributors to update Unmetered Load profiles reflecting energy efficiency improvements when they can be supported by evidence presented by Unmetered Load customers. The updated consumption estimates should be used by distributors for billing Unmetered Loads as soon as they are validated. To do otherwise is punitive to unmetered customers and does not promote efficiency and conservation.

6.5 Financial Impact of Streetlight Energy Efficiency Investments

Municipalities indicated reluctance to invest in energy efficiency improvements for Streetlights since municipalities do not understand the impact this would have in the charges from distributors.

Based on the results of the sensitivity scenarios in Section 5 of this report, a reduction in energy consumption for Streetlights resulting from energy efficiency improvements can reduce the revenue requirement for the Street Lighting customer class. In the base case, a 50% reduction in energy use produces a 33% reduction in distribution revenue requirement, but most of the savings to municipalities would be in the form of lower electricity bills for commodity (generation) and transmission related charges and not significantly lower distribution bills. Furthermore, the reduction in revenue requirement from efficiency improvements is dependent on the device per connection ratio, and at a 1:1 ratio the reduction in revenue requirement is small.

In order for municipalities to see lower bills it will be necessary to update the consumption patterns used by distributors to bill Street Lighting to reflect the energy efficiency improvements.

Municipalities expressed concerns that if Streetlights electricity consumption is reduced as a result of efficiency improvements, distributors would simply increase the distribution rates charged to Streetlights. Based on the Regulatory environment in Ontario for the approval of distribution rates as described in Section 2 above, distributors cannot increase the rates to their customers without prior approval from the Board.

Distributors on the other hand were concerned with the financial impact to distributors of lower energy consumption from Streetlights (i.e. lost revenue) that may occur during the IRM period.

Metered customers can invest in energy efficiency improvements and since the electricity consumption is metered, any reduction in energy consumption would be reflected in their bills. It is Elenchus' view that distributors should follow a similar approach with unmetered customers that invest in energy efficiency improvements. The consumption pattern used by distributors to bill Unmetered Loads should be updated to reflect energy efficiency improvements undertaken by the customer. It is the responsibility of the Unmetered Load customer to provide the updated information

(accompanied by sufficient evidence) on consumption to the distributor. As seen in the sensitivity analysis the impact to distributors is not significant compared to the revenues collected in total by the distributor and most of the financial benefits to municipalities resulting from energy efficiency improvements are as a result of lower commodity and transmission charges, that are pass-through charges for distributors.

6.6 AMPERAGE VERSUS KW AS ALLOCATOR

A member of the Working Group suggested that amperage should be used as an allocator of costs instead of demand (kW), especially for Streetlights.

Amperage information is generally not available for most customers and the use of kW as an allocator reflects the fact that the required data is available for all customer classes. The kW data is available from meter data for customers that are demand billed or from load research data for customers that are billed based on energy (kWh).

As part of Proceeding EB-2007-0031, Board staff released a paper titled "Rate Classification for Electricity Distribution" on January 29, 2009. At the time, in this paper, Board Staff recommended a customer classification based on connection voltage as opposed to the currently used customer classification of Residential, General Service, Large User, Street Light, Sentinel Light and Unmetered Scattered Load customers. The paper also included comments from stakeholders on the proposed customer classification. If the customer classification is changed to take into consideration connection voltage, then the allocator used in the Board's Cost Allocation Model should be reviewed.

There was no work undertaken by the Working Group that would point to the need to use a different demand allocator in the Board's Cost Allocation Model.

A change in the demand allocator used in the Cost Allocation Methodology will impact all customer classes and cannot be used to allocate costs just for one customer class. A change in the demand allocator in the Cost Allocation model should not be implemented without input from all affected stakeholders. If it is determined that a review of the demand allocator in the Cost Allocation Model is warranted, such a review and any resulting change should be the subject of a separate review process, perhaps in conjunction with the review of other identified Board's Cost Allocation Methodology issues.

Elenchus is of the view that a change in demand allocators should only be implemented if it can be determined that the data would be available for all customer classes, that the new allocator is a better reflection of cost causality, and after the impacts of the change in allocators have been evaluated for all customer classes.

Notwithstanding the above, a distributor that is of the view that there is a better demand allocator than kW in a Cost Allocation Model is free to modify the Board's model and submit its proposal to the Board for review and approval at its next rate rebasing application.

6.7 MINIMUM SYSTEM VERSUS 100% DEMAND RELATED COSTS

Some members of the Working Group questioned the use of the Minimum System Method in order to classify distribution lines and transformer costs as customer or demand related. They were of the view that these costs should be classified as 100% demand related. An additional concern expressed by a member of the Working Group related to the default percentage of customer–related portion in the Minimum System Method used in the Board's Cost Allocation Model. The percentages used for distribution transformers are: 60%, 40%, and 30% for Low, Medium and High Density utilities respectively. The member was of the view that the values are dated, they should be updated and that perhaps a value for a very High Density utility should be added.

Based on Elenchus' experience, utilities classify some of these costs as customer-related and a commonly used methodology is the Minimum System Method. Another methodology used is the Zero Intercept Method. The customer-related percentages used in the Board's Cost Allocation Model are in line with Elenchus' experience with the values used by utilities in other jurisdictions.

There was no work undertaken by the Working Group that would point to the need to alter the use of the Minimum System Method in the Board's Cost Allocation Model.

Elenchus supports continuing using the Minimum System Method in order to classify distribution lines and transformers as customer and demand related. Some distribution assets and expenses are consumption independent and these costs should be classified as customer-related.

A change to the use of the Minimum System concept in the Cost Allocation Model impacts all the distributor's customer classes and such a proposed change should not be implemented without input from all affected stakeholders and is outside the scope of this initiative. If it is determined that a review of the use of the Minimum System Method in the Cost Allocation Model is warranted, such a review and any resulting change should be the subject of a separate review process, with appropriately broader scope, perhaps in conjunction with the review of other identified Board's Cost Allocation Methodology issues.

6.8 WEIGHTING FACTORS FOR SERVICES, BILLING AND COLLECTING

The determination of weighting factors for Services, Billing and Collecting in the Cost Allocation Methodology was an issue that was studied also as part of the previous Board Proceeding (EB-2010-0219) that reviewed certain Cost Allocation Policy issues. In that proceeding, the Board determined that distributors would need to develop their own weighting factors based on their own characteristics reflecting their own costs and any distributor that proposes to use the default values provided in the Cost Allocation Model will be required to demonstrate that they are appropriate given their specific circumstances.

There are two general approaches being followed by distributors in determining weighting factors: Expert Opinion or Cost Analysis.

Under the Expert Opinion approach, distributors use the experience of knowledgeable staff in order to develop the relative weighting factors by customer class. This seems to be the most common approach used by distributors.

Using a Cost Analysis approach entails reviewing assets and/or expenses related information in order to develop the relative weighting factors by customer class.

6.8.1 SERVICES WEIGHTING FACTOR EXAMPLE

The Excel Model version 3 of the Cost Allocation Methodology includes in the Sheet "Instructions" an example of how to determine the weighting factors for Services by analyzing the distributor's asset data available. In this example all cost estimates are based on replacement costs, not accounting costs:

- Assume that the amount recorded in 1855 for a typical residential customer is $1,000 and is representative of replacement costs.
- Assume that there are 500 customers in the GS>50 kW class.
    - Assume that 100 of them are industrial customers served by a single span of overhead conductor. The amount remaining on the books in Account 1855 is small, but the current cost of replacing the service including labour would be $5,000
    - Assume that 100 customers have underground service that required extensive permits, street repairs, and labour costs, as well as materials. The services are recent, and the amount recorded in 1855 averages $25,000
    - Assume 300 customers have no costs recorded in Account 1855, and would have no cost recorded even if replaced (per distributor's accounting practice and conditions of service).

Calculation:

[(100 * $5,000) + (100 * $25,000) + (300 * $0)] / 500 = $6,000 per customer

Weighting factor for Residential = $1,000/$1,000 = 1.00

Weighting factor for GS>50 kW = $6,000/$1,000 = 6.00

6.8.2 BILLING AND COLLECTING WEIGHTING FACTOR EXAMPLE

The Excel Model version 3 of the Cost Allocation Methodology includes in the Sheet "Instructions" an example of how to determine the weighting factors for Billing and Collecting.

- Assume that the Residential cost averaged over all residential customers is $1.50 for bill preparation and mailing, $0.50 to record revenue from a normal payment, and $1.00 per bill on average for other costs associated with collecting, etc. that are recorded in accounts 5315, 5320 and 5340. Total $3 per residential bill.
- Assume that there are 15 customers in the USL class:

- Assume that 5 of the customers have a large number of devices and the number of devices changes from time to time, so additional clerical attention is required each month amounting to $50 over the group ($10 per bill). Including $1.00 postage and incidental costs, the cost of billing is $11 per bill. Including the costs of recording revenue at the same as for residential @ $0.50 and there are no other collecting issues results in $11.50 per bill
- Assume the other 10 USL customers have a small number of devices and require the same amount of effort as a typical residential customer. There are fewer issues with collecting, so the incidental costs are $0.50 per month. Total cost is $2.50 per bill.

Calculation:

[(5 * $11.50) + (10 * $2.50)] / 15 = $5.50 per bill.

Weighting factor for Residential = $3.00 / $3.00 = 1.00

Weighting factor for USL = $5.50 / $3.00 = 1.83

Elenchus recommends that the examples on how to develop weighting factors should be brought to the attention of distributors in order for them to familiarize themselves with the examples and develop their own weighting factors. Also distributors should be reminded that the use of default values is no longer accepted by the Board and utility specific values should be used, unless distributors provide the Board with justifications for the use of default weighting factors.

6.9 RATE DESIGN ISSUES

A Working Group member was of the view that there is confusion on the part of some customers on the rate design for Unmetered Loads used by distributors. Some distributors recover a portion of their fixed costs by charging customers based on number of devices, or based on number of connections, or based on number of accounts and some charge based on number of customers.

The Working Group member also raised the issue of how much of the revenue requirement is recovered by the distributor by way of fixed charges and how much is recovered by way of variable charges and how this compares to fixed and variable revenues collected from the other customer classes served by distributors.

Some members of the Working Group seem unfamiliar with the rate design used in Ontario of fixed and variable charges and what costs are recovered from each.

The fixed monthly charge applied by distributors in their rate design is typically based on the fixed expenses incurred by distributors in serving Unmetered Loads. Distributors incur expenses that do not vary with consumption, for example, Billing and Collecting expenses, as well as the customer-related portion of the distribution system assets (as determined by using the Minimum System Method) that are used to distribute electricity to customers.

The Working Group recommends and Elenchus agrees that the Board ensure that the terminology used with respect to Unmetered Load be consistent in the distributor's Cost Allocation Study and corresponding rate design. Examples were mentioned where the term "connection" is used in cost allocation, but "devices" is used in the rate design. This creates unnecessary confusion for customers.

Rate design issues are not being considered as being part of this project.

6.10 STREET LIGHT RATES PAST AND FUTURE CHANGES

As mentioned in Section 2.2, starting in 2008 distribution rates were set by distributors following guidelines developed by the Board. The guidelines were developed in order to establish distribution rates based on cost causality principles. The movement towards cost based distribution rates resulted in significant rate changes and therefore bill impacts to some customer classes, especially Street Lights. Prior to 2008, distribution rates for Street Lights were probably not recovering all the distribution costs imposed by the customer class of some distributors.

In order to mitigate the impact on bills of moving towards cost based distribution rates, the changes required to bring distribution rates closer to costs were implemented over a number of years starting in 2008.

Now that distributors have distribution rates that are more reflective of costs, any future change on distribution rates for Street Lights will reflect the overall distributor's change in operating expenses and further movement towards cost based distribution rates may not be required. Future increases in Street Light distribution rates can be expected to be lower than the increases seen from 2008 until now.

6.11 REVENUE TO COST RATIO RANGES

The range of revenue to cost ratio approved by the Board for Streetlight is 0.7 to 1.2. For Sentinel Lighting and Unmetered Scattered Loads, the range is 0.8 to 1.2.

The Board has suggested that a narrower range of revenue to cost ratios may be considered if it is supported by improved data used in the Cost Allocation Model.

Municipalities in the Working Group expressed concerns with the range of acceptable revenue to cost ratios for the Street Light customer class and there was a suggestion to lower the lower bound of the range from the current 0.7 (70%). No compelling rationale was provided to support this change to the lower bound.

There was no work undertaken by the Working Group that would point to the need to alter the current Board approved revenue to cost ratio ranges for the three unmetered customer classes.

Elenchus believes that the Board's current revenue to cost ratio range for the Street Light customer class remains appropriate given the quality of the underlying data. The Board has implemented Cost Allocation Policy on this specific class to bring most, if not all outlier Street Light customer classes to the bottom end of the range, and in some

instances distributors, without Board prompting, have applied for revenue to cost ratios inside the approved range. Elenchus does not recommend at this time to narrow the range of acceptable revenue to cost ratios for the three Unmetered Loads customer classes without the support of better data.

Instead distributors should be encouraged to analyze the configuration they use to connect Unmetered Loads to ensure that the correct inputs to the Cost Allocation Model are used, including developing their own weighting factors reflecting the effort required in providing Services, Billing and Collecting to Unmetered Loads.

Elenchus is of the view that if distributors are able to improve the quality of the data used in the Board's Cost Allocation Model, then the Board should encourage distributors to adopt revenue to cost ratios that are closer to unity to reduce the cross-subsidy that occurs when revenue to cost ratios are not set close to unity. Any change in the revenue to cost ratio proposed will need to take into consideration the bill impact on the affected customers.

6.12 COMPUTER MODEL CHANGES

Based on Elenchus recommendations, the Cost Allocation Model used by distributors does not need to be modified. Some Working Group members identified certain issues that were discussed at the meetings and have been included in this report. Notwithstanding the issues identified, there are no specific changes recommended. The Working Group as a whole did not identify areas where the model logic is deficient and needs to be modified.

Elenchus recommends that the terminology definitions included in this report as well as the different configurations for connecting Unmetered Loads should be added in the introduction sheet of the Cost Allocation Model as examples.

6.13 DISTRIBUTOR SPECIFIC SENSITIVITY ANALYSIS

The Working Group found the sensitivity runs described in Section 5 of this report informative and questioned the applicability of the sensitivity results to other distributors in Ontario.

The Working Group and Elenchus recommend that Unmetered Load customers approach their distributors and ask for similar sensitivity scenarios with each distributor's own Cost Allocation Model. The results would reflect the distributor's own distribution system and would be useful for planning purposes of Unmetered Load customers.

Appendix H provides information on Cost Allocation Model inputs.

7 SUMMARY OF ELENCHUS' RECOMMENDATIONS

7.1 DATA – CUSTOMERS' RESPONSIBILITY

Municipalities and distributors should establish a channel of communication that will enable the municipalities to bring to the attention of their distributor any technology change(s) that impacts electricity consumption. Municipalities and distributors should be able to determine what the appropriate consumption pattern is for Street Lighting that would reflect the technology used by Streetlights, (e.g. improved energy efficiency, dimming, under-driving, etc.). Elenchus recommends that the Board direct distributors to update Unmetered Load profiles reflecting energy efficiency improvements when they can be supported by evidence presented by Unmetered Load customers. It is the responsibility of the Unmetered Load customer to provide the information to the distributor. The updated consumption estimates should be used by distributors for billing Unmetered Loads as soon as they are validated.

7.2 COMMUNICATION – DISTRIBUTORS' RESPONSIBILITY

Distributors should continue to work closely with municipalities in order to determine and explain the distribution configuration system used by the distributor to connect Streetlights and other Unmetered Loads. The actual configuration used by the distributors in connecting Unmetered Loads should be reflected in their Cost Allocation Methodology. This leads to different cost allocation study results from one utility to another as the connection configuration of Unmetered Loads varies.

Distributors should continue to devote efforts in explaining to their unmetered customers the regulatory process that is followed in Ontario in order to approve distribution rates, including the Board's Cost Allocation Model and how it is used to develop charges for Unmetered Loads. Good utility practice would be that distributors involve their customers in Stakeholder sessions while the distributor is preparing the rate rebasing application to the Board and before it is finalized, in order to allow the customers to understand the assumptions used in the application and the resulting impacts. This would also allow customers to provide the distributor the most current information available to be used in the application.

Distributors should follow a similar approach with unmetered customers that invest in energy efficiency improvements as for metered customers. The new consumption reflecting energy efficiency improvements should be reflected in customers' bills. The consumption pattern used by distributors to bill Unmetered Loads should be updated to reflect energy efficiency improvements undertaken by the customer.

7.3 CONDITIONS OF SERVICE – DISTRIBUTORS' RESPONSIBILITY

The Board should require distributors to have Conditions of Service that clearly explain the roles, responsibilities, and expectations of the distributor and customer. The document should serve as a manual for customers. Distributors should continue to work with Unmetered Load customers to ensure that customers understand the roles and responsibilities of Unmetered Load customers and of distributors in determining the load profiles and how Unmetered Loads are being supplied by distributors. The Conditions of Service section dealing with Unmetered Loads should clearly state the roles and responsibilities of the customer and distributor, respectively, with respect to keeping load demand and consumption data current. The process for maintaining accurate Unmetered Load data should be specified in the Conditions of Service document.

Some of the requirements to be included in the Conditions of Service are listed below, but is not limited to the following:

- Outlining the process for submitting customer consumption, load, or device-specific data
- Acceptable forms of testing (e.g. certified lab or in-field metering units)
- Clarify ownership and maintenance responsibility of assets
- Clear references to specific external documents (e.g. commercial design specifications, outage protocol, demarcation points)

7.4 COST ALLOCATION MODEL AND RESULTS – BOARD'S RESPONSIBILITY

Change in demand allocators to use amperage instead of kW demand should only be implemented if it can be determined that the data would be available for all customer classes, that the new allocator is a better reflection of cost causality, and after the impacts of the change in allocators have been evaluated for all customer classes. A change in demand allocators used in the Cost Allocation Model should not be implemented without input from all affected stakeholders**.**

Continue using the Minimum System Method in order to classify distribution lines and transformers as customer and demand related. Some distribution assets are used and expenses incurred regardless of how much electricity is consumed and these costs, based on cost causality principles, should be classified as customer-related. A change in the use of the Minimum System Method in the Cost Allocation Model should not be implemented without input from all affected stakeholders, and is outside the scope of this initiative.

The Board's current Policy with respect to revenue to cost ratio ranges remains appropriate given the quality of the underlying data. Elenchus does not recommend at this time to narrow the range of acceptable revenue to cost ratios for the three Unmetered Loads customer classes without further data collection and analysis.

7.5 TERMINOLOGY AND DEFINITIONS – BOARD STAFF'S RESPONSIBILITY

Examples of how to develop weighting factors for Services, Billing and Collecting should be brought to the attention of distributors to assist them in developing their own weighting factors for Unmetered Loads. The Board requires that distributors derive their own weighting factors, or demonstrate that the default weighting factor values are appropriate given their specific circumstances.

The terminology definitions included in this report as well as the different configurations for connecting Unmetered Loads should be added in the introduction sheet of the Cost Allocation Model as examples.

Additional information sessions for interested Unmetered Load customers should be offered to explain the Board's Cost Allocation Model and the results of this consultation on Unmetered Loads.

Appendix A Working Group Members

Roger Higgin, on behalf of Energy Probe Research Foundation (EP)

Bill Harper, Econalysis Consulting Services, on behalf of the Vulnerable Energy Consumer's Coalition (VECC)

Tom Chessman, City of Hamilton[15]

Jamie Gribbon, Horizon Utilities

Paula Zarnett, BDR Consulting, on behalf of Rogers Cable Communications

George Shaparew, Innisfil Hydro

Ken Robertson, Cornerstone Hydro Electric Concepts (CHEC)

Kashif Jahangir, Susan Evans, City of Brampton

Ralph Frebold, City of Toronto

Scott Vokey, Cathie Brown, Association of Municipalities of Ontario (AMO)

Jane Scott, Hydro Ottawa, on behalf of the Coalition of Large Distributors (CLD)

Henry Andre, Hydro One

Michael Roger, Andrew Frank, Elenchus Research Associates

Vincent Cooney, Takis Plagiannakos, Ontario Energy Board Staff

[15] Attending in a joint capacity with City of Brampton.

Appendix B USL Load Data Study February to May 2006

See Separate Appendix

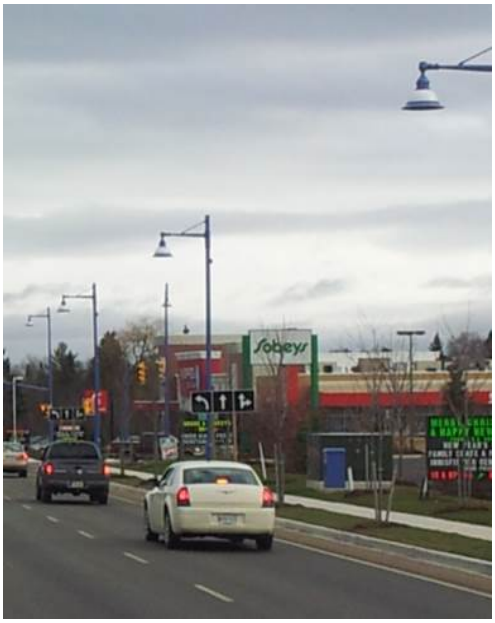
Appendix C 2006 USL Load Data Study Presentation

See Separate Appendix

Appendix D Unmetered Loads Pictures

Overhead Streetlight

Typical Underground Distribution



Unmetered Street Light Pedestal

Metered Streetlight Pedestal

Sentinel Lights

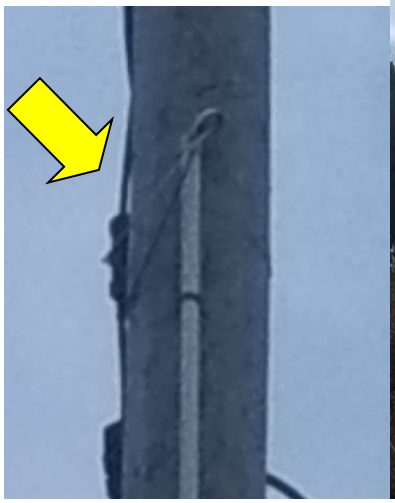
1 Light, 1 Connection

2 Lights, 1 Connection

Telecom Unmetered Loads

Telecom Metered Load

Phone Booth Unmetered Load



Traffic Sign
Unmetered Load

Appendix E Cost Allocation Model Sensitivity to Changes in Inputs Unmetered Loads

See Separate Appendix

Appendix F Unmetered Service Conditions, Connections & Upgrades

Hydro Ottawa Example

See Separate Appendix

Appendix G Minimum System Method[16]

The Minimum System Method assumes that a minimum-size distribution system can be built to serve the minimum load requirements of the customer. The minimum load for each customer is assumed to be a 100 watt light bulb.

The Minimum System Method involves determining the minimum size pole, conductor, cable, transformer, and service that is currently installed by the distributor.

In order to determine the customer-related portion of the utility's distribution system, it is assumed that the utility's poles, conductor cables, transformers and services are all replaced by the corresponding minimum size assets. Using replacement costs, the value for the minimum system distribution system is compared to the value of replacing all the poles, conductor cables, transformers and services. The ratio of the value of the minimum system to the value of the replacement off all the poles, conductor cables, transformers and services reflects the percentage of customer-related portion to be used in categorizing costs.

Once determined for each primary plant account, the minimum size distribution system is classified as customer-related costs. The demand-related costs for each account are the difference between the total investment in the account and the customer-related costs.

The minimum system is capable of carrying a small amount of demand, and, if unaddressed, this can contribute to the minimum system approach tending to generate a higher customer-related component than the zero-intercept approach, another commonly used methodology to categorize distribution system costs. To address this concern a Peak Load Carrying Capability ("PLCC") adjustment is made in the Board's Cost Allocation Model.

This PLCC adjustment determines how much demand for a rate classification can be met by the minimum system (number of customers/connections x PLCC for minimum system) and credits this amount against the classification's non-coincident peak demands used for determining demand allocators. The adjusted classification's non-coincident peaks can then be used to allocate the distributor's demand-related costs, eliminating the double-counting. The number of customers/connections used for the PLCC should match the number of customers/connections used to allocate the customer component of the distributor's capital and O&M costs associated with poles, conductors and transformers.

The minimum system results are applied to the following joint-cost accounts:

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[16] Extracted from Cost Allocation Review: Board Directions on Cost Allocation Methodology for Electricity Distributors, September 29, 2006, Proceeding EB-2005-0317, pages 47 to 56

• Line Transformers (Account 1850)
• “Distribution” which includes poles and conductors, and is defined as Accounts 1830 - 1845
• Related O&M accounts.

The minimum system results are also applied to depreciation accounts associated with the various asset accounts identified above.

The minimum system results are applied to the primary and secondary sub-accounts of the asset accounts and not to the bulk sub-account associated with the identified accounts.

Appendix H Board's Cost Allocation Model (CAM) Inputs

This Appendix shows where in the Board's Cost Allocation Model the data inputs can be found that would reflect specific Unmetered Load characteristics.

USL Characteristics	Item in OEB CAM	Input Cell in CAM
Customer pays for all Services	Services Weighting Factor	Sheet I5.2 Weighting Factors, row 11, value should be zero for the customer class
Reduced demand and/or energy consumption	Energy and demand data	Sheet I6.1 Revenue and Sheet I8 Demand Data should reflect the reduced energy and demand consumption
Billing and Collecting effort	Billing and Collecting Weighting Factors	Sheet I5.2 Weighting Factors, row 15
Number of Connection/Devices	Customer data	Sheet I6.2 Customer Data, rows 18 and 19
Distributor Density	Minimum System Customer-related Portion	Sheet E1 Categorization, rows 16 to 26