BLUEWATER POWER DISTRIBUTION CORPORATION

EXHIBIT 7

COST ALLOCATION

EB-2022-0016

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7 COST ALLOCATION

7.1 Cost Allocation Overview

Bluewater has followed the OEB's Cost Allocation policy reports of November 28, 2007 "*Report of the Board on Application of Cost Allocation for Electricity Distributors*"[1], and March 31, 2011 "*Review of Electricity Distribution cost Allocation Policy*"[2] and has completed the OEB's Cost Allocation Model ("CA Model"). The CA Model determines the proportion of Bluewater's total revenue requirement that is recoverable from each customer class for the 2023 Test Year. The revenue-to-cost ratio for each customer class for the Test Year has been determined using the customer class revenues over costs.

As part of Bluewater's 2013 Rate Application (EB-2012-0107) Settlement Agreement, Bluewater agreed to undertake a Large Use Study and to file the information as part of its application for 2015 rates. The study was completed with the assistance of Elenchus Research Associates, and was filed with Bluewater's 2015 IRM rate application EB-2014-0057. There were four findings outlined in the study, and for reference, each is listed below along with the commentary on how the finding was incorporated within this application.

1. **The data entry error that occurred in the 2013 cost allocation model affecting the separation of costs in Account 1820- Distribution Station Equipment between primary and secondary should be corrected;**
    a. Bluewater has determined there are no wholesale meter costs within account 1820, thus 100% of the cost has been attributed to Primary

2. **The current methodology for separating the costs in Account 1830 – Poles, Towers and Fixtures into primary and secondary classifications be refined to achieve a division that better reflects the shared usage of poles;**

[1] EB-2007-0067
[2] EB-2010-0219

a. Bluewater followed the guidance outlined in the Large Use study to determine the number of poles with only primary, the number of poles with only secondary, and the number of poles with both primary and secondary. The poles with both primary and secondary were allocated the same percentage split as the poles with only primary (74.8%), and poles with only secondary (25.2%) in order to provide a count of the total number of poles with primary vs. secondary. As a result, 60.1% of the costs within account 1830 are allocated to primary and 39.9% are allocated to secondary. **Table 1** below outlines the derivation of the results, and the CA Model reflects this allocation.

Table 1: Account 1830 Allocation

	Total # of Poles	**% Allocation of Shared Poles Based on Clearance Space**	**Shared Pole Allocation**	**Total # of Poles**	**% Allocation for CA Model**
	A	**B**	**C**	**D = C+A**	**E=D/D Total**
Poles with only Primary	2,966	74.8%	6,351	9,317	60.1%
Poles with only Secondary	4,034	25.2%	2,140	6,174	39.9%
Poles with both Primary and Secondary	8,491				
Totals	15,491	100.00%	8,491	15,491	100.00%

3. Bluewater should continue to evaluate the actual costs being posted to the primary and secondary accounts over the next four years to determine a longer-term trend. The current estimation methodology used to separate the costs in Accounts 1835 – Overhead Conductors/Devices, 1840 – Underground Conduit and 1845- Underground Conductors and Devices, the Underground Secondary be updated to reflect this new information;

a. Bluewater has continued to allocate costs to the appropriate sub-account for primary and secondary, and **Table 2** below outlines the results for the prior eleven years. Bluewater has utilized the average as an input to the CA Model for each of the accounts. For account 1840, we have assumed the same primary/secondary percentage as account 1845.

Table 2: Allocation of accounts 1835, 1840 and 1845

Account	Account Description	2011	2012	2013	2014	2015	2016
183501	OH Conductors/Devices - Primary	87,799	339,376	345,559	195,615	725,913	519,876
183502	OH Conductors/Devices - Secondary	38,027	47,198	40,349	45,897	105,014	69,875
	% Primary	70%	88%	90%	81%	87%	88%

Account	Account Description	2017	2018	2019	2020	2021	Total	%
183501	OH Conductors/Devices - Primary	279,368	392,687	697,451	348,216	167,046	4,098,906	78%
183502	OH Conductors/Devices - Secondary	118,949	69,401	188,002	59,304	393,791	1,175,807	22%
	% Primary	70%	85%	79%	85%	30%	78%	

Account	Account Description	2011	2012	2013	2014	2015	2016
184501	UG Conductors/Devices - Primary	485,752	256,473	230,201	348,143	341,665	239,386
184502	UG Conductors/Devices - Secondary	15,500	122,366	29,378	122,863	288,859	180,362
	% Primary	97%	68%	89%	74%	54%	57%

Account	Account Description	2017	2018	2019	2020	2021	Total	%
184501	UG Conductors/Devices - Primary	262,271	440,048	341,447	351,687	408,252	3,705,325	63%
184502	UG Conductors/Devices - Secondary	121,486	105,605	295,124	590,515	259,837	2,131,895	37%
	% Primary	68%	81%	54%	37%	61%	63%	

4. Bluewater should implement these changes when it files its next updated cost allocation model, which would be at the time of its next rebasing application which is currently scheduled to be filed in 2017 with rates being set for 2018.

a. Bluewater has incorporated all the above noted findings in this current application.

Load Profiles and Demand Allocators

7.1.1 Hourly Load Profile

In a letter dated June 12, 2015[3], the OEB stated that it expected distributors to be mindful of material changes to load profiles and to propose updates in their respective cost of service applications when warranted. In its 2013 COS application, Bluewater used the load profiles provided by Hydro One in its cost allocation models. Those load profiles were scaled to the 2013 consumption forecasts. The Hydro One profiles were based on 2004 data, and consumption patterns have changed since then due to factors such as technology, macroeconomic changes, conservation programs and time of use pricing.

Since that time, Bluewater has compiled hourly data from 2016-2021. Residential and GS < 50 kW data was provided by internal data systems utilizing smart metering data. Until 2019, GEN > 50 kW data was derived based on Bluewater's net system load shape (NSLS). For 2020 and 2021 Bluewater has utilized actual hourly data for the GEN>50 kW rate class. Intermediate and Large Use data is from Bluewater's CIS system that houses hourly data for this group of customers. Street Lights and Sentinel Light profiles were based on Bluewater's hourly street light load profile. Annual USL consumption was allocated evenly over each hour of the year.

Bluewater has updated the load profiles for all rate classes. Load profiles were derived using weather-normalized 2016-2021 hourly load data and adjustments were made to align the weather-normalized 2019 load profiles with the proposed 2023 Load Forecast (i.e. consumption forecast). The weather-normalization process involves three steps:

a) Deriving weather profile of a typical year;
b) Deriving the impact of heating degree days ("HDD") and cooling degree days ("CDD") on hourly load; and
c) Adjust actual load to typical load with the degree-day impacts.

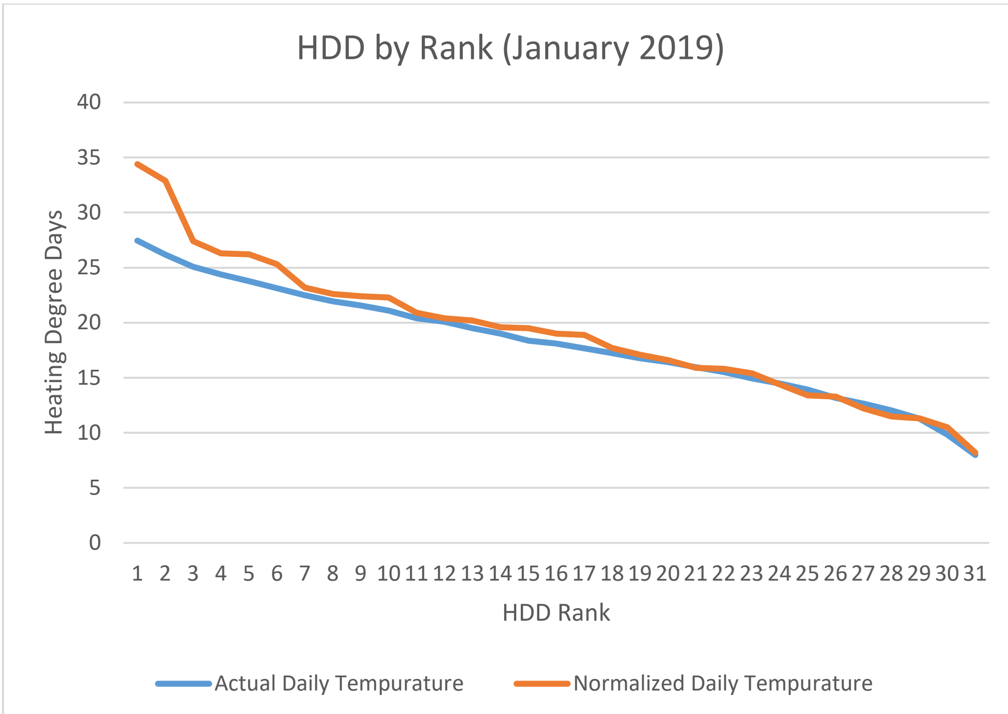
[3] EB-2012-0083, Review of Cost Allocation Policy for Unmetered Loads, Issuance of New Cost Allocation Policy for Street Lighting Rate Class

7.1.2 Derivation of Daily Temperatures

The weather profile of a typical year in Bluewater's service territory is calculated using average daily temperatures from 2012 to 2021. Average daily temperatures are defined as the average highest to lowest daily temperatures within a month (i.e. average of the coldest January day in each January from 2012 to 2021), rather than average temperatures on a specific calendar date (i.e. the average temperature on each January 1st). This process maintains the shape of the load profiles by determining typical monthly peaks and lows without smoothing those peaks.

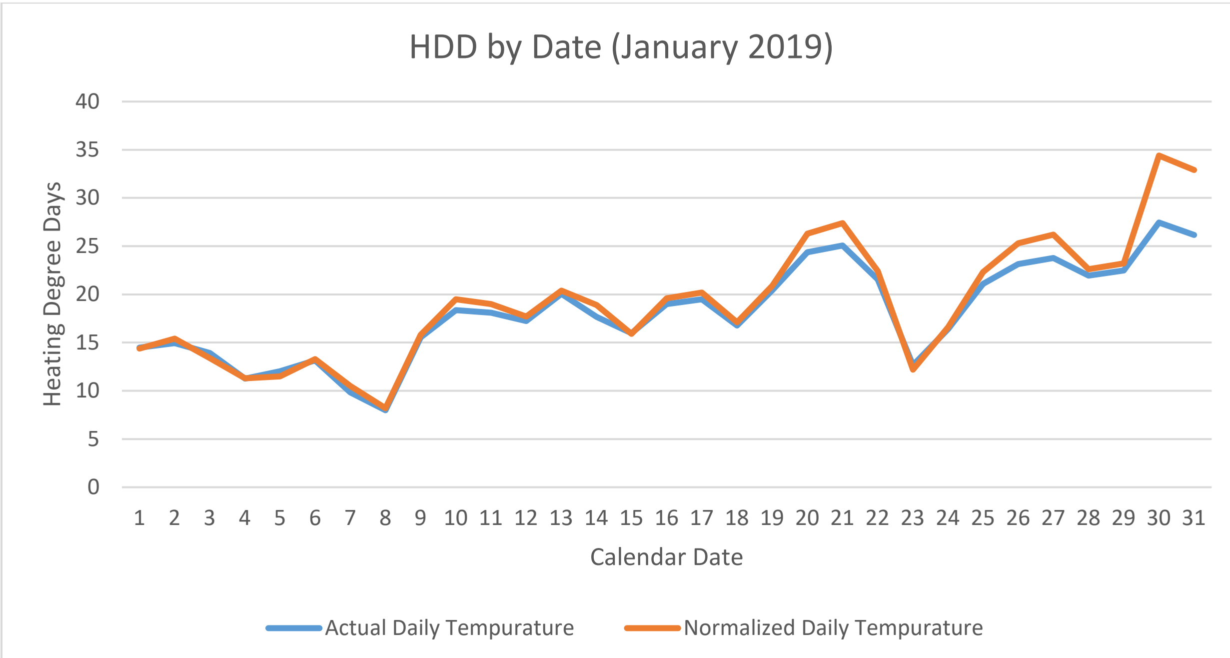
Average daily temperatures are derived by first ranking each day in each month from 2012 to 2021 from highest to lowest by HDD as measured at Environment Canada's Sarnia Climate Weather Station. The average HDDs among equivalently ranked days within a given month are then used as the average HDD for that ranked day in that month. For example, the days in January 2012 are ranked from 1 to 31 by HDD and this is repeated for each year from 2013 to 2021. The average HDD of the January days ranked 1 is calculated to provide the typical highest HDD day in January. All days in January ranked 1 are assigned this calculated average HDD. This process is repeated for the January days ranked 2 to 31. An example of average daily temperatures from 2012 to 2021 and actual temperatures in January 2021 ranked from 1 to 31 in **Table 3** below.

Table 3: 10-Year Avg. Daily HDD and Actual January 2019 HDD by Rank



Average daily temperatures reflect the January normal-weather profile in Bluewater's service territory. **Table 4** below displays the same information by calendar date using the average and actual temperatures associated with each ranked day.

Table 4: 10-Year Avg. Daily HDD and Actual January 2019 HDD by Calendar Date



Typical daily CDDs are determined by the same ranking and averaging methodology described above, using average daily CDD data from 2012 to 2021. Temperatures in January 2019 were colder than average January temperatures, so the weather normal values are lower than actuals and the normalization process reduces 2019 loads to reach weather-normalized loads.

7.1.3 Impact of HDD and CDD on Hourly Load

The impact of HDDs and CDDs on hourly load is calculated with a regression of six years of actual hourly loads (2016 to 2021) on daily HDDs and CDDs. The regression results provide the estimated impact of a change in degree days on load.

Temperatures can impact load differently depending on the time of the day and consequently HDD and CDD variables are converted to interaction variables between degree days and the hour of the day. There are 24 variables for each of HDD and CDD, equal to the actual degree days in the corresponding hour, and 0 in all other hours. A set of 24 binary variables, equal to 1 in the corresponding hour and 0 in all other hours; COVIDHDD and COVIDCDD variables equal to 0 in all days until March 16, 2020 and equal to the relevant HDD or CDD in each hour thereafter; a COVID_AM variable equal to 0.5 in every hour from March 16 to March 31, 2020, 1 in every hour in April and May 2020, and 0.5 for every month thereafter; a trend variable; a Weekend binary variable; and a Holiday binary variable.[4] The resulting coefficients reflect the impact of one HDD or CDD that considers different impacts depending on the hour of the day.

7.1.4 Adjust Actual Load to Typical Load

Actual 2019 hourly load is adjusted by calculating the difference between actual daily temperatures and the corresponding ranked typical daily temperature (as identified in **Table 5)** and applying the regression coefficient to the difference. The year 2019 was selected as the base year to scale to avoid irregular consumption patterns in 2020 and 2021 caused by the COVID-19 pandemic that are expected to diminish by the 2023 Test Year.

After 2019 weather-normalized demand is derived for each hour, the load in each hour is adjusted by the same factor such that the sum of hourly loads is equal to the proposed 2023 Load Forecast (i.e. consumption forecast).

Provided in **Table 5** below are the calculations used to adjust actual January 1, 2019 weather variables to typical weather for the Residential class. The Residential class uses HDD at base 14°C and CDD at base 16°C, as these variables provided better statistical results than other temperatures considered.

[4] There are a total of 78 independent variables, however, the set of 72 for hourly HDD, hourly CDD and binary Hour variables have only three non-zero values in each observation. The values are 0 in each hour other than the HDD, CDD, and binary hour variables that correspond to the hour of the observation. This regression is similar to 24 regressions, one for each hour of the day.

Table 5: January 1 Hour 1 Residential Example

Date	Hour	Temp °C	HDD	HDD Rank	Average HDD at Rank	CDD	CDD Rank	Average CDD at Rank
		A	B = 14 - A	C	D	E	F	G
1-Jan	1	-0.4	14.4	24	14.5	0	8	0

Date	Hour	2019 Load (kW)	HDD Diff.	HDD1 Coef.	CDD Diff.	CDD1 Coef.	2019 Normal Load (kW)
		H	I = D - B	J	K = G - E	L	M = H + (I * J) + (K * L)
1-Jan	1	25,576	0.1	360.5	0	2,057.0	25,602

Date	Hour	2019 Normal Load (kW)	Sum of 2019 Normal Loads	2023 Forecast Consumption	2019 to 2021 Load Adjustment	2021 Normal Load (kW)
		M	N	O	P = O / N	Q = M * P
1-Jan	1	25,602	252,157,820	264,890,809	1.0505	26,894

The HDD on January 1st, 2019 was 14.4 HDD, which was the 24th highest HDD in the month. The 24th highest January HDD in each year from 2012 to 2021 was, on average, 14.5 HDD. The difference, 0.1 HDD, is multiplied by the "HDD Hour 1" coefficient of 360.5 from the load profile regression to produce the 25.2 kW adjustment. This adjustment is applied to actual load in the first hour of January 1, 2019 (25,576 kW) to reach the weather-normalized load (25,602 kW). The 2023 Residential load forecast is 5.05% higher than the sum of 2019 weather-normalized hourly loads and as such, the January 1, 2023 weather-normalized demand increases to 26,894 kW.

General Service < 50 kW, General Service > 50 kW, Intermediate, and Large Use load profiles are derived by the same methodology. The Street Light and Sentinel Light classes are not weather sensitive and as such its loads are not weather-normalized. The USL hourly load was assumed to have a constant load.

An excel model illustrating how demand data was derived is provided as Bluewater 2023 Load Profiles Ex 7. This model provides detailed calculations for the Residential load profile, however, only 2019 data is provided and derivations for the other classes have been removed to reduce the size of the model, which exceeds 250MB. For reference, the figures provided in **Table 5** above are highlighted in the model. Regression outputs of non-Residential classes are provided in the 'Other Regressions' tab. Variables in the model are consistent with variables in the load forecast (see Exhibit 3 for descriptions of the variables).

7.1.5 Demand Allocators

The demand allocators used in Bluewater's 2023 CA model were derived using the hourly load profiles as described in Section 7.2.1. Using the 2023 hourly load profiles by class, the 12 monthly coincident and non-coincident peaks for the rate classes were determined as follows:

- The 1, 4 and 12 NCP values for each class were calculated by selecting the peak in the year (1 NCP), summing the four highest monthly peaks (4 NCP) and summing the 12 monthly peaks for each class (12 NCP), respectively.

- The total 1, 4 and 12 NCP values are the totals of the corresponding class NCP values.

- The 1, 4 and 12 CP values for each class were derived by identifying the hour in each month when the coincident peak occurred and then selecting the peak in the year (1 CP), adding the demands during the four highest coincident peak hours (4 CP) and summing the demand for each class during the 12 monthly coincident peak hours (12 CP), respectively.

- The total 1, 4 and 12 CP values are the totals of the corresponding class CP values, which are the values used to identify the relevant coincident peak hours.

7.1.6 2023 Demand Data

The demand allocators derived in the preceding section were input at the appropriate cells at sheet I8 Demand Data of the 2023 Bluewater CA Model. However, the Line Transformer and Secondary 1NCP, 4NCP and 12NCP values for GS > 50 and Large User customer classes are not equal to the full class NCP values since not all customers in these customer classes use these facilities. For the same reason, the Secondary 1NCP, 4NCP, and 12NCP values for the GS < 50 customer class is not equal to the full class NCP values. The Line Transformer and Secondary 1NCP, 4NCP and 12NCP values were therefore determined from the full load data NCP values using the ratio of values in the 2013 Cost Allocation Model.

Weighting Factors

The filing guidelines indicate that distributors are expected to develop their own weighting factors, and a description of the weighting factors is required. Bluewater has taken the opportunity to update the weighting factors and provides the information outlined below.

<u>Services (Account 1855)</u>

Bluewater directly charges customers other than residential customers for the cost of their service, as a result there are no service costs being booked to account 1855 for non-residential customers. Therefore, the weighting factor for residential customers is deemed to be 1.0, and all other rate classes are allocated a weighting for 0 as indicated in **<u>Table 6</u>** below.

Table 6: Weighting Factor for Services Account 1855

Residential	GS <50	General Service 50-999 kW	GS >50-Intermediate	Large Use >5MW	Street Light	Sentinel	Unmetered Scattered Load
1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Billing and Collecting

In determining the weighting factors for Billing and Collecting, an analysis of the underlying costs such as postage, and the effort required from the Billing staff, Credit and Collections staff and Customer Service staff was reviewed, also taking into consideration the complexity of the bills. The resulting weighting factors are presented in **Table 7** below.

Table 7: Weighting Factors for Billing and Collecting

Residential	GS <50	General Service 50-999 kW	GS >50-Intermediate	Large Use >5MW	Street Light	Sentinel	Unmetered Scattered Load
1.0	1.0	2.6	5.6	4.5	0.5	0.4	0.4

Meter Capital

Bluewater has updated the installed cost per meter for each meter type in service. The CA Model determines the weighted percentage factor, and then determines the cost relative to a residential average cost. The resulting factors are outlined in **Table 8** below.

Table 8: Meter Capital Weighting Factors

Residential	GS<50	General Service 50-999 kW	GS>50-Intermediate	Large Use
1.0	3.5	14.4	15.6	78.3

Meter Reading

Bluewater assessed the different costs associated with meter reading, and allocated the costs to the rate classes that depend on the various methods of meter reading. The weighting factor for meter reading for residential and General Service < 50 kW customers is 1.0 as these classes have smart meters, and the remaining classes of metered customers which includes General Service > 50 kW, Intermediate and Large Use, have a weighting of 44.6 related to the communication costs of reading the interval meters as detailed in **Table 9** below.

Table 9: Meter Reading Weighting Factors

Residential	GS<50	General Service 50-999 kW	GS>50-Intermediate	Large Use
1.0	1.0	44.6	44.6	44.6

Specific Customer Classes

Embedded Distributor

Bluewater is not a host distributor.

Unmetered Loads (including Street Lighting)

Bluewater acknowledges the OEB's "Report of the Board on Review of the Board's Cost Allocation Policy for Unmetered Loads"[5] dated June 15, 2015 and understands the CA Model has incorporated a 'Street lighting adjustment factor' which allocates costs to the street lighting rate class for primary and line transformer assets which replaces the prior 'number of connections' allocator.

Bluewater confirms that all unmetered customers including unmetered scattered load, sentinel lighting and streetlight customers have been advised of the rate application process through the customer engagement efforts as outlined in Exhibit 1.

microFIT class

Bluewater has not included microFIT as a separate class in the CA model, and proposes to maintain the current fixed rate of $4.55 per month for customers with a microFIT contract. Bluewater acknowledges this generic rate may be adjusted in the future by the OEB, and Bluewater would adopt the updated rate.

Standby Rates

Bluewater does not currently have an approved Standby rate, however, as outlined in Exhibit 8, Section 8.7, we encourage the OEB to resume the consultation on Commercial rate design in order to determine an appropriate generic policy on standby rates.

New or Eliminated Customer Classes

Bluewater is not proposing any new customer classes, or the elimination of any customer classes.

Class Revenue Requirements

The OEB has provided the Revenue Requirement Workform ("RRWF") containing Sheet 11. Cost Allocation, which contains a summary of the CA model results. **Table 10** below provides the 2023 Test Year class revenue requirements, compared to the 2013 results.

[5] https://www.oeb.ca/industry/policy-initiatives-and-consultations/review-cost-allocation-policy-unmetered-loads

Table 10: Allocated Revenue Requirement by Rate Class

Rate Class	Costs Allocated from 2013 Study	%	2023 Proposed Revenue Requirement	%
Residential	$ 12,930,320	59.3%	$ 17,306,579	62.5%
General Service < 50 kW	$ 2,758,928	12.6%	$ 3,299,487	11.9%
General Service > 50 kW	$ 2,865,526	13.1%	$ 3,825,555	13.8%
General Service 1000-4999 kW	$ 968,973	4.4%	$ 728,615	2.6%
Large Use	$ 1,250,022	5.7%	$ 1,778,999	6.4%
Unmetered Scattered Load	$ 94,978	0.4%	$ 83,817	0.3%
Sentinel Lighting	$ 56,970	0.3%	$ 68,165	0.2%
Street Lighting	$ 889,552	4.1%	$ 580,882	2.1%
Total	**$ 21,815,269**	**100.0%**	**$ 27,672,099**	**100.0%**

The RRWF, Sheet 11 Cost Allocation of the RRWF provides further information, which compares three revenue scenarios by rate class, including the allocation of the miscellaneous revenue to the rate classes. **Table 11** below summarizes the revenue scenario's included in Sheet 11 (under columns 'A, B, D' of Table 11) , along with the Allocated Costs (under column heading 'E' of Table 11), and the resulting Revenue to Cost in dollars (column 'F' of Table 11) and percentage (column 'G' of Table 11).

The reference to 'Status Quo Rates' in **Table 11** can be summarized as follows: The revenue deficiency can be stated as a percentage of distribution revenue at existing rates. If each of the rate classes distribution revenue was increased by the deficiency percentage, the deficiency would be reduced to zero. The resulting hypothetical revenue would retain the existing rate structure and can be referred to Total Revenue at status quo rates. The Allocated Costs (column 'E') is the revenue requirement determined from the CA Model, sheet O1, row 40. The revenues (column 'D') are compared to the costs (column 'E') to determine the difference and the resulting Revenue to Cost ratios for each rate class (column G').

Table 11: Allocation of Revenue's and Costs

	Total Revenue at Current Rates	Distribution Revenue at Status Quo Rates	Allocated Misc Revenue	Total Revenue at Status Quo Rates	Allocated Costs (revenue requirement)	Revenue to Cost	Revenue to Cost Ratio
	A	B	C	D	E	F=D-E	G=D/E
Residential	$ 13,695,242	$ 15,260,358	$ 805,473	$ 16,065,831	$17,306,579	($1,240,748)	92.8%
GS <50	$ 3,489,962	$ 3,888,801	$ 139,096	$ 4,027,897	$3,299,487	$728,410	122.1%
GS 50-999	$ 3,114,901	$ 3,470,877	$ 135,001	$ 3,605,878	$3,825,555	($219,677)	94.3%
Intermediate	$ 638,819	$ 711,825	$ 33,003	$ 744,828	$728,615	$16,213	102.2%
Large Use	$ 2,066,695	$ 2,302,880	$ 80,516	$ 2,383,396	$1,778,999	$604,397	134.0%
USL	$ 138,760	$ 154,618	$ 3,972	$ 158,590	$83,817	$74,773	189.2%
Sentinel	$ 52,243	$ 58,214	$ 3,618	$ 61,832	$68,165	($6,333)	90.7%
Street Light	$ 530,644	$ 591,287	$ 32,559	$ 623,846	$580,882	$42,964	107.4%
Total	**$ 23,727,268**	**$ 26,438,861**	**$ 1,233,238**	**$ 27,672,099**	**$ 27,672,099**	**-$ 0**	

Revenue-to-Cost Ratios

Outlined in **Table 12** below are the previously approved 2013 ratios, the Initial results of the cost allocation, and the proposed ratios for 2023. The percentage identifies the rate classes that are either being subsidized (with a ratio below 100%) or that are over-contributing (with a ratio greater than 100%).

Three rate classes were originally above the band threshold established for each rate class: General Service < 50 kW, Large Use and Unmetered Scattered Load. Bluewater proposes to reduce the revenues allocated to each of these classes to bring each class to the top of the band. This results in increasing the revenue expectation from the Residential, General Service > 50 kW, General Service 1000-4999 kW, and the Sentinel lighting rate classes. Each of these classes has been allocated a portion of the revenue such that each results in a R/C ratio of 95.3%.

Table 12: Revenue to Cost Ratios

Rate Class	2013 Previously Approved Ratio's	Status Quo Ratio's	2023 Proposed Ratios	Policy Range
Residential	93.7%	92.8%	95.3%	85 - 115
General Service < 50 kW	112.1%	122.1%	120.0%	80 - 120
General Service > 50 kW	116.7%	94.3%	95.3%	80 - 120
General Service 1000-4999 kW	89.4%	102.2%	102.2%	80 - 120
Large Use	114.2%	134.0%	115.0%	85 - 115
Unmetered Scattered Load	120.0%	189.2%	120.0%	80 - 120
Sentinel Lighting	106.3%	90.7%	95.3%	80 - 120
Street Lighting	89.7%	107.4%	107.4%	80 - 120

Bluewater proposes to implement the rates resulting from the proposed R/C ratios in **Table 12** in the 2023 Test Year, and does not require a phasing in of the rates as all customer rate classes have a total bill impact of less than 10%.