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# Exhibit 7: Cost Allocation



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## 1 List of Attachments

2 7-A. Cost Allocation Model Tabs I6.1, I6.2, O1 &	<u>ک</u> 02
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- 3 7-B. RRWF Cost Allocation
- 4 7-C. Elenchus Demand Allocation Methodology

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## **7.1** Background

2 This section summarizes EPLC's methodology of Cost Allocation for the 2018 Test Year.

3 For clarity, EPLC followed the Board's Cost Allocation Report (March 31<sup>st</sup>, 2011), the Board's

- 4 letter relating to the treatment of Streetlighting connection (June 12<sup>th</sup>, 2015) and the 2018 Cost
- 5 Allocation Model (Version 3.5).

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## **7.2 Rate Classes**

#### 2 7.2.1 Changes to Rate Classes

- 3 EPLC is requesting the following changes to Rate Classes as part of this Application:
- Elimination of the General Service > 3,000 to 4,999 kW ("Intermediate") Rate Class. The
   sole customer this class was originally design for is no longer in service as originally
   configured.
- Expansion of the General Service > 50 to 2,999 kW ("GS>50") Rate Class to 50 to 4,999
   kW. This change will reduce EPLC's number of Rate Classes while also reducing
   customer confusion for the few customers that could potentially transition between the
   GS>50 and Intermediate classes as they currently exist.
- Addition of an Embedded Distributor Rate Class. Please see section 7.2.4 below for
   more information.

#### 13 7.2.2 Unmetered Loads

As part of regular business operations, EPLC regularly communicates with its unmetered load
customers to aid and assist, where necessary, as it relates to how EPLC and other distributors
operate and our overall effect on unmetered load customers (including Unmetered Scattered
Load, Street Lighting, and Sentinel Lighting).

#### 18 **7.2.3 Standby Rates**

19 EPLC is not currently requesting a separate Standby Rate as part of this Application.

#### 20 7.2.4 Host Distributor

- 21 Effective January 1<sup>st</sup>, 2007, EPLC became a Host Distributor to Hydro One Networks Inc.
- 22 ("HONI") as HONI de-registered six wholesale meters with the Independent Electricity System
- 23 Operator. These de-registrations occurred downstream of EPLC wholesale meters at the Keith
- and Malden delivery points. HONI and EPLC have jointly re-configured load across their
- 25 systems to reduce the number of embedded points to three.
- 26 EPLC has discussed the proposed cost allocation methodology in this Application with HONI.
- 27 HONI was not in a position to comment prior to the submission of this Application. Based on
- 28 initial feedback, EPLC has made changes to the Demand Allocators for the Embedded



- 1 Distributor rate class to address HONI's initial concern that a large portion of its load does not
- 2 flow through EPLC distribution assets.

## 3 **7.2.5 MicroFIT**

4	EPLC is not currently requesting a separate MicroFIT rate class as part of this Application. EPLC
5	understands and acknowledges that the Cost Allocation Model will calculate unit costs that will
6	be used by the Board at a later time.
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## **7.3 Cost Allocation Study**

#### 2 **7.3.1 Overview**

- 3 EPLC followed the Board's Cost Allocation Report (March 31<sup>st</sup>, 2011), the Board's letter relating
- 4 to the treatment of Streetlighting connection (June 12<sup>th</sup>, 2015) and the 2018 Cost Allocation
- 5 Model (Version 3.5).
- 6 A copy of the Cost Allocation Model has been filed as evidence in Excel format. Each tab within
- 7 the Cost Allocation Model has been described in detail below.

#### 8 **7.3.2 Tab I2: LDC Class**

- 9 For the purpose of this Application, EPLC is proposing the following rate classes:
- 10 Residential;
- General Service < 50 kW ("GS<50");</li>
- General Service > 50 to 4,999 kW ("GS>50");
- Street Lighting;
- Sentinel Lighting;
- Unmetered Scattered Load ("USL");
- Embedded Distributor ("ED");

#### 17 7.3.3 Tab I3: Trial Balance Data

- For Tab I3, EPLC used Service Revenue Requirement as calculated in Exhibit 6 and Rate Base ascalculated in Exhibit 2.
- 20 Figures 1 and 2 below detail the Service Revenue Requirement and Rate Base calculations used
- 21 for this Tab.
- 22
- 23
- 24
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#### Figure 1 – Service Revenue Requirement

Description		Amount
OM&A Expenses	\$	7,710,275
Amortization/Depreciation	\$	1,848,004
Property Taxes	\$	42,538
Income Taxes (Grossed Up)	\$	227,249
Return:		
Deemed Interest Expense	\$	1,230,186
Return on Deemed Equity	\$	2,104,644
Service Revenue Requirement		13,162,895
Other Revenue	\$	691,821
Base Revenue Requirement	\$	12,471,074

2

## <sup>3</sup> Figure 2 – Rate Base

Description	Amount
2018 Average Gross Fixed Assets	\$ 84,365,384
2018 Average Accumulated Depreciation	\$ (30,144,082)
2018 Average Net Book Value	\$ 54,221,302
Working Capital Base	\$ 76,078,771
Working Capital Allowance Factor	7.50%
Working Capital Allowance	\$ 5,705,908
Rate Base	\$ 59,927,210

4 <sup>Ra</sup>

#### 5 7.3.4 Tab I4: BO Assets

- 6 EPLC used a consistent methodology for breaking out its assets with its previous 2010 Cost of
- 7 Service Application (EB-2009-0143). EPLC used best available information from its financial and
- 8 billing systems as well as engineering/design records.
- 9 EPLC does not own any transmission assets or distribution assets with voltages greater than 50
- 10 kV therefore no values were allocated to these categories.

#### 11 **7.3.5 Tab I5.1: Miscellaneous Data**

- 12 EPLC determined the Structure KM value using detailed records within its GIS system. EPLC
- 13 believes that this value best represents this required input.
- 14 EPLC utilized the deemed rate of 40% for the Deemed Equity Component of Rate Base.



- EPLC utilized the deemed rate of 7.5% for the Working Capital Allowance to be Included in Rate
   Base.
- 3 EPLC calculated the Portion of Pole Leasing Revenue from Secondary by dividing total poles
- 4 with secondary only (2,311) by the total poles owned by EPLC (6,208) resulting in a value of
- 5 37.23%.

### 6 7.3.6 Tab I5.2: Weighting Factors

- 7 The Weighting Factors for Services was calculated by determining the estimated average cost of
- 8 servicing the residential, GS<50 and GS>50 rate classes. EPLC then allocated a weighting factor
- 9 of 1 to the Residential rate class and calculated the relative weighting factor for GS<50 and
- 10 GS>50. EPLC determined that a weighting factor of 0.5 for the Street Lighting and Sentinel
- 11 Lighting classes was reasonable based on their relative work requirements to the Residential
- 12 Class and based on comparable submissions. EPLC calculated a weighting factor of 2 and 5 for
- 13 the USL and Embedded Distributor classes based on an assessment of work required to support
- 14 each respective class in relation to the Residential class.

#### <sup>15</sup> Figure 3 – Services Weighting Factors

Rate Class	Services Weighting Factors
Residential	1
GS<50	2.6
GS>50	2.1
Street Light	0.5
Sentinel	0.5
USL	2
ED	5

16

- 17 The Weighting Factor for Billing and Collecting was calculated by allocating assessed costs for
- 18 Billing and Collecting Costs to a low volume grouping (Residential) and a mid-high volume
- 19 grouping (GS<50, GS>50). EPLC then divided the allocated costs divided by the total number of
- 20 bills issued for the class in 2016 in order to determine a total cost per bill. As directed in the
- 21 instructions, EPLC then assigned a weighting factor of 1.00 to Residential and further calculated
- the associated weighting factor for the large volume grouping. EPLC determined that a
- 23 weighting factor of 1.00 for the Street Lighting, and Sentinel Lighting classes was reasonable
- 24 based on their similar work requirements to the Residential Class. EPLC also determined that a
- 25 Weighting Factor of 2 and 5 for the USL and Embedded Distributor rate classes was appropriate



- 1 based on their relative work required in relation to the Residential rate class. Figure 4 below
- 2 outlines the results of this calculation.

## <sup>3</sup> Figure 4 – Billing & Collecting Weighting Factors

Rate Class	Billing & Collecting Weighting Factors
Residential	1.00
GS<50	1.60
GS>50	1.60
Street Light	1.00
Sentinel	1.00
USL	2.00
ED	5.00

4

#### 5 **7.3.7 Tab I6.1: Revenue**

- 6 EPLC utilized its weather normalized 2018 Load Forecast as filed in Exhibit 3. This forecast
- 7 includes Wholesale Market Participants ("WMP") and estimated CDM savings. Figure 5 below
- 8 summarizes the entries used in the Cost Allocation Model.

#### <sup>9</sup> Figure 5 – 2018 Load Forecast Results

Rate Class	Customers/ Connections	kWh	kW
Residential	27,484	245,374,118	-
GS<50	1,977	62,707,450	-
GS>50	219	176,280,306	446,253
Street Light	2,740	2,799,882	8,848
Sentinel	173	335,758	2,080
USL	140	1,554,368	-
ED	3	29,865,554	80,869
Total	32,736	518,917,436	538,051

10

11 In order to forecast the Transformer Ownership Allowance credit ("TOA") in 2018, EPLC assessed 2016

12 eligible customers (11) and carried their respective demand forward to 2018 as their load is not

13 expected to materially change. EPLC does not foresee new or existing customers becoming eligible for

14 TOA in the near future. Figure 6 below demonstrates EPLC's methodology.

15



#### <sup>1</sup> Figure 6 – 2018 TOA Allocation

Rate Class	2016 Total kW	2016 Total kW w/ TOA	2018 Forecast	2018 Forecast w/ TOA
GS>50	532,036	416,425	446,253	330,642
Total	532,036	416,425	446,253	330,642

3 EPLC has three WMPs since August 2012 that qualify as GS>50 customers. Consistent with Exhibit 3 and

4 the Load Forecast, EPLC has removed WMP kWh from the GS>50 class in row 29.

#### 5 7.3.8 Tab I6.2: Customer Data

- 6 EPLC utilized historical data from its billing system to populate Historical Bad Debt and Late
- 7 Payment Charges.

2

- 8 EPLC utilized 2016 billing data to calculate Number of Bills in row 17, including re-issued bills
- 9 during the same calendar year.
- 10 The forecasted number of customers presented in the load forecast by Elenchus (Exhibit 3) was
- used to populate row 21 with the exception of 5 distinct municipal street lighting accounts
- 12 which were directly entered in cell J21.
- 13 EPLC does not have any bulk customers therefore row 22 was left blank.
- 14 All EPLC customers are considered Primary therefore row 23 remains the same as row 21 with
- 15 the exception of Street Lighting. EPLC utilized the Cost Allocation Model's calculation for Street
- 16 Lighting in cell J23 and J24 respectively.
- 17 EPLC customers that receive the TOA in 2016 were subtracted from the Primary Customer base
- in lines 24 and 25 to reflect the EPLC's Line Transformer Customer Base and Secondary
- 19 Customer Base.

#### 20 **7.3.9 Tab 17.1: Meter Capital**

- 21 The purpose of Tab I7.1 is to determine the weighting factors for the Cost Weighted Meter
- 22 Capital allocator which is used to allocate accounts 1860 (Meters), 5065 (Meter Expense) and
- 23 5175 (Maintenance of Meters).
- 24 The costs referenced below in Figure 7 reflect EPLC actual installed costs.



#### **1** Figure 7 – Metering Types & Associated Costs

Meter Types	Cost Per Meter (Installed)
Single Phase 200 Amp - Urban	333
Single Phase 200 Amp - Rural	333
Central Meter 1 Phase	394
Network Meter (Costs to be updated)	445
Micro- Fit 1 Phase	361
Central Meter 1 Phase - Demand	780
Demand without IT	948
Demand with IT	997
Demand with IT and Interval Capability - Sec	1,201
Demand with IT and Interval Capability - Pri	1,363
Dem w IT / Ant	1,198
Solar 3 Phase	818
600 Volt Delta	689

2

#### 3 7.3.10 Tab I7.2: Meter Reading

The purpose of Tab 17.2 is to allocate the cost of meter reading across EPLC's rate classes. EPLC
currently employs only two methods of reading its meters. The majority are smart meter reads
which are now automated and straight forward. The remaining meter reads are interval meter
reads which require relatively greater cost per unit when compared to their smart meter
counterparts (ie 3<sup>rd</sup> party costs, MV90 data collection costs, etc). EPLC currently estimates the
Meter Reading Weighting Factors as described in Figure 8 below.

## 10 Figure 8 – Meter Read Weighting Factors

11 12	Meter Read Type	Meter Read Weighting Factors
	Smart Meter	1.00
13	Smart Meter w/ Demand	1.00
	Interval	25.00



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#### 1 7.3.11 Tab I8: Demand

- 2 EPLC contracted Elenchus to complete a review of the Demand Allocators required in Tab I8 of
- 3 the Cost Allocation Model. Values in Tab I8 have been determined by Elenchus using the
- 4 methodology outlined in Attachment 7-C of this Exhibit.

#### 5 7.3.12 Tab I9: Direction Allocation

- 6 EPLC applied \$86,000 in directly allocated administrative costs to the Embedded Distributor 7 rate class as a result of the added complexity to EPLC's settlement system and processes that 8 are directly related to this rate class through the de-registration of wholesale metering points. 9 This expense represents the cost of settlement as well as regulatory and senior management 10 review. HONI has received a summary of these proposed changes but was not able to offer final 11 12 comment. 13 14 15 16 17 18 19 20 21 22 23
- 24 25
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## **7.4** Class Revenue Requirements

- 2 Figure 9 below demonstrates the allocated cost by rate class from EPLC's 2010 Cost of Service
- 3 application and the updated 2018 study results, consistent with Appendix 2-P.

#### **Costs Allocated from Costs Allocated from Rate Class** % % 2010 Study **Test Year Study** Residential \$ 8,442,067 70.48% \$ 9,665,793 73.432% \$ GS<50 1,585,605 13.24% 1,437,710 10.922% \$ \$ \$ GS>50 1,457,177 12.17% 1,707,614 12.973% \$ \$ Intermediate 0.49% 0.000% 58,824 -\$ Street Light 351,854 2.94% \$ 178,906 1.359% \$ \$ Sentinel 23,468 0.20% 23,079 0.175% USL \$ 58,914 0.49% \$ 0.389% 51,178 ED \$ \$ 0.00% 98,616 0.749% \$ Total 11,977,910 100.00% \$ 13,162,895 100.00%

### <sup>4</sup> Figure 9 – 2010 vs. Test Year Allocated Costs

5

6 Figure 10 below outlines the calculated revenue by class consistent with sheet 11 of the RRWF

7 model (formerly Appendix 2-P).

#### 8 Figure 10 – Calculated Class Revenue

Rate Class	20:	18 Base Revenue at Existing Rates	2 Al	018 Base Revenue located at Existing Rates (1.0230)	2018 Proposed Base Revenue		d Miscellaneo e Revenue	
Residential	\$	8,612,319	\$	8,810,192	\$	8,889,902	\$	521,363
GS<50	\$	1,585,914	\$	1,622,351	\$	1,622,351	\$	82,393
GS>50	\$	1,528,407	\$	1,563,523	\$	1,563,524	\$	74,371
Intermediate	\$	-	\$	-	\$	-	\$	-
Street Light	\$	187,611	\$	191,922	\$	191,922	\$	9,623
Sentinel	\$	27,447	\$	28,078	\$	26,669	\$	1,025
USL	\$	62,175	\$	63,604	\$	58,609	\$	2,805
ED	\$	187,106	\$	191,405	\$	118,097	\$	242
Total	\$	12,190,979	\$	12,471,074	\$	12,471,074	\$	691,821

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11



## **7.5** Revenue to Cost Ratios

- 2 The outputs of a Cost Allocation study are generally presented in the form of Revenue to Cost
- 3 ("RTC") ratios. These ratios represent the percentage of Distribution Revenue collected by rate
- 4 class, compared to the cost allocated to that same class. Ratios under 100% indicate that a
- 5 specific class is under-contributing and is being subsidized by other classes whereas ratios over
- 6 100% indicate that a specific class is over-contributing and subsidizing other rate classes.
- 7 The Board published a range of acceptable ratios on March 31<sup>st</sup>, 2011. Further, the Board
- 8 provided clarity to the treatment of Street Lighting connections on June 12<sup>th</sup>, 2015.
- 9 Figure 11 below, completed consistently with Tab 11 of the RRWF worksheet and formerly
- 10 Appendix 2-P, lists EPLC's previously approved ratios, summarizes the results of EPLC's Cost
- 11 Allocation study as well as EPLC's proposed ratios.

## <sup>12</sup> Figure 11 – Revenue to Cost Ratios

Rate Class	Previously Approved Ratios	Status Quo Ratios	Proposed Ratios	Policy Range
Residential	100.23%	96.54%	97.37%	85% to 115%
General Service < 50 kW	49.56%	118.57%	118.57%	80% to 120%
General Service > 50 kW	159.99%	95.92%	95.92%	80% to 120%
Intermediate Use	336.93%	0.00%	0.00%	80% to 120%
Street Lights	32.36%	112.65%	112.65%	80% to 120%
Unmetered Scattered Load	132.66%	129.76%	120.00%	80% to 120%
Sentinel Lights	38.09%	126.10%	120.00%	80% to 120%
Embedded Distributor	N/A	194.34%	120.00%	80% to 120%

13

14 In order to determine the proposed ratios presented above, EPLC moved all status quo RTC

ratios (resulting from the Cost Allocation Study) to the closest available policy range threshold.

16 Given that the Embedded Distributor class was new and there is no current policy range

17 established, EPLC chose 120% as the proposed ratio. This resulted in EPLC under earning

18 therefore EPLC moved the primary cost contributor (Residential) proportionately until revenue

19 neutrality was reached. This resulted in the Residential rate class having proposed RTC ratios of

20 97.37%.

# **Attachment 7-A**

# Cost Allocation Model Tabs I6.1, I6.2, O1 & O2

Ontario Energy Board

## 2018 Cost Allocation Model

#### EB-2017-0039 Sheet I6.1 Revenue Worksheet - 1

Total kWhs from Load Forecast	518,917,436
Total kWs from Load Forecast	538,051
Deficiency/sufficiency (RRWF 8. cell F51)	- 280,095

Miscellaneous Revenue (RRWF 5.	691,821
cell F48)	

			1	2	3	5	7	8	9	10
	ID	Total	Residential	GS <50	GS>50-Regular	GS >50- Intermediate	Street Light	Sentinel	Unmetered Scattered Load	Embedded Distributor
Billing Data										
Forecast kWh	CEN	518,917,436	245,374,118	62,707,450	176,280,306		2,799,882	335,758	1,554,368	29,865,554
Forecast kW	CDEM	538,051	-		446,253		8,848	2,080	-	80,869
Forecast kW, included in CDEM, of customers receiving line transformer allowance		115,611			115,611					
Optional - Forecast kWh, included in CEN, from customers that receive a line transformation allowance on a kWh basis. In most cases this will not be applicable and will be left blank.										
KWh excluding KWh from Wholesale Market Participants	CEN EWMP	508,048,486	246,273,348	62,262,858	164,956,718		2,799,882	335,758	1,554,368	29,865,554
Existing Monthly Charge			\$20.31	\$35.13	\$232.69		\$3.30	\$3.41	\$9.53	\$232.69
Existing Distribution KWn Rate			\$0.0078	\$0.0120	\$2.2101		¢9.0407	¢0 7022	\$0.0297	\$2.2101
Existing TOA Rate				\$0.60	\$0.60		φ0.9407	φ <del>3</del> ./ <del>3</del> 22		φ2.2101
Additional Charges										
Distribution Revenue from Rates		\$12,260,346	\$8,612,319	\$1,585,914	\$1,597,774	\$0	\$187,611	\$27,447	\$62,175	\$187,106
Transformer Ownership Allowance		\$69,367	\$0	\$0	\$69,367	\$0	\$0	\$0	\$0	\$0
Net Class Revenue	CREV	\$12,190,979	\$8,612,319	\$1,585,914	\$1,528,407	\$0	\$187,611	\$27,447	\$62,175	\$187,106

## 2018 Cost Allocation Model

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Sheet I6.2 Customer Data Worksheet - 1

			1	2	3	5	7	8	9	10
	ID	Total	Residential	GS <50	GS>50-Regular	GS >50- Intermediate	Street Light	Sentinel	Unmetered Scattered Load	Embedded Distributor
Billing Data										
Bad Debt 3 Year Historical Average	BDHA	\$164,142	\$122,315	\$34,461	\$7,366	\$0	\$0	\$0	\$0	\$0
Late Payment 3 Year Historical Average	LPHA	\$119,824	\$76,262	\$18,352	\$25,052	\$0	\$48	\$55	\$54	\$0
Number of Bills	CNB	353,209	323,868	24,534.00	2,744.00		60.00	372.00	1,595.00	36
Number of Devices	CDEV		27,484	1,977	219		2,740	173	140	3
Number of Connections (Unmetered)	CCON	32,736	27,484	1,977	219		2,740	173	140	3
Total Number of Customers	CCA	30,001	27,484	1,977	219		5	173	140	3
Bulk Customer Base	CCB	-								
Primary Customer Base	CCP	30,283	27,484	1,977	217		289	173	140	3
Line Transformer Customer Base	CCLT	30,272	27,484	1,975	211	-	289	173	140	
Secondary Customer Base	CCS	29,988	27,484	1,975	211	-	5	173	140	
Weighted - Services	CWCS	34,836	27,484	5,140	460	-	1,370	87	280	15
Weighted Meter -Capital	CWMC	10,790,525	9,272,145	1,277,023	237,266	-	-	-	-	4,090
Weighted Meter Reading	CWMR	35,011	27,484	1,977	5,475	-	-	-	-	75
Weighted Bills	CWNB	371,315	323,868	39,254	4,390	-	60	372	3,190	180

#### Bad Debt Data

Historic Year:	2014	143,700	97,622	23,979	22,098	-	-	-	-	-
Historic Year:	2015	164,888	137,806	27,081	-	-	-	-	-	-
Historic Year:	2016	183,840	131,516	52,324	-	-	-	-	-	-
Three-year average		164,142	122,315	34,461	7,366	-	-	-	-	-

#### Street Lighting Adjustment Factors

NCP Test Results

	Primary As	set Data	Line Transform	ner Asset Data
Class	Customers/ Devices	4 NCP	Customers/ Devices	4 NCP
Residential	27,484	275,543	27,484	275,543
Street Light	2,740	2,846	2,740	2,846

4 NCP

Street Lighting Adj	ustment Factors
Primary	9.6515
Line Transformer	9.6515

## 2018 Cost Allocation Model

EB-2017-0039

#### Sheet 01 Revenue to Cost Summary Worksheet - 1

Instructions: Please see the first tab in this workbook for detailed instructions

#### Class Revenue, Cost Analysis, and Return on Rate Base

			1	2	3	5	7	8	٩	10	
			•	-	, , , , , , , , , , , , , , , , , , ,	CS - 50	•	•	Unmotorod	Emboddod	
Rate Base		Total	Residential	GS <50	GS>50-Regular	Intermediate	Street Light	Sentinel	Scattered Load	Distributor	
crev	Distribution Revenue at Existing Rates	\$12,190,979	\$8,612,319	\$1,585,914	\$1,528,407	\$0	\$187,611	\$27,447	\$62,175	\$187,106	
mi	Miscellaneous Revenue (mi)	\$691,821	\$521,363	\$82,393	\$74,371	\$0	\$9,623	\$1,025	\$2,805	\$242	
	Tatal Davance at Existing Dates	Mis	cellaneous Revenu	ue Input equals Ou	tput		0107.001	000 170	004.000	0107.040	
	Factor required to recover deficiency (1 + D)	\$12,882,800	\$9,133,681	\$1,668,306	\$1,602,779	۵¢	\$197,234	\$28,472	\$64,980	\$187,348	
	Distribution Revenue at Status Quo Bates	\$12 471 074	\$8,810,192	\$1 622 351	\$1 563 523	\$0	\$191 922	\$28.078	\$63.604	\$191.405	
	Miscellaneous Revenue (mi)	\$691,821	\$521,363	\$82,393	\$74,371	\$0	\$9,623	\$1,025	\$2,805	\$242	
	Total Revenue at Status Quo Rates	\$13,162,895	\$9,331,554	\$1,704,744	\$1,637,895	\$0	\$201,545	\$29,102	\$66,408	\$191,647	
	Expenses	C1 005 040	\$1 0E0 000	¢010.000	\$050 E1E	¢o	¢00.100	¢0.657	000 31	£0.401	
ai	Customer Belated Costs (cu)	\$1,865,349	\$1,259,208	\$212,083	\$352,515	\$U \$0	\$29,162 \$29,581	\$3,657 \$3,134	\$6,302	\$2,421 \$958	
ad	General and Administration (ad)	\$3,731,323	\$2,858,458	\$406,196	\$383,796	\$0	\$55.531	\$6.454	\$17,660	\$3,226	
dep	Depreciation and Amortization (dep)	\$1,848,004	\$1,323,917	\$206,824	\$288,660	\$0	\$19,324	\$2,989	\$4,408	\$1,883	
INPUT	PILs (INPUT)	\$227,249	\$157,092	\$25,294	\$40,613	\$0	\$2,890	\$437	\$659	\$263	
INT	Interest	\$1,230,186	\$850,399	\$136,927	\$219,855	\$0	\$15,647	\$2,364	\$3,569	\$1,425	
	Total Expenses	\$10,972,251	\$8,210,902	\$1,203,450	\$1,331,478	\$0	\$152,136	\$19,035	\$45,073	\$10,177	
	Direct Allocation	\$86,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$86,000	
	Direct Allocation	400,000	φυ	ŞU	φυ	φυ	ψŪ	φυ	ψŪ	400,000	
NI	Allocated Net Income (NI)	\$2,104,644	\$1,454,891	\$234,260	\$376,135	\$0	\$26,770	\$4,044	\$6,105	\$2,439	
	Revenue Requirement (includes NI)	\$13 162 895	\$9,665,793	\$1 /37 710	\$1 707 614	\$0	\$178,906	\$23.079	\$51 178	\$98.616	
	noronae nequienent (included hi)	Bevenue Be	quirement Input er		\$1,707,011	ψu	\$110,000	<i>\$</i> 20,070	<i>401,170</i>	\$00,010	
		nevenue ne	quirement input et	uais output							
	Rate Base Calculation										
	Net Assets										
dn	Distribution Plant - Gross	\$94 354 574	\$65 563 703	\$10 510 022	\$16 549 592	\$0	\$1 181 184	\$177 850	\$267 931	\$104 293	
qp	General Plant - Gross	\$10,414,080	\$7,209,958	\$1,161,764	\$1,845,566	\$0	\$134,334	\$20,047	\$30,568	\$11,844	
accum dep	Accumulated Depreciation	(\$30,144,083)	(\$21,075,318)	(\$3,342,585)	(\$5,208,761)	\$0	(\$351,989)	(\$54,504)	(\$79,464)	(\$31,462)	
co	Capital Contribution	(\$20,403,273)	(\$14,210,027)	(\$2,292,508)	(\$3,505,256)	\$0	(\$272,769)	(\$39,196)	(\$61,535)	(\$21,982)	
	Total Net Plant	\$54,221,299	\$37,488,316	\$6,036,693	\$9,681,140	\$0	\$690,761	\$104,197	\$157,500	\$62,692	
	Directly Allocated Not Fixed Access	00	e0	60	03	¢0	60	¢0	03	03	
	Directly Anotaleu Net Fixed Assets	30	φU	ŞU	<b>\$</b> 0	φU	φU	φU	φU	φu	
COP	Cost of Power (COP)	\$68,325,958	\$33,120,584	\$8,373,550	\$22,184,548	\$0	\$376,548	\$45,155	\$209,042	\$4,016,531	
	OM&A Expenses	\$7,666,812	\$5,879,494	\$834,405	\$782,350	\$0	\$114,274	\$13,246	\$36,437	\$6,606	
	Directly Allocated Expenses	\$00,000	φU	\$0	φU	\$U	\$0	\$U	\$U	\$66,000	
	Subiolai	\$76,078,770	\$39,000,078	\$9,207,955	\$22,966,897	\$0	\$490,822	\$58,401	\$245,480	\$4,109,137	
	Working Capital	\$5,705,908	\$2,925,006	\$690.597	\$1,722,517	\$0	\$36.812	\$4,380	\$18,411	\$308,185	
			+_,,,	+,	+.,.=,			+ .,		,	
	Total Rate Base	\$59,927,207	\$40,413,321	\$6,727,290	\$11,403,658	\$0	\$727,572	\$108,577	\$175,911	\$370,878	
		Rate E	ase Input equals (	Output							
	Equity Component of Rate Base	\$23,970,883	\$16,165,329	\$2,690,916	\$4,561,463	\$0	\$291,029	\$43,431	\$70,365	\$148,351	
	Net Income on Allocated Assets	\$2,104,644	\$1,120,652	\$501,293	\$306.417	\$0	\$49,409	\$10.067	\$21,335	\$95,470	
				,						,	
	Net Income on Direct Allocation Assets	ŞU	şu	ŞU	\$0	şu	ŞU	şu	ŞU	\$0	
	Net Income	\$2,104,644	\$1,120,652	\$501,293	\$306,417	\$0	\$49,409	\$10,067	\$21,335	\$95,470	
	RATIOS ANALYSIS										
	REVENUE TO EXPENSES STATUS QUO%	100.00%	96.54%	118.57%	95.92%	0.00%	112.65%	126.10%	129.76%	194.34%	
		(\$200.005)	(\$500.110)	\$000 FOC	(\$104.005)	¢0.	\$10.000	¢5 000	\$12.001	¢00 700	
	EXISTING REVENUE WINUS ALLOUATED COSTS	(¢200,095)	(\$332,112)	φ∠30,596	(\$104,035)	\$U	\$10,328	<b>\$</b> 0,393	\$13,001	φοο,/33	
		Deficie	ency input equals (	output							
	STATUS QUO REVENUE MINUS ALLOCATED COSTS	\$0	(\$334,239)	\$267,034	(\$69,719)	\$0	\$22,639	\$6,024	\$15,230	\$93,032	
	RETURN ON EQUITY COMPONENT OF RATE BASE	8.78%	6.93%	18.63%	6.72%	0.00%	16.98%	23.18%	30.32%	64.35%	

Ontario Energy Board

## 2018 Cost Allocation Model

#### EB-2017-0039

#### Sheet O2 Monthly Fixed Charge Min. & Max. Worksheet - 1

Output sheet showing minimum and maximum level for Monthly Fixed Charge

	1	2	3	5	7	8	9	10
<u>Summary</u>	Residential	GS <50	GS>50-Regular	GS >50- Intermediate	Street Light	Sentinel	Unmetered Scattered Load	Embedded Distributor
Customer Unit Cost per month - Avoided Cost	\$5.50	\$8.09	-\$2.93	0	\$0.88	\$1.32	\$6.17	\$29.63
Customer Unit Cost per month - Directly Related	\$10.00	\$15.08	\$11.43	0	\$1.75	\$2.69	\$12.27	\$53.73
Customer Unit Cost per month - Minimum System with PLCC Adjustment	\$19.34	\$32.70	\$30.04	0	\$4.58	\$8.64	\$25.30	\$85.97
Existing Approved Fixed Charge	\$20.31	\$35.13	\$232.69	\$0.00	\$3.30	\$3.41	\$9.53	\$232.69

# **Attachment 7-B**

# **RRWF** Cost Allocation

Contario Energy Board

# Revenue Requirement Workform (RRWF) for 2018 Filers

#### **Cost Allocation and Rate Design**

This spreadsheet replaces **Appendix 2-P** and provides a summary of the results from the Cost Allocation spreadsheet, and is used in the determination of the class revenue requirement and, hence, ultimately, the determination of rates from customers in all classes to recover the revenue requirement.

Stage in Application Process: Initial Application

#### A) Allocated Costs

Name of Customer Class <sup>(3)</sup>	Costs Prev	Allocated from rious Study <sup>(1)</sup>	%	Al Reve	located Class nue Requirement	%	
					(7A)		
Residential General Service < 50 kW Intermediate Use Street Lights Unmetered Scattered Load Sentinel Lights Embedded Distributor	* * * * * * * *	8,442,067 1,585,605 1,457,177 58,824 351,854 23,468 58,914	70.48% 13.24% 12.17% 0.49% 2.94% 0.20% 0.49%	\$ \$ \$ \$ \$ \$ \$ \$ \$	9,665,793 1,437,710 1,707,614 - 178,906 51,178 23,079 98,616	73.43% 10.92% 12.97% 1.36% 0.39% 0.18% 0.75%	
Total	\$	11,977,910	100.00%	\$	13,162,895	100.00%	
			Service Revenue Requirement (from Sheet 9)	\$	13,162,895.35		

(1) Class Allocated Revenue Requirement, from Sheet O-1, Revenue to Cost || RR, row 40, from the Cost Allocation Study in this application. This excludes costs in deferral and variance accounts. For Embedded Distributors, Account 4750 - Low Voltage (LV) Costs are also excluded.

(2) Host Distributors - Provide information on any embedded distributor(s) as a separate class, if applicable. If embedded distributors are billed in a General Service class, include the allocated costs and revenues of the embedded distributor(s) in the applicable class, and also complete Appendix 2-Q.

(3) Customer Classes - If these differ from those in place in the previous cost allocation study, modify the customer classes to match the proposal in the current application as closely as possible.

#### B) Calculated Class Revenues

Name of Customer Class	Load curr	Forecast (LF) X ent approved rates	l api	F X current proved rates X (1+d)	LF X	Proposed Rates	N	liscellaneous Revenues
		(7B)		(7C)		(7D)		(7E)
1 Residential 2 General Service < 50 kW	\$	8,612,319 1,585,914	\$ \$	8,810,192 1,622,351	\$ \$	8,889,902 1,622,351	\$ \$	521,363 82,393
3 General Service > 50 kW 4 Intermediate Use	\$ \$	1,528,407	\$ \$	1,563,523	\$ \$	1,563,524	\$ \$	74,371
5 Street Lights 6 Unmetered Scattered Load 7 Sentinel Lights	\$ \$ \$	187,611 62,175 27,447	\$ \$ \$	191,922 63,604 28,078	\$ \$ \$	191,922 58,609 26,669	\$ \$ \$	9,623 2,805 1,025
8 Embedded Distributor 9 10 11 12 13 14 15 16 17 18	\$	187,106	\$	191,405	\$	118,097	\$	242
19 20 	\$	12,190,979	\$	12,471,074	\$	12,471,074	\$	691,821

(4) In columns 7B to 7D, LF means Load Forecast of Annual Billing Quantities (i.e., customers or connections, as applicable X 12 months, and kWh, kW or kVA as applicable. Revenue quantities should be net of the Transformer Ownership Allowance for applicable customer classes. Exclude revenues from rate adders and rate riders.

(5) Columns 7C and 7D - Column Total should equal the Base Revenue Requirement for each.

(6) Column 7C - The OEB-issued cost allocation model calculates "1+d" on worksheet O-1, cell C22. "d" is defined as Revenue Deficiency/Revenue at Current Rates.

(7) Column 7E - If using the OEB-issued cost allocation model, enter Miscellaneous Revenues as it appears on worksheet O-1, row 19,

#### C) Rebalancing Revenue-to-Cost Ratios

Name of Customer Class	Previously Approved Ratios	Status Quo Ratios	Proposed Ratios	Policy Range
	Most Recent Year:	(7C + 7E) / (7A)	(7D + 7E) / (7A)	
	2010			
	%	%	%	%
1 Residential	100.23%	96 5/%	07 37%	85 - 115
2 General Service $< 50 \text{ kW}$	49 56%	118 57%	118 57%	80 - 120
3 General Service > 50 kW	159 99%	95 92%	95 92%	80 - 120
4 Intermediate Use	336 93%	#DIV/01	#DIV/01	80 - 120
5 Street Lights	32.36%	112.65%	112.65%	80 - 120
6 Unmetered Scattered Load	132.66%	129.76%	120.00%	80 - 120
7 Sentinel Lights	38.09%	126.10%	120.00%	80 - 120
8 Embedded Distributor	N/A	194.34%	120.00%	80 - 120
9				
10				
11				
12				
13				
14				
15				
17				
18				
19				
20				

(8) Previously Approved Revenue-to-Cost (R/C) Ratios - For most applicants, the most recent year would be the third year (at the latest) of the Price Cap IR period. For example, if the applicant, rebased in 2012 with further adjustments to move within the range over two years, the Most Recent Year would be 2015. However, the ratios in 2015 would be equal to those after the adjustment in 2014.

(9) Status Quo Ratios - The OEB-issued cost allocation model provides the Status Quo Ratios on Worksheet O-1. The Status Quo means "Before Rebalancing".

(10) Ratios shown in red are outside of the allowed range. Applies to both Tables C and D.

#### (D) Proposed Revenue-to-Cost Ratios (11)

Name of Customer Class	Propo	osed Revenue-to-Cost Ra	atio	Policy Range
	Test Year	Price Cap	IR Period	
	2018	2019	2020	
1 Residential	97.37%	97.37%	97.37%	85 - 115
2 General Service < 50 kW	118.57%	118.57%	118.57%	80 - 120
3 General Service > 50 kW	95.92%	95.92%	95.92%	80 - 120
4 Intermediate Use	#DIV/0!	#DIV/0!	#DIV/0!	80 - 120
5 Street Lights	112.65%	112.65%	112.65%	80 - 120
6 Unmetered Scattered Load	120.00%	120.00%	120.00%	80 - 120
7 Sentinel Lights	120.00%	120.00%	120.00%	80 - 120
8 Embedded Distributor	120.00%	120.00%	120.00%	80 - 120
9				
10				
11				
12				
13				
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8				

(11) The applicant should complete Table D if it is applying for approval of a revenue-to-cost ratio in 2018 that is outside of the OEB's policy range for any customer class. Table D will show that the distributor is likely to enter into the 2019 and 2020 Price Cap IR models, as necessary. For 2019 and 2020, enter the planned revenue-to-cost ratios that will be "Change" or "No Change" in 2017 (in the current Revenue/Cost Ratio Adjustment Workform, Worksheet C1.1 'Decision - Cost Revenue Adjustment, column d), and enter TBD for class(es) that will be entered as 'Rebalance'.

# **Attachment 7-C**

# Elenchus Demand Allocation Methodology

#### 2018 Essex Hourly Load Profile

Essex provided Elenchus with data for 2016 actual hourly kWh for General Service > 50 kW and Embedded Distributor, but was unable to provide reliable data for the remaining rate classes. Due to a data availability issue with smart meter data, Elenchus obtained hourly data for the remaining rate classes from London Hydro to approximate the shape of the Essex's load profiles for those rate classes.

For the rate classes relying on London Hydro data, the hourly loads for each class were revised to reflect Essex's 2018 load forecast. For General Service > 50 kW and Embedded Distributor classes, the hourly leads were adjusted to account for changes in the relative loads from 2016 to 2018. This was done by scaling the hourly loads of each class to levels consistent with the 2018 load forecast while maintaining the hourly load shapes.

The 12 monthly coincident and non-coincident peaks for the rate classes were determined. The allocators were then derived as follows.

- The 1, 4 and 12 NCP values for each class were calculated by selecting the peak hour 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.

#### Weather Normalization

Data for the Residential and General Service < 50 kW classes were weather normalized to reflect load profiles in a year of typical weather in Windsor. The weather normalization process to determine Essex's weather sensitive load uses daily heating degree days and cooling degree days as measured at Environment Canada's Windsor Riverside and London Airport weather stations to take into account temperature

sensitivity. Environment Canada defines heating degree days and cooling degree days as the difference between the average daily temperature and 18°C for each day (below for heating, above for cooling). For example, a single day with a temperature of 20°C is considered to have two cooling degree days.

The typical weather of a given day was determined with a heating degree day and cooling degree day ranking process. Instead of looking at the typical weather of particular date, heating and cooling degree days from Windsor Riverside's weather station were ranked within each month from highest to lowest. The equivalently ranked days within a given month over the past 10 years were used to determine the average heating and cooling degree days for that ranked day. For example, the highest heating degree day in each of the past 10 Januarys are averaged to determine the normal highest heating degree day for January. This process maintains the shape of the load profiles by determining typical monthly peaks for the Residential and General Service < 50 kW classes without smoothing out those peaks.

The normal ranked heating and cooling degree days were then matched with the corresponding London Airport ranked days in 2016. The differences between London's actual heating and cooling degree days and their corresponding Windsor normal heating and cooling degree days were calculated to be used with regression results to adjust 2016 London Hydro hourly loads to Essex normal hourly loads.

The weather normalization regression calculated the impact of London's heating and cooling degree days at each hour of the day on London Hydro's hourly load (see appendix). This method considers that weather may impact electricity use differently at various hours of the day. The results reflect the impact of a single heating or cooling degree day at a given hour of the day on the load for that hour. The hourly results were combined with the London actual and Windsor normal heating and cooling degree day differences, as described in the above paragraph, to determine the weather normalization adjustment required for each hour in 2016. The weather normalization adjustments were then applied to the initial load profiles and the normalized load profiles were re-scaled to Essex's 2018 load forecast.

The table below shows Essex's final weather normalized demand allocators with the scaling adjustment.

		GS < 50	GS > 50		Street	Sentinel		
	Residential	kW	kW	Embedded	Light	Light	USL	Total
1CP	70,732	12,496	33,413	150	-	-	178	121,263
4CP	273,003	49,404	126,244	709	-	-	711	468,838
12CP	583,671	120,329	307,047	926	3,363	349	2,125	1,067,520

1NCP	73,521	14,064	37,065	444	713	117	189	132,840
4NCP	275,543	55,055	140,401	1,384	2,846	434	731	502,522
12NCP	616,780	138,117	348,326	1,953	8,513	1,059	2,125	1,186,462

## APPENDIX

Residential Weather Normalization Regression Results

	coefficient	std. error		t-ratio	p-value
HDD1	0.001516531	e	6.46E-05	23.46795097	6.18E-120
HDD2	0.001418183	e	6.46E-05	21.94603654	2.49E-105
HDD3	0.001381473	e	6.46E-05	21.37796238	4.10E-100
HDD4	0.00136472	6	6.46E-05	21.11870312	8.91E-98
HDD5	0.001311628	6	6.46E-05	20.29711683	1.51E-90
HDD6	0.001188816	e	6.46E-05	18.39664158	7.12E-75
HDD7	0.001241104	e	6.46E-05	19.20578381	2.28E-81
HDD8	0.001588629	e	6.46E-05	24.58365215	3.18E-131
HDD9	0.001552865	e	6.46E-05	24.03020595	1.46E-125
HDD10	0.001359006	e	6.46E-05	21.0302856	5.50E-97
HDD11	0.001257243	e	6.46E-05	19.4555355	2.00E-83
HDD12	0.001209134	e	6.46E-05	18.71104947	2.29E-77
HDD13	0.001206054	e	6.46E-05	18.66339231	5.51E-77
HDD14	0.001072537	e	6.46E-05	16.59724532	2.15E-61
HDD15	0.000889967	e	6.46E-05	13.77202916	6.29E-43
HDD16	0.000650839	e	6.46E-05	10.07157023	8.57E-24
HDD17	0.000715929	e	6.46E-05	11.0788302	1.98E-28
HDD18	0.001424373	e	6.46E-05	22.04182803	3.20E-106
HDD19	0.001665241	e	6.46E-05	25.76919208	9.42E-144
HDD20	0.001625338	ε	6.46E-05	25.15171565	3.70E-137
HDD21	0.001603763	e	6.46E-05	24.81784179	1.18E-133
HDD22	0.001733918	ε	6.46E-05	26.83195517	1.91E-155
HDD23	0.00186557	e	6.46E-05	28.86924569	4.54E-179
HDD24	0.00174133	ε	6.46E-05	26.946664	9.83E-157
CDD1	0.009383382	0.000	353918	26.51284237	6.88E-152
CDD2	0.00822855	0.000	353918	23.24985461	8.72E-118
CDD3	0.007356582	0.000	353918	20.78609819	8.10E-95
CDD4	0.006668223	0.000	353918	18.84113396	2.08E-78
CDD5	0.006072909	0.000	353918	17.15906657	1.85E-65
CDD6	0.005456424	0.000	353918	15.41718184	2.81E-53
CDD7	0.005434214	0.000	353918	15.35442818	7.33E-53
CDD8	0.007159626	0.000	353918	20.22959655	5.76E-90
CDD9	0.009549774	0.000	353918	26.98298681	3.84E-157
CDD10	0.011969641	0.000	353918	33.82034544	6.34E-243
CDD11	0.014350161	0.000	353918	40.54653093	0.00E+00
CDD12	0.016492899	0.000	353918	46.60085731	0.00E+00
CDD13	0.018201183	0.000	353918	51.42763296	0.00E+00
CDD14	0.019403592	0.000	353918	54.82505036	0.00E+00
CDD15	0.020312421	0.000	353918	57.3929564	0.00E+00

CDD16	0.020697023	0.000353918	58.47965564	0.00E+00
CDD17	0.020542007	0.000353918	58.04165612	0.00E+00
CDD18	0.020097008	0.000353918	56.78430511	0.00E+00
CDD19	0.01885623	0.000353918	53.278474	0.00E+00
CDD20	0.017303213	0.000353918	48.89040793	0.00E+00
CDD21	0.01656928	0.000353918	46.81667357	0.00E+00
CDD22	0.015384513	0.000353918	43.469103	0.00E+00
CDD23	0.013620832	0.000353918	38.48580225	0.00E+00
CDD24	0.011764294	0.000353918	33.24013552	5.59E-235
HOUR1	0.075053542	0.00104776	71.63236676	0
HOUR2	0.068695225	0.001047765	65.56355615	0
HOUR3	0.065227809	0.001047771	62.25390347	0
HOUR4	0.063975141	0.001047776	61.05804489	0
HOUR5	0.066576524	0.001047781	63.54049598	0
HOUR6	0.075941295	0.001047786	72.47785413	0
HOUR7	0.087088422	0.001047791	83.11618328	0
HOUR8	0.090069479	0.001047797	85.96084247	0
HOUR9	0.091419501	0.001047802	87.24884824	0
HOUR10	0.094499785	0.001047807	90.1881576	0
HOUR11	0.097890251	0.001047812	93.42346768	0
HOUR12	0.100704167	0.001047817	96.10850501	0
HOUR13	0.101027844	0.001047823	96.41693217	0
HOUR14	0.102313687	0.001047828	97.6436042	0
HOUR15	0.106734817	0.001047833	101.862426	0
HOUR16	0.11782737	0.001047838	112.4480505	0
HOUR17	0.130666281	0.001047843	124.7001914	0
HOUR18	0.132565705	0.001047849	126.5122604	0
HOUR19	0.134250409	0.001047854	128.1193981	0
HOUR20	0.137739554	0.001047859	131.448545	0
HOUR21	0.135668334	0.001047864	129.471281	0
HOUR22	0.122444188	0.00104787	116.8506054	0
HOUR23	0.10213463	0.001047875	97.46835873	0
HOUR24	0.08463163	0.00104788	80.76462436	0
Trend	-8.78E-08	2.34E-08	-3.746341907	0.000180009
Mean dependent var	0.124033406	S.D. dependent var	0.039385035	
Sum squared resid	4.075780369	S.E. of regression	0.015273779	
R-squared	0.850223234	Adjusted R-squared	0.849605987	
F(72, 17471)	1377.443478	P-value(F)	0	
Log-likelihood	48505.01956	Akaike criterion	-96864.03912	
Schwarz criterion	-96296.64901	Hannan-Quinn	-96677.22205	
rho	0.935985189	Durbin-Watson	0.127876525	

## GS < 50 Weather Normalization Regression Results

	coefficient	std. error	t-ratio	p-value
HDD1	0.000375466	3.53E-05	10.62250807	2.82E-26
HDD2	0.000379211	3.53E-05	10.72844904	9.07E-27
HDD3	0.000356009	3.53E-05	10.07203138	8.53E-24
HDD4	0.000375751	3.53E-05	10.63056393	2.59E-26
HDD5	0.000367158	3.53E-05	10.38746777	3.35E-25
HDD6	0.000372721	3.53E-05	10.54483392	6.42E-26
HDD7	0.000349567	3.53E-05	9.889780752	5.30E-23
HDD8	0.000260741	3.53E-05	7.376750687	1.69E-13
HDD9	0.0001445	3.53E-05	4.088118481	4.37E-05
HDD10	0.000143437	3.53E-05	4.058056548	4.97E-05
HDD11	0.000145598	3.53E-05	4.119174623	3.82E-05
HDD12	0.00014397	3.53E-05	4.073136864	4.66E-05
HDD13	5.77E-05	3.53E-05	1.631841961	1.03E-01
HDD14	7.51E-05	3.53E-05	2.125729968	0.033539736
HDD15	1.06E-05	3.53E-05	0.30067131	0.763668726
HDD16	0.000104934	3.53E-05	2.968735022	0.002994341
HDD17	0.000231782	3.53E-05	6.557467304	5.63E-11
HDD18	0.00031753	3.53E-05	8.983400321	2.89E-19
HDD19	0.000360158	3.53E-05	10.18942202	2.59E-24
HDD20	0.000351679	3.53E-05	9.949517048	2.92E-23
HDD21	0.000380654	3.53E-05	10.76926825	5.84E-27
HDD22	0.000396577	3.53E-05	11.21977629	4.10E-29
HDD23	0.000404131	3.53E-05	11.43348707	3.64E-30
HDD24	0.000397871	3.53E-05	11.25637344	2.72E-29
CDD1	0.001332356	0.000193585	6.882555482	6.08E-12
CDD2	0.001271743	0.000193585	6.56944494	5.19E-11
CDD3	0.001369898	0.000193585	7.076481796	1.53E-12
CDD4	0.001192862	0.000193585	6.161969599	7.34E-10
CDD5	0.001201846	0.000193585	6.208374977	5.47E-10
CDD6	0.001143739	0.000193585	5.908212784	3.52E-09
CDD7	0.000777456	0.000193585	4.016106026	5.94E-05
CDD8	0.00155012	0.000193585	8.007455459	1.24E-15
CDD9	0.002120607	0.000193585	10.95442343	7.80E-28
CDD10	0.002522283	0.000193585	13.02935902	1.26E-38
CDD11	0.002800061	0.000193585	14.46428078	3.81E-47
CDD12	0.002972188	0.000193585	15.35343349	7.44E-53
CDD13	0.002841648	0.000193585	14.67910231	1.71E-48
CDD14	0.003096852	0.000193585	15.99740977	3.39E-57
CDD15	0.002859718	0.000193585	14.77244733	4.36E-49
CDD16	0.00304231	0.000193585	15.71566385	2.82E-55

CDD17	0.00282838	0.000193585	14.61056787	4.62E-48
CDD18	0.002514755	0.000193585	12.99047203	2.09E-38
CDD19	0.00225252	0.000193585	11.63584601	3.53E-31
CDD20	0.001422493	0.000193585	7.348172562	2.10E-13
CDD21	0.002072448	0.000193585	10.70564862	1.16E-26
CDD22	0.001847557	0.000193585	9.543928234	1.55E-21
CDD23	0.001671764	0.000193585	8.63583094	6.33E-18
CDD24	0.0015552	0.000193585	8.033699468	1.01E-15
HOUR1	0.031108147	0.000573099	54.28059744	0
HOUR2	0.030346578	0.000573102	52.95147214	0
HOUR3	0.030327353	0.000573105	52.91766398	0
HOUR4	0.029716114	0.000573107	51.85086634	0
HOUR5	0.030155759	0.00057311	52.61773046	0
HOUR6	0.03106563	0.000573113	54.20506353	0
HOUR7	0.033837297	0.000573116	59.04093028	0
HOUR8	0.039381358	0.000573119	68.71413229	0
HOUR9	0.045564165	0.000573122	79.50174053	0
HOUR10	0.049464857	0.000573124	86.30735648	0
HOUR11	0.051773168	0.000573127	90.33449913	0
HOUR12	0.052584732	0.00057313	91.75007059	0
HOUR13	0.054280267	0.000573133	94.70797776	0
HOUR14	0.05347251	0.000573136	93.29814218	0
HOUR15	0.054222473	0.000573139	94.60619781	0
HOUR16	0.051274443	0.000573142	89.46209448	0
HOUR17	0.047141497	0.000573144	82.25064677	0
HOUR18	0.044292275	0.000573147	77.27905063	0
HOUR19	0.042866195	0.00057315	74.79052373	0
HOUR20	0.042190783	0.000573153	73.61173647	0
HOUR21	0.039560256	0.000573156	69.02182046	0
HOUR22	0.036395081	0.000573159	63.49914071	0
HOUR23	0.033781645	0.000573161	58.93913953	0
HOUR24	0.031909075	0.000573164	55.6717723	0
Trend	-1.37E-07	1.28E-08	-10.6993347	1.24E-26
Mean dependent var	0.044415784	S.D. dependent var	0.012446441	
Sum squared resid	1.219399594	S.E. of regression	0.008354378	
R-squared	0.551304428	Adjusted R-squared	0.549455302	
F(72, 17471)	298.1432378	P-value(F)	0	
Log-likelihood	59090.22379	Akaike criterion	-118034.448	
Schwarz criterion	-117467.0575	Hannan-Quinn	-117847.631	
rho	0.457066883	Durbin-Watson	1.085864146	