**EB-2015-0003**

## Ontario Energy Board

**IN THE MATTER OF** the *Ontario Energy Board Act, 1998*, S.O. 1998, c. 15, (Schedule B);

**AND IN THE MATTER OF** an application by PowerStream Inc. order approving just and reasonable rates and other charges for electricity distribution to be effective
January 1, 2016.

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# VULNERABLE ENERGY CONSUMERS COALITION ("VECC")
# CROSS-EXAMINATION COMPENDIUM

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**November XX, 2015**

**POWER STREAM INC. (EB-2015-0003)**

**2016-2020 CIR APPLICATION – PANEL 3)**

**VECC CROSS-EXAMINATION COMPENDIUM**

# TAB 1

**Table 11: Street Lighting Sales Forecast Model Statistics**

| Model Statistics | |
|---|---|
| Iterations | 1 |
| Adjusted Observations | 84 |
| Deg. of Freedom for Error | 72 |
| R-Squared | 0.83 |
| Adjusted R-Squared | 0.80 |
| Model Sum of Squares | 199,510,534.49 |
| Sum of Squared Errors | 40,822,842.12 |
| Mean Squared Error | 566,983.92 |
| Std. Error of Regression | 752.98 |
| Mean Abs. Dev. (MAD) | 459.89 |
| Mean Abs. % Err. (MAPE) | 9.82% |
| Durbin-Watson Statistic | 2.37 |

| Variable | Coefficient | StdErr | T-Stat | P-Value |
|---|---|---|---|---|
| CONST | 10905.76 | 658.50 | 16.56 | 0.00% |
| HrLight | -17.11 | 1.72 | -9.94 | 0.00% |
| Nov-08 | -2905.01 | 775.69 | -3.75 | 0.04% |
| Apr-09 | -2620.21 | 813.32 | -3.22 | 0.19% |
| Feb-10 | -2778.94 | 774.41 | -3.59 | 0.06% |
| Nov-12 | -4489.22 | 775.70 | -5.79 | 0.00% |
| Dec-12 | 4633.97 | 813.32 | 5.70 | 0.00% |
| Jan | 692.27 | 340.18 | 2.04 | 4.55% |
| Apr | 1628.23 | 330.03 | 4.93 | 0.00% |
| May | 1182.02 | 334.92 | 3.53 | 0.07% |
| Aug | 902.13 | 319.81 | 2.82 | 0.62% |
| Dec | 1151.36 | 368.07 | 3.13 | 0.25% |

The primary independent variable for the Street Lighting sales model is Hours of Light.

The Street Lighting model has an Adjusted R-Squared of 0.80, indicating that the model explains actual sales variation well. The Durbin-Watson Statistic of 2.37 indicates that serial correlation is not a concern.

The explanatory variables have T-Statistic values above 2.0, indicating statistical significance. This is also supported by P-Values that fall between 0% and 4.55%.

In developing the load forecast for Street Lighting sales, PowerStream has taken into account the LED streetlight conversion planned by the municipalities in its service areas. Over a 3-year period of time, starting in 2016, the existing HPS streetlights owned by the City of Vaughan, Markham and Barrie will be fully converted to the LED streetlights.

# TAB 2

**POWERSTREAM IRR III – VECC #19 - APPENDIX B**

**STREET LIGHTING_FORCAST TAB**

| Year | Sales Forecast | LED Adjustment | Sales Forecast Before CDM Adjustment |
|---|---|---|---|
| 2015 | 60,112 | | 60,112 |
| 2016 | 59,958 | 12,289.51 | 47,668 |
| 2017 | 60,112 | 14,506.12 | 45,606 |
| 2018 | 60,112 | 16,694.16 | 43,418 |
| 2019 | 60,112 | 16,694.45 | 43,417 |
| 2020 | 59,958 | 16,651.17 | 43,307 |

# TAB 3

## TECHNICAL CONFERENCE - JTC 1.6

## STREET LIGHTING_FORECAST TAB

| Year | Street Lighting Customer Counts from Regression Model Counts Forecast |
|---|---|
| 2015 | 87,270 |
| 2016 | 88,857 |
| 2017 | 90,469 |
| 2018 | 92,093 |
| 2019 | 93,746 |
| 2020 | 95,438 |

# TAB 4

**IV–VECC–29**

**Ref: E-H/Appendix H-1-3, pg. 11-13**
**SECTION III/TAB 1/SCHEDULE 1, H-VECC #25 c)**
**SECTION IV/TAB 1/UNDERTAKING #28-2**

a) The response to Undertaking 28-2 states that 65% of the streetlights in PowerStream's service territories are owned by the City of Vaughan, Markham and Barrie. However, the response to VECC #25 c) indicates that the % of HPS lights owned by these three municipalities is 53%. Please reconcile.

b) Based on the municipalities' current plans is it still appropriate to assume that the conversion to LED will be completed over the 2016-2019 period? If not, what are the appropriate revised assumptions?

c) Please provide a schedule that sets out (based on the pre-CDM adjustment load forecast for Street Lighting) the total kWh in each year (2015-2019), the number of connections and the resulting usage per connection.

d) Please reconcile the pre-CDM per connection forecast from part c) with the assumed pre-CDM use of 727 kWh per Undertaking 28-2 used to calculate the impact of conversion to LED.

e) Based on the foregoing responses please revise the estimated impact of the LED Street Light conversion (Appendix H-1-3, page 13) as required.

**RESPONSE:**

a) 65% of the streetlights in PowerStream's service territories are owned by the Cities of Vaughan, Markham and Barrie, of which, 12% were already LED as of December 2014. These 12% LED streetlights are owned by the City of Markham.

The 53% is referring to HPS lights that are owned by the Cities of Vaughan (22%), Markham (18%) and Barrie (13%).

b) No. Based on the current plans, Markham, Barrie and New Tecumseth will complete their LED Street Lighting upgrades by December 2015. The assumption on the LED conversion plan for the City of Vaughan remains unchanged.

c) Please see table below for the schedule requested:

| Year | SL Load Fcst kWh | SL Connections Fcst | Usage per Connection |
|---|---|---|---|
| 2015 | 60,109 | 87,377 | 688 |
| 2016 | 59,956 | 88,954 | 674 |
| 2017 | 60,109 | 90,576 | 664 |
| 2018 | 60,109 | 92,207 | 652 |
| 2019 | 60,109 | 93,857 | 640 |
| 2020 | 59,956 | 95,547 | 628 |

d) The 727 kWh per Undertaking 28-2 was derived from average annual usage per connection over the period from 2012 to 2014. The Usage per Connection in the table above in c) is based on the load and connection forecast for 2015-2020.

e) Please see table below for revised LED Street Lighting conversion impact (Appendix H-1-3, page 13) as required.

| Year | Actual/Forecast Before LED Adjustment | LED Adjustment | Actual/Forecast after LED Adjustment | % Change |
|---|---|---|---|---|
| **2008** | 55,677 | **0** | 55,677 | |
| **2009** | 56,744 | **0** | 56,744 | 1.9% |
| **2010** | 58,367 | 0 | 58,367 | 2.9% |
| **2011** | 59,196 | 0 | 59,196 | 1.4% |
| **2012** | 60,735 | 0 | 60,735 | 2.6% |
| **2013** | 61,302 | 0 | 61,302 | 0.9% |
| **2014** | 60,168 | 0 | 60,168 | -1.8% |
| **2015 Bridge Year** | 60,109 | 0 | 60,109 | -0.1% |
| **2016 Test Year** | 59,956 | - 12,290 | 47,666 | -20.7% |
| **2017 Test Year** | 60,109 | - 14,506 | 45,603 | -4.3% |
| **2018 Test Year** | 60,109 | - 16,694 | 43,415 | -4.8% |
| **2019 Test Year** | 60,109 | - 16,694 | 43,415 | 0.0% |
| **2020 Test Year** | 59,956 | - 16,651 | 43,305 | -0.3% |

# TAB 5

**III–VECC–25**

**Ref: E-H/T2, pg. 3 and Appendix H-2-1**
**SECTION III/TAB 1/SCHEDULE 1, H-VECC #26**

a) Please provide a schedule setting out PowerStream's proposed 2016-2019 LRAMVA kWh by customer class consistent with its proposed load forecast.

b) Please explain why the manual adjustment for LED Street Lighting is not included in the proposed LRAMVA kWh.

c) Please provide a revised response to part (a) which includes the adjustments for LED Street Lighting as part of the LRAMVA kWh values.

**RESPONSE:**

a) Please see the table below for PowerStream's proposed 2015-2020 CDM kWh reduction by customer class as per the proposed load forecast. This represents the forecast savings for comparison to the achieved savings in the future LRAMVA true-up calculations.

| | Residential | GS<50 | GS>50 | Total |
|---|---|---|---|---|
| **2015** | 2,226,378 | 4,907,745 | 18,904,920 | 26,039,043 |
| **2016** | 11,818,293 | 15,315,943 | 57,546,526 | 84,680,763 |
| **2017** | 32,226,368 | 26,548,154 | 98,935,434 | 157,709,956 |
| **2018** | 60,426,521 | 39,127,836 | 148,575,840 | 248,130,197 |
| **2019** | 99,429,767 | 52,846,816 | 203,967,533 | 356,244,116 |
| **2020** | 138,275,868 | 66,612,056 | 259,643,400 | 464,531,325 |
| **Total** | **344,403,196** | **205,358,549** | **787,573,654** | **1,337,335,399** |

b) Please see H-Energy Probe–23 (Section III, Tab1, Schedule 1, page 222)

c) Please see the table below which was inserted with the manual adjustment for LED Street Lighting, as requested.

However, PowerStream doesn't believe this is an appropriate approach. The CDM plan was submitted and approved by the IESO/OPA in December 2014. The LED conversion is not part of the approved CDM plan, for the reason explained in H-Energy Probe-23. As such, the LED Street Lighting adjustment should not be blended and mixed into the 2015-2020 CDM forecast savings which are the basis for comparison to the actual achieved savings in future LRAMVA

true-up calculations.

Any true-up to the manual adjustment for Street Lighting must be compared to actual LED savings regardless of whether they are part of the OPA program or not.

| kWh | Residential | GS<50 | GS>50 | Street lighting | Total |
|---|---|---|---|---|---|
| **2015** | 2,226,378 | 4,907,745 | 18,904,920 | | 26,039,043 |
| **2016** | 11,818,293 | 15,315,943 | 57,546,526 | 12,289,507 | 96,970,269 |
| **2017** | 32,226,368 | 26,548,154 | 98,935,434 | 14,506,119 | 172,216,075 |
| **2018** | 60,426,521 | 39,127,836 | 148,575,840 | 16,694,164 | 264,824,361 |
| **2019** | 99,429,767 | 52,846,816 | 203,967,533 | 16,694,455 | 372,938,571 |
| **2020** | 138,275,868 | 66,612,056 | 259,643,400 | 16,651,174 | 481,182,499 |
| **Total** | **344,403,196** | **205,358,549** | **787,573,654** | **76,835,419** | **1,414,170,817** |

# TAB 6

# IRR- APPENDIX 2-P

## 2016

## Appendix 2-P (1)
## Cost Allocation - 2016

Please complete the following four tables.

**A) Allocated Costs**

| Classes | Costs Allocated from Previous Study (PowerStream 2013) | % | Costs Allocated in 2016 Test Year Study (Column 7A) | % |
|---|---|---|---|---|
| Residential | $ 86,596,037 | 52.78% | $ 107,674,776 | 53.94% |
| GS < 50 kW | $ 25,700,411 | 15.66% | $ 30,484,705 | 15.27% |
| GS > 50 kW | $ 48,128,504 | 29.33% | $ 58,309,560 | 29.21% |
| Large User | $ 347,235 | 0.21% | $ 444,970 | 0.22% |
| Street Lighting | $ 2,820,943 | 1.72% | $ 1,991,526 | 1.00% |
| Sentinel Lighting | $ 16,178 | 0.01% | $ 25,066 | 0.01% |
| Unmetered Scattered Load (USL) | $ 460,065 | 0.28% | $ 683,488 | 0.34% |
| | | | | |
| **Total** | $ 164,069,372 | 100.00% | $ 199,614,092 | 100.00% |

**B) Calculated Class Revenues**

| Classes (same as previous table) | Column 7B Load Forecast (LF) X current approved rates | Column 7C LF X current approved rates X (1 + d) | Column 7D LF X proposed rates | Column 7E Miscellaneous Revenue |
|---|---|---|---|---|
| Residential | $ 87,473,969 | $ 101,115,223 | $ 101,115,223 | $ 7,573,814 |
| GS < 50 kW | $ 24,576,765 | $ 28,409,424 | $ 28,507,357 | $ 1,870,815 |
| GS > 50 kW | $ 46,764,217 | $ 54,056,930 | $ 54,243,277 | $ 2,902,423 |
| Large User | $ 266,234 | $ 307,752 | $ 364,942 | $ 14,343 |
| Street Lighting | $ 2,219,325 | $ 2,565,421 | $ 2,221,990 | $ 167,842 |
| Sentinel Lighting | $ 16,351 | $ 18,901 | $ 18,966 | $ 1,626 |
| Unmetered Scattered Load (USL) | $ 475,661 | $ 549,839 | $ 551,734 | $ 59,741 |
| **Total** | $ 161,792,522 | $ 187,023,489 | $ 187,023,489 | $ 12,590,603 |
| | *line 18* | *line 23* | *As per Rate model* | *line 19* |

**Notes:**

1 Columns 7B to 7D - LF means Load Forecast of Annual Billing Quantities (i.e. customers or connections X 12, (kWh or kW, as applicable). Revenue Quantities should be net of Transfomrer Ownership Allowance. Exclude revenue from rate adders and rate riders.

2 Columns 7C and 7D - Column total in each column should equal the Base Revenue Requirement

3 Columns 7C - The Board cost allocation model calculates "1+d" in worksheet O-1, cell C21. "d" is defined as Revenue Deficiency/ Revenue at Current Rates.

4 Columns 7E - If using the Board-issued Cost Allocation model, enter Miscellaneous Revenue as it appears in Worksheet O-1, row 19.

**C) Rebalancing Revenue-to-Cost (R/C) Ratios**

| Class | Previously Approved Ratio<br>Most Current Year<br>2013 | Status Quo Ratios<br>(7C + 7E) / (7A) | Proposed Ratios<br>(7D + 7E) / (7A) | Policy Range |
|---|---|---|---|---|
| | % | % | % | % |
| Residential | 102.1 | 100.9 | 100.9 | 85 - 115 |
| GS < 50 kW | 98.0 | 99.3 | 99.7 | 80 - 120 |
| GS > 50 kW | 98.0 | 97.7 | 98.0 | 80 - 120 |
| Large User | 85.0 | 72.4 | 85.2 | 85 - 115 |
| Street Lighting | 89.7 | 137.2 | 120.0 | 80 - 120 |
| Sentinel Lighting | 95.0 | 81.9 | 82.2 | 80 - 120 |
| Unmetered Scattered Load (USL) | 102.4 | 89.2 | 89.5 | 80 - 120 |

**Notes:**

1 Previously Approved Revenue-to-Cost Ratios - For most applicants, Most Recent Year would be the third year of the IRM 3 period, e.g. if the applicant rebased in 2009 with further adjustments over 2 years, the Most recent year is 2011. For applicants whose most recent rebasing year is 2006, the applicant should enter the ratios from

2 Status Quo Ratios - The Board's updated Cost Allocation Model yields the Status Quo Ratios in Worksheet O-

# TAB 7

# IRR - APPENDIX 2-P

## 2017

## Appendix 2-P (2)
## Cost Allocation - 2017

Please complete the following four tables.

**A) Allocated Costs**

| Classes | Costs Allocated from Previous Study (PowerStream 2013) | % | Costs Allocated in 2017 Test Year Study (Column 7A) | % |
|---|---|---|---|---|
| Residential | $ 86,596,037 | 52.78% | $ 124,417,434 | 55.78% |
| GS < 50 kW | $ 25,700,411 | 15.66% | $ 31,437,996 | 14.10% |
| GS > 50 kW | $ 48,128,504 | 29.33% | $ 64,016,527 | 28.70% |
| Large User | $ 347,235 | 0.21% | $ 500,935 | 0.22% |
| Street Lighting | $ 2,820,943 | 1.72% | $ 1,971,703 | 0.88% |
| Sentinel Lighting | $ 16,178 | 0.01% | $ 27,167 | 0.01% |
| Unmetered Scattered Load (USL) | $ 460,065 | 0.28% | $ 671,265 | 0.30% |
| | | | | |
| **Total** | $ 164,069,372 | 100.00% | $ 223,043,027 | 100.00% |

**B) Calculated Class Revenues**

| Classes (same as previous table) | Column 7B Load Forecast (LF) X current approved rates | Column 7C LF X current approved rates X (1 + d) | Column 7D LF X proposed rates | Column 7E Miscellaneous Revenue |
|---|---|---|---|---|
| Residential | $ 88,052,546 | $ 113,967,689 | $ 114,344,829 | $ 8,199,319 |
| GS < 50 kW | $ 24,601,972 | $ 31,842,690 | $ 31,842,690 | $ 1,588,508 |
| GS > 50 kW | $ 46,870,375 | $ 60,665,007 | $ 60,865,759 | $ 2,707,047 |
| Large User | $ 265,314 | $ 343,400 | $ 412,998 | $ 13,932 |
| Street Lighting | $ 2,205,179 | $ 2,854,195 | $ 2,206,635 | $ 159,409 |
| Sentinel Lighting | $ 16,285 | $ 21,079 | $ 21,148 | $ 1,536 |
| Unmetered Scattered Load | $ 487,251 | $ 630,656 | $ 630,656 | $ 48,561 |
| **Total** | $ 162,498,923 | $ 210,324,715 | $ 210,324,715 | $ 12,718,312 |
| | *line 18* | *line 23* | *As per Rate model* | *line 19* |

**Notes:**

1 Columns 7B to 7D - LF means Load Forecast of Annual Billing Quantities (i.e. customers or connections X 12, (kWh or kW, as applicable). Revenue Quantities should be net of Transfomrer Ownership Allowance. Exclude revenue from rate adders and rate riders.

2 Columns 7C and 7D - Column total in each column should equal the Base Revenue Requirement

3 Columns 7C - The Board cost allocation model calculates "1+d" in worksheet O-1, cell C21. "d" is defined as Revenue Deficiency/ Revenue at Current Rates.

4 Columns 7E - If using the Board-issued Cost Allocation model, enter Miscellaneous Revenue as it appears in Worksheet O-1, row 19.

**C) Rebalancing Revenue-to-Cost (R/C) Ratios**

| Class | Previously Approved Ratio<br>Most Current Year<br>2013 | Status Quo Ratios<br>(7C + 7E) / (7A) | Proposed Ratios<br>(7D + 7E) / (7A) | Policy Range |
|---|---|---|---|---|
| | % | % | % | % |
| Residential | 102.1 | 98.2 | 98.5 | 85 - 115 |
| GS < 50 kW | 98.0 | 106.3 | 106.3 | 80 - 120 |
| GS > 50 kW | 98.0 | 99.0 | 99.3 | 80 - 120 |
| Large User | 85.0 | 71.3 | 85.2 | 85 - 115 |
| Street Lighting | 89.7 | 152.8 | 120.0 | 80 - 120 |
| Sentinel Lighting | 95.0 | 83.2 | 83.5 | 80 - 120 |
| Unmetered Scattered Load | 102.4 | 101.2 | 101.2 | 80 - 120 |

**Notes:**

1 Previously Approved Revenue-to-Cost Ratios - For most applicants, Most Recent Year would be the third year of the IRM 3 period, e.g. if the applicant rebased in 2009 with further adjustments over 2 years, the Most recent year is 2011. For applicants whose most recent rebasing year is 2006, the applicant should enter the ratios from

2 Status Quo Ratios - The Board's updated Cost Allocation Model yields the Status Quo Ratios in Worksheet