London Hydro
111 Horton Street
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August 10, 2015

Ms. Kirstin Walli
Board Secretary
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

**Re: Rate Design for Commercial and Industrial Customers (EB-2015-0043)**

Dear Ms. Walli:

London Hydro acknowledges that the OEB has initiated a process on Rate Design for Commercial and Industrial Customers (EB-2015-0043). London Hydro has some concerns with some the proposed direction and objectives for this initiative and therefore wishes to offer the attached submission for consideration.

In addition London Hydro steps beyond the scope of the OEB's initiative in order to address some additional proposals for consideration.

Please feel free to contact me if you

Yours Truly,

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# London Hydro

# Rate Design for C&I Customers

**Date Prepared: August 10, 2015**

**London Hydro**

**111 Horton Street**

**P.O. Box 2700**

**London, ON**

**N6A 4H6**

# Summary

London Hydro attended the OEB's presentation by Laurie Reid on July 6, 2015 at the EDA offices. The OEB provided a PowerPoint document to participants which highlighted the following:

**OEB Direction**

The OEB is proposing revising rate design for electricity in all rate classes "to increase the amount of revenue recovered through fixed charges". The proposition includes the following possibilities:

- Development of a new rate for GS<50 kW
- Development of a new rate for GS>50 kW
- Initiation of the development of new time-sensitive rates for large customers

**OEB Objectives**

- To support innovation for customers given the evolution of supply:
  - Customers' ability to leverage new technology;
  - Customers' ability to manage their bill through conservation; and
  - Customers' understanding of the value of connection.
- To increase efficiency:
  - To maximize use of the current system; and
  - To optimize investment for long-term cost containment.
- To stabilize distribution revenue:
  - To enable technology changes;
  - To support conservation;
  - To facilitate investment planning.

The following is London Hydro's response to the OEB staff identified issues for discussion.

London Hydro is supportive and agrees with the OEB's recent directive (Rate Design for Electricity Distributors (EB-2012-0410) to convert all residential customers to 100% fixed rate over the next four years. London Hydro sees this as the next logical step in supporting the financial security of the local distribution company (LDC). From the May 2002 inception of electricity deregulation in Ontario the LDC's have seen many changes that have challenged the financial integrity of the utility (i.e. economic recession, industrial defection, conservation) and some complex band aids solutions (i.e. LRAM for conservation) created to help curb the decline in LDC's revenue. Over time many utilities have challenged the OEB to increase the fixed rates applied for in rate applications as one means to address growing concern. The OEB has recognized the need for addressing LDC's concerns and thus this is the first positive step taken.

The speculation for the future of the LDC continues to be influenced by the same threats as known in the past but also includes a new risk such as grid defection. Grid defection is having current consumers leaving the grid by installing their own self sufficient means of electricity generation and storage. This new threat is currently only a growing theory for potential outcome at this point in time. But, daily the news of improved alternatives floods the internet and news media. These threats comprise of cheaper more efficient solar panels and combined heat and power units to produce electricity, battery storage to store electricity, micro grid development. As Ontario's electricity cost rise the economics for grid defection grow closer to grid parity (where on grid electricity costs meet or exceed the costs of going off-grid towards self-sufficiency of supply).

London Hydro recognizes in this submission that the OEB has initiated Rate Design for Commercial and Industrial Customers (EB-2015-0043) as the next step in this process. The OEB's direction and objectives for this initiative have been detailed above.

London Hydro has some concerns with some the proposed directions and therefore wishes to offer the following alternatives for consideration.

To support the following recommendations London Hydro has utilized its 2013 Cost of Service application as a working platform to illustrate information pertaining to our recommendations. This is shown in Schedule 2 of our submission.

## LH Recommendation 1 - New Small Commercial Rate Class

London Hydro would propose that consideration be given to the development of a singular fixed distribution charge for C&I customers consuming less than 4,000 kWh. This would mirror the action taken for the Residential rate class. This is detailed further in Schedule 3 of our submission.

## LH Recommendation 2 - Consolidation of C&I Rate Class

London Hydro would propose that consideration be given to the consolidation of the remaining C&I consumers into a singular rate class with customers being charged a fixed distribution charge in conjunction with a variable distribution charge based on kW demand or some other equivalent. This is detailed further in Schedule 4 of our submission.

In addition London Hydro steps beyond the scope of the OEB's initiative in order to address some additional proposals for consideration. To assist in supporting our proposals London Hydro offers the following considerations:

- Electricity has become a necessity for the way of life that we pursue and it is almost as important to our existence as food and water.
- Greenhouse gases cause global warming
- Many sources of untapped green energy exist
- People and businesses will always be most active during the day
- People and businesses formulate decisions on whether to move into, stay or move out of areas that are reflective on energy costs
- Through technological advancements and behavioural changes the resultant conservation of energy will continue to provide additional capacity for existing transmission and distribution networks

- Under the opportune framework the electric vehicle will become a more efficient mode of city travel thereby adding load to existing capacity
- New home building mandates include the requirement for cable raceways from the electrical panel to the garage to readily accept EV
- In the distributed generation model generators will, at times, need energy that they cannot generate, want a backup supply of energy when they cannot generate and they will always want to sell energy when they have a surplus if possible
- Many people will not be interested in generating their own electricity
- Distributed generations can offset capacity concerns if it is accessible by all
- Generation that cannot be controlled remotely causes safety risks for distribution personnel, failures of distribution/transmission equipment and additional costs to mitigate risks and failures
- Additional electricity demands that cannot be controlled remotely can cause failures to distribution systems
- Energy forms used to created electricity have varying levels of carbon intensity
- Incentives exist to conserve and generate electricity and more may be needed in a specific concentrated effort that accommodate local situations
- More disincentives, directly linked to the energy forms' carbon intensity, are required to equitably reduce carbon emissions
- Appropriate planning and development is required to create the platform to facilitate conservation, distributed and other forms of generation, electric vehicles and energy storage enabling a bold new green energy economy.

## LH Recommendation 3 - Mandatory Grid Connection

London Hydro would propose that consideration be given to lobbying various sectors of the government of Ontario to enact laws, rules, codes and regulations supporting

consumer mandatory grid connection. This is detailed further in Schedule 5 of our submission.

## LH Recommendation 4 - Grid Defection/ Reconnection Charge

Should mandatory grid connection not be enacted London Hydro would propose that consideration be given to the determination of grid defection and subsequent grid reconnection charges. This is detailed further in Schedule 6 of our submission.

## LH Recommendation 5 - Change treatment of generation

London Hydro would propose that consideration be given to a change to billing for generation customers removing the potential for customer cross subsidization of costs. This is detailed further in Schedule 7 of our submission.

## LH Recommendation 6 - Metering behind the meter generation

London Hydro would propose that consideration be given to lobbying various sectors of the government of Ontario and Canada to enact laws, rules, codes and regulations supporting metering behind the meter generation. London Hydro is concerned that proper system planning depends on up-front knowledge for the true load of all customers. This is detailed further in Schedule 8 of our submission.

## LH Recommendation 7 – Carbon Cap and Trade

London Hydro would suggest that the electricity LDC is in a natural position to assume the responsibility for capturing and reporting on consumer carbon footprint. London Hydro would suggest that consideration be given for LDC’s to assume this role. This is detailed further in Schedule 9 of our submission.

## LH Recommendation 8 - Electric Vehicle

London Hydro would propose that consideration be given to lobbying various sectors of the government of Ontario and Canada to enact laws, rules, codes and regulations supporting the standards design and allow LDC's load control opportunities over electric vehicle (EV) charging stations. London Hydro is concerned that its role as load manager will depend on its earlier ability to influence (EV) system control and on up-front knowledge for the true load of all customers. This is detailed further in Schedule 10 of our submission.

## LH Recommendation 8 - Customers given equal opportunity

London Hydro would suggest that not all customers are given equal opportunity to participate in renewable generation. London Hydro would propose that consideration be given to directing Hydro One to address this inequity of opportunity. This is detailed further in Schedule 11 of our submission.

London Hydro concludes our submission with some observations that we would like to communicate. These are detailed further in Schedule 11 of our submission.

All of which is respectfully submitted.

# London Hydro 2013 COS

**London Hydro 2013 COS**

While the actual year over year results achieved by LH will be significantly influenced by numerous factors such as changes in weather patterns, economic factors and consumer base changes, LH has determined that using its 2013 Cost of Service application to provide a static foundation for its submission will allow the establishment of reasonable grounds to support our recommendations.

The following is a simplified study of the design of London Hydro's current revenue recovery mechanism.

The OEB approved London Hydro's revenue requirement of $62.7M in its 2013 Cost of Service application. This meant that London Hydro's rates were designed to collect $62.7M from London Hydro ratepayers. The following chart details the portion of base revenue requirement per customer class, recovered through both fixed and variable rates.

| Customer Class | Total Fixed Revenue | Total Variable Revenue | Gross Revenue Requirement | Transformer Ownership Allowances | Base Revenue Requirement |
|---|---|---|---|---|---|
| Residential | $ 21,738,775.68 | $ 16,880,279.65 | $ 38,619,055.33 | | $ 38,619,055.33 |
| GS <50 kW | $ 4,461,665.31 | $ 3,957,037.53 | $ 8,418,702.84 | | $ 8,418,702.84 |
| GS 50 to 4,999 kW | $ 2,989,381.30 | $ 9,847,172.62 | $ 12,836,553.92 | $ -683,847.98 | $ 12,152,705.93 |
| GS 1,000 to 4,999 kW (Co-Generation) | $ 86,510.74 | $ 183,835.33 | $ 270,346.07 | $ -26,276.00 | $ 244,070.07 |
| Large Use >5MW | $ 695,333.75 | $ 818,554.03 | $ 1,513,887.78 | $ - | $ 1,513,887.78 |
| Street Light | $ 656,655.48 | $ 543,876.47 | $ 1,200,531.94 | | $ 1,200,531.94 |
| Sentinel | $ 26,808.74 | $ 23,113.41 | $ 49,922.15 | | $ 49,922.15 |
| Unmetered Scattered Load | $ 36,043.75 | $ 84,102.08 | $ 120,145.83 | | $ 120,145.83 |
| Standby Power | $ - | $ 449,323.99 | $ 449,323.99 | $ -92,880.00 | $ 356,443.99 |
| TOTAL | $ 30,691,174.75 | $ 32,787,295.10 | $ 63,478,469.85 | $ -803,003.99 | $ 62,675,465.86 |

The OEB approved the following rates for the prescribed rate classes to obtain the revenue requirement.

| Customer Class | Fixed Monthly Rate | Variable Distribution Rate |
|---|---|---|
| Residential | **$ 13.12** | **$ 0.0155** |
| GS <50 kW | **$ 30.70** | **$ 0.0099** |
| GS 50 to 4,999 kW | **$ 150.00** | **$ 2.5038** |
| GS 1,000 to 4,999 kW (Co-Generation) | **$ 2,403.08** | **$ 4.1978** |
| Large Use >5MW | **$ 19,314.83** | **$ 2.0949** |
| Street Light | **$ 1.57** | **$ 8.1064** |
| Sentinel | **$ 3.31** | **$ 10.9336** |
| Unmetered Scattered Load | **$ 1.98** | **$ 0.0171** |
| Standby Power | **$ -** | **$ 2.9026** |

The following is the allocation of revenues recovered from the different rate classes.

| Customer Class | Fixed Revenue | Variable Revenue | Percent of Revenue |
|---|---|---|---|
| Residential | 56.3% | 43.7% | 60.8% |
| GS <50 kW | 53.0% | 47.0% | 13.3% |
| GS 50 to 4,999 kW | 23.3% | 76.7% | 20.2% |
| GS 1,000 to 4,999 kW (Co-Generation) | 32.0% | 68.0% | 0.4% |
| Large Use >5MW | 45.9% | 54.1% | 2.4% |
| Street Light | 54.7% | 45.3% | 1.9% |
| Sentinel | 53.7% | 46.3% | 0.1% |
| Unmetered Scattered Load | 30.0% | 70.0% | 0.2% |
| Standby Power | 0.0% | 100.0% | 0.7% |
| | 48.3% | 51.7% | 100.0% |

As illustrated above, London Hydro currently recovers 48% of its revenue from fixed rates and 52% from variable rates.

For purposes of this discussion, the revenue recovery from Commercial and Industrial (C&I) customers is highlighted below. As shown, London Hydro currently receives 37% of its total

revenue requirement from the C&I customer classes, with 35% from fixed rates and 65% from variable rates revenue stream.

| Customer Class | Fixed Revenue | Variable Revenue | Percent of Revenue |
|---|---|---|---|
| GS <50 kW | 53.0% | 47.0% | 13.3% |
| GS 50 to 4,999 kW | 23.3% | 76.7% | 20.2% |
| GS 1,000 to 4,999 kW (Co-Generation) | 32.0% | 68.0% | 0.4% |
| Large Use >5MW | 45.9% | 54.1% | 2.4% |
| Standby Power | 0.0% | 100.0% | 0.7% |
| | 35.1% | 64.9% | 37.0% |

**Analysis of Impact of 100% Fixed Residential**

The following table illustrates the impact of the upcoming transition to 100% fixed residential rates, using the 2013 revenue requirement as an example. As one can see, this switch enables London Hydro to recover 75% of its revenue requirements from fixed charges – a significant increase from the current 48% recovery.

| Customer Class | Fixed Monthly Rate | Variable Distribution Rate | Total Fixed Revenue | Total Variable Revenue | Gross Revenue Requirement | Transformer Ownership Allowances | Base Revenue Requirement |
|---|---|---|---|---|---|---|---|
| Residential | **$ 23.31** | **$ -** | $ 38,619,055.33 | $ - | $ 38,619,055.33 | | $ 38,619,055.33 |
| GS <50 kW | **$ 30.70** | **$ 0.0099** | $ 4,461,665.31 | $ 3,957,037.53 | $ 8,418,702.84 | | $ 8,418,702.84 |
| GS 50 to 4,999 kW | **$ 150.00** | **$ 2.5038** | $ 2,989,381.30 | $ 9,847,172.62 | $ 12,836,553.92 | $ -683,847.98 | $ 12,152,705.93 |
| GS 1,000 to 4,999 kW (Co-Generation) | **$ 2,403.08** | **$ 4.1978** | $ 86,510.74 | $ 183,835.33 | $ 270,346.07 | $ -26,276.00 | $ 244,070.07 |
| Large Use >5MW | **$ 19,314.83** | **$ 2.0949** | $ 695,333.75 | $ 818,554.03 | $ 1,513,887.78 | $ - | $ 1,513,887.78 |
| Street Light | **$ 1.57** | **$ 8.1064** | $ 656,655.48 | $ 543,876.47 | $ 1,200,531.94 | | $ 1,200,531.94 |
| Sentinel | **$ 3.31** | **$ 10.9336** | $ 26,808.74 | $ 23,113.41 | $ 49,922.15 | | $ 49,922.15 |
| Unmetered Scattered Load | **$ 1.98** | **$ 0.0171** | $ 36,043.75 | $ 84,102.08 | $ 120,145.83 | | $ 120,145.83 |
| Standby Power | **$ -** | **$ 2.9026** | $ - | $ 449,323.99 | $ 449,323.99 | $ -92,880.00 | $ 356,443.99 |
| TOTAL | | | $ 47,571,454.40 | $ 15,907,015.45 | $ 63,478,469.85 | $ -803,003.99 | $ 62,675,465.86 |

| Customer Class | Fixed Revenue | Variable Revenue | Percent of Revenue |
|---|---|---|---|
| Residential | 100.0% | 0.0% | 60.8% |
| GS <50 kW | 53.0% | 47.0% | 13.3% |
| GS 50 to 4,999 kW | 23.3% | 76.7% | 20.2% |
| GS 1,000 to 4,999 kW (Co-Generation) | 32.0% | 68.0% | 0.4% |
| Large Use >5MW | 45.9% | 54.1% | 2.4% |
| Street Light | 54.7% | 45.3% | 1.9% |
| Sentinel | 53.7% | 46.3% | 0.1% |
| Unmetered Scattered Load | 30.0% | 70.0% | 0.2% |
| Standby Power | 0.0% | 100.0% | 0.7% |
| | 74.9% | 25.1% | 100.0% |

**Analysis of Commercial Class Transition**

In the following tables, London Hydro has summarized the escalating costs associated with the increased use of energy between the GS<50 kW class and GS>50 kW class. For comparative purposes a 55% load factor has been used to estimate probable demand for illustrative purposes. As shown, there is a $50 “transition bump” ($275 - $225) in cost recovery that increases cost to the GS>50 kW class when a customer transitions to this class.

Similarly, there is a $17,000 “transition bump” ($30K - $12K) in cost recovery that increases cost recovery when a GS>50 kW customer transitions to being a large use customer.

| | | | 55% | | | | |
|---|---|---|---|---|---|---|---|
| | kWh | kW | LF | Fixed | Variable | Total | ¢/kWh |
| GS<50 | 1,000 | 2.51 | 55% | $ 30.70 | $ 9.92 | $ 40.62 | $ 0.0406 |
| | 2,000 | 5.01 | 55% | $ 30.70 | $ 19.84 | $ 50.54 | $ 0.0253 |
| | 2,745 | 6.88 | 55% | $ 30.70 | $ 27.23 | $ 57.93 | $ 0.0211 |
| | 3,000 | 7.52 | 55% | $ 30.70 | $ 29.76 | $ 60.46 | $ 0.0202 |
| | 4,000 | 10.02 | 55% | $ 30.70 | $ 39.68 | $ 70.38 | $ 0.0176 |
| | 5,000 | 12.53 | 55% | $ 30.70 | $ 49.60 | $ 80.30 | $ 0.0161 |
| | 10,000 | 25.05 | 55% | $ 30.70 | $ 99.20 | $ 129.90 | $ 0.0130 |
| | 15,000 | 37.58 | 55% | $ 30.70 | $ 148.81 | $ 179.51 | $ 0.0120 |
| GS<50 | 19,561 | 49.00 | 55% | $ 30.70 | $ 194.05 | **$ 224.75** | $ 0.0115 |
| GS>50 | 19,960 | 50.00 | 55% | $ 150.00 | $ 125.19 | **$ 275.19** | $ 0.0138 |
| | 20,000 | 50.10 | 55% | $ 150.00 | $ 125.44 | $ 275.44 | $ 0.0138 |
| | 25,000 | 62.63 | 55% | $ 150.00 | $ 156.80 | $ 306.80 | $ 0.0123 |
| | 30,000 | 75.15 | 55% | $ 150.00 | $ 188.16 | $ 338.16 | $ 0.0113 |
| | 35,000 | 87.68 | 55% | $ 150.00 | $ 219.52 | $ 369.52 | $ 0.0106 |
| | 40,000 | 100.20 | 55% | $ 150.00 | $ 250.88 | $ 400.88 | $ 0.0100 |
| | 45,000 | 112.73 | 55% | $ 150.00 | $ 282.24 | $ 432.24 | $ 0.0096 |
| | 50,000 | 125.25 | 55% | $ 150.00 | $ 313.60 | $ 463.60 | $ 0.0093 |
| | 78,781 | 197.35 | 55% | $ 150.00 | $ 494.11 | $ 644.11 | $ 0.0082 |
| | 100,000 | 250.50 | 55% | $ 150.00 | $ 627.20 | $ 777.20 | $ 0.0078 |
| | 200,000 | 501.00 | 55% | $ 150.00 | $ 1,254.39 | $ 1,404.39 | $ 0.0070 |
| | 300,000 | 751.50 | 55% | $ 150.00 | $ 1,881.59 | $ 2,031.59 | $ 0.0068 |
| | 400,000 | 1,002.00 | 55% | $ 150.00 | $ 2,508.78 | $ 2,658.78 | $ 0.0066 |
| | 500,000 | 1,252.51 | 55% | $ 150.00 | $ 3,135.98 | $ 3,285.98 | $ 0.0066 |
| | 600,000 | 1,503.01 | 55% | $ 150.00 | $ 3,763.17 | $ 3,913.17 | $ 0.0065 |

| | | | 55% | | | | |
|---|---|---|---|---|---|---|---|
| | kWh | kW | LF | Fixed | Variable | Total | ¢/kWh |
| GS>50 | 19,960 | 50.00 | 55% | $ 150.00 | $ 125.19 | **$ 275.19** | $ 0.0138 |
| | 20,000 | 50.10 | 55% | $ 150.00 | $ 125.44 | $ 275.44 | $ 0.0138 |
| | 25,000 | 62.63 | 55% | $ 150.00 | $ 156.80 | $ 306.80 | $ 0.0123 |
| | 30,000 | 75.15 | 55% | $ 150.00 | $ 188.16 | $ 338.16 | $ 0.0113 |
| | 35,000 | 87.68 | 55% | $ 150.00 | $ 219.52 | $ 369.52 | $ 0.0106 |
| | 40,000 | 100.20 | 55% | $ 150.00 | $ 250.88 | $ 400.88 | $ 0.0100 |
| | 45,000 | 112.73 | 55% | $ 150.00 | $ 282.24 | $ 432.24 | $ 0.0096 |
| | 50,000 | 125.25 | 55% | $ 150.00 | $ 313.60 | $ 463.60 | $ 0.0093 |
| | 78,781 | 197.35 | 55% | $ 150.00 | $ 494.11 | $ 644.11 | $ 0.0082 |
| | 100,000 | 250.50 | 55% | $ 150.00 | $ 627.20 | $ 777.20 | $ 0.0078 |
| | 200,000 | 501.00 | 55% | $ 150.00 | $ 1,254.39 | $ 1,404.39 | $ 0.0070 |
| | 300,000 | 751.50 | 55% | $ 150.00 | $ 1,881.59 | $ 2,031.59 | $ 0.0068 |
| | 400,000 | 1,002.00 | 55% | $ 150.00 | $ 2,508.78 | $ 2,658.78 | $ 0.0066 |
| | 1,700,000 | 4,258.52 | 55% | $ 150.00 | $ 10,662.32 | $ 10,812.32 | $ 0.0064 |
| | 1,800,000 | 4,509.02 | 55% | $ 150.00 | $ 11,289.51 | $ 11,439.51 | $ 0.0064 |
| | 1,900,000 | 4,759.52 | 55% | $ 150.00 | $ 11,916.71 | $ 12,066.71 | $ 0.0064 |
| GS>50 | 1,995,599 | 4,999.00 | 55% | $ 150.00 | $ 12,516.30 | $ 12,666.30 | $ 0.0063 |
| LU | 1,995,998 | 5,000.00 | 55% | $ 19,314.83 | $ 10,474.54 | $ 29,789.36 | $ 0.0149 |
| | 2,000,000 | 5,010.02 | 55% | $ 19,314.83 | $ 10,495.54 | $ 29,810.36 | $ 0.0149 |
| | 2,100,000 | 5,260.53 | 55% | $ 19,314.83 | $ 11,020.31 | $ 30,335.14 | $ 0.0144 |
| | 2,200,000 | 5,511.03 | 55% | $ 19,314.83 | $ 11,545.09 | $ 30,859.92 | $ 0.0140 |

**Simple Fixed Rate Simulation**

For the purposes of this discussion, London Hydro performed a simple calculation to determine the impact of 100% fixed rates. Using the total current cost recovery for the average consumption level in each class (highlighted in green) as the new fixed rate, the following tables summarize the new fixed rates, as well as the monthly impact for different levels of consumption within the GS<50 kW and GS>50 kW customer classes.

| Customer Class | 100 % Fixed Revenue | | Current Fixed Monthly Rate | Current Variable Distribution Rate |
|---|---|---|---|---|
| Residential | $ 23.31 | | $ 13.12 | $ 0.0155 |
| GS <50 kW | $ 57.93 | | $ 30.70 | $ 0.0099 |
| GS 50 to 4,999 kW | $ 644.11 | | $ 150.00 | $ 2.5038 |
| GS 1,000 to 4,999 kW (Co-Generation) | $ 7,509.61 | | $ 2,403.08 | $ 4.1978 |
| Large Use >5MW | $ 42,052.44 | | $ 19,314.83 | $ 2.0949 |
| Street Light | $ 2.87 | | $ 1.57 | $ 8.1064 |
| Sentinel | $ 6.17 | | $ 3.31 | $ 10.9336 |
| Unmetered Scattered Load | $ 6.58 | | $ 1.98 | $ 0.0171 |
| Standby Power | | | $ - | $ 2.9026 |

| | kWh | kW | LF | Fixed | Variable | Total | ¢/kWh | | 100% Fixed | Change |
|---|---|---|---|---|---|---|---|---|---|---|
| GS<50 | 1,000 | 2.51 | 55% | $ 30.70 | $ 9.92 | $ 40.62 | $ 0.0406 | | $ 57.93 | $ 17.31 |
| | 2,000 | 5.01 | 55% | $ 30.70 | $ 19.84 | $ 50.54 | $ 0.0253 | | $ 57.93 | $ 7.39 |
| | 2,745 | 6.88 | 55% | $ 30.70 | $ 27.23 | $ 57.93 | $ 0.0211 | | $ 57.93 | $ - |
| | 3,000 | 7.52 | 55% | $ 30.70 | $ 29.76 | $ 60.46 | $ 0.0202 | | $ 57.93 | $ -2.53 |
| | 4,000 | 10.02 | 55% | $ 30.70 | $ 39.68 | $ 70.38 | $ 0.0176 | | $ 57.93 | $ -12.45 |
| | 5,000 | 12.53 | 55% | $ 30.70 | $ 49.60 | $ 80.30 | $ 0.0161 | | $ 57.93 | $ -22.37 |
| | 10,000 | 25.05 | 55% | $ 30.70 | $ 99.20 | $ 129.90 | $ 0.0130 | | $ 57.93 | $ -71.98 |
| | 15,000 | 37.58 | 55% | $ 30.70 | $ 148.81 | $ 179.51 | $ 0.0120 | | $ 57.93 | $ -121.58 |
| GS<50 | 19,561 | 49.00 | 55% | $ 30.70 | $ 194.05 | **$ 224.75** | $ 0.0115 | | $ 57.93 | $ -166.82 |
| GS>50 | 19,960 | 50.00 | 55% | $ 150.00 | $ 125.19 | **$ 275.19** | $ 0.0138 | | $ 644.11 | $ 368.92 |
| | 20,000 | 50.10 | 55% | $ 150.00 | $ 125.44 | $ 275.44 | $ 0.0138 | | $ 644.11 | $ 368.67 |
| | 25,000 | 62.63 | 55% | $ 150.00 | $ 156.80 | $ 306.80 | $ 0.0123 | | $ 644.11 | $ 337.31 |
| | 30,000 | 75.15 | 55% | $ 150.00 | $ 188.16 | $ 338.16 | $ 0.0113 | | $ 644.11 | $ 305.95 |
| | 35,000 | 87.68 | 55% | $ 150.00 | $ 219.52 | $ 369.52 | $ 0.0106 | | $ 644.11 | $ 274.59 |
| | 40,000 | 100.20 | 55% | $ 150.00 | $ 250.88 | $ 400.88 | $ 0.0100 | | $ 644.11 | $ 243.23 |
| | 45,000 | 112.73 | 55% | $ 150.00 | $ 282.24 | $ 432.24 | $ 0.0096 | | $ 644.11 | $ 211.87 |
| | 50,000 | 125.25 | 55% | $ 150.00 | $ 313.60 | $ 463.60 | $ 0.0093 | | $ 644.11 | $ 180.51 |
| | 78,781 | 197.35 | 55% | $ 150.00 | $ 494.11 | $ 644.11 | $ 0.0082 | | $ 644.11 | $ - |
| | 100,000 | 250.50 | 55% | $ 150.00 | $ 627.20 | $ 777.20 | $ 0.0078 | | $ 644.11 | $ -133.09 |
| | 200,000 | 501.00 | 55% | $ 150.00 | $ 1,254.39 | $ 1,404.39 | $ 0.0070 | | $ 644.11 | $ -760.28 |
| | 300,000 | 751.50 | 55% | $ 150.00 | $ 1,881.59 | $ 2,031.59 | $ 0.0068 | | $ 644.11 | $ -1,387.48 |
| | 400,000 | 1,002.00 | 55% | $ 150.00 | $ 2,508.78 | $ 2,658.78 | $ 0.0066 | | $ 644.11 | $ -2,014.67 |
| GS>50 | 1,995,599 | 4,999.00 | 55% | $ 150.00 | $ 12,516.30 | $ 12,666.30 | $ 0.0063 | | $ 644.11 | $ -12,022.19 |

From a simplified point of view a simple flat rate would not transition fairly for either the GS<50 kW or, even more so, the GS>50 kW class. However, as is discussed later, there may be an opportunity to more fairly apply a fixed rate to the lower section of the GS<50 kW rate class (see LH Recommendation 3 - New GS Rate Class).

# LH Recommendation 1 - New Small Commercial Rate Class

As illustrated below, the London Hydro distribution cost (delivery) component of a customer's bill is becoming less of percentage of the total electricity bill as electricity rates (cost of energy) continue to escalate. In 2009, distribution costs were 25% of the average monthly residential customers bill. This has been steadily declining to 20% in 2015 - not because of falling costs, but due to the fact that the cost of electricity has been increasing exponentially. Therefore, the price signals given out by London Hydro may have little influence in aligning the interests of customers and distributors to maximize use of the system and contain long-term costs.

| **Average Residential Customer - Monthly Bill** | 2015 Bill | 2014 Bill | 2013 Bill | 2012 Bill | 2011 Bill | 2010 Bill | 2009 Bill |
|---|---|---|---|---|---|---|---|
| London Hydro (delivery) | $ 26.48 | $ 26.13 | $ 27.50 | $ 25.64 | $ 25.62 | $ 25.04 | $ 25.37 |
| Independent Electricity System Operator (Cost of Energy) | $ 90.08 | $ 82.10 | $ 72.83 | $ 71.61 | $ 65.95 | $ 59.45 | $ 51.84 |
| Hydro One (Transmission) | $ 10.93 | $ 10.85 | $ 10.33 | $ 10.24 | $ 9.40 | $ 9.33 | $ 8.50 |
| Federal and Provincial Governments (includes Ontario Clean Energy Benefit-Sept 2012) | $ 7.86 | $ 7.72 | $ 7.57 | $ 7.52 | $ 19.45 | $ 18.52 | $ 17.47 |
| | $ 135.35 | $ 126.79 | $ 118.23 | $ 115.02 | $ 120.42 | $ 112.34 | $ 103.19 |

| **Percentage of Bill** | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
|---|---|---|---|---|---|---|---|
| London Hydro (delivery) | 20% | 21% | 23% | 22% | 21% | 22% | 25% |
| Independent Electricity System Operator (Cost of Energy) | 67% | 65% | 62% | 62% | 55% | 53% | 50% |
| Hydro One (Transmission) | 8% | 9% | 9% | 9% | 8% | 8% | 8% |
| Federal and Provincial Governments (includes Ontario Clean Energy Benefit-Sept 2012) | 6% | 6% | 6% | 7% | 16% | 16% | 17% |
| | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

The same idea may be applied to the smaller consumers within the GS<50 kW class - those customers whose consumption is more akin to a residential customer.

London Hydro would suggest that consideration be given to allow for the creation of a new General Service Rate Class – GS<10 kW or GS<4,000 kWh or Small Commercial.

In reviewing the construct of the current GS<50 kW class, London Hydro observes that approximately two thirds (approximately 8,000 out of 12,000 customers) of this class consumes less than 4,000 kWh per month  London Hydro noted in the study of the 2013 COS that the class average kWh per month is 2,745 kWh.

| | kWh | kW | LF | Fixed | Variable | Total | ¢/kWh | 100% Fixed | Change |
|---|---|---|---|---|---|---|---|---|---|
| GS<50 | 1,000 | 2.51 | 55% | $ 30.70 | $ 9.92 | $ 40.62 | $ 0.0406 | $ 57.93 | $ 17.31 |
| | 2,000 | 5.01 | 55% | $ 30.70 | $ 19.84 | $ 50.54 | $ 0.0253 | $ 57.93 | $ 7.39 |
| | 2,745 | 6.88 | 55% | $ 30.70 | $ 27.23 | $ 57.93 | $ 0.0211 | $ 57.93 | $ - |
| | 3,000 | 7.52 | 55% | $ 30.70 | $ 29.76 | $ 60.46 | $ 0.0202 | $ 57.93 | $ -2.53 |
| | 4,000 | 10.02 | 55% | $ 30.70 | $ 39.68 | $ 70.38 | $ 0.0176 | $ 57.93 | $ -12.45 |

Using the simplified calculation of $57.93 (see Schedule 2 London Hydro COS) as a monthly fixed charge for this class, the monthly impact could be potentially insignificant for most customers in this portion of the rate class. Obviously more work is necessary to fine tune this value to achieve complete fairness.

As noted in our 2013 COS summary discussion earlier, the change over the next four years to a 100% fixed residential rate would increase the recovered amount from fixed charges from 48% to 75%. By adding in the class proposed here, London Hydro could potentially recover upwards of 80% of its revenue through fixed rates.

For C&I customers beyond 4,000 kWh, the variations in load and usage are harder to define into a series of fair fixed rates and would therefore recommend that the OEB continue with the current structure of fixed and demand variable for this entire group. This would require that those remaining 4,000 customers from the current GS<50 kW class would need to be converted from kWh to kW billing.

This may require that these customers be taken off their current smart meters and transitioned to more sophisticated meters, but that is beyond the scope of this current discussion.

# LH Recommendation 2 - Consolidation of C&I Rate Class

For C&I customers using greater than 4,000 kWh, London Hydro believes that the variations in load and usage are harder to differentiate into a series of fair fixed charges and would therefore recommend that the OEB continue with the current structure of fixed and demand variable for this entire group. Furthermore, London Hydro would recommend that the C&I customers all be folded into one class - this approach would be fairer, given that the transition steps between classes could be avoided.

London Hydro's 2013 COS of Service application was approved for fixed variable rates based on the table below.

| Customer Class | Fixed Revenue | Variable Revenue | Total |
|---|---|---|---|
| Residential | 56.3% | 43.7% | 60.8% |
| GS <50 kW | 53.0% | 47.0% | 13.3% |
| GS 50 to 4,999 kW | 23.3% | 76.7% | 20.2% |
| GS 1,000 to 4,999 kW (Co-Generation) | 32.0% | 68.0% | 0.4% |
| Large Use >5MW | 45.9% | 54.1% | 2.4% |
| Street Light | 54.7% | 45.3% | 1.9% |
| Sentinel | 53.7% | 46.3% | 0.1% |
| Unmetered Scattered Load | 30.0% | 70.0% | 0.2% |
| Standby Power | 0.0% | 100.0% | 0.7% |

While the majority of London Hydro's revenue requirement is derived from the Residential (61%) and GS<50 kW (13%) rate classes, a significant portion also comes from the GS>50 kW (20%) class. In this class the minimum system process currently results in what could be described as a sub-optimal fixed charge return. This class of customer covers a wide swing of consumption as it can include from 20,000 kWh (50 kW) to 2,000,000 kWh (5,000 kW) assuming a 55% Load Factor. As shown below, it is currently a challenge to transition from GS<50 kW to GS>50 kW as there is an unintentional increase of approximately $50 per month.

| | | | 55% | | | | |
|---|---|---|---|---|---|---|---|
| | kWh | kW | LF | Fixed | Variable | Total | ¢/kWh |
| GS<50 | 1,000 | 2.51 | 55% | $ 30.70 | $ 9.92 | $ 40.62 | $ 0.0406 |
| | 2,000 | 5.01 | 55% | $ 30.70 | $ 19.84 | $ 50.54 | $ 0.0253 |
| | 2,745 | 6.88 | 55% | $ 30.70 | $ 27.23 | $ 57.93 | $ 0.0211 |
| | 3,000 | 7.52 | 55% | $ 30.70 | $ 29.76 | $ 60.46 | $ 0.0202 |
| | 4,000 | 10.02 | 55% | $ 30.70 | $ 39.68 | $ 70.38 | $ 0.0176 |
| | 5,000 | 12.53 | 55% | $ 30.70 | $ 49.60 | $ 80.30 | $ 0.0161 |
| | 10,000 | 25.05 | 55% | $ 30.70 | $ 99.20 | $ 129.90 | $ 0.0130 |
| | 15,000 | 37.58 | 55% | $ 30.70 | $ 148.81 | $ 179.51 | $ 0.0120 |
| GS<50 | 19,561 | 49.00 | 55% | $ 30.70 | $ 194.05 | **$ 224.75** | $ 0.0115 |
| GS>50 | 19,960 | 50.00 | 55% | $ 150.00 | $ 125.19 | **$ 275.19** | $ 0.0138 |
| | 20,000 | 50.10 | 55% | $ 150.00 | $ 125.44 | $ 275.44 | $ 0.0138 |
| | 25,000 | 62.63 | 55% | $ 150.00 | $ 156.80 | $ 306.80 | $ 0.0123 |
| | 30,000 | 75.15 | 55% | $ 150.00 | $ 188.16 | $ 338.16 | $ 0.0113 |
| | 35,000 | 87.68 | 55% | $ 150.00 | $ 219.52 | $ 369.52 | $ 0.0106 |
| | 40,000 | 100.20 | 55% | $ 150.00 | $ 250.88 | $ 400.88 | $ 0.0100 |
| | 45,000 | 112.73 | 55% | $ 150.00 | $ 282.24 | $ 432.24 | $ 0.0096 |
| | 50,000 | 125.25 | 55% | $ 150.00 | $ 313.60 | $ 463.60 | $ 0.0093 |
| | 78,781 | 197.35 | 55% | $ 150.00 | $ 494.11 | $ 644.11 | $ 0.0082 |
| | 100,000 | 250.50 | 55% | $ 150.00 | $ 627.20 | $ 777.20 | $ 0.0078 |
| | 200,000 | 501.00 | 55% | $ 150.00 | $ 1,254.39 | $ 1,404.39 | $ 0.0070 |
| | 300,000 | 751.50 | 55% | $ 150.00 | $ 1,881.59 | $ 2,031.59 | $ 0.0068 |
| | 400,000 | 1,002.00 | 55% | $ 150.00 | $ 2,508.78 | $ 2,658.78 | $ 0.0066 |
| | 500,000 | 1,252.51 | 55% | $ 150.00 | $ 3,135.98 | $ 3,285.98 | $ 0.0066 |
| | 600,000 | 1,503.01 | 55% | $ 150.00 | $ 3,763.17 | $ 3,913.17 | $ 0.0065 |

The challenge is even larger when a customer transitions between GS<50 kW and Large Use – a move that involves an unintentional increase of about $17,000 per month (as shown below).

| | | | 55% | | | | |
|---|---|---|---|---|---|---|---|
| | kWh | kW | LF | Fixed | Variable | Total | ¢/kWh |
| GS>50 | 19,960 | 50.00 | 55% | $ 150.00 | $ 125.19 | **$ 275.19** | $ 0.0138 |
| | 20,000 | 50.10 | 55% | $ 150.00 | $ 125.44 | $ 275.44 | $ 0.0138 |
| | 25,000 | 62.63 | 55% | $ 150.00 | $ 156.80 | $ 306.80 | $ 0.0123 |
| | 30,000 | 75.15 | 55% | $ 150.00 | $ 188.16 | $ 338.16 | $ 0.0113 |
| | 35,000 | 87.68 | 55% | $ 150.00 | $ 219.52 | $ 369.52 | $ 0.0106 |
| | 40,000 | 100.20 | 55% | $ 150.00 | $ 250.88 | $ 400.88 | $ 0.0100 |
| | 45,000 | 112.73 | 55% | $ 150.00 | $ 282.24 | $ 432.24 | $ 0.0096 |
| | 50,000 | 125.25 | 55% | $ 150.00 | $ 313.60 | $ 463.60 | $ 0.0093 |
| | 78,781 | 197.35 | 55% | $ 150.00 | $ 494.11 | $ 644.11 | $ 0.0082 |
| | 100,000 | 250.50 | 55% | $ 150.00 | $ 627.20 | $ 777.20 | $ 0.0078 |
| | 200,000 | 501.00 | 55% | $ 150.00 | $ 1,254.39 | $ 1,404.39 | $ 0.0070 |
| | 300,000 | 751.50 | 55% | $ 150.00 | $ 1,881.59 | $ 2,031.59 | $ 0.0068 |
| | 400,000 | 1,002.00 | 55% | $ 150.00 | $ 2,508.78 | $ 2,658.78 | $ 0.0066 |
| | 1,700,000 | 4,258.52 | 55% | $ 150.00 | $ 10,662.32 | $ 10,812.32 | $ 0.0064 |
| | 1,800,000 | 4,509.02 | 55% | $ 150.00 | $ 11,289.51 | $ 11,439.51 | $ 0.0064 |
| | 1,900,000 | 4,759.52 | 55% | $ 150.00 | $ 11,916.71 | $ 12,066.71 | $ 0.0064 |
| GS>50 | 1,995,599 | 4,999.00 | 55% | $ 150.00 | $ 12,516.30 | $ 12,666.30 | $ 0.0063 |
| LU | 1,995,998 | 5,000.00 | 55% | $ 19,314.83 | $ 10,474.54 | $ 29,789.36 | $ 0.0149 |
| | 2,000,000 | 5,010.02 | 55% | $ 19,314.83 | $ 10,495.54 | $ 29,810.36 | $ 0.0149 |
| | 2,100,000 | 5,260.53 | 55% | $ 19,314.83 | $ 11,020.31 | $ 30,335.14 | $ 0.0144 |
| | 2,200,000 | 5,511.03 | 55% | $ 19,314.83 | $ 11,545.09 | $ 30,859.92 | $ 0.0140 |

London Hydro recognizes the challenge faced in setting a fair rate design policy, especially as the C&I larger volumes require more intensive capital investment to accommodate the customer.

As discussed further in the previous recommendation, it may be easier separate the GS<50 kW rate class at the 4,000 kWh level of consumption and make the lower group 100% fixed and the upper group (remaining GS<50 kW rate class, GS>50 kW and Large Use) all one singular rate class.

LH would initially propose that the fixed charge be set close to the fixed rate charged to the amount billed to the New GS<4,000 kWh Rate Class. This would serve to prevent transition bumps occurring between the rate classes. This would impact the percentage of costs

recovered from fixed rates but, to lessen this impact, there may be an opportunity to increase the menu of Specific Service charges for such things as complex metering, complex billing and other charges of this nature that are normally incurred as the customer size increases.

As to the kW demand variable, London Hydro would suggest that utilizing this component for all customers in this class would allow the fairer allocation and recovery of capacity costs from those customers that are responsible.

This would require that those remaining 4,000 customers from the current GS<50 kW class be transitioned from kWh to kW billing. These customers would likely need to be taken off their current smart meters and with more sophisticated meters, but that is beyond the scope of this current discussion.

One consideration that needs to be explored between the GS > 50 kW tariff class and the Large User tariff class is the manner in which demand is determined. For the GS>50kW class it is currently based on a 15-minute period, whereas for the Large User class it is based on a rolling hour period (using 5 minute sub-intervals). It is imperative to treat all customers in a class in the same manner. So if we phased out the Large User class in favour of an expanded GS>50kW, the former LU customers would certainly have a lower fixed monthly charge, but their peak demand determinants would certainly be greater than at present (London Hydro does not have any insight or intuition as to how much bigger they would be).

Another consideration would be the treatment of embedded generation as this will become more of an issue as cheaper means of behind the meter generation become available.

London Hydro has not addressed these issues as it would require more in depth analysis.

# LH Recommendation 3 - Mandatory Grid Connection

The existing infrastructure investment for the current generation, transmission and distribution system from its inception in 1905 was created to provide electricity at cost. This motto should never be overlooked but only improved upon through the insistence of interconnectivity. The interconnectivity of all users and creators of electricity is just as important to support the way of life we pursue because all generators will also have a need for energy they cannot generate, they will want a backup supply for when they cannot generate and they will always want to sell their energy when they have surplus.

This recommendation is to make it a mandatory legal requirement for all consumers to have a service connection to the electricity grid. This requirement should be handled through various provincial codes and standards (not just the Ministry of Energy).

London Hydro would suggest that electricity connections to the distribution grid be made mandatory through various provincial codes and standards which could be justified on a number of levels.

- Ontario Building Codes/Municipal Building Codes
    - Ensure that electrical standards are met and maintained
    - Fire prevention
    - Consumer safety
- Canadian Standards Authority
- Landlord and Tenancy Act
- Electrical Safety Association
- OEB Distribution System Code

London Hydro would note that while this recommended action might be viewed by many as draconian or protectionist, it is more of a social safety net for all concerned. To start with, the province - through the IESO (and previously the OPA) - has considerable contractual long term

power procurement commitments. Hydro One and other provincial transmission companies have long-term assets which could ultimately become stranded. Local distribution companies have invested long-term assets and continue to be required to reinforce the local system to facilitate and manage two-way energy flows.

Should grid defection become a reality, the burden of increasing costs will fall to disadvantaged customers who will not be able to leave the grid, or ultimately back to the province as a whole.

# LH Recommendation 4 - Grid Defection/ Reconnection Charge

The alternative to the integrated grid scenario would be to facilitate grid defection by refusing to adapt to societal needs thus creating increased costs to those that do not wish to become generation partners.

This recommendation is for the application of a severance charge (to recover stranded assets) upon request for disconnection and a subsequent reconnection fee should the customer wish to be reconnected in future.

Possible disconnection cost would include:

- Recovery of unamortized cost of meter, meter base, and service connection to point of common origin;
- Removal and site restoration cost for asset recovery to point of common origin; and
- Discounted cash flow for share of allocated system and services depreciation.

Possible reconnection cost would include:

- Installation and site restoration cost for asset installation from point of common origin to, and including, meter base.

Application of monies received for actual costs incurred would be applied in current period accounting, whereas the collection of future costs would be amortized in a similar fashion to an intangible asset or customer contribution.

# LH Recommendation 5 - Change treatment of generation

London Hydro notes that the current measurement and treatment of distributed energy resources (FIT, microFIT, RESOP) within our distribution boundaries are primarily a unidirectional transaction as required by Measurement Canada. London Hydro does not, by government direction, invoice any form of monthly compensation for servicing FIT or RESOP accounts. London Hydro is allowed to invoice only $5.40 per month for microFIT accounts. As such, London Hydro feels it is not being fully compensated for servicing these accounts; hence creating some level of customer cross subsidization. London Hydro would note that the quantity of accounts is currently low (24 FIT / 185 microFIT / 1 RESOP / 8 Net-metered) but steadily increasing.

London Hydro understands that it was an expressed interest by those engaged in the early provision of distributed energy resources that any form of management fee or utility cost recovery mechanism proffered upon them was a disincentive to their investment in generation. London Hydro would suggest that the OEB determine that the past practices no longer provide supportable arguments and that some form of management fee or utility cost recovery mechanism be allowed with some immediacy.

London Hydro would submit that considerable capital and operating costs are currently, and are forecasted to be, spent by the utility to allow distributed energy resources to connect to the distribution grid and balance the energy harmonics. The infusion of generation onto London Hydro's grid requires new efforts by London Hydro to become a localized manager of electricity distribution. The utility also bears the risk in terms of voltage regulation for reliability and energy quality. London Hydro must ensure that energy flowing from connected distributed energy resources does not have an impact on the property or equipment of other customers who consume that energy.

London Hydro believes that current and future providers of distributed energy resources should assume responsibility of their costs in order to maintain fairness amongst all consumers on the London Hydro system.

London Hydro would propose that the OEB develop a cost allocation model and rate design methodology to allow the utility to apply a reasonable management fee for current and future consumers engaged in the provision of distributed energy resources.

# LH Recommendation 6 - Metering behind the meter generation

LH system planning engineers have grave concerns about the potential loss of vision with respect to system load planning as a result of behind the meter generation. Efficient and safe electrical system planning requires load analysis and design to prevent system faults in the event of sudden increased demand requirements.

One of the most relevant concerns of LH's system planning engineers is the loss of vision on what the actual load could be in the event of a large scale series of failures resulting in unexpected demand requirements on the system. Growing interest and potential threats to our systems will come from behind the meter generation.

London Hydro would recommend that legal legislation be put in place to ensure that all connected premises are metered for the enablement of reliable system load planning and maintenance.

Alternatively automated control systems might be installed at meter bases to limit the draw of electricity into premises that have previously agreed to load restrictions.

# LH Recommendation 7 - Carbon Cap and Trade

With the provincial interest in Carbon Tax and Cap and Trade, some sources have speculated that the electricity LDC is the logical manager to assume a key role in this initiative.

As some organizations are striving to reduce their carbon foot print many Ontarians do not even understand the terminology. Only the properly educated would understand the dynamics involved in becoming an energy partner. Many homes have energy delivered to their homes in the form of natural gas which is currently a cost effective way to heat and cook. Everyone must understand that it is also an energy form that has a much higher carbon intensity than electricity. Remembering the intent of all green energy initiatives being to reduce carbon dioxide equivalent emissions one should pause and think why is natural gas more affordable to heat, cook and dry your clothes with? We could take that one step farther and ask the question as to why it is currently cheaper to drive a gasoline vehicle that an electric vehicle?

Smart meters are installed in all homes and business. Most natural gas meters do not have remote meter reading capabilities. There is no reason why another energy metrics such as the monthly cubic meters of gas consumed cannot be efficiently collected through the use of the existing smart meters. Total energy consumption would be used to formulate each home's and business's carbon foot print. Yearly amounts of fuel used for all vehicles could be reported in income tax returns. Yearly fuel carbon taxes could help fund the new energy economy. Incentives could then also be tied to actual personal, family and businesses reductions. LDC's could assist in the development of a mechanism to present the carbon footprint information. Initiatives such as these would help level the playing field and help fund many different green initiatives.

London Hydro would suggest that the electricity LDC's are in a natural position to be considered as the logical aggregator of readings for electricity, natural gas and water to calculate and report on carbon footprints.

# LH Recommendation 8 - Electric Vehicle

As London Hydro envisions it people will continue to migrate to our great city in increased proportions continuing additional demands for electricity. A properly administered distributed generation model and increased conservation efforts will provide additional capacity. These dynamics coupled with the additional demands related to electric vehicles require more dynamic electron management systems that are able to ride out the peaks and valleys efficiently. If this is not accomplished, existing distribution equipment will need to be replaced prematurely. To mitigate these risks and to manage increased demands the electric vehicle charging systems must be connected to a distribution company owned flow enabling device that would allow for customers to select the rate at which they want to charge their vehicle when they are using a level 2 or 3 charging system. To charge their batteries by a specific time in the morning, the distribution company's flow enabling device, through the remote wireless abilities of the smart meter, would create a first come first serve roll call program to decide when to allow these chargers to begin charging. This would eliminate the risk of overloading of the existing infrastructure. When it is necessary for a faster charge, additional monetary charges should be incurred by the customer to help replace infrastructure when they prematurely fail.

As mandated home building standards have changed to ensure conduit from panel to the garage is in place so should the IESO, OPA, ESA and CSA mandate that car chargers are designed to be connected to LDC's flow enabling devices. The electron management platform required to facilitate this additional intermittent load must come with monetary compensation to integrate the flow enabling devices. This same mandate should also maintain the interconnectivity of all energy users. These flow enabling devices would also be used to limit the flow of stored electricity from the batteries back onto the grid and generation flow during maintenance and other activities that require energy isolation.

These new challenges come with additional monetary constraints and must be understood by customers who will need to become more like partners. Distribution charges must be levied for the use of electricity and for acceptance of generation or stored energy. Banks apply fees when

money is transferred or even when stored. Similarly, LDCs must apply fees for managing electrons whether they are provided, accepted or stored. Partnerships that facilitate mutual benefits could also be incentivized through additional savings of electron management fees.

The Ontario Building code was recently updated to require new construction to install conduit designed to run 240V wiring from the breaker panel to the garage.

London Hydro would suggest that the code be amended to include a second conduit for a communication line.

# LH Recommendation 9 - Customers given equal opportunity

London Hydro suggests that the current electrical system infrastructure does not allow all consumers an equal opportunity to become a partner in renewable energy generation. Limitations due to Hydro One transformers stations load designs prevents certain sectors from connecting to the electricity grid.

This flaw must be corrected which will require Hydro One to invest additional costs to infrastructure development.

# LH Observation

## 1) Sustainability Through Interconnectivity

The interconnectivity of all users and creators of electricity is just as important to support the way of life we pursue because all generators will also have a need for energy they cannot generate, they will want a backup supply for when they cannot generate and they will always want to sell their energy when they have surplus. As a collective network or generation partners we should strive to create more energy than we need and we must always collectively reap the rewards of surplus sales.

## 2) Strategically Located Generation and Storage

Generation should be awarded at or near increased demand points or existing capable distribution points. Type of generation should also match the time of day the needs exists such as solar in areas of increased demands of the day and wind during increased demands during the evening. The natural environment should be used where possible to provide electrical storage through pumping water and hydro generation. LDCs should be encouraged (through incentives) to use batteries and other storage mechanisms to assist in normalizing demands such as EV night charging, cloudy days and in periods of excess energy generation.

## 3) Incentives and Disincentives

Incentives for energy generation initiatives must be aligned with our societal needs and benefits. These incentives must be proportionate to the hierarchy of generation and should turn to disincentives as the risk to humanity and planet increase. Incentives should also be linked to the specific dynamics of time of day generated and demands at the time and location and should be inversely proportionate to environmental harm related to life cycle of generation or storage employed.

## 4) Dynamics of maintaining a reliable distribution system

The incentives for the green energy initiatives have created somewhat of an injustice to the transmission and distribution companies and the energy network. Generation that cannot be controlled remotely causes safety risks for distribution personnel, failures of distribution/transmission equipment and additional costs to mitigate risks and failures. The coordination of the new generators also places additional labour requirements on the organizations.

The dynamics of maintaining a reliable distribution system will require additional safeguards when considering distributed generation. For example, safety is ensured through remotely accessible disconnection and isolation points for the existing transmitted and distributed electricity system. When a customer's generated energy source must be isolated for safety, employees must physically travel to the location to apply a lock and there are other administrative controls that also attached to ensuring health and safety when working on systems that include customer generation points. In order to mimic the reliability and the ability to isolate and disconnect in a distributed generation model, additional remotely operated control systems must be instituted.

## 5) A Managed Road Map to Success

New challenges come with additional monetary constraints and must be understood by customers who will need to become more like partners. Distribution charges must be levied for the use of electricity and for acceptance of generation or stored energy. Banks apply fees when money is transferred or even when stored. Similarly, LDCs must apply fees for managing electrons whether they are provided, accepted or stored. Partnerships that facilitate mutual benefits could also be incentivized through additional savings of electron management fees.
We should ensure that we continuously review and improved upon controls that are in place to ensure the efficient management of the energy system or platform. This will also ensure energy is provided at the lowest price possible while minimizing the harm to people, facilitating green development, and protecting our descendants and the planet.