

**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 Union Gas Limited pursuant to Section 36(1) of the *Ontario Energy Board Act, 1998*, for an Order or Orders approving the 2015 to 2020 Demand Side Management Plan (**DSM**).

**EB-2015-0029/EB-2015-0049**

**Interrogatories From**

**The Association of Power Producers of Ontario (APPrO)**

**To**

**Ontario Sustainable Energy Association (OSEA)**

**August 4, 2015**

**Question: 1**

Reference: i) Paragraph 2 and paragraph 4<sup>1</sup>

Preamble: In the above references, Mr. Young indicates that he is providing expert opinion on sustainable energy opportunities and he also discusses his own experience in developing combined heat and power (**CHP**) projects in Ontario. APPrO would like to better understand his experience.

- a) Please provide a list all of the operating CHP plants in Ontario that Mr. Young has been involved in developing and/or operating and include the size in MW, the location and the year in which it went into service, the input energy source, the annual capacity factor of each plant, and Mr. Young's ownership percentage, if any.
- b) Please describe the role that Mr. Young played in developing and/or operating each of the plants identified in (a), above.
- c) Please describe the commercial arrangements for the "sale" of the resulting energy outputs of each of the CHP plants.

**Question: 2**

Reference: i) Paragraphs 9, 10, 13 and 21

Preamble: In the above references, Mr. Young speaks to greenhouse gas (**GHG**) emissions and Ontario's electricity sector and indicates: "*Sustainable energy approaches are critical to both energy conservation and environmental protection. Despite progress in specific areas, significant programmatic, institutional and regulatory processes and practices within many key organizations in the energy sector have had limited progress on these two matters. With respect to greenhouse gas emissions, Ontario's challenge is moving beyond phasing out coal and reducing the carbon content of applications such as heating and transportation.*"

- a). Please provide, in the following chart format, the information on energy conservation and greenhouse gas emissions applicable to various programs initiatives and sectors and all supporting primary resources and documentation:

(i) Energy Conservation

Energy conservation measure	Resulting energy saved (MWh or GJ, as applicable)	Corresponding GHG emissions factor	Corresponding GHG emissions reduced over the defined period of time	Cost to end-use customer (corresponding rate or bill increase over the applicable

<sup>1</sup> All references are to the evidence of Chris Young on behalf of Ontario Sustainable Energy Association dated July 27, 2015 unless otherwise indicated.

				<b>period (\$)</b>
Gas DSM (a) EGD <sup>2</sup> 2005-2015 (b) EGD 2010-2015 (c) Union <sup>3</sup> 2005-2015 (d) Union 2010-2015				(please provide Ontario Energy Board approved DSM budgets and customer costs)
Electricity CDM (a) OPA <sup>4</sup> /IESO <sup>5</sup> programs (b) LDC <sup>6</sup> Programs (c) Customer Initiatives				
Phase-out of coal-fired electricity in Ontario				
All other energy conservation programs and regulatory measures in Ontario				

## (ii) GHG Emissions

<b>Relevant sector of Ontario economy</b>	<b>Total GHG emissions from sector in 2005 (MT) and contribution to Ontario's total economy-wide GHG emissions in 2005 (%)</b>	<b>In each of (a) 2010 (b) 2014<sup>7</sup> and (c) 2015<sup>8</sup>: total GHG emissions from sector in (MT) and contribution to Ontario's total economy-wide GHG emissions (%)</b>	<b>Corresponding GHG emissions reduced over the 2005 to 2015<sup>9</sup> period</b>	<b>Cost to end-use customer (the published rate or bill increase over the applicable period (\$))</b>
<b>Electricity</b>				
<b>Transportation</b>				
<b>Industry (a) process</b>				

<sup>2</sup> Enbridge Gas Distribution Inc.<sup>3</sup> Union Gas Ltd.<sup>4</sup> Ontario Power Authority<sup>5</sup> Independent Electricity System Operator<sup>6</sup> Local Distribution Company<sup>7</sup> Should 2014 data not be available please use most recent 2013 data and provide projected estimate for 2014 based on known conditions.<sup>8</sup> Should 2015 data not be available please use most recent 2014 data and provide projected estimate for 2015 based on known conditions.<sup>9</sup> Should 2015 data not be available please use most recent 2014 data and provide projected estimate for 2015 based on known conditions.

<b>emissions (b) energy combustion emissions</b>				
<b>Buildings</b>				
<b>Agriculture</b>				
<b>Waste</b>				

**Question: 3**

Reference: i) Paragraph 16, 18  
ii) Paragraph 21 and 22, 27

Preamble: In Reference i) Mr. Young notes that the electricity market is dominated by existing large central power plants. APPrO would like to better understand Mr. Young's position on gas-fired power generation.

- a) Please confirm that these gas-fired power plants were developed based on, and operate in accordance with, long-term contracts between the developer and the IESO (formerly the OPA), or the Ontario Electricity Financial Corporation? If not explain.
- b) Please confirm that, among other functions, gas-fired power plants provide the necessary operational back-up generation capability that is required when alternate forms of renewable energy are not available. If not confirmed, please explain.
- c) In Reference ii) Mr. Young indicates the typical efficiency of electricity generation from natural gas is less than 40%.
  - i. Please explain in full how Mr. Young arrived at this efficiency percentage.
  - ii. Please provide all the studies of, or works on, the Ontario natural gas-fired electricity generation fleet that Mr. Young has personally worked on in order to assess the efficiency of electricity generation from natural gas in Ontario.
  - iii. Please provide any and all other third party documentation and information that Mr. Young has relied on to arrive at this result.
  - iv. Mr. Young states that the efficiency of CHP is "well in excess of 90 per cent". Please provide detailed calculations from both (a) an Ontario CHP plant and (b) the Ontario CHP fleet that supports this stated efficiency level. Please reconcile this statement with Exhibit H, which indicates that the overall efficiency of CHP plants range from 60-92%.
  - v. Please confirm that the majority of gas-fired generation facilities in Ontario are, in fact, of a combined cycle or CHP nature or utilize waste heat for secondary power generation to meet industrial steam or other heating requirements.
  - vi. Please provide: (a) the total and average annual amount of water usage by Ontario's natural gas-fired generation fleet and (b) the total and average annual amount of water usage by Ontario's combined cycle natural gas-fired generation fleet.
  - vii. Please confirm that Appendix H in Mr. Young's evidence illustrates that combined cycle power plants have overall efficiencies in the 73-90%.

- viii. Please provide the estimated capital costs and projected energy savings from converting an existing single cycle gas-fired generating facility to CHP (a) not adjacent or within 1 km of an operating industrial facility (b) adjacent to an operating industrial facility and (c) within 1 km of an operating industrial facility.
- d) Please provide a map of Ontario illustrating the location of all electrical generation facilities by type.

**Question: 4**

- Reference: i) Paragraphs 24-27  
ii) Exhibit I

Preamble: In Paragraph 24-27 Mr. Young indicates that regulatory practices in Ontario have not been revised to reflect the broader societal benefits of CHP. In Paragraph 27 Mr. Young states that based on his analysis, 63.3 TWh/yr. of electricity could be saved annually by shifting away from centralized power plants in favour of CHP. The reference associated with Reference i) states that "*Based on a full conversion rate, there is potential to replace upwards of 8,000 MW of relatively low efficiency thermo electric generation capacity.*" In Reference ii) Mr. Young references efficiency information related to 'standard power plants'. APPrO would like to better understand this information.

- a) Please file the reference associated with Paragraph 27 and all supporting documentation.
- b) Please provide the total electrical consumption in Ontario for each of the last 3 years and express the 63.3 TWh/yr. of purported potential annual savings as a percentage of the provincial total. Please also confirm that these savings are related to the replacement of 8,000 MW of low efficiency thermo electric generation capacity.
- c) Please provide a full copy of Mr. Young's analysis and include all major assumptions that support the claim of 63.3 TWh/yr. annual savings.
- d) In Reference ii) Mr. Young references a standard power plant. Please state what Mr. Young means by a "standard power plant". Please confirm that Mr. Young's reference to a "standard power plant" is not a reference to a natural gas-fired combined cycle power plant. Please explain if this is not the case.
- e) Please confirm that the efficiency estimates in Reference ii) were not developed by Mr. Young.
- f) Please provide an itemization of any and all expertise that Mr. Young has in analyzing the OPA/IESO's Clean Energy Supply Agreements and early mover contracts for combined cycle natural gas-fired electricity generation.
- g) Please provide a list of the Ontario "regulatory practices" that Mr. Young believes do not reflect any societal benefits.
- h) Please provide Mr. Young's working definition of a "large central power plant" as stated in Paragraphs 25-27.

**Question: 5**

Reference: i) Exhibit G

Preamble: Mr. Young provides a publication called "Up in Smoke". APPrO would like to better understand the information referenced in this exhibit.

- a) Please confirm that this information references power generation in the United Kingdom and not Ontario.
- b) Please indicate if Mr. Young conducted any of the underlying analyses that resulted in the percentages in the Exhibit. If so, please provide such detailed calculations and include all major assumptions.

**Question: 6**

Reference: i) Paragraphs 1 through 4, inclusive, and Exhibit A

Preamble: In the above references, Mr. Young set out his qualifications and scope of work, which includes providing expert opinion on sustainable energy opportunities that the utilities can incorporate into their DSM plan, and identification of barriers that prevent conservation and GHG reduction.

- a) Please provide any background or expertise that Mr. Young has had in relation to the Ontario integrated energy initiatives including: the 2014 Natural Gas Market Review, the Natural Gas Electricity Interface Review, the IESO/OPA conservation and demand management initiatives, and the IESO technical panel and market rule amendment process, and any supporting reports or documents that he has produced or relied upon in those matters.
- b) Please provide a list all sustainable energy opportunities that you considered and rejected in light of the Ontario energy context.

**Question: 7**

Reference: i) Paragraphs 28 through 33, inclusive

Preamble: In the above references, Mr. Young indicates that to date the Ontario approach has been focused on electricity and has not considered combined thermal and storage initiatives.

- a) Please provide an itemization of any and all CHP and energy storage programs or initiatives in the province and the associated responsible authority.

ALL OF WHICH IS RESPECTFULLY  
SUBMITTED THIS  
4th day of August, 2015



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