

EB-2017-0224

EB-2017-0255

EB-2017-0275

Enbridge Gas Distribution Inc.

Union Gas Limited

EPCOR Natural Gas Limited Partnership

Applications for approval of the cost consequences of 2018 cap and trade compliance plans

VECC COMPENDIUM

Union Gas Limited Panel

April 23, 2018

Salaries and Wages

The 2018 estimate of \$2.6 million relates to the salaries and wages for 12.5 FTE. This also includes an allocation of benefits, pension, and overhead costs. The level of staffing reflects the incremental level of effort Union expects to require across the organization to administer the Cap-and-Trade program in 2018. There is one less FTE forecast for 2018 than was forecast in Union's 2017 Compliance Plan. The difference is due to a Finance role that was expected to be allocated to Cap-and-Trade on a permanent basis. On an actual basis, the incremental workload associated with this role has been distributed across multiple roles in Finance, with no individual committing more than 25% of their time to Cap-and-Trade activities. These roles and associated costs have not been included in the 2018 Cap-and-Trade FTE forecast because they did not meet the documented threshold. In order to ensure that incremental salaries and wages costs related to Cap-and-Trade obligations are properly accounted for, Union created a decision tree and process that is presented and described in Exhibit 6. A description of the FTE roles organized by functional area is provided in Table 1 below:

Table 1
2018 Cap-and-Trade Roles and Responsibilities

Role and Responsibilities	Number of FTE's
<u>Cap-and-Trade Team</u> <i>Manager, Cap-and-Trade</i> <ul style="list-style-type: none">Overall responsibility for implementation and ongoing sustainment of Cap-and-Trade regulations and Compliance Plans. <i>Program Manager, Cap-and-Trade</i> <ul style="list-style-type: none">Leads activities on establishment of process changes, governance structures, reporting and monitoring, regulatory requirements, and Compliance Plan filings.	3.0

<p><i>Cap-and-Trade Advisor</i></p> <ul style="list-style-type: none"> Leads interpretation and analysis of regulations, research of other jurisdictions, response to Cap-and-Trade proposals from ministries, and supports Cap-and-Trade communications content. 	
<p><u>GHG Reporting and Forecasting</u> <i>Principal EHS Technical Advisor</i></p> <ul style="list-style-type: none"> Accountable for all Regulatory reporting of GHG emissions, including all provincial reporting under O.Reg.452 and O.Reg.143 as well as federal reporting under Section 46 of the Canadian Environmental Protection Act. <p><i>Environmental Specialist (2 roles)</i></p> <ul style="list-style-type: none"> Responsible for emissions calculations and reporting, technical support related to Cap-and-Trade and GHG emissions including emissions measurement, assessment of emission reduction opportunities and research. 	3.0
<p><u>Compliance Purchase Plan and Execution</u> <i>Senior Buyer, Carbon Markets</i></p> <ul style="list-style-type: none"> Responsible for the development and execution of Union's compliance instrument procurement strategy and the management of Union's CITSS accounts. 	1.0
<p><u>Technology and Innovation</u> <i>Manager, Natural Gas Technology and Innovation and Project Manager, Natural Gas Technology and Innovation</i></p> <ul style="list-style-type: none"> Assessment of emerging technologies and innovations for renewable natural gas, with the goal of increasing the technology and commercial readiness levels of those technologies. Evaluation and development of Cap-and-Trade's Offset Protocols and strategy around offsets. <p><i>Manager, Customer Technology and Innovation</i></p> <ul style="list-style-type: none"> Assessment of emerging technologies and innovations for the natural gas end-user in the residential, commercial, and industrial markets that reduce GHG emissions. 	3.0
<p><u>Distribution Business Development</u> <i>Director, Distribution Business Development and Strategic Accounts (25% allocated to Cap-and-Trade)</i></p> <ul style="list-style-type: none"> Accountable for creating and executing strategies and approach to market required to develop new end use markets for natural gas, including renewable natural gas. Interface with government ministries on the development of Climate Change Action Plan initiatives. <p><i>Manager, Distribution Business Development – Planning (25% allocated to Cap-and-Trade)</i></p> <ul style="list-style-type: none"> Supports the development of opportunities in RNG markets by providing research, analytics and stakeholder support. <p><i>Manager, Distribution Business Development - RNG</i></p> <ul style="list-style-type: none"> Accountable for developing the market approach for renewable natural gas, identifying partnerships, business models and products with industry partners, 	2.5

<p>potential customers, associations and government.</p> <p><i>Business Development Manager</i></p> <ul style="list-style-type: none"> For RNG, develops new customer and industry relationships in target markets, supports business cases, creates materials and educates potential RNG producers and buyers on market opportunities, facilitates contracting for services and develops sustainable processes. 	
Total	12.5

In addition to the 12.5 FTE described above, many departments across the organization have adjusted existing workloads to accommodate requirements related to Cap-and-Trade. If an employee will not be committing greater than 25% of their time to Cap-and-Trade activities, then an allocation of that FTE is not included in the 12.5 FTE. There are many examples of existing positions across the organization that have been required to absorb incremental workload as a result of Cap-and-Trade regulations but their costs will not be captured in the deferral account because the time commitment does not meet the 25% threshold. Examples of this situation include staff in departments such as Finance (described above), Gas Supply, Communications, Customer Care, Information Technology, Regulatory, and Sales. In these cases, Union has reallocated work, refined processes and restructured support teams to drive productivity gains allowing for these roles to assume the incremental Cap-and-Trade work.

Consulting

In 2018, Union will continue to use external consulting to support the development of its Compliance Plans and the ongoing sustainment of the Cap-and-Trade program. Union continues to adapt quickly to the dynamic and developing Ontario carbon market, and continues to engage the use of external consultants with specialized knowledge and expertise. These consulting

Activity	Overview of 2017 Work	Approximate Spend	Included in GGEIDA Costs
<u>Carbon Capture</u>	Technology demonstrating GHG reduction, energy recovery and savings and overall performance of system. The work completed included a technology scan, pre-screening and assessment, initial risk assessment, lessons learned review and residential stakeholder identification.	N/A	No
<u>Building Skins</u>	Working with MaRS Advanced Energy Center to develop a workshop around creating a building envelope system for retrofit application on low-income housing. The work included planning of workshop, preliminary energy modeling and the execution of the workshop and the development of the RFP.	\$90,000	No
<u>Integrated ASHP/NG Solution</u>	Two pilot projects to demonstrate hybrid heating efficiencies and optimal switch-points for GHG savings and cost savings. Pilots will also include a study of home energy management system ("EMS") for integrated control.	\$10,000	No
<u>Ground Source Heat Pump</u>	Technology demonstrating GHG reduction, energy savings and overall performance of system. The work included a technology scan, pre-screening and an initial risk assessment.	\$31,000	No
<u>Micro Generation</u>	Pilot projects demonstrating hybrid heating efficiencies, GHG savings, system resilience, integration with net-zero homes and customer cost savings. Technology Scan, pre-screening, assessment and installation of 2 units at pilot sites M&V for both units.	\$117,500	No

- b) In 2017, Union was able to leverage a modest existing budget and incremental FTE in order to initiate work on new technologies.¹ Specifically, Union was able to initiate work advancing the Abatement Construct and Initiative Funnel. As such, Union established its selection and project management approach, developed relationships with key stakeholders

¹ 3.0 incremental roles for Technology and Innovation were identified in the Cap-and-Trade forecast administration costs for 2017 and 2018. Actual costs for these roles are captured in the GGEIDA.

UNION GAS LIMITED

Undertaking of Ms. Flaman
To Mr. Poch

Reference: Tr.1, p.85

TO PROVIDE THE SUGGESTED IDEAS AND ANALYSIS GIVEN TO THE MOECC AND GREENON CURRENTLY NOT ON THE RECORD.

Response:

Below is a list of meetings that Union, EGD and Enbridge Incorporated ("EI") held with the Ministry of Environment ("MOECC"), the Environmental Commissioner and the Green Ontario Fund ("GreenON").

Table 1

Date	Meeting Topic	Meeting Attendees
June 13, 2017	Low carbon/energy conservation discussion item included how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	Assistant Deputy Minister of MOECC, EI
June 22, 2017	Low carbon/energy conservation discussion item included how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	MOECC, EI
July 18, 2017	Low carbon/energy conservation discussion item included Behavioural Programs	MOECC, EGD, EI
August 17, 2017	GreenON RFP 128 – Proposal submission for Residential Smart Thermostat Direct Install	Union, EGD, GreenON
September 01, 2017	GreenON RFP 129 – Proposal submission for Residential Home Energy Expert	EGD, Union, GreenON
September 08, 2017	Low carbon/energy conservation discussion item included how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	MOECC, EI
September 27, 2017	Low carbon/energy conservation discussion item included how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	Meeting with Secretary to Cabinet, EGD, Union, EI
October 23, 2017	Low carbon/energy conservation discussion item included how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	Minister of MOECC, EGD, Union, EI

Date	Meeting Topic	Meeting Attendees
November 10, 2017	Low carbon/energy conservation discussion item focused on Residential New Build Program Design/Delivery and how collaborating with existing Utility DSM New Build Programs could help maximize incremental GHG reductions	Enbridge hosts MOECC at a DSM Savings By Design Charrette, EGD, EI
December 01, 2017	Low carbon/energy conservation discussion including: Residential Building Envelope, Smart Thermostat Direct Install for Low-Income Customers, Behavioural, Indigenous, and Residential & Commercial New Construction Programs – and how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	GreenON, IESO, MOECC, EGD, Union, EI
December 13, 2017	Low carbon/energy conservation discussion including: the continuation of province-wide delivery of the deep-savings home retrofit program and Behavioural programs – and how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	EGD, Union, EI Presentation to the GreenON Board
December 22, 2017	GreenON/IESO RFP 147- Participation in proposal submission for Ontario Home Assistance Program	Union, EGD, GreenON
January 19, 2018	Low carbon/energy conservation discussion including: Indigenous and Smart Thermostat Direct Install for Low-Income Customers Programs – and how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	EGD, Union, EI Presentation to GreenON and MOECC
February 14, 2018	Low carbon/energy conservation discussion including: Indigenous and Small/Medium Enterprise Programs - – and how collaborating with Utility DSM Program Design/Delivery can help to maximize incremental GHG reductions	EGD, Union, EI, GreenON, MOECC

UNION GAS LIMITED

Answer to Interrogatory from
Ontario Energy Board Staff ("Staff")

Reference: Exhibit 3, Tab 4, p. 43
Exhibit 1, p. 6
Exhibit 3, Tab 4, Appendix A, p 6, Table 2 and Table 3

Preamble: In Exhibit 3, Union Gas states that when assessing the OEB MACC for abatement opportunities, it "did not identify any cost-effective Commercial/Industrial (C/I) abatement opportunities incremental to its existing DSM programs." Union Gas LAO states that it "did, however, identify cost-effective abatement opportunities incremental to Union's existing DSM programs within the Residential sector in all carbon price forecast scenarios." Union Gas indicates that it will "assess the incremental opportunity and pursue it through the DSM Framework where possible."

Union Gas proposes that "through the CPS and OEB MACC analyses, Union has determined that it is not appropriate to include incremental DSM abatement opportunities in the 2018 Compliance Plan."

In Appendix A, Union Gas identifies its annual savings in 2020 (plus savings persisting from the 2018 and 2019 year) based on its analysis of the potential found in the OEB MACC, and compared them to the savings anticipated in the existing DSM plan for those years.

Questions:

- a) Please explain why Union Gas states that is not appropriate to include incremental abatement in its 2018 Compliance Plan even though Union Gas identified cost-effective abatement opportunities in the residential sector in all carbon price forecast scenarios.
 - i. Please explain why and how Union Gas proposes to pursue this opportunity through the DSM Framework instead (given that the DSM budgets for 2015-2020 were approved in the DSM Decision.¹
- b) For the Commercial/Industrial Analysis in Appendix A:
 - i. Please provide Union Gas' calculation of the OEB MACC mid-range LTCPF savings potential of 66 million m³, based on the results found in the OEB MACC.
 - ii. Please provide Union Gas' data and analysis to calculate the annual savings realized in 2020 from Union's C/I prescriptive and custom DSM plan, including savings from 2018 and 2019 that persist into 2020. Please indicate the achievement of their targets (in %) assumed for 2017, 2018, 2019, and 2020 in this calculation.

¹ EB-2015-0029/0049

- iii. Please indicate what commercial/industrial measures included in the OEB MACC are those that Union Gas does not currently incent, and provide rationale for excluding each.
 - c) For the Residential Analysis in Appendix A:
 - i. Please provide Union Gas' calculation of the OEB MACC mid-range LTCPF savings potential of 35 million m³, based on the results found in the OEB MACC (i.e., 144 million m³ of 2018-2020 abatement potential in Ontario, as shown in Table 14 of the OEB MACC).
 - ii. Please provide Union Gas' data and analysis to calculate the annual savings realized in 2020 from Union Gas' Residential DSM Plan, including savings from 2018 and 2019 that persist into 2020. Please explicitly indicate the achievement of their targets (in %) assumed for 2017, 2018, 2019, and 2020 in this calculation.
 - d) Please explain whether the annual savings from Union Gas' DSM Plan in Appendix A are consistent with the 2018 DSM volume reductions indicated in Exhibit 2.
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Response:

- a) The energy conservation measures that were identified within the MACC Report that are not currently included within Union's DSM programs can be grouped into the following three categories.

1. Behavioural Measures

The MACC identified the following opportunities related to residential behavioural measures, which are not currently included within Union's DSM program.

- Minimize Hot and Warm Clothes Wash;
- Reduce Temperature of DHW;
- Clothes lines and drying racks;
- Close windows and blinds; and,
- Maintain Weather-stripping.

As part of Union's 2015-2020 DSM Plan application, the utility proposed a residential behavioural offering.² Within its Decision and Order, the OEB denied the offering stating "The OEB is not convinced, based on the evidence filed, that the proposed budgets are a good use of customer funds or that the programs provide value for money."³ Union submits that it would not be appropriate to propose a behavioural program given the OEB's decision on Union's 2015-2020 DSM Plan. Union suggests that should a behavioural offering be revisited, it should be assessed within the DSM Framework, and

² EB-2015-0029, Union DSM 2015-2020 DSM Plan, Exhibit A, Tab 3, Appendix A, pp. 2-24.

³ EB-2015-0029, Decision, p. 37.

that it is not appropriate to duplicate the DSM Framework within the Cap-and-Trade Framework. Please see the response at Exhibit B.GEC.22 for more detail.

2. Adaptive Thermostats

The MACC identified opportunity related to residential adaptive thermostats, which are not currently included in Union's DSM program.

In its Decision and Order on Union's 2015-2020 DSM Plan, the OEB directed Union to "propose a new, widespread residential program at the mid-term review".⁴ Within its DSM Mid-Term Review submission for Part 2 Requirement 2, Union proposed a new Residential Adaptive Thermostat offering, requiring approval of incremental budget.⁵ Union submits that this opportunity should continue to be assessed within the DSM Framework, and that it is not appropriate to duplicate the DSM Framework within the Cap-and-Trade Framework. Please see the response at Exhibit B.GEC.22.

3. Assessed and Not Prioritized

The MACC identified opportunity related to the following residential measures:

- Draft Proofing Kit;
- Heat Reflector Panels;
- Programmable Thermostat;
- Faucet Aerator;
- High-Efficiency (ENERGY STAR®) Dishwashers;
- Low-Flow Shower Head;
- Pipe Wrap;
- DHW Tank Insulation;
- Active Solar Water Heating Systems;
- DHW Recirculation Systems;
- Wastewater Heat Recovery Systems;
- High-Efficiency Gas Clothes Dryers;
- Sensor for Clothes Dryer;
- Insulating Pool Covers;
- High-Efficiency Gas-Fired Pool Heaters;
- Solar Pool Heaters;
- Fireplace Intermittent Ignition Control Retrofit; and,
- High Efficiency Fireplace with Pilotless Ignition.

⁴ EB-2015-0029/EB-2015-0049, Decision and Order, January 20, 2016, p. 15.

⁵ EB-2017-0127, Union Submission, January 15, 2018, pp. 4-6.

These measures have either been denied by the OEB within the current or previous DSM Frameworks, or have been assessed by Union within the DSM Framework and have been identified as low priority measures (either due to poor TRC-Plus cost effectiveness or limited market opportunity). Union submits that should these measures require reassessment, they should continue to be assessed within the DSM Framework, and that it is not appropriate to duplicate the DSM Framework within the Cap-and-Trade Framework. Please see the response at Exhibit B.GEC.22.

b)

- i. Union used the following methodology to arrive at the commercial/industrial MACC (Mid-Range LTCPF) annual savings potential for 2018-2020 of 66 million m³.
 1. Union first identified the province wide cost-effective savings opportunity identified in the MACC Report (Mid-Range LTCPF) for commercial and industrial sectors respectively: 99 million m³,⁶ and 96 million m³.⁷
 2. Union then adjusted the savings opportunity identified in the MACC Report to align with Union's DSM savings results by applying Net-to-Gross adjustments. The Net-to-Gross adjustments used for each sector was based on Union's 2015-2020 DSM Plan. Specifically, Union assumed a 90% Net-to-Gross adjustment for the commercial sector (based on the typical range of Net-to-Gross adjustments for the Commercial/Industrial Prescriptive offering) and a 46% for the industrial sector (based on the Net-to-Gross adjustment for the Commercial/Industrial Custom offering).
 3. Union then adjusted the savings to represent the opportunity within Union's franchise area, as opposed to province wide. Union attributed 42% of the commercial sector savings opportunity and 66% of the industrial sector savings opportunity to Union's franchise area. These figures are based on the savings identified in the CPS Constrained Scenario for the 2018-2020 years in Union's territory.
 4. Union summed the savings opportunity for the Commercial and Industrial sectors. The calculation is as follows:

⁶ EB-2015-0363, MACC Report, p. 35.

⁷ EB-2015-0363, MACC Report, p. 28.

Commercial + Industrial = 66 million m³

Where:

Commercial = 99 million m³
× 0.90 Net-to-Gross adjustment
× 42% franchise area adjustment
= **37 million m³**

Industrial = 96 million m³
× 0.46 Net-to-Gross adjustment
× 66% franchise area adjustment
= **29 million m³**

- ii. 2017 has not been included in this response as Union only used 2018-2020 for this analysis. The “C/I Prescriptive and Custom DSM Plan” figure (193 million m³) in Table 2 of Union’s application at Exhibit 3, Tab 4, Appendix A is the sum Union’s commercial/industrial 2018-2020 annual natural gas savings forecasts from its 2015-2020 DSM Plan. The figure includes:
- Low-Income Multi-Family offering;⁸
 - Commercial/Industrial Prescriptive offering;⁹
 - Commercial/Industrial Custom offering;¹⁰ and,
 - Performance-Based Conservation program.¹¹

M3 savings	2018	2019	2020	Total
Low Income (Multi-Family)	1,039,617	1,203,334	1,191,633	3,434,584
CI Prescriptive	16,375,788	16,375,788	16,375,788	49,127,363
CI Custom	45,430,134	45,430,134	45,430,134	136,290,403
Performance Based Conservation	650,000	1,250,000	2,050,000	3,950,000
Total				192,802,350

Savings from Union’s Large Volume program were not included in order to estimate a comparable figure to the MACC Report’s results, as Large Final Emitters were not included in the MACC Report.

Union assumed 100% achievement of these forecasts.

- iii. There are three measures included in the MACC Report which Union does not currently include within its DSM Commercial/Industrial Program.¹² The measures represent routine maintenance projects.
- Boiler Tune-up
 - Steam Leak Repairs

⁸ EB-2015-0029, Union Application and Evidence, Exhibit A, Tab 3, Appendix A, p. 89.

⁹ EB-2015-0029, Union Application and Evidence, Exhibit A, Tab 3, Appendix A, p. 42.

¹⁰ EB-2015-0029, Union Application and Evidence, Exhibit A, Tab 3, Appendix A, p. 42.

¹¹ EB-2015-0029, Union Application and Evidence, Exhibit A, Tab 3, Appendix A, p. 60.

¹² EB-2015-0363, MACC Report, pp. 30-32.

- Steam Trap Survey and Repair

As per Union's DSM Mid-Term Review Submission on Part 2 Requirement 1:¹³

"In an effort to reduce free-ridership, beginning in 2016, Union stopped providing incentives for routine maintenance projects such as steam trap repairs, steam leak repairs and combustion tune ups. Steam traps, for example, are devices used within commercial/industrial facilities to discharge condensate with minimal steam loss, and should be repaired or replaced soon after failure to prevent excessive steam loss and inefficient energy use. In an effort to reduce free-rider participation, routine maintenance projects such as steam trap repairs are no longer eligible for financial incentives within Union's Commercial/Industrial Custom offering, and savings from routine maintenance projects are not claimed towards the offering's results. To ensure customers are aware of the benefits of performing routine maintenance activities, Union continues to provide information and education about routine maintenance projects as part of the offering."

c)

- i. Union used the following methodology to arrive at the residential MACC (Mid-Range LTCPF) annual savings potential for 2018-2020 of 35 million m³.
 1. Union first identified the province wide cost-effective savings opportunity identified in the MACC Report (Mid-Range LTCPF) for the residential sector: 97 million m³.¹⁴ It should be noted that the 144 million m³ figure referenced in the IR represents the total abatement over the 2018-2020 period, whereas the 97 million m³ figure represents the abatement from cost-effective measures over the 2018-2020 period using the Mid-Range LTCPF. Both figures are presented in the MACC report.¹⁵
 2. Union then adjusted the savings opportunity identified in the MACC to align with Union's DSM savings results by applying a Net-to-Gross adjustment. The Net-to-Gross adjustment used for the residential sector was based on Union's 2015-2020 DSM Plan. Specifically, Union assumed a 95% Net-to-Gross adjustment for the residential sector (based on the Net-to-Gross adjustment for the Residential Home Reno Rebate offering).
 3. Union then adjusted the savings to the represent the opportunity within Union's franchise area, as opposed to province wide. Union attributed 38% of the

¹³ EB-2017-0127, Union Submission, October 2 2017, p. 6.

¹⁴ EB-2015-0363, MACC Report, p. 41.

¹⁵ EB-2015-0363, MACC Report, p. 41.

residential sector savings opportunity to Union's franchise area. These figures are based on the savings identified in the CPS Constrained Scenario for the 2018-2020 years in Union's territory.

The calculation is as follows:

$$\begin{aligned}
 \text{Residential} &= 97 \text{ million m}^3 \\
 &\times 0.95 \text{ Net-to-Gross adjustment} \\
 &\times 38\% \text{ franchise area adjustment} \\
 &= 35 \text{ million m}^3
 \end{aligned}$$

- ii. 2017 has not been included in this response as Union only used 2018-2020 for this analysis. The "Residential DSM Plan" figure (20 million m³) in Table 3 of Union's application at Exhibit 3, Tab 4, Appendix A is the sum Union's residential 2018-2020 annual natural gas savings forecasts from its 2015-2020 DSM Plan. The figure includes Union's:

- Low-Income offerings, not including the Low-Income Multi-Family offering;¹⁶ and,
- Residential Home Reno Rebate offering.¹⁷

M3 savings	2018	2019	2020	Total
Residential (HRR)	5,196,700	5,196,700	5,196,700	15,590,100
Low Income (Residential)	1,528,909	1,625,149	1,669,642	4,823,699
Total				20,413,799

Union assumed 100% achievement of these forecasts.

- d) Please see the response at Exhibit B.Staff.13 b).

¹⁶ EB-2015-0029, Union Application and Evidence, Exhibit A, Tab 3, Appendix A, p. 89.

¹⁷ EB-2015-0029, Union Application and Evidence, Exhibit A, Tab 3, Appendix A, p. 15.

MACC, consistent with the CPS in 2016, shows that Union's DSM program targets aim to achieve more than what is identified.

In addition, Union compared the CI measures included within the MACC Report to the prescriptive and custom measures included within Union's current DSM plan. This comparison shows that Union incents the majority of the MACC measures. For the few that are not currently incented, it is important to note that Union has evaluated these measures in the past, but has chosen to maintain focus on the offerings included within the DSM Plan, as these drive the most cost-effective savings when also taking into account the available budget and OEB guidelines.

4. Residential Analysis: Based on the same approach outlined above, the following values were calculated for the Residential Market:

Table 3

Annual Savings Realized During the 2020 Year (million m ³) (Includes savings from 2018 and 2019 that persist into the 2020 year)				
	MACC (Minimum LTCPF)	MACC (Mid-Range LTCPF)	MACC (Maximum LTCPF)	Residential DSM Plan
Residential	34	35	39	20

This Residential analysis identifies that there is incremental cost-effective abatement opportunity; however, Union is unable to determine the measure mix from the incremental opportunity since the MACC Report does not provide the underlying analysis. As a result, Union looked to the CPS and determined that incremental

- 1 abatement exists and Union will assess the opportunity and pursue it through the DSM
- 2 Framework where possible.

1 2. Union

2 **Q: Please summarize your understanding of how Union assessed the potential for**
3 **additional energy efficiency – beyond what their current efficiency programs are designed**
4 **to achieve – and what the results of that assessment was?**

5 A: Like Enbridge, Union focused its analysis on the MACC study and, to a lesser degree, the
6 Conservation Potential Study (CPS). First, it compared its currently planned savings to the
7 MACC study estimates of cost-effective savings over the 2018-2020 period. The Company
8 estimated that its C&I programs were capturing nearly three times as much savings as MACC
9 found to be cost-effective.¹⁵ The Company also states that it compared the C&I measures in the
10 MACC study and concluded that the Company is already promoting most of them. On the other
11 hand, Union concluded that it was planning to achieve only about 60% of the residential savings
12 the MACC study suggested were cost-effective.¹⁶ Second, like Enbridge, Union estimated that
13 the incremental cost of moving from the Conservation Potential Study (CPS) constrained
14 scenario to the semi-constrained scenario would be about \$60/tonne of carbon emission
15 reduction.¹⁷

16 **Q: What did Union conclude from this analysis?**

17 A: Union concluded that “there is no cost-effective, incremental DSM that is prudent to pursue
18 in 2018.”

19 **Q: Is that a reasonable conclusion?**

20 A: No.

¹⁵ Exh. 3, Tab 4, Appendix A, p. 5.

¹⁶ Exh. 3, Tab 4, Appendix A, p. 6.

¹⁷ Exh. 3, Tab 4, Appendix A, p. 3.

1 **Q: Why not?**

2 A: For several reasons. First, as with Enbridge, Union's analysis is fraught with errors and
3 misleading omissions. Second, also as was the case with Enbridge, even if it had been accurate,
4 the Company's analysis was far too cursory to rule out investment in additional energy savings
5 as part of its 2018 Cap and Trade Compliance Plan.

6 **Q: Can you elaborate on these concerns?**

7 A: To begin with, for the purpose of comparing its own planned savings levels to the MACC
8 study Union adjusted the MACC results down by a set of net-to-gross (NTG) factors consistent
9 with the average NTG factors it has historically used for its net savings estimates. That was
10 inappropriate because the MACC study already accounted for naturally-occurring conservation.¹⁸
11 Union argues that it made such NTG adjustments because the CPS only partially adjusted for
12 free ridership, citing a statement in the CPS study that stated it did not account for any initiatives
13 in the provincial Climate Change Action Plan.¹⁹ However, the Company provided no analysis to
14 suggest that the specific NTG adjustments it proposed – including a very large additional 54%
15 free ridership adjustment for industrial savings – were appropriate for the effects, particularly in
16 the early years, of the Climate Change Action Plan. Moreover, the Company failed to account
17 for the fact that any change that the Climate Change Action Plan would have on total available
18 net savings potential it would also likely have on the actual savings realized by the Company
19 through its planned programs. In other words, the 54% free rider adjustment Union applied to

¹⁸ ICF, "Natural Gas Conservation Potential Study", submitted to Ontario Energy Board, June 30, 2016, updated on July 7, 2016, p. 8.

¹⁹ Union response to Staff.30.

1 the MACC's industrial savings estimates should arguably also apply to its own planned savings
2 estimates for the same years (2018 to 2020).²⁰

3 In addition, although Union excluded savings from its Large Volume program from the
4 comparison, it appears to have included all other C&I savings, even though some of those
5 savings will come from capped customers.²¹ Again, this is a problem because the MACC study
6 explicitly excluded savings from all capped customers based on information provided to the
7 study authors by the utilities themselves.²² Put simply, Union has made an "apples to oranges"
8 comparison.

9 Second, Union did identify additional residential savings that were in the MACC study that it
10 was not planning to capture. However, it chose not to include that savings potential in its 2018
11 Cap and Trade Compliance plan, suggesting that it will instead "assess the opportunity and
12 pursue it through the DSM Framework where possible."

13 Third, as noted in the discussion of Enbridge's analysis above, the MACC study analyzed only
14 savings potential under "Business as Usual" levels of financial incentives for all efficiency
15 measures considered. The CPS looked at a more expansive set of options for financial
16 incentives. Even the CPS "constrained scenario" included a number of measures for which
17 "aggressive" incentive levels were modeled instead (rather than "BAU" incentive levels).²³
18 Thus, Union should also have compared its planned savings levels to the CPS savings levels.

²⁰ The 54% free rider rate Union had planned for its industrial programs was developed well before the Climate Change Action Plan was developed.

²¹ Even after excluding its Large Volume program, over 40% of Union's C&I program savings are from contract customers (Union attachment to response to GEC.2(c)), at least some of which may be capped. Furthermore, even some of the savings from General Service customers may be capped (Union response to GEC.2(b)).

²² MACC study, p. 7

²³ Based on review of workpapers used to develop the CPS supply curves. Confirmed in personal communication with the MACC study project manager,

1 The results of such a comparison are telling: the CPS study suggests that even under the most
2 constrained scenario Union could acquire 25% more savings from its non-Large Volume
3 customers than it is currently planning for 2018 through 2020; without budget constraints it
4 could acquire nearly 80% more savings than it is current planning for those years.²⁴

5 Fourth, as is also the case with Enbridge, Union's conclusion that the incremental cost of carbon
6 emission reductions between the CPS "constrained" and "semi-constrained" scenarios was
7 \$60/tonne is both incorrect and highly misleading. \$60/tonne is just the incremental DSM cost
8 divided by tonnes of carbon emission reduction. It does not account for the fact that the
9 incremental gas savings also produce incremental gas bill savings for Union's customers!

10 Union states that its calculation is "consistent with the OEB's Cap-and-Trade Framework"
11 because the OEB concluded that "it was premature to apply the TRC or SCT to the Utilities'
12 Compliance Plans at this time."²⁵ However, including avoided energy costs (and other avoided
13 utility costs) in this analysis is not the same thing as applying the TRC or SCT. Rather, it is
14 simply using what is commonly called the Utility Cost Test (UCT) – i.e. a test that only assesses
15 impacts on the utility system.²⁶ That is the test used in the MACC report. Furthermore, as I
16 discuss in more detail in the final section of my testimony, the UCT appears to be the very test
17 Union and Enbridge have used to assess renewable gas.

²⁴ These estimates were developed by (1) subtracting the incremental annual savings potential estimated in the CPS for 2017 from those for 2020 (CPS report tables ES 7, ES 11 and ES 15); (2) adjusting the savings values down further to remove large volume savings per CPS report table ES 17 (assuming all large volume savings are industrial); (3) multiplying those values, by sector, by the percent of provincial gas sales by sector estimated to be from Union (using Union's assumptions in Staff.31); and comparing the resulting sums to Union's estimates of 2018 to 2020 savings (response to Staff.31).

²⁵ Response to GEC.7(d).

²⁶ The UCT is also sometimes call the Program Administrator Cost test (or PAC or PACT) to account for the fact that efficiency programs are managed in some jurisdictions by entities other than utilities.

1 Finally, Union should have considered more than just the MACC and (in a very limited way) the
2 CPS in assessing the extent to which additional cost-effective efficiency resources could be
3 acquired for carbon emission abatement purposes. Specifically, the Company could have
4 benchmarked its forecast current forecast savings levels against other leading gas utilities –
5 ideally by sector, if not by program and/or key measures – to gain insight into whether others are
6 capturing greater savings that may also be acquired in Ontario. Finally, and most importantly,
7 the Company could have reviewed its existing efficiency program offerings to identify measures
8 and/or programs for which market penetration rates were modest and could be increased through
9 increased financial incentives, increased marketing and/or other means. It should then have
10 performed a quantitative analysis of the added DSM program cost, increased savings, increased
11 carbon emission reductions, and other avoided costs to determine whether the additional savings
12 could be acquired at a lower cost to its ratepayers than carbon emission allowances.

13 3. Cap and Trade Plans vs. DSM Mid-Term Review

14 **Q: Both Enbridge and Union have suggested that it would be more appropriate to address**
15 **the question of whether additional efficiency resources should be acquired in the DSM**
16 **Mid-Term Review process instead of in this proceeding. What is your view of that**
17 **suggestion?**

18 A: That would be far from ideal for several reasons. First, the failure to target additional cost-
19 effective efficiency resources in the Cap and Trade plan can lead to more expensive compliance
20 options being adopted. The corollary to that point is that waiting until the DSM mid-term review
21 probably means losing a year's worth of potential additional energy savings, many of which will

Total technical potential: The results show that the adoption of all technically-feasible measures could reduce total consumption by 35.1% by 2020 and 46.1% by 2030.⁴

Total economic potential: Adoption of all measures that are economically viable (i.e. are cost-effective), have the potential to reduce total consumption by 24.5% by 2020 and 26.5% by 2030.

Total achievable potential: The unconstrained, semi-constrained, and constrained achievable potential scenarios could reduce total consumption by 7.1%, 5.1%, and 4.5%, respectively, by 2020, and by 17.8%, 12.4%, and 9.0%, respectively, by 2030.

Exhibit ES 4 Total Technical, Economic and Achievable Potential Savings and Program Cost Results⁵

Value	Unconstrained		Semi-Constrained		Constrained	
	Year					
	2020	2030	2020	2030	2020	2030
Annual Savings (million m ³ /yr.)	1,869	4,973	1,338	3,468	1,187	2,510
Measure Lifecycle Savings (million m ³)	28,582	82,756	18,909	55,386	14,115	39,831
Value of Savings (million \$)	16,456	96,600	12,938	78,266	9,142	58,628
Program Spending to Milestone Year (million \$)	3,298*	11,544*	893	3,330	666	1,917
Average Annual Program Spending (million \$/yr.)	550*	722*	149	208	111	120
Average Program Spending up to Milestone Year (\$/m ³)	0.12*	0.14*	0.05	0.06	0.05	0.05

*Note: These are not specific program costs but are the total costs for the scenario.

Unconstrained program results: With unconstrained budget, all sector programs combined could achieve 1,869 million cubic metres of annual savings, or 28.6 billion cumulative cubic metres of savings by 2020, at a total cost of \$3.3 billion or on average \$550 million per year. All sector programs combined could achieve 5.0 billion cubic metres of annual savings, or 82.8 billion cumulative cubic metres of savings by 2030, at a total cost of \$11.5 billion or on average \$722 million per year.

Semi-constrained program results: A program budget for all sectors of \$893 million for 2015-2020, or \$149 million per year, could achieve 1.3 billion cubic metres of annual savings, or 18.9 billion cumulative cubic metres of savings, by 2020. A program budget of \$3.3 billion to 2030 could achieve 3.5 billion cubic metres of annual savings, or 55.4 billion cumulative cubic metres of savings, by 2030. This level of spending up to 2030 represents 29% of the total spending of the

⁴ The large technically-feasible savings available are driven largely by the inclusion of electric air-source and ground-source heat pumps in the residential and commercial sectors of the study. Although these technologies do not currently pass the TRC-plus economic screen, they technically have the potential to eliminate a significant portion of the natural gas space heating in the province by 2030.

⁵ The annual savings represent the natural gas saved each year by measures implemented in the years up to a milestone year.

The measure lifecycle savings present the natural gas saved over the lifetime of the measure installed up to that year, taking into account repeated installation of measures with lifetimes shorter than the period in question.

The value of the savings is the sum of the stream of avoided cost savings over the measure lifecycle for all the measures, with all savings discounted back to the year of installation.

The program spending to milestone year represents the sum of program spending for all years up to a given milestone year without discounting.

The average annual program spending is the total program spending up to a given milestone year divided by the number of years until that milestone year.

The average program spending up to milestone year is the total program spending divided by the total measure lifecycle savings.

Exhibit ES 7 shows the total annual savings in the residential sector for all scenarios until 2030 relative to the reference case.

Exhibit ES 7 Residential Technical, Economic, and Achievable Potential Annual Natural Gas Savings Relative to Reference Case

Year	Reference Case Use (million m ³ /yr.)	Technical Potential		Economic Potential		Unconstrained Achievable Potential		Semi-constrained Achievable Potential		Constrained Achievable Potential	
		Absolute Savings (million m ³ /yr.)	Savings Relative to Reference Case (%)	Absolute Savings (million m ³ /yr.)	Relative to Reference Case (%)	Absolute Savings (million m ³ /yr.)	Relative to Reference Case (%)	Absolute Savings (million m ³ /yr.)	Relative to Reference Case (%)	Absolute Savings (million m ³ /yr.)	Relative to Reference Case (%)
2015	7,751	2,185	28.2%	1,805	23.3%	110	1.4%	69	0.9%	65	0.8%
2016	7,871	2,643	33.6%	1,870	23.8%	230	2.9%	138	1.8%	130	1.6%
2017	7,934	3,079	38.8%	1,935	24.4%	357	4.5%	207	2.6%	194	2.4%
2018	8,009	3,422	42.7%	1,962	24.5%	474	5.9%	277	3.5%	260	3.2%
2019	8,070	3,735	46.3%	1,991	24.7%	590	7.3%	349	4.3%	326	4.0%
2020	8,130	4,006	49.3%	2,021	24.9%	708	8.7%	423	5.2%	395	4.9%
2025	8,496	5,253	61.8%	2,195	25.8%	1,115	13.1%	714	8.4%	519	6.1%
2030	8,882	6,371	71.7%	2,379	26.8%	1,539	17.3%	1,105	12.4%	774	8.7%

Exhibit ES 8 presents a summary of the residential (excluding low-income) sector achievable potential savings and program costs for each achievable potential scenario in 2020 and in 2030.

Exhibit ES 8 Residential (Excluding Low-Income) Achievable Potential Savings and Program Cost Results⁷

Value	Unconstrained		Semi-Constrained		Constrained	
	Year					
	2020	2030	2020	2030	2020	2030
Annual Savings (million m ³ /yr.)	503	1,109	330	845	307	553
Measure Lifecycle Savings (million m ³)	8,506	18,675	3,321	11,266	2,629	7,516
Value of Savings (million \$)	1,385	3,262	520	1,948	430	1,293
Program Spending to Milestone Year (million \$)	1,298*	2,435*	318	1,161	235	657
Average Annual Program Spending (million \$/yr.)	216*	152*	53	73	39	41
Average Program Spending up to Milestone Year (\$/m ³)	0.15*	0.13*	0.10	0.10	0.09	0.09

*Note: These are not specific program costs but are the total costs for the scenario.

Residential unconstrained program results: With unconstrained budget, residential programs (excluding low-income) could achieve 503 million cubic metres of annual savings, or 8.5 billion cumulative cubic metres of savings by 2020, at a total cost of \$1.4 billion or on average \$216 million per year. Residential programs could achieve 1.1 billion cubic metres of annual savings, or 18.7 billion cumulative cubic metres of savings by 2030, at a total cost of \$2.4 billion.

Residential semi-constrained program results: A program budget for the residential sector (excluding low-income) of \$318 million for 2015-2020, or \$53 million per year, could achieve 330 million cubic metres of annual savings, or 3.3 billion cumulative cubic metres of savings, by 2020. A program budget of \$1.2 billion to 2030 could achieve 845 million cubic metres of annual savings, or 11.3 billion cumulative cubic metres of savings, by 2030.

Residential constrained program results: Under current budget allocations for the residential sector (excluding low-income) of \$235 million for 2015-2020, or \$39 million per year, programs could

⁷ See footnote 5 for details on the values in this table.

achieve 307 million cubic metres of annual savings, or 2.6 billion cumulative cubic metres of savings by 2020. Under a budget allocation of \$657 million to 2030, or \$41 million per year, programs could achieve 553 million cubic metres of annual savings, or 7.5 billion cumulative cubic metres of savings by 2030.

Exhibit ES 9 presents a summary of the low-income residential sector⁸ achievable potential savings and program costs for each achievable potential scenario in 2020 and in 2030.

Exhibit ES 9 Low-Income Residential Achievable Potential Savings and Program Cost Results⁹

Value	Unconstrained		Semi-Constrained		Constrained	
	Year					
	2020	2030	2020	2030	2020	2030
Annual Savings (million m ³ /yr.)	205	430	93	260	88	221
Measure Lifecycle Savings (million m ³)	2,246	5,399	1,002	3,731	859	2,829
Value of Savings (million \$)	434	1,063	208	743	173	536
Program Spending to Milestone Year (million \$)	447*	999*	148	536	108	302
Average Annual Program Spending (million \$/yr.)	74*	62*	25	33	18	19
Average Program Spending up to Milestone Year (\$/m ³)	0.20*	0.19*	0.15	0.14	0.13	0.11

*Note: These are not specific program costs but are the total costs for the scenario.

Low-income residential unconstrained program results: With unconstrained budget, low-income residential programs could achieve 205 million cubic metres of annual savings, or 2.2 billion cumulative cubic metres of savings by 2020, at a total cost of \$447 million or on average \$74 million per year. Low-income residential programs could achieve 430 million cubic metres of annual savings, or 5.4 billion cumulative cubic metres of savings by 2030, at a total cost of \$1.1 billion.

Low-income residential semi-constrained program results: A program budget for the low-income residential sector of \$148 million for 2015-2020, or \$25 million per year, could achieve 93 million cubic metres of annual savings, or 1 billion cumulative cubic metres of savings, by 2020. A program budget of \$536 million to 2030 could achieve 260 million cubic metres of annual savings, or 3.7 billion cumulative cubic metres of savings, by 2030.

Low-income residential constrained program results: Under current budget allocations for the low-income residential sector of \$108 million for 2015-2020, or \$18 million per year, programs could achieve 88 million cubic metres of annual savings, or 859 million cumulative cubic metres of savings by 2020. Under a budget allocation of \$302 million to 2030, or \$19 million per year, programs could achieve 221 million cubic metres of annual savings, or 2.8 billion cumulative cubic metres of savings by 2030.

More details on the residential sector analysis can be found in chapter 4.

⁸ The residential low-income sector includes single-family dwellings (attached and detached houses) whose occupants meet the low-income criteria set out in the OEB's 2015-2020 DSM Framework.

⁹ See footnote 5 for details on the values in this table.