K4.1


# OEB Staff Compendium for Cross Examination of Enbridge Gas Distribution

## 2018 Cap and Trade Compliance Plan

**OEB Staff Cross Compendium – Enbridge Gas Distribution Inc.**

**2018 Cap and Trade Compliance Plan**

Tab 1 – OEB Transcript, EB-2017-0255, Day 3, p. 11, Lines 14-24 (Mr. Johnson)

Tab 2 – Exhibit KT1.5 – ICF Conservation Potential Study, page 8

Tab 3 – Oral Hearing Transcript Day 3, p. 12, Lines 17-26

Tab 4 – Exhibit KT1.5 – ICF Conservation Potential Study, p. 7

Tab 5 – Exhibit C, Tab 5, Schedule 2, p. 26, footnote 6

Tab 6 – Oral Hearing Transcript Day 2, top of page 133

Tab 7 – Technical Conference Transcript Day 2, bottom of page 29 continued to page 30

Tab 8 – Oral Hearing Transcript Day 3, bottom p. 138 – top p. 139

Tab 9 – Exhibit KT1.2 – ICF Marginal Abatement Cost Curve Report, p.7, footnote 2

Tab 10 – Oral Hearing Transcript Day 2, p. 168-170

Tab 11 – Exhibit I.1.EGDI.STAFF.23

Tab 12 – Technical Conference Transcript Day 2,

Tab 13 – Exhibit I.1.EGDI.STAFF.31

Tab 14 – Exhibit B, Tab 4, Schedule 1

Tab 15 – Cap and Trade Framework, Section 6.2

Tab 16 – Exhibit D, Tab 1, Schedule 1, p.5

Tab 17 – Undertaking Response JT2.12

Tab 18 – Exhibit C, Tab 7, Schedule 1, Appendix A

Tab 1

DSM, at a high-level, exceeded the opportunities -- or the cost-effective opportunities identified within the MACC.

MR. O'LEARY: All right. We heard some discussion the other day about natural conservation. Can you tell us how that is relevant to this discussion, and your evidence about the CPS being a gross study?

MR. JOHNSON: Certainly. So within the conservation potential study, the reference case attempts to account for natural conservation and we differentiate that from net-to-gross. Probably the best example I can give is to take an example in a home of a furnace. So an existing home might have a furnace that's 80 percent efficient, and it is nearing the end of its useful life and the customer is considering replacing that. The code today says they would need to replace that furnace with something that's 90 percent. That is the minimum that they would be allowed to replace it with, so that difference between 80 percent and 90 percent, that's natural conservation. It has to happen.

The conservation potential study attempted to exclude those opportunities when it was done, and our programs also exclude those opportunities. We would not count that difference between 80 and 90 percent.

What our programs attempt to do is encourage the customer to go from 90 percent to, say, 95 percent and that difference is what our programs would claim, and that's also the types of opportunities that were identified in the CPS.

In our programs there is an additional factor applied,

Tab 2

programs would be problematic because high program administrative or incentive costs would likely overwhelm their marginal benefits will be assigned low (or zero) participation rates to account for these factors.[36]

## 2.4 Base Year Natural Gas Energy Use

The Base Year is the starting point for the analysis. It provides a detailed description of "where" and "how" natural gas is currently used in each sector. The bottom up profile of energy use patterns and market shares of energy-using technologies was calibrated to actual Union Gas and Enbridge Gas Distribution customer sales data. For this study, the base year is the calendar year 2014.

Completion of this section of the study involved the following steps:

- Utility customers were segmented into sub-sectors containing buildings with similar energy-use patterns
- The major energy end uses within each sector were selected
- Detailed sub-sector archetypes developed and these archetypes were used to create building energy-use models for each sub-sector

## 2.5 Reference Case

The reference case includes the ongoing effects of DSM activity initiated before the study period, and also includes the effects of DSM activity by other actors in the market, such as electricity utilities. The reference case also presents a scenario in which policy, legislation, and regulation continue to exist as they are today. The inclusion of these first two areas of DSM activity into the reference case ensures that all natural conservation has been considered. Legislation that is not yet passed or clearly mapped out is subject to influence and is therefore considered within the realm of potential savings. As such, the reference case provides the point of comparison for the calculation of new energy saving opportunities associated with each of the scenarios that are assessed within this study.

Completion of this section of the study involved the following steps:

- The detailed profiles of new buildings (those buildings expected to be constructed during the study period) were updated for each sub-sector in each service region. Changes in building envelope and equipment affecting energy consumption were noted.
- The growth in building floor space was estimated for each sub-sector within each service region.
- Naturally-occurring efficiency changes affecting annual natural gas use in existing buildings were estimated.
- Special consideration was given to three factors:
  - Naturally-occurring improvements in equipment efficiency
  - Expected penetration of more efficient equipment into the building stock
  - Known, upcoming changes in building and equipment energy performance codes and standards.
- Changes in natural gas share for each end use were estimated.

[36] The zoned-up windows measure was an example of a residential measure whose assumed incentive level, based on interview discussions of building envelope measures, was high relative to the value of the gas savings it would provide. The participation levels were set to zero for this measure. The ratio for the super high-performance windows was more attractive, and it was included in the potential.

Tab 3

which is free ridership or, more broadly, net to gross, and that accounts for the fact that a customer may, of their own volition -- perhaps they are very environmentally conscious -- may say, I want to go to that 95 percent efficient furnace anyway, despite our programs being present, and so that's what we call a free rider, and that's discounted off the results of our program.

The conservation potential study didn't apply that net to gross adjustment as part of the methodology. It can be in some cases a very significant one, so you would, you know, you would expect to see it clearly articulated where that discount was applied.

In fact, if we can just quickly pull up the conservation potential study. I forget the reference, Exhibit...

MR. O'LEARY: KT1.5.

MR. JOHNSON: Thank you. And you will see in footnote 34 here it says that:

> "Measured TRC Plus results do not include program costs such as program administrative (non-incentive) costs and adjustments for Free ridership spillover effects and persistence."

Free ridership spillover colloquially being net to gross. So that's why in our view this study was a gross number, so again, in order to compare it properly against our results we had to provide that discount factor.

MR. O'LEARY: All right, did Enbridge do any analysis beyond the MACC?

Tab 4

Future penetrations require estimates of the naturally-occurring adoption of the efficiency measures. The overall applicability would be the product of the fraction-of-end use applicability and the technical barrier applicability. The methods used to estimate future penetrations varied by sector and are therefore discussed in the sector-specific chapters of this report, found in chapters 4, 5, and 6.

## 2.2 Avoided Costs

Avoided costs[32] are one of the key components of the cost-effectiveness tests that are used to evaluate energy efficiency investments. Cost-effectiveness represents whether an investment's benefits exceed its cost. A detailed description of the avoided cost analysis is provided in chapter 3.

## 2.3 Measure Total Resource Cost-Plus (TRC-plus)

The measure TRC-plus is a cost/benefit analysis of the net present value of energy savings that result from an investment in an efficiency or fuel choice technology or measure. The measure TRC-plus calculation considers a measure's full or incremental capital cost (depending on application) plus any change (positive or negative) in the combined annual energy and operation and maintenance (O&M) costs. This calculation uses the avoided natural gas price with a 15% non-energy benefit adder,[33] electricity supply costs, the life of the technology, and the selected discount rate. In this study, TRC-plus is expressed as a ratio of benefits divided by costs, with both the numerator and denominator calculated as net present values. [34]

A technology or measure with a TRC-plus benefit/cost ratio of 1.0 or greater is included in the technical, economic, and achievable potential analyses. A measure with a TRC-plus benefit/cost ratio below 1.0 is not considered economically attractive and is therefore included only in the technical potential analysis Consistent with OEB DSM Guidelines, a lower benefit/cost ratio threshold of 0.7 was used for measures applied to low-income sub-sectors.

With regards to measure persistence, in this study measures are assumed to persist for their full expected measure life and to be replaced at similar TRC-plus ratios if their lifetime is shorter than the study period. In the economic potential estimate, no customers remove efficient measures once installed, and no one "falls back" to the standard technology after the measure reaches end of life. For measures whose TRC-plus ratio is just below the threshold at the beginning of the study, they will be retested using the stream of avoided costs applicable to measures applied at the end of the study. If they pass the TRC-plus test under those circumstances, they will be included in the economic potential, but with adoption initially suppressed until the year when they begin to pass.

It should be noted that the measure TRC-plus provides an initial screen of the technical options. Considerations such as program delivery costs, incentives, etc., are incorporated in later detailed program design stages, which are beyond the scope of this study.[35] To some extent, these factors will be considered during the achievable potential phase of the study, through adjustment of expected adoption (or participation) rates for the measures. Measures whose success within

[32] The avoided cost is the marginal cost for a utility to supply one more unit of energy. The natural gas avoided costs used in this study include the direct natural gas supply and infrastructure costs that can be avoided by the utilities as a result of a decrease in demand, resulting from a reduction in load attributed to the conservation program, as well as other avoided costs not paid directly by the utilities. See Section 3 for additional details on the development of avoided costs for this study.

[33] See footnote 23 for a description of the 15% adder.

[34] Measure TRC-plus results do not include program costs such as program administrative (non-incentive) costs and adjustments for free ridership, spillover effects, and persistence etc. Measure TRC-plus results were used for preliminary screening of measures for inclusion in the economic potential.

[35] Although the utilities' current program designs/structures were a reference point for this study, the assumptions used in this study are independent of these programs.

Tab 5

Table 3: MACC Potential vs. DSM Plan[5]

| Customer Segment | Province-Wide Gross Savings in MACC Study (Mid-Range LTCPF) ($m^3$) | Net Savings[6] ($m^3$) | % of Potential in EGD Franchise | Net Potential in EGD Franchise as per MACC ($m^3$) | DSM Plan as originally filed in EB-2015-0049 ($m^3$) |
|---|---|---|---|---|---|
| Residential | 97,000,000 | 82,450,000 | 62% | 51,119,000 | 56,224,675 |
| Commercial | 99,000,000 | 83,160,000 | 58% | 48,232,800 | 169,335,715 |
| Industrial | 96,000,000 | 48,000,000 | 44% | 21,120,000 | |
| Total | 196,000,000 | 165,610,000 | - | 120,471,800 | 225,560,390 |

76. In the Framework, the Board also acknowledges that offering customer abatement programs "creates the potential for significant overlap between existing DSM programs and future Compliance Plans... [However, the Board] is confident that any potential overlap can be appropriately addressed through the robust Evaluation, Measurement & Verification ("EM&V") process of the DSM Framework."[7] The Board further clarifies that any "customer-related GHG abatement activities must be incremental to the Utilities' 2015-2020 multi-year DSM plans (EB-2015-0029/49)".[8]

77. Enbridge shares the Board's concern regarding the potential for overlap between existing DSM and additional energy efficiency programs under the banner of Cap

[5] Values shown are annual savings taking place by the end of the year 2020. These values will include the sum of recurring annual savings achieved as a result of efforts in 2018, 2019 and 2020 respectively.
[6] Freeridership values applied are 15% for residential, 16% for commercial and 50% for industrial as filed in EB-2014-0354, Exhibit B, Tab 1, Schedule 2, page 9. Commercial freeridership has been determined as a simple average of 12% freeridership in the commercial sector and 20% freeridership in the multi-residential sector.
[7] Regulatory Framework for the Assessment of Costs of Natural Gas Utilities' Cap and Trade Activities (EB-2015-0363), Section 5.6.
[8] Regulatory Framework for the Assessment of Costs of Natural Gas Utilities' Cap and Trade Activities (EB-2015-0363), Section 5.3.1.1.

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R. Sigurdson

Tab 6

that fair?

MR. GINIS: Generally I think that's fair, yeah.

MR. POCH: Okay, and when did you realize that your statement in your evidence was not, strictly-speaking, correct, that it was net, not gross, in the MACC?

MR. GINIS: I don't think those statements contradict each other. I think what we're saying is that the reason that we applied the net-to-gross adjustment to it was because of that -- those CCAP programs.

MR. POCH: The MACC presumably already had something like a 54 percent free rider rate in it for industrial, and then you've added another 54 -- you've multiplied by a further 54 percent derating, and I'm trying to understand, does that mean you are implicitly assuming that the government programs you've spoken of will acquire on an order of 54 percent of all savings in that market over the three years? In other words, that the current -- your current free rider rate is your best proxy for the percent of savings that these government programs will achieve and, in effect, take off the table, make unavailable to you and your programs?

MR. GINIS: So you said a couple things there that I don't think that I would agree with. You started it by saying that the MACC already included a 54 percent reduction as if it already included every possible net-to-gross adjustment. That's not our understanding of it.

MR. POCH: Well, they had a net-to-gross adjustment in there, correct?

Tab 7

has the opportunity to make that case.

But just to be clear on the record, the question was asked and it's being refused.

MR. O'LEARY: Yes.

MR. WASYLYK: Thank you. So my questions are going to then -- actually, I've got one follow-up question to that.

Could you please let me know if you agree that free ridership and spillover are a product of program design?

MR. JOHNSON: What I would say is that program design can influence both of those factors.

MR. WASYLYK: Thank you. So we have a couple of follow-ups to -- I think it's Board Staff 24 and Board Staff 28.

It appears as though Enbridge has made some adjustments, as we've just discussed, to bring the potential which has been identified in the MACC down to what it claims is a net savings number.

I'm just wondering if -- can you please confirm the manner in which Enbridge has done this, and if there has been any additional net to gross adjustments outside of what adjustments are within its DSM plan that have been made to the MACC potential to account for any CCAP programs?

MS. OLIVER-GLASFORD: I can speak to the CCAP piece. There have been no adjustments to the MACC to address the CCAP funding because at the time of the MACC development, that was not known and it is still not fully transparent to us. So no adjustments were made, other than those of the

net to gross ratios being applied.

MR. WASYLYK: Okay. And then the net to gross adjustments -- I think it states here, but maybe just so you can clarify and I know for one hundred percent certainty that those have been the ones what that have been historically used and applied by Enbridge through its DSM -- I guess, DSM planned programs?

MR. JOHNSON: Yes, that's correct, the last several years.

MR. WASYLYK: All right. Thank you. Now I'd like to just touch on cost-effectiveness.

Enbridge noted, I think in response to Staff 24, that it had concluded that additional DSM programs would not be cost-effective.

And so I just wanted to follow-up on that and just gain a bit of a better understanding as to how Enbridge determined cost-effectiveness for its potential customer abatement programs compared to potential RNG opportunities.

Can you please describe the manner in which you went about assessing cost-effectiveness for your potential customer abatement programs, as well as for potential RNG opportunities?

MR. JOHNSON: I think as we've indicated, the MACC was our primary tool for assessing within the context of what I'll refer to as DSM, but really are energy efficiency programs. So that was the primary tool that we used and you can refer to the analysis that you were talking about on attachment 1, where we compared the opportunities

Tab 8

MR. ELSON: Yes.

MR. JOHNSON: As well as the gas -- avoided gas cost.

MR. ELSON: Oh, of course. I'm just now talking about the cost side of things. The cost side is the incentive, the utility incentive cost and the utility program delivery costs, right?

MR. JOHNSON: That's correct.

MR. ELSON: And on the benefits side you have natural gas-avoided costs, including commodity costs, upstream capacity costs, and downstream distribution system costs; right?

MR. JOHNSON: Subject to check, in terms of the first two, the distribution, I think, is an adder in the way the math works; it is not the actual distribution charge that one would see on the bill.

MR. ELSON: But it's a --

MR. JOHNSON: There is a component in there.

MR. ELSON: A component in there. Okay. And so that's on the benefits side, and then in addition to those items we have now added the cost of carbon based on the long-term carbon price forecast; right?

MR. JOHNSON: Correct.

MR. ELSON: And so what we've done there is, my understanding is the same as the cost metric in the MACC; would you agree to that?

MR. JOHNSON: So again, I think as we mentioned earlier, we didn't have full visibility into exactly how the MACC worked. The MACC did appear to apply the UCT as a

secondary screen. UCT is applied as a secondary screen in DSM as well, but there was an additional screen applied ahead of that.

MR. ELSON: Well, let's turn up KT1.1, page 7, please. And that's the MACC. I think we're on the same page. That is the cost metric. But if that could get pulled up on the screen, that would be great.

MR. JOHNSON: Which page, sorry?

MR. ELSON: That's page 7 of the MACC. So if we scroll up a bit on page 7, just to confirm, so this is the section described in the cost metric, and I think we were on the same page, in that you noted that the UCT was used, but I just want to be a hundred percent clear.

Here's the cost metric as described in the MACC, and we have listed the benefits and the costs, and those are the ones that we just discussed; right?

MR. JOHNSON: Yes, as I say, we didn't have full visibility into exactly the mechanics of the MACC. Our understanding is it was a proprietary model. As you are pointing out from this, it does appear that UCT was at least a screen that was applied to the results.

MR. ELSON: And just for clarity, although I think everybody knows this, the utility cost test is basically the same as the program administrator cost test. Those names are using interchangeably often.

MR. JOHNSON: I would agree they are often used interchangeably.

MR. ELSON: Okay. Thank you.

Tab 9

- Adoption rates for BAU case incentive levels
- End use classification (e.g., industrial HVAC, commercial space heating, etc.)
- Utility program and incentive costs
- Treatment of conservation measure interactions
- All economic and market assumptions (including 4% discount rate)

The same caveats and limitations apply to this study as are documented in the 2016 CPS report, including that the model does not consider factors such as infrastructure requirements or lead time to implement abatement programs.

### Cost Metric

The cost metric used in this study was developed to quantify the cost effectiveness of natural gas customer conservation abatement options under different carbon pricing assumptions from a utility perspective. The cost metric includes:

Benefits (avoided costs):

- Natural gas avoided costs, comprising commodity costs, upstream capacity costs and downstream distribution system costs[1]
- Avoided cost of carbon, based on the three LTCPF scenarios (see Section 1.4.2)

Costs:

- Utility incentive costs
- Utility program delivery costs

The data and assumptions for all cost and avoided cost components listed above remain unchanged from the 2016 CPS[2], with the exception of the carbon price which is based on the LTCPF Report. The three MACC study scenarios – based on the minimum, maximum and mid-range carbon price forecast – were developed by varying the LTCPF used in the cost metric.

### Capped and Uncapped Participants

Estimates of natural gas consumption volumes representing 'capped' participants under Ontario's cap and trade program were developed through consultation with the utilities, and their associated natural gas volumes were removed from the modelling exercise[3]. Facilities directly covered under the program are excluded from the utilities' compliance obligations, so the associated abatement potential was excluded from the MACCs.

### Heat Pumps

Heat pumps were assessed through an analysis separate from the CPS model exercise (refer to Appendix A).

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[1] For a detailed description of avoided costs, see chapter 3 of the 2016 CPS Report.
[2] While cost data and assumptions from the CPS were used for this analysis, the definition of the cost metric in this study is *not* the same as the cost metric in the CPS. The main driver behind the differences in what costs and benefits are included is that the CPS was based on a societal cost perspective, whereas this study's objective is to evaluate costs from a utility perspective.
[3] Refer to Section 6.2 for recommendation to develop market penetration rates that might be more reflective of non-LFEs in future studies.

Tab 10

end-use. Therefore, an analysis by end-use category is not possible to this segment."

And in response to that, I have a couple of follow-up questions.

My is first question is does Union track the types and number of measures that are installed as part of their custom portfolio?

MR. GINIS: Subject to check, once we complete a year, we would have that level of information.

MR. MURRAY: And I guess the second question is: Does Union track the end uses of measures that are installed as part of its custom portfolio?

MR. GINIS: So backward-looking, I think yes, if you looked at what the end use was -- sorry, what the measure was, then you could role it up to an end use.

Just to clarify, I think, the reason what we're saying here is about forecast numbers. But historically, you are correct, we would have that information.

MR. MURRAY: So could Union provide a breakdown between commercial and industrial measures and end uses, like a comparison between that and the MACC for the years 2016 and 2017 in terms of your actuals? Is that something you could provide to us?

MR. GINIS: So to provide, based on the actual results, kind of what the breakdown is between end use?

MR. MURRAY: Yes, if you could kind of break down the end uses. I guess what we want is kind of a list of measures that were installed as part of the custom programs

in 2016 and 2017. Is that something you could provide?

MR. GINIS: I think what we could provide, and I think this serves your purpose, is in '16 and '17 --obviously this is all very much pre-audited because the audits haven't begun for this, the total savings amounts that were achieved through our DSM programs, but the percentages that come from end use segments.

So if in 2016, 25 percent of the savings from that year came from a specific end use, we could provide that, and I think that would serve your purpose if you wanted to gauge that against the future.

MR. MURRAY: Could you then apply those numbers to the 2018 MACC?

MR. GINIS: We could do that. I would just have to caveat that we don't know necessarily that it will come in that way, but that's based on the methodology that you are proposing.

MR. MURRAY: That's fine.

MS. SEERS: So if I could restate that undertaking, it is to provide for 2016 and 2017 the total savings amounts achieved through DSM programs as a percentage by end-use segment on an unaudited basis. Is that first part accurate?

MR. GINIS: Yes, I'm just thinking about the years we might struggle a bit doing that with, even '17. '15 would be for sure numbers that we could provide, but we could make best efforts to look at if we have that information readily available for '16 and '17.

MR. MURRAY: I've been advised that I think -- I think there was a lot of program changes in 2015. So to that extent we can have '16 and, to the extent you can, '17, I think that would be preferable.

MS. SEERS: Why don't I start over? So on a best efforts basis, to provide in respect of 2016 and 2017 the total savings amounts achieved through DSM programs as a percentage by end use segment on an unaudited basis.

MR. MURRAY: Just for commercial/industrial. We don't need end uses for residential.

MR. GINIS: And that's just for custom as well -- or did you want it for the entire program?

MR. MURRAY: Ideally both. Is that something you could do?

MR. GINIS: The entire program for CI?

MS. SEERS: Yes.

MR. GINIS: Yes.

MS. SEERS: For commercial/industrial, and then to apply those results to the 2018 MACC. We'll do that. Thank you.

MS. DJURDJEVIC: That's J2.7.

**UNDERTAKING NO. JT2.7: ON A BEST EFFORTS BASIS, TO PROVIDE IN RESPECT OF 2016 AND 2017 THE TOTAL SAVINGS AMOUNTS ACHIEVED THROUGH DSM PROGRAMS AS A PERCENTAGE BY END USE SEGMENT ON AN UNAUDITED BASIS FOR COMMERCIAL/INDUSTRIAL, AND THEN TO APPLY THOSE RESULTS TO THE 2018 MACC**

MS. SEERS: There may be another --

Tab 11

# STAFF INTERROGATORY #23

## INTERROGATORY

Ref: Exhibit C / Tab 5 / Schedule 1 / pp. 9-10
Exhibit C / Tab 5 / Schedule 1 / p. 11

Preamble:
Enbridge Gas proposes a $2 million annual "Low Carbon Initiative Fund" (LCIF) to enable the identification and development of GHG reducing technologies to progress into future abatement opportunities.

Enbridge Gas indicates that "the LCIF will initially provide funding for Enbridge Gas to better define each opportunity in order to successfully qualify for government grants." It will also provide the means to accelerate innovative technologies necessary for the Province to meet its renewable energy and emissions reduction targets."

Enbridge Gas also indicates that it will require two additional full time equivalent ("FTE") employees to support its efforts to identify, formulate and begin to implement on new or expanded abatement activities within the Initiative Funnel.

Questions:

a) How does Enbridge Gas currently identify abatement activities to pursue? What would change if the LCIF is approved? Please explain.
   i. In 2017, did Enbridge Gas undertake any activities that would, in 2018, fall within the ambit of the LCIF?
      1. If yes, please provide: a description of each activity; amounts spent on each activity in 2017; and whether those amounts are included in Enbridge Gas' 2017 admin costs.

b) Please explain what work Enbridge Gas intends to undertake in 2018 with the LCIF, if approved.
   i. Please explain how this work is related to the abatement activities proposed in the Initiative Funnel.

c) Please provide details of expected resourcing requirements and costs associated with each stage of the Funnel, including implementation, for 2018.
   i. Please explain whether these costs are incremental to Enbridge Gas' forecast 2018 administration costs.
   ii. Please explain whether these costs are included in the proposed $2M LCIF.

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d) Please explain why it is appropriate for Enbridge Gas to receive additional ratepayer funding so that it can qualify for government grants.

e) Please explain why it is appropriate for Enbridge Gas to obtain ratepayer funding to accelerate technologies to help the Province meet its renewable energy and emissions reduction targets.

f) Please explain what will happen if the OEB does not approve the proposed $2M LCIF.

g) Enbridge Gas and Union Gas filed a MAAD application[1] with the OEB. Please explain whether, and if so how, Enbridge Gas will realize any economies of scale in relation to activities being undertaken in relation to GHG abatement.

h) Please provide details of the activities and work that Enbridge Gas' proposed two new FTEs would undertake in 2018.
   i. Given the Enbridge Gas and Union Gas MAAD application[2] with the OEB, please explain whether, and if so how, Enbridge Gas has considered any economies of scale in relation to resourcing requirements.

i) Please provide references to specific cases and/or policy from the OEB and from any other authorities where research and development activities such as consulting, pilot programs, testing, market research, and data analysis is funded by ratepayers.

j) In the event where Enbridge Gas' research undertaken through the LCIF leads to new technologies that could be marketed resulting in a financial value, would that financial value be shared with the ratepayers?
   i. If yes, please explain how.
   ii. If no, please explain why not

RESPONSE

a) Enbridge has put into place an Abatement Construct and Initiative Funnel as described in Exhibit C, Tab 5, Schedule 1. The Company uses the outlined abatement principles (please see the response to Board Staff Interrogatory #21, filed at Exhibit I.1.EGDI.STAFF.21) as a supplement, or complementary to the Board's Guiding Principles and considers a range of factors (please see the response to

[1] EB-2017-0306
[2] Ibid

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BOMA Interrogatory #1, filed at I.C.EGDI.BOMA.1) when identifying abatement activities to pursue. If the LCIF is approved, Enbridge will be in a position to rely on a reliable and steady flow of funding to support its abatement planning.

i. Yes, Enbridge did engage in some activities during 2017 that would be expanded with the benefit of the incremental LCIF funding. Please see the table below for the requested information:

| Activity | Description of 2017 Work | Approximate 2017 Spend | Included in EGD 2017 GGEIDA Costs |
|---|---|---|---|
| Net Zero/micro generation | Development of equipment integration strategies between electricity and gas systems, including acquisition of equipment for integration testing before larger-scale field deployments in customer homes. | $70,000 | No |
| Natural gas heat pumps | Two pilot projects – 1. Heat pump field demonstration: Quantify the energy savings of an air source natural gas absorption heat pump (GHP) in a domestic hot water application. The heat pump has been providing domestic hot water to two TCHC buildings served by a common boiler plant. 2. Monitoring the space heating performance of a NGASHP and estimate its GHG reduction in a controlled setting at the Kortright Center. | $30,000 | No |
| Hydrogen | Participation in European and Canadian technical task forces that are evaluating the requirements for gas utility blending of hydrogen in the networks. Information to be used by Enbridge to finalize detailed work plans for the implementation of a hydrogen blending initiative and to confirm budget requirements | $30,000 | No |

Further to the table above, work that Enbridge has supported through the Canadian Gas Association may also be considered to be in the scope of the LCIF.

b) Please see table below for the customer-related abatement initiatives. For a list of facility-related abatement initiatives and associated costs, please refer to the response to Board Staff Interrogatory #27c, filed at Exhibit I.1.EGDI.STAFF.27.

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| Breakdown of proposed $2M 2018 LCIF Budget - Customer-Related Abatement Initiatives | | | | |
|---|---|---|---|---|
| **Stage** | **Initiative** | **Targeted / Applicable Sectors** | **Description of work under consideration** | **2018 Estimate** |
| **Stage 1:** Conceptualize | Smart Metering | Residential/ Small Commercial | Pilots to demonstrate the integration of hybrid heating (dual-fuel) appliance control that leverages new meter functionality to minimize carbon emissions | $ 100,000 |
| | RNG - Gasification | Residential/ Commercial/ Industrial | Research Projects to investigate biomass conversion to RNG through gasification | $ 200,000 |
| | Carbon Capture | Residential/ Commercial/ Industrial | Pilots in Ontario demonstrating potential for 2 carbon capture technologies. Market scan of existing technologies/limitations, development/leveraging of strategic partnerships as well as financial support for vendors to develop new technologies that can achieve up to 100% carbon capture. | $ 250,000 |
| **Stage 2:** Formulate | Hydrogen (Power to Gas) | Residential/ Commercial/ Industrial | Technical due diligence and planning, specific to Enbridge's gas distribution system, to establish the initial guidance and capabilities for blending hydrogen into the natural gas pipeline network as means of diversifying how Ontario can meet provincial and federal renewable content requirements. This work is required as a prerequisite before proceeding with an a actual field trial of hydrogen blending in a segment of Enbridge's pipeline network. | $ 500,000 |
| | Net-Zero Homes/ Micro-Generation | Residential/ Small Commercial | Implementation of Net Zero Energy Emissions pilot project for residential homes to build on the earlier 2017 technology integration assessments and planning. The pilot will be implemented in partnership with electric LDC(s) and Municipalities. The objective is testing, optimization and monitoring of variations in the hybrid heating solutions, as well as distributed power generation platforms like solar PV and mCHP. The objective is to fully assess the GHG reduction potential, costs and potential for cost reductions. This results of the multi-home pilot would help inform energy planners and the HVAC industry on the development priorities to accelerate measures that advance higher-value GHG abatement. | $ 449,000 |
| | Expanded NGV Program | Commercial | Demonstration projects with small fleets. Focus on developing the large transport truck market within Ontario. | $ 300,000 |
| | Natural Gas Air-Source Heat Pumps | Residential/ Commercial | Conduct field tests to quantify actual savings and provide performance data vs. energy efficient furnaces as well as electric heat pumps. Aim to develop competitively priced natural gas heat pumps specifically for the residential market. | $ 150,000 |
| **Total Estimated 2018 Cost** | | | | **$ 1,949,000** |

Witnesses: S. McGill
F. Oliver-Glasford
R. Sigurdson

c) Enbridge requires two incremental FTEs to support activities related to the Initiative Funnel.

   i. The two incremental FTEs are included in the 2018 Administrative Costs outlined in Table 1 in Exhibit D, Tab 1, Schedule 1. This is further illustrated through the detailing of the Staffing Resources found in Exhibit D, Tab 1, Schedule 1 in Table 2.

   ii. The costs associated with the two incremental FTEs are in addition to the $2 million LCIF.

d) The proposed LCIF is to help ensure the Company has the ability to work through the implications and data related to abatement opportunities. In completing research or a pilot, it may be determined that a next step is to seek government funding where available noting this isn't the principal purpose for LCIF. Where government funding is available and can be obtained that would be to the benefit of ratepayers.

e) The ratepayers will benefit from the LCIF where it promotes the development and ultimately implementation of cost effective abatement technologies.

f) Should the $2 million LCIF fund not be approved, Enbridge's ability to adequately review, assess and develop low carbon abatement opportunities is lessened. To develop abatement opportunities Enbridge needs access to certain and steady funding.

g) Please refer to the response to Board Staff Interrogatory #16a, filed at Exhibit I.1.EGDI.STAFF.16.

h) The two incremental resources would be responsible to support the Company's efforts in identifying, formulating and implementing initiatives related to the LCIF. Please see Exhibit C, Tab 5, Schedule 1, page 11 of 15 for areas of responsibilities.

   i. Please refer to the response to Board Staff Interrogatory #16a, filed at Exhibit I.1.EGDI.STAFF.16.

i) In the DSM multi-year filing, the Collaboration and Innovation Fund was approved to promote innovative or collaborative research and pilots within the realm of customer related energy efficiency.

Witnesses: S. McGill
F. Oliver-Glasford
R. Sigurdson

j) As stated in Exhibit C, Tab 5, Schedule 1, page 9, paragraph 23 "The Low Carbon Initiative Fund ("LCIF") is proposed to enable the identification and development of GHG reducing technologies to progress into future abatement opportunities". It is premature to consider how unknown future benefits from proposed LCIF technology projects would be treated.

Yes. –

Witnesses: S. McGill
F. Oliver-Glasford
R. Sigurdson

Tab 12

evolution of some experience given the limited resources that we had, so, for example, with smart metering we've put a budget of -- it is an estimate of 100,000, estimating, you know, that would be approximately ten homes, so we've taken a high-level approach in the initial estimates.

The work that would proceed post this would be project concepts to further delve into what those budget breakdowns would be.

MS. GIRVAN: So ten homes at $100,000? That's your budget?

MS. SIGURDSON: Approximately 10,000 for monitoring as well, so it won't only just be for the actual technology, and also integration with other applications in the net zero concept.

MS. GIRVAN: Okay. Did you seek provincial or federal funding for any of these initiatives?

[Witness panel confers]

MS. SIGURDSON: So if all of these initiatives are absent of government funding, however, when we are looking at them we will be taking a look to see if there are any funds that could be leveraged to do more with the dollars that we have.

MS. GIRVAN: I think, as I recall, and Mr. Wolnik was talking about this, in the past both Enbridge and Union were involved in NGV development, and from what I remember it never became economic. Is that -- what's changed?

MS. SIGURDSON: Say with carbon pricing and clean fuel standards the environment has changed, so if there's other

Tab 13

# STAFF INTERROGATORY #31

## INTERROGATORY

Ref: Exhibit F / Tab 1 / Schedule 1 / p. 2, #6

Preamble:
Enbridge Gas states that in 2015 and 2016, Enbridge Gas incurred administrative costs in relation to the implementation of the Cap and Trade program. The administrative costs captured in the 2016 GGEIDA amount to $0.840M (exclusive of interest).

Questions:

a) Please explain how Enbridge Gas proposes to recover the 2016 GGEIDA amounts and over what time period. Please provide Enbridge Gas' disposition methodology, including the following:
   i. The allocation factors by rate class for each of the cost items in Exhibit D / Tab 1 / Schedule 2 / p. 2, Table 1, and the amount allocated by rate class
   ii. Timing of the 2016 GGEIDA disposition
   iii. Disposition period (one time, multiple months, etc.)

b) Please provide an indication of the average bill impact for a typical residential customer.

## RESPONSE

a) In the Regulatory Framework for the Assessment of Costs of Natural Gas Utilities' Cap and Trade Activities (EB-2015-0363), the Ontario Energy Board determined that administrative costs relating to the implementation and ongoing operation of the Cap and Trade program will be allocated and recovered from all customers in the same manner as existing administrative costs. Accordingly, the Company proposes to clear the balance of the 2016 GGEIDA to various customer classes based on the number of customers in each rate class.

   The Company proposes to clear the balance of 2016 GGEIDA together with the amounts approved for clearance at the upcoming application for clearance of the 2017 Deferral and Variance Account balances proceeding. Following the Board's Decision and Order in that proceeding, the Company would clear the balances to customers in the next practical QRAM.

Witness: A. Kacicnik

The proposed disposition could either be one or two one-time billing adjustments. This will be determined by whether the billing adjustment (which includes balances from other deferral and variance accounts) is material enough to warrant more than a single billing adjustment.

b) The average bill impact for a typical residential customer using 2,400 $m^3$ of natural gas per year is approximately $0.41 per year.

Witness: A. Kacicnik

Tab 14

# CARBON PRICE FOR RATE SETTING PURPOSES

1. This evidence summarizes the derivation of Enbridge's carbon price for rate setting purposes.

2. In the Board's Framework[1], Section 6.2 states that:

   > The OEB has decided that the customer-related and facility-related charges will be set based on the annual weighted average cost of the Utilities' proposed compliance options.

3. Enbridge's annual weighted average cost of compliance ("WACC") is calculated by i) determining the number of emission units or equivalent compliance instruments required, ii) identifying the price of each compliance instrument, iii) multiplying the compliance instrument price by the quantity of each compliance instrument, and iv) summing the values calculated in iii) for each compliance instrument and dividing by total number of emission units or equivalent compliance instruments identified in i).

4. As explained in Exhibit A, Tab 3, Schedule 1, Enbridge notes that the information required to calculate the Company's WACC is strictly confidential, being either market or auction confidential as defined by the Board's Framework.

5. Since the inputs into the Company's WACC are strictly confidential, Enbridge notes that the use of the Company's WACC at this time for rate setting purposes is not appropriate.

[1] Report of the Board, Regulatory Framework for the Assessment of Costs of Natural Gas Utilities' Cap & Trade Activities, EB-2015-0363, September 26, 2016, p. 31.

Witnesses: A. Langstaff
J. Murphy
F. Oliver-Glasford

6. Enbridge suggests that the carbon price for rate setting purposes be set based on inputs that are publically available. The Company believes that this is the most transparent means of developing a price for carbon for rate setting purposes.

7. As noted in the Framework, the Board has instructed the Utilities to set their annual carbon price forecast using the average of the [Intercontinental Exchange] ICE daily settlement of a California Carbon Allowance ("CCA") for each day of the forecast period for each month of the forecast year. Furthermore, the Framework states that the forecasting period should be 21 business days and should be as close as possible to the forecast year.

8. The Intercontinental Exchange ("ICE") 21-day strip of a California Carbon Allowance ("CCA") for delivery in each month of the forecast period, 2018, (the "ICE Price") was calculated in US dollars ("USD"). The USD ICE Price was converted to Canadian dollars ("CAD") using a 21-day USD/CAD strip rate. The 21-day period was from September 1 to September 29, 2017. The derivation of the ICE Price in CAD is detailed in Table 1.

Table 1: ICE Price

| Strip Period | ICE Price (USD) | USD/CAD Exchange Rate[2] | ICE Price (CAD) |
|---|---|---|---|
| September 1 to September 29, 2017 | $15.46 | 1.2284 | $18.99 |

9. The Company proposes to use the CAD ICE Price, as identified in Table 1, for rate setting purposes. While Enbridge acknowledges that the Board's EB-2016-0300

[2] Exchange rate based on a 21-day strip USD/CAD strip from September 1 to September 29, 2017.

Witnesses: A. Langstaff
J. Murphy
F. Oliver-Glasford

Decision and Order indicates (at page 3) that the Utilities should use the Ontario auction reserve price (in an unlinked market) for the carbon price forecast in their next Compliance Plan, the Company believes that the CAD ICE Price is a better indicator of the likely costs that will be observed assuming that Ontario is linked with the WCI market on January 1, 2018.

10. In future Compliance Plan filings, Enbridge will consider alternate rate setting approaches as additional details and methodologies become available.

11. At Exhibit G, Tab 1, Schedule 1, Enbridge sets out the derivation of its Cap and Trade Unit Rates for customer-related and facility-related costs. These Cap and Trade Unit Rates are calculated based on a carbon price of $18.99 CAD.

Tab 15

conducted on experience in other jurisdictions, the OEB does not expect these costs to be sufficiently material to justify changing the allocation methodology.

Most stakeholders supported the proposal in the Discussion Paper that administrative costs should be recovered from all customers. Stakeholders representing large gas users commented that a portion of the administrative costs should not be borne by the LFEs or voluntary participants, as they would be incurring their own administrative costs to comply with the Cap and Trade program. These stakeholders also commented that the volume and associated GHG emissions from the LFEs and voluntary participants are not part of a Utility's compliance obligation and that, as a result, their liability for the Utility's administrative costs should be limited to those incurred in meeting facility-related GHG obligations only.

The OEB agrees that administrative costs will be incurred to support both facility-related and customer-related obligations. Based on the expectation that the costs will not likely be material, introducing a new approach to cost allocation would not be warranted. The OEB may revisit this approach in the future, based on experience with the Utilities' implementation of the Cap and Trade program and associated administrative costs.

## 6.2 Rate Setting

The OEB has decided that the customer-related and facility-related charges will be set based on the annual weighted average cost of the Utilities' proposed compliance options. This approach will align the charges with the costs of the proposed compliance options in the initial years, while mitigating volatility.

The OEB has determined that it will set annual charges to recover the approved costs of compliance for both customer-related obligations and facility-related obligations. To set these charges, the OEB has determined that it will use the Utility's annual weighted average costs of its proposed compliance options. This approach will ensure the matching of the Utilities' forecast costs with the charges to customers during the early years of the Cap and Trade program as the OEB, Utilities and customers gain experience with the program, while also providing stability in the charges. The process of setting the charges should be focused on changes in the forecasts of annual costs, unless the Utility has made material changes to its Compliance Plans.

The Discussion Paper identified two options for setting the annual customer-related and facilitated-rated charges: based on the Utilities' annual forecasts, or based on the Utilities' forecasts for the entire compliance period. Those stakeholders who

commented on this issue supported establishing charges based on the Utility's annual forecast of costs. Some stakeholders stated their preference for charges to be based on the weighted average cost of the Utility's proposed compliance options as this would provide transparency and would represent the best available forecasts. As discussed in section 5, the Utilities have indicated that they need to gain some experience in the marketplace before they can develop comprehensive and longer term Compliance Plans.

The OEB has determined that it would be premature at this time to adopt an approach where the charges are set based on the Utilities' forecasts for the entire compliance period. Setting the charges for recovery based on the weighted average cost of Utilities' compliance options for the particular rate year will provide for a matching of costs to volumes consumed by the Utilities' customers. This approach, in the OEB's view is appropriate during the early stages of the Cap and Trade program while the OEB, Utilities and stakeholders gain experience.

In the longer-term, a move to a compliance period-based approach to setting the charge will provide more predictability over the period, and support longer-term planning by Utilities. However, without sufficient information about the costs and activities over the compliance period, there would be a greater risk of variances and a need for regular adjustments, thus reducing the value of the approach.

The OEB recognizes that the Utilities may purchase future vintage allowances (these are emissions units that have an effective date in a future year) and other compliance options during the compliance period. For example, a utility could buy future vintage allowances in 2017 for the years 2018 – 2020 and also enter into other types of agreements to meet future GHG obligations. For the purposes of setting the annual charge, it is expected that the Utilities will align their costs with their annual consumption (and associated GHG emissions). This approach will match a Utility's revenue with its annual GHG emissions.

### 6.2.1 **Re-Calibration and True-Up Processes**

The OEB has decided that the re-calibration of the rates for customer-related and facility-related costs and any required true-ups should be done annually. Annual reviews will provide the opportunity to manage any volatility in the carbon markets and costs for compliance options against the desire for rate predictability.

The OEB is of the view that requiring more than annual reviews at this stage is not warranted given the newness of the Cap and Trade program and in particular the fact that for the initial year the program will be an Ontario only market. The OEB also

Tab 16

| Cost Element | Forecasted Amount |
|---|---|
| Bad Debt Provision | $960,000 |
| Other Miscellaneous Costs | $60,000 |
| Applicable Compliance Plan Proceeding Costs | TBD |
| **Total 2018 Forecast Administrative Costs for GGEIDA** | **$5,251,000** |

8. The amounts set out in Table 1 are the Company's current forecasts of relevant costs. The actual amounts incurred and thus sought for clearance may differ.

9. A discussion of each cost element is contained in the paragraphs below.

Revenue requirement implications of IT billing system upgrades

10. In 2016, Enbridge implemented billing system changes to allow for the collection of Cap and Trade charges. As noted in EB-2016-0300, Exhibit C, Tab 3, Schedule 6, Enbridge will seek an annual revenue requirement associated with these billing system changes until the cost can be incorporated into delivery rates.

11. For 2018, Enbridge anticipates a revenue requirement of $191,000 to recover the costs associated with the billing system changes implemented in 2016. This amount will be recorded in the GGEIDA.

Staffing Resources

12. Enbridge's estimate for 2018 staffing resources is $1.5 million. This cost is fully allocated and includes pension, benefits and related overheads.

Witnesses: A. Langstaff
D. McIlwraith
F. Oliver-Glasford
R. Small

13. Enbridge recognizes the importance of further developing an internal team to effectively manage the Company's Cap and Trade related obligations on behalf of its ratepayers. As explained in EB-2016-0300, the Company's core Cap and Trade staffing resources in 2016 totaled four full time resources.

14. The Company notes that the Cap and Trade file affects and interacts with a variety of groups within the existing organization. Wherever reasonable to do so, Enbridge has leveraged existing staff and managerial time and effort from persons outside of the Company's Cap and Trade group, highlighting a commitment to cost effectiveness, productivity gains and continuous improvement. These ancillary resources' time and related costs will not be recorded in the GGEIDA.

15. Moving forward, Enbridge will continue to optimize resources, where possible, recognizing that as some activities decrease and others increase, incremental resources may become necessary to adequately manage the Company's Cap and Trade obligations. Any incremental resources required for Cap and Trade will be articulated in the respective Compliance Plan and captured in the GGEIDA for subsequent clearance.

16. In 2017, staffing resources evolved to reflect the changing demands on the business to meet its Cap and Trade obligations. In particular, focus has shifted from the earlier days of business system and infrastructure readiness to carbon market expertise and program implementation. To this end, during 2017 Enbridge added one formal role around Carbon Market Financial/Offset Instrument Procurement, as well as a Document Control Administrator. The Business Implementation and Compliance Reporting role was an evolution from the Business Readiness role and is in the process of being filled.

Witnesses: A. Langstaff
D. McIlwraith
F. Oliver-Glasford
R. Small

17. This evolution will continue into 2018 with the result being a team of eight with increased sophistication and targeted accountabilities in the combined task of planning for and implementing all aspects of the Compliance Plan.

Table 2: Cap and Trade Roles/Accountabilities in 2018

| **Role/Accountability** | **Number of FTEs** |
|---|---|
| Manager | 1 |
| Cap and Trade and Related Regulation Senior Advisor | 1 |
| Carbon Market Financial/Offset Instrument Procurement Specialists | 2 (1 new for 2018) |
| Business Implementation and Compliance Reporting Lead | 1 |
| Document Control Administrator | 1 |
| Abatement Initiative Identification, Development and Reporting Specialists | 2 (new for 2018) |
| **Total** | **8** |

18. For 2018, it is evident that the Company's roles and responsibilities will become more complex as linkage with the WCI market occurs (bringing a diversity of available compliance instruments) and as Enbridge increases its focus on carbon abatement activities. A more complete team with targeted and an increasingly sophisticated skills will be required as assessments of instruments and advancement of abatement initiatives become more complex. While Enbridge has reassessed the need for a full time Communications Lead, the Company Group has determined that a second carbon market financial instrument procurement resource as well as the two new abatement initiative resources are necessary to effectively

navigate the increasingly complex carbon markets, meet Compliance Plan and related deliverables and meet the increased expectations around abatement initiative assessment and low/no carbon technology deployment.

19. Refer to Exhibit C, Tab 5, Schedules 1 to 3 for details about the Enbridge's abatement plans for 2018, which includes a request for approval or endorsement of the two new Abatement Initiative Identification, Development and Reporting Specialists.

Low Carbon Initiative Fund ("LCIF")

20. As detailed in Enbridge's Abatement Activities evidence at Exhibit C, Tab 5, Schedules 1 to 3, the Company is requesting approval for (or endorsement of) a "Low Carbon Initiative Fund" ("LCIF") of up to $2 million accessible each year starting in 2018 in order to provide funding for carbon abatement activities.

21. Details about the specific projects that would be funded from the LCIF are set out at Exhibit C, Tab 5, Schedules 1 to 3. As with other Administrative Costs, only the LCIF-related amounts actually spent would be recorded in the GGEIDA (up to a cap of $2 million).

Consulting Support and Market Intelligence

22. In order to continue to be well-informed about and responsive to the Cap and Trade markets and environment, Enbridge participates in industry associations and receives support from experts and consultants for development and execution of the Cap and Trade activity. Consulting and market intelligence costs, which are captured in Table 3 below, are forecasted to be approximately $400,000 and cover:

Tab 17

# UNDERTAKING JT2.12

## UNDERTAKING

TR 2, p.92

To advise the number of FTEs approved for 2017 and then how many were actually filled.

## RESPONSE

In EB-2016-0300, Exhibit C, Tab 3, Schedule 6, Enbridge forecasted that the Company would require seven full time equivalents ("FTEs") for 2017. Five FTEs were filled.

Tab 18

**[COMPANY]**
**Actual Activity**
**for Activity in the 12 month per od ending December 31, 20xx**

| Line No. | Compliance Option | (a) | (b) | (c) = (a)*(b) | (d) | (e) | (f) = (c) + (d) + (e) | (g) = (f) / (a) | (h) | (i) | (j) | (k) = (i * (j) | (l) | (m) | (n) = (k) + (l) + (m) | (o) = (n) / (i) | (p) | (q) = (i) - (a) | (r) = (n) - (f) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Forecast** | | | | | | | | | | | | | | | | **Variance** | |
| | | Volume ($tCO_2e$) | Price ($CAD/tonne of $CO_2e$) | Cost ($CAD) | Transaction Cost ($CAD) | Financing Cost ($CAD) | Total Cost ($CAD) | Total Cost ($CAD/tCO2e) | Percentage of Portfolio | Volume ($tCO_2e$) | Price ($CAD/tonne of $CO_2e$) | Cost ($CAD) | Transaction Cost ($CAD) | Financing Cost ($CAD) | Total Cost ($CAD) | Total Cost ($CAD/tCO2e) | Percentage of Portfolio | Volume ($tCO_2e$) | Total Cost ($CAD) |
| | **Compliance Instruments** | | | | | | | | | | | | | | | | | | |
| 1 | Allowances - primary market[1] | | | | | | | | | | | | | | | | | | |
| 2 | Allowances - secondary market[2] | | | | | | | | | | | | | | | | | | |
| 3 | Offsets - primary market[3] | | | | | | | | | | | | | | | | | | |
| 4 | Offsets - secondary market[4] | | | | | | | | | | | | | | | | | | |
| 5 | Subtotal - Compliance Instruments | | | | | | | | | | | | | | | | | | |
| | **Abatement** | | | | | | | | | | | | | | | | | | |
| 6 | Customer Abatement Programs | | | | | | | | | | | | | | | | | | |
| 7 | Facility Abatement Programs | | | | | | | | | | | | | | | | | | |
| 8 | Subtotal - Abatement | | | | | | | | | | | | | | | | | | |
| 9 | Total - Compliance Plan | | | | | | | | | | | | | | | | | | |

**Notes**
1 - Primary market allowances include purchases of allowances from auction
2 - Secondary market allowances include, but are not limited to, allowance bi-laterals and allowance futures/forwards
3 - Primary market offset purchases include purchases from offset projects
4 - Secondary market offsets include the purchase of offsets that have already been issued. This includes, but is not limited to, offset bi-laterals and offset forwards/futures