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17 April 2018

BY EMAIL AND RESS

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
2300 Yonge Street, Suite 2700, P.O. Box 2319
Toronto, Ontario M4P 1E4

Dear Ms. Walli:

Re: EB-2017-0224 – Enbridge Gas Distribution Inc. ("Enbridge")
EB-2017-0255 – Union Gas Limited ("Union")
2018 Cap and Trade Compliance Plans

Attached please find Undertaking Response JT2.15 and a revised version of GEC/ED Interrogatory Response to GEC/ED.EGDI.4

Sincerely,

David Poch

cc: Parties in this proceeding

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Undertaking No. JT2.15:

To Rerun the Table at Exhibit GEC.ED.Staff.3 using that savings that are included with the Conservation Potential Report, and at the three various scenarios – constrained, semi-constrained and unconstrained – for the period 2018 to 2020.

GEC Response:

The requested information is provided in Tables 1 and 2 below. Note that, as in GEC's response to Staff.3, all of the results are expressed in terms of utility costs (i.e. under the UCT) and exclude large volume industrial customers.

Table 1 shows the estimated net cost per tonne of carbon emission reduction, by sector, for each of the three Conservation Potential Study (CPS) scenarios in their totality – i.e. the *total* net cost for each scenario divided by the *total* carbon emission reduction for each scenario. The sources of the information used in the analysis are provided below the table. Depending on the life of the savings, anything with a carbon emission reduction cost on the order or $25 to $30 would be cost-effective under the UCT. As the table shows, the value of just the avoided gas costs is hundreds of millions of dollars greater than the utility DSM program costs for each sector in each scenario. As a result, the net utility cost per tonne of carbon emission reduction is ***negative*** for each sector for each scenario.

Table 2 shows the *incremental* net utility costs per *incremental* tonne of carbon emission reduction for each of the following two "steps" of increased savings above the CPS constrained scenario:

(1) between the constrained and semi-constrained scenarios; and
(2) between the semi-constrained and unconstrained scenarios.

This second tables provides insight into how far up the "supply curve" of savings one can go and still achieve additional increments of carbon emission reduction cost-effectively. As the table shows, for both the residential and commercial sectors, both the increment from constrained to semi-constrained and the increment from semi-constrained to unconstrained are very cost effective.[1] In other words, of the three levels of efficiency analyzed under the CPS, the unconstrained scenario provides the greatest incremental benefit per incremental dollar spent on DSM. For the industrial sector, the increment between the constrained and semi-constrained scenarios is cost-effective, with net cost savings and negative costs per tonne of carbon emission reduction. However, the increment between the semi-constrained and the unconstrained scenarios is not cost-effective.

[1] All have costs per tonne of carbon emission reduction well below the cost-effectiveness breakeven point of about $25-$30 per tonne, with almost all of them providing carbon emission reductions at negative net cost.

Table 1: 2018-2020 Total Cost per Tonne of Carbon Emission Reduction
(CPS Scenarios Analyzed Separately, excluding Large Volume Industrial Customers)

Utility/Sector		Annual Savings (million m3)	Budget (millions $)	Lifetime Carbon Avoided (tonnes)	Avoided Gas Costs (millions $)	Net Cost (millions $)	Net cost per Tonne Carbon
Constrained							
	Res	201	$175	3,227,376	$355	($181)	($56)
	Com	126	$110	3,266,518	$326	($216)	($66)
	Ind	209	$59	6,460,908	$604	($545)	($84)
	Total	536	$344	12,954,802	$1,286	($942)	($73)
Semi-Constrained							
	Res	216	$238	4,075,773	$418	($180)	($44)
	Com	146	$146	3,923,346	$377	($231)	($59)
	Ind	222	$79	6,901,391	$676	($597)	($87)
	Total	584	$463	14,900,510	$1,471	($1,009)	($68)
Unconstrained							
	Res	351	$865	11,129,247	$1,067	($202)	($18)
	Com	211	$254	5,091,317	$512	($258)	($51)
	Ind	237	$354	7,338,042	$720	($366)	($50)
	Total	799	$1,473	23,558,606	$2,299	($826)	($35)

Notes

1 Annual m3 from Tables ES7 (Res), ES11 (Com) and ES 15 (Ind), with industrial numbers adjusted down to exclude large volume customers based on percent of total 2020 industrial savings from such large customers (based on CPS tables ES16 and ES17), as year-by-year annual savings values are only available for the sector as a whole.

2 Lifetime savings based on 2020 ratios of lifetime to annual savings from Tables ES8 (Res excl Low Inc), ES12 (Com excl Low Inc) and ES16 (Ind excl large volume). This extrapolation is necessary since year by year lifetime savings values by sector are not available. Note that this approach may understate lifetime savings because some of the measures installed in 2015 through 2019 will no longer be producing savings in 2020.

3 Sector budgets based on ratios of total budgets through 2020 to total annual savings through 2020 (multiplied by 2018-2020 annual savings) from Tables ES8 (Res excl Low Inc), ES9 (Res low income), ES12 (Com excl Low Inc), ES13 (Com Low Income) and ES16 (Ind excl large volume). This extrapolation is necessary since year by year budgets by sector are not available.

4 Avoided carbon emissions calculated as 1875 tonnes/million m3 savings

5 Value of avoided gas costs calculated using avoided costs in CPS Exh. 11, assuming 50% weather sensitive savings and 50% baseload, as well as a real discount rate of 4%.

6 Net cost is the difference between avoided gas costs (i.e. savings) and program costs.

7 Cost per tonne of carbon emission reduction is net cost divided by lifetime tonnes of carbon emission reduction.

Table 2: 2018-2020 Incremental Cost per Tonne Carbon Emission Reduction
(CPS Scenario Incremental Impacts, Excluding Large Volume Industrial Customers)

Utility/Sector		Annual Savings (million m3)	Budget (millions $)	Lifetime Carbon Avoided (tonnes)	Avoided Gas Costs (millions $)	Net Cost (millions $)	Net cost per Tonne Carbon
Constrained to Semi-Constrained							
	Res	15	$63	848,397	$63	$1	$1
	Com	20	$36	656,828	$52	($16)	($24)
	Ind	13	$19	440,483	$72	($52)	($119)
	Total	48	$119	1,945,708	$186	($67)	($34)
Semi-Constrained to Unconstrained							
	Res	135	$627	7,053,474	$649	($22)	($3)
	Com	65	$108	1,167,971	$134	($26)	($22)
	Ind	15	$275	436,651	$44	$231	$529
	Total	215	$1,011	8,658,096	$828	$183	$21

It should be emphasized that the incremental UCT cost-effectiveness of additional DSM spending and savings by the utilities – relative to their 2018-2020 plans – is likely to be considerably better than the increment shown in Table 2 for the increment between the CPS constrained and CPS semi-constrained scenarios. There are a couple of reasons for this. First, the utilities planned spending for 2018-2020 (i.e. about $381 million, as shown in GEC's response to Staff.3) is actually a little more than 10% higher than implied by the CPS report for the constrained scenario (i.e. $344 million as shown in the first table below). Second, and more importantly, the CPS constrained scenario savings (536 million annual m^3, as shown in the first part of the first table below) is 22% higher than utilities' forecast savings (i.e. 438 million m^3 between the two utilities as shown in GEC's response to Staff.3). Thus, while the difference between the CPS constrained and semi-constrained scenarios is only 9% more annual savings[2] for 35% more budget (still a very cost-effective increment), the difference between the utilities' current plans and the semi-constrained scenario is 33% more annual savings for just 21% more budget. The principal reason for this difference appears to be that each of the CPS scenarios were optimized – i.e. designed to maximize savings for a given budget level – whereas the level of savings achieved was only one of several considerations in the design of the utilities' efficiency program portfolios. To be clear, I am not suggesting that the utilities could achieve 33% more savings with 21% more budget – or at least not with dramatic changes to their DSM plans (likely including elimination of market transformation activities).

[2] Note that the 9% increase in annual savings is associated with a 15% increase in lifetime savings and lifetime carbon emission reductions. In essence, the additional measures added to the constrained scenario to produce the semi-constrained scenario are much longer-lived (an average life of more than 21 years) than the measures in the constrained scenario (an average life of a little under 13 years). The difference is most pronounced for the residential sector (incremental savings between constrained and semi-constrained scenarios of about 30 years compared to average of about 9 years for the constrained scenario).

However, the utilities should be able to achieve significantly more additional savings per dollar than implied by the difference in the CPS constrained and semi-constrained scenarios.

ENBRIDGE INTERROGATORY 4

1. Reference: page 34

Preamble:

"In ballpark terms, I think that about half of those extra savings (8 million m3) – and therefore about half of the cost savings ($9 million) – could have been realized by each utility."

Request:

a) What are your assumptions and calculations in that assessment?
b) What part of the $9 million of forecast savings will directly benefit ratepayers who do not choose to participate in such incremental energy efficiency programs?

RESPONSE (corrected April 17, 2018)

a) See GEC/ED response to Staff.1

b) As noted in the GEC/ED response to Staff.1, I made an error in stating that the gas customers of each utility could save $9 million. The correct value is $18 million per utility. The $18 million value is half of the $36 million I estimated to be the net benefits (benefits minus costs) of one year's worth of incremental impact between the CPS constrained and semi-constrained scenarios.

As can be seen on p. 32 of my testimony, the incremental cost of the additional efficiency savings was estimated to be $37 million, but the estimated benefits were estimated to be $73 million. Of the $73 million in benefits, $56 million is derived from avoided gas costs, roughly 4% (i.e. on the order of $2 million) of which are associated with estimated avoided gas distribution system costs[1] which should accrue to all customers, including DSM non-participants. However, that estimate of avoided distribution system costs may be significantly understated, perhaps by a factor of 3 or more.[2] Another 10-15% (i.e. $6-8 million) are associated with avoided "upstream capacity costs". I am unfamiliar with how those costs are allocated, so I cannot speak to whether such savings would accrue to all customers or not. Furthermore, my analysis of the net benefits of additional efficiency did not account for the benefits such additional savings would produce for all gas customers (including DSM non-participants) by suppressing market clearing prices for natural gas, carbon emission allowances, and electricity[3]. Finally, as also noted in my

[1] Based on average of the 15 year NPV (2016-2030) values for weather sensitive avoided costs (about 6% being avoided distribution system costs) and baseload avoided costs (about 2% being avoided distribution system costs) as shown in CPS p. 26.
[2] EB-2015-0029/0049, Exhibit L.GEC.2
[3] Because natural gas is one of the fuels used to produce electricity in Ontario, suppression of natural gas prices can also result in suppression of electricity prices paid by all gas customers (assuming all gas customers use electricity).

testimony, my analysis conservatively focused on the differences in costs and savings for the CPS constrained and semi-constrained scenarios. That analysis likely significantly overstates the incremental utility cost per unit of additional savings because it implicitly assumes that the constrained scenario is a proxy for the utilities currently planned levels of budget and savings. In reality, though the CPS constrained scenario was designed assuming a budget limit equal to the utilities' current DSM budgets, the utilities are currently planning to achieve less savings from non-large volume customers than estimated in the CPS constrained scenario. Thus, a more detailed analysis would be required to estimate the impacts of additional efficiency program spending on non-participants.

It should also be noted that one of the best ways to address any concerns about impacts on non-participants would be to construct an efficiency program portfolio that minimized the number of non-participants over time. That usually requires more spending, not less. Of course, if programs are required to be cost-effective, it also means more net benefits will accrue to customers as a whole.