April 20, 2018

BY EMAIL, COURIER & RESS

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

RE: EB-2017-0255 – Union Gas Limited 2018 Cap-and-Trade Compliance Plan – Updates to Technical Conference Undertakings

Dear Ms. Walli,

On April 16, 2018, Union Gas Limited ("Union") filed its responses to the undertakings received during the 2018 Cap-and-Trade Compliance Plan technical conference held on April 9, 2018.

Union wishes to submit updates to the following undertakings:

- JT1.1 – Updated to note that the California Carbon 2030 Carbon Price Forecast has been filed confidentially with the OEB
- JT1.9 – Updated to include a more detailed overview of Union's RNG Procurement and Funding model
- JT1.31 - Upon further review of the technical conference transcript, updated to more fully address the substance of the request posed by Mr. Rubenstein. There have been no updates to Exhibit JT1.31, Attachment A.

For clarity, the JT1.31 undertaking wording has also been adjusted to accurately reflect the substance of the request accepted. The adjusted wording is provided below.

Undertaking	Per Transcript	Adjusted
JT1.31	TO PROVIDE THE RESEARCH AND/OR RELATED DATA FOR PHASE 1 AND PHASE 2 MICRO-GENERATION INITIATIVES; AND IF NOT, TO ADVISE WHY NOT	TO PROVIDE THE RESEARCH AND/OR RELATED DATA FOR PHASE 1 AND PHASE 2 MICRO-GENERATION INITIATIVES (EVEN IF THEY DO NOT CONTINUE TO STAGE 3) AND ADVISE WHETHER UNION INTENDS TO PUBLICLY DISCLOSE SUCH RESEARCH AND/OR RELATED DATA; AND IF NOT, TO ADVISE WHY NOT.

Additions to the original responses are clearly indicated in the margins of the attached updated responses.

If you have any questions with respect to this submission please contact me at 519-436-4558.

Yours truly,

[Original signed by]

Adam Stiers
Manager, Regulatory Initiatives

c.c.: EB-2017-0255 Parties *(by email)*
Myriam Seers, Torys *(by email)*
Valerie Bennett, OEB *(by email)*
Ljuba Djurdjevic, OEB *(by email)*
Lawren Murray, OEB *(by email)*
Josh Wasylyk, OEB *(by email)*

UPDATED: 2018-04-20
EB-2017-0255
Exhibit JT1.1

UNION GAS LIMITED

Undertaking of Mr. Dantzer
To Mr. Elson

Reference: Tr.1, p.8

TO PROVIDE ANY CARBON PRICE FORECASTS IN UNION'S POSSESSION THAT COVER YEARS BEYOND 2028.

Response:

Union does not have in its possession any publicly available forecast of carbon prices that extends beyond 2028.

Union does have in its possession a California Carbon 2030 Carbon Price Forecast, but does not have permission to disclose the forecast publicly.

Union has not been granted permission to file this forecast publicly as it contains commercially sensitive materials and proprietary information. Accordingly, Union has provided the requested information (Exhibit JT1.1, Attachment A) to the Board in confidence under separate cover in accordance with the Board's Practice Guidelines on Confidential Filings and Rule 10 of the Board's Rules of Practice and Procedures.

UNION GAS LIMITED

Undertaking of Ms. Newbury
To Ms. Klein

Reference: Tr.1, p.60

TO UPDATE THE INTERROGATORY RESPONSE TO EXPLAIN THE ACCOUNTING OF THE FIXED PRICE OF RNG AND HOW THE DIFFERENCES WILL BE TREATED WITH RESPECT TO THE COST OF GAS AND THE COST OF CARBON.

Response:

Union's interrogatory responses related to the RNG funding mechanism do not require updating as they accurately reflect the accounting clarification requested through this undertaking.

The following provides a more detailed overview of Union's RNG Procurement and Funding model and discusses alignment with that of Enbridge Gas Distribution ("Enbridge").

Union and Enbridge are aligned on the RNG Procurement and Funding model.

As discussed at Exhibit B.Staff.6, the proposed RNG mechanism consists of three components:

1. Gas cost forecast
2. Carbon cost forecast
3. RNG premium

Union anticipates that it will enter into ten-year fixed price contracts for RNG. Ratepayers will pay the same amount for RNG as they would for conventional natural gas (inclusive of carbon costs) on a forecast basis. The balance of the RNG cost will be covered by government funding.

At the time of RNG procurement, a ten-year forecast of the cost of carbon and natural gas will be used to determine the volume of RNG that can be procured, taking into account the amount of available government funding.

Gas and carbon cost components will be a direct pass-through to ratepayers at the fixed forecasted price using Board approved methodologies for cost recovery (i.e. QRAM and Cap-and-Trade processes). This is similar to the treatment that would be used for a longer term fixed gas or carbon allowance purchase.

Union is aligned with Enbridge on how the fixed carbon cost component of RNG will be recovered. Union will recover the carbon cost component of RNG by recording differences between the Cap-and-Trade unit rates and the fixed forecast of carbon costs set at the time of contracting the RNG in the GHG-Customer and Facility Variance Accounts.

Union and Enbridge have slightly different Board Approved QRAM mechanisms and reference prices in rates, however, Union and Enbridge are aligned in that the fixed gas cost component of RNG will be recovered from ratepayers through their respective QRAM processes.

Union will recover the gas cost component of RNG by including the annual cost as a source of supply in the 12 month forecast gas supply portfolio costs filed in the QRAM proceeding.

The 12 month forecast gas supply portfolio costs are recovered from ratepayers prospectively through the Dawn Reference Price[1] and a prospective rate adjustment in the commodity rate. The prospective rate adjustment includes the difference between the average cost of the 12 month forecast gas supply portfolio and the Dawn Reference Price.

If the gas cost component of the contracted RNG price is different than the Dawn Reference Price set in rates each quarter as part of the QRAM process, the difference between the gas cost component of RNG and the Dawn Reference Price will be recovered or refunded in PGVA deferrals as a prospective adjustment in each QRAM.

The following examples (Exhibit 3, Tab 4, p. 21, Figure 3) set out the mechanics of how Union will recover RNG costs.

Table 1

Renewable Natural Gas Procurement Funding Model

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 9	Year 9	Year 10
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**
a) Forecast gas cost ($ / GJ)	$ 3.91	$ 3.95	$ 3.91	$ 4.22	$ 4.22	$ 4.29	$ 4.28	$ 4.68	$ 5.03	$ 5.43
b) Forecast Cost of Carbon ($ / GJ)	$ 0.85	$ 0.90	$ 0.90	$ 0.95	$ 1.00	$ 1.05	$ 1.56	$ 1.81	$ 2.16	$ 2.51
(c) = (d)-(a)-(b) Required Provincial Funding ($ / GJ)	$ 11.24	$ 11.15	$ 11.19	$ 10.83	$ 10.78	$ 10.66	$ 10.16	$ 9.51	$ 8.81	$ 8.06
d) Assumed Cost of RNG ($ / GJ)	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 16.00

Gas Costs/PGVA Mechanics

Table 1 above shows a gas cost of $3.91/GJ for Year 1. This price will be used in the derivation of the 12 month forecast gas supply portfolio costs for the four quarters of Year 1.

Table 2 below is an illustrative calculation of the 12 month forecast gas supply portfolio costs, the Dawn Reference Price, and the amount that would be included in the prospective rate adjustment on a forecast basis and on an actual basis. The inclusion of RNG is provided in Table 2, line 9 below.

[1] The Dawn Reference Price is used as the reference price for Union South and Union Northeast customers. For customers in Union Northwest, an Alberta Border Reference Price is used.

Table 2

		12 Month Forecast Gas Supply Portfolio					12 Month Actual Gas Supply Portfolio				
		Volume (GJ) (a)	Forecast Purchase Cost ($000's) (b)	Forecast Weighted Average price ($/GJ) (c)	Dawn Reference Price (d)	Forecast Amount to be recovered in Prospective Rate Adjustment (e)	Actual Purchase Cost ($000's) (f)	Actual Weighted Average price ($/GJ) (g)	Dawn Reference Price (h)	Actual Amount to be recovered in Prospective Rate Adjustment (i)	Difference to be reflected in Quarterly Update (j)
	Union South										
	Supply Costs										
1	Empress Supplies	1,095,000	4,767	$ 4.354	$ 3.191	(1,273)	4,780	$ 4.365	$3.191	(1,286)	(13)
2	Niagara Supplies	7,701,865	21,206	$ 2.753	$ 3.191	3,370	21,450	$ 2.785	$3.191	3,127	(243)
3	Chicago Supplies	30,807,491	104,210	$ 3.383	$ 3.191	(5,904)	103,914	$ 3.373	$3.191	(5,607)	297
4	Panhandle Supplies	13,478,340	45,372	$ 3.366	$ 3.191	(2,363)	44,950	$ 3.335	$3.191	(1,941)	422
5	Michcon Supplies	14,528,121	46,288	$ 3.186	$ 3.191	71	46,272	$ 3.185	$3.191	87	16
6	Appalachian Supplies	22,367,187	89,710	$ 4.011	$ 3.191	(18,337)	90,006	$ 4.024	$3.191	(18,632)	(295)
7	Ojibway Supplies	7,701,865	29,399	$ 3.817	$ 3.191	(4,822)	29,190	$ 3.790	$3.191	(4,613)	209
8	Ontario Local Production	465,375	1,433	$ 3.079	$ 3.191	52	1,540	$ 3.309	$3.191	(55)	(107)
9	RNG Production	490,000	1,915.90	$ 3.910	$ 3.191	(352)	1,916	$ 3.910	$3.191	(352)	-
10	Dawn Supplies	35,633,766	115,012	$ 3.228	$ 3.191	(1,305)	113,155	$ 3.176	$3.191	552	1,857
11	Total Supply Costs	134,269,010	459,314	$ 3.421	$ 3.191	(30,862)	457,172	$ 3.405	$3.191	(28,719)	2,142

Columns (a) to (e) reflect the 12 month forecast gas supply portfolio costs. Columns (f) to (i) reflect the 12 month actual gas supply portfolio cost. Union reflects the Dawn Reference Price in rates and the difference between the Dawn Reference Price and the total cost of the gas supply portfolio is recovered in a prospective Rate Adjustment.

Column (j) reflects the difference between forecast Rate Adjustment and actual Rate Adjustment that would be reflected in the QRAM as a quarterly update to the prospective rate adjustment for actual variances.

Line 9 shows that the actual cost of the RNG purchases equal the forecast cost used to determine the 12 month gas supply portfolio costs. That is because the forecast of gas costs for RNG will be fixed at the time that RNG is contracted. Therefore, the variance as shown in column (j) will be 0 for the RNG portion and there will not be any "actual" price variances associated with RNG.

Carbon Costs/GHG-Customer and Facility Variance Account Mechanics

Table 1 above shows a carbon cost of $0.85/GJ for Year 1. This is equivalent to $17.00/tCO2e. In 2018, Union's proposed Cap-and-Trade unit rates are based on the proxy carbon price of $18.99/tCO2e. Throughout the year, Union will defer any variance between the Cap-and-Trade unit rates and its actual Weighted Average Cost of Compliance (WACC), including the fixed cost carbon component of RNG, to the GHG Customer and Facility Variance Accounts. The allocation between GHG Customer and Facility Variance Accounts for the carbon cost component of RNG will be done on a proportionate volumetric basis using the same methodology as is used for all compliance instrument purchase costs.

Table 3 below is an illustrative example of how the carbon cost component of RNG will be considered in calculating amounts to be booked to the GHG Customer and Facility Variance Accounts.

Table 3

	Compliance Option	Volume (tCO2e) (a)	Actual price (CAD/tCO2e) (b)	Cap-and-Trade unit rate (CAD/tCO2e) (c)	Difference to be reflected in GHG Customer and Facility Variance Accounts (CAD) (d) = (c - b) x a
1	Compliance Instruments (i.e. allowances, offsets)	14,910,709	$ 21.00	$ 18.99	$ (29,970,525)
2	RNG	23,000	$ 17.00	$ 18.99	$ 45,770
3	Total/Weighted Average	14,933,709	$ 20.99	$ 18.99	$ (29,924,755)

Notes:
1. The volume and prices included in this example are illustrative and are not indicative of the Company's actual 2018 compliance strategy.
2. The price for RNG in column (b) corresponds to the 2018 amount in the LTCPF.

The WACC in this illustrative example is $20.99/tCO2e (see Table 3, line 3, column b). The total variance between the Cap-and-Trade unit rates and the WACC, of which the carbon cost component of RNG is a small piece, will be recorded in the GHG Customer and Facility Variance Accounts for disposition to ratepayers. In this example, Union's procurement of RNG would result in a $0.046 million refund within the total $29.9 million recovery sought from ratepayers upon disposition of the variance accounts.

Union does not anticipate that changes to its applicable accounting orders would be required as a result of its proposed RNG Procurement and Funding model.

UNION GAS LIMITED

Undertaking of Mr. Trofim-Breuer
To Mr. Rubenstein

Reference: Tr.1, p.144

TO PROVIDE THE RESEARCH AND/OR RELATED DATA FOR PHASE 1 AND PHASE 2 MICRO-GENERATION INITIATIVES (EVEN IF THEY DO NOT CONTINUE TO STAGE 3) AND ADVISE WHETHER UNION INTENDS TO PUBLICLY DISCLOSE SUCH RESEARCH AND/OR RELATED DATA; AND IF NOT, TO ADVISE WHY NOT.

Response:

In principle, Union expects that final reports and supporting data and analyses related to Stage 1 and Stage 2 initiatives within the Initiatives Funnel would be made available publicly through future Cap-and-Trade regulatory proceedings. However, Union reserves the right to make a case-by-case determination based on customer sensitivity, commercial sensitivity, Intellectual Property or other similar considerations as appropriate (please see Union's response to undertaking Exhibit JT1.32 for additional detail regarding Intellectual Property).

Consistent with the description provided in Exhibit B. Staff 21 a), Union has used its selection and project management approach to assess the technology and identify the micro-generation initiatives shown in the 2018 Initiatives Funnel.

As such, during Stage 1 Union has completed the following selection activities:

- Completed numerous research/study scans and meetings with research organizations and industry associations.
    - Organized several meetings with Dr. Evgueniy Entchev who is Senior Scientist and Head Hybrid Energy Systems and Advanced Energy Cycles Integrated Energy Systems Laboratory at the CANMET Energy Research Center of Natural Resources Canada. The purpose of these meetings was to understand the development status of the micro-generation technology and potential applications in Ontario. As a result, Dr. Entchev shared with Union the Annex 54 Integration of Microgeneration and Related Technologies in Buildings report prepared as part of the International Energy Agency (IEA) Energy in Buildings Program. This report has become one of the principal sources of micro-generation related information and is provided as Attachment A.
    - Attended meetings and conference calls with QUEST's Ontario CHP Consortium.[1] This consortium is a working group composed of electrical and

[1] http://www.questcanada.org/our-network/caucus/on/on-chp-consortium

natural gas utilities, technology and service providers, municipalities and government organizations. The purpose was to understand the overall Combined Heat and Power ("CHP") market context in Ontario, the role micro combined heat and power ("mCHP")/micro-generation technologies could play in this market and what barriers exist today that would have to be addressed and resolved as part of potential pilot demonstration projects in Union's franchise.

- Conferences, workshops and meetings with manufactures.
    - Attended the Energy Solutions Center, Inc. ("ESC") mCHP Workshop.[2] The ESC is a US based non-profit organization of energy utilities and equipment manufacturers that promotes energy efficient natural gas solutions and systems for use by residential, commercial, and industrial energy users. The purpose was to gain understanding regarding examination of the state-of-the-art mCHP products that are currently making their way to the North American marketplace.

- Site visits to view installations.
    - Completed several site visits with manufacturers to review different micro-generation technologies such as Internal Combustion Engines ("ICE"), micro turbine, smart-hybrid and steam generation technologies. The purpose was to understand the status of each technology development and the technical, commercial and operational capability of each manufacturer.

The outcome of these selection activities led to the identification of new micro-generation technologies to be assessed in Stage 1 and of projects to be pursued in Stage 2 of the Initiatives Funnel.

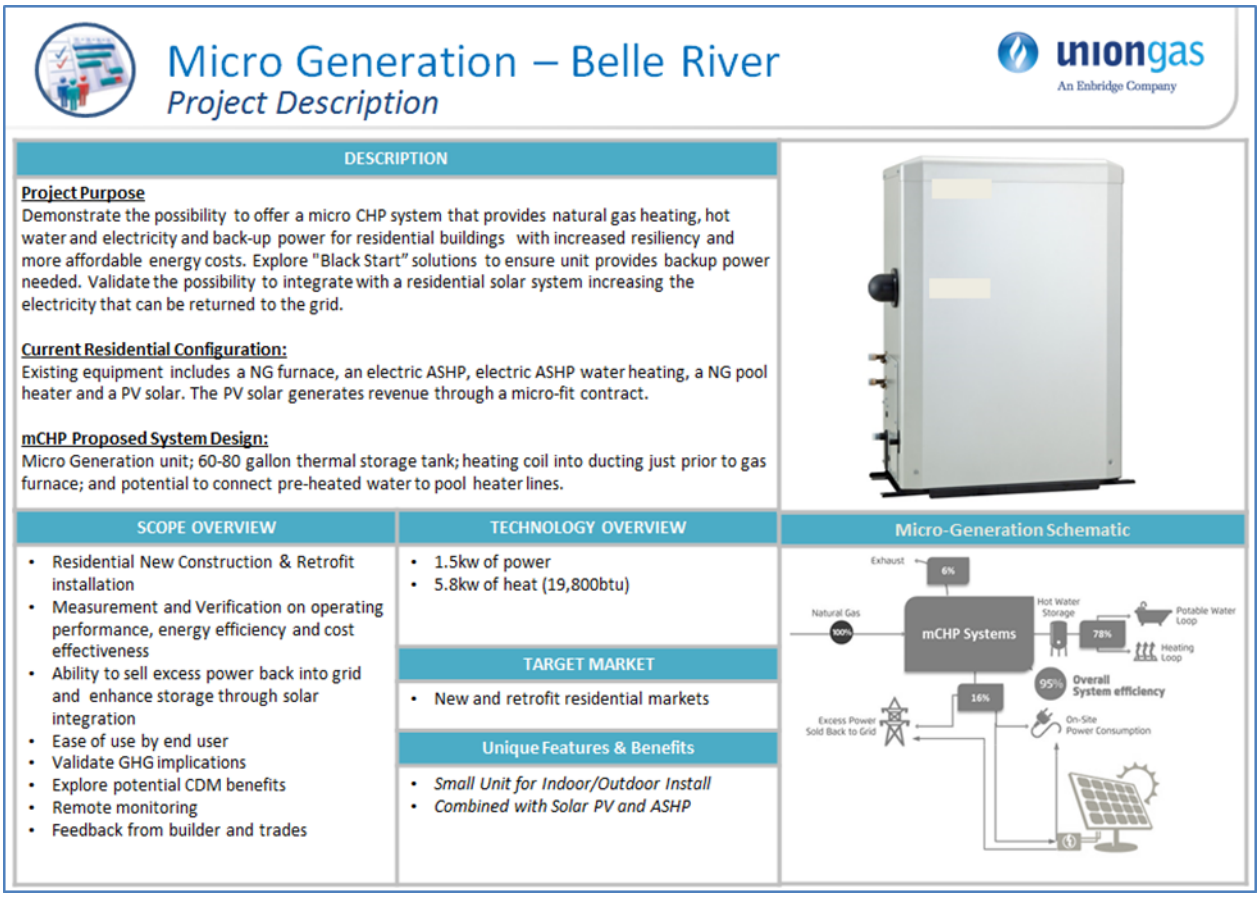
The funds identified in Union's response at Exhibit B.Staff.21 b) p. 4, for Stage 1 are associated with on-going pre-screening and assessment of new micro-generation technologies such as fuel cells.

The funds identified in Union's response at Exhibit B.Staff.21 b) p. 5, are associated with three of the nine projects. Specifically, these three projects utilize ICE technology and one is currently in execution in Belle River, while the other two are in planning mode to be deployed in the Chatham and Collingwood areas respectively. The remaining six projects are in the early stages of project feasibility assessment.

Union is applying the project management approach described in in Exhibit B. Staff 21 a), to the project that is currently in execution in Belle River, Ontario. Consistent with this approach, Union has developed a project description, budget, work plan and schedule. The project description is shown in Figure 1 below, whereas, insights regarding the project budget, deliverables, year-to-date spend and schedule have been provided as part of Union's response to Exhibit JT 1.17.

[2] https://www.energysolutionscenter.org/about/default.aspx

Figure 1: Micro Generation Belle River Project Description



Furthermore, Union will be preparing project reporting on actual performance upon completion of the execution phase of the project when measurement and verification data becomes available.