Introduction

Enbridge Gas Inc. (EGI) has applied for the Board's approval of a pilot program to blend two percent hydrogen with natural gas in a segregated area of its Markham gas distribution network. As a result of differences in the amount of energy derived from hydrogen vs. natural gas, EGI has applied for a rate rider to be provided to customers in the Blended Gas Area (BGA) to minimize any inequities associated with this difference. EGI's stated purpose of this initiative is to understand better the potential for this approach to de-carbonize its gas stream and prepare for requirements of an expected clean fuel standard.[1]

There are a variety of views that will be provided to the Board on the economic efficacy of project when the costs are compared to the potential benefits. FRPO has had the benefit of reviewing draft and actual submissions by a number of parties and believe that the Board will be well enough informed on the spectrum of views on the economic and environmental aspects of the proposed project. As such, while we will provide our high-level views on the relief requested, we will focus our submissions on public interest matters that avoid duplication or countering the views of other intervenors who have provided advanced submissions.

FRPO Conditionally Supports the Relief Requested by EGI

The application requests leave to construct the project and facilitating mechanisms to place the pipe while keeping customers economically whole for measurement differences. We conditionally support the Board providing the relief requested primarily to support the better understanding of the potential and limitations of blending of hydrogen with natural gas as a method of reducing carbon emissions from energy used in the province. Of the intervenor submissions reviewed, FRPO supports the submissions of the School Energy Coalition (SEC) in recognizing the potential value of this project to customers and the province. But that potential can only be harvested if additional public reporting is provided. We support SEC's requests for the reasons provided in their submissions. In addition, we add the following:

Many interrogatory responses were not provided by EGI citing commercial and risk management reasons.[2] While we understand some aspects of protecting the interests of customers and potential risks to safety, we are concerned that the protection of Enbridge Inc. interests should not inhibit the potential value that could be harvested from the project. Like SEC, we would expect that ratepayer investment should receive a return of intellectual capital. Given that the inclusion of the capital costs of the project

[1] AIC, paragraph 10.
[2] Exhibit I.H2GO.1 provides their reasons to which FRPO, Staff, CCC and VECC were all referred.

would not go into rates until at least rebasing, we would respectfully encourage the Board to communicate its expectations for sufficient public reporting to warrant the inclusion of the project costs to be reviewed and evaluated at rebasing.

With the limitations on information provided, we asked about the consideration of alternatives for the classification of the costs of this project including as business development costs. EGI's response quoted a section EBO 188 that defines distribution system expansion projects[3].

> *"The Board is of the view that all distribution system expansion projects should be included in a utility's portfolio. This includes projects being developed for security of supply and system reinforcement reasons. The Board will be prepared on an exception basis to consider a utility's submissions as to why a proposed project should not be included in the portfolio but treated separately."*

But the fact that additional pipe and equipment are being added to the system does not result in any actual expansion of the distribution system. Nor does the project contribute to security of supply or system reinforcement. In our view, this citation does not describe the Low-carbon Energy project giving the Board discretion as to its treatment and the prudency of costs for consideration of inclusion in rates. We respectfully submit that the Board would consider if the project contributed understanding and advancement of the risks and opportunities for reducing carbon emissions for the benefit of customers through this project. Otherwise, if the intellectual property is not publicized and benefits the business interests of Enbridge Inc., then the project costs should not be included in ratemaking.

Reporting Ought to Include Safety and Risk Mitigation Measures

Given the novel application of hydrogen blending in Ontario distribution systems, the Board incorporated input from the Technical Standards and Safety Authority (TSSA) procedurally[4]. While the TSSA provided a response letter and answered some interrogatories from Board staff and intervenors, we are concerned that this written evidence demonstrates a strong reliance on industry "knowledge"[5], literature review[6] and specific risk assessments of this project communicated with EGI most of which is not on the record[7]. This is the first proposed introduction of hydrogen into the natural gas distribution system in Ontario and the risks must be understood and mitigated.

[3] Exhibit I.FRPO.6 includes the EGI reasoning and original citation from EBO 188
[4] PO2_EGI_Low Carbon Energy Project_20200616
[5] TSSA_Review report_EGI Low Carbon Energy Project_20200708, page 3
[6] TSSA_IRR_to FRPO_R6_20200814, response to question 12 g)
[7] TSSA_IRR_to FRPO_R6_20200814, response to question 8

As noted in the Review of Key Issues in the Blending Hydrogen in Natural Gas Systems:

> *"However, the appropriate blend concentration may vary significantly between pipeline network systems and natural gas compositions and must therefore be assessed on a case-by-case basis. Any introduction of a hydrogen blend concentration would require extensive study, testing, and modifications to existing pipeline monitoring and maintenance practices (e.g., integrity management systems). Additional cost would be incurred as a result, and this cost must be weighed against the benefit of providing a more sustainable and low-carbon gas product to consumers."*[8]

From the review of the literature provided and the responses from the TSSA, we provide a couple of examples of issues that we believe demonstrate the need for enhanced reporting.

Hydrogen Embrittlement

In attempting to inform the record, we asked the TSSA for an explanation of the concept of hydrogen embrittlement. Having not received an explanation[9], we extract the following simple summary from the updated IRR that included the AGA/CGA report:

> *The durability of high-strength metal pipes can degrade when exposed to hydrogen over long periods, particularly with hydrogen in high concentrations and at high pressures.*

While a review of literature demonstrates differentiations between high-strength and low-strength steel pipes, we do not have EGI's nor TSSA's assessment of the potential risk and mitigation for the new steel high-pressure pipes proposed for this project. TSSA's response to our request that focused on the steel pipe refers to the appropriateness of the materials in the "selected network" and concludes with[10]:

> *"Specified Minimum Yield Strength only applies to steel pipe and does not apply to polyethene pipes. The distribution network has a combination of these materials. The maximum operating pressure for the selected network was found to be suitable for both materials with the selected hydrogen blending rate, based on the engineering assessment submitted by EGI. The normal operating pressure is 55 psig for the selected network."*

[8] Blending Hydrogen into Natural Gas Pipeline Network: A Review of Key Issues, Executive Summary, page v. https://www.nrel.gov/docs/fy13osti/51995.pdf
[9] TSSA_IRR_to FRPO_R6_20200814, response to question 9
[10] TSSA_IRR_to FRPO_R6_20200814, response to question 9 b) i)

However, respectfully, the response misses the point. The project includes NPS 6 ST HP pipe[11] which is described as having a maximum operating pressure of 1200kPa[12] (or approximately 175 psig, well above the 55 psig in the "selected network". The potential risk of hydrogen embrittlement and any mitigation or integrity management protocol are not directly addressed by the evidence in this case.

Safety and Leak Detection

In attempting to understand the TSSA's review of safety matters related to the blending of hydrogen with natural gas and its impact on LEL and UEL[13]. The LEL is lower explosive limit and UEL is the upper explosive limit[14] which specifies the range of percentage of the respective gas in air that will combust. The AGA/CGA report provides[15]:

> *"FID & DIAL devices are not sensitive to hydrogen and will give an inaccurate response due to the diluting effect of addition of H2".*

The acronym FID stands for flame ionization detector[16]. Utility personnel and contractors who access customer premises are equipped with portable personnel devices such as ionization detectors which alert the wearer to the potential for hazardous conditions. An alert can prompt the evacuation of the building for the safety of the occupants and personnel.

The AGA/CGA report comments:

> *"In terms of accuracy, use of FID and DIAL devices could be acceptable in situations with hydrogen blends up to 5 %,* ***but it needs further investigation."*** *(emphasis added)*

With respect, neither the TSSA's answer[17] nor EGI evidence addresses how the utility may address this issue including but not limited to the further investigation referred to by the AGA/CGA group. This issue may be addressed through investigation, the

[11] Exhibit B, Tab 1, Schedule 1, Page 12, paragraph 32 iv)
[12] Exhibit D, Tab 1, Schedule 1, Page 7, Table 4
[13] TSSA_IRR_ to OEB introgatory_R4_20200814, question 7 a)-d)
[14] Exhibit I.H2GO.1, Attachment 1, Page 7 of 16
[15] Exhibit I.H2GO.1, Attachment 1, Page 15 of 16
[16] Honeywell Gas Book, Honeywell Gas Detection, page 69 https://www.honeywellanalytics.com/~/media/honeywell-analytics/documents/english/11296_gas-book_v5_0413_lr_en.pdf?la=en-gb
[17] TSSA_IRR_ to OEB introgatory_R4_20200814, question 7

adjustment of the portable gas detection equipment, personnel training (of both staff and contractors attending premises in the BGA) or all of the above.

These two issues, Hydrogen Embrittlement and Safety and Leak Detection are not commercial issues requiring confidentiality to protect investments. These are public safety issues worthy of due process of review and reporting. Notwithstanding the simple summary provided by the TSSA to Board staff[18], there is a derth of information on what risk assessment the utility has done on this first of a kind project in Ontario.

EGI has requested that its risk assessment is proprietary and the TSSA has cited section 24 of the Technical Standards and Safety Act for its inability to publish the document[19]. In our view, public accountability begins with transparency and disclosure. While the TSSA may be prohibited in sharing it, we would urge the Board to require EGI to produce the document to the Board as a condition of approval. In doing so, EGI can request confidential submission subject to the Board's acceptance of that under the Board's Practice Direction on Confidential Filings.

Conclusion

FRPO respectively submits its contingent support for the relief requested with the recommended specific conditions of approval:

- EGI providing evidence of benefit with its rebasing application to have the capital costs included in rates
- EGI to provide the Board with its current risk assessment provided to the TSSA and update(s) once the system is operational

All of Which is Respectfully Submitted on Behalf of FRPO,

Digitally signed by R. Dwayne Quinn
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Dwayne R. Quinn
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DR QUINN & ASSOCIATES LTD.

[18] TSSA_IRR_ to OEB introgatory_R4_20200814, question 5
[19] TSSA_Review report_EGI Low Carbon Energy Project_20200708, page 3