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August 6, 2010

British Columbia Public Interest Advocacy Centre
Suite 209 – 1090 West Pender Street
Vancouver, BC
V6E 2N7

Attention: Mr. James L. Quail, Executive Director

Dear Mr. Quail:

Re: Terasen Gas Inc. ("Terasen Gas")
Application for Approval of Biomethane Service Offering and Supporting Business Model, for the Approval of the Salmon Arm Biomethane Project and for the Approval of the Catalyst Biomethane Project (the "Application")

Response to the British Columbia Public Interest Advocacy Centre on behalf of the British Columbia Old Age Pensioners Organization et al. ("BCOAPO") Information Request ("IR") No. 1

On June 8, 2010, Terasen Gas filed the Application as referenced above. On July 23, 2010 the BCOAPO issued BCOAPO IR No. 1. In accordance with Commission Order No. G-109-10 setting out the Regulatory Timetable for the review of the Application, Terasen Gas respectfully submits the attached response to BCOAPO IR No. 1.

If you have any questions or require further information related to this Application, please do not hesitate to contact the undersigned.

Yours very truly,

TERASEN GAS INC.

Original signed by: Paul Craig

For: Tom A. Loski

Attachment

cc (e-mail only): Erica Hamilton, Commission Secretary
Registered Parties

1.0 Reference: Exhibit B-1, Section 1.1, page 1

1.1 Does TGI envision partnering for Biogas supply with any entity that is affiliated or related to TGI or any entity in which TGI has an interest?

Response:

No. TGI will either invest directly in projects, or partner with unrelated third parties to facilitate the development of biomethane supply to meet the demands of our customers.

1.2 Please compare the relative financial risks and rewards that the shareholder would have if the green offering were made by an unregulated affiliate rather than by the regulated utility.

Response:

The offering is, by definition, a regulated offering. Please see TGI's response to BCUC IR 1.1.1 addressing the relative financial risks and rewards of TGI owning and operating the upgrading assets, relative to another regulated entity, whether a TGI affiliate or otherwise.

In circumstances where TGI owns the upgrading facilities, the risk of stranding is relatively small because the upgrading facilities can be moved. The stranding risk arises from the relatively modest cost of the interconnection facilities, and this risk exists regardless of who owns the upgrading facilities.

To the extent that there is a cost risk in respect of the upgrading facilities, it is managed through the use of fixed price contracts for equipment, and other means identified in the response to sections 9.2.7, 9.3.6, and 11 of the Application. The residual cost risk is shared between customers and the shareholder as follows: the customers bear the risk of prudently incurred costs being higher than budgeted, and the shareholder bears the risk of non-recovery of imprudently incurred costs.

The rate of return on equity on TGI-owned upgrading facilities is that rate of return that has been established by the Commission for TGI as a whole.

The shareholder of a third party or affiliate owning the upgrading assets bears the entire (albeit modest) risk of stranding and cost overruns. It also has only one customer - TGI. This

potentially increased business risk could conceivably result in the entity requiring a higher return on its investment than the regulated rate of return accorded to TGI. This higher return would be factored into the price of biomethane sold to the Company, driving the cost of biomethane upwards. The higher cost is passed on to customers through higher Green Gas offering rates.

In light of the relatively modest stranding and cost risk with upgrading facilities, and the risk adjusted return required by any owner of the upgrading facilities, TGI believes that a desire to mitigate this relatively modest risk should not be driving the decision regarding who owns the upgrading facilities. Rather, customers are best served when the operator of the upgrading facilities is capable of delivering a safe, reliable and cost effective supply of biomethane. TGI is capable of doing so, and there will be instances where third parties are also capable of doing so. The model should be left flexible so as to allow room for consideration of commercial realities in particular circumstances, which may make one or the other model the appropriate choice for a given project.

2.0 Reference: Exhibit B-1, Section 1.1, page 3

2.1 Please explain why the costs of monitoring the Biomethane quality and ensuring its safe delivery into TGI's system are not considered energy costs.

Response:

For TGI currently the costs for measuring and regulating, odourizing, monitoring the quality of gas received into TGI's system are included in the Company's operating expenses as these costs pertain to all the gas received by TGI irrespective to whom the gas is delivered to--whether for sales or transport customers. With the introduction of this new supply source, TGI is proposing similar treatment, namely, that the costs related to monitoring the quality of the biomethane gas, measuring and regulating of gas received be treated as an operating cost. In both instances, the operating costs are recovered in the delivery margin from all customers, both sales and transport.

3.0 Reference: Exhibit B-1, Section 2.7.1, pp 16-17

3.1 TGI has provided an illustrative comparison for the use of Biogas for producing either Biomethane or electricity. The example assumes that the conversion to electricity will use a reciprocating engine with no heat recovery and results in an engineering efficiency of 33% for this use of the raw energy. Please provide an estimate of the efficiency of using Biogas to produce electricity assuming that the most efficient known technologies are used in production.

Response:

TGI recognizes that in some cases there may be overall efficiencies that are higher than stated when using biogas for electricity generation. In particular there may be cases where waste heat can be recovered from an electrical generator. However, in order to effectively capture and use heat energy, there must be a nearby heat use. In the case of many landfills and farm applications this may not be practical. For the purpose of answering this question, TGI will make some assumptions.

For the calculation, the GE Jenbacher type 6, engines with 1.8MW – 3.0MW size were used for comparison. This is equivalent to 60,000 GJ/year – 100,000 GJ/year. These engines have been used in biogas applications around the world according to the manufacturer's data sheet available on the website. The manufacturer's quoted efficiencies (based on the data sheet available on the website) are displayed below:

Electrical efficiency 39.1% - 39.8%[1]
Thermal efficiency 44.2% - 45.0%

Thermal efficiency in this case is a measure of the total amount of energy in the form of heat that can be captured from the generator at the source as a percentage of the total energy input. In order to capture this energy generator packages require additional equipment and therefore this option comes at a higher cost.

According to the German Biogas Association (Biogas, An All-Rounder, published in 2007), based on existing installations, the expected useable heat efficiency is 50%. In other words, though heat can be captured at the generation source, only about 50% of this heat is useable in

[1] These efficiencies are only relevant over a narrow range of gas flows. So, for example, in the case of a landfill that has fluctuating flows, the actual average efficiency will be much lower than the highest number quoted by the manufacturer

an end-use application. This is a result of heat losses in transportation of heat and heat exchange. Therefore, the useable thermal efficiency used in the calculation is 22.1% - 22.5%.

Total end use efficiency, therefore ranges from 58% - 59% total efficiency.

This number was calculated as follows:

No.	Item	Low	High	Comment
1	Starting Units	100.0	100.0	
2	Energy to pre-condition Biogas	1%	1%	
3	Remaining Energy	99.0	99.0	
4	Electrical Efficiency	39.1%	39.8%	
5	Remaining Energy	38.7	39.4	
6	Transmission Loss	6%	6%	
7	Remaining Energy	36.4	37.0	
8	End Use efficiency Loss	0.0	0.0	
9	Remaining Energy	36.4	37.0	Comparable to TGI number
10	ADD - recovered heat	44.2%	45.0%	
11	Useable heat adjustment	50.0%	50.0%	
12	ADD - energy	21.9	22.3	
13	Energy Remaining	58.3	59.3	
14	Total Efficiency	58%	59%	

Note that the electrical efficiency is not significantly higher than the values assumed in the figure (Remaining Energy Line No.9) and TGI took the approach of using an industry average analysis rather than a best-in-class number because TGI felt that this was a more reasonable approach. See the response to CEC IR 1.7.1 for a discussion about industry average efficiency.

TGI believes that the industry average number of 35% efficiency is a reasonable number to use when calculating the useable energy in a biogas application. This analysis shows that only a best-in-class generator with additional equipment and capital cost may provide higher efficiency, but this is not an assumption that can be used in many biogas applications.

3.2 Please provide an estimate of the energy cost in $/GJ consumed for each case illustrated in Figure 2-5, indicating any assumptions made.

Response:

TGI is confident that converting biogas to biomethane is a better option than electricity generation for energy customers in many cases. Based on the cost escalation of the commodity due to inefficiencies in converting the energy from its raw form into useable energy, it is clear that biomethane is the right choice in many cases for optimum use of this renewable resource.

To do a high level analysis, TGI has assumed the following:

Raw Gas Price	$5.00/GJ
Costs associated with capital investment	not included
Cost associated with O&M	not included

Efficiency numbers are taken from the Application, Section 2.7.1, Figure 2-5.

	Electricity		Biomethane	
Raw Gas Price	$ 5.00	/GJ	$ 5.00	/GJ
Loss - Conversion to Transmission	65%		9%	
Adjusted Price	$ 14.29	/GJ	$ 5.49	/GJ
Loss - Transmission	6%		3%	
Adjusted Price	$ 15.20	/GJ	$ 5.66	/GJ
Loss - End Use	0%		8%	
Adjusted Price	$ 15.20	/GJ	$ 6.16	/GJ

The analysis clearly shows that the end price to the customer, assuming the same starting price is significantly higher for the same amount of energy supplied.

4.0 Reference: Exhibit B-1, Section 4.3, pp 29-30 and Appendix C-1, NREL Report page 6

Preamble: The evidence indicates that the participation rate for the top 10 green pricing programs was between 5% and 21% as compared the overall average rate of 2.2% and median rate of 1.2%.

4.1 Does TGI assume that the average is more indicative of a "typical" result than is the median? Please explain since these summary statistics indicate that the distribution of participation rates is skewed to the right.

Response:

TGI has assumed that the average is more indicative of a typical result than the median. The top 10 performing programs reflect high customer participation potential and TGI's customer research also supports that there is higher market share potential which would skew the distribution to the right as well (16% estimated market share potential for residential for a 10% blend of Biomethane at a 10% premium).

4.2 Does TGI have any views as to why the top 10 results were the top 10 results? That is, does TGI have any views as to why these programs were so successful in enrolling subscribers?

Response:

TGI found several reasons why some of the top 10 results were successful. The most common underlying factor was that a majority of the programs were energy-based programs. As published in the Chartwell's Helping Customers Live a Sustainable Lifestyle 2007 Report as attached in Appendix C-2 of the Application, a case study for Silicon Valley Power's Green pricing program found the key drivers for their top 10 program which achieved a 6% uptake rate in the first two years were:

- Political climate looking for clean energy solutions
- Low enrolment costs
- Highly visible location of projects

- Recognition of participants
- Marketing strategies that help motivate customers to spend more for green energy
- High profile customers enrolled in the program

Cross-marketing and communications has been a key component of other green energy programs, in addition to the product itself. Local renewable energy projects have led to higher participation rates in many of these programs. The proposed Green Gas program in the Application has been designed on the basis of the Company's secondary research and the scientific research study, and encompasses many of these key drivers. As a result, TGI believes the proposed Green Gas program is positioned to be a successful renewable energy program.

4.3 If the response to the previous part is in the affirmative, please indicate how TGI has reflected what it has learned from its analysis of the successful programs in the current proposal.

Response:

As discussed in the response to BCOAPO IR 1.4.2, there are several underlying characteristics of the success of the top 10 green pricing programs that are reflected in TGI's current proposal. They are as follows:

- TGI has proposed a renewable energy program which is the most popular type of green pricing program and makes up the majority of the Top 10 performing programs in North America.
- BC's political and social climate is very environmentally conscious and searching for GHG reducing solutions. In other jurisdictions where green pricing programs have been successful, political support and consumer awareness of environmental issues have also existed.
- TGI's proposed projects are within the Company's service territory which Silicon Valley Power's Green pricing program reports has contributed to their success as customers can relate better to something in their own backyard.

- TGI's customer education plan (Appendix H) has taken into consideration marketing strategies identified in Appendix C-2, Chartwell's Helping Customers Live a Sustainable Lifestyle 2007, as contributors to success.

- TGI has proposed to lead with a lower priced enrolment product in the early phase of the program. Silicon Valley's Green pricing program as discussed in BCOAPO 1.4.2 has one of the lowest price premiums. Many of the new programs are leading with a lower premium per NREL's Green Power Marketing Report attached in Appendix C-1.

TGI believes the proposed Green Gas program in the Application that has been designed as a result of the Company's secondary research and scientific research study encompasses many of these key drivers and is positioned to be a successful renewable energy program.

5.0 Reference: Exhibit B-1, Section 5 and Appendix D-2, Green Gas Study

5.1 Given that the methodology used for the demand study is contingent valuation (as opposed to revealed preference, hedonic pricing, or other approaches based on observed behavior and market data), to what extent does TGI believe that the elicited responses overall with respect to participation rates and willingness-to-pay will be realized when the Green Gas option is offered to customers?

Response:

TGI believes the above question is asking to confirm that we are using "stated preference" data to create a model of choice prediction and not using "revealed preference" data which is observation. This is correct. Discrete choice models (DCM) are statistical procedures that model choices made by people among a finite set of alternatives. The models have been used to examine, for example, the choice of which car to buy, where to go to college, which mode of transport (car, bus, rail) to take among numerous other applications. Each choice contains a set of attributes. The model relates the choices made by each person to preference for attributes. *DCMs estimate the probability that a person chooses a particular alternative*. The models are often used to forecast how people's choices will change when the attributes in the alternatives change. It is a statistical approach that is often used by academics and research practitioners today.

The original RFP to this study indicated a desire on behalf of Terasen to "determine pricing preferences and options by evaluating a variety of product options". TNS felt that Discrete Choice Modelling was an appropriate approach to answer this research objective. DCM could be used to bundle different product options together into a concrete offering at different price points (as choices), to determine (1) which product features respondents preferred, and, (2) which price points they prefer. This method was chosen as there was no real world observational data in terms of choice decision of the consumers to use as this was to be a new venture.

The estimated take-up rates were 16% for residential and 10% for commercial at a 10% blend of Biomethane. This is the maximum projected market share, or best case scenario. As discussed in the response to BCUC IR 1.51.2, there are many factors that need to be taken into account to achieve such success.

It is TGI's opinion that there is sufficient market demand for Biomethane beyond the two supply projects as proposed in the Application. As discussed in Section 6, the targeted demand in Phase 1 is to serve 2% of the residential market at a 10% blend, which is closer to the national

average of other green pricing programs. Therefore, this phased approach will allow TGI to validate this customer demand and to plan additional supply projects accordingly.

6.0 Reference: Exhibit B-1, Section 9.2.2, page 85 and Section 9.3.2, page 96

6.1 Please comment on the rationale for the differences in term and renewal arrangements for the two projects.

Response:

This response is provided to the Commission confidentially under a separate cover due to commercially sensitive information.

7.0 Reference: Exhibit B-1, Section 11.2.1, page 119, Undersupply Risk

7.1 Does TGI agree that a supplier has a financial incentive to produce more Biomethane rather than less, only if the commodity price paid exceeds the short-run average variable cost of production?

Response:

TGI believes that the projected economics of biogas production provide sufficient incentive to produce biomethane up to the maximum limits of the supply contracts currently in place. TGI believes that a supplier has incentive to produce more biomethane if the potential revenue incentive is greater than the costs to produce the biomethane. TGI also believes that the current supply contracts in place provide sufficient incentive to ensure minimum supply is met.

In the case where a supplier has a contract to supply biomethane, TGI is relying upon producers to do this analysis prior to entering into an agreement with TGI. If the supplier is rational, it is expected that the agreement would take into account the variable cost of production and potential profits for the supplier. As stated in the response to BCUC IR 1.22.3), in order to reduce risk to the program, TGI will also ensure that a potential supplier is financially stable enough to be relied upon to produce biomethane. As part of this analysis, TGI needs to be mindful that the negotiated price allows a supplier to earn a sufficient enough return to avoid financial stress. Finally, in the longer run, the supplier may have options in terms of where they direct the biogas. The financial incentive needs to be sufficient enough to encourage the producer to direct volumes in excess of contracted quantities to the TGI system rather than seeking out alternatives.

TGI does not believe that there is risk of undersupply due to the economics of the biogas production.

7.2 Please explain how TGI has mitigated the risk of financial failure of a supplier.

Response:

TGI believes that different suppliers have different levels of financial risk associated with them. Therefore each supply contract will address the risks associated with a particular supplier. In the case of the current application, a discussion of the particular risks is addressed in BCUC IR 1.61.5.

Further, given the relatively modest stranding risk (due to TGI's design approach which emphasizes modularity for ease of redeployment), the larger business risk in the early days of the biogas program is one of reliability of supply.

At this time, if one of two suppliers goes down, there is a greater risk to the program from the view of undersupply. Over time, however, the risk of one supplier going down is mitigated by having multiple suppliers to ensure reliability of supply. TGI is mitigating this risk by allowing maximum flexibility in its approach to business arrangements with parties to allow different ownership models for upgrading facilities as commercial requirements indicate. In the short term, TGI is taking a cautious approach to customer enrolment ensuring that supply is available ahead of customer demand. This is discussed in the Application in Sections 6.4 and 6.5.