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August 6, 2010

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Commercial Energy Consumers Association of British Columbia
c/o Owen Bird Law Corporation
P.O. Box 49130
Three Bentall Centre
2900 – 595 Burrard Street
Vancouver, BC
V7X 1J5

Attention: Mr. Christopher P. Weafer

Dear Mr. Weafer:

**Re: Terasen Gas Inc. ("Terasen Gas" or the "Company")
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 Commercial Energy Consumers Association of British
Columbia ("CEC") Information Request ("IR") No. 1**

On June 8, 2010, Terasen Gas filed the Application as referenced above. On July 23, 2010 the CEC issued CEC 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 CEC IR No. 1.

On July 28, 2010, Terasen Gas received a letter from the British Columbia Ministry of Finance related to Terasen Gas' inquiry regarding the application of carbon tax on the sale of natural gas, specifically, biomethane. The Company is currently in discussion with the Ministry of Finance regarding the letter, and determining the appropriate next steps. As such, the Company has not filed responses to IRs relating to carbon tax at this time. The Company intends to file responses to those IRs by August 18, 2010. The Company believes that this delay is required and appropriate, to enable the Company to address the IRs taking into account the most recent developments.

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



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1. Reference: Exhibit B-1, Page 2

The key objective of this Application is to safely, reliably and economically meet the customer demand for renewable, carbon-neutral Biomethane. Terasen Gas' partners will in all cases be

- 1.1. Why does Terasen discuss these sources of renewable biomethane as carbon-neutral?

Response:

TGI refers to biomethane as carbon-neutral since it is from a biogenic source rather than a fossil fuel-based source. Since biogas is a natural product arising from the decomposition of organic matter the carbon in biogas is part of the natural carbon cycle and does not add new carbon to the atmosphere in the way that burning natural gas or other fossil fuels would. This is discussed in more detail in Sections 2.7.2 and 2.7.3 of the Application (Exhibit B-1, pages 17 to 20).

- 1.2. Is it not the case that absent Terasen's capture, processing and use of the biomethane in its natural gas distribution system the gas would have been released into the atmosphere as methane instead of as carbon dioxide as will be the case after Terasen's customer's use of the gas?

Response:

It is the case that the biogas capturing and upgrading processes in TGI's biomethane program will result in some avoidance of higher-GHG methane releases into the atmosphere. However not all the biogas capture and upgrading to biomethane will cause incremental avoidance of fugitive methane emissions. In some situations, such as at landfills, biogas capture has been already mandated by provincial government regulation, so adding upgrading equipment to convert the raw biogas to biomethane for pipeline injection does not result in additional avoidance of methane emissions. In agricultural situations some emissions would be in the form of methane but other emissions from farming operations occur from aerobic (rather than anaerobic) decomposition of organic matter, such as for example, when manure is spread on a field, and the resulting emissions are in the form of carbon dioxide rather than methane. The complexities related to GHG emissions at biogas sources of supply and GHG reductions resulting from biogas capture were discussed in Exhibit B-2-1, a response to an undertaking from the June 24, 2010 Workshop dealing with carbon offsets. At pages 3 and 4 of Exhibit B-2-1, TGI made the following statement:



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Given the uncertainty in this emerging field, TGI has chosen at this time to let the producer deal with the logistics and costs associated with establishing whether or not offsets from these projects can bring about a revenue stream to the project proponent. This was also the preference of the producers because it would be difficult to establish a long term price given the infancy of the market in BC.

In summary, although TGI believes that there will be GHG emission reductions at the producer level arising from its biomethane initiative TGI is not able to make any claims as to the magnitude of these reductions. Any benefits from these producer-level GHG reductions, such as offset revenue streams, will remain with the producer, as will the costs of identifying and verifying them, under the model proposed in the Application.

- 1.3. Is it not the case that the release of methane into the atmosphere has a greenhouse gas equivalent of somewhere in the range of 20 to 25 times the release of carbon dioxide?

Response:

Yes, methane is generally considered to have a GHG intensity factor that is 21 times the equivalent of carbon dioxide. Please see the response to CEC IR 1.1.2.

- 1.4. Is this proposed process not GHG beneficial (a) because it displaces use of carbon based fossil fuel, which is not part of the renewable carbon cycle and (b) because it displaces the poorer, from a GHG perspective, form of natural emissions CH₄ with the better form of emissions CO₂?

Response:

Overall TGI believes its biomethane program will be GHG beneficial. Both aspects mentioned in the question will make a contribution to GHG reductions. The displacement of fossil fuel-based natural gas consumption with biomethane consumption clearly reduces GHG emissions by the avoided CO₂ from the displaced natural gas. As discussed in CEC IR 1.1.2, TGI believes that some but not all of its biomethane production will result in incremental reductions in methane emissions. However, due to the complexities of making complete assessments of GHG emission impacts from biogas production processes TGI cannot say definitively how large the GHG reduction benefit from the second part of the question will be.



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2. Reference: Exhibit B-1, Page 3

replacement of the existing Customer Information System ("CIS"). The first phase of the offering will involve making a blended Biomethane product available to residential customers commencing October 1, 2010, starting with a blend of 10% Biomethane and 90% conventional natural gas. Phase two will involve launching this 10% blend for small and large commercial customers on January 1, 2012. The Company will also sell Biomethane to on-system (transport customers) and off-system wholesale customers. Terasen Gas will seek to expand these offerings as the program matures and new supply sources are developed.

2.1. What would be the impact on customer's bills if Terasen were mandated to achieve a 1% Biomethane blend across its entire system?

Response:

Terasen Gas estimates the increased cost of gas from a mandated 99% / 1% blend would result in an increase of 5 cents per GJ to the commodity recovery rate. This assumes the biomethane is added to Terasen Gas' commodity portfolio which is applicable to Sales customers who continue to receive gas service under the Terasen Gas standard commodity rate offering.

In responding to this question Terasen Gas has assumed an average commodity cost of gas derived from the June 3, 2010 Second Quarter Gas Cost Report, Tab 2, Page 1, Lines 1 and 17, Column 2; and the biomethane rate that Terasen Gas is requesting for approval. The details of the calculation are as follows:

Commodity Cost of Gas for July 1, 2010 to June 30, 2011 (\$000's)	\$ 468,564
Forecast Sales Volumes TJ	94,167
Average Cost of Gas / GJ	\$ 4.976

Sales Volume	Proportion Blend	Unit Cost of Gas / GJ	Gas Costs
94,167	99%	\$ 4.976	\$ 463,879
94,167	1%	\$ 9.904	<u>\$ 9,326</u>
			<u>\$ 473,205</u>

Biomethane / Natural Gas Blended Average Cost of Gas	<u>\$ 5.025</u>
increase from Average Cost of Gas / GJ	<u>\$ 0.049</u>



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Finally, it should be noted that 1% of supply would represent 941,670 GJ which is over seven times the quantity of biomethane that Terasen Gas is proposing to introduce from the two projects in the Application. Therefore, the projects in the Application have an impact of less than \$0.01 / GJ on Terasen Gas' overall supply portfolio.

- 2.2. Is it not the case that efficiency and conservation alone are not projected to be sufficient to meet government 2050 GHG targets and that biomethane can be one of the important solutions to the future sustainability of the company, Terasen, and the customer's public interest in the sustainability of natural gas supply?

Response:

The answer is yes to each of the components of the question. In terms of reaching the 2050 GHG target and implementing government policy in general, TGI has put forward a multi-faceted approach which includes expanded Energy Efficiency and Conservation (EEC) programs, entering into alternative energy developments, expanded use of NGV in the transportation market and incorporating carbon neutral biomethane into its portfolio of supply resources. EEC programs on their own will not be sufficient to reach the 2050 targets. Biomethane is an important element of this multi-faceted approach. Depending on how biogas technologies emerge in the future, particularly in areas such as biomass gasification, biomethane has the potential to become a material portion of the overall gas supply resource needed to supply TGI's customers. Even if the supply of biomethane remains at a relatively low percentage of TGI's overall gas supply portfolio TGI will be able to assist a considerable number of customers reduce their carbon footprint through blended biomethane offerings like the proposed program in the Application.



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3. Reference: Exhibit B-1, Page 6

As will be demonstrated in Section 3 of this Application, Terasen Gas customers want to purchase and consume Biomethane. Terasen Gas is submitting this Application to ensure that this demand is met safely, reliably and economically. Owning and operating the required

- 3.1. Isn't this program also vital to all existing customers to help change the perception risk by demonstrating that the natural gas product can be a renewable supply source of heat?

Response:

Agreed.

Terasen Gas believes that its customers will benefit from the biomethane product offering, which is a renewable energy source, with its production and consumption being carbon-neutral, and therefore resulting in a net reduction in GHG emissions. If the Application is approved by the Commission, the addition of biomethane as a renewable natural gas product will further highlight, along with TGI's other energy efficiency and green initiatives (such as alternative energy developments), that the natural gas system and infrastructure can be used as part of the solution to help customers reduce their emissions and do their part in addressing climate change. This new product offering will help to educate energy consumers in BC that other more practical and efficient solutions than an all electricity solution exist and should be considered. Success in the Company's suite of energy efficiency and alternative energy initiatives, including the biomethane initiative is vital to the long term health of TGI and its natural gas infrastructure and its customers.

- 3.2. Isn't it vital that Terasen have a significant & flexible willingness to be in an ownership position for the purpose of development of the market and for the perception reason?

Response:

Agreed.

TGI has a significant leadership role to play in facilitating the development of a biogas or biomethane market in BC. The main alternative to upgrading biogas for pipeline injection, other than simple flaring, is to produce electricity. TGI believes that, with limited exceptions, producing



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electricity from biogas is an inefficient use of the resource when compared with upgrading to biomethane for pipeline injection. If TGI was to adopt a passive or do-nothing approach with respect to biogas the default response would be to generate electricity and the opportunity to utilize available biogas resources in the province in the most efficient manner would be lost.

TGI has consulted with industry over the past two years both more formally through its RFEOI process and informally through discussions with market participants both locally and in other jurisdictions. TGI believes that in order for the industry to develop in a smaller market like BC, the utility must take a leadership role and be prepared to be flexible in its approach.

The business model that is outlined within the Application is flexible. We have outlined two ownership supply models within the Application, including the possibility of third parties providing both biogas collection and upgrading service if certain conditions can be met by the supplier. This should promote competition and supply development competition among suppliers to meet the demand of our customers.

- 3.3. Isn't it also true that development of this potential in BC needs the kind of leadership, which Terasen can provide or its development may not be as robust as is needed to meet provincial GHG objectives?

Response:

To achieve the aggressive provincial GHG reduction targets by 2020, TGI will need to play a prominent role in providing new products and services to energy consumers in BC that assist in meeting these goals.

TGI estimates that about 15 to 17 percent of BC's total emissions came from the consumption of natural gas in 2007. Given that the emission output from the electricity sector is small, and the emission from the upstream oil and natural gas production is expected to grow with the discovery of the Horn River shale gas play, it is expected that the transportation and residential and commercial sectors have the greatest potential for GHG reductions within the Province.

TGI has played a leadership role to date in outlining and implementing alternative energy strategies, including the use of biomethane, that can help make use of the existing natural gas infrastructure, while helping customers reduce their carbon intensity. TGI believes that its participation in the market as outlined in the Application will add simplicity and certainty to the process of developing supply resources. Further, that without this leadership, the GHG emission reductions achieved from this resource will be diminished as biogas resources will be used



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either to generate electricity (see the response to CEC IR 1.3.1) or possibly remain undeveloped.

- 3.4. Like PowerSmart investments are critical to BC Hydro's perception are not GreenGas investments critical to Terasen's future perception?

Response:

TGI would characterize the offering as meeting customer demands for new products that will help reduce their carbon footprint, rather than being directed at changing public perceptions. TGI believes that new product offerings, such as the biomethane offering, are critical to meeting the demands and changing expectations and perceptions of energy consumers in BC. As mentioned in the Application, market research conducted by TGI has suggested that our customers have a strong desire to purchase renewable clean energy from TGI. Similar to how TGI Energy Efficiency and Conservation ("EEC") offerings (or BC Hydro's PowerSmart programs) are critical to meeting customer's demand, Biomethane is another offering that makes use of the TGI infrastructure, while at the same time meets the expectation and demands of some customers. Thus, new products offerings to customers are critical to the long term health of the TGI network, which is a benefit to all existing customers.



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4. Reference: Exhibit B-1, Page 6

As will be demonstrated in Section 3 of this Application, Terasen Gas customers want to purchase and consume Biomethane. Terasen Gas is submitting this Application to ensure that this demand is met safely, reliably and economically. Owning and operating the required

- 4.1. Why would the company be trying to attract partners to own and operate biogas upgrading facilities?

Response:

TGI believes that neither the market for biomethane nor the supply of biomethane is mature enough to formalize a single approach to the supply. Therefore, a flexible approach to operating and ownership arrangements will provide the most benefit for customers and suppliers.

However, TGI believes that in order to ensure customers have a safe, reliable supply of biomethane, the best approach is to own upgrading facilities. As discussed in BCUC IR 1.2.2, there are several reasons for this model and Terasen Gas has the experience and competence to successfully manage these assets.

TGI does not see any benefit in the activity of attracting partners to own and operate upgrading facilities as a goal unto itself. The best way to benefit the market is to attract partners in the development of the raw biogas resource which will involve a variety of differing competencies. This will benefit the market and ultimately customers because having multiple approaches will allow TGI to optimize supply and demand matching while at the same time focusing on its areas of strength – upgrading and delivery of biomethane.

- 4.2. Isn't it only sufficient that if independent suppliers want to get into the business that Terasen provide standards, equal to those standards Terasen meets, and have methods of monitoring and ensuring performance to standards?

Response:

Methods of monitoring and securing contractual obligations are a precondition to having third parties engage in upgrading, but it is preferable if those preconditions are supported by the considerations that suggest commitments will be met without resorting to enforcement of contractual obligations. Hence, in the case where an independent supplier can also demonstrate reliability (financial, technical and security of supply) Terasen Gas is willing to



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accept biomethane from this supplier provided the price is competitive. In this case, as stated in Section 8.3.3 of the Application and restated here, Terasen Gas intends to ensure measuring and monitoring is done for the project. At this early stage of market development, a mechanistic standards based approach is not possible but in the long run Terasen Gas believes that this will likely evolve as the market grows.

At no time will Terasen Gas risk the safety of customers or integrity of existing assets in order to build supply volumes by relying on independent suppliers.



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5. Reference: Exhibit B-1, Page 7

removal of non-combustible gas which will increase the heating value of the gas. Elements such as N₂, O₂ and H₂ are monitored to ensure that, if they are present, they are present in such small amounts that they not impact the safety or heating value of the gas. Other contaminants such as H₂S, NH₃, siloxanes and dust are filtered out to ensure that the end product is clean and safe for pipeline injection. For the purpose of this Application, the purification process will be referred to as "upgrading". Once Biogas has been upgraded, it is safely interchangeable with natural gas in the existing distribution and transmission system.

- 5.1. In the upgrading process are any of the by-products useable and saleable or are they all wasted?

Response:

TGI believes that there may be opportunity to take advantage of certain waste products including heat from the upgrade process in certain projects.

The upgrade process may vary according to the particular choice of technology used in a given application and therefore the waste products may vary in amount and form. For an overview of some of the best known technology including that used in the first two biogas projects in BC, see Section 2.5 of the Application.

The most likely sources of useful waste products are heat generated from the process and carbon dioxide (CO₂). There are efforts around the world to look for ways to better use these two waste products, but one of the most promising applications is in agriculture. A good example of a use of waste heat and CO₂ in a greenhouse to enhance growing is the WarmCO₂ project in the Netherlands (www.warmco.nl).

TGI believes that there is opportunity in the future to take advantage of waste heat and CO₂ from upgrading equipment making it an even more attractive option as a source of renewable energy.

In another example, it is proposed that waste water from a biogas upgrade plant get used to aid in the post-composting process. The material would then be screened and bagged to sell as a product.

In addition, on the raw biogas supply side, there is opportunity to take advantage of waste products in some cases. For example, in the case of a digester, the remaining undigested solids can be used for animal bedding reducing the need for the import of new materials to a farm. Similarly, the leftover liquids can be used as a fertilizer for fields.

Overall, there are opportunities to take advantage of by-products in certain projects.



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5.2. What is the waste handling process and how are the by-products to be disposed of?

Response:

TGI will ensure that all waste products for which it is responsible are managed in a safe and legal manner. The waste handling varies slightly depending on the technology used. TGI will answer this question in the context of the two current projects filed with this Application.

In the case of CSRD, the waste products will be managed in three ways. Waste CO₂ will be vented to atmosphere. The other contaminants will be captured either in a filter media or in excess moisture in the form of condensate (a product formed as air containing moisture is compressed and forms liquid water). In these cases the waste will be directed back into the landfill and remain there permanently. Note that these contaminants were already present in the landfill to begin with and will therefore fall well within all legal requirements.

In the case of the Catalyst Power Inc. project, TGI does not have direct control or direct responsibility for the waste products. However, TGI understands that the waste CO₂ will be vented to atmosphere. The remaining contaminants will be captured in either filter media or the water stream. The water stream will re-circulate and eventually contaminants will be captured in a filter system. The final waste product, in the form of saturated filter media will be disposed of legally (most likely in a landfill.)

Though there is waste captured through the upgrade process, this waste is not considered to be a significant volume over the course of expected operation. It is anticipated that the waste can be managed with semi-annual or annual changes of filter media.



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6. Reference: Exhibit B-1, Page 15

The interchangeability of Biomethane with conventional natural gas allows for notional delivery using the existing natural gas distribution system. Biomethane can be injected at one point on the system, displacing conventional natural gas used at that point on the system. The user notices no difference between the gases, which allows the gas to be physically consumed in one place, but be accounted for as sold at another location through displacement.

- 6.1. To what extent does the flexible use of natural gas through the Terasen distribution system avoid more GHG intensive forms of delivery such as trucking fuel to customer sites?

Response:

TGI is not able to answer this question in any way other than a general qualitative manner. TGI's delivery system enables it to deliver natural gas to its customers efficiently, cost-effectively, flexibly and with low GHG emissions. The existence of the natural distribution system also provides the same benefits for delivering bioenergy. For example, using TGI's existing distribution system to displace conventional natural gas with Biomethane allows this energy to be notionally moved long distances very efficiently. It is TGI's opinion that this is inherently more efficient than moving the biomass to the customer directly (via truck) unless very short distances are involved. The use of the natural gas distribution system for example allows for Biomethane to be delivered from the landfill in Salmon Arm to the Lower Mainland with no change in delivery infrastructure or end use equipment. Contrast this with the logistics of delivering forest biomass to the Lower Mainland which involves trucking from the Interior and purpose build end use equipment.

Looking back in time, an example of natural gas having displaced other higher GHG fuels is in the home heating market where natural gas has all but replaced the use of fuel oil in TGI's service territory. Undoubtedly, the convenience and efficiency of the delivery of natural gas versus fuel oil which was delivered by truck played a part in this conversion. However, it is most likely the case that other factors motivated this change as well. Natural gas is more convenient, cleaner burning and less expensive than fuel oil so the transition from fuel oil to natural gas was driven by these factors. Likewise, there is also very little use of fuel oil in commercial buildings in TGI's service territory. TGI is presently endeavouring to expand its natural gas for vehicles (NGV) service in particular segments of the transportation market. The initial emphasis in this NGV strategy is on return-to-base fleet vehicles, including, for example, light and medium duty commercial vehicles, buses, waste haulers and municipal fleets. As the NGV initiative expands there will be an increasing number of examples of reduced demand for the trucking of fuel to customer sites. This will provide benefits in terms of reduced GHG emissions and improved air



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quality because natural gas is a cleaner burning, lower GHG emitting fuel but it will also reduce the road traffic associated with gasoline and diesel fuel deliveries. Further, as additional sources of biomethane are added into TGI's overall supply pool of biomethane there will be opportunities in the future to use carbon neutral biomethane to displace gasoline and diesel in the transportation market, and achieve larger GHG emission reductions beyond those offered by natural gas.



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7. Reference: Exhibit B-1, Page 16

Biomethane is in the range of 90% efficient. In contrast, when converting to electricity using a reciprocating engine with no heat recovery the efficiency is closer to 35%. This means that

- 7.1. Is it not true that the newer GE Jenbacher 6 series are reaching 40% to 45% electrical production efficiency?

Response:

According to the data sheet (available on the GE website) for the GE Jenbacher type 6 generators, the rated electrical efficiency is in the range of 39.1% to 39.8% (when using biogas). In contrast to the Jenbacher generators, the Caterpillar G3516LE has a rated efficiency that ranges from 32.4% to 36.4%. The efficiency rating for the Jenbacher is also specified in the data sheet at its highest possible level and does not account for operation at partial capacity levels, in which case the efficiency will likely drop closer to the value that TGI used for the comparison in Section 2.7 of the Application.

TGI believes that the assumed electrical conversion efficiency of 35% is a reasonable factor to use for the illustrative purposes of comparing electricity generation to biomethane production.

Please also see the response to BCOAPO IR 1.3.1.

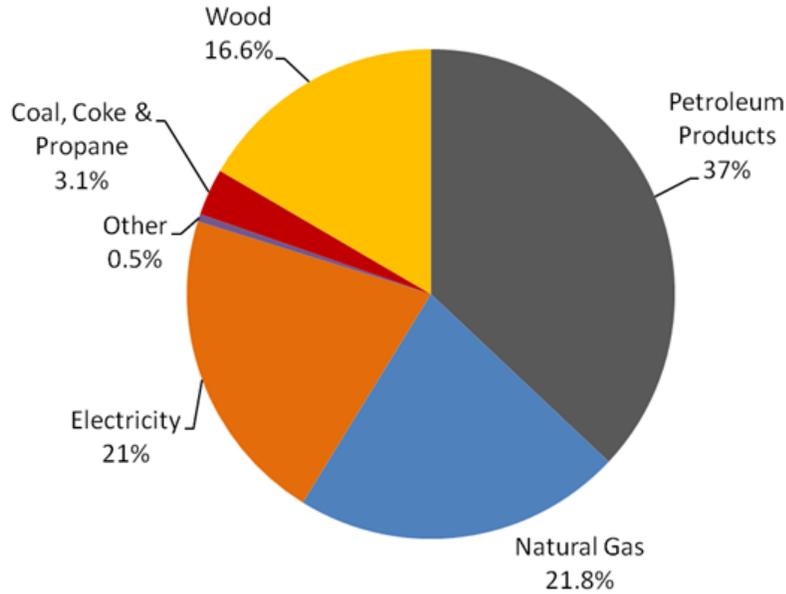
- 7.2. To what extent does the use of natural gas for heating through the Terasen distribution system as opposed to new electricity supply production and electric heating contribute to reducing the cost of new electricity supply being added to BC Hydro's electricity rates?

TGI does not have a quantitative estimate of the total amount of electricity supply avoided or the related cost of the avoided electricity by using gas for space and water heating but the overall amounts are very large. The first chart below indicates that electricity and natural gas provide similar amounts of end use energy in the province. The side-by-side residential and commercial charts below indicate that the thermal energy requirements, which could be served by either natural gas or electricity, form a large majority of energy consumption in these customer segments. The residential and commercial classes are very large segments in both the natural gas and electricity sectors in BC.



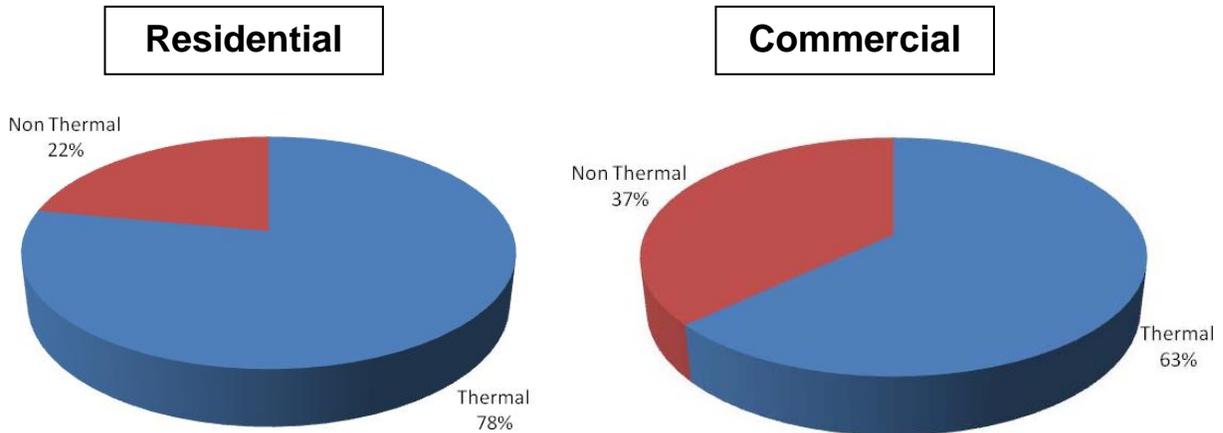
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BC End Use Energy



(Source: NRCAN 2007 Stats)

BC End Use Energy Profiles



Thermal energy use includes space heating, space cooling, and water

(Source: NRCAN 2007 Stats)



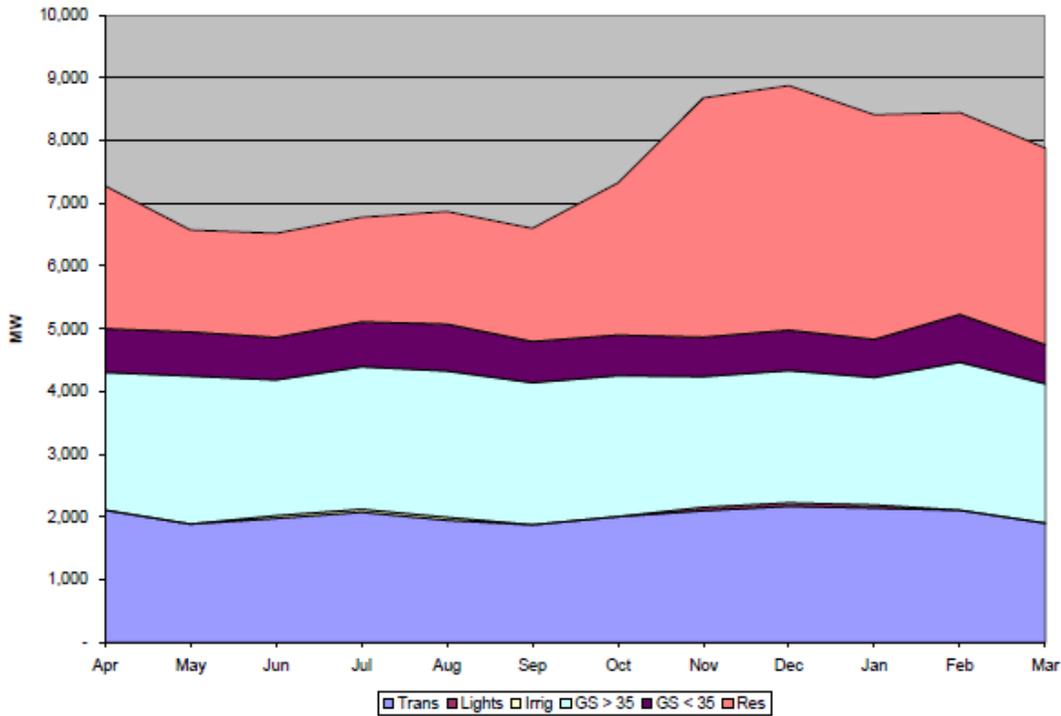
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In its Decision on BC Hydro's 2007 Rate Design Application the Commission recognized that BC Hydro experiences its peak demands in the winter season and that the residential class is the main contributor to these winter peaks. Electric space heating is an important driver of peak electricity demands in the winter period. The chart below reproduced on page 74 of the BCUC Decision (dated October 26, 2007) illustrates that peak demands in other customer classes are relatively stable throughout the year while residential peak demands are in the order of two times in the winter months what they are in the summer period. The electricity transmission and distribution systems must be sized to accommodate these winter peak demands. Wholesale electricity prices also tend to be the highest in peak demand periods. TGI's natural gas system is also a winter peaking system since providing thermal energy for winter space heating constitutes the largest end use category by volume. This means that if natural gas was not used to serve space heating and other thermal energy needs in BC there would be very large additional demands placed on the electricity system. This would mean not only having to acquire large volumes of electricity supply in the winter period when electricity is the most expensive but also having to make costly upgrades to the transmission and distribution systems to deliver that electricity in the winter when customers would need it. In its current Clean Power Call BC Hydro has selected 17 project proponents as of June 21, 2010 for the award of an Electricity Purchase Agreement. The average electricity price for these EPAs has not been disclosed as yet but is expected to be in the range of \$120/MWh which is a large increase relative to EPAs awarded in the 2006 power call and much more expensive still than BC Hydro's average embedded cost of electricity supply. If large volume electrification began to occur due to natural gas customers switching to electricity the incremental electricity supply needed to serve the extra load would become more and more costly as the lower priced (and more competitive) sources of new supply would be expected to come on-stream first leaving more expensive sources for development later.



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Coincident Peak Electricity Demands by Customer Segment (BC Hydro 2007 Rate Design Application, Exhibit B-3, Terasen Utilities IR 1.9.1)



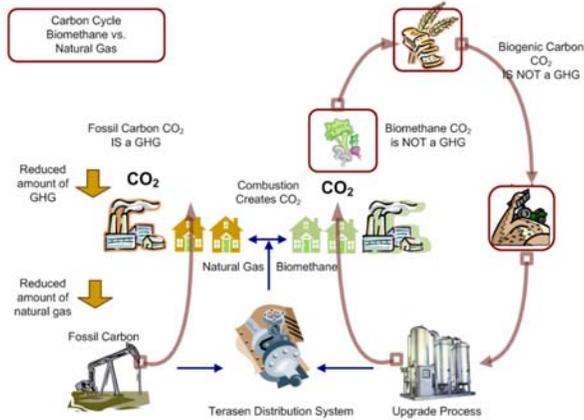
Coming back to the fact that natural gas and electricity currently provide about the same amount of end use energy in BC it is readily apparent that there would need to be a large incremental increase in the cost of electricity to absorb the energy needs being served by natural gas. In its 2008 LTAP proceeding BC Hydro has already indicated that it is expecting large electricity rate increases over the next ten years assuming business-as-usual growth in electricity demand (BC Hydro 2008 LTAP, Exhibit B-3, BCUC IR 1.7.1, Attachment 1, page 7 of 9). Adding further electricity demand due to natural gas-to-electricity load migration would only serve to exacerbate this situation.

In conclusion, programs such as the biomethane program, which could potentially reduce fuel switching from natural gas to electricity, would result in a lower overall demand for electricity (especially peak electricity) and would, therefore, help to lower the marginal cost of electricity.

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8. Reference: Exhibit B-1, Page 20

Figure 2-7: Carbon Cycle – Biomethane vs. Natural Gas



8.1. Is it not also true that in the production of conventional natural gas there is a significant release of GHG gas emissions, which further enhances the net GHG beneficial nature of the proposed Biomethane?

Response:

There is a release of GHG emissions associated with the production of natural gas.

As shown in the Figure below, the oil and gas production industry accounts for the second largest share of B.C.'s GHG emissions, representing 18% of GHG emissions¹. The fossil fuel production GHG emissions of 18% of the total provincial are related to BC-produced fossil fuels (coal, oil and natural gas) that are consumed within BC as well as those that are exported to other provinces and states in North America and overseas. Displacing conventional natural gas with Biomethane will avoid both the production and consumption-related GHG emissions in the Province, if we look at BC in isolation.

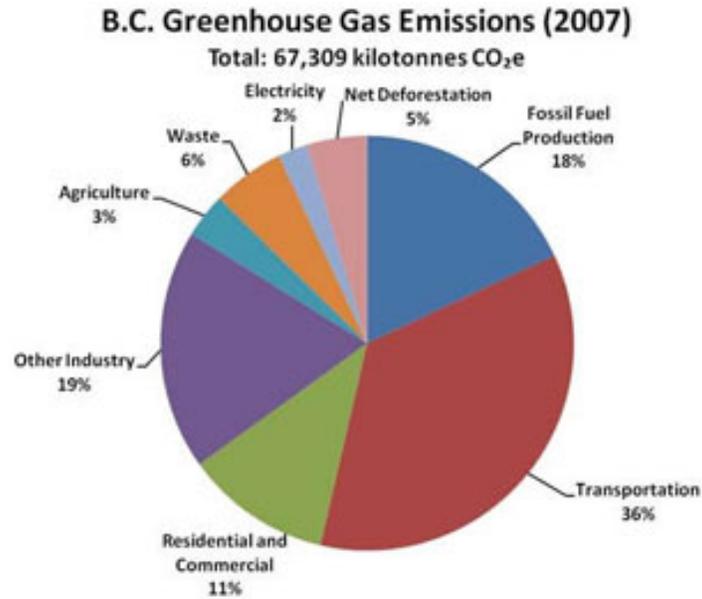
However, given that B.C. has a rich endowment of conventional and unconventional (shale gas) natural gas resources, which is an important contributor to BC's economic growth and development, while this gas may not be consumed in BC it will be produced and exported for consumption in neighbouring jurisdictions. Since initial volumes of biomethane are very small in relation to the total amount of conventional natural gas produced in the province there will not be a noticeable impact on GHG emissions from upstream natural gas production. However each

¹ <http://www.livesmartbc.ca/learn/emissions.html#Sector>



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gigajoule of renewable biomethane that is consumed in place of a gigajoule of conventional natural gas will also avoid the associated upstream emissions from natural gas production.





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9. Reference: Exhibit B-1, Page 21

- The *Greenhouse Gas Reduction Targets Act* ("GGRTA"), enacted in 2007, mandates reductions of provincial GHG emissions of thirty-three percent by 2020 and eighty percent by 2050 using 2007 as the baseline.¹⁶ The GGRTA also requires all departments of the provincial government to become GHG neutral by 2010.

9.1. Is it not the case that the BC Government does not have detailed plans for how to achieve the 2050 GHG targets and that without leadership and contribution from a number of parties including utilities such as Terasen achieving the targets will be an even greater challenge than it already is?

Response:

Recognizing that utilities have a leadership role to play in helping to achieve the GHG emissions reduction targets, TGI applied to expand its service offerings to provide alternative energy solutions to customers in its 2010-2011 Revenue Requirements Application, which was settled by a negotiated settlement process and approved by BCUC Order No. G-141-09. In that process, TGI made a commitment to file a biomethane application at a later date. This Application is a result of TGI's commitment to be a leader in providing solutions to help customers achieve their GHG emission reduction goals. As the figure in the response to CEC IR 1.8.1 demonstrates, two of the greatest opportunities in BC for GHG emission reductions are in the transportation and residential / commercial sectors. TGI is in a key position to provide new integrated energy solutions in these sectors in order to address customer needs and help the Province meet its GHG emission reduction targets.



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10. Reference: Exhibit B-1, Page 28

- **Contribution Programs:** The earliest types of programs were contribution programs that were designed to allow customers to contribute to a utility managed fund for renewable energy project development. In most contribution programs, customers can determine the amount of their monthly donation. In some cases the customer contribution is tax deductible, which utilities accomplish by setting up separate non-profit entities to administer the program.

10.1. Is there a tax deductible status for contributions to GHG reduction in BC?

Response:

On July 28th, 2010, Terasen Gas received a letter from the British Columbia Ministry of Finance regarding Terasen Gas' enquiry regarding the application of carbon tax on the sale of natural gas, specifically, biomethane. The Company is currently in discussion with the Ministry Of Finance regarding the letter, and determining the appropriate next steps. The Company intends to file a response to this question by August 18th, 2010. The Company believes that this delay is required and appropriate, to enable the Company to address this question taking into account the most recent developments.

10.2. Hasn't the BC Government gone in the other direction by taxing the carbon content in conventional natural gas and not taxing biomethane?

Response:

On July 28th, 2010, Terasen Gas received a letter from the British Columbia Ministry of Finance regarding Terasen Gas' enquiry regarding the application of carbon tax on the sale of natural gas, specifically, biomethane. The Company is currently in discussion with the Ministry Of Finance regarding the letter, and determining the appropriate next steps. The Company intends to file a response to this question by August 18th, 2010. The Company believes that this delay is required and appropriate, to enable the Company to address this question taking into account the most recent developments.



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10.3. Is such a separate non-profit really a practical option in BC?

Response:

No, in TGI's opinion setting up a separate non-profit is not a practical option for the proposed Green Gas program. As discussed in BCUC IR 1.5.1 and BCUC IR 1.5.3, TGI examined Contribution Programs, some of which were tax deductible. Contribution programs were the earliest types of programs and the least popular, representing less than 3% of the green pricing programs across North America, whereas renewable energy-based programs represent over 95% and dominate the top 10 green pricing programs. When compared to an Energy-based program, Contribution Programs are likely to encounter scrutiny as to how the funds are being distributed as they are not tied to a specific amount of energy. The lack of popularity of these types of programs has contributed to limited renewable energy development in the areas where they are offered. TGI has not evaluated the implementation of this program within the organization in detail, but expects that the administrative burden of creating and operating a registered renewable energy focused charity for tax purposes would create unnecessary administrative and management costs to the total cost of operating the renewable energy projects. In discussions with NW Natural staff that set up their carbon offset program, NW Natural indicated that they investigated setting up a non-profit to administer collection of funds for their program and it was more costly to do so than with a for-profit partner.

TGI's scientific research indicated a strong preference for a renewable-energy based program and as such, it is the Company's opinion that setting up a separate non-profit is not a necessary measure for the proposed program.



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11. Reference: Exhibit B-1, Page 30

Since 2000, the average premium has dropped at an average annual rate of 8%, leading to lower initial premiums for many new programs³². Terasen Gas' proposed price premium will also follow this trend as discussed in Section 5.3.3.2 and will be in the range of 8-12% premium on the natural gas commodity.

- 11.1. Does the research material explain why the average price premium is dropping over time and if so could this explanation be provided?

Response:

The NREL Report attached in Appendix C-1 suggests that some of this reduction can be attributed to lower market costs for renewable energy supplies and in recent years increases in the price of natural gas have narrowed the price gap between renewable and gas-fired generation alternatives leading to lower initial premiums for many new programs. Natural gas prices have fallen dramatically recently, reversing this trend, so the trend is less clear than in previous years without knowing the cost of new renewable energy supplies, but the Company's opinion is that it is likely to continue a downward trend at a slower decline rate. Please refer to the response to BCUC IR 1.7.2 for further details.

- 11.2. From the data supplied it can be seen that the price premium in absolute \$ is staying more stable, but has dropped recently but that the increased price of electricity is changing the % price premium. Presumably it is the absolute \$ premium that is necessary to pay for programs and not necessarily a % price premium on a rising price, is this the case?

Response:

TGI agrees with the statement that it is a dollar value that determines the cost of renewable energy and that the percent premium will fluctuate over time relative to the current commodity price. TGI's proposed program is connected to TGI's cost of service for Biomethane. At this stage TGI believes that the resulting 10% premium is sufficient to recover the costs associated with the Green Gas program because it represents the current premium of the cost of service of Biomethane at a 10% and 90% conventional natural gas blend divided by the price of 100% conventional natural gas. If the cost of acquiring Biomethane rise or fall that price will be



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reflected in the blended rate charged to customers participating in the program. TGI has proposed in the Application that the rate be reset annually to reflect the costs.

- 11.3. How stable will the cost of the biomethane be once introduced, is it likely to have a rising cost curve such as the price curve expected for electricity prices in BC?

Response:

Due to a very large portion of the costs of a Biomethane project coming from fixed capital investment, the cost of Biomethane from each project is respectively expected to stay relatively stable, assuming the volume produced at these facilities is consistent from year to year. The cost of producing Biomethane will however vary from project to project and from year to year based on the differences generated by the cost of service line items, primarily as a result of depreciation and taxation changes.

TGI is unable to make definitive comparisons to the price curve for electricity but notes that it believes new Biomethane production can currently be brought on at costs comparable to the BC Hydro standing offer rate. TGI believes that this is significantly less expensive on an energy basis than some of the current marginal sources of clean electricity supply.

- 11.4. To the extent there is a risk of not paying for the cost of the biomethane presumably the 10% premium can remain and the blend can be changed, would that be an option to ensure that there is essentially no risk of stranded assets?

Response:

As discussed in the Company's response to BCUC IR 1.6.3, the program has been designed to recover the incremental cost of Biomethane. At this stage TGI believes that the resulting 10% premium is sufficient to recover the costs associated with the Green Gas program because it represents the current premium of the cost of service of Biomethane at a 10% and 90% conventional natural gas blend divided by the price of 100% conventional natural gas. If the cost of acquiring Biomethane rises or falls that price will be reflected in the blended rate charged to customers participating in the program. TGI has proposed in the Application that the rate be reset annually to reflect the costs, therefore, the risk of the cost of Biomethane not being recovered within the program is very small. However, in the unlikely event that the costs were to be higher than expected, TGI could apply to the Commission to restore the cost of service basis via an altered blend or a different premium, depending on TGI's assessment of which would best ensure the success of the program.



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- 11.5. A 10% premium on conventional natural gas costs is likely to be much more stable, relative to historical prices, than a 10% premium on electricity prices in BC based on current forward price projections, is that not true?

Response:

No, it cannot be assumed that a premium on natural gas costs is likely to be more stable than a premium on electricity prices. Natural gas is a volatile commodity.

As discussed in the Company's response to BCUC IR 1.6.3, the premium is the result of the current cost of service of Biomethane relative to the current cost of commodity gas on the Terasen Gas system. The proposed Green Gas program has a fixed blend with a variable premium, meaning that the risk of the cost of Biomethane not being recovered within the program is very small. The Company feels there is actually less risk in recovering costs by having a cost of service based on a set amount of Biomethane.



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12. Reference: Exhibit B-1, Page 35

Terasen Gas commissioned TNS Canadian Facts ("TNS"), one of Canada's largest marketing and social research firms, to conduct a primary market research study⁴⁰ to validate and evaluate the potential residential and commercial markets for a Biogas⁴¹ program in BC, its market drivers, and factors affecting different price points.⁴² There was strong support from both residential and commercial markets surveyed for a Terasen Gas renewable energy-based program, in which customers can sign up for a portion of their gas use to come from the Company's proposed Biogas supply projects. There was also a strong preference among survey participants for a 10% premium to the commodity price, which would result in a 10% blend of Biogas. Terasen Gas has, to a significant extent, designed the proposed program around the results of the market research.

- 12.1. Has Terasen considered a Team HeatSmart kind of social networking program through the social networking media to build a community of interest in its Green Heat options?

Response:

Yes, TGI has considered social networking and social networking media for education and promotion of the program and has included this type of activity in the budget for online communications in Table 6-3: Customer Education Annual Budgets, pages 57-58 of the Application. Social networking is an effective channel through which to gain more exposure and generate influential word-of-mouth communications.

TGI will contribute content and participate in conversations that members of the target audience have online about reducing environmental footprints through energy choices. This will include engaging those who publish blogs, whether they are directly or indirectly related to the environment and energy.

- 12.2. Has Terasen examined BC Hydro's Team PowerSmart and are there any lessons to be learned from this kind of marketing to build market and confidence in Terasen's marketing and pricing proposals?

Response:

Yes, Terasen Gas has examined BC Hydro's Team PowerSmart.



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As noted on page 57 of the Application, Terasen Gas is proposing a very modest customer education budget of \$400,000 over 2010-2011 in order to achieve the targeted demand and customer awareness. The communications plan envisioned for the Green Gas program entails primarily online and print communications, along with incentives for customer participation and referrals. BC Hydro's "Team PowerSmart" initiative falls into the categories of "Behaviour" and "Public Awareness and Education", which had requested budgets of \$21 million and \$8.5 million respectively in BC Hydro's 2008 LTAP (Appendix K, page 109). "Team PowerSmart" had many different marketing components: a significant TV campaign, radio, print, the involvement of "celebrities" as well as an online component.

Terasen Gas believes that the marketing plan for the Green Gas program outlined in Appendix H of the Biomethane Application will be sufficient to achieve the targeted demand as outlined in Section 6.5.1 of the Application.

12.3. Would this be a useful addition to the one time survey work already undertaken?

Response:

TGI has examined BC Hydro's PowerSmart program and believes it is too extensive for TGI's proposed offering. See the response to CEC IR 1.12.2.

12.4. Has Terasen compared its green renewable programs to BC Hydro in terms of whether or not specific user customers are asked to pay or whether all customers participate in the costs of adopting green renewable sources of supply?

Response:

TGI is aware of the differences between how BC Hydro is developing renewable energy programs and how costs will be recovered from TGI customers within the proposed Biomethane Application. In general, BC Hydro is recovering the costs of renewable energy costs from all customers, whereas TGI's model is to recover energy costs from customers who opt into the program, with the costs associated with making the program available to all customers recoverable through the distribution charge. TGI's rationale for this approach is outlined below.

The background for this discussion is TGI's Revenue Requirement Application (RRA) for 2010 and 2011. In the RRA, TGI put forward a cost recovery mechanism for biogas which was similar



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in principle to how BC Hydro recovers the costs for renewable energy. This mechanism was outlined on page 250 of the TGI RRA as follows:

The costs of biogas and upgrading will be tracked and accounted for. TGI is also requesting approval to recover the costs of biogas and upgrading during this two-year period, through TGI Midstream Costs Reconciliation Account².

TGI viewed this proposal as an interim solution that would move two supply projects forward, while it began work to validate customer demand and structure a product offering to recover the costs associated with the "green" gas from customers who purchase the green energy. The Commission Panel's "Issues of Concern" identified at the outset of the Negotiated Settlement Process (NSP) (and set out in the Negotiated Settlement Agreement (NSA) that resulted from the NSP), stated: "*Biogas – to be reviewed by a CPCN which demonstrates market uptake of customers that are willing to pay the full costs*". TGI understood this to be a direction from the Commission to move the "biogas" project forward on the basis of a user pay cost recovery model, which is consistent with TGI's currently approach to cost recovery. The Biogas offering was deferred by agreement in the NSA.

TGI believes that the costs incurred to make the service offering eventually available to all customers should be borne by all of the customers, as they are driving those costs. TGI's research suggests that adhering to the principles of cost causality in the manner proposed by TGI also enhances the potential for maximizing customer participation in the program.

Currently, TGI product offerings to customers make a clear separation in cost recovery between energy costs (gas commodity and resources to bring the gas to the TGI distribution network (Midstream)) and infrastructure and O&M cost to provide delivery service to customers. This is apparent within TGI's current business models, transportation services and the Customer Choice program, where customers elect to whom and how they buy their natural gas or energy. There is no energy or commodity related costs embedded in the distribution charge which all customers pay. This is in contrast to the BC Hydro example, where customers have limited choice or options to how they buy their energy.

In TGI's view, this Application meets the guidance of the Commission Panel in the RRA in bringing forth a "green" offering that demonstrates strong customer demand and recovering the energy costs from the customers who elect into the program.

The cost recovery proposal contained within Section 10 of the Application is consistent with past practice in allowing customers to opt into programs in which they pay the majority of the associated costs. TGI is of the belief that certain costs which make the product offering available to all customers should be borne by all customers, but costs that can be directly tied to

² These cost are recovered from Rate Schedule 1 through 7 customers.



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a product offering should be recovered from the customers who elect to purchase their energy costs from a certain supplier or in a certain manner.

If the provincial government was to mandate a renewable portfolio for natural gas companies in BC, as they have done for BC Hydro, TGI would need to develop a new recovery mechanism related to energy charges that could be recovered from all customers, like the distribution charge. For example, this could come in the form of a rider applied to all customers. TGI recognizes that such a mechanism might have some merit in helping the government reach its GHG provincial reduction targets, but we must balance this goal with how customers on the natural gas side are comfortable and used to making decisions related to how, when and who they buy their natural gas from. This flexibility in product selection is valued by some customers because it allows them choice in a product offering.

In sum, TGI is aware of BC Hydro's green renewable programs, and took this information into consideration in the process of developing the Green Gas program, while at the same time recognizing the differences in how energy costs are recovered from customers on the natural gas side versus the electricity side in BC.



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13. Reference: Exhibit B-1, Page 42

There was a very high level of support at a 0.5% - 1% price increase for costs to be borne by all customers for a Terasen Gas Biogas program. The results below pertain specifically to Terasen Gas customers and indicate that 78% of Terasen Gas residential customers and 65% of commercial customers would support the program⁶⁶ at this level of price increase. As expected, support for a Biogas program where costs were borne by all customers decreased as the potential price of gas increased. This is depicted in Figure 5-3 below.

- 13.1. With high levels of support for a universal program at a very modest level, why would Terasen not include such a proposal in their application?

Response:

The Company's preference expressed in the TGI 2010-2011 Revenue Requirements Application (RRA) was to develop sources of Biomethane and pass along costs to midstream customers until the supply sources were sufficiently proven as to allow the launch of a directed Green Gas program. TGI included this line of questioning in the survey done by TNS to gauge what the pricing level acceptance would have been for modest price increases spread amongst all customers. This proposal in the RRA was withdrawn without prejudice as part of the Negotiated Settlement Process, with the understanding that TGI would subsequently propose a user pay program based on guidance from the Commission Panel "Issues List" outlined in the Negotiated Settlement Agreement date November 5, 2009. The Company feels however, that the universal price increase support does support TGI's cost allocation proposal for some costs to be borne by all customers.

The Company feels that the precedent from the Customer Choice program and current practice whereby customers pay for the gas they choose to purchase and consume, and all share collectively in the costs of bringing all gas on to the system and maintaining the system and other customers programs is appropriate and fair. Please also see the response to CEC IR 1.12.4.



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- 13.2. Could the Commission require Terasen to introduce a universal component to the program as soon as Terasen is able to line up sufficient supply?

Response:

TGI finds it difficult to answer this question in the abstract, without knowing the circumstances in which such a requirement would be imposed. The Commission has general jurisdiction to determine just and reasonable public utility rates. A number of factors would potentially go into the consideration of just and reasonable rates, including the amount of the increase contemplated and government's energy objectives. Please also refer to CEC IR 1.12.4. TGI believes that some universal component beyond that proposed in the Application would meet the requirements of just and reasonable rates (in fact, this is what TGI proposed in the RRA as a pilot). TGI anticipates that the same may well be true in the future, but it would be necessary to consider all of the relevant circumstances at the time.

- 13.3. Is the premium program a useful starting point and other potential pricing options can be augmented at a later date as Terasen develops the market?

Response:

Yes. The Green Gas program as proposed serves as a starting point to wider producing and consumption of Biomethane in British Columbia. Terasen Gas has received expressions of interest from customers in other rate classes than those proposed in this Application and also from customers in several rate classes interested in purchasing either higher blends of or 100% Biomethane.

Please refer to the Application, Section 6.4.2 for further information relating to proposed plans for the future development of the Green Gas program's customer offerings.



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- 13.4. Would it be useful to Terasen to have approval to implement a modest universal program, such as the data supports, when it has available supply rather than bear the added regulatory burden of another application to the Commission in the future?

Response:

TGI believes a simple straight forward offering (Rate Schedule 1B) along with the identified risk mitigation measures (Rate Schedule 11B and amendments to Rate Schedule 30) as proposed in Section 6 and 11 of the Application offers the best chances of success for a customer demand driven user-pay program. Terasen Gas has proposed a streamlined process for the expansion of the proposed Green Gas program which, if approved, will allow an efficient regulatory process allowing demand and supply to be brought into balance as quickly and economically as is possible.

Please also refer to the response to CEC IR 1.12.4.



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14. Reference: Exhibit B-1, page 45

The following results were observed for these price points for residential customers:

- 16% of residents say they would sign up for a Biogas renewable energy-based program that had a 10% price increase and a corresponding 10% GHG reduction;
- 11% of residents say they would sign up for a program at a 20% price increase with a 20% GHG reduction; and
- 8% of residents say they would sign up at a 30% price increase with 30% GHG reduction.⁷²

- 10% of Terasen Gas' commercial customers say they would subscribe to a Biogas program at a 10% price increase of the current commodity price and 10% GHG reduction;
- 6% of commercial customers say they would subscribe at a 20% price increase and 20% GHG reduction; and
- 5% of customers say they would subscribe at a 30% price increase and 30% GHG reduction.⁷³

14.1. Has Terasen considered a program where multiple price points are offered so that customers can self select the level of contribution they might like to make?

Response:

Yes. Terasen Gas is committed to expanding the proposed Green Gas offering to allow multiple higher blends so that customers might self select their consumption levels when our new CIS allows these to be economically introduced and as sufficient supply is brought on to the Terasen Gas system as discussed in Section 6.4.2 of the Application.

Under our present CIS through CWLP there is a cost of approximately \$50,000 (described in Appendix G of the application) for adding each incremental Rate Schedule or blend to the proposed Green Gas program. Due to the limited availability of Biomethane between now and the commissioning of our new CIS in 2012, and also due to the Company not expecting any similar incremental cost for adding new Rate Schedules or blends to the Green Gas program with the new CIS, Terasen Gas did not propose to offer any other blends than the one applied for in Rate Schedule 1B before 2012.



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The Green Gas program as offered represents a measured, phased approach to ensure the sustainable development of this new product offering.

14.2. What issues are there for Terasen in offering a multiple price point product?

Response:

Please refer to the response to CEC IR 1.14.1.

14.3. Has Terasen noted that the lower participation rates expected for higher premiums produce higher expected value GHG reduction contributions and would this be a useful consideration in Terasen's decision making about premium levels?

Response:

Terasen Gas has observed the fact that, according to the scientific research detailed in Section 5 of the Application, a 30% blend offering rather than the 10% blend proposed might have sold more Biomethane despite declining participation rates. The Company proposes to begin with the 10% blend proposed in the Application as it will allow as many customers as possible to purchase Biomethane during the first phase of the program. Terasen Gas believes that allowing as many customers as possible to participate as soon as possible will lead to additional customer awareness, saving customer education costs as well as promoting the long term success of the program.



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15. Reference: Exhibit B-1, Page 46

Applying the industry average for enrolment in green pricing programs would result in over 16,000 residential sign-ups for Terasen Gas. Terasen Gas considers this to be a conservative measure because the industry average includes carbon offset programs, which tend to have lower participation rates than renewable energy-based programs which are the top performers and is in the nature of what is proposed by Terasen Gas. The two current supply projects included in this Application could currently only serve 12,000 –15,000 residential customers based on a 10% Biogas blend. Therefore, the Company feels confident that there is sufficient demand even when using the industry average to proceed with a Green Gas offering to customers.

- 15.1. If Terasen had an option to provide a universal program in the unlikely event the specific premium price program did not work, what would be the price increase across the Terasen system to absorb these two projects?

Response:

If the cost of service for the Green Rate Offering was to be charged to all non-bypass customers the impact on average rates using the throughput from the negotiated settlement for 2011 would be \$0.011 / GJ (\$1,764,300 cost of service for 2010/2011 divided by 157,738.3 TJ (BCUC Order No. G-141-09, Appendix A, Page 36 of 110, Line 25, Column 3). For a Lower Mainland residential customer who uses 95 GJ per year this would equate to an annual cost of \$1.05.

Please refer to the response to CEC IR 1.12.4.



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16. Reference: Exhibit B-1, Page 49 & 50

- The proposed sales model is designed to leave the Customer Choice program and its customers unaffected. The customer continues to have choice of commodity supply between a Gas Marketer's fixed rate and the Terasen Gas variable rate. Customer: electing to participate in the Customer Choice program may not be enrolled in the Greer Gas program and any customer who is enrolled in the Green Gas program and who elects to participate in the Customer Choice program would be automatically removed from the Biomethane tariff. Gas Marketer rules and functionality that are part of the Customer Choice program will remain unchanged.

- 16.1. Can Terasen confirm that there will be nothing preventing a Gas Marketer from obtaining its own supply of green gas, provided that the supplier meets the Terasen safety and reliability standards, such that they may offer a green gas product as well if they so choose?

Response:

Confirmed. Phase one of the program is focused on validating the market and producer reliability. As discussed in the response to BCUC IR 1.66.1, through the proposed Rate Schedule 11B and the proposed amendments to Rate Schedule 30, the Company will have the capability to sell Biomethane to marketers both on and off of the Terasen Gas distribution system should there be excess supply. Additionally, the business model doesn't preclude a gas marketer from developing their own supply at a future date. As stated on page 128 of the Application:

"Terasen Gas recognizes the possibility of making the supply of Biomethane available to marketers to integrate into their offerings once the product and market have matured sufficiently to make such an offering possible. Further, nothing proposed in this Application precludes Marketers from developing sources of raw Biogas supply. The Company has made every effort to ensure it has the capability to sell Biomethane to Gas Marketers as part of our risk mitigation planning."

Please refer to the responses to BCUC IR's 1.16.2 & 1.21.5.



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- 16.2. Given that the customers buying gas from a Gas Marketer under the Customer Choice programs will not be eligible to obtain a Biomethane service, will they also be exempt from paying any of the general service development charges being allocated to all customers?

Response:

No. The Customer Choice program (fixed rate) and the Green Gas service offering (variable rate) result in some costs to be borne by all customers in order to enable these two options for customers. The distribution system infrastructure and Green Gas service offering costs are those costs related to providing the Green Gas platform for the receipt of Biomethane onto the distribution system and for enabling the sale of Biomethane to all customers. Under the cost allocation proposals made in the Application, the costs allocated to all non-bypass customers will be recovered from marketer customers as well as Terasen Gas commodity customers and Green Gas customers through delivery rates as they will be eligible to enrol in the service offering when their gas marketer contract has expired. As discussed in Section 10 of the Application, these costs aren't proposed to be recovered until 2012. Green Gas customers, as well as marketer customers and Terasen Gas commodity customers, will also continue to contribute to the costs of the Customer Choice program as is currently the case. The Company believes that continuing this current practice is the most appropriate and fair cost allocation methodology.



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17. Reference: Exhibit B-1, Page 50

- Biomethane rates will typically be set on a forecasted 12 month period with the rate reset on a January 1 effective date (the initial offering anticipated effective October 1, 2010 will be based on a 15-month forecast period). The non-Biomethane commodity tariff rate will remain subject to quarterly rate adjustments, and the resulting blended commodity rate that customers will see on their bills could change up to four times a year as the standard commodity rate changes.

17.1. Given that the Biomethane is purchased at a premium, relative to conventional natural gas, sufficient to make the supply economic, why would the price change quarterly?

Response:

Please refer to the response to BCUC IR 1.36.1.1.

The Biomethane costs and recoveries will be subject to quarterly review, as part of the Company's quarterly gas cost report to the Commission, however under normal circumstances the Biomethane Energy Recovery Charge would be adjusted on an annual basis using a January 1 effective date. The Green Gas rate offering for Sales customers, as described in the Application, is a 10% blend of Biomethane gas and a 90% blend of natural gas commodity. The Biomethane commodity component of the tariff would normally be adjusted annually, however the natural gas commodity component of the tariff, similar to the natural gas Commodity Cost Recovery Charge for all Sales customers on the Terasen Gas Standard Rate Offering, is subject to quarterly review and adjustment.

17.2. Is Terasen proposing that the biomethane supply will float at a premium with respect to conventional natural gas prices?

Response:

No, Terasen Gas is not proposing the Biomethane supply will float at a premium with respect to conventional natural gas.

Please refer to the response to BCUC IR 1.36.1.1.



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17.3. What is expected to influence the proposed price changes for which these proposed adjustments may be made?

Response:

Please refer to the response to CEC IR 1.17.1. One factor that could influence the resetting of the Biomethane Energy Recovery Charge would be the introduction of new projects into the portfolio, but there would also be changes relating to current Biomethane projects such as changes in annual production volumes, and any contractual escalation clauses and incentive volumes.



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18. Reference: Exhibit B-1, Page 56

Table 6-1: Targeted Demand

		# of Customers	Volume	# of Eligible Customers ^[1]	% of Customers	Enrolments	Volume	Volume @ 10 %
Oct 2010- Dec 2010	Residential - Terasen Gas Rate 1	752,416	72,348,220	616,981	0.50%	3,085	73,267	7,327
2011	Residential - Terasen Gas Rate 1	752,416	72,348,220	616,981	1.00%	6,170	586,132	58,613
2012 ^[2]	Residential - Terasen Gas Rate 1	752,416	72,348,220	616,981	2.00%	12,340	1,172,264	117,226

Notes:

^[1] eligible customers are those not currently enrolled with a marketer

^[2] 2012 projections do not include commercial market customers or growth in residential customers

18.1. How will the supply timing be matched to the market and when will customers begin to be charged when the supply comes on-line?

Response:

TGI's first Biomethane project is expected to begin production by end of August 2010, several months in advance of the proposed Green Gas offering. Therefore, the Company will have notionally stored Biomethane as well as have a better idea as to what can be counted as firm supply for the initial offering. TGI has requested approval of Rate Schedule 1B to be effective 1st, October 2010, to enable customers to enrol at that time, however, if the regulatory process has not been completed by that time, TGI would anticipate offering the service prior to the end of the year (2010).

The expected rollout to other rate classes will be driven by uptake rates in the first phase of the program, as well as supply availability and could be modified from time to time. See the response to CEC IR 1.18.3 for details on a potential waitlist.

As the Green Gas offering is a notional delivery, Biomethane from new supply projects can be notionally stored for future delivery to TGI customers and excess supply sold off through the proposed Rate Schedule 11B and amendments to Rate Schedule 30. Customers that enrol in the Biomethane Rate Schedule will begin to be charged effective the first of the month following the month they enrol. The Biomethane Variance Account ("BVA") will capture all the actual costs incurred and the sales revenues received related to Biomethane gas.



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18.2. What will happen if the supply is interrupted for any reason?

Response:

Terasen Gas has proposed several risk mitigation tools to deal with the potential interruption of Biomethane supply to our distribution system. Terasen Gas will first utilize the modest cushion of notionally stored Biomethane as described in our response to BCUC IR 1.36.1.2. The proposed amendments to our General Terms and Conditions also allow substitution of carbon credits or removal of customers from the program in the unfortunate event of insufficient Biomethane supply. The Company believes that these steps are sufficient to mitigate the risk of undersupply.

18.3. Will customers be waiting in a queue for supply because of over subscription if that occurs?

Response:

Terasen Gas has proposed to balance supply and demand through the use of internal enrolment caps in the Green Gas program. The Company anticipates that a list of customers interested in enrolling in the Green Gas program, but previously unable to because of this cap, will be notified when more Biomethane is available for the program. Customers will be enrolled on a first come, first served basis.



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19. Reference: Exhibit B-1, Page 61

There is a significant potential supply of Biomethane within the Terasen Gas service territory. Many of the prospective partners that are interested in working with Terasen Gas have the potential to offer long-term supply to the utility. Terasen Gas intends to take a measured approach to bringing these supply sources to market. Projects will be evaluated and implemented when required to meet demand for Biomethane over time.

- 19.1. Would it be useful in terms of matching supply and demand to have a universal price increment included for all customers, such that all customers could take up the new supply immediately as it becomes available and then the supply could be reallocated to premium paying customers from the universal supply?

Response:

The Company does believe the above option would be useful. TGI proposed a similar model as described above in the TGI 2010-2011 Revenue Requirement Application whereby new supply would be developed and costs incurred would be recovered through the mid-stream rate of customers in rate Schedules 1-7. The Company proposed to develop a new Green Gas offering in parallel, whereby, when supply was further established, offer a premium product to customers who elect in the program. As a result of the Negotiated Settlement Process, the Biogas proposal was withdrawn without prejudice and TGI committed to return with a comprehensive business model that would stream the cost of the Biomethane to customers that elect in the program. This model does limit the aggressiveness of supply development, but it also reduces risk to ratepayers by ensuring projects are not overdeveloped to meet expected demand for a user-pay program.

Please also refer to the response to CEC IR 1.12.4.

- 19.2. Could having the universal supply as the buffer in matching supply and demand for premium paying customers be helpful?

Response:

Yes, please see the response to CEC IR 1.19.1.



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20. Reference: Exhibit B-1, Page 80

1. The projected supply meets the proposed economic test discussed in Section XX above, with the maximum price for delivered Biomethane on the system re-calculated from time to time based on updates to the BC Hydro RIB Step 2 Rate;
2. The supply contract is at least 10 years in length;
3. Terasen Gas has, by agreement, retained final control over injection location;
4. Terasen Gas is satisfied that the upgrade technology is sufficiently proven;
5. Terasen Gas has, by agreement, reserved the right to refuse gas if customer safety or asset integrity is at stake;
6. The partner is a municipality, regional district or other public authority, or is a private party with a track record in dealings with the Company or that posts security to reduce risk of stranding.

20.1. Is Terasen expecting suppliers of the Raw Biogas to bid prices to Terasen for the contract term?

Response:

Terasen Gas does not currently have a formal process for accepting bids from any potential suppliers. At this time, Terasen Gas believes that it is in the best interest of the biogas program and by extension the customers to keep a negotiation process that is as flexible as possible given the small number of participants and the infancy of the market. Terasen Gas understands that investors in supply projects will require a fair return on their investment. The price needs to be as low as possible to allow for maximum customer participation, and Terasen Gas is motivated to negotiate on that basis. Projects that are economic will have to cover the costs of development and investment returns, while still providing biomethane at a cost consistent with the expectations of the Commission.

As additional operating data such as true operating costs, customer demand and customer willingness to pay is collected, Terasen Gas will be in a better position to understand what a reasonable price is for raw biogas. Further, any investment by Terasen Gas would need to be economic and would therefore be dictated to some degree by the amount of energy available compared to the capital costs.

Terasen Gas is willing to consider a formal bid price process for future supply projects, but at this time, it is considered premature.



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20.2. Is Terasen going to be selecting projects based on the best economic bid for customers?

Response:

Please see the response to CEC IR 1.20.1.

20.3. Has Terasen considered using a standing offer price and seeing which projects come forward?

Response:

Terasen Gas believes that the supply market is too immature to develop a sensible and rational standing offer program. Currently, there is not enough actual data (in the form of operational costs, reliability, customer sign up etc) to develop a price that would meet the objectives of the program.

In the absence of a standing offer program, however, Terasen Gas has presented a cap on the price of biomethane at \$15.28/GJ to customers. This cap will provide some guidance to project developers regarding a possible selling price to TGI for biomethane and therefore a basis for evaluating project economics.

Further, Terasen Gas went through an RFEOI process specifically related to biogas to get an early understanding of projects that may be developed. However, as mentioned above, the immaturity of the market did not allow for Terasen Gas to develop a rational price, so the process has intentionally been left flexible.

Terasen Gas believes that in the future a standing offer program may be an efficient means of developing supply, but it is too early to establish it today.

20.4. How is the maximum price proposed going to be used, is it only a cap beyond which Terasen will not buy biogas?

Response:

Terasen Gas will use the maximum price as a cap above which biomethane will not be purchased.



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The maximum price as described in the Application in Section 8.4.2.1 and restated here, is the "forecast maximum unit cost of \$15.28/GJ". Costs associated with the project (upgrading equipment on a cost per GJ), biomethane and/or biogas costs will be added together and compared with the maximum price.

Terasen Gas believes that this is a reasonable proxy because it ensures that customers will pay less than or at most equal to a comparable amount of energy derived from electricity. At this time, Terasen Gas believes that this price is a good proxy for a price cap. However, in the future, as energy prices change Terasen Gas may re-evaluate this cap to ensure that there continues to be an incentive to develop biogas projects and at the same time that energy consumers are paying a price that is reasonable when compared to other similar energy sources. In terms of how projects will be developed, Terasen Gas plans to attempt to develop the most cost effective projects first.



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21. Reference: Exhibit B-1, Page 85

It is expected that the equipment installed by Terasen Gas will have a lifetime that exceeds the contract term. The Company will evaluate whether or not to pursue a renewal of the contract at an appropriate time, which is as yet undetermined. In the event that an agreement to renew the contract term was not reached for any reason, Terasen Gas will remove and either re-purpose or liquidate the skid-mounted upgrading equipment and re-purpose the meter and gas analysing equipment.

21.1. What is the expected economic life of the CSRD investments as far as Terasen has been able to determine?

Response:

TGI does not know the expected life of the CSRD investments at the landfill. TGI believes that CSRD took the life of the assets into account when negotiating the 15 year term of the contract. TGI was asked to present to the CSRD board at the final approval meeting for the agreement at the same time the budget for the landfill investment was presented for approval. The TGI/CSRD contract was an integral aspect of the capital investment in the landfill at the board meeting. The key contract terms were clear to the board, including the length of the contract. It was based on this critical board meeting that TGI is confident that the contract term was considered as part of the decision process.

Although TGI does not have confirmation of the life of the CSRD investment, TGI can make an assumption about the life of these assets based on the nature of landfill gas generation. It is probable that the assets would last at least 15 years with proper maintenance based on the assumption that the life of the CSRD assets will match the typical gas generation life of a given phase or section of the landfill (see figure below for projected gas production at the CSRD landfill provided by CSRD). Typical landfill gas modelling indicates that buried waste generates waste for more than 15 years (in a declining amount over time). In fact, as the landfill grows over time more gas will be generated, and if CSRD is rational, it will maintain the assets to last beyond the life of the contract to take advantage of higher gas production with some of the same assets. For further discussion regarding the ongoing security of supply at CSRD, refer to the response to CEC IR 1.24.4.



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21.2. What is the expected economic life of the Terasen investments?

Response:

TGI has used 15 years for the economic life of the investments in the cost of service model.

TGI does not have historical data to confirm the expected life of the upgrading equipment. However, according to the manufacturer, the upgrading equipment is expected to last for 20 years with a major overhaul including pressure vessel recertification at year 10. TGI believes that a projected 20 year life provides enough of a margin to ensure that the upgrading equipment can reasonably be expected to last the duration of the 15 year contract.

21.3. Why was a 15 year term chosen as opposed to one which would align with the economic lives of the investments?

Response:

The 15 year term was established based on a negotiation between TGI and CSRD.

From TGI's point of view the 15 year term struck a balance between the required capital investment, the needs of CSRD and a final price for finished biomethane. Further, TGI believes that a 15 year term provides confidence that the upgrading equipment would still have some remaining useful life to allow for contract renewal.

As discussed in BCOAPO IR1.6.1, the capital investment in the CSRD upgrading equipment is being recovered in the final price of the biomethane. A 15 year amortization period was used as an input into the costs for the upgrade equipment. These costs are used for the cost of service model to develop a price per GJ for the biomethane. A 15 year term versus a shorter term results in a lower final price for the biomethane.

The 15 year term also gives TGI the option of using the upgrade equipment beyond the contracted term if desired (as expected life of the upgrade equipment is 20 years). On the other hand, CSRD is investing a significant amount of capital in the landfill and wanted some assurance that TGI would be willing to purchase biogas over the long term. The starting point was similar to the Catalyst Project at 10 years, but both parties agreed that 15 years would better match each others' needs. The contract term provided the balance required to secure a contract with CSRD while providing assurance that TGI would get full use out of the upgrading assets and provide a reasonable price for finished biomethane. TGI is open to considering different contract terms in the future.



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21.4. What is the potential for the Terasen investments to become technologically obsolete over time with the development of new technology?

Response:

TGI believes that the technology being used for the project will meet the technical standards required to meet the expected supply requirements for the life of the contract.

TGI accepts that technology will evolve, however the upgrading equipment for this project is expected to recover as much as 95% of the methane in the raw biogas. Improvements in technology over time could therefore be expected to improve between 0% and 5% when measuring recovery of methane.

Therefore, TGI believes that advancement in technology will have little impact on the success of this project.



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22. Reference: Exhibit B-1, Page 90

Terasen Gas was originally awarded money from the provincial government Innovative Clean Energy ("ICE") fund in early 2009 for a proposed Biogas project at the Lion's Gate Wastewater Treatment Plant. Though that project did not proceed as planned, the ICE fund staff have agreed to transfer the remaining undisbursed funds in the amount of \$315,600 to the Salmon Arm Project.

In addition, Terasen Gas has been awarded \$200,000 from the BC Bioenergy Network (BCBN) in direct support of this project.

- 22.1. What terms and conditions does Terasen have to meet in order to account for the funds and to account for the resulting performance expected by the funds providers, if any?

Response:

Terasen Gas has agreed to the standard terms and conditions of the contribution agreements for these two funding agencies. The terms and conditions are not onerous and benefit customers by reducing the required initial capital investment and therefore the final price of biomethane.

Both of these funding awards are grants and are not expected to be repaid financially. The details of the terms will be found in the respective contribution agreements once they are finalized. Terasen Gas did finalize a contribution agreement for the cancelled Lions Gate project and it is expected that the terms for Salmon Arm to be substantially similar. For both funding agreements the key considerations are expected to be:

1. Recognize the fund providers publicly. This includes press releases naming fund providers, signage at the project sites, mention of fund providers on the website in the appropriate place and naming fund providers in public presentations related to the project.
2. Execute the project to completion. Terasen Gas must complete the project or the funds may be subject to a claw back or repayment.
3. Terasen Gas is obligated to share operating data as a means of contributing to the success of possible future projects.

In general, these terms are considered commercially reasonable and Terasen Gas believes that the benefit to its customers is greater than any cost associated with meeting the agreement obligations.



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23. Reference: Exhibit B-1, Page 92

The quantity of Biogas from this single project will not impact the Company's overall gas supply portfolio. At this level of supply, entering this agreement with the CSRD will not cause Terasen Gas to alter its other portfolio planning practices or contracts. Therefore, on its own, the amount of Biogas promised in this agreement will not leave Terasen Gas vulnerable to either additional market purchases or access to alternative sources of conventional gas to replace Biogas that is not delivered. As additional Biogas purchase agreements come online and as confidence in the firm delivery of pipeline quality Biogas increases, Terasen Gas will reassess the impact on its overall portfolio.

- 23.1. Please confirm that having no impact on the Terasen gas portfolio does not mean that:
- (a) the 30,000 GJs per year will not be displaced; and
 - (b) the peak requirement on the Terasen system will not be reduced from what they otherwise would have been.

Response:

- (a) TGI would like to clarify that no impact, as was stated in the original Application should be interpreted to mean no significant or material impact on the Terasen gas portfolio. Any impacts from potential supply from Biomethane sources will be reviewed annually, by the Commission, as part of the Company's submission of its Annual Contracting Plan. The Annual Contracting Plan details the appropriate Midstream portfolio required to meet core customer load requirements in the interests of providing safe and reliable supply to core customers.

TGI confirms that, in the initial phases of the project, as TGI assesses supply reliability from this supply source, the Company does not anticipate displacing the 30,000 GJs per year in its existing supply portfolio. However, eventually, should this Biogas supply source prove to be reliable, TGI anticipates, at that point, displacing conventional supply quantities equivalent to the Biomethane supply from its supply portfolio. Displacing existing conventional supply with Biomethane supply would be consistent with the objectives of supply cost effectiveness, supply diversity and reliability as outlined in the Annual Contracting Plan. A prudent approach, which will take into account the best interests of customers, will be taken by TGI when evaluating which supply to displace with Biomethane supply.



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To put the amount of Biomethane supply from this project into context, TGI Midstream normally purchases approximately 30 PJs per year of gas supply in the winter months to meet customer load requirements during this period. The 30,000 GJs per year of expected Biomethane supply is a very small fraction of the overall Midstream gas supply portfolio that TGI typically contracts for in a winter period, representing about one-tenth of one percent. As a result, this Biomethane supply is not expected to have a significant impact on the TGI gas portfolio.

- (b) TGI confirms that the TGI peak requirement will not be impacted or reduced as a result of this Biomethane supply. The peak requirement is the maximum level of demand expected on the TGI system as a result of forecast customer demand loads and expected customer usage. The peak requirement is a demand driven forecast and does not change depending on the supply source. However, Biomethane supply is a supply source that can potentially be used to help fulfill the peak requirement. During the initial phases of this Biomethane project, TGI will assess the supply reliability of the Biomethane, and then determine if this supply is sufficiently dependable to be included as part of its supply portfolio, through displacement to help service its peak requirement (as discussed in the response to CEC IR 1.23.1(a), above).

23.2. Please explain the statement that there will be no impact relative to the potential benefits justifying the project.

Response:

As discussed in the response to CEC IR 1.23.1, there is not expected to be a significant or material impact on the TGI gas supply portfolio as a result of the Biomethane project. As is also mentioned in response to CEC IR 1.23.1, the 30,000 GJs of Biomethane supply represents a very small fraction of the overall supply within the midstream supply portfolio that TGI typically contracts for in a normal year.

The main benefit of the Green Gas Program, as outlined in the Application, is to introduce programs that will help customers reduce their greenhouse gas emissions.

In addition to the environmentally friendly benefits of the Biomethane project, over time it is expected that the Biomethane supply will be proven to be a reliable form of on-system supply. On-system supply sources are generally considered more reliable than off-system supply sources as they are not typically adversely affected by third party pipeline outages or upstream supply constraints and/or curtailments, which sometimes arise in times of increased weather driven demand on pipelines.



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24. Reference: Exhibit B-1, Page 92

The supply of gas is expected to continue to grow as more waste is added to the landfill.

24.1. At what rate is waste added to the land fill?

Response:

This question is answered in the response to CEC IR 1.24.4.

24.2. How long has the land fill been receiving waste?

Response:

This question is answered in the response to CEC IR 1.24.4.

24.3. How long does it take after waste is added to the land fill for it to start producing methane?

Response:

This question is answered in the response to CEC IR 1.24.4.

24.4. How long will a land fill produce methane and does the rate of production decrease over time?

Response:

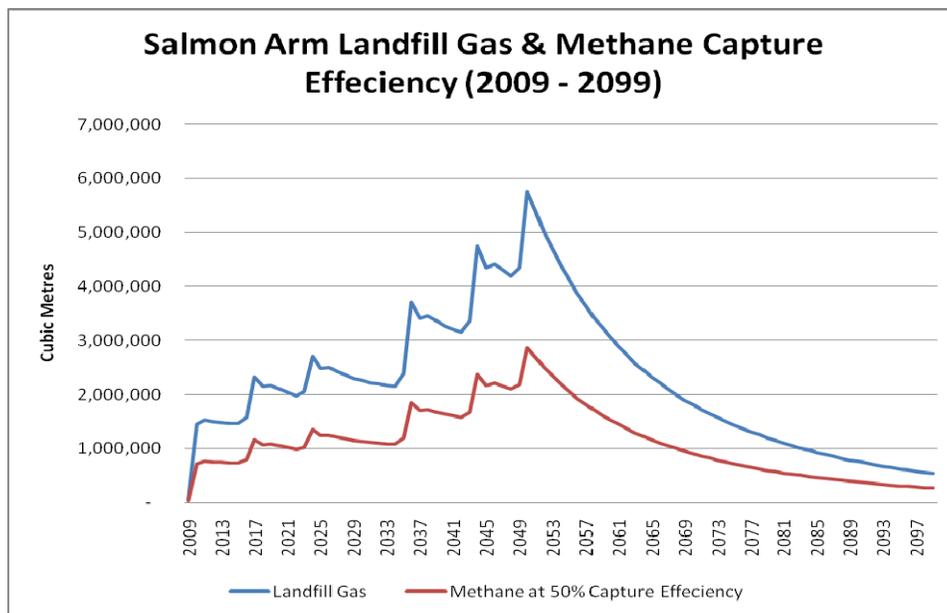
The questions from CEC IR1.24.1, 1.24.2 and 1.24.3 will be addressed in this response. TGI believes that more than enough gas will be produced over the term of the contract.



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According to the CSRD, waste is being added at approximately 700 kg per year per person and the landfill serves a population currently of about 35,000 people. The landfill has been in operation since the mid 1970's and is expected to close completely in about 2050 (estimated population 130,961 at 3.4% annual growth).

Once waste is added to the landfill, methane is generated within days. The figure below illustrates the expected raw landfill gas generation over the next 80 years. Each spike upwards represents the closing of a landfill phase. The last spike represents the final phased closure and decline of production to 2099.



TGI is confident that over the life of the contract, there will not be a shortage of raw landfill gas. In fact, over the expected life of the contract, gas production is expected to increase on average.



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25. Reference: Exhibit B-1, Page 92

an estimated \$45,100 for the abandoned connection). Terasen Gas expects this risk to be highest in the first year of operation because this is the year of the highest asset value and the performance of this project will not yet be well-characterized.

- 25.1. Has Terasen determined what failure rate land fill gas recovery has experienced elsewhere and why those failure rates have occurred?

Response:

TGI believes that the risk of failure for the CSRD project is low for several reasons. The potential gas supply is secure well beyond the term of the contract (refer to the graph in the response to CEC IR 1.24.4), the upgrade supplier has had experience with landfills and TGI believes that there will be sufficient supply. Further, TGI believes that the dollar value of the risk is low compared to the contracted termination clause with CSRD (an amount of the greater of \$90,000 or the previous two years of revenue).

TGI, therefore, did not perform an analysis of the failure rate of other landfill gas facilities. TGI is confident that this project will be successful and operate well into the future.

- 25.2. Has Terasen determined the success rate for recent land fill gas recovery investments elsewhere?

Response:

TGI is confident that the CSRD project will be successful for the reasons stated in the response to CEC IR 1.25.1.

At this time TGI is aware of several installations that have been operating successfully in the U.S. According to the US EPA website (Landfill Methane Outreach), there were 518 landfills currently converting waste to energy. Of those, there are 35 landfill gas to biomethane (High BTU gas) projects currently in operation.

Because there are so many projects in operation, TGI also believes that there are good supporting resources to ensure the success of this and future projects.



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25.3. Please provide a quantified probability estimate of the failure of the land fill gas recovery investments.

Response:

Terasen Gas did not develop quantified failure probability estimates for this project. Terasen Gas believes that the cost risk associated with the upgrading equipment is low and is sufficiently covered with contingency to ensure that the project is delivered on budget based on foreseen costs (see also the response to BCUC IR 1.64.2). The estimated costs of the upgrade equipment, when taking into account funding received from the government to offset costs is below \$1,000,000 (again refer to the response to BCUC IR 1.64.2). Therefore the rigor of a quantified probability is not warranted.



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26. Reference: Exhibit B-1, Page 96

Quantity

The supply agreement provides for a minimum daily delivery quantity of 230 GJ per day of processed pipeline quality Biomethane. This quantity is equal to annual delivery of 84,000 GJ. If CPI can produce more than 230 GJ per day, Terasen Gas has agreed to accept up to 500 GJ per day, which is the maximum flow that can be received on the distribution system based on demand downstream of the interconnection location during low flow (summer) periods.

- 26.1. Do Terasen's estimates of the maximum flow acceptable include projection of declining use rates, by customers and potential development additions in the area?

Response:

The maximum acceptable flow is based on lowest consumption of gas during the year. The flow analysis was done by the system planning department using a well-established system model. The model was used to look at the system as it is today, and it is believed that this is a reasonable assumption for a longer term estimate. It does not account for potential load growth in the area, which would increase consumption and therefore create an opportunity for increased flow into the TGI distribution system. Neither does it account for declining use in the area. TGI believes that the likelihood of either a sharp increase or decrease in load is low for the given area. This is due to the fact that most of the closely surrounding area is dedicated as agricultural use.

In the event that there are declining use rates, the system is large enough to absorb the projected maximum gas flow. Theoretically, in this case, given the same amount of supply, a declining use per household would mean that the biomethane would be distributed further from the source.

In the unlikely event that there is more supply than demand in the local distribution system, the TGI system integrity will not be at risk. The existing TGI distribution system is designed with a large enough factor of safety to absorb more gas at slightly elevated pressure for a short period of time.

The daily maximum amount is based on a reasonable assumption of a summer load which should be considered as a worst case and may only occur for a few days per year. TGI believes that the contracted maximum flow allows for variation in customer consumption and the local distribution system with the required main upgrade is sufficient to accept this quantity of biomethane. Therefore, TGI is confident that the maximum contracted flow will not pose either a cost or safety risk.



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27. Reference: Exhibit B-1, Page 107

However, some costs are being incurred in order to give all customers the choice of participating in the Green Gas program, and all customers obtain environmental benefits from the Company offering Biomethane as an option. Consistent with the implementation of other

- 27.1. Once a biogas project is delivering biomethane to the distribution level and doing so over the winter peak, is there not a benefit to all customers of reduced peak supply requirements and costs?

Response:

Please refer to the response to CEC IR 1.23.1. As discussed in that response, there is not expected to be a significant or material impact on the TGI gas supply portfolio as a result of the initial supply of Biomethane. The initial Biomethane supply will represent approximately one-tenth of one percent of TGI's overall supply portfolio in a normal year. In the initial phases of the Green Gas Program TGI will assess supply reliability from the Biomethane supply sources and the Company does not anticipate displacing the supply within in its currently existing supply portfolio.

However, should this Biomethane supply source prove to be reliable, TGI anticipates, at that point, displacing conventional supply quantities equivalent to the Biomethane supply from its supply portfolio. Displacing existing conventional supply with Biomethane supply would be consistent with the objectives of supply cost effectiveness, supply diversity and reliability as outlined in the Annual Contracting Plan.

Furthermore, once the reliability of Biomethane supply is confirmed and displacement of conventional Midstream resources can occur, Biomethane supply costs may offset any displaced conventional supply costs. Therefore, there may or may not be a significant reduction in peak supply requirements or costs as Biomethane is substituted for other resources. However, Biomethane supply does benefit all customers in terms of it being a source of on-system supply in the portfolio. On-system supply, brought directly into the distribution system, reduces the reliance on third party pipeline resources or peak winter supply that may be subject to supply curtailments or market price volatility during periods of cold weather.



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27.2. Is it not also true that the constraint of putting the biomethane into a local distribution system reduces pipeline transmission costs for all other customers?

Response:

Injecting Biomethane into a local distribution system may potentially reduce transmission costs for all customers. However, such a reduction in pipeline transmission costs will depend primarily on which location the Biomethane comes onto the distribution system. Biomethane projects that are located farther away from TGI's key load centers, primarily the Lower Mainland and the Interior, will still require the Company to utilize a certain level of third party transportation resources in order to move natural gas to these load centers. However, Biomethane projects that are located close to or within the key load centers may result in the Company contracting for less transportation. Biomethane projects, as proposed, will provide gas supply directly into TGI's distribution system and then be consumed directly downstream of that particular location. If the volumes of gas provided by Biomethane projects become material and reliable enough to significantly displace natural gas that would otherwise have been delivered and consumed at these locations, this then may allow TGI to require a reduced level of third party transportation. However, initial Biomethane supply volumes are not expected to be significant enough to cause TGI to alter its contracting levels.

Please refer to the responses to CEC IR 1.23.1 and CEC IR 1.27.1. As noted in those responses, these Biomethane projects will need to be evaluated for reliability of supply if the Company wishes to displace a portion of its supply portfolio with Biomethane supply. It should also be noted that the initial volumes from Biomethane projects are not expected to be significant, or about one-tenth of one percent, of TGI's overall supply portfolio. A prudent approach, which will take into account the best interests of customers, will be taken by TGI when evaluating which conventional supply to displace with Biomethane supply, as outlined in the Annual Contracting Plan each year.



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28. Reference: Exhibit B-1, Page 114

As discussed in Section 10.7.3 of this Application, in the unlikely event that customers' consumption of Biomethane under the Green Gas offering exceeds the available supply in a given period, one of the mechanisms Terasen Gas is proposing to mitigate against the risk of under supply of Biomethane is to have approval to purchase carbon offsets in order to maintain the GHG emission reduction associated with Biomethane supply. These costs would be collected in the BVA, in the event that this proves necessary.

- 28.1. As opposed to purchasing carbon offsets, does Terasen believe that it might be useful to run an account for any under delivery or over delivery and maintain a balance as the lumps of delivery **increments** are added or vary?

Response:

Terasen Gas' proposal is to manage the Biomethane supply and demand volumetric variances through the Biomethane Variance Account ("BVA") and, under normal circumstances, avoid having to purchase of carbon offsets.

Please refer to the response to BCUC IR 1.36.1.1.

- 28.2. Could this role of balancing out variability be handled within a universal biomethane component in all customers supply?

Response:

Please refer to the responses to CEC IR 1.28.1 and BCUC IR 1.36.1.1.



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29. Reference: Exhibit B-1, Page 131

Biogas is a renewable energy source that can be upgraded to carbon neutral Biomethane. When Biomethane is injected into Terasen Gas' distribution system it offsets the use of natural gas and reduces GHG emissions. The Green Gas offering represents a significant first step in the development of Biogas as a new source of renewable energy to meet Terasen Gas' customers' needs and the "government's energy objectives".

29.1. What steps will Terasen take to integrate this initiative into its overall branding and advertising?

Response:

TGI's current advertising campaigns are program specific (ie. Safety, Energy Efficiency and Conservation, etc.), therefore, it would not be appropriate to incorporate the Biomethane initiatives into those communications. Key messages however about TGI's Biomethane initiatives and Green Gas program can be incorporated into corporate communications (e.g. annual report, news releases, earned media, etc) which discuss the Company's contributions to the province's energy, economy and environment framework.



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30. Reference: Exhibit B-1, Appendix C, NREL Marketing Report, Page 10

Table 7. Estimated Cumulative Number of Customers Participating in Utility Green Pricing Programs (Regulated Electricity Markets Only)

Customer Segment	2001	2002	2003	2004	2005	2006	2007	2008
Residential	166,300	224,500	258,700	323,700	383,400	470,800	526,700	519,700
Nonresidential	2,500	3,900	6,500	8,100	11,300	15,500	20,200	26,100
Total	168,800	228,400	265,200	331,800	394,700	486,300	546,900	545,800
% Total Annual Growth	27%	35%	16%	25%	19%	23%	12%	0%
% Residential Growth	27%	35%	15%	25%	18%	23%	12%	-1%
% Nonresidential Growth	47%	56%	67%	25%	40%	37%	30%	29%

30.1. Does Terasen believe that the economic pressures causing declining housing markets in the US, which started in 2006 and the eventual sub-prime mortgage problems in the US have anything to do with the dramatic decline in participation in 2008?

Response:

Yes. The NREL Marketing Report referenced above and attached in Appendix C of the Application indicates that the decline in the economy, particularly the second half of 2008, likely contributed to smaller gains in participants relative to previous years.

30.2. Does Terasen have access to any information beyond what is in this report to explain the results in the report?

Response:

No. TGI does not have access to any information beyond what is in the report to explain the results in the report.



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30.3. Does Terasen know whether or not the increasing prevalence of renewable portfolio standards in the US is contributing the tailing off of voluntary premium payments?

Response:

The NREL Report attached in Appendix C does not directly correlate the prevalence of renewable portfolio standards (RPS) in the US as contributing to the tailing off of voluntary premium programs. However, it does provide analysis (page 31) that RPS could lead to an increase in prices for regional renewable energy due to demand and these higher prices could dampen voluntary demand.



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31. Reference: Exhibit B-1, Appendix E-2 Alternative Business Model

Model	Description	Pros	Cons
<p>4. Hybrid Midstream Model – Recommended Green Gas Business Model</p>	<p>Midstream manages supply and volumes variances due to production curve of Biogas</p> <p>Create a deferral account to recover costs for Biogas supply directly from customers who elect in the program</p>	<p>Leverage existing IT and systems with some modifications</p> <p>Supply issues managed in Midstream</p> <p>No impact to the ESM</p> <p>Same model as RRA Midstream, but now have added cost recovery mechanism for most costs recovered from those who elect in the program</p>	<p>Program costs will need to be incurred</p>

31.1. How did Terasen evaluate the alternatives to make a choice of the recommended model, was it a judgment decision based on the pros and cons analysis or was there some quantitative justification of the benefits versus the program costs?

Response:

TGI evaluated the alternative business models based upon the pros and cons from a customer offering perspective, stakeholder perspective (i.e. affect on gas marketers), program goals and objectives, IT, billing and gas supply management impact. A universal price increase model had been thoroughly explored in advance of the proposed pilot program in the TGI 2010-2011 Revenue Requirement Application. Various meetings were held with internal business units and high level review was provided by Knowledge Tech Consulting regarding business model considerations for a User Pay model. The result of this work was the proposed model as outlined in the Application. Please also refer to the response to CEC IR 1.12.4.