Section 1. Introduction

1.1 Terasen Gas (Vancouver Island) Inc.

Terasen Gas (Vancouver Island) Inc (TGVI), formerly Centra Gas British Columbia, provides natural gas transmission and distribution services to more than 76,000 residential, commercial, and industrial customers on Vancouver Island and the Sunshine Coast. Service is provided through approximately 640 km of high pressure transmission pipeline, including three compressor stations, and over 3,200 km of distribution mains. TGVI's largest customers are the Vancouver Island Gas Joint Venture (VIGJV) representing seven large pulp and paper mills and British Columbia Hydro & Power Authority (BC Hydro) serving the Island Cogeneration Project (ICP).

1.2 Purpose

BC Hydro through its subsidiary Vancouver Island Energy Company (VIEC), has applied for a Certificate of Public Convenience and Necessity (the Application) to build and place in service a new gas fired generation facility on Vancouver Island, the Vancouver Island Generation Project (VIGP). The Application contemplates that the natural gas fuel requirements for VIGP and for the existing ICP will be transported to Vancouver Island using the proposed Georgia Strait Crossing pipeline (GSX). The TGVI system would then be used to transport the gas from the TGVI/GSX interconnect to the plants.

The purpose of this evidence is to present TGVI's proposal to meet current and future natural gas requirements for all natural gas customers on Vancouver Island, including the needs of the VIGP. TGVI has investigated how its existing system can most efficiently and economically be expanded to meet the new requirements through the use of new pipe, compression or storage resources. TGVI's proposal outlined in this evidence involves phased expansion of TGVI's current system through compression, pipeline looping and a natural gas storage facility and could defer or avoid the need for a second marine pipeline crossing. This solution, meeting the demands of VIGP and ICP, can be executed at lower cost than the proposed GSX.

This evidence is presented to specifically address BC Hydro's natural gas supply requirements for ICP and VIGP, in response to the current VIGP Application. It also addresses TGVI's ability to meet the requirements of the NorskeCanada generation proposal.

TGVI supports the development of gas fired generation on Vancouver Island, and believes that development of the most cost effective solution to meet the new gas demands is to the benefit of both Vancouver Island electric and natural gas customers. TGVI therefore requests that the BCUC direct BC Hydro to negotiate and enter into a long term natural gas firm service transportation agreement with TGVI to serve the needs of its generation capacity on Vancouver Island based on the solution outlined in this proposal.

1.3 Terasen Gas Experience and Capabilities

TGVI is one of the two principal gas distribution utilities of the Terasen Inc. group of companies. TGVI serves gas customers on Vancouver Island and the Sunshine Coast. Terasen Gas Inc. (TG), formerly BC Gas Utility Ltd., is the other major Terasen gas distribution company utility, serving customers across the B.C. mainland. For the purposes of this evidence these two gas distribution utility companies together are referred to as Terasen Gas.

In total, Terasen Gas operates the third largest natural gas distribution system in Canada based on the number of customers, and the largest in North America in terms of territory served. It transmits and distributes natural gas to over 850,000 residential, commercial, industrial and transportation customers in over 100 communities, representing 95% of the existing natural gas customers in British Columbia.

Terasen Gas transports more than 200 billion cubic feet (bcf) of natural gas per annum to end use consumers, and can meet peak day deliveries of 1.5 bcf.

Experience with Natural Gas Facilities

Terasen Gas's facilities consist of approximately 40,000 km of distribution mains and services and 3,000 km of transmission pipelines, including 10 compressor stations and associated metering, pressure and flow control stations. In addition, TG operates a 0.6 Bcf liquefied natural gas storage and peak shaving facility located in Delta B.C. The entire system is monitored and controlled by a fully automated, state of the art telecommunications and SCADA system located in Surrey, B.C. and staffed 24 hours per day.

For the past 45 years Terasen Gas has been involved in all phases of natural gas infrastructure development and operation including project management, planning, design, construction management, operations and maintenance and training. Terasen Gas has strong project management capabilities that enable the organization to implement new major construction projects on time and on budget. Recent successes that demonstrate this capability include:

- 24" 312 km Southern Crossing Pipeline;
- 7000 hp Texada Island and Port Mellon compressor stations;
- 10,000 hp compressor addition to Coquitlam Station
- 15,000 hp Langley Compressor and Kitchener compressor stations;
- 16" South Okanogan Natural Gas Pipeline; and
- 42" Surrey Langley Natural Gas Pipeline.

Environmental Stewardship and Public Safety

As a primary supplier of energy and utility services, Terasen Gas is committed to mitigating environmental impacts of its business and ensuring the safety of the general public and our employees.

Financial Capability

Terasen Gas is the largest provider of natural gas service and infrastructure in British Columbia. Terasen Gas has sufficient access to financial markets to accomplish the expansion plan put forth in this proposal. The equity markets are familiar with Terasen Gas and proposals of this nature. Terasen Gas has access to low-cost debt, providing the ability to carry out the capital expenditures described in this proposal in a timely basis.

Section 2. General Project Overview

2.1 BC Hydro's Vancouver Island Requirements

The Application states that the requirement and timing for VIGP and GSX are driven by the need to ensure electric system reliability for Vancouver Island. BC Hydro's two main arguments that support this position are:

- The dependable capacity of ICP is limited by the available firm transportation capacity on the TGVI system; and
- VIGP is required to be in service by July 2006 to offset the expected retirement of the HVDC system in 2007.

TGVI submits that its proposal allows BC Hydro to meet its objectives with respect to ICP and VIGP in a more cost efficient manner than its GSX alternative, while improving resource planning flexibility to meet future requirements for both the gas and electric customers.

2.2 Project Description

TGVI proposes a phased expansion program that includes upgrades to the TGVI system through compression and looping and the construction of an on-island natural gas storage facility. This program offers flexibility to expand the natural gas transportation capacity to match future demand growth requirements of both natural gas and electric customers as they occur.

The proposed program of new facilities is discussed in detail in Section 3. The main components of the expansion program can be summarized as follows:

- Expansion of the TGVI system primarily through the addition of new compression facilities between 2005 and 2007; and
- Construction of an on-island, 1 bcf liquefied natural gas ("LNG") storage facility, with liquefaction and vaporisation facilities, to be in service as early as November 2007.

The timing and costs of the facility additions are dependant on the requirements to meet new generation and the availability of load curtailment during peak periods. However, the program can be implemented to allow TGVI to offer transportation service to meet the full fuel requirements to ICP beginning November 2005, and to VIGP beginning July 2006.

2.3 Impact on Vancouver Island Gas Customers

The new facilities proposed under this program will complement the existing TGVI system, and will be included in TGVI's portfolio of resources to meet the requirements of its distribution and industrial customers as well as the long term fuel requirements for both ICP and VIGP.

The principal characteristic of TGVI's proposal is that it results in a resource portfolio that more closely matches the annual natural gas demand profile of the Vancouver Island gas customers, thereby reducing the amount of unutilized capacity that would result from the GSX alternative. Consequently, TGVI's proposal can be executed at lower cost than the proposed GSX and still meet the requirements of all Vancouver Island customers, including the existing ICP and proposed VIGP.

Recovery of the costs for the new facilities will be through the tolls and tariffs established for the different customer classes using rate design principles approved by the BCUC. Rate design will take into account the need to maintain the competitiveness of natural gas to electricity on Vancouver Island, while also providing BC Hydro a lower cost alternative to meet the natural gas requirements of its on-island generation facilities to serve ICP and VIGP.

Section 3. Technical Project Description

3.1 BC Hydro's Natural Gas Supply Requirements

TGVI's planning assumptions include a natural gas demand forecast for Vancouver Island over the planning period 2003-2023. The current forecast for all existing major customer groups is discussed in Appendix C. The forecast of the firm demand of 42.5 TJ/d for ICP has been the planning basis that TGVI has used for some time based on discussions with BC Hydro regarding the potential for a long-term transportation agreement to serve the plant.

The incremental capital additions to the TGVI system have been evaluated based on the following two scenarios of fuel requirements to serve ICP and VIGP on Vancouver Island:

Scenario 1: Service to ICP only

- ICP is provided firm service of 42.5 TJ/d beginning in November 2005

Scenario 2: Service to ICP and VIGP

- ICP is provided firm service of 42.5 TJ/d beginning in November 2005 and VIGP is provided firm service of 45 TJ/d beginning in July 2006

In addition to these generation loads, each scenario includes the demand requirements of TGVI distribution customers (core load), Terasen Gas Squamish (formerly Squamish Gas), and VIGJV. In both scenarios the VIGJV demand assumes that curtailment rights currently available to meet the core demand under the VIGJV Peaking Gas Management Agreement (PGMA) continue. Also, the capital requirements have been developed for these scenarios to reflect curtailment of ICP, which is assumed to be fully curtailable for up to 10 days in a cold winter year, and 5 days in a normal year.

3.2 Service to Island Cogeneration Project Only

TGVI currently provides firm transportation service to ICP of 28 TJ/d, and has agreed to increase this service to 38 TJ/d. TGVI also has a peaking agreement in place that effectively gives TGVI the ability to curtail ICP for the first 28 TJ/d of contract demand. TGVI has also been in preliminary discussions with BC Hydro to extend this transportation service to 2005.

TGVI has evaluated the requirements for new facilities on its system to meet the core load growth plus the full requirements of ICP of 42.5 TJ/d over the next twenty years. Two scenarios were evaluated; one where curtailment continues to be available for the full 42.5 TJ/d, and the second where ICP requires firm non-curtailable service.

The new facilities required involve the addition of new compression facilities and pipeline looping. The timing and costs of these facility additions are described in Appendix A. Detailed descriptions of the compression and the pipeline looping projects are included in Appendices D and E.

The total costs of each program over the planning period are summarised in the following table. In either scenario, the forecast capital requirements are lower than the $218 million program estimated by Singleton based on the assumptions provided to Singleton by BC Hydro (ref pg 41 of the Application).

Cost Comparison (Millions $)

	TGVI Forecast	Singleton Estimate	Variance
ICP with curtailment	$ 90*	n/a	n/a
ICP with no curtailment	$130*	$218**	$88

*TGVI estimates are in 2003$ and include AFUDC
**Singleton estimate is in 2002$ and excludes AFUDC

3.3 Service to ICP and VIGP

The TGVI system can be further expanded to provide 45 TJ/d of firm supply to the VIGP in addition to ICP, VIGJV, Squamish and core market needs. The additional facilities would include compression, pipeline looping and the installation of a liquefied natural gas storage facility on Vancouver Island to serve Vancouver Island customers.

As illustrated by Chart 2 in Appendix C, TGVI's core market has a load factor of approximately 35%. This means that although the system is heavily utilized in the high demand periods, primarily to meet heating loads, there is significant capacity available during most of the year. This capacity can be used to transport natural gas to a storage facility on the island. The stored gas would subsequently be re-injected into the TGVI system to help meet demand during the winter season. The addition of an on-island storage facility on TGVI's system therefore results in a resource portfolio that more closely matches the natural gas demand profile of Vancouver Island customers.

In evaluating the facility requirements to serve both ICP and VIGP, it was determined that in addition to the compression facilities, the natural gas storage facility would be required by the winter 2009/10. Should curtailment of ICP not be available long term, the requirement for the storage facility would be advanced, and could be in service as early as November 2007. To the extent that VIGP is in service prior to the storage facility, curtailment of ICP would be required to continue to meet design day requirements. Firm service, with no curtailment provisions, for both VIGP and ICP could be in place by summer 2007, matching the proposed retirement of the HVDC system.

The nature, timing and costs of the facilities for both scenarios are described in Appendix A. As well, detailed descriptions of the compression, looping, and natural gas storage facility are provided in Appendices E, F and G.

The total costs of each program over the planning period are summarised in the following table. Note that these facilities would serve ICP and VIGP as well as the VIGJV and TGVI's core market, and can be installed at a lower cost than the GSX alternative.

Cost Comparison (Millions $)

Service Alternative	TGVI Forecast	GSX Estimate*	Variance
ICP w/Curtailment + VIGP	$214	$322	$108
ICP + VIGP (no curtailment)	$217	$322	$105

*TGVI forecasts are in 2003$ and include AFUDC
**GSX total based on estimate provided in the Application

TGVI's planning assumption for service to ICP at 42.5 TJ/d is based on its previous discussions with BC Hydro regarding the potential for a long term transportation agreement to serve ICP. TGVI has now assessed the impact of increasing the service to ICP to 45 TJ/d in conjunction with service to VIGP, and confirms that the small increase results in no significant differences in the facility requirements proposed for the two scenarios described in this section.

3.4 Schedule and Technical Feasibility

The proposed expansion of the existing TGVI system, primarily through the addition of compression, will provide sufficient capacity through to 2009 when the natural gas storage facility is proposed to be in service. The addition of this new facility provides sufficient capacity to meet forecast demand through to the end of the planning period (2003 to October 2024). The compression and looping projects are described in Appendix D and Appendix E respectively.

Appendix F contains a detailed description of the natural gas storage facility, siting and approval requirements, as well as a cost estimate and project schedule. The results of preliminary siting studies undertaken by TGVI demonstrate that there are a number of suitable areas where a storage facility could potentially be sited. The next phase of site investigation would involve extensive stakeholder discussion and consultation. Schedule

7.1 in Appendix F shows that with project approval in place by June 2006, sufficient time is available to allow the project to be in-service to meet the November 1, 2009 requirement.

If the ICP fuel switching capacity is not available as described in the Application, the TGVI expansion could be phased in such that firm service with no curtailment rights would be provided in 2007, matching the proposed retirement of the HVDC system. Schedule 7.2 in Appendix F shows that with the acceleration of the project development activities to support having project approvals in place by December 2004, sufficient time is available to meet the November 1, 2007 in-service date with the adequate gas in storage to meet the requirements of the 2007/08 heating season.

3.5 Impact on Coastal Transmission System

In developing the proposals to serve BC Hydro and/or the NorskeCanada projects discussed in Section 6, TGVI has requested that TG evaluate the impact on its Coastal Transmission System (CTS) over the planning period to 2023. TG's current forecast of CTS facility additions is based on meeting Lower Mainland core market requirements as well as its contractual obligations under the BC Hydro Bypass Transportation Agreement and the TGVI Wheeling Agreement, and the take-away capacity of downstream facilities. TG has confirmed that the proposed additions to the TGVI system will have minimal impact on the current forecast for CTS facility additions over the planning period.

Section 4. Cost of Service Comparison

4.1 Comparison of the TGVI Proposal to the GSX Alternative

In order to fully evaluate the TGVI proposal versus the GSX alternative, TGVI evaluated the incremental revenue requirement associated with the new facilities and compared this to the BC Hydro GSX alternative. As the compressor fuel requirements are quite different in each scenario, the cost of fuel has also been evaluated. The TGVI scenario used in this comparison is based on the availability of ICP curtailment and the installation of a natural gas storage facility on Vancouver Island in 2009.

Financial schedules summarising the incremental revenue requirement in each scenario are included in Appendix B. The present value of the annual revenue requirements was then calculated for the period from November 2005 to October 2024. November 2005 is the beginning of the first gas year when the new facilities are in service, and October 2024 matches the end of the facility planning scenarios provided in Appendix A.

The results of the incremental cost of service analysis are summarised in the table below. For the TGVI solution, PV COS represents the present value of the cost of service planning period related to the incremental facilities only. However, the PV Fuel is the present value of the total fuel requirement on the expanded TGVI system, including incremental fuel associated with the higher throughputs. In the GSX scenario, the present value was determined over the same period using the levelised annual revenue requirement of $53 million discussed in the Application. PV Fuel includes the fuel usage on GSX as well as on the TGVI system. For the purposes of this comparison, TGVI has used the fuel price forecast used by BC Hydro in the Application.

COS Comparison Nov 2005 to Oct 2024
Nominal Discount Rate 10%

Alternative 2005$Millions	PV of Incremental COS	PV of Total Fuel	PV TGVI Benefit
GSX	$443	$52	
TGVI - ICP + VIGP	$198	$118	
Difference (GSX-TGVI)	$245	($66)	$179

The difference between the two options represents the benefit and value, from a system wide perspective, that the TGVI proposal would provide by minimising the cost of adding incremental facilities to meet Vancouver Island's gas requirements, including ICP and VIGP. This comparison shows that there is significant cost savings with the capital and operating costs associated with the TGVI proposal. Although some of these savings are offset by the increased fuel requirements, the TGVI proposal still offers a significant net benefit of $179 million over the period.

Section 5. BC Hydro Transportation Service

5.1 Transportation Service

The proposed facility additions to the TGVI system will allow BC Hydro to meet the full fuel requirements to ICP commencing in November 2005 and to VIGP in July 2006.

TGVI's proposal to expand the capacity available on its system is based on BC Hydro contracting with TGVI for long term firm natural gas transportation service from Huntingdon to both the ICP and VIGP delivery points. The principal requirements are as follows:

	ICP	VIGP
Commencement Date:	Nov 2005	July 2006
Contract Demand	42.5 to 45 TJ/d	45 TJ/d
Receipt Point	Huntingdon	Huntingdon
Delivery Point	ICP Plant Gate	VIGP Plant Gate
Term	30 years	30 years
Fuel	In Kind	In Kind

The proposal assumes that BC Hydro's existing firm capacity on TG's Coastal Transmission System (CTS) will be used to transport the ICP and VIGP volumes from Huntingdon to Eagle Mountain, as well as to serve Burrard Thermal.

5.2 Toll Considerations

TGVI will work with BC Hydro, or any other customer that wishes to have firm transportation service on the high pressure system to establish a transportation service agreement, including tolling and terms and conditions. Any such negotiated toll will be subject to Commission approval prior to acceptance. Tolls for fixed price long-term contracts will consider the risks associated with forecast uncertainty over the contract period and will be set accordingly.

Section 6. Service to NorskeCanada

6.1 NorskeCanada Generation Proposal

NorskeCanada is currently a customer on the TGVI system through its participation in the VIGJV. NorskeCanada has four mills on the TGVI system at Crofton, Port Alberni, Campbell River and Powell River. Primary load is from the three mills on Vancouver Island. The Powell River mill on the Sunshine Coast uses natural gas mainly as a backup fuel should its main energy systems upset. NorskeCanada has advised TGVI that its share of the VIGJV contract is 21 TJ/day or approximately 55% of the total VIGJV demand of 38 TJ/d.

At NorskeCanada's request, TGVI has evaluated the incremental capital additions required to serve the suite of projects proposed by NorskeCanada to BC Hydro. This evaluation was based in part on the following assumptions provided by NorskeCanada:

- Natural gas demand by mill as described in NorskeCanada's response to BCUC IR #1. Of the total requirement of 52 TJ/d, there is an incremental demand of 31 TJ/d in addition to the NorskeCanada's 21 TJ/d share of the VIGJV capacity.

- The load would be curtailable for gas peaking purposes in blocks of 10 TJ/d up to 30 TJ/d.

In addition to the incremental 31 TJ/d of demand associated with NorskeCanada's proposal, the demand forecast in Appendix C was assumed. The one exception is that it was assumed that the VIGJV firm demand would stay at the current level if the NorskeCanada proposal proceeded. It is also assumed that ICP is provided firm service of 42.5 TJ/d commencing in November 2005.

6.2 Facility Requirements

In determining the facility requirements to serve both NorskeCanada and ICP, two scenarios were evaluated; one where ICP's contract demand is fully curtailable for 10 days in a design year and 5 days in a normal year, and the second where ICP requires firm non-curtailable service. As with the BC Hydro scenarios, TGVI's evaluation determined the most cost effective combination of new facilities among compression, pipe and storage.

With the ICP curtailment, the new facilities required involve the addition of new compression facilities and pipeline looping. If ICP curtailment is not available, additional facilities are required, including the construction of the natural gas storage facility in 2012. The timing and costs of these facility additions for the planning period up to October 2024 are summarised in Appendix A. Under either scenario, (ICP curtailable or firm), capital expenditures of $78 million are required up to 2011. Additional capital expenditures for the rest of the planning period are required after 2011 to meet forecast market growth.

The total costs of each program over the planning period are summarised in the following table.

Cost Comparison (Millions $)

	Planning Estimates*
TGVI with Norske + ICP (ICP Curtailment)	$163
TGVI with Norske + ICP (No ICP Curtailment)	$189

*TGVI estimates are in 2003$ and include AFUDC

6.3 Cost of Service Impacts

TGVI has also modeled the incremental revenue requirement associated with the new facilities for each scenario. Financial schedules summarising the incremental revenue requirement in each scenario are included in Appendix B. The results are summarized in the table below.

As with the BC Hydro scenarios, the PV calculation is based on the period from November 2005 to October 2024. November 2005 is the beginning of the first gas year when the new facilities are first in service, and October 2024 matches the end of the planning scenarios provided in Appendix A. "PV COS" represents the PV of the cost of service related to the incremental facilities only. The "PV Fuel" is the present value of the TGVI fuel based on the fuel price forecast used by BC Hydro in the Application.

COS Comparison Nov 2005 to Oct 2024
Nominal Discount Rate 10%

Alternative 2005$Millions	PV COS	PV Fuel
TGVI with Norske + ICP (ICP Curtailment)	$ 94	$109
TGVI with Norske + ICP (No ICP Curtailment)	$149	$112

The proposed facility additions to the TGVI system will meet the full fuel requirements for ICP in 2005 and of the NorskeCanada additions commencing in November 2007. Any changes to the NorskeCanada schedule would also change the timing of these additions.

For TGVI to expand its system to meet the ICP and NorskeCanada requirements, TGVI would require that long-term transportation service agreements would have to be put in place to ensure recovery of the costs of the new facilities.

Section 7. Conclusion

7.1 Summary

Through this evidence, TGVI has presented its proposal to economically expand the capacity of its system to meet the current and future natural gas requirements for all customers on Vancouver Island, including the needs of ICP and VIGP. This proposal can be implemented in a cost effective and timely manner to meet BC Hydro's objectives to ensure electric system reliability for Vancouver Island and to benefit both electric and natural gas customers in British Columbia in the following respects:

- The proposed timing of the TGVI system upgrades meets B.C. Hydro's near term requirements by matching the schedule requirements of HVDC retirement and providing cost effective firm service to ICP and VIGP by mid-2006.
- The TGVI alternative makes efficient use of current resources, including existing TGVI capacity, the Texada Island compressor capacity and CTS capacity which otherwise may become underutilized under a GSX solution.
- The phased addition of compression, pipe and storage facilities, allows TGVI to build incremental capacity that best matches the demand profile of its customers, and provides significant cost savings over the proposed GSX alternative.
- Terasen Gas has the financial, technical and operational capability to implement this proposal. In accordance with the new provincial energy policy direction, TGVI's proposal also means that no additional public sector investment into new natural gas infrastructure is required in the province.

In this submission, TGVI has also demonstrated that it has the ability to meet the firm requirements of the NorskeCanada generation proposals, should the BCUC determine that the NorskeCanada solution is an appropriate alternative to BC Hydro's proposal for VIGP.

7.2 Requested Action

TGVI fully supports the development of gas fired generation on Vancouver Island, and is prepared to expand its system in a phased manner to meet the needs of ICP and VIGP. TGVI therefore requests that BCUC give due consideration of the TGVI proposal in its deliberations of the VIGP Application.

TGVI requests that the BCUC direct BC Hydro to negotiate and enter into a long term natural gas firm service transportation agreement with TGVI to serve BC Hydro's needs on Vancouver Island as a condition of approving the VIGP.