



Intervenor Final Argument

*Vancouver Island Energy Corporation
Certificate of Public Convenience and Necessity
Application
Vancouver Island Generation Project*

Submitted to:
British Columbia Utilities Commission

July 22, 2003

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1.0 SUMMARY AND RECOMMENDATIONS

Considering the Applicant and other hearing submissions, the Application for VIGP should be rejected. BC Hydro should be instructed to complete their Integrated Energy Plan and as a result of that plan make CPCN submissions as required to meet Vancouver Island's energy needs.

In reviewing the BC Hydro Portfolio analysis, it is suggested that BC Hydro, to meet domestic requirements over the next ten years, will need to select from one of the following broad alternatives:

1. Major new gas fired generation on Vancouver Island (500 to 1000 MW) with the VIGP being the first phase;
2. Substantial increase in transmission line capacity into the Lower Mainland and to Vancouver Island with new generation sited in the B.C. interior;
3. Large amounts of cogeneration, demand control, conservation and renewable energy projects in the Lower Mainland and Vancouver Island with transmission line expansion from the Lower Mainland to Vancouver Island.

Considering the provincial Energy Plan, its policy objectives to provide 50% of new incremental energy via "Clean Energy", and its emphasis on conservation, distributive generation, cogeneration and renewable energy, it is recommended that alternative 3 should be seriously considered before 1 is finally selected. In their Portfolio analysis BC Hydro did analyze an alternative involving two 230 kV transmission lines to Vancouver Island but in assessing this alternative they did not consider it in conjunction with conservation, distributive generation, cogeneration and demand control. Accordingly, in preparing their Integrated Energy Plan BC Hydro should be instructed to develop a power purchase selection process which does not prejudice small cogeneration projects, conservation or demand control alternatives. Specifically, a fair process where the gas price risk is treated on an equal basis to the arrangement that BC Hydro is proposing for VIGP and to the arrangement that they already have with the Island Cogeneration Project. This treatment of gas price risk is a prerequisite for achieving the objectives of the Provincial Energy Plan.

Small-scale cogeneration projects (1 MW to 50 MW) appear to have the potential of providing lower cost power to BC Hydro than VIGP. This submission does not consider the cogeneration projects being considered by NorskeCanada since they are included in their own submission. If the potential of the projects identified in this submission are combined with the Norske projects, the total cogeneration potential for Vancouver Island and the Lower Mainland is over 700 MW.

In this Final Argument by Maxim, the cost of electricity from Greenhouse cogeneration has been estimated for varying gas prices and varying values of heat sales. This estimate indicated that the cost of electricity varies from \$46 per MWh to \$84 per MWh depending on the price of natural gas assumed and the assumed value of heat sales. It is suggested that this compares favourably with the cost of Power from VIGP.

The implementation of VIGP and GSX does commit BC Hydro to a long-term gas fired power alternative. The economics of VIGP and GSX as a 265 MW project on its own is very questionable per BCUC IR 63.1 and BC Hydro's response. Submission by Terasen also suggests

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that either VIGP or a variety of cogeneration projects could be supported with gas supply at a significantly lower cost than GSX.

In conclusion the information submitted by BC Hydro and intervenors suggest that the VIGP and GSX projects as submitted will result in higher costs to rate payers than necessary and that alternatives more closely aligned with objectives of the provincial Energy Plan have not been properly analyzed by BC Hydro.

2.0 INTRODUCTION

During cross examination of the Maxim Panel during the hearing the following questions were raised by Commission staff and Maxim indicated that they would provide a response.

Question 1:

Please explain the energy balance of a cogeneration facility with particular reference to the 90% recovery of wasted heat.

Question 2:

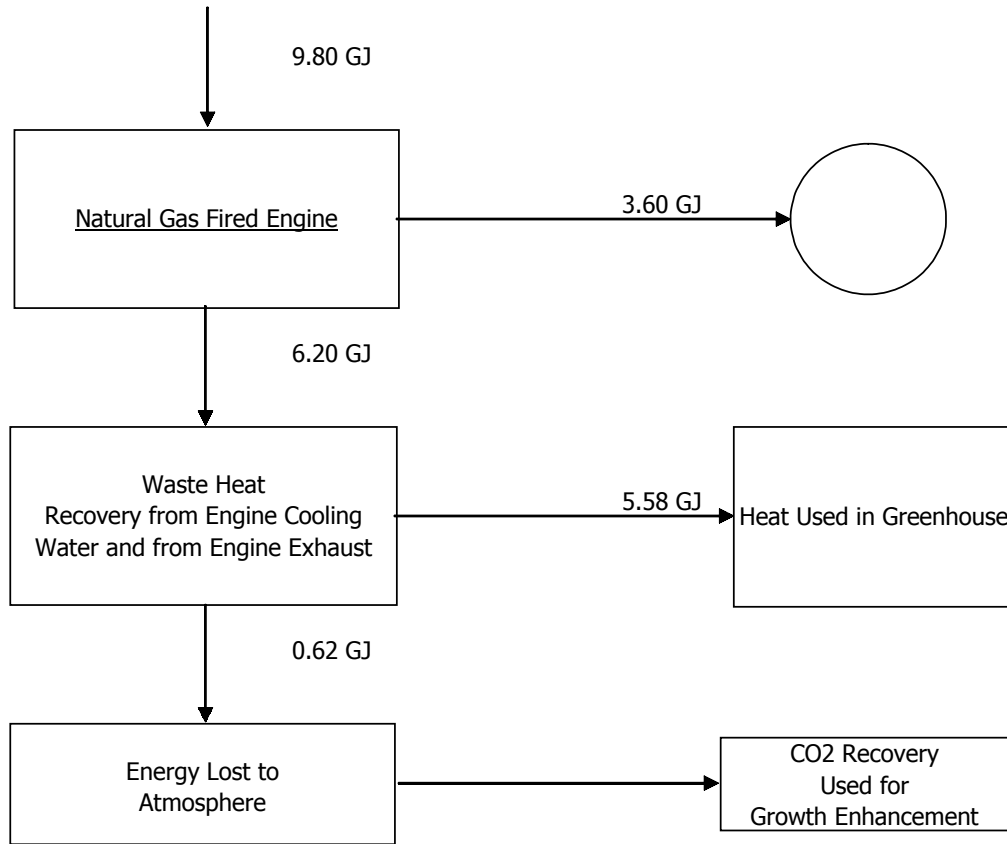
Please indicate the cost of electricity from cogeneration facilities for different values of heat sales.

Also in Vancouver Island Energy Corporation's Final Argument submitted on July 15th, they referred to the Maxim proposal and indicated that Maxim's estimate for the cost of electricity from cogeneration facilities was \$72 per MWh.

The following two sections address the questions and the Applicant's Final Argument. The Energy Balance Explanation section indicates how efficiencies are calculated from a cogeneration facility located at a greenhouse. The Gas Price Analysis graph indicates how the cost of electricity varies with heat sale values.

3.0 ENERGY BALANCE EXPLANATION - COGENERATION GREENHOUSES

**Energy Balance Explanation
Cogeneration - Greenhouses**



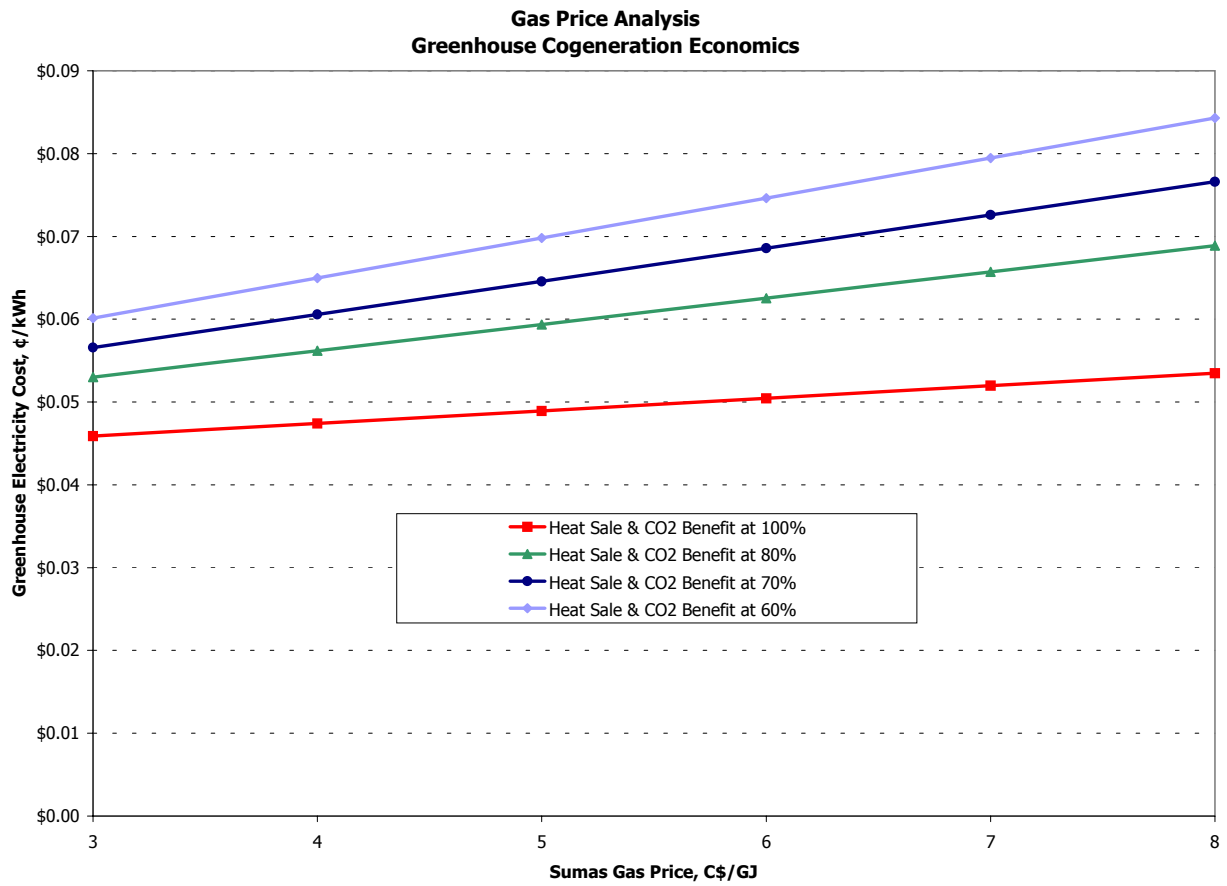
Avoided Natural Gas that would have been otherwise used to generate CO² 2.70 GJ

Percent of Waste Heat Utilized = $\frac{5.58}{6.20}$
= 90%

Overall Efficiency Not Considering CO2 Recovery = $\frac{5.58 + 3.6}{9.80}$
= 94%

Overall Efficiency Including Consideration of Natural Gas Use that is avoided due to CO2 recovery = $\frac{5.58 + 3.6 + 2.7}{9.80}$
= 121%

4.0 GAS PRICE AND HEAT SALE VALUE IMPACT ON COST OF COGENERATION ELECTRICITY



**Gas Price Analysis
Greenhouse Cogeneration Economics**

Sumas Price	Heat Sale Price as % of Sumas Price	Price as % for Natural Gas Avoided Cost from CO2 Recovered	Greenhouse Cogeneration Electricity Costs
\$ 3.00	100%	100%	\$0.046
\$ 4.00	100%	100%	\$0.047
\$ 5.00	100%	100%	\$0.049
\$ 6.00	100%	100%	\$0.050
\$ 7.00	100%	100%	\$0.052
\$ 8.00	100%	100%	\$0.053
\$ 3.00	80%	80%	\$0.053
\$ 4.00	80%	80%	\$0.056
\$ 5.00	80%	80%	\$0.059
\$ 6.00	80%	80%	\$0.063
\$ 7.00	80%	80%	\$0.066
\$ 8.00	80%	80%	\$0.069
\$ 3.00	70%	70%	\$0.057
\$ 4.00	70%	70%	\$0.061
\$ 5.00	70%	70%	\$0.065
\$ 6.00	70%	70%	\$0.069
\$ 7.00	70%	70%	\$0.073
\$ 8.00	70%	70%	\$0.077
\$ 3.00	60%	60%	\$0.060
\$ 4.00	60%	60%	\$0.065
\$ 5.00	60%	60%	\$0.070
\$ 6.00	60%	60%	\$0.075
\$ 7.00	60%	60%	\$0.079
\$ 8.00	60%	60%	\$0.084