

## PROJECT: Burrard Repowering 500MW - one 2x1 Fseries

Resource Category: Resource Smart - Natural Gas

Level of Study: Feasibility

Region: Lower Mainland

### PROJECT DESCRIPTION

The Burrard Generating Station (BGS) is a 950 MW conventional natural gas fired generating facility located in the Lower Mainland. Repowering would increase the efficiency of Burrard, therefore reducing operating costs and emissions on a per GWh of power production basis.

This resource option involves the repowering of the three units on the east side of the plant with a two-on-one F-series (M502F) combined cycle unit. The three units on the west side of the plant would continue to operate during construction. After construction, the west side units would be used for voltage support only. The repowered plant would have a total firm capacity of 500 MW (the current firm capacity is 900 MW).

In November 2002 the BC Provincial Government announced a technical review of the future of BGS as part of its Energy Plan. This technical review is scheduled to complete at the end of 2003, and the findings of the Review Committee may affect the options for Burrard presented in the 2004 Integrated Electricity Plan.

This summary is not incremental to the Burrard base case as presented in Volume 2: Demand Supply Balance.

### FINANCIAL INFORMATION

Total Capital Cost (\$1000s of 2003\$)	\$390,000
Fixed Operating And Maintenance Cost (\$1000s/year)	\$8,173
Variable Operating And Maintenance Cost (\$/MWh)	\$5
Project Life (Years)	20
Project Lead Time (Years)	4
Unit Energy Cost (\$/MWh)	Unknown

Costs have been escalated to 2003\$ from 2002\$ using inflation rates provided by BC Hydro Engineering, Estimating and Scheduling group (2003\$=127.4/124.7 x 2002\$). Total Capital Cost includes Direct Supply and Install, Indirects and Engineering, Interest During Construction & Overhead. Total Capital Cost also includes the incorporation of Selective Catalytic Reduction (SCR) technology which reduces the plant's NOx emissions by up to 90%. The capital cost estimates assumes a \$150 million value in the existing site, infrastructure and permits, versus developing a similar gas fired plant at a greenfield site.

Unit energy costs for thermal resource options are not estimated in the database because the cost depends largely on the market price of fuel, which varies over time. In addition, for thermal resource where BC Hydro has the ability to adjust the dispatch depending on the market fuel price, operation & maintenance costs would vary over time based on the rate of plant usage. Thus, unit energy costs for thermal resources are calculated as part of the Portfolio Evaluation modelling and scenario analysis to account for these forecastable variables.

### TECHNICAL INFORMATION

Installed Capacity (MW)	500
Average Annual Energy (GWh/year)	4000
Dependable Capacity (MW)	485
Firm Energy (GWh/year)	3900

The repowered plant will be available for generation for 8000 hours/yr (~700 hours of shutdown).

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**SOCIAL AND ENVIRONMENTAL INFORMATION**

Meets BC Hydro Clean Criteria	No
Greenhouse Gas Emission Factor (Tonnes CO2 equivalent/GWh)	350

Atmospheric Emissions (Metric Tonnes/GWh)	SOx	NOx	CO	VOC	PM 10	PM 2.5	Hg
	0	0.05	0.06	0.01	0.03	Unknown	0

Project Footprint (Hectares)	0
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Note: Some footprint aspects have not been estimated specifically.

Small quantities of ammonia are also emitted associated with the use of selective catalytic reduction (SCR) technology to reduce NOx. Although ammonia is not classified as a greenhouse gas the ammonia emission is usually regulated to a concentration of 7 mg/m3.

Opacity which is a measure of the visible plume of emission gasses exhausted by the facility is usually regulated to a opacity measure of less than 10%.

No new road or transmission will be required since this is an upgrade project.

The project uses 60% of existing cooling water permit allowances of 620 million cubic meters per year.

**Job Creation**

Construction Jobs Created (Person-years)	350
Permanent Jobs Created (Full time equivalents)	50

For this project, roughly 23 of the 50 Operation jobs created will be maintenance jobs on a contract basis. The project construction time will consist of 6 months demolition followed by 24 months of construction.

The permanent job numbers are total jobs at the Burrard site, and are not incremental to existing jobs.

**PRIVATE SECTOR INVOLVEMENT**

Estimated Level of Private Sector Involvement	Primary: 50% to 99%
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**UNCERTAINTY**

Development Uncertainty	Medium
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Until results from the Burrard MLA (Members of the Legislative Assembly) Review are available the development uncertainty of this project is estimated as medium.

Price Uncertainty	Low
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This option includes standard proven equipment and has had site specific studies.

**REFERENCES**

Calder, P., BC Hydro Burrard Upgrade Project Files, 2003.

## PROJECT: Burrard Repowering 500MW - second 2x1 Fseries

Resource Category: Resource Smart - Natural Gas

Level of Study: Feasibility

Region: Lower Mainland

### PROJECT DESCRIPTION

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This resource option involves the repowering of the three units on the west side of the plant with a two-on-one F-series (M502F) combined cycle unit. The repowered plant would have a total firm capacity of 500 MW (the current firm capacity is 900 MW).

In November 2002 the BC Provincial Government announced a technical review of the future of BGS as part of its Energy Plan. This technical review is scheduled to complete at the end of 2003, and the findings of the Review Committee may affect the options for Burrard presented in the 2004 Integrated Electricity Plan.

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