

Appendix C – Resource Planning Model & Key Inputs Summary**C-1 Resource Planning Model****C-2 Power Rates Summary****C-3 Exchange Rates**

C-1 Resource Planning Model

Planning Model Description

The model that was used to compare the different Cases is a Microsoft Excel workbook consisting of a number of linking worksheets.

Figure 1 below illustrates the key inputs and outputs for the Model.

Figure 1: Schematic of Resource Planning Model - Inputs and Outputs

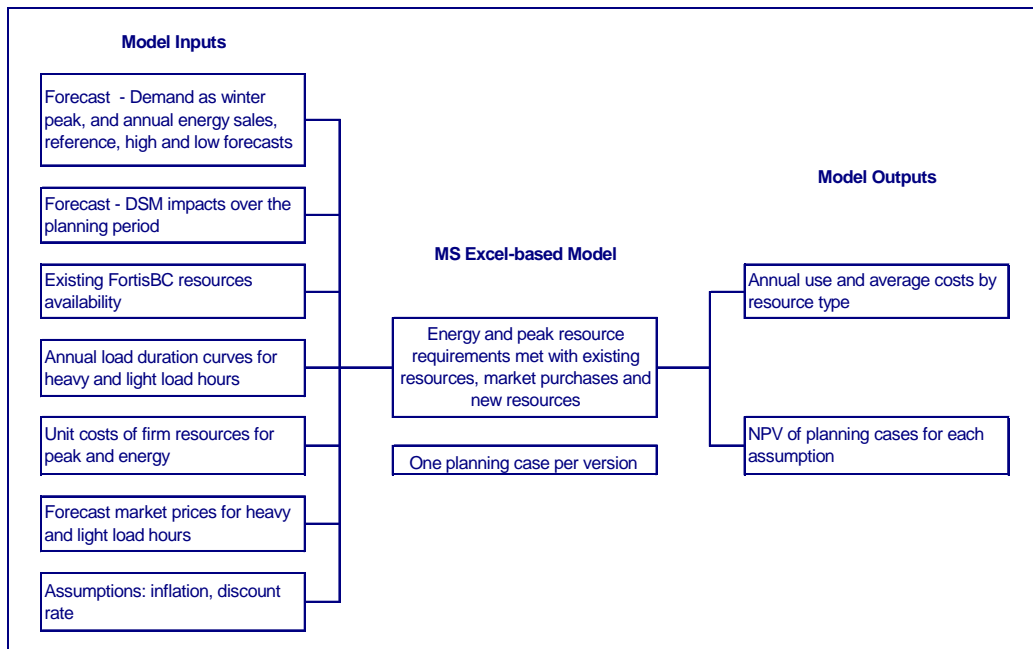


Table 1 below provides a description of the output worksheets, for each case, generated by the model.

Table 1: Resource Planning Model Output Worksheets

Title	Description
Annual Energy Resources	Summarizes annual resource requirements, energy supply and costs by resource type for 2005 to 2024, including annual total costs of supply and annual cost of market purchases.
Annual Capacity Resources	Summarizes the annual capacity requirements and resources, by resource type, by year, for 2005 to 2024.
Load-Resource Balance	Provides the date for the annual load/resource balance of energy (GW.h) and capacity (MW), by resource type, by year, for 2005 to 2024. Figures are also provided.

Model Calculations

The model for all Cases calculates for each year the amount of required capacity (monthly peak in terms of MW) and the amount of energy (monthly energy in GW.h) that can be met by FortisBC owned resources. The model then calculates for each year and month the amount of additional capacity and energy that will need to be acquired from other resources. These resources can be categorized as follows:

- Electricity Purchase Agreement with BC Hydro RS 3808;
- Electricity purchased from new firm resources;
- Medium Term Block Energy Purchases (3 to 5 years);
- Short Term Block Energy Purchases (1 year); and
- Spot Market Energy Purchases (energy purchased on a day-ahead or hour ahead basis to meet requirements).

The key differences between the Cases are the assumed availability of these resources and the rank order in which they are utilized by the planning model.

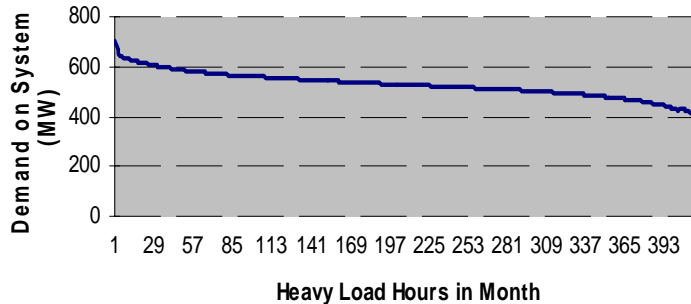
For each Case after the Load-Resource Balance is determined the Model then calculates the monthly and annual costs for each resource and the resulting energy costs for FortisBC.

Importance of Load Duration Curves

One of the key aspects of the model is that it does take into consideration the impact of load duration curves for every month over the study period. An example of a load duration curve is illustrated in the figure below.

Figure 2: Load Duration Curve

Load Duration Curve for Heavy Load Hours



A load duration curve indicates the amount of time in the month that a specific demand is exceeded. The figure above for example indicates that during Heavy Load Hours the peak demand for the month being analyzed exceeds about 600 MW for less than 30 hours. This information is important because it means that for any given month FortisBC may have enough energy from its own resources to meet the system’s energy requirement for that month. However, it will not have enough peak capacity within its own resources to meet the peak demand on the system for short periods of time.

FortisBC has to either purchase electricity on the spot market just during those hours when it needs the additional energy, or purchase blocks of energy either on a short, medium or long term basis. In many instances, the latter will require FortisBC to sell back much of the energy purchased. The model, using estimated duration curves based on recent system history, estimates the amount of spot energy or block energy that will need to be purchased and in the situation with block purchases, how much will have to be resold to the market.

C-2 Power Rates Summary

Summary Table of Rates

Resources	Based on	2005	2006	2007	2008-2024
Brilliant	CPC Forecast	\$31.24	\$34.03	\$34.98	2% increase annually after 2007
DSM	FortisBC Forecast	\$42.00	\$42.84	\$43.70	2% increase annually after 2007
BC Hydro 3808	BC Hydro Existing Rate, \$4.72 per kW and 27.809¢ per kWh, the model dispatches the needed energy and capacity and blends the rates	\$42.41	\$41.62	\$41.93	2% increase annually after 2005
Brilliant Upgrade	CPC Forecast	\$23.86	\$24.39	\$24.92	2% increase annually after 2007
IPP	FortisBC Forecast	\$25.87	\$26.39	\$26.92	2% increase annually after 2005
Medium-Term Block	Mid-C - Willis Market Price Forecast Plus \$5-10 Hedge				
Short-Term Block	Mid-C - Willis Market Price Forecast Plus \$4-7 Hedge				
Spot Market	Mid-C - Willis Market Price Forecast Plus 75% for HLH Spot and 25% for LLH Spot				
Peaking Plant	Capital Cost estimated to be \$5,840 per MW per Month. Energy Charge is the Spot Market Price for Electricity.				
BC Clean	Capital Cost estimated to be \$21,000 per MW per Month. Energy Charge starts at \$30 per MWh in 2005 and inflated at 2% annually.				
New Firm Power	Capital Cost estimated to be \$10,950 per MW per Month in 2005 and inflated at 2% annually. Energy Charge based on EIA Natural Gas Price forecast adjusted for Sumas Natural Gas Market. Assumed Heat Rate is 7.3 GJ/MWh.				

Willis Forecast References:

1. U.S. EIA Annual Energy Outlook 2004 with Projections to 2024.
2. NYMEX Forwards
3. Sumas Forwards
4. Discussion with Marketers

C-3 Exchange Rates**Exchange Rate Summary**

Year	Exchange Rate
2005	1.2328
2006	1.2452
2007	1.2452
2008	1.2617
2009	1.2617
2010	1.2802
2011	1.2802
2012	1.2982
2013	1.2982
2014	1.2982
2015	1.2982
2016	1.2982
2017	1.2982
2018	1.2982
2019	1.2982
2020	1.2982
2021	1.2982
2022	1.2982
2023	1.2982
2024	1.2982

Exchange rates were obtained from Bank of Montreal's website on October 29, 2004.