E-NP#04

Myler, Don J.

From: Milne, Bruce [Bruce.Milne@BCHydro.bc.ca]
Sent: Wednesday, October 03, 2001 5:48 PM
To: 'dmyler@newfoundlandpower.com'
Cc: Jones, Sandra; Kassam, Wafi; Fast, Brian
Subject: RE: Average Hydroelectric Production

Importance: High

Newfoundland Power questions_...

Don, BC Hydro relies on monthly energy studies to support operations planning, electricity trade, and financial forecasting. The methodology for determining electricity trade for rate-setting purposes is different.
The attached note explains the issue and I hope answers the other questions you posed below. Please call me or send me an email if you require additional information.

<<Newfoundland Power questions_.doc>>

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> From:
> dmyler@newfoundlandpower.com[SMTP:dmyler@newfoundlandpower.com]
> Sent: 2001 October 01 11:25 AM
> To: bruce.milne@BCHydro.bc.ca
> Subject: Average Hydroelectric Production
>
> Bruce, as per our phone call. Would it be possible to have a response by
> Thursday of this week.
>
> What is the basis for the estimate of hydroelectric production for use in
> estimating production costs in a forecast or a test year for setting
> rates?
>
> (1) average of all hydrological data on record;
> (2) average of all production data on record;
> (3) Number of years used;
> (4) Is the average based on median or mean;
> (5) other, please specify;
> (6) basis of firm supply (ex: lowest historical water levels);
> (7) Do you have a rate stabilization plan ? (To protect from
> financial risk of low and high water level years or variations in fuel
> and purchase power cost.);
>
> Does your forecast of hydroelectric generation used for rate setting
> purposes during a test year differ from the hydroelectric generation assumed
> available for planning purposes?
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" Average Water Assumption" for rate setting purposes

For rate determination purposes, BC Hydro consolidated net income must include an amount for electricity trade. The methodology for determining electricity trade income for rate-setting purposes is currently based upon Special Direction and precedent. The "average water" assumption utilized in establishing electricity trade income for rate-setting purposes, is different from assumptions used to plan system operations that influence actual operations and actual electricity trade. The forecast income difference between the two methodologies can be significant.

Special Direction No. 8 requires that for rate setting purposes, the return on equity must be calculated using consolidated net income from all sources. For this purpose, projections of consolidated net income must include an amount of electricity trade income consistent with the British Columbia Utility Commission's forecast of annual net export revenue under average water conditions, as contained in the Commission's report to the Lieutenant Governor in Council dated June 30, 1992, as amended on BC Hydro's energy removal certificate.

In previous rate application submissions, for rate setting purposes, BC Hydro has prepared electricity trade forecasts based upon historical average runoff and average reservoir starting positions.

For operations planning and financial forecasting purposes, BC Hydro undertakes monthly energy studies, using its System Marginal Cost (SMC) model, to generate forecasts of expected export and import amounts, Burrard (thermal) generation, and Williston Reservoir levels, along with the current system marginal (opportunity) cost of generation for the Peace River plants. The study is initialized with current reservoir levels and uses the latest expected runoff forecasts for the major B.C.Hydro reservoirs. Between 1 January and 1 August of each year, the expected runoff forecast for the period ending 30 Sept. reflects the latest snowpack conditions. During the remainder of the year and for subsequent years, the expected runoff forecast is equal to the average historical runoff for the BCH

system. With the above inputs, the SMC model results always reflect the current expected BCH resource portfolio.

The current expected resource portfolio is used for system operation planning and cost of energy and electricity trade forecasts. The electricity trade subsidiary, Powerex, modifies the initial electricity trade projections derived by the SMC.

The word "average" used above is in regard to the BCH system runoff forecast. However, the System Marginal Cost study also considers a number of other factors such as current reservoir levels and forecast electricity and natural gas prices, which are not expected to be at average historical levels. This further complicates the issue of modeling a "truly average" scenario.

Runoff conditions in the B.C.Hydro system and the remainder of the WSCC region are not strongly correlated. The impacts on B.C.Hydro of runoff conditions elsewhere in the WSCC region are captured in the forward market prices used by the model. In the same way that the SMC model uses "expected", not average, runoff conditions for B.C.Hydro reservoirs, the SMC model also uses "expected" market prices for the U.S. market. Since market prices reflect runoff conditions in the U.S. Columbia River system, it is not reasonable to change the water supply conditions to "average" but to continue using "expected" market prices.

System Marginal Cost Model – Key details of parameters

Optimization: The SMC model uses stochastic dynamic programming to determine optimal operating strategy for Williston Reservoir and to optimize other generation and electricity trade.

Stochastic variables: Hydrologic conditions and domestic load uncertainty are both considered. Weather conditions are used to correlate the variations in these variables – the model typically incorporates 26 weather sequences (1973 through 1998). US market variations are included in the optimization.

Flow data: For current water year GM Shrum and Peace Canyon flow data for each weather scenario is determined by the UBC watershed model. For subsequent years: Flow data is taken from historical stream flow information corresponding to the weather scenario.

Study frequency and length: Studies are run at least monthly and the first one to three years are used to support operations and financial planning and forecasting.

Rate Stabilization Account

The rate stabilization account was established on March 30, 2000, to mitigate the impact of volatile earnings on ratepayers. Transfers are made to the rate stabilization account during high income years to reduce the need for rate increases in lower income years. Where consolidated net income, before any rate stabilization account transfers, is greater than the amount needed to achieve the annual rate of return on equity allowed by the Commission, then consolidated net income is decreased accordingly by an appropriate transfer to the rate stabilization account. Where consolidated net income, before any rate stabilization transfers, is less than the amount needed to achieve the allowed rate of return on equity, then consolidated net income is increased by a transfer from the rate stabilization account. Transfers from the rate stabilization account are subject to a positive balance existing in the account, provided BC Hydro's debt : equity ratio, after the transfers, is not greater than 80 : 20.