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2005 Revenue Requirements Application,
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Q200.0 Reference: Volume 3, p. 68

FortisBC presents the results of a spot and short-term purchase volume sensitivity analysis.

What did FortisBC conclude from this analysis?

A200.0 This analysis investigates if there is a more cost-effective combination of short-term versus spot purchases than what is generally the existing market strategy where about 75 MW of the shortfall is left to the spot market. For the case of an 8 percent discount rate, case A1 is more or less the same cost whether the spot market purchase is 50, 75, 100 or 150 MW. There are similar results for the other discount rates and also for case B1, where the variable is the amount of the short-term purchase.

The conclusion was that there is no reason not to simulate the existing market strategy cases, i.e., the "A" cases, with 75 MW left for the spot market and simulate the new market strategy cases, i.e., the B and C cases with 75 MW left to the short-term market.

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Q201.0 Reference: Volume 3, p. 69

FortisBC states that any new long-term firm resources which may be added to meet the capacity shortfall and thereby eliminate the energy shortfall are likely to involve considerable surplus energy, which would have to be exported, with the risk of selling at a loss, or else displace lower-cost energy from the PPA.

Q201.1 How does the Resource Planning model estimate or otherwise incorporate the incremental costs or benefits costs that may be associated with these possible dynamics? Please provide the assumptions and results of the analysis, as relevant.

A201.1 To simulate the risks of selling surplus at a loss (also see the response to BCUC IR1 Q171 for more of an explanation of the effects of constraints on selling surplus), the model simply "sells" surplus block power at a loss compared to the purchase price. However, in the case of a long-term firm resource (e.g. new plant), any surplus energy from the plant will largely displace PPA power due to the PPA constraints as explained in the response to BCUC IR1 Q171. It is therefore not practical as the PPA power is expected to be more cost effective.

In the cases in which a new market strategy is evaluated, the model first adds a HLH block purchased at market price with sufficient capacity to meet the expected demand, calculates the energy which is surplus based on the load duration curve and then "sells" that surplus at 90 percent of the purchase price. (as in the response to BCUC IR1 Q203; analysis calculates it with 80 percent to investigate the effect of a variation.) The model assumes this is more economic than reducing the take under the PPA, a reasonable assumption.

The Annual Energy Resource results for all of the model runs indicate that over 99 percent of FortisBC's energy requirement up to 2014 is supplied by FortisBC's own hydro resources, Brilliant Purchases, low-cost IPP, DSM and BCH PPA purchases. The highest cost of all of these resources is BCH's PPA at $47.94 per MWh. Accordingly, up until that year if a Firm Power resource was purchased to meet the capacity shortfall the energy from the firm power resource would displace PPA energy at $47.94 per MWh.

Case B3 examines the result of a 50 MW clean resource being added in 2014.

Analyzing some of the results of this case indicates the economic challenge of purchasing firm power in the early years. The clean power cost has been calculated as follows:

Total Annual Clean Power Charge = $\sum_{n=1}^{12} (CCn + ECn)$, where

n = month

CC = Capital Charge

EC = Energy Charge

Capital Charge = **$21,000** [1]/MW/Month x 50 MW/Month

Energy Charge = **$35.85** [2]/MWh x Energy Consumption of the Month

Annual Clean Power Cost ($/MWh) = Total Annual Clean Power Charge / Total Annual Clean Power Energy Consumption

For example, in January there are 744 hours, the Clean Power Charge =

Capital Charge = $21,000/MW/Month x 50 MW/Month = $1,050,000

Clean Power Energy Used = 50 MW x 50% x 744 hours = 18,600 MWh

Energy Charge = $35.85 x 18,600 MWh = $666,810

Clean Power Charge for January 2014 = $1,050,000 + $666,810 = $1,716,810

Clean Power Cost = $1,716,810 / 18,600 MWh = $92.30/MWh

In this scenario the Clean Power at $92.30 would be replacing PPA power at $47.94.

Note:

1. $21,000/MW/Month is based on a 50 MW plant costing $125 millions when it is built in 2010 with an annual capital charge of 10 percent of the total capital cost. 10 percent of $125 million is $12.5 million and divided by 12 months per year and 50 MW is $20,833 per MW per Month rounded to $21,000 per MW per Month.
2. $35.85/MWh consists of Fuel Cost and Non-Fuel Operation & Maintenance Cost.

Q201.2 Further to the preceding question, if the model does not address these factors, what does this imply about the analysis results for the Case Scenarios to which these dynamics could apply?

A201.2 It is believed that the model adequately addresses these factors.

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202.0 Reference: Volume 3, pp. 69, 74

FortisBC states on page 69 that it is expected that the PPA will be renewed under similar terms and conditions for a period beyond 2013, at least until to 2024, the last year of the resource plan study. FortisBC states on page 74 that as part of its Action Plan the Company will begin discussions with BC Hydro, with a view to gaining certainty regarding the status of the PPA beyond 2013.

Q202.1 What actions has FortisBC taken to date toward gaining certainty about the status of the PPA beyond 2013?

A202.1 At this point in time there have been no actions taken to gain such certainty, the Company's focus has been on completing the CPA negotiations which is expected to occur in the first quarter of 2005.

Q202.2 How would FortisBC rate the degree of certainty, at this point in time, about the status of the PPA beyond 2013? Why?

A202.2 We would say that the degree of certainty is not sufficiently high to be able to plan our resources with any degree of confidence, beyond 2013, hence the recommended action to take the steps referred to above in 202.1

However, we would say the degree of certainty is not that low. It appears that BC Hydro has included us as a load in its 2004 Integrated Electricity Plan beyond 2013 through to 2024. While this in itself does not create any certainty it at least makes the assumptions consistent between their Resource Plan and ours. Further, the Company believes that while the Heritage Contract is in effect it has a strong case to argue that the PPA should be in effect because the Terms of Reference for the Heritage Contract between BC Hydro Generation and BC Hydro Distribution include the PPA in the list of eligible rate classes.

As explained in the Resource Plan, one way to achieve more certainty would be to match the termination provisions in the PPA to those in the Heritage Contract. This would provide the Company with five years notice before expiry of the PPA.

BC Hydro also has some incentive to gain certainty on this issue since they have to plan resources.

Q202.3 What is FortisBC's expectation as to the likelihood that the PPA will be renewed under similar terms and conditions for a period at least until 2024? Why?

A202.3 In spite of the absence of any discussions on the topic with BC Hydro, we nevertheless feel the likelihood is high that the parties will be able to renew the agreement under reasonably similar terms and conditions, as is being done with the Canal Plant Agreement. We believe we have had a long and successful relationship with BC Hydro through both the CPA and the PPA and the logic for continuing both agreements is compelling.

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203.0 Reference: Volume 3, p. 65, Table 24 and Appendix D

Q203.1 For each set of input assumptions associated with each of the columns in the tables of Appendix D, please conduct a *Goal Seek* analysis that identifies the absolute and percentage changes in each key input that, all else equal, would result in the incremental power costs in Table 24 equaling zero.

A203.1 Further to our discussions with BCUC staff concerning this question: it was agreed that it was not feasible to conduct the comprehensive sensitivity analysis requested because the model was not set up to readily allow that, e.g. the incremental power costs reported in Table 24 are the differences between independent spreadsheets that are not linked in any way and many variables would have to be changed in both sheets at the same time. It was agreed, however to conduct a limited sensitivity analysis on some selected key variables and report on the results which are presented below. Insert BCUC 203.xls

Q203.2 For each Case Scenario, please conduct a sensitivity analysis that ranks the absolute and percentage change in its NPV resulting from an equal positive and negative percentage change to each of its inputs respectively, holding all other inputs constant. Please report the results in a table as well as in the form of a tornado diagram.

A203.2 Please see the response to BCUC IR1 Q203.1 above.

Q203.3 In light of the results of the analyses in the preceding two questions, please comment on what possible future scenarios would warrant FortisBC recommending a different action plan than that proposed on page 74. Please discuss the relative likelihood of these scenarios as compared to the scenario and input assumptions that are associated with FortisBC's recommended action plan.

A203.3 <u>Results Pertaining to Market Strategy (new A1 vs B1 cases)</u>

The above sensitivity analysis has examined some likely variations in energy block sell-back, energy block hedge cost and spot (super-peaking) purchases. From this analysis, it appears that a new market strategy which would be based on complete hedging of the expected market purchases with energy blocks, short term and medium term, could be considerably more costly than what was reported in Volume 3, i.e., the 14-16 M could more than double. The cost appears to be most sensitive to the sell-back price from the blocks. A relatively small decrease from 90 percent to 80 percent resulted in a significant increase in the cost of the new strategy. Recent experience with the daily block sell-backs indicates 80 percent being more likely than 90 percent. Whether this holds into the future is unknown at this time. Considering also the revised volatility analysis provided in the response to BCUC IR1 Q199 where the benefits appear to be reduced somewhat, the new market strategy then seems less favorable.

However, it is difficult to make assumptions based on the short term that would hold over a

twenty year period of the study. It is entirely possible there would be years of mild volatility in the market in which the sell back from the blocks could be equal or slightly higher than the purchase price, raising the long term average sell-back. With this scenario, the new market strategy looks favourable.

It was recognized in the Vol. 3 report and re-iterated in BCUC IR199 that simulation of the market is complex and a more detailed study of a shorter time frame has to be done to optimize a new market strategy. A shorter time frame lends itself to more confidence in assumptions concerning input variables such as those investigated above and further, allows the effects of sensitivity to be analysed. The above results pertaining to the block purchases have to be confirmed as applicable to the short term and other options will be investigated, as explained in the response to BCUC IR1 Q199.

Therefore overall conclusions of the study are not materially affected, the conclusion that a new market strategy will have to be optimized through a more detailed study of a shorter time frame still holds.

Impact of loss of PPA (new A1 vs A3 and C1 vs B1 cases)

It is evident that even with a 30 percent reduction in firm energy cost in the CCGT, an outcome which is considered unlikely, the impact from loss of the PPA would only drop to 50 percent, about $56 million, still a very significant cost, indicating that that the conclusion requiring action to gain certainty on the future status of the PPA is not affected.

Impact of New BC Clean plant (new B3 vs B1 and C3 vs C1 cases)

It is evident that even with a significant decline in the price of clean energy 50 percent to 66 percent, which is considered very unlikely, the cost of compliance with the clean energy policy through addition of a biomass plant would still be significant and the previous conclusion is considered to hold.

Impact of Peaking Plant (new B2 vs B1 and C2 vs C1 cases)

A 25 percent decline in capacity cost of a peaking plant compared to the cost used in the study could be a possibility with used equipment or existing plant in today's market. However, the incremental cost even compared to the new market strategy in which it was simulated to displace the short term component of the block purchases is still significant. If it were to be an alternative to a lower cost market strategy such as a capacity purchase, it would appear more costly, therefore it still does not appear to be feasible even with a capital cost reduction.