
Integrated Resource Plan

Appendix 7E

Technical Advisory Committee – Written Submissions on Consultation Topics 2011

About the IRP Technical Advisory Committee

An IRP Technical Advisory Committee (TAC) was established by BC Hydro in December 2010 to provide detailed technical input and feedback to assist BC Hydro in creating a thorough and well-considered Integrated Resource Plan (IRP). This advisory input is in addition to input provided by the public, First Nations, and stakeholders through the [province-wide consultation process](#).

The [Committee membership](#) consists of knowledgeable participants with a significant stake, interest and experience in BC Hydro's resource planning process. Members of the Committee include representatives from the public, First Nations and stakeholders. The [Terms of Reference](#) details the purpose, mandate, roles and responsibilities and process management aspects of the Committee's work.

The Committee meets periodically throughout the development of the IRP to review the technical inputs to the analysis, the results of the analysis, and ultimately the draft IRP. Meeting agendas, presentations and supporting materials can be found in the [Document Centre](#).

Written Submissions

As stated in the IRP TAC's Terms of Reference, *"At key junctures during the process, committee members will be asked to provide attributed comments to BC Hydro on core planning topics of the IRP to form part of the consultation record."*

As part of TAC Meeting #4 held April 5/6 2011, TAC members were requested to respond to the same five consultation questions provided in the feedback form of the IRP [Consultation Workbook](#). The timing of this request coincided with the timing of the public and First Nations consultation process which extended from March through April, 2011.

The written submissions received from TAC members form part of the consultation record and will be considered, along with the First Nations and Public consultation input as BC Hydro drafts the IRP.

The submissions received are attached in the following order:

- Association of Major Power Consumers (Richard Stout)
- BC Sustainable Energy Association (Bill Andrews)
- Clean Energy Association of BC (Loch McJannett)
- Commercial Energy Consumers (David Craig)
- First Nations Energy and Mining Council (Andrew McLaren)
- Fortis BC (David Bennett)
- The Pembina Institute (Matt Horne)

WRITTEN SUBMISSION FROM:
ASSOCIATION OF MAJOR POWER CONSUMERS

BC Hydro IRP TAC Written Submissions May 2011
Submitted by, Association of Major Power Consumers

1. Strongly disagree.

BC Hydro is an electric utility, not a Government agency. It is BCHydro's role to provide reliable electricity at the least possible cost, and sell at regulated rates that balance the generally accepted principles of rate design. Those rate principles include reflecting the allocated cost of service, promoting efficiency and customer acceptance.

When all factors are considered, it is usually not be practical to offer "conservation" rates that provide the desired price signal. Rate design is always a compromise. To the extent that rates are less than the full marginal cost of service (including access to external markets) it is appropriate to offer conservation incentives that bridge the gap to better reflect marginal costs. This approach is based on the operation of markets for energy consuming products and alternatives. It is not appropriate to offer incentives that are higher than this.

The utility may also provide information to assist customers in making wise choices. It is not appropriate for BC hydro or any public utility to attempt to shape, or change markets or to influence societal "norms" or attitudes to energy use. This is the role of a Government agency, as is the setting of regulations such as building envelope standards. If the average German uses less energy than the average Canadian, it has nothing to do with utility conservation or market influence in Germany. It has everything to do with relative energy pricing and government regulation, including regulation and establishment of markets.

The legislated "self sufficiency" and "insurance" requirements add 8000GWh of surplus energy to the level required for secure energy supply. This is completely unacceptable to AMPC and every other consumer group. We cannot support planning to such wasteful levels, and suggest that this does not reflect efficient use of resources. Waste on this level does not build the credibility to lead public opinion on better resource management.

2.1, 2.2, 2.3, Strongly Disagree with every portfolio listed.

It is not the role of BC Hydro to foster regional development, "green" development, reduced GHGs, or any other social objective through the purchase of new electricity supply. Regional development is still a consideration in extending the transmission system to serve loads within BC where the mandate is very different. The supply side responsibility is to develop the least cost portfolio that will provide a secure supply and meet all applicable environmental standards.

Portfolio 2.3 is the closest to making sense, but is designed to meet the wasteful concept of "self sufficiency" which ignores efficient and cost effective trading possibilities. It also ignores more cost effective gas-fired options that would provide much needed diversity of source, controllability and flexibility of location. Other jurisdictions regard gas as a relatively clean fuel, and we export gas to them. There is no climatic virtue in burning gas next door and ignoring the lower cost option in BC. AMPC does not share the concern that gas prices will escalate to the extent that it is no longer cost effective, and this can be mitigated by trading in any event.

We are assuming that the review panel will reconsider the costly constraints that have been placed on BC Hydro, resulting in a new set of portfolios. Presumably the TAC was suspended for this reason.

3. Strongly Disagree.

See comments under point one. It is not the role of the utility to accelerate "electrification" in order to displace GHG. Price electricity correctly and allow the market to work. Respond to consumer demand for electricity. Do not tell them to consume more. This is the antithesis of conservation. In many cases it is more efficient to consume natural gas rather than to generate remotely and displace it. Electric vehicles will develop at a natural rate. The societal benefits of forcing such developments are dubious and should not result in extra costs to the utility ratepayer. We just cannot afford this.

4. Strongly Agree.

Transmission has a longer lead time than generation and is expensive and controversial. Any rational planning process has to be "proactive" in the transmission build. It would be completely unacceptable to be reactive due to the sub-optimal nature of the system development. It is also BC Hydro's role to provide service in areas of growing customer demand. As building transmission will then constrain where generation can be developed, it affects the competitive procurement process - which needs to be reconsidered.

5. Neither Agree nor Disagree.

We believe there will be few profitable contracts when all IPP and transmission costs are taken into account. As long as all the costs incurred by BC Hydro, including administrative and use of existing transmission are taken into account, and BC Hydro does not enter an IPP purchase agreement until a profitable export agreement of matching length is executed, then AMPC does not object to the aggregation. We do doubt that any contracts will materialize on this basis.

WRITTEN SUBMISSION FROM:
BC SUSTAINABLE ENERGY ASSOCIATION

British Columbia Sustainable Energy Association
Comments in response to
BC Hydro 2011 Integrated Resource Plan Consultation Workbook
April 29, 2011

1.1 Summary

BCSEA's responses to the five questions posed by BC Hydro regarding its 2011 integrated resource plan in progress are summarized as follows:

1. BCSEA strongly agrees with the greater conservation and efficiency approach. BCSEA supports targeting all cost-effective demand-side management (DSM) savings.
2. BCSEA's view is that it is premature to express preferences about particular portfolios before the results of the portfolio modeling have been made available. Regarding Site C it is premature to express or imply acceptance of Site C, pending the results of environmental assessment, First Nations consultation, updated cost estimates, the Minister's review of BC Hydro, and the portfolio modeling.
3. BCSEA supports cost-effective electrification measures to reduce GHG emissions.
4. Consideration of proactive transmission planning options is prudent; but there has not been enough information presented to justify support for actually building transmission on a proactive basis.
5. BCSEA is fundamentally skeptical that there is a positive business case for generation for export.

1.2 Background

BCSEA

BCSEA is a non-profit association of citizens, professionals and practitioners committed to promoting the understanding, development and adoption of sustainable energy, energy efficiency and energy conservation in British Columbia. BCSEA has eight chapters across B.C. and approximately seven hundred and fifty individual and corporate members. Many of BCSEA's members are customers of BC Hydro. BCSEA's goals include sustainable energy, energy efficiency and energy conservation in British Columbia.

BCSEA has participated extensively in BC Hydro's earlier integrated resource planning processes, and in the B.C. Utilities Commission's review of BC Hydro's proposed long-term plans. BCSEA has followed the 2011 IRP process closely, and has a representative on BC Hydro's IRP technical advisory committee.

IRP Workbook Questions

BC Hydro is required by section 3 of the B.C. *Clean Energy Act* to prepare and submit to the Minister of Energy an integrated resource plan (IRP). Unlike BC Hydro's previous long-term resource plans, the 2011 IRP is not submitted for approval to the Utilities Commission. The IRP must include, among other things, a description of the consultation BC Hydro has carried regarding the plan. BC Hydro's IRP consultation includes three streams: public consultation, a Technical Advisory Committee, and First Nations consultation.

BC Hydro's public consultation has focused in part on a document called "2011 Integrated Resource Plan: Planning for a Clean Energy Future, Consultation Workbook, March 1 – April 30, 2011"¹ (Workbook). The Workbook concludes with a series of five questions to which BC Hydro invites responses. This brief provides BCSEA's responses.

1.3 Responses

Q1. Please indicate your level of agreement with this greater conservation and efficiency approach.

BCSEA strongly agrees. BCSEA supports targeting all cost-effective energy conservation and efficiency ("demand-side management" (DSM)) savings.

BCSEA disagrees with the suggestion in the Workbook that pursuing an aggressive DSM approach involves a risk of higher energy costs:

"If higher electricity savings are not achieved, higher cost electricity may need to be acquired from other jurisdictions on the open market or from accelerated power acquisition processes in B.C." [p.28]

With respect, this is not a valid reason to target something less than all cost-effective DSM electricity savings. The implied concern about the uncertainty of DSM savings results is misplaced.

- If DSM savings don't materialize in predicted quantities there will be plenty of time to alter the long-term plan, regarding both DSM and supply-side options. DSM plans can be, and are, adjusted as events unfold. Some DSM measures will be more effective than others; new DSM opportunities will arise.
- When DSM savings are lower than anticipated it is often due to low uptake, in which case DSM expenditures are lower than expected (e.g., fewer incentive payments are made). As a result, DSM remains cost-effective even if the results are below predictions.
- Lower-than-predicted DSM savings are often due to a slow economy. However, a slow economy puts downward pressure on electricity demand, so it is unlikely that lower-than-predicted DSM savings would cause an unplanned need for additional energy.
- Regarding "higher cost electricity ... on the open market": the cost of market power is notably lower than the cost of new firm generation resources in BC, so this (the supposed risk that DSM savings shortfalls will necessitate higher-cost market purchases) is not a valid financial argument against aggressive DSM.

1

http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/iep_itap/2011q1/bc_hydro_irp_consultation.Par.0001.File.BC-Hydro-IRP-Consultation-Workbook-February-24-2011.pdf

- Regarding “accelerated power acquisition processes in B.C.”: if aggressive DSM plans deliver lower savings than expected, and *if* this causes “accelerated power acquisition processes in B.C.” (which can’t be assumed, because, as noted above, DSM savings may fall short of predictions at times when demand is low), then there is still no reason to assume that the additional cost of “accelerated power acquisition processes in B.C.” would not have been incurred if less-aggressive DSM targets had been chosen. On the contrary, if more-aggressive DSM targets are missed then less-aggressive DSM targets would presumably yield even lower actual savings, which, other things equal, accelerate even further any need for new generation. BCSEA rejects the notion that setting an aggressive DSM target for a 20-year plan runs the risk of actually achieving even less conservation and efficiency savings than would have resulted from setting a less-aggressive DSM target (if that is what is implied in the Workbook).

Q2.1 Please indicate your level of agreement with Portfolio 1 – Renewable Mix.

BCSEA neither agrees nor disagrees. It is premature to express preferences about particular portfolios before the results of the portfolio modeling have been made available.

Portfolio 1 is notable because it does not include Site C. Site C is a very big project, the pros and cons of which are not systematically identified in the Workbook or other IRP consultation materials. As one example, the Workbook uses a unit cost of Site C at \$85/MWh, compared to other new generation. But that cost estimate is based on Site C’s 30-year old design. As the Workbook notes, an updated Site C cost estimate based on an upgraded design is “expected by spring 2011.” [p.14] However, the updated cost estimate for Site C has not yet been made publicly available.

The IRP, as discussed in the Workbook, treats Site C primarily in terms of “need” and unit cost in electricity planning terms. There are other important attributes of Site C that must be considered in deciding whether the project should be implemented or not. Some of these attributes such as environmental assessment and First Nations consultation and accommodation are being, or will be, dealt with partly or totally in *fora* other than the IRP. However, the *Clean Energy Act* requires BC Hydro’s IRP to include consideration of the “energy objectives” defined in the *Act*. Some of these energy objectives go beyond strictly electricity- and price-related issues: such as, reducing GHG emissions (directly, through fuel switching and by encouraging communities), fostering the development of First Nation and rural communities through clean energy development, and fostering economic development. Therefore, BC Hydro’s consideration of Site C and other resources in the IRP should go beyond strict electricity planning criteria and should include GHG reductions, community development and economic development. For example, BC Hydro’s assessment of Site C should include consideration of the GHG and community development implications relative to an alternative scenario where the full agricultural potential of Site C flood area is developed for local, sustainable food production.

The Workbook includes the statement:

“The cost of renewable resources and the need for backup resources make this [Portfolio 1] the most expensive portfolio of the three.”

This conclusion is not supported by the consultation materials, at least so far. For example, in a low load growth scenario, say in the absence of mandatory over-acquisition of energy, there is no certainty that additional generation capacity would be required (noting again that the full portfolio model outcomes have not yet been made available.)

Q2.2 Please indicate your level of agreement with Portfolio 2 – Renewable Mix with Site C

BCSEA neither agrees nor disagrees. In BCSEA's view, it is premature to express or imply acceptance of Site C, pending the results of environmental assessment, First Nations consultation, updated cost estimates, the Minister's review of BC Hydro, and the portfolio modeling.

Q2.3 Please indicate your level of agreement with Portfolio 3 – Renewable Mix with Site C and Gas-Fired Generation (within 93 per cent Clean Energy Act target).

BCSEA "somewhat disagrees."

While a final preference regarding any of the three portfolios would be premature, Portfolio 3 includes gas-fired peaking generation. As the Workbook acknowledges, the increased use of gas in the BC Hydro system would increase GHG emissions, making this portfolio more GHG intensive than the other two. This runs counter to the legislated requirement for BC to reduce its GHG emissions, and BC's energy objectives as stated in the *Clean Energy Act*.

Also, the assumption that Portfolio 3 is the least expensive of the three is suspect because Site C costs are not updated, the full portfolio models have not been run, the timing of "need" for additional capacity is not specified, and the costs and risks associated with increased GHG emissions have not been identified.

Q2.4. Do you have any other comments about electricity generation resource options to meet customers' future electricity needs?

BCSEA is disappointed that geothermal generation in B.C. did not prove to be a cost-effective resource in the 2010 resource options report. Geothermal generation technology itself is relatively inexpensive and commercially proven. And B.C. has considerable land area that would or could contain geothermal resources. However, we understand that the current problem is that it is generally too expensive for Independent Power Producers (IPPs) to explore and test specific sites with insufficient assurance of finding a site that is technically desirable, in a developable location and for which BC Hydro would provide a long-term contract. Apparently more is needed from BC Hydro and the provincial government to help identify potentially feasible geothermal generation resource locations.

Q3 Please indicate your level of agreement with this approach to electrification that involves active promotion by BC Hydro.

BCSEA strongly agrees. BCSEA supports cost-effective electrification measures to reduce GHG emissions.

Not all electrification ideas would be cost-effective. There needs to be a 'GHG-reduction electrification options' report for B.C, with analysis of the relative costs of the various measures.

Q4 Please indicate your level of agreement with this proactive approach to transmission planning.

BCSEA neither agrees nor disagrees.

Thinking ahead about the *pros* and *cons* of transmission options, both proactive and responsive, seems intrinsically prudent. However, there isn't enough information presented to justify supporting a 'build it (transmission) and they (generation) will come' approach.

Put another way, it is one thing to support proactive transmission planning; quite another thing to support proactive transmission building.

Q5 Please indicate your level of agreement with this export approach [meaning clean generation by IPPs solely for export, aggregated by BC Hydro, and not to the account of ratepayers].

BCSEA “somewhat disagrees.”

BCSEA is fundamentally skeptical that there is a positive business case for generation for export. Until BC Hydro releases its report on the topic (required by the *Clean Energy Act*), the default assumption has to be that generation for export would be costly to taxpayers (if not ratepayers) and/or IPPs would not participate.

Among the reasons for skepticism are the following:

- project risk and cost uncertainty regarding transmission capacity increases needed on the US side between BC and California,
- unfavourable and uncertain eligibility criteria regarding California Renewable Portfolio Standards (RPS), and
- uncertainty about lower-cost competition, e.g., wind farms closer to the California market, US subsidies for domestic renewable generation.

1.4 Conclusion

The BC Sustainable Energy Association welcomes this opportunity to provide input to BC Hydro’s Integrated Resource Plan. We believe BC Hydro and the province are at an important crossroad in their energy planning and development, and there is a significant opportunity to lay the groundwork for increased efficiency in electricity use, while reducing greenhouse gas emissions and minimizing environmental harm.

We hope and expect that there will be further rounds of outreach to solicit further public input when the IRP is further developed.

WRITTEN SUBMISSION FROM:
CLEAN ENERGY ASSOCIATION OF BC

CONSERVATION & EFFICIENCY

Greater Conservation & Efficiency

To achieve higher energy savings from conservation and efficiency than BC Hydro already targets, BC Hydro would need to rely on additional changes to federal and provincial regulations, send stronger rate signals through specially designed electricity conservation rates, and expand Power Smart programs. Greater emphasis would be placed on changing province-wide market parameters, and on changing societal norms and patterns that influence electricity savings.

From a planning perspective, BC Hydro must be highly confident that savings from conservation and efficiency will be achieved as and when expected – otherwise it risks falling short of meeting future energy requirements.

Increasing the current aggressive target carries risk that the savings will not materialize, meaning that BC Hydro would not have the adequate supply to meet legislated self-sufficiency requirements and would need to act quickly to procure a potentially more costly supply from Independent Power Producers.

Here are some trade-offs and other factors to consider:

- This approach would require you and your neighbours to reduce your electricity consumption by adopting additional energy-efficient technologies, responding to conservation rates, and making conserving energy a focus of your daily activity
- It would require additional regulations to make energy efficient building practices and technologies mandatory
- If higher electricity savings are not achieved, higher cost electricity may need to be acquired from other jurisdictions on the open market or from accelerated power acquisition processes in B.C.

Q1.

Please indicate your level of agreement with this greater conservation and efficiency approach. In developing your response, please consider the summary to the left, including the trade-offs and other factors that have been provided.

(please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Comments:

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1. Please see Attachment 1 for our Comments on Q1.

ELECTRICITY GENERATION OPTIONS

These portfolios are offered as examples to illustrate key trade-offs that arise between generation options.

Portfolio 1:

Renewable Mix

This portfolio includes a mix of renewable resources such as wind, run-of-river and biomass from Independent Power Producers. The Site C Project is specifically excluded. Given that wind and run-of-river hydro are intermittent resources, this portfolio requires backup resources when the intermittent sources are not available. These backup resources would generally consist of additions at existing BC Hydro generating facilities, or new pumped storage facilities or gas-fired generation. This portfolio has low greenhouse gas emissions with a geographically widespread environmental footprint. The cost of renewable resources and the need for backup resources make this the most expensive portfolio of the three.

Here are some trade-offs and other factors to consider:

- More diverse mix of renewable resources
- More dispersed regional jobs
- Lower greenhouse gas emissions and more dispersed environmental footprint
- Requires additional backup (capacity) resources
- Costs more than other portfolios

Q2.1

Please indicate your level of agreement with Portfolio 1 – Renewable Mix. In developing your response, please consider the summary to the left, including the trade-offs and other factors that have been provided.

(please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Comments:

1. We can neither agree nor disagree with Q2.1.

2. We concur and support the principle of a diverse mix of cost effective renewables, regional jobs and „lower“ GHG emissions.
3. We are unable to evaluate and agree with the statement that Portfolio 1 “Costs more than other portfolios”. We cannot do otherwise knowing that outdated costs have been used for Site C – in fact is it even fair to have presented these portfolios to the public without Site C’s latest cost estimates being presented on an apples to apples based comparison with other renewables?
4. The difficulty with all 3 of these questions about choosing one of 3 portfolios is that the reader is being asked to make trade-offs that are meaningless unless he has some knowledge of the numerical magnitude of the differences. If one is more costly than another, how much more costly? If it has lower GHGs, how much lower?
5. Also, these questions of choosing portfolios are quite premature knowing that Site C costs are completely out of date, and we don’t know how the cost of the renewable is being characterized.

Portfolio 2: Renewable Mix with Site C

This portfolio includes a mix of renewable resources that include Site C along with wind, run-of-river and biomass projects from Independent Power Producers. Site C is included to provide system storage and capacity to back up intermittent resources, but ongoing additions at existing BC Hydro generating facilities and additional capacity and storage still may be required if a large amount of intermittent resources are added. This portfolio has the lowest greenhouse gas emissions, with its environmental and social footprint concentrated in the Peace region. This portfolio will have a lower cost than Portfolio 1.

Here are some trade-offs and other factors to consider:

- Economic and environmental impacts are relatively more geographically concentrated
- Lowest greenhouse gas emissions
- Requires less backup generation than Portfolio 1
- Relatively lower cost – lower than Portfolio 1, but higher than Portfolio 3

Q2.2

Please indicate your level of agreement with Portfolio 2 – Renewable Mix with Site C. In developing your response, please consider the summary to the left, including the trade-offs and other factors that have been provided.

(please check one box only)

Strongly Agree

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- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Comments:

1. We can neither agree nor disagree with Q2.2
2. We agree with pursuing the lowest GHG emissions where and when all costs are taken into consideration.
3. For the statement “Relatively lower cost – lower than Portfolio 1, but higher than Portfolio 3” we find ourselves referring back to the Comment #3 for Q2.1.

Portfolio 3:

Renewable Mix with site C and Gas-fired Generation (within 93 per cent *CLEAN ENERGY ACT* Target)

This portfolio includes Site C, other potential renewable resources such as wind and run-of-river from Independent Power Producers, and gas-fired generation allowable under *Clean Energy Act* limits. Both Site C and gas-fired generation are available to back up intermittent resources. This portfolio has higher greenhouse gas emissions than Portfolios 1 and 2 due to its reliance on natural gas-fired generation, and has a more concentrated environmental footprint in the Peace region. It has the lowest cost if the price of natural gas remains low but, again, this is subject to uncertain natural gas and carbon emission prices.

Here are some trade-offs and other factors to consider:

- Fewer renewable resources and relatively higher greenhouse gas emissions
- High degree of operating control (as a result of lower intermittency) and no backup resources required
- Lower initial cost, but higher risk of higher future costs due to volatile natural gas prices and greenhouse gas emissions offset cost

Q2.3

Please indicate your level of agreement with Portfolio 3 – Renewable Mix with Site C and Gas-Fired Generation (within 93 per cent *Clean Energy Act* target). In developing your response, please consider the summary to the left, including trade-offs and other factors that have been provided.

(please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Comments:

1. We can neither agree or disagree with Q2.3
2. We agree this portfolio presents the highest level of GHG emissions. From a climate change leadership perspective we believe British Columbia should aggressively pursue all cost effective options to reduce the provinces GHG emmissions.
3. For the statement „Lower initial cost, but higher risk of higher future costs due to volatile natural gas prices and greenhouse gas emissions offset cost“ we again find ourselves referring back to Comment #3 for Q2.1

ELECTRIFICATION

Electrification: Active Promotion by BC Hydro

With a proactive approach to electrification, BC Hydro would work with government and other partners to facilitate and encourage increased electrification where it can reduce greenhouse gas (GHG) emissions and benefits to customers. Under this approach, BC Hydro could support the early development of an electric vehicle charging infrastructure in advance of significant electric vehicle sales in B.C., thereby encouraging consumers to purchase these vehicles. BC Hydro could also introduce other programs to encourage electrification in other areas.

Here are some trade-offs and other factors to consider:

- Additional reductions in provincial greenhouse gas emissions can be achieved
- Additional electrification, over what will happen in B.C. on its own, would increase the need for electricity generation resources to be built in the province
- BC Hydro’s promotion of electrification could result in increased electricity rates for BC Hydro customers because of the additional resources needed to serve and promote the new demand

Q3.

Please indicate your level of agreement with this approach to electrification that involves active promotion by BC Hydro. In developing your response, please consider the summary to the left, including as well as the trade-offs and other factors that have been provided.

(please check one box only)

Strongly Agree

Somewhat Agree

Neither Agree nor Disagree

Somewhat Disagree

Strongly Disagree

Comments:

1. We somewhat agree with Q3.
2. We support and agree with BC Hydro’s active involvement in increasing electrification throughout British Columbia.
3. Electrification throughout the province, whether it is with electric vehicles or for new mines being developed along the Highway 37 corridor or gas extraction in the northeast will bring significant economic development opportunities for all British Columbians, and will also battle GHG emissions.
4. From a broader perspective serious consideration must be given to consequences of electrification vis a vis ratepayers. In determining cost effectiveness of electrification we need to consider economic development benefits including employment and tourism, taxation benefits realized by various levels of government as well as export potential for BC’s natural resources. Electrification options need to include both a short term view from the ratepayers perspective and a long term view from the taxpayers point of view.
5. We do not agree that “BC Hydro’s promotion of electrification could result in increased electricity rates for BC Hydro customers because of the additional resources needed to serve and promote the new demand.” An accurate and up to date apples-to-apples cost assessment of those additional resources is required in order to determine if electricity rates would increase.

TRANSMISSION PLANNING

Proactive Approach: Plan Transmission TO ANTICIPATE Future Need

This approach plans the transmission system in anticipation of future need. This planning process involves identifying and considering opportunities for developing the transmission system in the following ways:

- Building bulk transmission based on anticipated need over a 30-year time horizon rather than responding to need over a 20-year time horizon
- Building regional transmission to serve an area with significant generation resource potential rather than individual generation projects under development
- Building regional transmission to serve an area with significant economic development potential (e.g., mines, natural gas) rather than responding to individual requests for service as they arise

Here are some tradeoffs and other factors to consider:

- Higher short-term cost, but potentially lower long-term cost if new generation and load materialize
- Higher stranded investment risk if need does not materialize
- Increased ratepayer cost, but significant potential benefits from reduced transmission footprint, more concentrated generation footprint
- May facilitate economic development in certain regions or communities, as transmission has been planned to facilitate this

Please indicate your level of agreement with this proactive approach to transmission planning. In developing your response, please consider the summary to the left, including the trade-offs and other factors that have been provided.

(please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Comments:

1. We strongly agree with Q4.
2. We positively support BC Hydro having a pro-active approach to transmission planning – not necessarily transmission building but, yes, transmission planning.
3. British Columbia has a history of foresight and leadership in developing its electricity generation and associated transmission throughout the province. Our location and proximity to Asian markets places us in an ideal position and provides a positive catalyst to viewing the future from a 30 year perspective versus one limited to 20 years.
4. We encourage both the British Columbia government as the utility's shareholder and BC Hydro itself to think outside of the box when considering transmission opportunities that serve both generation potential and economic development throughout the province.

5. Serious consideration and focus should be placed on servicing “clusters of generation” as well as longer term exports of electricity to the United States. Globally, jurisdictions are increasing their respective renewable portfolio standards. What might the RPS-leading state of California have as its RPS standard in 30 to 50 years from now? Fossil fuel reliance over the long term has but one direction: downwards. Desired living standards by the world’s growing population have but one direction: upwards. British Columbia has two ideal attributes in its arsenal to set leadership standards: firstly a compliment of virtually all the different types of renewables and close access to major markets.
6. In framing out the future transmission potential and possibilities British Columbia should seriously consider advancing the initial steps required: planning, permitting, environmental assessments and First Nations consultations, while holding back on the most costly steps of actual construction. Plans and permitting should be prepared so they can be implemented quickly when needed. Potential developers should be informed of the expected cost in each area, based on a reasonable expectation of the build out of the area; and then the developers should be set free to develop the sites, knowing that transmission will be available when needed.

EXPORT MARKET POTENTIAL

Clean Generation for the Purpose of Export

Consistent with the *Clean Energy Act*, which requires BC Hydro to undertake an assessment of the export market demand for clean or renewable energy, the energy would come from the aggregation of renewable energy acquired from Independent Power Producers in B.C. solely for the purpose of exporting this electricity to markets outside B.C.

Here are some tradeoffs and other factors to consider:

- Additional electricity generation projects would be built by Independent Power Producers within the province
- The environmental footprint from additional clean or renewable electricity generation projects would occur in B.C., versus other jurisdictions
- Building generation resources across the province would lead to increased construction and maintenance jobs in the regions
- Ratepayers are protected from bearing any negative financial consequences, as per the *Clean Energy Act*
- Economic benefits and additional revenue from this electricity generation would flow to the Province

Comments:

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1. We somewhat agree with Q5.
2. We believe in principle that the export of cost effective and competitive electricity affords British Columbia tremendous opportunities for economic development, employment and an opportunity to play a leadership role in reducing GHG's throughout North American. As noted above in #5 to Q4, renewable and sustainability trends are virtually unidirectional – up! Our resource based economy thrives, indeed, it actually exists to a large extent on exports. Electricity exports will, over time, become increasingly valuable with the universal increased attention to GHG emissions, carbon pricing and conservation. British Columbia needs to pro-actively lead the way in promoting and establishing a level electricity market playing field in its target markets.
3. However, while opportunistic exports are always possible because of BC Hydro's storage capabilities, we believe there are many obstacles to be overcome before long-term firm contracted exports can become an economic reality for British Columbia. Not the least of these obstacles is the absence of transmission capacity and presence of government subsidies to US producers.

Attachment 1

BC Hydro Integrated Resource Plan – Feedback Form**Question 1 – Support for greater conservation and efficiency****1. Clean Energy BC both whole-heartedly agrees and emphatically disagrees.**

CEBC's members have always been whole-heartedly in support of the principle of pursuing demand side management and conservation efforts that are demonstrably cost-effective.

However, the key word is cost-effective, and that qualifier is often forgotten. For instance, it is totally omitted from the framing of this question. There is an unspoken implication in the asking of this question, that all energy conservation or efficiency measures are necessarily cheaper than the alternative of new clean renewable supply.

That assumption is not necessarily always true – particularly in the case of the more ambitious savings targets in the more aggressive DSM portfolios. In fact, numbers we have received in the recent past from BC Hydro indicate that certain of the intended programs will, in fact, be more expensive for the ratepayers than new supply would be.

We simply cannot agree that the required cost-effectiveness has been adequately demonstrated within the methodology of the IRP. The reasons for this inadequacy are many and various and we attempt to outline a few of them below.

2. Conservation targets ranging from 66% to 83% of new load growth have been presented as possible but, without proper comparisons on the basis of cost-effectiveness, it is impossible to choose which level is best.

The question of choosing which level of conservation to target is a poorly framed one, because it says nothing about the cost-effectiveness of these different levels yet there is an implication that all of these levels would be cheaper than new renewable energy supplies. For the reasons stated below, this is possibly an erroneous and misleading assumption.

3. Bundling – the portfolio approach bundles together the good with the bad and the ugly.

Many of the measures in a given portfolio may be quite cost-effective, but those that may not be cost-effective are given a free ride by being bundled up in the portfolios.

Two years ago, in the 2008 LTAP proceeding, we asked that this practice be discontinued, and the Commission agreed with us in their decision, stating *“that BC Hydro’s portfolio approach results in the costs of the programs being spread over savings from Codes and Standards and Rate Structures (neither of which incurs costs of any consequence) and the programs themselves.”*

The Commission felt, as does CEBC, *“that the use of this portfolio approach has little value when it is determining the cost-effectiveness of DSM, since it could hardly be said to be in the public interest to approve, by way of illustration only, a DSM program having a UEC of \$150/MWh when new supply was available at \$110/MWh.”*

And it continued, “...*The Commission Panel considers that within the context of an LTAP, it is appropriate to determine the cost-effectiveness of a DSM Plan by calculating the UEC of DSM programs on a program-by program basis and to compare the UEC of that program with supply-side alternatives on an equivalent basis.*”

At a meeting with BC Hydro in March, we asked the question again: “*How is the IRP methodology proposing to make rational selections based on the cost-effectiveness of DSM’s individual programs that are being bundled along with Codes and Standards and Rate Structures into large portfolios.*”

Until this unbundling occurs, it cannot be said that the cost-effectiveness of every program in the portfolios has been demonstrated.

4. The metric of Total Resource Cost (“TRC” or All Ratepayers Cost, as it is sometimes called) is inadequate to measure the cost-effectiveness of demand side measures vis-a-vis supply side options, from the ratepayers’ perspective.

To give a more complete picture from the ratepayers perspective, the TRC must be combined with the Ratepayer Impact metric (“RIM”).

The reason for this is quite simple. Supply side prices are ratepayer impact prices. They are not comparable to the TRC unit costs of demand side alternatives: They should only be compared to the RIM unit costs. If you want to compare supply and demand side options you can only do it using the RIM metric for the demand side programs. Otherwise you’re comparing apples to oranges.

We also asked this question two months ago in our meeting with BC Hydro, “*How will/can the IRP evaluate cost-effectiveness from a ratepayer perspective, if it only deals with the Total Resource Cost of DSM measures, and the Firm Energy Prices of the renewable energy options...*” neither of which represent the true impact on the ratepayers?

5. Price elasticity of demand -- this refers to the tendency of consumers to reduce their demand for any product as the price of that product increases relative to the general level of prices.

Most econometric research has pointed to elasticity ratios for electricity consumption of -0.05 to -0.10 in the short term and -0.20 to -0.40 in the long term. (Given a longer time period, people have more ability to change their consumption patterns.) BC Hydro has used -0.05 for both the short and long term impact on demand.

This means that, while the long term price forecast appears to indicate a 60% increase in the real price for electricity, BC Hydro is calculating that this will cause a demand reduction of only 2.5-3.0%. This small reduction appears to be totally unrealistic in the face of other econometric research.

Two months ago we asked the question, “*How does the IRP methodology propose ensuring that the demand reductions due to rate increase are adequately separated from the energy savings due to DSM program expenditures?*”

Four months ago we asked the question, “*With significant rate increases being implemented the importance of rate price elasticity becomes increasingly important. How much analysis has been undertaken to differentiate both short and long term elasticity effects on consumption*

behaviour – will that analysis be shared with the TAC? How much analysis has been done in differentiating price elasticity effects compared to other DSM programs? Might BC Hydro make available to the TAC the report (and any updates based on recent experiences) prepared by Dr. Ren Orans for the 2008 LTAP?”

We have to date seen no response to these questions, but the issue remains of enormous importance.

The consequences of not getting the correct attribution of the price-level effect on demand can be very significant. The impact of natural conservation is greatly underestimated in the load forecast, and a similar error occurs in overestimating the savings attributed to the program expenditures. This can make a huge difference to the cost-effectiveness evaluation of the programs and may cost the ratepayers hundreds of millions of dollars in wasted program expenditures, when price level demand response would have accomplished the same result for free.

6. The “rebound effect” is extremely difficult for a utility to properly assess and is therefore frequently ignored. But it can greatly diminish the net effectiveness of any demand side management efforts.

The rebound effect refers to the tendency that consumers have in reacting to efficiency improvements by finding more applications for the product. For instance, in the automobile industry, pretty well all of the efficiency gains of the past 20 years have been used up by people driving further and buying bigger cars. The same thing happens in the electricity industry. Improved efficiency is often a two-edged sword, and utilities have a very difficult time forecasting this effect.

The empirical fact, however, is that in spite of all the DSM efforts to date, the use per residential and commercial customer remains flat.

The use per customer account is the same now as it was 10 years ago. Whatever the reason for this is not fully understood – it may be larger TVs and more electronic equipment. We can call it the rebound effect. Whatever the reason is, it simply means that the electricity load for these sectors continues to grow with the population, at approximately 1.5-2.0%, which flies in the face of the assumptions being made about the success of DSM measures.

7. “Cross effects” -- Many of the current DSM programs have serious cross effects, which are being minimized in their evaluations.

Cross effects refer to the energy savings of a program lost due to the interactive effects of electricity savings and space heating (i.e. the program may be merely replacing one form of energy with another). For instance, a program may save some of the electrical energy used for lighting (which is BC Hydro’s objective) but increase gas consumption used for heating (which is contrary to the government’s GHG reduction goals).

A good example of this is the residential light bulb program. In estimating the cross effects for CFL bulbs in a 2009 Milestone Report, BC Hydro’s own evaluator used a figure of 75% for the heat loss factor – that is 75% of the reduction in lighting energy is recovered in heating energy. (Incidentally, the National Research Council of Canada, in an experiment using a carefully measured test house, put the figure somewhat higher, at 89-95%, stating

that, “*The reduction in the lighting energy use was almost offset by the increase in the space-heating energy use.*”)

At any rate, in spite of this 75% heat loss factor, the BC Hydro evaluator multiplied the factor by the percentage of electrically heated accounts, to come up with a final overall cross effects factor of 16%. That means that his calculation gave absolutely no weight to any home that was being heated by gas. This confirms that BC Hydro’s programs are really only concerned with reducing electrical load – not total energy use, and not GHG reduction.

However, in spite of the 16% calculated by the evaluator above, BC Hydro states that it evaluates its residential lighting program using a cross effects factor of 5-8%. Imagine the impact on the estimated savings (and consequently on the estimated unit energy cost), if you used a cross effects factor of 95%, as suggested by the NRC’s test house, instead of 5%, as stated by BC Hydro. That would effectively reduce the projected energy savings by 95%, and consequently multiply the unit energy cost by a factor of 19.

The claimed unit energy cost for this program of \$32/MWh would suddenly become a cost of \$608/MWh and this program would look far from cost-effective. That’s just how sensitive these estimated savings and costs can be.

Imagine, further, that the bulbs don’t last 10 years, as advertised, but only 5 years, as many users find. That one difference in assumption effectively doubles the participant’s cost for the bulbs, and would immediately double the unit energy cost of this part of the DSM program, putting it over \$1200/MWh.

So the cost of some aspects of this measure (such as any outdoor applications, or bulbs in air-conditioned homes during the summer), might have a unit energy cost of \$32/MWh, as claimed by BC Hydro. However, some other aspects (such as most bulbs installed indoors during the heating season), might actually have a unit energy cost of \$1200/MWh -- just by changing two of the key assumptions that go into the calculation.

This may be an extreme example just to illustrate a point, but the point is that these estimates are very very sensitive to a number of assumptions that are each very difficult to make accurately.

This type of problem exists right across the whole spectrum of DSM savings measurement. There are 6-10 critical empirical variables that have to be estimated by the program managers for every single program, in order to forecast what savings are likely to occur. If they err in any of those estimations, then both the savings attributed to the program and the unit energy costs for the cost-effectiveness test could swing by 100% to 500% or more.

Our point is that these calculated unit energy costs are extremely “touchy” numbers. They don’t have the solidity that comes with supply side alternatives. And the savings estimates are likewise “touchy”. There are no guarantees attached to those savings, and there are no liquidated damages that will be paid if the savings don’t materialize. The savings are merely the best estimates of the people who are running the programs.

It’s one thing to say you could correct in mid-course but, to take the light bulb example as a case in point, the participants could go on for years investing in these bulbs, and if you haven’t measured the results properly, you won’t even know you’ve been investing millions of dollars in an cost-ineffective program.

8. For all of these reasons, CEBC considers it is extremely risky, and not in the best interest of ratepayers, to push the reliance on DSM measures beyond the government's mandated 66%.

WRITTEN SUBMISSION FROM:
COMMERCIAL ENERGY CONSUMERS

Commercial Energy Consumers (CEC) of BC

Comments on the BC Hydro Integrated Resource Planning Process

May 1, 2011

The BC Hydro Integrated Resource Planning (IRP) Process is only at a midway point in its development and even at that the information BC Hydro has been able to share with its Technical Advisory Committee (TAC) is sometimes not finished, not completed or is not yet produced.

Consequently these comments are interim comments based on the stage at which the IRP is currently.

Although the workbook does not allow for it, comment on the IRP needs to begin with comment on the context and form of the IRP planning and its appropriateness.

General Comment #1

The first and most important comment to provide is that the IRP to date suffers from having its foundations built upon sand. The basic foundation for BC Hydro's planning and for many critical IRP questions is the Government's Energy Policy and in particular the Clean Energy Act (CEA) Page 8.

This act sets out requirements and constraints for BC Hydro, which dramatically affects the key issues involved in the IRP. BC Hydro has precluded itself from examining alternate scenarios for the future, which might have enabled it to reasonably examine a broad range of alternatives. Consequently the IRP as it exists, at this time, is severely deficient of information relevant to critically important options for the future.

A further consequence of this deficiency is that the public consultation process, based on the IRP information BC Hydro has developed and provided to the public, does not have information critical to understanding key energy planning issues in the province. The entire credibility of any outcome from the consultation process is tainted with the absence of vital information and options.

The CEA imposes costs on BC Hydro rate payers in excess of \$1 billion per year, driving future rate increases of potentially up to 30%, and has numerous provisions which have not yet matured to show the costs they will entail. The uncertainty regarding the sustainability of this foundation to the IRP makes the planning task very challenging.

Conclusion

It is critical for planning processes to be empowered with more open mandates enabling analysis of a broad range of alternative scenarios and options. The BC Hydro IRP process needs to be more in order to have a more solid foundation.

General Comment # 2

The second comment has to do with the form of the IRP, which appears to have disproportionate supply focus.

It is very notable that the demand side management component of closing the demand/resource gap is dominated by the conservation and efficiency strategy and strategies 79% to 83%. Unfortunately BC Hydro's IRP process is focused on supply side portfolios, while they are related to 21% to 17% of closing the resource gap. Three question pages are devoted to exploring portfolio questions, while only one is devoted to the demand side questions.

The key strategic questions are framed as (1) electrification (2) transmission planning (3) export market potential. Of these electrification and export market potential are future world demand scenarios that would create completely different planning contexts. Unfortunately the treatment of the scenarios is an extremely thin surface treatment.

Transmission planning does not belong in this context setting because transmission planning is a response to demand and not a demand context. Transmission planning has been singled out from the response to demand issues because a policy question has been raised about building transmission before it is needed and before the requirements are firm, thereby taking on substantive risk. The context set for transmission planning and generation planning is set on Page 2; "It can take five to seven years to build new generation and even longer to build transmission" and "most new resources require significant lead times to develop as a consequence electric utilities must plan ahead to be sure that the required resources will be in place when needed". The IRP is actually about response times and flexibility in meeting demand but after this context introduction the entire treatment of transmission becomes an issue of building early in the absence of demand. This is just one of many examples where the IRP is deficient in asking appropriate questions.

Electrification and export are set up as the only key strategic questions on the demand side. Their treatment is extraordinarily narrow. Electrification is set up on Page 4 as an issue of rising price and environmental impact and shortage of fossil fuels driving people to choose electricity. The characteristics of oil and natural gas are very different than this context set up, particularly in terms of price. The assumption is made that export of electricity is direct export across transmission tie lines to the United States. The major form of export of electricity from BC is in the form of processed resources like pulp and paper, forest products, minerals, fuels, chemicals, and manufactured goods. The world economic context of population burgeoning and billions of people seeking higher standards of living is completely absent from the context setting. The world demand on Canada and BC is for resources among other things. Why wouldn't export be set in the larger context of the reality of the BC export economy?

Conclusions

The context for integrated resource planning and the form of the IRP is poorly established and as a consequence the entire planning process set is fractured into disconnected questions and is lacking comprehensive and prioritized treatment of the planning issues.

General Comment #3

The planning methodology for the IRP is set out on Page 2 & 3.

The IRP is defined as a long term plan for acquiring resources to meet customers' needs for the next 20 years. The electricity planning questions are; (1) how much electricity will British Columbians need over the next 20 years; (2) what is the gap between existing supply and forecast demand, and; (3) how can the gap be met.

This leads to a static model of electricity planning, which has a single view of demand for the next 20 years, albeit with an uncertainty distribution around a central expectation and a project stack of responses (conservation and efficiency, generation, and transmission).

Interestingly when listing how to close the gap on Page 3, BC Hydro includes "how much electrification will contribute to growth in electricity demand" and what export market potential may be".

The static view of electricity demand/supply balance forecast is perpetuated on Page 5.

It is fascinating to see how the model has to be contorted to deal with the CEA insurance provision, which is added in as demand.

Even more interesting is the depiction of the Conservation Plan as a single view for the next 20 years, again albeit with an uncertainty distribution around a central expectation.

While the planning approach is called integrated resource planning nothing is done to deal with what needs to be integrated with what to make for better quality planning.

In reality conservation and efficiency is a system for integrating customers and their needs or demands with the resource planning process. As a system it is dynamic and its dynamic features are critical to what it can do.

In reality the supply side of generation and transmission is also a system, which integrates supply chains and processes into the resource planning process. These systems too are very dynamic and their dynamic features are critical to what they can deliver and when.

In reality the policy planning in the province is a system, which can integrate numerous critical factors into the resource planning process. First Nations, environmental issues, economic development issues, other energy systems, and communities would be among some of the areas where the planning could be integrated. However, the IRP process treats these largely as external consequence areas as opposed to integral systems.

Conclusion

A systems approach to the IRP may provide considerably more integrated resource planning than the current process. Treating the processes as a systems design and optimization process might lead to better questions with more dynamic and interesting planning consequences.

IRP Workbook Questions

Q1. Please indicate your level of agreement with this greater conservation and efficiency approach.

In the premise to the question BC Hydro states that it must be highly confident in the conservation and efficiency savings otherwise it would fall short of meeting future energy requirements. This is a technical error in risk assessment. The conservation and efficiency or demand side option just like the power generation supply side option is a dynamic process. If one initiative fails or does not achieve the levels of savings planned for it another one can take its place. If a particular initiative does not work at first it can be changed and improved until it does work. These two dynamic process aspects provide considerable certainty in consideration of the joint probabilities inherent in the dynamic processes. So unfortunately a somewhat misleading view of conservation and efficiency options is advanced as the premise.

The trade-offs posed as a premise to the question indicate that; individuals would need to make conserving energy a focus of daily activity; that additional regulations to make energy efficient building practices and technologies mandatory, and that if savings are not achieved higher cost power may need to be acquired from other jurisdictions or from accelerated power acquisition process. This method of assessing the public concern for trade-off issues is flawed by virtue of the fact that there is no quantification of the trade-off. So individuals are left to response to the emotional content of the words. Further even with quantified trade-offs there is always a problem between what people say they want and what they will actually do.

The description for the question refers people to pages 12 and 13 for more information. There are a number of questions on page 12 and the primary information provided is the percentage of the demand/ resource gap supplied by the current conservation and efficiency plan 79% and the range of plans being looked at by BC Hydro, going from 66% to 83%. This information is of very little use to someone trying to assess conservation and efficiency as an option. These percentages can easily be confused with traditional good/bad marking percentages in the absence of context. BC Hydro adds to the problem by describing under 'technical' that savings greater than the current plan have a significant uncertainty that they will materialize.

The facts are that conservation and efficiency is substantially less expensive than acquiring new supply. Conservation and efficiency will be developed for \$40/MWh to \$50/MWh on average. New supply is in the range of \$140/MWh for firm shaped power. Conservation and efficiency can be expected to be subject to ongoing innovation and technology development, which will have the effect of ensuring moderated increases in the costs curves for providing conservation and efficiency. New strategies for conservation and efficiency using market and societal approaches can be even more cost-effective. The evidence is quite strong that conservation and efficiency measures can and will be adopted by people and businesses over time and that these result in continuous transition to a more conservation and efficiency minded culture.

Unfortunately, the issues presented in the question are poorly framed so there is little likelihood of understanding whether or not the consultation response is delivering any really useful information.

Given all of the positive features of conservation and efficiency there is little doubt that BC Hydro should pursue all of the cost-effective conservation and efficiency possible.

Given that conservation and efficiency is also a very flexible resource the consultation should be framed in terms of the response times to respond to need and the potential to have all the conservation and efficiency sought available and achieved ahead of the need and therefore be 100% certain. This makes the answers to questions about conservation and efficiency very different.

My answer to the question is that there is not a question. It is simply imprudent not to pursue all of the cost-effective conservation and efficiency possible. Even more importantly the conservation and efficiency should be pursued in advance of need to ensure certainty.

The fact that important integrated resource planning issues are not adequately addressed, needs to be fixed if the IRP is going to have satisfactory value to the government.

Q2.1 Please indicate your level of agreement with Portfolio 1 – renewable mix.

The resource option consideration is done as a mix choice problem and then asks for agreement or not with respect to each mix choice presented. The information provided is in the form of icons at the bottom of the left hand column. This reduces the participant to simply providing feelings because they have been left completely deficient of useful information to provide sensible consultation.

The trade off factors includes a more diverse mix of renewable resource. Nobody responding to this can possibly understand this. What does this mean and how would I measure this and know what it is? I am provided no information to understand if diversity has a value or not and no idea how it might compare to anything else.

Another trade-off suggests considering more diverse regional jobs. Nobody can possibly understand what this really means. On Page 18 the same comparison is made suggesting that other portfolio options are more job-intensive capital projects concentrated in the Peace or wherever a gas plant might be built. The only thing this could possibly imply is that there may be jobs in some regions and not in others, begging a prejudice to spread the jobs around. Are jobs in one region more important than jobs in another region? I am provided no useful information to assess the employment impacts of projects and in particular no information whatsoever that would allow me to assess this particular parameter against any of the other suggested parameters.

Lower greenhouse gas emissions are suggested as a trade-off consideration and on Page 18 it is clear that this is a comparison to use of gas fired generation. Unfortunately there is no discussion with regard to how much, what the gas fired generation plant might provide as a product for the electric system,

what values might be ascribed to the gas emissions, what alternatives may be considered to mitigate GHG emissions. The information available to make an informed consideration is nearly useless.

Suggesting that this alternative portfolio requires additional back-up (capacity) resources and showing 2 batteries versus 1 or none is so simplistic as to be ridiculous. How much is 1 battery of capacity worth. Is the cost of this back-up capacity included in the cost? Is the invitation to consider this trade-off an invitation to assess whether back-up or capacity, in and of its self, is inherently good, bad or indifferent? Again there is zero ability to compare the value of back-up capacity to any of the other trade-offs.

When asked to consider the cost of this portfolio the information I have is 4 dollar signs versus 3 for the lowest cost portfolio and 3 plus a fraction for the middle cost portfolio. The cost ranges for the generation types is shown on Page 14 and 15. From these it is impossible to tell what any particular portfolio might cost. Is the relative number of dollar signs an accurate reflection of cost? How does cost trade-off with anything else? If the lower end of the cost range is 'real' in 2011 dollars, why has BC Hydro just bought into energy purchase agreements at an average 2009 dollar cost of \$124/MWh? What are the 'real' costs? Without a reasonable understanding of the 'real' cost curves for renewable supply it is virtually impossible to provide an informed agreement preferring any given portfolio.

Unfortunately there are questions critical to trade-off not included. For instance the local First Nations concern, support or opposition to projects is a very important issue. Local community concern, support or opposition to projects is a very important question. The trade-off between adding supply side resources and making demand side reductions is not viewed as a consideration. No consideration is given to long term sustainable development. No consideration is given to risk and uncertainty in the suggested trade-offs. However, on Pages 18 a few risks are identified. Unfortunately there is no sense provided for probability, consequence or timing of risks all of which information is needed to make a tradeoff assessment.

My answer to the question as to whether I support a renewable supply mix is that I support the most cost effective mix of resources, which may include renewable supply projects.

Q2.2 Please indicate your level of agreement with Portfolio 2 – renewable mix with Site C

The question is posed as a consideration of renewable mix plus Site C. Unfortunately there is scant information provided about Site C. What is provided is provided on Page 14. More importantly the information provided is qualified as based on a 30 year old design, which is being updated and based on an upgraded design.

The consideration of Site C is misplaced, when mixed with the renewable resource mix. Site C is not an alternative renewable project, which may or may not proceed in place of other renewable projects. Site C is an extension of the Peace watershed hydro-electric system. It is a one off project with characteristics so different from the renewable mix projects that it becomes a yes/no strategic decision in its own right.

The suggested trade-off issues to consider of geographically concentrated environmental and economic impact are impossible to assess. There is no information provided as to what issues may be involved in

geographically concentrated economic or environmental impacts. The implication is that a job in one location in the province may be worth more than another job elsewhere, but there is no context for this. All that can be drawn out is an emotional reaction to the words. The implication of environmental impacts concentrated or dispersed also has no context for making tradeoffs. What kind of environmental impacts, what values for the impacts, what quantities of environmental impact per MWh and what mitigation and or compensation can be done?

Oddly the trade-offs suggest the portfolio with Site C is the lowest GHG emissions portfolio, while the comparison on Page 18 simply shows Site C as with other renewable energy is one of the lower GHG emission options. Also there is no value context for dealing with differences in GHG emissions.

The back-up generation requirements of Site C are really masked by its inclusion in a renewable mix, which requires significant capacity resources to enable it to be integrated into the BC Hydro electric system. The data shows the requirements measured in battery icons as $\frac{1}{2}$ that of the renewable portfolio. However, given the nature of the Peace watershed and hydro-electric facilities with the significant Williston storage capability the capacity back-up issues are significantly less. The information, on Page 14 and 15, provided in the work book is deficient in terms of defining the products being compared and their qualities. Whether or not these have been adjusted to a standard for comparison is not clear, but appears not to be the case.

The nature and values of the BC Hydro heritage hydro-electric system are not adequately provided to establish the context for assessing the Site C project. There are significant non-linear consequences for the entire electric supply system in BC arising from integration of intermittent renewable resources into the system. Some understanding of these issues and the limits of these options is an important planning consideration.

The relative cost of Site C on page 14, as provided would make it relevant as a strategic option, if the costing estimates hold up. Unfortunately, the self-sufficiency provisions of the Clean Energy Act, having precipitated significant planned average surpluses has significantly weakened the dynamic and values for integrating a project like Site C into the supply/demand mix on the BC Hydro electric system.

Some of the key issues with Site C, because of the size and longevity of the resource, are related to (1) whether or not it can obtain approval for environmental and social reasons (2) whether or not the cost update makes the project reasonably attractive, including putting this in the context of BC Hydro's cost overruns on all large hydro facility construction (3) whether there is sufficient political capacity to sustain the project over its long development timeframe (4) how to cost-effectively integrate such a large project increment into the BC Hydro system, including recognizing a potential hiatus for renewable supply independent power producers, and (5) placing the project in the context of the heritage hydro-electric systems and facilities for the very long term (100 years plus) (6) placing the project in the context of a significant transformation of passenger vehicle transportation from oil based fuels to electricity (7) whether or not the First Nations issues are suitably resolved and or accommodated.

My answer to the question is that Site C is not really an alternative option among the renewable project mix options and that it should continue to be assessed as a provincial strategic decision with respect to

the heritage hydro-electric system and the load planning. Site C development timing is not urgent given the Clean Energy Act induced surplus situation.

Q2.3 Please indicate your level of agreement with Portfolio 3 – renewable mix, with Site C and gas-fired generation.

The consideration of natural gas fired generation and its potential role in the electricity supply planning for the BC Hydro electric system requires separate treatment from the treatment of the renewable mix resources and from Site C. When it is combined it into a portfolio in the way it has been here, the value issues relative to the merits of including such a resource in the BC Hydro hydro-electric system mix are somewhat lost.

Very little information is provided with respect to natural gas-fired generation. The information provided on Page 15 appears to assume a base load energy supply role, which might be exposed to fuel price risk. Some of the potential values of natural-gas fired facilities in the BC Hydro electric system are mentioned but no context is provided to aid in understanding the potential value contribution.

The trade-offs offered for consideration of fewer renewable resources and relatively higher GHG emissions are not adequately put into context. If the BC generated non-firm resources are exported, then it is reasonable to assume that in the western electric grid they can and would be firmed up by natural gas fired generation capability in the jurisdiction to which the export is sent. Consequently, there would be no net environmental GHG emission difference to firming up those resources in BC. This potential role for natural gas fired generation has been a fundamental part of the BC Hydro system since its early design. The potential for natural gas to provide dispatchable supply and dependable capacity are quite important potential features. The potential to supply combined heat and power to achieve exceptionally high efficiencies is also a critically important feature. Further natural gas based generation capability can be installed and made operational extremely quickly and it can be made very flexible and mobile to meet exigent needs. Lastly the potential to site the natural gas based generation in locations where transmission constraints are significant issues can create highly beneficial opportunities, which may far outweigh the environmental and GHG issues.

The tradeoff suggestions pose the potential for natural gas fired generation to have a high degree of operational control, because of lower intermittency. This explanation seems to be technically misplaced. Natural gas fired generation is not inherently intermittent. However, because it is presented embedded in a renewable mix the suggestion is that the intermittency is just lower. More correctly for the natural gas fired generation the statement is made that there are no backup resources required. Depending on the level of natural gas resource in the portfolio and the role it plays it is possible for the statement about the portfolio to be true that no backup resources are required.

The tradeoff proposition that natural gas fired generation may have a lower initial cost is not supported in the context information. More importantly there is no information to say how much less capital intensive the natural gas fired generation is relative to the other options for filling the supply demand gap. As a consequence it is impossible to make a tradeoff assessment between capital cost, operating cost and risk.

The suggestion is that natural gas fired generation is subject to higher risk of higher future costs due to volatile natural gas prices and greenhouse gas offset costs.

Natural gas has always been supplied from a market, which reflects the volatility of changes in the day to day supply and demand circumstances. However, nothing is added to demonstrate how stable natural gas prices have been when smoothed by the utility supplying the natural gas. Nothing is mentioned with respect to the mitigation capabilities that would allow firming up of the natural gas fuel supply costs, if the criteria were important. Nothing is mentioned with respect to alternative options available whenever the economic cost of the natural gas fuel exceeds the threshold of alternatives, enabling economic control of the cost of this resource. The context is so deficient as to make the requested assessment of tradeoffs moot.

Unfortunately there is no discussion of the potential for distributed generation based in part on natural gas as a backup fuel mixed with other less certain options or on smart grid options. There is no discussion of the potential to turn biomass into natural gas without the greenhouse gas impacts of the fossil fuel natural gas.

The role that the Burrard Thermal Generating Station has played in the past, including providing significant value, with virtually no GHG emissions, has been completely left out as a demonstration of how natural gas fired plants can add value to the BC Hydro system.

No significant information has been supplied on GHG offset costs or emissions values and therefore the issues can provoke no assessment other than an emotional reaction. Particularly important is the tradeoff of the GHG with other supply values, which is non-existent.

There is no consideration of the option to base the 93% clean on the basis of all generation in BC, which would include the non-firm as well as the firm. If this were done the CEA constraints could be quite different than the base presumption, with significant economic benefits.

The broad issue with respect to the natural gas role in the BC Hydro hydro-electric system is sustainability. Unfortunately BC Hydro has not considered the sustainability issues and instead has focused on only the emissions.

My answer is that the role for natural gas in the BC Hydro electric system is a separate strategic consideration from Site C, which itself should be separate, and from the renewable consideration. The role of natural gas should continue to be assessed without mixing it into the renewable portfolio considerations. Natural gas fired generation should be considered for the values it can bring to the system in balance with the GHG emissions issues.

Q3 Please indicate your level of agreement, with a proactive approach to electrification, that involves active promotion by BC Hydro.

The first point made in this section is that this proactive approach would facilitate electrification, 'where it can reduce greenhouse gas emissions and benefits to customers'. This point oddly makes the case that electrification would reduce benefits to customers. The information context for electrification is on Page

20 and 21. The information states that additional electrical supply would be required and that it would increase utility costs. Given that the view proposed is to develop a whole range of infrastructure before it is needed the information provided also suggests that this would create a financial risk if the electrification does not occur as forecast. Unfortunately the background information does not provide any quantification of these issues and therefore makes the tradeoff assessment suggested virtually impossible. Consistent with other assessment information the suggestion is that electrification could spur economic activity. This depends entirely on whether or not there is a net savings to the economy and there is no indication that this assessment has been made.

The suggestion is that BC Hydro would undertake significant development of electrical infrastructure in advance of need to encourage customers to purchase electric intensive options in place of fossil fuel options. Undertaking significant activity that is substantially uneconomic can represent a significant risk. The key to this is whether or not a solid business case can be advanced for the market transformations anticipated. The tradeoff issues between the risk, the cost of electrification and the GHG benefits has not been explored, yet it is the key to evaluating this strategic future. Such substantive policy change without a substantive evaluation of the values approaches imprudence. Public consultation without a solid information basis and context is a most unfortunate position into which BC Hydro is putting itself and particularly those with whom it consults.

The first tradeoff consideration offered is that greenhouse gas emissions would be reduced. There is nothing to say by how much the GHG emissions would be reduced. There is nothing to say what the value of BC reducing greenhouse gases is and why that value is an appropriate value to internalize into BC Hydro's cost structure. There is no consideration as to whether or not these added costs of electrification would become part of a new rate class or would be part of existing rate classes. The rate impacts of BC Hydro's existing cost structure are running very high, without significant amount of these costs yet in a rate impact forecast. Some of the most serious questions involved in this issue are not even mentioned. The whole consideration hardly counts as integrated resource planning in any serious way.

The second tradeoff consideration offered is the need for additional generation resources to be built in the province. There is no consideration provided as to how much may be needed. There is no consideration as to what the cost of the resources would be and particularly what the ratepayer impacts would be. The closest information made available is on Page 14 and 15 where a casual reader might get the impression that the new electricity generation resources might be available for as low as \$58/MWh and from many sources as low as \$100/MWh. The small print foot note shows that the price of \$200/MWh is what might be acquired over the term of the planning horizon. Unfortunately BC Hydro does not explore in its consultation what people's real tradeoff issues are between their electricity rates and the reduction of greenhouse gases.

The third tradeoff issue raised is that BC Hydro promotion of electrification could result in increased electricity rates. The conditional tense is used here implying that there are conditions under which there would be no increase in BC Hydro electricity rates. There is no quantification of this. Also there is no context for the assessment of rates, which leads people to use their current rates as the basis for consideration. The facts are that BC Hydro is already facing substantive rate increases, without consideration of proactive electrification issues. The vitally important impact of this issue on the BC

economy, when electricity rates jump to the rates which might be expected, is critical to evaluating this strategic future. Dramatic impacts on the economy would follow from a serious transformation of the transportation markets and of the oil & gas industries in the province. Integrated resource planning without incorporating these considerations is not particularly good planning.

Unfortunately BC Hydro does not put any of these considerations into the context of long term sustainability and how human beings are going to have any chance of a sustained future without control of a significant range of issues. Unfortunately BC Hydro does not put this issue into the context of the future for supply and pricing of fossil fuels as well as electricity. Unfortunately BC Hydro is not able to put this issue into the context of GHG emissions planning and climate change. Consequently a number of critical issues are not even brought into the consideration of the electrification issues.

There is very little discussion as to the alternative approaches to proactive electrification and what may be possible to control the development of this issue. This is the most important consideration for electrification and it is not in serious consideration.

My answer to this question is that proactive electrification is properly considered as a separate strategic scenario but is unfortunately not sufficiently considered to allow for adequate evaluation. Therefore in my view it needs to continue under consideration until such time as clarification has been brought to the issue.

Q4 Please indicate your level of agreement with this proactive approach to transmission planning.

The concept of building bulk transmission based on anticipated need over a 30 year time horizon instead of a 20 year time horizon is being proposed as a proactive approach to transmission planning. The proposal is to build regional transmission to serve an area with significant generation resources rather than plan for individual generation projects. Further the proposal includes building to serve an area with significant economic development potential rather than responding to individual requests. The proposal is elaborated on Pages 22, 23 and 24. The information on the problem with the current approach is reduced down to (1) generation projects may be completed before transmission lines are ready (2) generation projects might develop in a way that leads to a spider web of transmission lines with greater environmental impacts (3) new demand for electricity may occur sooner than transmission lines can be built.

The solution proposed is to build transmission in advance of need. BC Hydro identifies that this approach brings with it the risk that transmission investments may be stranded if the generation and or load does not develop as anticipated. BC Hydro also says that this may result in higher transmission costs in the short term and lower costs in the long term. BC Hydro's approach has always been to try to establish the most cost-effective generation, transmission, distribution and customer solutions for electricity plans. The proposal seems to be a violation of the BC Hydro cost-effective planning principles.

BC Hydro has not examined options for dealing with bulk transmission planning, which involve preparing plans, acquiring rights of way and obtaining approvals for transmission before the needs have materialized but not constructing lines or excess capacity before the need. This approach may represent

a significant opportunity to increase the speed with which BC Hydro can respond to needs as they emerge and a significant opportunity to reduce the cost risk of stranded assets a consequence of building lines before they are needed.

Another alternative which BC Hydro has not examined is developing plans with potential customers and generators in an integrated way so that the need and supply are developed and scheduled to coincide. This coordinated planning could deliver significant optimization benefits and significantly reduced stranded cost risks.

It may also be possible to develop plans to serve certain loads in emerging economic areas with alternatively fueled generation and small local grids as a precursor step to eventual grid interconnection. Equally generation can be made available quickly and efficiently making it responsive to need, while the more capital intensive options of bulk grid extension are planned to interconnect to these loads and displace the intermediate solutions.

When doing long term planning it is advisable to examine a number of strategy options and to evaluate, which may be the most cost-effective. Unfortunately we have no cost-effectiveness evaluation even on the one being proposed.

The BC Hydro electric system has been significantly over built in the past in a number of areas, with very significant financial consequences to the economy. The potential for inadequate control over the development, resulting in many projects and inadequate materialization of need, may be unnecessarily risky.

The suggested tradeoff factors to consider propose that costs may be higher in the short term but lower in the long term. There is no information presented as to how much higher costs may be and how much lower they may be and particularly when. So it is impossible to evaluate the proposed strategy. The approach proposed can have significant flaws. This way of examining cost evaluation masks the potential for the present value of the proposed combinations to be clearly more expensive under many scenarios. Present value methodologies are the standard for BC Hydro resource planning and the tradeoff appears to be seeking to weaken the standard. Capital invested well ahead of its need can simply represent economic inefficiency.

The suggested tradeoff of higher stranded investment risk is a statement made without any limits and without any assessment of the potential for the risk. There is no information of the risk probabilities or consequences making it nearly impossible to assess. Given that the dollar value of the risk could be substantial it seems strange that BC Hydro would be proposing to take on such risks without examining significant mitigation approaches.

The tradeoff proposing increased ratepayer costs, but significant potential benefits from reduced transmission footprint and more concentrated generation footprints seems to present a proposition that BC Hydro could lower environmental costs through planning to a higher level scale than the scale at which the need emerges. There is however, no information provided to suggest how much this may be, under what circumstances it might occur and what values such reductions would have. Also, the opportunity to achieve the environmental benefits with a fraction of the cost has been passed over.

Facilitation of economic development in certain regions or communities, BC Hydro says, may occur. The conditionally uncertain economic development as a tradeoff with investment has the potential to go beyond subsidization to speculation. There is no information as to what economic development may occur, how certain it might be, what value it would have, how it might be assured and serviced without speculation and a host of other information requirements one would like filled before designing such strategy. At the level presented there is very little information available which may support the proposed direction.

Ultimately if BC Hydro customers are left paying for uneconomic plans, as in the past, the rates go up and the economy suffers. All of these planning scenarios need to be placed into a context of what is projected to happen with BC Hydro rates. Unfortunately, despite requests to BC Hydro for this information, the long term rate impact consequences of these policy scenarios are not yet available.

My answer to the question is that cost-effective transmission planning is vitally important to the long term integrated resource planning. The process of looking for opportunities to plan for more optimal results is appropriate. Leaping at solutions without adequate information and without adequate assessment of alternatives is weakness that has the potential to create serious economic consequences. Finding the right criteria for advancing transmission building timelines will take much more than this integrate resource plan has presented if it is to succeed.

Q5 Please indicate your level of agreement with this export approach.

BC Hydro is required to assess the electricity export market. The information provided is shown on Pages 25 and 26. BC Hydro opens with its subsidiary's long successful record of trading electricity. Much is made of the ability of the BC Hydro hydro-electric system and its interconnections to Alberta and the Western United States. These interconnections provide power stability and enable British Columbians to keep lower rates by taking advantage of imported electricity when it is inexpensive. Unfortunately, BC Hydro fails to mention that this traditional value will no longer be available to British Columbians because of the Clean Energy Act.

BC Hydro discusses "traditional exports" as exports of surplus energy during times when BC Hydro has excess water, including energy acquired to achieve self-sufficiency by 2016 and an additional 3000 GWh of 'insurance' by 2020. These of course are not traditional. They are new Clean Energy Act provisions, which are not yet even fully in place. The Clean Energy Act when fully implemented will have forced BC Hydro into exceptional levels of surplus requiring export all of the time every year. So the opportunities for importing inexpensive power will be reduced to trading, which is much more limited than has been possible in the past.

The proposition is that the transmission interconnections could be used to open up markets for new clean electricity generation. The sole purpose exports are to come from aggregation of BC Independent Power Producer supply and would be sold under long-term contracts.

BC Hydro has described the difference between "traditional export" and "purpose export" in a table. The financial evaluation of traditional export suggests that it is limited, with the first \$200 million going

to ratepayers and the income over \$200 million going to the Province. The \$200 million limit used to be on trading income but is here being applied to export income. The concepts throughout the IRP document are mixed up with no clarification of the difference. I believe this may be a technical error in the document. However if it is intended then BC Hydro ratepayers are in for a huge surprise. The Clean Energy Act surplus would result on average in permanent excess income above \$200 million transferring very substantial income to the Province with almost all of the costs being borne by the ratepayers.

Throughout the IRP technical planning committee process BC Hydro did not highlight this transfer of concept between trading and export and when similar mistakes were made by BC Hydro staff when presenting this subject and I sought and received clarification, the clarification was that the export and trading distinctions remained.

“Sole purpose” export is clearly expected to be different.

The tradeoffs BC Hydro suggests considering are that additional electricity generation projects would be built by Independent Power Producers. This is opportunity may be attractive if the costs and pricing demonstrate that a permanent profit will be generated and that the use of the BC Hydro electric system assets is provided at full cost. BC Hydro states that the government will not proceed unless there is a clear business case demonstrating that such exports will provide a benefit to British Columbians. This would make sense. The lack of detail with respect to what will define benefit is an area of concern, particularly given that the trading income issues currently do not adequately cost the use of the BC Hydro system. Resolution of the costing issues and signed contracts would make this an interesting future scenario. There are also some concerns about risks that may be left with BC Hydro’s customers and these would need to be fully allocated to the Province and the Independent Power Producers if the Province and the Independent Power Producers are going to take the profits.

The environmental footprint tradeoff of having the impacts in BC while delivering the power to other jurisdictions requires that the value of the environmental impacts be fully compensated and mitigated in BC. There is no information with respect to this issue or what the environmental impacts may be or what the environmental values may be. There is no information with respect to the profitability of this export potential and whether or not it can pay for itself let alone justify whatever the unknown set of environmental impacts might be.

The jobs involved in building generation across the Province could be a useful contribution to the economic development of the Province provided that the jobs do not have net negative impacts on the BC social support systems, such as may happen with boom and bust jobs or uneconomic project jobs. The US housing market boom and bust, when exaggerated by poorly thought out policy, regulation and business practice can be very poor economic development.

Interestingly, the export of electricity may be accomplished with more job stability if it is done through added local processing. Potentially, for example, a copper smelting plant in BC may export more electricity at a lower cost and higher profit than direct export of electricity over the BC Hydro transmission tie line interconnections to neighbouring grids. Export policy should have a much broader foundation than the policy being considered.

Ratepayers are supposed to be protected from bearing any negative financial consequences. The Clean Energy Act is cited as the source for this assurance. The Clean Energy Act provisions of course do provide some protection from some of the direct impacts of building for export. However, close reading of the provisions makes it clear that the protection is limited. Financial impacts from uses of the existing BC Hydro system may not be adequately covered. Indirect impacts are also not covered. For instance if projects in BC are dedicated to export then the resource will not be available for BC. As all of the supply option cost curves for clean renewable energy are rising curves then the potential for low cost energy available in BC could be diminished by export if that were to occur in significant enough quantities. The electric transmission interconnections have limited capability to transport electrical energy. Use of the transmission lines for 'purpose export' would limit other values on the transmission lines. Building new transmission lines is an expensive and lengthy process and it is quite uncertain that this would be done by the Independent Power Producers wanting to make exports. Issues with regard to congestion in the Western Grid will have to be addressed and the relevant costs allocated to export. No contracts for long term export exist at this time and the terms and conditions for such sales are not available to assess what sort of risks BC Hydro and BC would be taking on. Unfortunately, BC Hydro in its IRP planning process has not and or does not have the ability to provide details and certainty with respect to the potential for ratepayer impact.

The clear allocation of economic benefits and additional revenue from "this" electricity generation flowing to the Province as a tradeoff seems to be an interesting feature to the export policy. Does this mean that the BC Government is going to be in the electricity export business, buying from BC suppliers and selling to foreign jurisdictions for a profit mark-up? Does this mean that Independent Power Producers would be excluded from making export sales themselves? Given that no one to date has long term power export contracts what evidence is the Provincial Government using to determine that there is additional revenue available from the export market or does the government have signed contracts or conditional sales ready to go?

My answer to the question is that I hope the "traditional export" information provided by BC Hydro is just a technical error and can be corrected otherwise the entire export approach is fraught with fundamental problems. Assuming the information is corrected, the absence of adequate information on the other issues makes it impossible to assess this approach properly. The best that can be said is that there may be interesting potential in exporting more electricity in some form and it would seem appropriate to continue exploring the options. A solid business case is needed and customer contracts are needed and nothing of the sort is anywhere available.

WRITTEN SUBMISSION FROM:
FIRST NATIONS ENERGY AND MINING COUNCIL

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**COMMENTS ON TECHNICAL ADVISORY COMMITTEE
PARTICIPATION FOR THE INTEGRATED RESOURCE PLAN**

May 6, 2011

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INTRODUCTION

The Integrated Resource Plan (IRP) is BC Hydro's plan for obtaining the resources necessary to meet provincial electricity requirements for the next 20 years. The IRP includes several components:

- A load forecast, which estimates how much electricity British Columbia will require over the next 20 years.
- Conservation initiatives that BC Hydro could pursue with its customers in order to reduce the amount of electricity that must be supplied.
- An evaluation of generation and transmission resources that could be acquired in order to meet the gap between existing resources and those required to serve future load growth.

BC Hydro examines each of these components under different potential future market scenarios, for example high or low future economic growth. Potential generation and transmission resources are evaluated across different indicators including cost, environmental impacts and economic benefits. Specific objectives for the IRP are set out in the Clean Energy Act which came into effect in 2010. The Clean Energy Act requires BC Hydro to complete its IRP and submit it to the provincial government before the end of 2011.

As part of the IRP process, BC Hydro established a Technical Advisory Committee (TAC). The purpose of the TAC is to provide ongoing feedback and expert advice to BC Hydro during the development of the IRP. BC Hydro has committed to considering input and advice from TAC members in developing the IRP. However, the IRP is BC Hydro's document and BC Hydro is not bound by recommendations or advice it receives from TAC members.

BC Hydro requested that the BC First Nations Energy and Mining Council (FNEMC) participate as a member of the Technical Advisory Committee (TAC). The FNEMC retained a consultant to participate on the FNEMC's behalf and to provide the FNEMC with a summary of comments and analysis following each TAC meeting. TAC meetings were held on December 14, 2010; January 26-27, 2011; February 14, 2011; and April 5-6, 2011.

TAC meetings originally scheduled for April 27-28, 2011 to review the initial results of BC Hydro's analyses were postponed in light of the provincial government review of BC Hydro rates that was announced in April. As a result, TAC members have not to date reviewed draft results of significant portions of the IRP. Despite this delay, BC Hydro has requested comments from TAC participants on five topic areas. This document summarizes the FNEMC's comments on the five topic areas from a TAC participation perspective. A separate document has been prepared summarizing the FNEMC's comments on BC Hydro's First Nations consultation process.

CONSERVATION AND EFFICIENCY

Issue Summary

BC Hydro's current load forecast projects an increase in electricity sales of approximately 14,000 GW.h or 27% by fiscal year 2020¹ before including any savings that might be accomplished through conservation and efficiency improvements. Conservation, sometimes called Demand Side Management (DSM), is the cleanest way to address future load growth. The Clean Energy Act includes an objective for BC Hydro to reduce the expected increase in electricity demand by the year 2020 by at least 66%.

Conservation methods can take many forms, from providing assistance to customers to purchase more efficient appliances and equipment; electricity rates that are designed to let customers know the full cost of electricity use and working with government to require higher energy efficiency standards for buildings and electrical equipment. However, one of the challenges with conservation and efficiency improvements from a planning perspective is that it is difficult to track and confirm conservation and efficiency improvements over time. Therefore, it can be hard to know how well these programs are performing relative to targets.

BC Hydro has provided information to the TAC that evaluates a range of conservation options targeting different levels of future conservation and efficiency improvements. In general, in order to achieve greater future electricity savings, BC Hydro needs to spend more money on DSM programs and needs help from all British Columbians to make a commitment to reduce their own electricity consumption. If the conservation and efficiency improvements are successful it could mean fewer impacts on the environment in the future (since it would help avoid the need to build new electricity generation and transmission projects) and lower electricity rates (if spending on DSM to avoid future electricity consumption is lower than the cost of building new generation and transmission projects). However, it is difficult to measure or estimate avoided electricity use and therefore difficult to evaluate the success of spending on conservation programs.

Key Comments/Recommendations

Based on the information provided to the TAC to date, the FNEMC provides the following comments:

- **Sustainability:** As stewards of the land, First Nations are committed to the responsible use of lands and waters to ensure their availability for future generations. Improving conservation and efficiency is consistent with sustainability and sustainable development which are core principles of the BC First Nations Energy Action Plan.
- **Pursue Economic Conservation/DSM Opportunities:** Given the benefits of improved conservation and efficiency, (including reduced environmental impacts; improved efficiency and lower energy costs) BC Hydro should pursue all economic conservation/DSM opportunities.

¹ 52,024 GW.h in F2011 increasing to 65,939 GW.h in F2020.

May 6, 2011

- BC Hydro and the Province of British Columbia should provide capacity funding for energy managers to support energy conservation in First Nations communities.
- **Access to Conservation Initiatives:** Access to DSM/Conservation initiatives is a challenge for many First Nation communities – particularly those in rural and remote locations. BC Hydro needs to ensure its DSM programs are accessible to all First Nations communities. Relevant considerations in this regard include:
 - In First Nations communities housing costs and electricity bills may be paid by the Band and not the individual or family residing in the home. Therefore conservation programs involving financial incentives/assistance for repairs and upgrades or reduced electricity bills may not be as effective as in other communities.
 - Access to capital dollars for repairs and improvements to community facilities (both residential and commercial) may be limited compared to other communities.
 - Codes and standards applicable in First Nations communities may differ from provincial standards.
- **Funding for First Nation Community Energy Managers:** In recognition of the specific challenges associated with conservation/DSM initiatives in First Nations communities, BC Hydro and the Province of British Columbia should provide capacity funding for energy managers to support energy conservation in First Nations communities.
- **Communication:** Much of BC Hydro's communication related to DSM and conservation in the IRP process focuses on the need to make sacrifices and the consequences if conservation targets are not achieved. BC Hydro should instead focus its communication on conservation initiatives on the benefits to First Nations and British Columbia, including reduced environmental impacts, less waste and lower energy costs.

ELECTRICITY GENERATION OPTIONS

In its consultation materials, BC Hydro describes three electricity generation “portfolios” that represent different potential strategies for addressing the need for future electricity resources. BC Hydro has not yet provided detailed comparisons of the costs and benefits of the different portfolios to the TAC members. However, a brief summary of the options identified by BC Hydro and specific comments on each option based on the information available to date are provided below.

PORTFOLIO #1: RENEWABLE MIX PORTFOLIO

Issue Summary

BC Hydro’s first portfolio includes plans to meet future electricity requirements from renewable sources including wind, run-of-river hydro-electric and biomass. New projects would be developed by independent power producers (IPPs) with BC Hydro purchasing electricity from the IPPs. The Site C hydro-electric project is excluded from this portfolio. BC Hydro notes that since renewable generation resources aren’t always available (for example when the wind isn’t blowing or when water flows are low) this portfolio would also require additional back-up resources to ensure electricity demand at peak times could be met. These back-up resources might include expanding existing BC Hydro hydro-electric generation stations, using pumped storage or natural gas-fired generation.

Although BC Hydro has not yet provided detailed information on the potential costs and benefits of this portfolio to TAC members, at a high level BC Hydro notes this portfolio has the following characteristics compared to other portfolios:

- **Diverse Resource Mix:** This portfolio would include a variety of different types of electricity generation sources including wind, hydro-electric and biomass.
- **Lower Greenhouse Gas Emissions:** This portfolio relies largely on renewable resources and therefore would have lower greenhouse gas emissions than some other portfolios.
- **Dispersed Environmental Impacts and Benefits:** Renewable resource developments would involve developing a greater number of smaller electricity projects throughout the province. As a result the potential environmental impacts and the economic benefits (in terms of community ownership of projects and related jobs) would be more dispersed across the province.
- **Higher Costs:** Electricity purchased from renewable energy IPPs generally costs more than other potential electricity sources. Therefore, the cost of electricity is likely to be higher with this portfolio than with other portfolios. BC Hydro has not to date provided detailed estimates of the electricity costs associated with each portfolio.

Key Comments/Recommendations

Based on the information provided to the TAC to date, the FNEMC provides the following comments:

- **Support for Renewable Energy Projects:** First Nations strongly support the development of clean, renewable sources of electricity to meet future energy requirements. Many First Nations are currently experiencing the direct negative effects of climate change. Ensuring future electricity needs are supplied by clean and renewable sources will help respond to the impacts of climate change and stabilize greenhouse gas concentrations.
- **Support for Locally Developed and Owned Projects:** In the past, resource developments imposed environmental damages without ensuring benefits for local communities. First Nations support projects that are developed and owned directly by the community or through partnerships. This helps to ensure projects are developed in a manner that is consistent with the broader plans and objectives of local communities in mind.
- **Balancing of Costs and Benefits:** It is recognized that the cost of future development projects must be taken into account in long-term planning. A focus on conservation and sustainability can help to ensure increasing electricity prices do not become a burden on local residents or become a barrier to other types of economic development.

PORTFOLIO #2: RENEWABLES WITH SITE C

Issue Summary

BC Hydro's second portfolio includes the Site C hydro-electric project in its plans to meet future electricity requirements. Electricity requirements beyond those that could be supplied by Site C would be sourced from renewable energy based IPPs. This portfolio would also require additional back-up resources to ensure peak electricity demands could be met. However, since Site C can provide energy storage and additional capacity, these requirements would lower than the first portfolio.

Although BC Hydro has not yet provided detailed information on the potential costs and benefits of this portfolio to TAC members, at a high level BC Hydro notes this portfolio has the following characteristics compared to other portfolios:

- **Lowest Greenhouse Gas Emissions:** This portfolio would produce the lowest greenhouse gas emissions of any of the portfolios as it relies largely on renewable resources.
- **Concentrated Environmental Impacts:** Environmental Impacts would be concentrated in the Peace region with approximately 5,000 hectares of flooding.²

²

http://www.bchydro.com/etc/medialib/internet/documents/planning_regulatory/site_c/2010Q2/site_c_ba_ckgrounder.Par.0001.File.Site_C_Backgrounder_6_2_2010.pdf

- **Mid-Level Costs:** Costs for this portfolio are expected to be lower than portfolio #1, but higher than portfolio #3. However, it should be noted BC Hydro has not yet provided updated capital cost estimates for Site C.

Key Comments/Recommendations

Based on the information provided to the TAC to date, the FNEMC provides the following comments:

- **Conflicts between Provincial Level Planning and Regional/Local Environmental Impacts:** Site C highlights the conflict between provincial level energy planning and regional environmental impacts. In order to develop Site C, local First Nations and communities would be asked to bear significant impacts on lands and water. One of the core principles of the First Nations Energy Action Plan is recognition of the autonomy of individual First Nations in decision-making for their traditional areas. No decisions or plans with respect to Site C can be made without meaningful consultation and accommodation with First Nations whose lands and waters would be impacted.
- **Funding Required for Local and Regional Development Plans:** There is a need for better development and coordination of energy planning with regional and local planning processes. BC Hydro and the provincial government should address funding for local and regional development plans.
- **Early Engagement Necessary:** Site C also highlights the need for early engagement of First Nations and local communities in resource development projects. First Nations must have the opportunity and the necessary resources to understand and evaluate development proposals.
- **Full Impacts of Development must be Understood:** In order to make informed decisions on new developments, a complete understanding of the potential environmental and human effects of the development must be undertaken. This includes an assessment of impacts at the regional level and an assessment of cumulative effects with other activities in the region.
- **Benefits must be Shared:** If new projects, including Site C, can be developed in a manner that is acceptable to the impacted First Nations and communities, mechanisms must be in place to ensure the economic benefits of the project are shared fairly with the local communities. Benefit sharing must extend beyond simply offering short-term construction-related employment to local residents. Revenue sharing and project ownership must be included as benefits for local First Nations and communities. Best practices from other Canadian jurisdictions should be reviewed and incorporated into project planning and development.³
- **Capital Costs of Site C must be Reviewed:** Capital costs for major hydro-electric facilities can change dramatically in a short period of time. For example, Manitoba Hydro has recently updated its capital cost estimates for the Keeyask and Conawapa generating stations. The most recent 2010 capital cost forecasts are both 50% higher than the 2008 forecasts. Manitoba Hydro notes

³ As an example, the Nisichawayasihk Cree Nation participation in the Wuskwatim generation project in Manitoba.

these cost increases are due to more current market information and delays in the in-service dates for both facilities.⁴

PORTFOLIO #3: RENEWABLE MIX WITH SITE C AND GAS-FIRED GENERATION

Issue Summary

BC Hydro's third portfolio includes Site C, renewable energy purchased from IPPs and gas-fired generation as allowed under the 93% renewable target in the Clean Energy Act. Since both Site C and gas-fired generation provide back-up ability the need for other sources of back-up is reduced. Although BC Hydro has not yet provided detailed information on the potential costs and benefits of this portfolio to TAC members, at a high level BC Hydro notes this portfolio has the following characteristics compared to other portfolios:

- **High Degree of Operating Control:** With both Site C and gas-fired generation available, this portfolio would provide the highest degree of operating control of the three portfolios. As a result no additional back-up resources would be required.
- **Concentrated Environmental Impacts:** As with portfolio #2, environmental impacts of Site C would be concentrated in the Peace region.
- **Higher Greenhouse Gas Emissions:** Because of the use of natural gas generation, this portfolio has the highest greenhouse gas emissions of the three portfolios.
- **Lower Initial Cost:** Costs for this portfolio are expected to be the lowest of the three portfolios initially, but there are risks of higher future costs due to potential increases in natural gas prices and greenhouse gas emissions costs.

Key Comments/Recommendations

Based on the information provided to the TAC to date, the FNEMC provides the following comments:

- **Concerns Related to Site C:** The FNEMC reiterates its concerns with potential effects of Site C noted above.
- **Role of Natural Gas Requires Careful Consideration:** First Nations are currently experiencing negative impacts of climate change and support efforts and policies to stabilize and reduce greenhouse gas emissions. However, natural gas generation may still have a role to play in long-term energy planning. For example, planning to include natural gas based resources, to

⁴ Manitoba Hydro's 2008 Capital Expenditure Forecast included capital cost estimates of \$3.7 billion for Keeyask and \$5.0 billion for Conawapa. The 2010 capital cost estimates are \$5.6 billion for Keeyask and \$7.8 billion for Conawapa. Both the 2008 and 2010 capital expenditure forecasts are available at http://www.hydro.mb.ca/regulatory_affairs/electric/gra_2010_2012/index.shtml

be used particularly during infrequent low-water years, may provide cost-benefits and improve reliability and energy security. Natural gas may also have a role in helping to displace electricity that is currently imported from other jurisdictions that primarily use coal for generation. These potential benefits need to be weighed against the greenhouse gas and potential environmental implications. To date, insufficient information has been produced on the trade-offs involved to allow for informed decision making.

ELECTRIFICATION

Issue Summary

The provincial government has set targets to reduce greenhouse gas emissions in the future. One way to help reduce greenhouse gas emissions involves switching from non-renewable energy sources (such as fossil fuels used for transportation) to electric energy provided by clean and renewable generation sources. BC Hydro refers to this process as “electrification” or “fuel switching”. One of the objectives of the Clean Energy Act is to encourage switching energy sources to decrease greenhouse gas emissions in British Columbia.

Places where it might be possible to reduce greenhouse gas emissions by substituting renewable electricity sources for fossil fuels include:

- **Transportation:** Replacing gasoline and diesel fuelled vehicles with electric vehicles.
- **Space Heating:** Using air and ground heat pumps to replace oil or natural gas heat.
- **Industry:** Using electricity to run compressors instead of natural gas or other industrial uses.

Currently, BC Hydro plans to meet electricity needs that include naturally occurring electrification. However, BC Hydro does not actively promote fuel switching. In the future, BC Hydro could work to promote and encourage electrification to reduce greenhouse gas emissions. As part of this proactive approach BC Hydro could support the development of electric vehicle charging stations and expand transmission and distribution systems to encourage new customers and uses of electricity.

A proactive approach to electrification could help achieve reductions to provincial greenhouse gas emissions. However, fuel switching from fossil fuels to electricity would require additional renewable electricity generation sources and likely additional transmission. The need for additional generation and transmission resources may increase electricity rates.

Key Comments/Recommendations

Based on the information provided to the TAC to date, the FNEMC provides the following comments:

- **Electrification of Remote Communities:** Electrification should include extending BC Hydro grid service to remote communities as a priority. In particular those communities currently served by diesel or non-renewable generation.
- **Greenhouse Gas Benefits need to be Weighed Against Other Environmental Impacts:** First Nations are supportive of actions that reduce greenhouse gas emissions. However, increased electricity generation and transmission projects involve their own environmental impacts. The potential greenhouse gas benefits need to be weighed against these environmental impacts.

TRANSMISSION PLANNING

Issue Summary

BC Hydro's IRP also includes a description of transmission infrastructure that will be required over the next 30 years. BC Hydro has noted a concern about the ability to develop the required transmission facilities in a timely way. BC Hydro notes transmission planning needs to consider:

- The need to maintain a high standard of reliability for customers.
- Load growth at a regional level (to ensure there is sufficient transmission in place to serve future growth).
- Potential location of future generation resources (to ensure future generation resources can be connected to the provincial grid).
- Minimizing line losses that occur when electricity is transmitted over large distances.
- The need to replace or refurbish existing transmission facilities that are nearing the end of their useful life.
- Potential for transmission lines to spur regional economic development.
- Potential cost savings and environmental benefits from avoiding multiple transmission lines.
- Potential to facilitate electrification or fuel switching.

BC Hydro can choose to address transmission planning on a reactive basis (i.e. responding to needs as they arise) or a proactive basis (i.e. building transmission facilities based on responding to development potential rather than in response to specific projects or developments). BC Hydro indicates that the following trade-offs of a primarily proactive approach need to be considered:

- **Higher Short-Term Cost:** A primarily proactive approach would involve building transmission infrastructure in advance of the need for the project. In the longer-term though costs could be lower as new generation and loads are developed.
- **Higher Investment Risk:** A primarily proactive approach may increase the risk that assets are built and not fully used or required, particularly if forecast generation or load requirements aren't developed.
- **Potential to Reduce Environmental Impacts:** A coordinated proactive planning approach may reduce the footprint of transmission projects.
- **May Facilitate Economic Development:** Improving access to electricity in some regions may enable economic development that would not otherwise be possible.

Key Comments/Recommendations

Based on the information provided to the TAC to date, the FNEMC provides the following comments:

- **Transmission Planning must be Coordinated with Local and Regional Development Plans:** A proactive approach to transmission planning may provide benefits to local regions and communities by reducing costs in the long-term, reducing environmental impacts associated with transmission developments and supporting local and regional economic development. However, for this planning approach to be successful it must be conducted in partnership with First Nations and local communities.
- **Isolated Communities should be Priority:** At present, many First Nation and rural communities are isolated from the provincial electricity grid. Isolated communities, in particular those currently served by diesel generation, should be a priority for new transmission access in order to ensure the economic benefits of clean, low-cost electricity are provided to all communities in the province.

EXPORT MARKET POTENTIAL

Issue Summary

The Clean Energy Act requires BC Hydro to explore whether there is the potential for BC Hydro to acquire additional renewable generation, beyond the needs of communities and businesses in British Columbia, in order to serve export markets and customers in other jurisdictions. The Clean Energy Act also requires that ratepayers in the province not bear any negative rate impacts as a result of additional electricity acquired for export. BC Hydro notes the following factors that would need to be considered:

- This approach would lead to increased development of electricity generation and transmission in the province. Environmental impacts associated with these projects would occur in British Columbia instead of other jurisdictions.
- Potential economic benefits (jobs and investments in IPPs) for local communities and regions.
- Additional revenue from exports would flow to the Province.

Key Comments/Recommendations

Based on the information provided to the TAC to date, the FNEMC provides the following comments:

- **Clean Energy Act Requirements Already Ensure Substantial Energy Available for Export:** As a result of implementing the planning requirements contained in the Clean Energy Act, BC Hydro will already have a substantial amount of clean and renewable electricity available for export in most years. Despite this amount of energy being available for export, BC Hydro is projecting substantial rate increase requirements over the next several years. It is difficult to understand how a case could be made that acquiring additional electricity resources to serve the export market could result in economic benefits to British Columbia.
- **Domestic and Export Markets Require Different Policy Context:** In the FNEMC's view development of energy resources to support local communities and businesses is a different policy concept than the development of energy resources for sale to customers in other jurisdictions. Local First Nations and communities should not be asked to bear increased environmental impacts to serve customers in other jurisdictions without ensuring the local communities and regions benefit substantially from these developments. The concept that the economic benefits would flow primarily to the provincial government is not acceptable.

WRITTEN SUBMISSION FROM:
FORTIS BC

We offer the following comments in response to each of your questions:

Q1: Conservation and Efficiency

Please indicate your level of agreement with this greater conservation and efficiency approach. (please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Please provide any comments in the space provided below to explain the reasons for your agreement or disagreement.*

*For privacy reasons please do not provide opinions about identifiable third parties.

Comments:

FortisBC believes that this question about a greater conservation and efficiency approach is oversimplified and cannot therefore agree or disagree with the question as stated. We do; however, offer the following comments with respect to conservation and efficiency.

FortisBC supports the use of cost effective efficiency and conservation programs to offset growth in electricity demand and to meet the provincial energy objectives as set out in the Clean Energy Act. We also believe that to best serve all energy customers in BC, using the right energy source for the right use is an important consideration in the cost effectiveness challenge in planning and designing programs. For this reason, we believe that utilities should work cooperatively to achieve the most benefit for all energy customers when designing and implementing demand side management programs.

BC Hydro's greater conservation and efficiency approach relies on additional changes to federal and provincial regulations. Such changes to regulations need to be developed with great care to ensure that a level playing field exists for all utilities to be able to provide solutions that meet the needs of all energy customers in BC.

FortisBC believes that in the current policy and legislative context in BC efficiency and conservation programs are being relied on to do more than traditional demand side management programming was expected to achieve when the conventional cost-benefit tests were developed. For example, carbon emission reductions were not a consideration in establishing the total resource cost test as a measure of the effectiveness of demand side management programs. Today, carbon reduction is among the primary objectives of the Province's Clean Energy Act. Further, consideration of the benefits of efficiency and

conservation programming are generally lost once a measure becomes mandated by regulation. Implementing additional regulations as contemplated by this approach could cause programs to fail conventional cost benefit tests. For these reasons, we believe that the conventional cost benefit tests need to be updated or replaced in order to allow greater efficiency and conservation programming to be effective.

FortisBC notes that a greater efficiency and conservation approach could be in conflict with an electrification approach also outlined in this consultation workbook. We wish to point out that electrification of thermal energy demand in many cases does not result in the best or most cost effective reduction in carbon emissions. Care should be taken to ensure a holistic approach to greater conservation and efficiency programming such that it is not aimed at electrification of thermal demand that increases overall carbon emissions while having detrimental electricity load and cost impacts. Further discussion of the electrification approach is discussed in response to Question 3.

Finally, as a BC Hydro customer, FortisBC is concerned about the risk of implementing the greater efficiency and conservation approach and not achieving the expected load reduction results. Due to the impact of such an outcome on customer rates, we strongly urge that if BC Hydro proceeds with this approach:

- the risks and rate impacts be carefully balanced, and
- complete transparency and stakeholder input are sought throughout the full development of the approach and resulting new efficiency and conservation programming.

Q2.1: Generation Options – Portfolio 1

Please indicate your level of agreement with Portfolio 1 – Renewable Mix. (please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Please provide any comments in the space provided below to explain the reasons for your agreement or disagreement.

Comments:

As a general comment FortisBC believes that the information available on the various portfolios is not a detailed enough level to offer strong comments on the merits of one portfolio relative to the others. For example, how the supply / demand balance (also called the load-resource gap) develops over time and how different resource options fill in the gap in the various portfolios is a critical element needed to improve the understanding on the part of stakeholders. However we offer the following comments of a directional nature

- Portfolio 1 costs more than other portfolios and would lead to the greatest upward pressure on electricity rates (of the three portfolio options presented).
- The heavy reliance on intermittent renewable resources will pose greater challenges on the system for back-up and system reliability
- Widespread geographic footprint may lead to corresponding regional economic benefits as generation is developed around the province; however
 - Care must be exercised in the development of a portfolio of this nature to make sure that there an integrated approach is being taken in the serving of consumer energy demands. Where feasible thermal energy demands (space and water heating) should be served by lower grade energy forms such as geexchange, waste heat recovery, solar and natural gas.
- GHG emissions are low in this portfolio, however all environmental impacts need to be considered such as, for example, the impact of transmission connections to these widespread generation sites needs to be considered in the overall evaluation
- Would like to see natural gas-fired generation in the mix as an alternative to this portfolio. This would be like Portfolio 3 without Site C. (FortisBC notes BC Hydro’s comments on gas-fired generation in its 2011 IRP TAC Issue Brief regarding matters such as permitting concerns, the policy context and legislative parameters affecting gas-fired generation.)
 - Since the emissions from gas-fired generation must be offset the gas-fired generation would not be adding to the province’s overall emissions on a net basis.

- Gas-fired generation is viewed as a preferred choice in surrounding jurisdictions for firming up renewable generation and for reducing emissions relative to coal-fired generation. Gas-fired generation has the potential to provide these benefits in BC and to contribute to increased diversity in electricity generation resource mix.
- Gas-fired generation would also add diversity in the cost structure associated with electrical generation resources. Hydro generation and many renewables typically have a cost structure based on high capital cost and low operating cost while gas-fired generation typically has a lower proportion of capital cost and higher proportion of operating (i.e. fuel) costs.
- High efficiency cogeneration (including small scale combined heat and power applications) using natural gas or a biofuel energy source with natural gas backup has the potential to contribute to a robust and reliable electricity system through distributed generation and efficient use of available energy resources (serving both thermal energy needs and electrical energy needs).
- Siting of gas fired-generation can be closer to the load allowing for less transmission requirements and providing voltage support in the demand centres.
- Energy losses are lower for gas transmission than electricity transmission.

○ **Q2.2: Generation Options – Portfolio 2**

Please indicate your level of agreement with Portfolio 2 – Renewable Mix with Site C.
(please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Please provide any comments in the space provided below to explain the reasons for your agreement or disagreement.

Comments:

In addition to the general comments made with Portfolio 1 a key one to add with respect to the second Workbook portfolio options is:

- There is still a great deal of uncertainty around overall Site C costs and impacts – The overall Portfolio 2 costs may not be in the mid-range in terms of overall portfolio costs when the Site C project scope and costs are updated.
 - Among other matters First Nations concerns add a high degree of uncertainty to the impact of Site C.
 - Transmission upgrades necessitated by Site C add further to the complexity and cost uncertainty of this portfolio
 - A clear plus of Site C, once the conclusion is reached to go ahead with the project, is that it is a long-term stable source of electricity generation with similar long term benefits to the province that existing heritage hydro generation facilities have been producing for many years

Q2.3: Generation Options – Portfolio 3

Please indicate your level of agreement with Portfolio 3 – Renewable Mix with Site C and Gas-Fired Generation (within 93 per cent *Clean Energy Act* target). (please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Please provide any comments in the space provided below to explain the reasons for your agreement or disagreement.

Comments:

- See comments on gas-fired generation in Portfolio 1 comments and Site C in Portfolio 2 comments

Q2.4: Generation – other comments

Do you have any other comments about electricity generation resource options to meet customers' future electricity needs? (please provide any comments in the space provided)

Comments:

- Diversity of energy types and solutions, including natural gas will make a stronger, more robust provincial and regional electrical system (for both energy and capacity purposes).

Q3: Electrification

Please indicate your level of agreement with this approach to electrification that involves active promotion by BC Hydro. (please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Please provide any comments in the space provided below to explain the reasons for your agreement or disagreement.

Comments:

FortisBC neither agrees nor disagrees with the active promotion of electrification by BC Hydro.

FortisBC believes that the assessment of electrification options should be made within an integrated framework of the energy system, the environment and the economy. Electrification options should consider lifecycle emissions and environmental impacts some of which occur elsewhere in the world.

Since the primary purpose of electrification initiatives is to achieve GHG emission reductions in the province FortisBC believes these should in general be selected based on their ranking on a provincial carbon abatement cost curve. In other words, electrification of certain segments of the economy may not be the most cost effective path to achieve the province's overall emission reduction targets

- Electrification makes sense for some energy applications and not in others.
- Electrification initiatives may encourage natural gas to electricity fuel switching when electricity may not be the most efficient or cost effective way to serve thermal demand.
- Renewable thermal technologies such as geo-exchange, solar thermal and biomass heating systems combined with hydronic heat distribution systems can meet carbon reduction objectives without putting the same kind of technical and cost pressures on the electricity system that electrification would.
- High efficiency natural gas end-use solutions can also help to meet carbon reduction objectives and targets.
- Policies and utility practices should encourage the most efficient and long-run cost effective energy choice implementation.
 - Electrification initiatives may cause unnecessary cost increases to BC Hydro customers and BC tax payers.
- Carbon reduction policies and electrification strategies should consider total, regional carbon reduction potential in comparison to BC-only carbon reduction potential.

- Diversity of energy types and solutions will make a stronger, more robust provincial and regional energy system; whereas electrification expands reliance on a single energy system with fewer options to deal with increasing cost pressures and service disruptions.

Q4: Transmission Planning – Proactive Approach

Please indicate your level of agreement with this proactive approach to transmission planning. (please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Please provide any comments in the space provided below to explain the reasons for your agreement or disagreement.

Comments:

FortisBC believes that this question about a proactive approach to transmission planning is complex, and cannot be answered with a simple agree or disagree. We offer the following comments with regards to transmission planning.

For transmission investments of strategic significance which would likely benefit all customers, a proactive approach may be appropriate. This could include transmission planning for the northeast oil sector, or a coordinated enhancement of cross-border transmission interties to increase the ability to import and export power.

Large transmission investments where it is unlikely that a single customer could justify, yet there is a high probability that there would be numerous customers to recover the cost, may also be suitable for a proactive approach.

Other transmission investments may be more suited for a reactive approach.

In the proactive approach, failure of the expected customer load to materialize could significantly impact the affordability and utilization of the existing wholesale transmission system. In all cases, appropriate commercial evaluation criteria should be stringently applied to the investment decisions.

The proactive approach may be more susceptible to political interference, putting transmission users at risk to cover the costs of uneconomic decisions. A transparent and independent review of such proposed expenditures, preferably through the BCUC, is essential.

Proactive transmission solutions may also be prejudicial against regional solutions, such as distributed generation and DSM programs, that can reduce the need for transmission and avoid some of the cost and social acceptance issues that transmission typically encounters. Alternative solutions must be evaluated.

As a BC Hydro customer, FortisBC is concerned about the risk of implementing a proactive approach and not achieving the expected transmission loads, resulting in significantly higher costs for all customers.

Q5: Export Market Potential

Please indicate your level of agreement with this export approach. (please check one box only)

- Strongly Agree
- Somewhat Agree
- Neither Agree nor Disagree
- Somewhat Disagree
- Strongly Disagree

Please provide any comments in the space provided below to explain the reasons for your agreement or disagreement.

Comments:

In principle, FortisBC supports the concept of building clean generation for the purpose of export. There are many advantages to the province if the economics of build-for-export work.

Of concern is the lack of financial compensation to ratepayers. Although not taking direct financial risk, there will be financial consequences for the ratepayer:

- The cost of new generation to meet future domestic load growth will be higher as development projects move higher on the marginal cost curve;
- Traditional exports from BC, which are to the ratepayers benefit, will be competing for power purchase agreements with build-for-export projects. There is the potential for bias by the Province that the more profitable transaction go to the build-for-export projects;
- Build-for-export projects will likely need to be firmed up through BC Hydro storage from its dams and with ancillary services. This could limit resources available for traditional exports and drive up prices for these services for domestic load;
- Build-for-export will create further transmission congestion at the border and within BC, limiting the opportunity for traditional exports.
- Transmission congestion in and out of BC could also result in higher domestic costs for wholesale energy purchases, and lower domestic market prices for surplus energy sales.

There will be a need for dynamic scheduling and smart grid to incorporate intermittent renewable generation such as wind. The build-for-export projects should pay their fair share for such projects.

Finally, natural gas is considered clean generation in neighbouring jurisdictions and should be considered in the build-for-export mix.

ADDITIONAL COMMENTS:

Please provide any additional comments.

Comments:

BC Hydro should reconsider its view that the 93% clean or renewable generation requirement in the Clean Energy Act requires that this target be exceeded in even the most adverse conditions such as a critical water year. If this target was exceeded in most years or on average over a rolling period of several years it may be possible that the Province's requirements would be met while providing a lower cost portfolio to customers and even potentially lower GHG emissions in total.

WRITTEN SUBMISSION FROM:
THE PEMBINA INSTITUTE

May 4, 2011

Responses to the Consultation Workbook Questions

by Matt Horne | 604.874.8558 x 223 | matth@pembina.org

The following document provides the Pembina Institute's perspectives on the questions posed in the Integrated Resource Plan workbook.

Question 1 – Conservation and efficiency

Pembina supports greater conservation and efficiency efforts. The analysis presented to date shows that there are opportunities to exceed current efforts where the expected costs are lower than building additional supply.

Pembina would also support pursuing some emerging efficiency and conservation approaches that are expected to be more expensive and/or more uncertain than supply-side options for two reasons. First, the simple cost comparison does not account for the relative environmental benefits of conservation and efficiency compared to supply side options. Second, BC Hydro will need to experiment with the new approaches to reduce uncertainty surrounding them so they can be considered on a larger scale in future planning exercises.

Pembina also notes that the workbook summary of this option (page 28) does not provide a well-rounded view of the risk and uncertainty associated with conservation and efficiency. While there is undeniably a potential downside in that new approaches to conservation and efficiency may not deliver anticipated savings, the summary fails to mention the range of approaches to mitigate that risk, or the potential that efforts could over-deliver savings.

Questions 2.1 to 2.3 – Supply side options

Not enough information has been provided to fairly assess the two renewables based portfolios. In particular, the analysis is currently lacking updated cost information on the proposed Site C dam and portfolio level results for the environmental analysis.

Relating to the same two portfolios where back-up power is required because of intermittent wind and run-of-river projects, it is not clear why geothermal does not figure in the portfolios. With comparable ranges for energy costs and an ability to reduce back-up needs, it seems that the portfolio costs would be close enough in cost to the others to merit consideration. It is not clear if the exclusion of geothermal from the portfolios is the result of an economic barrier not communicated in the workbook,

or if it is an issue relating to the way the analysis examines energy needs first and then capacity needs as a separate question.

Pembina does not support the natural gas portfolio primarily because of concerns about increased greenhouse gas emissions and a lack of assessment as to how those additional emissions would fit in the context of a low-carbon future for B.C. (as per the greenhouse gas reduction targets in the Clean Energy Act). Our concern is that the development of natural gas fired generation will leave B.C. in the difficult situation of either having to miss important climate change targets or curtailing the use of plants at a relatively early age. This challenge is particularly relevant given the relatively long operating lifetime for thermal power plants and the fact that the greenhouse gas emissions need to be declining throughout that time period.

An additional comment across supply-side options is that the Integrated Resource Planning analysis does not currently account for any uncertainty in supply side options apart from an assumed attrition rate for new projects. The implications of this gap are unclear, but based on the relatively significant implications of assessing uncertainty in efficiency and conservation options, it would be prudent to apply a similar approach to supply side options. In thinking about uncertainty in supply side options, it would be useful to consider two questions:

- How might the costs of supply side options vary from the values provided in the resource options database?
- How might the deliverability of supply side options (i.e. the likelihood that an approved project is built) impact the overall analysis?

Question 3 – Electrification

Pembina supports BC Hydro playing a proactive role in electrification for the purposes of greenhouse gas reduction, with two important caveats:

- Any specific measures need to be based on a more thorough review of electrification opportunities in B.C. That analysis should be placed in the context of the province's Climate Action Plan to build on the port and truck stop electrification, and non-electrification strategies to reduce emissions that the province is already pursuing. This is particularly important because in many instances, electrification is just one potential solution to reduce greenhouse gas emissions (e.g. electric heat pumps vs. biomass district energy systems) and a singular focus on electrification could miss better opportunities. The review of electrification opportunities should also assess the costs of different opportunities (in terms of \$/tonne reduced) so that they can be compared with a full range of emissions reduction strategies.
- Pembina is concerned about electrification in the natural gas sector because the province has not taken a proactive approach to understand and plan for the pace and scale of gas development in B.C. While electrification of some upstream gas processes may be a very sensible solution, it is difficult to assess

it as an option without any kind of proactive planning happening in the sector. Due to the gap, development (including potential electrification) may be proceeding on a trajectory that could result in unacceptable environmental impact in the region.

Question 4 – Transmission planning

Pembina supports the analysis of different transmission planning options being done as part of the Integrated Resource Plan, but we are not in a position to agree or disagree with specific options until that analysis is complete.

Question 5 – Export market potential

Pembina remains open to the idea of electricity exports, but is concerned that the current approach is overly focused on economics, and as a result, it misses other important questions that should be part of any eventual decision. Namely:

- Will the exported electricity result in greenhouse gas reductions in the importing jurisdiction?
- Are the expected environmental impacts in B.C. justified by the expected economic and environmental benefits?

These are difficult questions to answer, and the second question in particular is very values-based where the same set of facts could lead to many different conclusions. The information being produced through the Integrated Resource Plan do not currently seem set up to provide the necessary information to answer these questions, nor does it provide an adequate forum for such decisions.

Other comments

The self-sufficiency electricity requirements mandated in the Clean Energy Act will result in BC Hydro having an average surplus of approximately 8,000 gigawatt-hours of electricity per year. The economic and environmental costs associated with this surplus could be significant and they could undermine support for the eventual Integrated Resource Plan, regardless of how robust the rest of plan is. While BC Hydro does not have flexibility to not meet the surplus requirements prescribed in the Clean Energy Act, it would be prudent to use the Integrated Resource Planning process to assess and communicate the economic and environmental costs of those requirements to the provincial government.