DATE/TIME	October 3, 2016 9:00 a.m. – 12:00 pm.
LOCATION	BC Hydro Customer Centre Presentation Room 2ND Floor, 333 Dunsmuir Street, Vancouver, B.C.
TYPE OF MEETING	BC Hydro Integrated Resource Plan Technical Advisory Committee (TAC) TAC is a group of knowledgeable participants with significant interest, stake, and experience in BC Hydro's resource planning process, which was established to provide detailed, technical input and feedback to BC Hydro during the development of the 2013 IRP.
FACILITATOR	Anne Wilson, BC Hydro
PRESENTERS	Randy Reimann, BC Hydro Kathy Lee, BC Hydro John Rich, BC Hydro
NOTE TAKER	Edlira Gjoshe, BC Hydro
MEETING ATTENDEES	Randy Reimann, BC Hydro (Chair) Bill Andrews, BC Sustainable Energy Association David Craig, Commercial Energy Consumers Association Doug Chong, BC Utilities Commission Thomas Hackney, BC Sustainable Energy Association Mike Hopkins, FortisBC Paul Kariya, Clean Energy Association of BC Erin Pritchard, BC Public Interest Advocacy Centre Tom-Pierre Frappé-Sénéclauze, Pembina Institute Leigha Worth, Movement of United Professionals (MoveUP) Amy Sopinka, Ministry of Energy (by phone) Jim Quail, Movement of United Professionals (MoveUP) Paul Wieringa, Ministry of Energy Richard Stout, Association of Major Power Customers of BC Willie Charlie, Sts'ailes First Nation <u>Other Attendees:</u> Greg Charchun, BC Hydro

WELCOME, REVIEW AGENDA, MEETING OBJECTIVES

Anne Wilson welcomed everyone, and reviewed the meeting agenda and objectives. This meeting is to provide the Technical Advisory Committee with an update on the Revenue Requirements Application, the updated Load Resource Balance, to communicate the outcomes of the review of the 2013 IRP in light of the updated Load Resource Balance, and look ahead to the 2018 IRP.

OPENING COMMENTS

During the recap from the last meeting, the Committee Chair (Randy Reimann) addressed the question on whether BC Hydro would consider delaying Site C. From BC Hydro's perspective, Site C is a committed project and to date, there have been about $4B in commitments, of which over $1B has already been spent.

LOAD FORECAST REVIEW

John Rich presented the updated May 2016 Load Forecast results, with comparisons as to what has changed since the 2013 IRP. A series of questions and answers followed. Questions focused on load growth rates and uncertainty, forecasting assumptions about LNG and upstream oil and gas sector, electrification assumptions, and general load forecasting methodology.

All of these topics were included within BC Hydro's Fiscal 2017-2019 Revenue Requirements Information Request (IR) process, and it was mentioned that interested parties were directed to the British Columbia Utilities Commission website at www.bcuc.com.

LOAD RESOURCE BALANCE

Slide 26 – "At least 66%" Conservation Objective

Q: How come the DSM Plan (RRA) scores 106% on the objective?
A: The result is due to the metric used. Everything else equal, as load drops, the percentage of DSM score would increase. Reductions in load that may not be related to DSM programs are accounted for in the metric used, the table shows how sensitive the metric is to changes in load.

CLIMATE LEADERSHIP PLAN

Slide 29

Kathy Lee stated that BC Hydro does not anticipate any load increase arising from Climate Leadership Plan 2.0 will require new resources in the near term beyond what is already planned. Longer term need will be addressed in the 2018 IRP.

Slide 30

Q: Is the 100% clean target going forward in the Climate Leadership Plan a material change from the direction BC Hydro has worked with over the years?

A: We have worked with a 93% clean generation target from the Clean Energy Act. We do not currently have any new gas-fired generation planned. The question will come to a head if and when it appears that gas-fired generation is the only viable option.

Q: Where are we at today as compared to the 93% target?
A: We are actually closer to 98% clean in terms of generation.

Q: What are the implications for the remaining 2% going forward? Does it mean that it needs to be dropped off?
A: We're targeting 100% clean going forward, but we don't want to burden existing ratepayers by getting rid of what's already been built. The thinking is to also have some options in the future should the need arise from a reliability perspective. We have gas-fired generation in places like Ft. Nelson, Fort St. John (McMahon), Vancouver Island (Island Cogen).

Q: What's the cost effectiveness of delivering the last 2% of clean generation? One would suspect that this last bit would come at a much higher cost.
A: Not sure there is a bright line and where or when we have to cross it. There are clean resources like pumped storage, which might be a good/reasonable option going forward.

Q: It would be a good topic for the 2018 IRP to get to the cost metric for this issue- to prove that we won't be overspending to get the last 2% increment. How do we make sure that we are keeping the marginal costs in check?
A: From studies to date, pumped storage resource options come at about double the cost of gas-fired generation, and can also be energy constrained. Load curtailment options would be looked at as well.

Slide 32

Q: The Federal government just announced this morning that all provinces must have a carbon tax in place by 2018. Do you have an estimate of what the Climate Leadership Plan 2050 emissions reduction target would mean for B.C.in terms of GWhs? What about your thoughts on the City of Vancouver carbon neutral initiatives?
A: It is still early days of the Climate Leadership Plan. These are topics to address in the 2018 IRP.

Q: In so far as electrification impacts, we should not be looking at just the upstream (oil and gas) sector electrification. What about programs to reduce gas use in other sectors?
A: The Climate Leadership Plan addresses the upstream sector specifically; the intent is to come up with a DSM approach that could incent some of the initial capital investment. For PRES, we would be looking to the Federal government to help fund. For other sectors, we expect that it will be gradual. We have surplus of energy in the near term. We will be okay from a reliability perspective, aside from short-lived windows of capacity shortfall. So, we have a bit of a tighter capacity Load Resource Balance (LRB) and we believe we have a good plan to address it by keeping development of Revelstoke 6 at the earliest in-service date.

Slide 33-34

Kathy Lee provided an update on the load resource balances. For energy, there is enough supply until F2033. From an operational perspective, some existing generation will likely be dispatched off (such as Island Cogen). The conclusion is that we will have sufficient energy in the near term that we wouldn't need to buy additional resources before the 2018 IRP.

The capacity load resource balance is a different story. There is a projected 2-year shortfall beginning in F2023 and before Site C in service that we are proposing to rely on the markets or other options like load curtailment to make up for the shortfall. As well, after Site C and Rev 6 in-service, we expect a shortfall again in F2029.

Q: Do capacity numbers include losses and reserve requirements?
A: Yes, they do. They are capacity at the generators' end, as opposed to customers' end.

Q: Does the capacity forecast include the potential 100 MW addition by Alcan that is already covered by the existing agreement?
A: What that entails is Alcan building a second tunnel so that they can reduce tunnel losses, which will then allow them to provide more generation. The timing of this is uncertain.

ROUND TABLE: CLOSING REMARKS

Q: What is the plan to finish the 2013 IRP review?
A: It was a commitment for us to look at and we will communicate that we don't see a need for additional acquisition processes before the 2018 IRP. The remainder of the process with government will probably be in the form of a communication towards the end of year.

- There are credibility issues with forecasting of LNG and upstream developments; not so much whether it will happen but when. As well, every Revenue Requirement Application ought to be built around an approved IRP.

- We have done what we can with this particular review. Let's move to the next process (2018 IRP) and begin discussions around some of the issues that are identified.

- We need to start on the new process sooner rather than later. There needs to be full discussion on solar energy moving forward and the impact it will have on planning. Equally on DSM and its scope and metrics (including discussions with Victoria), to deal with technical and economic potential as technologies move; particularly with storage/EV technologies. We need to avoid the cost of overbuilding.

- Let's not continue to spend more time with the 2013 IRP review. Let's jump into the 2018 IRP process; get started early; involve First Nations early. As industry, we put a lot of effort in being complementary to BC Hydro. We have concerns about the health of BC Hydro and its debt. Let's engage and find out what's happening with the sector globally and be at the forefront of that change; and not be too resistant and try to effect change.

- Have a high regard for the collective expertise around the table and for putting numbers around the thoughts of the future. We are very interested in what's happening around provincial and US elections and Climate Change issues. How do we minimize the impacts of Climate Change? Let's try and understand how we can move forward. We tend to look at things generations out. Will our children and grandchildren have the same things we have? Look forward to the 2018 discussion.

- There are still legal cases against Site C; acknowledging it would be more fair to the process, as opposed to not. We need to integrate energy and GHG emissions discussions- to look at scenarios that capture both. The Climate Leadership Plan issues are within scope. We need to understand the impacts on forecasts from LNG - both from upstream and downstream developments. Regarding DSM programs, Alberta and Manitoba are moving towards a single agency approach for DSM, is there room for BC Hydro to collaborate with FortisBC on DSM? Also, to look at electrification of northeast B.C.

- We are very interested in the 2018 IRP - would like to be able to effect the thinking, planning for, the scope of it. Have some frustrations with the last couple of Revenue Requirements Applications, where DSM issues weren't really hashed with stakeholders. Climate Change will be a game-changer going forward. The IRP seems to be more structured as a "business-as-usual" government policy informed, as opposed to exploring game-changing scenarios. Electrification of transportation: if society decides to switch – need to enable those discussions now. And better inform DSM discussions through IRP scoping. Avenues for carbon reduction and electrification were the main "unfinished business" of the 2013 IRP Review. Good to hear that these topics will be front and centre in the 2018 IRP. Cities and municipalities are assuming a more important planning role. It may be time to invite a few more representatives from cities or municipalities on the TAC.

- It is time to move on (from the 2013 IRP Review) and start the 2018 IRP process.

- Need to also address the tariff issues around net-metering as it concerns distributed generation/storage resources. There will be cross subsidy issues between those who can afford solar power and those who can't.

Randy Reimann provided some closing remarks, appreciated participants for their time and the discussions, and that he has received the message that it's a changing world and we will be considering these comments for the 2018 IRP.

CLOSE AND NEXT STEPS

Anne Wilson thanked people for attending. The meeting concluded at 12:00 p.m.

HANDOUT – SUMMARY OF FEEDBACK FROM MARCH – SEPTEMBER, 2016

Feedback on Issues for 2018 IRP	Response
Appropriate to set some kind of framework to look at **big change scenarios**; be more radical than just sensitivities • e.g., scenarios with distributed energy resources that reduce demand. Hydro can't control timing – consider impacts	Agreed that we need to consider game changers.
Work on **scenario definitions** now as 2016 scoping prep for the IRP 2018	Currently gathering issues and information as initial scoping. Will include this as a discussion item in the work plan in the new year.
Use **Climate Leadership Team as a baseline scenario** rather than try to come up with new scenarios.	We will undertake scenarios under current policy framework and aligned with the Climate Leadership Plan. Further discussion of scenarios will be part of 2018 IRP process
Any relevant items in **federal infrastructure budget**?	As per Climate Leadership Plan, the Provincial Government is seeking federal funding for infrastructure such as Peace Region Electricity Supply (PRES) project.
Interties with Alberta, how does changes in Alberta impact BCH and how can BCH benefit	Continue to support government dialogue with Alberta.
Look at portfolios that examine **delaying Site C**; evaluation of costs.	Will not be running a delay portfolio. Site C is now under construction, and not in scope for 2018 IRP.
Treatment of DSM uncertainty (uneven with supply-side). Can get a lot more certainty around DSM by pre-planning Issue of **flexibility capability** and incorporation into the resource planning Improvements in the **DSM evaluation metrics and target setting** can likely deliver significant benefits.	Contemplating a dedicated meeting on the topic of treatment of DSM uncertainty. And for additional DSM related topics, we will be coordinating discussions with EC&E.
Include capacity DSM options in long term planning, e.g., non-firm interruptible rate to the commercial sector as a pilot.	Expect to engage commercial customers in the fall as part of BCUC Order. Other options to be considered as part of 2018 planning process.
The **LRMC determination** will be an important factor in the design of rates and the implementation of demand side management initiatives – need to consider a capacity LRMC	Addressed as part of RDA.
Improve **rate impact analysis** and option tradeoff planning	Will consider approach for 2018 IRP.

Feedback on Issues for 2018 IRP	Response
Reconcile **Electricity End Use Final Demand** for BC from Statistics Canada (showing flat) and BCH forecast.	BC Hydro has compared the source of the Stats Canada data to other sources such as BC Hydro's annual report and the historical sales reported by the BCUC's Annual Reports. All sources indicate that load has not recovered to levels prior to the recession. The Stats Canada data also suggest a decline in sales in 2006, while the other sources do not.
Meeting process: • Appreciate informal meetings • Would like materials in advance • Would like information on funding – as well, would like BC Hydro to consider funding for work put into written commentary • Request to share assumption information – IRP modelling and Load Forecast modelling • Review of the Resource Options Report early and other data early would be helpful.	We will maintain an informal approach, and will address any questions (verbal or written) the best we can. We will do our best to share information and enable early review of materials, being mindful of making the best use of committee input and time. Participant funding will remain at current levels, and will be provided additional compensation (up to one day) when written comments are requested at "key junctures" in the process.
Membership: two First Nations members to represent diversity.	Agreed.