SUMMARY NOTES Resource Options Update: Wind Engagement

May 5, 2015
10:00 – 12:00
BC Hydro Dunsmuir

TYPE OF MEETING	Wind Engagement
ATTENDEES	Ron Hankewich (Elemental Power), Paul Kariya (CEBC), Frankie Nash (CEBC), Mike Hopkins (FortisBC), Resja Campfens (Seabreeze Power), Karim Hirji (CPC), Nguyen Pham (FortisBC), Ian Baillie (CanWEA), Sam Littlefield (EDPR), John Patyka (Aeolis Wind), Wagner Ksenhuk (Aeolis Wind), Ron Percival (Avro Wind Energy), Jake Gray (Capstone Power Development Corp), Dave Warner (EDF EN), Scott Cutler (MEM), Julie Chace (MEM), Sean Barricle (Capital Power), Murray Westerberg (Borea Construction), Johnny Casana (EDPR)
BC HYDRO	Nan Dai, Magdalena Rucker, Anne Wilson, Randy Reimann
AGENDA	1. Review impact of updated turbine characteristics on net capacity factor 2. Review updated wind costs and assumptions
MATERIALS	Presentation slides

MEETING SUMMARY

Magdalena presented the slides.

Below is a summary of questions and comments that were made during the meeting.

Slide 3
There was some discussion around using a 3 MW turbine nameplate capacity for the analysis. It was agreed that this assumption is reasonable for a high-level analysis, but in reality the turbine model is determined based on a cost benefit analysis for each project. It may be that a 2 MW turbine is the better machine for a site.

Slide 4
BC Hydro clarified that the cost analysis done by Hatch is based on a 3 MW turbine.

Slide 6
BC Hydro explained that this slide is based on projects that were originally identified in the 2009 BC Hydro Wind Data Study. An additional 26 projects were identified in a follow-up study (2009 BC Hydro Wind Data Study Update), but those are not included here because no wind speed time series are available for those projects (analysis was based on wind maps).

BC Hydro expressed concerns about the high net capacity factors (>40%) for a number of projects, which may not be realistic for B.C. In addition, projects with the very high net capacity factors would likely be located in difficult terrain, e.g., narrow ridges. The cost estimates, however, are based on a 'best case scenario' which does not capture increased costs due to difficult terrain. The combination of high net capacity factors with best case cost assumptions will produce unit energy costs that may be overly optimistic. It was suggested that the projects with the very high net capacity factors could be excluded from the cost analysis, or a lower hub height could be used for those sites.
BC Hydro will consider an appropriate approach.

A participant asked if the sites with the highest net capacity factors were also viable for construction. BC Hydro responded that the projects were identified in the original 2009 study based on slope constraints and minimum wind speed.

Slide 8
There was some discussion about costs associated with First Nations consultation and accommodations. Some participants suggested that the 2–3% range provided by Hatch was appropriate. In the previous Resource Options Report, BC Hydro used a soft cost adder to cover costs associated with environmental, community and First Nations assessment, engagement/consultation and mitigation. BC Hydro still needs to consider internally how to apply these estimates and be consistent across all resource options. A participant also mentioned that there may be more negotiation with higher cost resources, and so the percentage may be lower, but the dollar amount may be the same.

Slide 10
BC Hydro clarified that the cost estimates for each region were based on base project sizes for each region: 48 MW for Vancouver Island, 117 MW for Southern Interior, 117 MW for Peace Region and 195 MW for North Coast. The size for the base project in each region was based on the median size of projects in the resource options database for each region. Participants asked why the median size was used, and not the size for the most cost competitive projects. It was suggested to look at the size of wind projects going through environmental permitting, and that most of those projects would be larger than 117 MW. One participant commented that whether it is a 117 MW or 195 MW plant is just tweaking on the margins; i.e., building a 200 MW project would maybe save $2/MWh.

BC Hydro remark that it is trying to get more details into the cost estimation, but no two sites are the same and so what is really needed is a site by site cost analysis. But this was not in the scope of work for Hatch. BC Hydro hasn't tried in the past to come up with region specific cost estimates and this is a first stab at it. Hatch has always maintained that project size matters, but the scope was to consider one project per region, and so the decision was made to use the median as the representative size for each region. This makes it difficult, however, to compare the costs between the different regions, and so Hatch was asked to prepare cost estimates for an equal sized project. Hatch also prepared a cost adjustment curve to calculate the capital cost on a per MW basis for each project (depending on project size).

There was a suggestion to capture in the Resource Options Report (e.g., as a footnote) that in reality, the available projects are quite distinct and different.

Slide 11
Participants raised questions with regard to pre-construction costs for the various regions, e.g., why the Peace region is higher than the North Coast or Southern Interior regions, and why Vancouver Island is so high. BC Hydro pointed out that these costs are for the base projects, which have different nameplate capacities. So, the costs on a $/MW are larger for Vancouver Island (smaller project size, less economies of scale), and smaller for North Coast (larger project size, more economies of scale). A participant then pointed out that, on a total MW basis, the differences in pre-construction costs are not that large.

Another participant wanted to understand the differences between the Peace region and the Southern Interior region. It was explained that the main factors to explain the regional differences are labour costs, travel/mobilization costs and transportation costs for turbines. Generic site assumptions were used for all four regions. One participant felt that the numbers are not accurate and that they are problematic in the way they are distributed across the regions, e.g., some sites in the Peace region are flat and easy.

There were several comments made that it is hard to provide feedback on the costs without seeing the Hatch report. BC Hydro stated that the report will be made public.

The general agreement was to revisit how the costs compare between the various regions.

Slide 12
This slide shows the costs across the four regions, but adjusted to one size. It was clarified that the North Coast cost estimates are only for onshore projects (i.e., offshore was not considered).

Some participants were still questioning the relatively high pre-construction costs in the Peace region. There were some comments that the North Coast region is very challenging to work in, especially on sites closer to the coast. There were also questions with regard to the relative costs between the Peace and Southern Interior regions. BC Hydro suggested that this likely due to the higher labour costs in the Peace region. It was suggested that it is a different world now with the general downturn in oil, and that there are lots of workers looking for work.

A request was made to provide a breakdown of the costs. BC Hydro replied that they would check with Hatch if they want to release the detailed line items, but at the very least BC Hydro will make the report available. It was mentioned that it would be good to get more information on the operation and maintenance costs as well.

Slide 13
BC Hydro explained that the leveling out of the cost curve is based on the notion that larger projects would potentially be built in stages, hence not achieving any additional economies of scale. There was a question if BC Hydro could look at a range of sizes, instead of basing the cost on the median size. It was explained that Hatch

started out with coming up with the costs for a base case project using the median size, but then developed the curve to help with customize the cost according to size. There was general agreement with the shape of the curves, but some participants commented that if the costs for the base case are inaccurate, then the curves will be inaccurate as well.

Slide 14
BC Hydro clarified that these cost estimates include transmission costs but these are considered to be minor components due to the short transmission distances. It was asked if interconnection costs were included. It was hypothesized that they were probably not included as this would require work with BC Hydro. One participant commented that interconnection costs would likely add $25–30 million.

Slide 16
It was asked if Borea Construction looked at other regions. The answer was yes, they looked at one other region and there was quite a discrepancy with Hatch's numbers. Part of the differences may be due to the fact that Hatch's analysis is for generic sites which are most cost effective and are likely to be successful in calls for power, and hence did not capture the costs for this particular site. One thing that the report by Borea Construction really underlined was the variations in balance of plant (BoP) costs between the various sites. The fact that Hatch's numbers are in line with Borea Construction numbers may be that the site is representative of generic conditions.

One participant asked if it would be possible in the Integrated Resource Plan to provide a rider to give a range of percent error on the unit energy costs. There will be better or worse and we won't know the price of wind in B.C. until there is a power call. The price of wind hasn't been tested for six or seven years. There was a question on how such information would be considered. At the end of the day, this is a projection and the participants understand that.

FortisBC asked if projects with unrealistic net capacity factor (in the 45–50% range) should be excluded. A participant suggested that overestimating the resource potential and overestimating the cost would have a cancelling effect, ending up with results that may not be far from reality.

BC Hydro mentioned that today's session was intended to get feedback. Previously we have considered an uncertainty range from -10% to +40–60%. If Hatch considered 'best-case scenario' projects, then maybe -10% as a lower bound is not far off. But what should be the upper bound? +40%? BC Hydro does not get into selecting resources, and so not sure how much precision is needed. One participant thought that a +40% upper uncertainty bound may be too large, but that using the independent power producer cost estimates as the upper bound may be okay. Another participant thought that a development/BoP/owner's cost of $800/kW would be a very good site.

Slide 18
There was some discussion around market conditions that impacted turbine pricing would affect all resource options. It was responded that some would apply to all resource options, but there are some that would be specific to the wind turbine market. One stakeholder expressed that the wind industry is sophisticated enough now, and that there may be minor reductions in turbine prices, but not huge reductions. Another stakeholder thought that the current turbine prices are as low as they can go and it was suggested that BC Hydro further consider future trends.

At the end of the meeting, some next steps were discussed. In general, there was interest by participants to better understand the cost estimates and particularly what the regional drivers were. BC Hydro emphasized the desire not to get stuck on the various costs components and how they vary from region to region, but rather to look at the total cost to make sure that they are in the appropriate and the regional order is correct. There was discussion in terms of keeping the regional analysis. There was general agreement to stay with the regional analysis, but to come up with a range of costs for each region.

BC Hydro thanked the stakeholder for participating in this engagement session.

Meeting close.