

# BC Hydro Resource Options Update Solar Technical Workshop

## Summary Notes for November 12, 2019

*Includes post-session comments and consideration of feedback*

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### AGENDA

- Review technical characteristic and potential for the solar resource in B.C.

### ATTENDEES

- BC Hydro: Alex Tu (Technical Lead), Alevtina Akbulatova, Anne Wilson
- Representatives of: FortisBC, Sunfield Energy, HES PV, Convergent Energy + Power, independent consultants, and BC Ministry of Energy, Mines and Petroleum Resources.

### SUMMARY NOTES

Alex welcomed participants and reviewed the agenda and purpose of today, which is to review technical characteristics and inputs to determine the B.C. solar resource potential. Alex invited participants to provide feedback through the presentation, and written comments following this meeting.

Comments captured below are organized based on slide number of the session presentation “Resource Options Engagement – Solar Technical Potential, November 12<sup>th</sup>, 2019”

#### Slide 5 – What are the relevant attributes?

- What about proximity to load as a benefit of the solar resources? i.e. the benefit of transmission or distribution deferral. It was clarified that these benefits may be considered as part of the IRP analysis and modelling.

#### Slide 6 – Proposed approach to Solar Technical Attributes (Utility scale)

- From practical experience and looking at a lot of sites, the potential will be a much smaller number. Showing within 50 miles to transmission is too far way to be economic. It would need to be a lot closer if it is not subsidized. Something closer to 20 or 25 is more in line, and only for very large utility scale projects.
- Not sure this matrix considers land conflicts or other land uses. North, east, and west slopes won't make it to production. Also, need gentle slopes or flat ground. In general, the GIS analysis produces only a coarse estimate of resource potential that may identify more sites than are truly viable, and at the same time may not identify small solar hot-spots within larger potential solar sites.
- You haven't taken into consideration the solar resources, it was mentioned that we are including lower resource quality sites as they may make sense in some circumstances.

- Feedback that it's useful to create a solar map from NREL data which shows where solar is developing, especially in areas of higher radiance. Would advise caution against setting up false expectations that solar can develop in lower resource areas if there is a higher resource area available.

### Slide 7 – Proposed approach to Solar Technical Attributes (Utility scale)

- Photovoltaic panel types – there is growing interest in monocrystalline panels as costs are falling. Tracking – differing points of view on this. One participant indicated that single axis tracking is typical and fixed tilt is not seen that much. Another participant indicated that systems in B.C. may not benefit much from tracking systems and proponents are more likely to use lower cost fixed tilt systems.
- Generally agree with assumptions presented. 32 MW per kilometer is a generous build out. Agree with overbuild ratio, it's possible to move that to batteries to deliver in dark hours. Losses are reasonable. Agree with NREL weather assumption.
- It was suggested to talk to Kimberly on their tracking experience, they have a double a double axis system.
- Operating and maintenance costs vary by technology – for example, dual axis have higher maintenance, single axis have higher operating costs than fixed tilt. Ultimately the design decisions of any single project will depend on achieving the lowest cost of energy at the site.

### Slide 8

- Most of B.C. is Crown land (about 95%) with the rest, about 5% private. On Crown land there are enormous constraints due to conflicts with land use and topography. This database will shrink dramatically. Permitting with setbacks from water bodies, it will be a much smaller dataset once those factors are taken into consideration.

### Slide 9 – Additional comments

- There was another comment that the proximity to transmission is too long – will be filtered. It was clarified the 20 to 25 miles out would only be for very large utility scale solar – e.g. 400 MW, now looking at more like 25 km. No projects in US would ever build that far away from transmission.

### Slide 11 – Urban scale

- Looking at greater Vancouver – it was agreed that it was hard to imagine there aren't strong competing uses for the land – i.e. development. The density of solar projects on an urban scale would have to be a much tighter density. Solar is different – requires significant areas of land and low-cost land.
- For community based solar – understand the desire for municipalities – but if we are generating power we need to get on 85% of land base (Crown land) that has a high solar radiance. That is where the power will come from – not from small and expensive urban developments. Not much power and very expensive.
- Biggest thing is social benefits and pricing, there may be opportunities that have an ancillary benefit; it would be more expensive but may have other benefits. Simply on cost of energy it wouldn't compete, but there may be features that make it attractive. It was mentioned there is some municipal interest and knowing what is out there is good even if the costs are high.

**Slide 13**

- Depends on who's paying for the power and ownership – if it is a municipality or community or if BC Hydro is subsidizing heavily for social benefits it may make sense.
- Are you only looking for capacity factors for urban or also for the utility? Currently utility capacity factor is just over 17% DC. There was feedback that utility scale capacity factors of DC are approaching 20 % and for AC 25% with over build.

**Slide 15 – Proposed approach to Solar Technical Attributes (Customer Scale)**

- BC Hydro confirmed assumptions that houses host an average of 6 kW for an average home by looking at net metering data.

**Slide 16 – Proposed approach to Solar Technical Attributes (Customer Scale)**

- One participant suggests their typical estimate of panel density is 5 W per square foot.
- Comment that BC Hydro may want to separate owner occupied from rental buildings, noting that rental buildings do not have proper incentives for installing net-metered generation. BC Hydro mentioned good data was not there. It was mentioned that smaller commercial is pursuing solar.
- Should there be a cap on the amount (referring to the net metering cap)? It was clarified that this review was being agnostic on the program, looking at overall potential. It was suggested we may want to make a note to clarify for people.

**Slide 17 – Proposed approach to Solar Technical Attributes (Customer Scale)**

- The overbuild would still be a ratio 1.3 both commercial and residential. It will approach 1.5 as its moving that way.

**Slide 18 – Proposed approach to Solar Technical Attributes (Customer Scale)**

- It was commented that it would be curious to see Cranbrook (sample generation profiles)

**Slide 20 – Summary of Technical Input Assumptions**

- GIS exclusion criteria should be made further specific, noting that the term 'forested' is too broad a classification (forested, old growth, plantain, generally B.C. Crown land has forest cover –may be more useful to use north, east, west facing slopes and/or terrain type, for example).

**Session closing**

- Please provide any additional comments by end of this week to incorporate for meeting next week. If participants are not able to provide feedback this week, but still would like to – let Alex know and we can look into how to incorporate your feedback.
- Alex thanked the participants for their time and comments.

## POST SESSION COMMENTS

- Two sets of written comments received, re-affirming the comments made above.

## CONSIDERATION OF FEEDBACK

Feedback	BC Hydro's consideration of feedback
Viable utility scale resources should be limited to within 20 miles of existing transmission infrastructure.	BC Hydro will update the restriction to reflect this feedback.
Forested land is too simplistic of a limitation to screen viable land uses.	BC Hydro will expand the land uses restrictions to reflect a more granular view.
Develop a map of current solar development in B.C.	This is beyond the scope of the Resource Options Update at this time.
Stakeholders suggested monocrystalline panels are moving toward the default assumption.	BC Hydro will change assumption to use monocrystalline panels.
The utility and urban scale resource estimate likely overstates the total resource available after practical considerations of competing land uses and land availability.	Agreed – this estimate reflects a higher bound 'technically achievable' resource inventory and may be further refined in future to better reflect this additional considerations, such as substation capacity constraints.
For commercial and residential systems, both are likely to have 1.3:1 overbuild ratios.	BC Hydro will adopt these assumptions where relevant.
For commercial and residential systems, 10-degree fixed tilt for commercial and 20-degree fixed tilt for residential are reasonable assumptions.	BC Hydro will adopt these assumptions where relevant.