Newfoundland Wind Assessment Questions

August 1, 2012

- Economic data was not in the scope of the Hatch report
  - Should economics be considered in our report?
  - Can we get the economic data?

Technical Comments

- Study of inertia could be added to their analysis
- Vista – they use long term (5 days) instead of ST (hourly)
  - We agree with their use subject to limitations
  - We agree with their statement to go to shorter time for load following
- They should give a capacity value for the wind
- Lack of analysis related to inertia
- Missing cold weather analysis, use existing wind plant experience
  - Showing that data we could verify
  - Icing due to weather conditions
- Shut down or damage due to heavy icing, throwing ice, etc
  - What is the experience from existing farms?
- Curtailment agreement with purchase contract details, etc.
- Holyrood has minimum generation
  - What would it take to eliminate that?
  - Could holyrood be converted to sync condenser operation to support voltage/freq?
- Reservoir limits? What are they? How are they affected by wind integration
  - Page 3-1 "No end condition was specified for reservoir…"
  - What other uses for the reservoir? Recreation? Irrigation?
- Wind Energy = Thermal generation red divided by available wind energy
  - At the long term analysis, this may be misleading calculation
  - How many days of storage are in the reservoir? This affects the answer.
  -
- If all wind is in one area, local voltage stability could be a problem
  - How will wind generation plants be distributed on the island?
  - Inertia and voltage stability are concerns
  - Will the wind plants provide inertia to the grid? (DFIG)
- 2007 electricity review from Tom Molinski provides background

- What is the cut off for wind penetration in terms of economics, what was the assumption?
- Capital cost of environmental upgrades to Holyrood
    - What avoidance does wind integration provide to reducing the environmental upgrades to Holyrood?
    - 450 Million for 300MW wind, could displace 600Mil upgrades?
    - Need costs of operating costs for Holyrood vs new wind generation
- Page 4-7 Paragraph 5,1 in 500 year conditions, dam safety…
- Page 4-8; winds are generally at peak during night, even though seasonally they are lower.
- Wind variability is quite significant, and so the statements in this section are risky
- Spilling the wind may be a more economic operation of the system than spilling water.
- Chapter 5 review of wind penetration in other areas:
    - What are the problems that have occurred?
    - Over production at night?
    - Becalming?
    - Should add the risks and troubles that have been experienced
    - The statements about targets for penetration should be clarified
- Our knowledge says 5% penetration is generally no problem
    - 10% may be fine, depending on the exact situation
- Generally the approach has been to take the highest number that no extra adjustments will be required
- Manitoba plan to integrate 1000MW was overstated, it was not officially “considered”
- Hydro Quebec is limiting to 10%, not stated in this report
- Penetration percent may be based on energy or capacity, and there are other ways
    - There are disagreements on this
- United States penetration figures are advantaged since they are heavily interconnected
    - Neighboring states may be compensating
- References are not clearly defined
- Isolated Systems
    - Are they appropriate based on size, situation?
    - Would be nice to have references
- Page 5-3: BPA story about salmon habitat damage affects the current value of these statements
- Page 5-4; 10% limit is contradicted by Hawaii, but true to avoid the sophisticated wind forecasting, thermal ramp ups, etc.
- Page 6-1; have they confirm Holyrood cannot be upgraded instead of replaced? This goes back to the idea where thermal can be modified to allow higher penetration
- Page 6-2; Displacement efficiency numbers, are they affected by the 5 day time step?
- Page 7-2; does the 300MW penetration at 10%
- References are not properly cited within the body of the text. Makes it harder to verify.

- Levels on charts should be clear
- 200MW reservoir water level charts are shown only, not the 300MW levels!!!
-

What we can propose right now

-