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April 6, 2007

Laura Letourneau
Alberta Electric System Operator
2500, 330 – 5th Ave SW
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Re: Comments regarding the Market and Operational Framework For Wind Integration in Alberta

Dear Ms. Letourneau

Thank you for the opportunity to submit comments on the Market Operating Framework document. Shell Canada Ltd is pleased that the Alberta Electric System Operator has advanced its proposal on the integration of wind power into the Alberta electrical grid. We hope that you consider the following comments and questions.

Forecasting

1) Use of forecasting as a tool to decrease integration costs and difficulty.

We are encouraged by AESO's use of forecasting to decrease the operational and market issues that arise from integrating wind power into the Alberta electrical system. We have suggested to the AESO wind forecasting group that determining accuracy of forecasting models is not a relatively simple task. We suggest further work needs to be completed to determine the appropriate basket of metrics used to determine the 'best' forecasting methods.

It is our understanding that forecasting is the primary method for reducing the cost of mitigating measures. All mitigating tools (EMMO, ancillary services & wind power management) will rely heavily on forecasting. The potential cost for additional ancillary services is not insignificant. Therefore, the approach we take on forecasting is very important in terms of reducing these costs as well as reducing the potential impact to wind generators by minimizing power management requirements.

2) In the Market and Operating Framework document, it is confusing as to whether the AESO is looking at centralized versus decentralized forecasting.

Page 4 – "It is envisioned that all wind power facilities will forecast their power output for next day as well as two hours prior to the start of the delivery hour..." The current wind-forecasting pilot is based on a centralized forecasting model, rather than a decentralized model. Research indicates that centralized forecasting has the capability and economies of scale to provide more accurate forecasts at a cheaper cost compared to decentralized forecasts. Is the AESO contemplating a forecasting study on a decentralized basis, to compare decentralized with centralized forecasting?

Economic Impacts

1) Potential Impact on Wind Farm Economics.

Any impact on the wind-farm production rate will obviously impact wind-farm economics. The following areas would need to be defined with respect to the envisioned frequency and magnitude of production losses for the wind farm developer.

- a) The example System Wide Ramp Rate Limits in Appendix 1, page 12 show a significant reduction in the cost of additional ancillary services. However these ramp rates seem quite restrictive. For example, at 1MW per minute system wide and 2,000MW installed, it would take 17 hours (1,000 minutes) to get from 0-50% output for wind? This appears to be unreasonably aggressive. What ramp rates is the AESO envisioning for the wind industry and at what expected frequency of occurrence?
- b) Power Limiting
 - i) The AESO indicates that power limiting is preferred or better than ramp rate limiting; however, it gives examples of both working together. Would ramp rate limiting be required in addition to power limiting? Tables comparing ramp rate limiting versus ancillary services costs are provided but similar detail is not provided for power limiting. Can you provide more detail on power limiting?
 - ii) Protocol for Power Limiting. Power limiting does not appear to be well defined in terms of how the system operator decides how much to limit wind when required. The example in Appendix 2, page 17, shows a considerable cut to wind (Unconstrained Wind vs. Wind Dispatched Down). The economic impact to wind generators depends on how frequently the system operator imposes these limits, how much operator believes the wind forecast, etc. Does it make the system operators' job easier to be more aggressive with power limiting? Shell encourages the AESO to work with industry to determine a transparent protocol for power limiting. Will power limiting be across all wind farms in Alberta? Will each wind farm be power limited at the same rates?
- c) As a wind developer, we have concerns about quantifying how much output could be lost through the AESO's proposed Power Management. This would add a significant element of complexity for any wind developer's financing arrangements.
- d) How does the AESO expect Power Management requirements to affect existing projects, now and in the future, when wind penetration increases? How will Power Management change as wind penetration increases?

2) Cost of Ancillary Services

- a) In the cost analysis presented in Appendix 1, an estimate of the additional cost for ancillary services at 2,000 MW of wind is \$60Million/Year. This is about a 30% increase in current cost of ancillary services, which is not insignificant. The AESO has used the additional ancillary service requirements corresponding to No System Wide Wind Power Rate Ramp Limit from the table on page 12. At some level of ramp rate limiting (or power limiting), the additional ancillary services costs could be significantly reduced. Can you confirm that this estimate assumes no ramp rate limiting or power limiting?
- b) The AESO indicates that the Market and Operational Framework balances wind facility power management and ancillary services. Although not fully defined in the framework document, it would appear that a balance between Power Management requirements and additional ancillary services could provide appropriate economic signals for wind developers while helping to reduce the cost of additional ancillary services. Is it the

AESO's intention to find such a balance between Power Management requirements and additional ancillary services, and if so, how will the AESO evaluate the economic impact to wind developers versus the cost of additional ancillary services? Is the AESO leaving this out for broader consultation?

- c) What are the estimated ancillary service costs for integrating wind projects beyond the 2000MW illustrated in the Market and Operational Framework document - for example all currently proposed wind projects in Alberta? If wind power projects significantly beyond these levels are contemplated, how will the AESO weigh the benefits of additional wind power generation against increasing ancillary service costs?

Once again Shell Canada appreciates the AESO's efforts to incorporate stakeholder input and feedback. We look forward to your responses.

Regards,

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