



June 18, 2009

To: Market Participants and Interested Parties:

Re: **Final Recommendations Regarding Implementation of Market and Operational Framework (MOF) for Wind Integration in Alberta and AESO Response to Stakeholder Comments**

The Alberta Electric System Operator (AESO) appreciates stakeholder comments and suggestions received in response to the Notice to Stakeholders: Implementation of Market & Operational Framework for Wind Integration in Alberta (March 3, 2009). The AESO has reviewed all comments and suggestions received from stakeholders and provided its responses in a [Comment-Response Matrix](#).

After carefully considering all stakeholder comments the AESO has prepared the following Final Recommendations and Action Plans. The eight explicit recommendations and the implicit recommendation regarding revised technical requirements for wind power facilities originally listed in the [Recommendation Paper: Implementation of Market & Operational Framework for Wind Integration in Alberta](#), March 2009, are also included below followed by the applicable Final Recommendation and Action Plan.

1. **Implement a Centralized Wind Power Forecasting Service**

Original Recommendation

The AESO recommends that a centralized forecasting approach be implemented in Alberta.

Final Recommendation and Action Plan

The AESO considers that it is vitally important to become familiar with the forecasting techniques/tools and to refine these techniques prior to the large scale integration of wind on the AIES and several stakeholders expressed support for this approach. The AESO anticipates that Alberta wind generation capacity will be approximately 1000 MW by Q3 2010; accordingly, the AESO will proceed to implement a centralized forecasting model as quickly as possible.

Stakeholders also expressed concerns about the ability to obtain accurate forecasts and to predict wind ramping events. The AESO considers that information regarding the accuracy and uncertainty of the forecast would assist

the AESO in making risk assessments, operational decisions and ensuring reliable operation of the grid. The AESO also considers that the forecasts can be tuned and used for multiple purposes such as predicting the timing and magnitude of wind ramps. Accordingly, the forecasting service provider will be required to provide a wind forecast that includes accuracy and uncertainty information and also predicts ramping conditions.

Some stakeholders provided comments regarding allocation and recovery of costs arising from wind power forecasting. As noted in the Market & Operational Framework For Wind Integration In Alberta, September 26, 2007, the obligation that all generators must communicate any change or limitation to availability to the ISO supports a “must forecast” obligation (or an obligation to provide the data necessary for centralized forecasting) for wind generators. The AESO confirms that, as indicated in the Market & Operational Framework for Wind Integration in Alberta, September 26, 2007, the ongoing costs associated with that obligation will be allocated to wind power generation. Accordingly, the AESO will address issues related to cost recovery for the wind forecasting service in its 2010 General Tariff Application.

2. Proceed with a RFP for a Wind Power Forecasting Service

Original Recommendation

The AESO recommends that solicitation (RFP), evaluation and selection of a centralized forecasting service provider should proceed as soon as practicable.

Final Recommendation and Action Plan

The AESO will proceed with the issuance of the Wind Power Forecasting Service – Request for Proposals (the Forecasting Services RFP). In the submitted comments, several stakeholders provided suggestions regarding RFP requirements and also expressed an interest in assisting the AESO in developing the selection criteria. The AESO has also had additional discussion with wind power facility operators, CanWEA, and other ISO's to clarify its understanding and has proceeded to draft the Forecasting Services RFP. Accordingly, certain requirements will be incorporated into the Forecasting Services RFP as per stakeholder suggestions (e.g. minimum forecast requirements, expected accuracy standards, quality control processes and incentives for service levels and performance improvements). The AESO will also establish a Standing Wind Power Forecasting Work Group to provide input and advice to the AESO on an ongoing basis. The Forecasting Services RFP is expected to be finalized and posted on the AESO web site in June.

3. Commence Consultation on Rules, Procedures and Standards Defining the Obligation to Provide Wind Power Forecasts

Original Recommendation

The AESO will commence consultation on rules, procedures, standards and technical requirements regarding submission of wind generator forecast data/information including: data requirement such as turbine availability and on-site meteorological data as described above; communication protocols; and data quality required from wind generation facilities (or individual forecasters) to deliver forecasts to the AESO.

Final Recommendation and Action Plan

The AESO considers that comprehensive wind data, particularly facility-specific wind and turbine data, is critical to reliable system and market operation on the AES. Hence, wind power facilities will be obligated to submit wind generator forecast data/information. Accordingly, the AESO will commence consultation on rules, procedures, standards and technical requirements regarding submission of wind generator forecast data/information. These requirements will ultimately define participant obligations respecting wind generator forecast data/information. The AESO will follow the ISO Rules development process pursuant to AUC Rule 017. The AESO will provide further notices to stakeholders on the proposed process and timing.

4. Management of Wind Power Forecast Data

Original Recommendation

As part of its forecasting research and development work, the AESO will continue work to determine the capability, resources, systems and time required to perform the data management function. In parallel, the AESO will include data management as an optional requirement in the wind forecasting RFP.

Final Recommendation and Action Plan

With respect to forecast data management, it is the AESO's view that the forecasting data should reside in the AESO and be managed by the AESO, to ensure that quality, accuracy and confidentiality requirements are met and maintained. The AESO has ongoing discussions with other ISO's who also perform data management and quality control functions and will continue to leverage their experience and knowledge to determine the capability, resources, systems and time required to perform the data management function. Industry experience (by other ISO's) indicates a need to retain data for compliance and flexibility if a new or additional forecaster is chosen in the future. However, so as not to preclude any future flexibility, the data management function will be included as an option in the wind forecasting RFP.

5. Monitor and Improve Forecasting Accuracy

Original Recommendation

The AESO will monitor forecasting, market and operational results and develop measures of forecasting accuracy. The AESO intends to leverage available data and forecasting resources toward this end.

Final Recommendation and Action Plan

The AESO considers that it is important to monitor the accuracy of the wind forecast and its impact on system and market operations. Accordingly, the AESO will establish a Standing Wind Power Forecasting Work Group to provide input and advice to the AESO on aspects of the wind power forecasts such as: improvements to increase accuracy, the need for additional meteorological towers, multiple forecasters, and technical and performance requirements for a forecaster.

6. Provide Aggregate Wind Power Forecasts to the Market

Original Recommendation

The AESO considers that system or aggregate wind forecasts should be transparent and made available to all market participants, particularly near term to real time.

Final Recommendation and Action Plan

With respect to the publishing of aggregated wind power forecasts, the AESO considers that an information-rich environment to inform market participants and investors of the risks and opportunities is necessary for a market to function efficiently. As more wind is integrated under the current market design, it will become increasingly important to ensure that useful and proper information is available to participants. The AESO considers that availability of an aggregate wind forecast and variability (load plus variable generation) and indication of supply surplus conditions on the AIES may enable participant actions (e.g. demand side response, changes to offers and operating strategies, etc.) that will further improve the reliable and efficient operation of the system and markets in Alberta.

Accordingly, the AESO has determined that aggregated wind forecasts should be published and made available to all market participants, particularly near term to real time. Such information indicating the system and generation variability is important to the operation of the AIES and as market information to other participants. This is consistent with the publishing of other aggregate market information such as supply adequacy and generator outage reports. This information is also valuable to the AESO and participants to demonstrate, test, and gain familiarity and experience with wind forecast accuracy.

7. Commence Consultation on Rules, Procedures and Standards for Wind Power Management (WPM)

Original Recommendation

The AESO seeks stakeholder feedback on the work group recommendations to use a Potential MW Protocol and specifically would like input from stakeholders regarding practicality and risks associated with this option.

Final Recommendation and Action Plan

After considering stakeholders' comments, the AESO has determined that the use of the Potential MW protocol and pro-rata allocation for wind power management provides generators a fair and efficient mechanism to compete for system access in conditions where curtailment is required. This approach will also capture any benefits associated with diversity of various wind regimes in Alberta. The AESO also confirms its proposal that the energy market merit order (EMMO), followed by ancillary services (AS) will be used prior to the triggering of the WPM protocol. This sequential approach was discussed at stakeholder sessions as early as 2007. The AESO also confirms that the quantity and type of the AS requirement will be determined by the wind forecast information in conjunction with the operational experience of the AESO. Accordingly, the AESO will proceed with the development of ISO Rules in this regard. The AESO will follow the ISO Rules development process pursuant to AUC Rule 017. Consultation on the proposed rules is expected to commence in Q3 2009.

The AESO also received comments from stakeholders respecting the need to consider market based solutions (i.e. demand side options, load/supply following services, etc.) to complement use of wind power management.

The AESO supports exploring market based solutions as a complement to the wind power management curtailment protocol and these will be advanced in concert with other market design initiatives over the medium to long term. The AESO recognizes that ongoing refinement of ISO rules, operating procedures, standards and operating tools to facilitate the integration of wind generation in Alberta will be necessary including consideration of more comprehensive market based solutions (i.e. demand side participation, dynamic scheduling, negative pool pricing, AS procurement).

If the AESO determines that the necessary Wind Power Management solutions will not be available prior to the large scale integration of wind generation on the AIES, the AESO will initiate the development of a contingency plan, which will be developed and consulted with stakeholders in accordance with the ISO Rules process pursuant to AUC Rule 017. As noted previously, the AESO expects that the installed wind generation capacity on the AIES will be approximately 1000 MW by Q3, 2010.

8. Supply Surplus (OPP 103) Protocol

Original Recommendation

Supply Surplus Protocol: The AESO solicits input from all stakeholders on the proposed supply surplus protocol and proposed modifications to OPP 103.

Final Recommendation and Action Plan

The AESO received comments from stakeholders which recommended that further consultation is required on the proposed Supply Surplus Protocol or dispatching equal priced offers, including the appropriateness of the minimum operating level (MOL).

Based on the comments submitted by stakeholders, the AESO has determined that further stakeholder consultation on the Supply Surplus Protocol is required and the Supply Surplus Work Group recommendations will be considered as input to that process. The objective continues to be identification and refinement of longer-term and possible interim solutions to address supply surplus matters while ensuring that the AESO is able to manage pending issues as they arise. The AESO expects that any subsequent ISO Rules and/or OPPs will address supply surplus issues in a way that is fair, efficient, openly competitive, technically sound and in the public interest. Upon completion of additional consultation (i.e. discussion paper, stakeholder session, etc.), the AESO will follow the ISO Rules development process pursuant to AUC Rule 017. The AESO will provide further notices to stakeholders on the proposed process and timing.

In the meantime, any occurrence of Alberta supply surplus situations will be managed in accordance with the existing OPP 103. As noted previously, if the AESO determines that the longer term solutions will not be available prior to the large scale integration of wind generation on the AIES (i.e. approximately 1000

MW expected by Q3 2010), the AESO will initiate the development of a contingency plan, which will be developed and consulted with stakeholders in accordance with the ISO Rules process pursuant to AUC Rule 017.

9. Revise Wind Power Facility Technical Requirements Standard

Original Recommendation

In section 6.2 of the Recommendation Paper: Implementation of Market & Operational Framework for Wind Integration in Alberta, March 2009 the AESO proposed to exempt wind generation facilities that interconnected prior to November 15, 2004 from the Wind Power Facility Technical Requirements, 15 November 2004 with all new facilities, or existing facilities that undergo major upgrades, being required to comply with the revised standards.

Final Recommendation and Action Plan

The AESO will proceed with revisions to the Wind Power Facility Technical Requirements, 15 November 2004 and all wind power facilities that connected to the system prior to that date will be exempt from the revised standard. All exempt facilities (approximately 300 MW) will not be required to meet the new technical requirements, including over frequency control, ramp rate limiting, power limiting, and wind forecasting. However, exempt facilities will be required to comply with all dispatch and market requirements as established in the rules and procedures and will be required to comply with technical requirements that are in effect at the time, if they undergo major upgrades or refurbishment.

The AESO will follow the ISO Rules development process in AUC Rule 017 to revise the Wind Power Facility Technical Requirements. Consultation on the proposed standard is expected to commence in Q3 2009.

The AESO is committed to the reliable, fair and efficient integration of wind generation on the AIES and looks forward to continued collaboration with industry stakeholders on this important initiative. The AESO will continue to monitor industry experience and technological advances related to wind generation integration and expects that several of the rules, procedures practices will need to evolve with operating experience.

If you have any questions or require any further information, please contact Anita Lee, Director, Wind Integration.

Sincerely,

Original Signed By

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Vice President, Operations and Reliability