

Minutes of Meeting

Date held: May 14, 2008	Time held: 8:30 a.m. to 2:00 p.m.	Location held: Monte Carlo Inn - Airport Suites, Mississauga
Invited/Attended	Company Name	Attendance Status (A)ttended; (R)egrets; (S)ubstitute
Adams, Tom		A
Cary, Rob	Robert Cary & Associates	A (teleconference)
Fleming, Ted	Ontario Power Authority	A
Goldberger, Dan	New Paradigm Capital Corp	A
Jayaraman, Jay	Enbridge	A
Jenkins, Allan	Ministry of Energy	A
Kourtoff, John	Trillium Power	A
Leung, Alan	Ontario Power Authority	A
Leung, Linda	Ontario Power Generation	A (teleconference)
Manougian, Harout	Elektron Consulting	A
Potts, Gordon	Northland Power Incorporated	A
Pundsack, Gary	Invenergy Wind Canada LLC	A
Russell, Stewart	AIM PowerGen	A
Seethapathy, Ravi	Hydro One	A
Tintor, John	Aquilon Power Corporation	A
Vallejo, Patricia	FPL Energy	A
Yang, Bunli	E4	A
IESO		
Chase, Maia		A
Facca, Mauro		A
Khan, Khaqan (chair)		A
Lafoyiannis, Peter		A (a.m.)
Lam, Timothy		A
Lodyga, Martin		A
Ng, Hok		A (a.m.)
Romeo, Rick		A (p.m.)
Tobala, Mohammed		A
Wright-Hilbig, Rhonda		A (p.m.)
Scribe: Tim Lam, IESO. Please report any corrections, additions or deletions to the following e-mail address: stakeholder.engagement@ieso.ca		

All meeting material is available on the IESO web site at:
http://www.ieso.ca/imoweb/consult/consult_windpower-sc.asp

Item 1 Welcome and Introductions

a) Review of Agenda

- No changes

b) Review of Action Items

Khaqan Khan reviewed progress on the open action items.

#	Date	Action Items	Status
24	November 16, 2007	Working group members to collect information about other ISO's forecasting accuracy levels and methodology and incentive programs for near-term forecasting, by April 30, 2008 .	Open
31	November 16, 2007	Members are to review the issues list from the website and let the IESO know the priority they would like to see these issues addressed going forward.	Open
32	February 20, 2008	Dave Hurd, Michael Cookson and David Timm to provide European ISO contacts to gather information from them on forecasting accuracy levels, methodology and incentive programs.	Open
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Members Questions, Comments and Discussion

- Action Items 24 and 32, Khaqan Khan reported that the Standing Committee had received a response from just one member to date. It was agreed that the previous deadline of **April 30, 2008** would be extended till mid July 2008.
- Action Item 31, Khaqan Khan noted that with a number of short-term issues ([Wind Power Issues List](#)) addressed or being resolved, it was now time to form a priority list for the resolution of longer-term issues identified in Tables 2 & 3 of the issues list. It was noted that a few longer-term issues (items # 3.3 and 3.2 -Table 3 of Issues List regarding Wind Constraining Issues and Operational Control) may be considered as next prospective issues for WPSC consideration. Members were reminded to submit a priority list of issues pertaining to identified longer-term wind issues or any area of significant concern that is not mentioned in issues list. One member requested information regarding the impact of geographic diversity of wind power on variability due to aggregate wind output. Khaqan

Khan requested Tom Adams to make a presentation on wind diversity issues: quantifiable benefits and characteristics at the next WPSC meeting.

- Regarding Action Item 33, Khaqan Khan noted that the subject of Mid-Term Wind Forecasting Requirements would be addressed in Item 2 of the today's agenda.

Action Item: Tom Adams to make a presentation on wind diversity issues: quantifiable benefits and characteristics at the next standing committee meeting

c) **Terms of Reference**

Maia Chase briefly reviewed IESO's updated Stakeholder Engagement [principles](#) and [process](#). It was also noted that going forward, the review of meeting minutes would be done by e-mail correspondence with standing committee members in the time frame noted in the terms of reference.

Item 2 Wind Capacity Contribution (18 Month Outlook/ORO)

Khaqan Khan provided an update to the WPSC regarding the development of a Wind Capacity Contribution (WCC) value. It was noted that IESO is in the process of exploring additional WCC methods. In the meantime, the IESO will continue to use a WCC value of 10% of installed capacity in mid-term resource adequacy models (in and beyond the 18-Month Outlook timeframe). The IESO will inform the members about the IESO decision and timeline for future developments via email notification.

Action item: IESO to inform members of the IESO decision and timeline for future developments on Wind Capacity Contribution, via e-mail.

A member requested clarification regarding the use of the 10% value, specifically, whether or not 10% is being used in transmission related and connection assessment studies. It was confirmed that these studies generally assume the full rated output of a wind farm, not just 10% of its capacity.

A brief overview of the North American Electric Reliability Corporation (NERC) task force on integration of variable generation was provided. The IESO expects that recommendations arising from this and other reliability governing bodies (Northeast Power Coordinating Council – NPCC) will provide guidelines and/or clarity regarding generally accepted methodology for determining and applying capacity contribution values for wind in resource adequacy models.

Item 3 Wind Forecast Error Impacts on Efficiency

Hok Ng gave a presentation on the impacts of wind forecast error on the efficiency of the wholesale electricity market. Market efficiency refers to using the most economic set of resources to meet demand. The presentation reported on forecast error in three different timeframes: 1-hour ahead, 3-hours ahead and day-ahead.

Members Questions, Comments and Discussion

- A member raised a question regarding whether or not natural-gas prices were included as a variable in the measure of economic efficiency. In response, it was clarified that generator-submitted offers to the market were used to represent the actual replacement cost of generation.
- A member noted that it would be useful to report median values in addition to the reported average values when looking at variables such as wind forecast error.
- It was noted that when reporting under- and over-forecast frequencies and magnitude (average/median), it would be useful to include a measure that reported on how often the wind forecast was “close” to real-time output. This item was addressed in the presentation made in Agenda Item 4.
- A member remarked that it may be informative to look at forecast error normalized to the installed capacity of wind resources, instead of the reported MW values. In response, it was noted that when identifying an impact to market efficiencies, it was necessary to have a MW value representation to calculate the dollar value impact on efficiency. Several members raised concern over the compound effect of demand forecast error (which systematically over-forecasts real-time demand through the use of a peak-demand forecast) in addition to wind forecast error. In this discussion, it was noted that in a situation where both wind and demand were over- or under-forecast; the forecast errors actually offset each other, thereby reducing market inefficiencies.
- Several standing committee members viewed the inefficiency costs associated with 1-hour ahead wind forecast error to be trivial and not worth the potential price of a centralised wind forecasting system at this stage. In response, the IESO acknowledges that while inefficiency costs appear low over the next few years, the addition of higher penetration of wind may materially impact market and raise reliability concerns and may require changes to market rules concerning forecast requirements.
- A member noted that offshore wind generation may be able to reduce uncertainty associated with wind generation.
- Members noted that the day-ahead analysis did not include a scenario regarding the impact of generator forced outages on day-ahead market inefficiencies.

Item 4 Near Term Wind Forecasting

Martin Lodyga made a presentation comparing current 1-hour ahead wind forecasts submitted by wind generators to various persistence forecast methods. The presentation identified that persistence forecasts that are at most 2-hours ahead perform better than current forecasts. . The presentation compared current 1-hour ahead wind forecasts (submitted by wind generators) to various persistence forecast methods. The presentation identified that aggregate persistence forecasts (that are up to 3-hours ahead of real-time) perform better than the aggregate of current hour-ahead values used in the pre-dispatch run. The *mandatory window* requires market participants to phone-in to the IESO control room for any update to their schedules within 2 hours of real-time.

Members Questions, Comments and Discussion

- It was clarified that the relatively larger forecast errors and over-forecast bias of existing wind generators was a procedural issue; the result of some generators that have not updated their forecasts as frequently as others.
- A request was made for analysis on wind generator submitted forecasts, focusing on large hour-ahead to real-time deviations. Specifically, a request for a breakdown of this subset by month and by hour was made.
- Clarification was provided distinguishing the market rules requirements for intermittent and self-scheduling generation to provide schedule updates on a best efforts basis and any outage updates as mandatory.
- The standing committee noted that persistence forecasts up to 3-hours ahead of real-time are more accurate than current submissions. Concern was raised over the manual process of phoning-in persistence-based updates to the control room due to the *mandatory window*. A question was raised as to whether or not the existing Market Rules and technical processes would allow for persistence forecasts to be inputted into the pre-dispatch run in an automated process. The existing picture of persistence forecasts being more accurate than current submissions may change if the market participants exercise due diligence in revising dispatch data (forecasts) to reflect expected injections. Refer to compliance requirements mentioned in Item 5 below.

Action Item: IESO to provide a breakdown of wind generator submitted forecasts, focusing on large hour-ahead to real-time deviations, by month and by hour.

Action Item: IESO to find out if the existing Market Rules and technical processes would allow for persistence forecast to be inputted into the pre-dispatch run as an automated process.

Item 5 Compliance Assessment of Revising Dispatch Data for Wind Generators

Cynthia Harrison gave a presentation regarding compliance assessment of revising dispatch data for wind generators. The presentation noted the market rules and the associated market manual forecasting related requirements. It was reiterated that a registered wind market participant is required to submit its dispatch data indicating its best forecast of the amount of energy that it will inject in each dispatch hour. It was emphasized that a registered market participant is required to submit revised dispatch data to the IESO for a material change in schedule as per requirements set out in Section 3.3.8 of Chapter 7. A few snapshots were presented as examples of the factors MACD will consider when reviewing a failure to revise dispatch data.

It was noted that Market Assessment and Compliance Division (MACD) will be looking for evidence that the market participant has exercised due diligence in revising dispatch data (forecasts) to reflect expected injection and confirmed that MACD recognizes the variability of the wind and the challenges this presents to market participants..

Item 6 Wind Power Management

Rhonda Wright-Hilbig gave a presentation on wind power management. The presentation provided a comparison and overview of power management requirements for wind in other jurisdictions. Two general trends were noted among other jurisdictions:

- No specific equipment requirements at this time
- Some jurisdictions had various models of ramp rate restrictions on individual farms as a percentage of nameplate capacity.

It was noted that some ISO's are in process of developing power management requirements, notably California and Alberta.

Within Ontario, no power management or ramping requirements for wind farms presently exist. A summary of individual wind farm as well as the fleet's historical delivered ramp rates in Ontario market was presented. Fleet rates were below those limits noted by other jurisdictions, while individual farm ramp rates upon occasion were higher, without any impact at current market penetration. Rhonda indicated that, based on initial preliminary analysis, wind power management control capability may not be immediately required in Ontario. The IESO, in close coordination with wind farms, will continue its analysis to determine any need for new generators to install such capability.

Item 7 Wind Generation Activities and Issues

Allen Jenkins from Ontario Ministry of Energy gave a presentation on Wind Generation Activities and Issues. Allen gave an overview of Ontario's evolving electricity trends and highlighted the Government's commitments that are the primary drivers for new renewable energy. For example, it was noted that over 7,800 MW of new renewable generation is expected by 2025. Allen gave an overview of a list of challenges to further development of wind in Ontario namely transmission and distribution system adequacy (most lines are near capacity and generation queues are long); integrating wind into the system; approvals; expertise; Ontario climate and geography; cost/performance relative to other generation sources.

A member noted that more emphasis should also be given to explore off-shore wind potential in Ontario.

Wrap up

Khaqan Khan reviewed and summarized the key items of the meeting. The Chair emphasized the need of continuous and active engagement and participation of members in this stakeholder process. The members were encouraged to identify and submit any additional wind related issues that are of significant concern to them.

The next meeting is August 15, 2008.

Action Item Summary				
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