

Minutes of Meeting

Date held: May 13, 2010	Time held: 8:30am-12:00pm	Location held: Holiday Inn – Oakville Centre
Company Name	Invited/Attended	Attendance Status (A)ttended; (R)egrets; (S)ubstitute
Acciona Energy North America	Wallaert, Gerrud	Teleconference
AIM SOP Phase I LP	Hickey, Maurice	Attended
Brookfield Renewable Power	Brason, Tracy	Attended
Canadian Wind Energy Association (CanWEA)	Levy, Tom	Teleconference
Capital Power Corporation	Hayden, Dan	Attended
Capital Power Corporation	Russell, Stewart	Attended
DTE Energy	Pakela, Gregory	Teleconference
Elenchus Research Associates for Power Workers Union	Hassan, Fred	Teleconference
Enbridge Ontario Wind Power	Lamont, Michelle	Teleconference
Enbridge Ontario Wind Power	Simpson, Bob	Teleconference
Environment Canada	Besner, Serge	Teleconference
Gamesa	Champigny, Paul	Teleconference
GDF Suez Renewable Energy North America	Apold, Robert	Attended
Genivar	Tang, Chi	Attended
Gilead Power	Sorensen, Kevin	Attended
Hydro One	Savulak, Jason	Attended
Hydro One Networks Incorporated	Farahbakhsh, Payam	Attended
Hydro One Networks Incorporated	Garg, Ajay	Attended
Independent	Penn, Richard	Attended
Invenergy LLC rep Raleigh Wind Energy Centre	Collins, Mike	Teleconference
Invenergy LLC rep Raleigh Wind Energy Centre	Goldstein, Michael	Teleconference
Kruger, Groupe Énergie	Boland, Joe	Attended
Leader Resources Services Corporation	Boa, Heather	Teleconference
Ministry of Energy & Infrastructure	Cheng, Clarence	Teleconference
Ministry of Energy & Infrastructure	Kuber, Kathryn	Attended
Ministry of Energy & Infrastructure	Konzak, Sonya	Attended
Natural Resources Canada	Pelland, Sophie	Teleconference

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NextEra Energy Resources	Romaniuk, Oliver	Attended
Ontario Power Authority	Chee-Aloy, Jason	Attended
Ontario Power Authority	Dick, Kevin	Attended
Ontario Power Authority	Kwong, Reena	Attended
Ontario Power Authority	Nollert, Beverly	Attended
Ontario Power Authority	Nusbaum, Stephen	Attended
Ontario Power Generation	Bell, Brian	Teleconference
Ontario Power Generation	Peterson, David	Attended
Ontario Power Generation	Tuenter, Hans	Attended
Ontario Power Generation	Urukov, Vlad	Attended
Renewable Energy Systems	Muszynski, Nicolas	Attended
Renewable Energy Systems Americas Inc	Srivastava, Raja	Teleconference
Riverbank Power	Lee, Andrew	Attended
Rodan Energy & Metering Solutions	Malinowski, Martin	Attended
Samsung	Mawani, Zohrab	Teleconference
Shell Energy	Kerr, Paul	Teleconference
Sky Generation	Estill, Glen	Teleconference
Tom Adams Energy	Adams, Tom	Attended
TransAlta Corporation	Jehn, Laura	Attended
TransAlta Corporation	Marshall, Brenda	Attended
University of Toronto	Tate, Zeb	Attended
UofT Research Student	Li, Xiaoguang	Teleconference
Windrush Energy	Pennie, J.C.	Attended
IESO	Deol, Paul	Attended
IESO	Adam, Gabriel	Attended
IESO	Burns, Steve	Attended
IESO	Finkbeiner, Darren	Attended
IESO	Khan, Khaqan	Attended
IESO	Lam, Timothy	Attended
IESO	Rochester, Dan	Attended
IESO	Romeo, Rick	Attended
Scribe: Tim Lam, IESO. Please report any corrections, additions or deletions to the following email address: tim.lam@ieso.ca .		

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

Document output of each agenda item below:

Item 1 Welcome and Introductions

Khaqan Khan (IESO) welcomed the group and reviewed the objectives of the Wind Power Standing Committee. Members introduced themselves.

The agenda was reviewed with one additional item added. The Chair added to Agenda Item 8 an information update to the WPSC regarding updated Wind Capacity Contribution values for use in 18-Month Outlooks and longer-term forecast assessments.

Updates were provided on the following Action Items:

- Action Item #45: Chair noted that there was an action item from previous year's meeting regarding a study by Tom Adams on "Quantifying Benefits of Geographic diversity", requiring response from General Electric (GE). GE's response spoke to differences in study results between Mr. Adams' analysis and GE's analysis. GE's response was posted in the meeting materials. This action item is closed. Mr. Adams expressed concern that this action item took 16 months to close. IESO acknowledged that the response was not timely.
- Action Item #49: A meeting(s) was held between the IESO, OPA and RES1/2 wind facilities to discuss the contract pricing and dispatch of RES 1/2 wind facilities. This action item is closed.
- Action Item # 50: This action item remains open. See action item summary list at the end of this document.
- Action Item #51: The issue regarding performance requirements for distributed/embedded generation was forwarded to SE-57 in order to identify which forum is appropriate to address this matter and whether specific performance requirements are addressed for distributed generation (DG) in Ontario. The IESO is currently participating in NERC IVGTF interconnection committee that is developing performance requirements for variable generators including such distributed/embedded generation performance requirements. In Ontario, Local Distribution Companies (LDCs) are in charge of performance requirement standards for distributed/embedded generation as per the Distribution System Code. This item is closed.

Item 2 Updates on performance requirements for wind generators

Stephen Burns (IESO) provided an update on the status of performance requirements for wind generators in the Market Rules. The Market Rule changes became effective as of early March 2010. The next step is to finalize the Market Manual describing how wind generators will demonstrate equipment performance.

Member Questions, Comments and Discussion:

- A WPSC member asked if there were any power factor control requirements for wind farms. For transmission system connected wind farms, there are voltage control requirements but no power factor requirements. For wind farms connected to the distribution system there are no power factor requirements in the Market Rules, but these farms would fall under the jurisdiction of the LDCs that may have their own requirements.
- Another member asked if there are any requirements for the modeling of wind farm distribution connection systems. There is no standard for how they are to be modeled, but the performance at the wind farm's connection point to the grid should reflect what the model shows. The wind farm must demonstrate that actual performance is consistent with the model as part of the commissioning process.
- A member noted that in certain cases/classes of generation there are no performance requirements specified in the Market Rules, however such classes of distributed/embedded generation are subject to performance and connection requirements established by the Distribution System Code (DSC)/Local Distribution Companies (LDCs).

Item 3 NERC IVGTF (Phase II) Activities and IESO involvement

Khaqan Khan (IESO) provided an update on IESO's involvement in ongoing NERC IVGTF activities; specifically work being conducted at four IVGTF committees related to variable generation's impact on operations forecasting, system operability and generation/transmission planning. Key efforts are being made in these committees to identify standards, tools and processes, which need to be enhanced, with larger penetrations of variable generation. Recommendations of these IVGTF committees will provide opportunities for system operators and planners to enhance their practices and tools. Reports from these committees are expected to be published by the end of the year.

Member Questions, Comments and Discussion:

- A member inquired if there are any forums that are looking at facilitating variable generation's participation in electricity markets. Dr. Khan noted that the Markets Committee of the ISO/RTO Council (IRC) is currently investigating options for the integration of variable generation in electricity markets. It was also noted that the Federal Energy Regulatory Commission (FERC) recently issued a notice of inquiry, initiating a discussion on market structures with increased opportunities for participation from variable energy resources.
- Regarding the centralized wind forecasting in Ontario, a member inquired if any thought was given to coordinating wind integration and forecast efforts with other jurisdictions or Independent System Operators. Centralized forecasting coordination was addressed by Darren Finkbeiner in Agenda Item 5.
- Dan Rochester noted that a number of IVGTF reports will be tabled at the NERC Planning Committee meeting in June 2010, and that the IESO would be communicating any decisions to the WPSC as soon as they become available.

Item 4 Ontario's Renewable Energy/Feed-in-Tariff (FIT) Program

Jason Chee-Aloy (Ontario Power Authority) provided an update on the status of the FIT program, including information on the upcoming Transmission Availability Test (TAT) and Economic Connection Test (ECT) scheduled for August 2010. It was noted that transmission capacity from the Bruce to Milton transmission expansion is expected to be included in the upcoming TAT/ECT, but that the quantity of capacity allocated to FIT projects is unknown. It was noted that transmission capacity has not yet been allocated to renewable generation expected under the Korean Consortium (up to 2500 MW of capacity).

Member Questions, Comments and Discussion:

- Regarding additional transmission capacity resulting from the Bruce to Milton expansion, a member stated that in general it would not be economic for a relatively small (e.g. a 100 MW wind farm) generation project to connect to the new 500kV transmission circuit. The member asked if the Bruce nuclear station currently connected to existing 230kV lines would be offloaded to the 500kV circuits to make the 230kV lines available for FIT generation. Mr. Chee-Aloy remarked that 1500 MW of applications may make connection to the 500kV circuit economic, and that ultimately there would be connection of renewable projects. A member requested that OPA provide information regarding availability and capacity allocation of Bruce Milton lines for FiT generation.

Action Item: OPA to provide information to WPSC members regarding availability and capacity allocation of 230 kV and 500 kV Bruce Milton lines for FiT generation.

- A member inquired if future build-outs of transmission capacity resulting from ECTs would include extra capacity for projects have not yet applied for a FIT contract. The short answer is no, the FIT program is not building ‘buffers’ of extra transmission capacity. FIT program features such as application security and the ‘notice to proceed’ status were included to provide incentives and assurance that generation and transmission projects identified as economic are realized.
- A member asked for the following data/information:
 - RESOP projects that have switched over to the FIT program – OPA can provide this data upon request.
 - Updated information regarding projects that have submitted FIT applications after Dec 2, 2009 – OPA expects to release this information on the May 19 TAT/ECT webinar.
 - Regarding installed capacity (MW) figures presented on slide 6 of the presentation, are there any energy yield figures associated with these capacity figures? Capacity factors presented by the OPA during the FIT consultation process last year were used to derive expected energy.
 - When integration planning starts, will there be adjustments to existing capacity factors? OPA Power System Planning will decide what capacity factors to use in future plans.
- It was noted that projects representing approximately 1100 MW of solar/PV capacity have been offered contracts under FIT/RESOP. A member inquired if there are any studies addressing the amount of solar that can be incorporated on the Ontario system, and if the OPA is considering increasing the amount of Automatic Generation Control (AGC) for regulation system balance. Regulation and procurement of AGC are the responsibility of the IESO. Darren Finkbeiner (IESO) remarked that at this time there are no plans to increase the amount of AGC procured, but that the IESO will be assessing the trade-off between the current 5-minute dispatch mechanism of the market and increasing AGC. In addition, further study is required to investigate the impact of solar/PV on regulation requirements in the future as additional solar capacity comes online.
- A question was raised regarding when wind farms start getting paid their FIT contract price. Wind farms are paid their contract price when they start injecting to the grid. A follow up comment suggested that wind farms should be paid the market price until they complete the commissioning process and then start receiving their contract price. This would incent wind farms to complete their commissioning requirements quickly.

Item 5 Status Update on SE-57 (Renewable and Embedded Generation) Initiatives

Darren Finkbeiner (IESO) provided a verbal update on current and upcoming SE-57 initiatives. It was noted that SE-57 also addresses issues relating to renewable generation and surplus baseload generation (SBG). The following topics were addressed:

- IESO is working to enable FIT contract clauses for curtailment of generation under local and global oversupply conditions. IESO is currently working on the market/system triggers that will signal to both grid-connected and embedded generation when curtailment would most benefit the system (e.g. Pricing thresholds, ramping events, IESO communication to market, etc.)
- Visibility/telemetry and forecasting of variable resources applies to all facilities greater-than-or-equal to 5 MW (grid-connected and embedded). Centralized forecasting is proceeding with wind resources; centralized forecasting may be extended to solar in future. IESO is proceeding with a centralized wind forecasting pilot project for existing wind facilities to see if centralized forecast is indeed better than a de-centralized forecast, and to determine which forecasting model/method is most appropriate for Ontario's wind resources. It is expected that components of the forecast model will be used to determine the amount of forgone energy for purposes of calculating the FIT additional contract payment for curtailment.
- Market rule changes are expected as part of the centralized forecast initiative – to specify expected changes in meteorological data requirements.
- The IESO will work with LDCs regarding the visibility/telemetry for embedded generation, and expects to share centralized forecast outputs with LDCs as well.
- There have been changes made to IESO policy in dealing with Surplus Baseload Generation. A summary of these changes can be found in the following link:
<http://www.ieso.ca/imoweb/pubs/consult/se57/se57-20100310-SBG-Communication-Protocol.pdf>
- The IESO has initiated an internal renewables project design team to look at the various needs and options resulting from the large-scale integration of FIT resources. Stakeholdering on this topic will proceed, pending endorsement from IESO Senior Management.

Member Questions, Comments and Discussion:

- A number of clarifying statements were made regarding the wind forecast pilot project:
 - A start date for the pilot project has not yet been determined, but it is expected to begin sometime in 2010.
 - The pilot test period is expected to last somewhere in the range of 6-9 months.
 - Metrics for evaluating the different forecast models in the pilot have not yet been developed.
 - The IESO does not expect to limit the number of vendors participating in the pilot.
- A member expressed concern that in the very near future the IESO needs to define meteorological tower requirements (number of towers required, specifications, etc...) in order for wind farm developers to budget for any increased costs in the development of their project.

Action Item: IESO to inform wind developers about meteorological tower requirements in near future to enable them to include these requirements for advance business planning.

- Regarding SBG, a member requested historical data tracking of actions taken by the IESO under SBG conditions, and the resulting impact on the market (impact on Global Adjustment). At this time, only real-time data from IESO System Status Reports contain information on real-time SBG events. Dan Rochester suggested Global Adjustment discussions would be better suited to be brought up at the IESO Stakeholder Advisory Committee (SAC)

Action Item: IESO to consider the provision of more market data around actions taken during SBG.

Item 6 Pan-Canadian Wind Integration Initiative: IESO Involvement

Dan Rochester (IESO) provided a verbal update on the Pan-Canadian Wind Integration Initiative being led by CanWEA. The study's main focus is to determine what would be required to achieve in Canada 20 percent annual energy to be generated by wind resources by the year 2025. It is expected that this is the first phase of a multi-phase study looking into large scale wind integration:

- Representatives from system operators across the country, the federal government/Natural Resources Canada, and some US system operators and regional entities (WECC, NYISO, UWIG, etc..) have all participated over the past year to define the project scope.
- Garrad Hassan was selected to develop the scope and terms of reference for the study
- An RFP will be issued later this year to conduct the primary study work
- three main scenarios are being considered for the study:
 - o Look at 2009 wind and operational characteristics and scaling them up to meet 20% energy target
 - o meeting the 20% target with focus on placing wind resources at the best wind locations in Canada
 - o meeting the 20% target with focus on placing wind resources at the best wind locations within groups of provinces (likely East/West Canada – with separation defined either east or west of Manitoba.)
- Study will include high level assessment of operational impacts at 10 min, 30 min and 60 min granularity
- Study will also include a transmission reinforcements assessment to tie new wind projects into the grid
- Target publication date is tentatively set for late 2011/2012 depending on funding timing.

Member Questions, Comments and Discussion:

- It was noted that East-West transmission interconnections are not as robust as the North-South ties, and so it is possible that the study will consider a potential for exports to the US.

- Large ramp events will not likely be assessed in this study, but possibly in a future study.
- A member inquired if this study would include assumptions/implications regarding storage opportunities for balancing the wind. The response was that the current scope and budget for this study is to determine the capacity requirements and wind locations required to achieve 20 percent energy from wind, and that storage would not be considered in this phase of the study.
- As a follow-up, a member noted that storage in the form of plug-in electric vehicles is a relevant and important consideration that should be considered in a study of this kind.

Item 7 a) Study on “Evaluating Potential for Solar Photovoltaic Power in Ontario”

Khaqan Khan (IESO) provided a verbal update to the group on a joint initiative between the IESO and OPA to identify potential for solar photovoltaic (PV) power in Ontario. The study will provide Ontario-wide production data for both ground-mounted and rooftop solar PV power. An RFP has been issued. The deliverables include:

- Energy production profiles for identified solar sites in Ontario
- Time-series data at 10-min and 1-hour granularity, consisting of previous 10 years data
- Profiles will be submitted to the IESO/OPA on a site-specific, IESO zone and Ontario-wide basis

Once data becomes available, the time series production profiles/data will enable the IESO and OPA to further study the implications of large amounts of solar-PV generation on the resource adequacy and operability of the Ontario system. IESO/OPA expects to receive the solar data set by the end of 2010.

b) Group discussion: inclusion of other renewable generation matter in WPSC

Chair noted that wind, solar and hydro fall under category of renewable or variable generation, and poses many similar challenges and issues to system due to their variable nature of fuel. The Chair requested feedback from the group on whether or not to expand the scope of the Wind Power Standing Committee to include issues regarding the integration of solar-PV resources as well. Some members suggested that the scope of the existing WPSC should be revised to deal with solar and renewable issues, while others were apprehensive with the idea of adding to what is perceived to be an already full agenda at most WPSC meetings. A member suggested that wind and solar issues should be managed within WPSC, by broadening its title and scope, and dedicating half day meeting agenda for wind issues, with rest half of day dedicated to broader renewables issues. It was also voiced that a stakeholder forum addressing the issues regarding “solar-PV” integration would be important going forward. The Chair noted that these recommendations would be passed on the IESO management and Stakeholder Relations.

Action Item: IESO to forward members’ recommendations and suggestions to the IESO management (re: addressing solar PV integration issues in either existing WPSC forum by expanding its title and scope, or through a separate “solar integration” stakeholder forum.)

Item 8 Round Table/Future Agenda Items/Wrap up and next steps

Khaqan Khan (IESO) provided an update to the WPSC regarding updated Wind Capacity Contribution (WCC) values to be used in 18-Month Outlooks and other longer-term operational planning assessments. The new seasonal (winter months Dec-Jan and summer months Jun-Aug) and monthly (shoulder period months) values are reported below and will be included in the next published version of the *Methodology to Perform Long Term Assessments* expected in late-May 2010¹.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WCC (% of Installed Capacity)	32%	32%	27%	22%	19%	13%	13%	13%	16%	22%	30%	32%

Action Item Summary				
#	Date	Action	Status	Comments
45	January 28, 2009	GE’s response to Tom Adams’ wind power geographic study to be posted on WPSC web page, upon availability. (For more information on this topic, see minutes of January 28, 2009 WPSC meeting)	Closed	See Comments under Agenda Item 1 in these minutes.
49	November 19, 2009	IESO to schedule a meeting with the OPA and RES 1 or 2 wind facility representatives to discuss the contract, pricing and dispatch of these wind facilities.	Closed	See Comments under Agenda Item 1 in these minutes.
50	November 19, 2009	IESO to forward OPA’s recommendation to the IESO management (re: moving forward OPA’s FIT and other wind contract related issues should also be discussed and resolved through WPSC forum)	Open	
51	November 19, 2009	Forward to SE-57 the issue of performance requirements for distributed/embedded generation.	Closed	See Comments under Agenda Item 1 in these minutes.
52	May 13,	OPA to provide information to WPSC	Open	

¹ <http://www.ieso.ca/imoweb/monthsYears/monthsAhead.asp>

Action Item Summary				
#	Date	Action	Status	Comments
	2010	members regarding availability and capacity allocation of 230 kV and 500 kV Bruce Milton lines for FiT generation.		
53	May 13, 2010	IESO to inform wind developers about meteorological tower requirements in near future to enable them to include these requirements for advance business planning.	Open	
54	May 13, 2010	IESO to consider the provision of more market data around actions taken during SBG.	Open	See Agenda Item 5 in these minutes.
55	May 13, 2010	IESO to forward members' recommendations and suggestions to the IESO management (re: addressing solar PV integration issues in either existing WPSC forum by expanding its title and scope, or through a separate "solar integration" stakeholder forum.)	Open	