

Minutes of Meeting

Date held: March 3, 2011	Time held: 9:00 - 2:00	Location held: IESO Clarkson Facility
Invited/Attended	Company Name	Attendance Status (A)ttended; (R)egrets; (S)ubstitute
Brason, Tracy	Brookfield Renewable Power	A
Mahuteau, Laurent	EDF EN Canada	A
Taylor, Kris	Essex Energy Corporation	A
Sorensen, Kevin	Gilead Power	A
Savulak, Jason	Hydro One	A
Pattani, Naren	PENN Energy Renewables Ltd.	A
Chee-Aloy, Jason	Power Advisory LLC	A
Switzer, Doug	PowerStream Inc.	A
Simmons, Sarah	SunEdison	A
DaRosa, Emanuel	Thunder Bay Hydro	A
Observers		
Chintapalli, Raj	Customized Energy Solutions	A
Tremblay, Martin	Garrad Hassan Canada Inc.	A
Daye, Tony	Green Power Labs	A
Pelland, Sophie	NRCan	A
Peterson, Dave	Ontario Power Generation	A
Hutson, Michael	Renewable Energy Systems Americas Inc.	A
Gavrilidis, Anna	Sherwood Electromotion Inc.	A
Banack, Adam	Torys LLP	A
Scribe: Jo Chung, Market Development		
Please report any corrections, additions or deletions to: stakeholder.engagement@ieso.ca		

All meeting material is available on the IESO web site at:

http://www.ieso.ca/imoweb/consult/consult_se91.asp

Meeting Objectives:

To review the IESO's existing static and dynamic data requirements for market participants, as well as proposed requirements for wind and solar resources.

Item 1 Welcome and Introduction

Len Johnson of the IESO welcomed the Visibility Technical Working Group (VTWG), and invited members and IESO staff to introduce themselves. Introductory remarks were made including a review of the objectives of the meeting. Len indicated that the IESO and members would discuss and record any requirements that VSWG members had issues or concerns with, and that a “parking lot” list with action items would be created.

Items 2 & 3 Review of Meeting Agenda, Finalize Terms of Reference

Jordan Penic of the IESO provided an overview of the agenda and asked if there were any questions or issues on the VSWG terms of reference. A member requested, and the IESO agreed, that “communication protocols” should be added considering its importance to small generators. Another member asked whether work on the forecast model for centralized forecasting had begun. The member expressed her concern that data requirements were being discussed prior to a model being built. Len indicated that the Request for Proposal (RFP) had been issued and would close in March, and that data requirements should be standard across the industry.

Item 4 Control Room Tour

Len gave members a tour of the IESO control room.

Item 5 Existing Static and Dynamic Data Transfer Requirements

Charlie Day of the IESO provided an overview of the existing static and dynamic data requirements for market participants. A member requested clarification as to whether the current data requirements were applicable to embedded generators above 5MWs who were non-market participants. Charlie clarified that the current data requirements were only applicable to market participants.

A member asked whether there were separate communication paths for telemetry from a generator to entities such as Hydro One and Brookfield, as well as a separate communication path to the IESO. Charlie responded that this was correct, and that the Market Participants that were generators would have an RTU to connect to the IESO.

A member asked whether an RTU would be required if a generator had a SCADA of their own. Charlie responded that to communicate with the IESO, the generator could use SCADA as the source of data, or through an RTU. He noted that if high performance delivery of information was required, that SCADA may be insufficient. The member noted the need to reduce redundancy of communications for small generators. Len added that the group will be discussing communication requirements at the next session, and that the IESO’s goal is to not prescribe communications methods but to allow generators to choose which method best suits their facility while meeting IESO requirements.

Item 6 Proposed Static and Dynamic Requirements for Wind Generation Facilities

Devon Huber of the IESO provided an overview of the proposed static and dynamic requirements for wind facilities.

A member asked if telemetry had a higher priority than forecasting. Len responded that to do forecasting, telemetry was required. The member asked what the window would be for forecasting, one

hour upfront, five minutes, etc. Len responded that initially, it would be hourly. Devon added that in the longer term, centralized forecasting would expand to cover intra-hourly forecasting, ramp forecasting, probabilistic forecasting and that forecasting data will also be used for situational awareness tools.

A member asked the IESO how it intends to map the weather and generate hourly forecasts. Devon responded that the centralized forecasting vendor, and not the IESO, would start with numerical weather prediction models generated by government agencies and then add site specific data and statistical analysis to produce power production forecasts for a specific wind facility. These forecasts would be sent to the IESO and integrated into IESO operational tools. The member asked whether site specific data was used to build models for weather forecasting. Devon responded that a wide range of data is used as inputs into numerical weather prediction models. The member asked whether data input was required for forecasting. Devon responded that NERC and other jurisdictions have a collection of data that is considered standard for centralized forecasting and that quality site specific data significantly influences the forecast accuracy that can be achieved for a specific facility.

A member asked whether the current IESO data requirements would be required from embedded generators who were non-market participants. Devon responded that for purposes of centralized forecasting, all of the current IESO data requirements for market participants would not be required from non-market participants – only the proposed static and dynamic data.

A member asked whether outage information would be required every single time an outage was taken, noting that for a large farm there is normally a turbine on outage every day. Len responded that there is an existing process for outages that may allow for limited submissions for reoccurring outages (daily outages) and there is a pre-approval process for outages that could be adapted to wind/solar facilities. The member responded that if the outage threshold was 5MWs, that it would be a more manageable process. Devon responded that forecast vendors often state that better outage information would improve forecasts. Len added that the solution may not use the traditional methods of communicating an outage, and indicated that outage reporting is an area where the IESO needs feedback from members.

For available megawatts under proposed dynamic wind requirements, a member asked whether this information could go through the automatic SCADA process. Devon responded that available megawatts is the total megawatts of installed capacity available (turbines on line) in real-time and that the IESO's current understanding is that this is a value within SCADA systems. Another member asked whether the required information could be determined from scheduled outages. Len responded this would be the case although scheduled outages are more a forward looking value, and added that forced outages would be picked up in available megawatts. The member commented that many smaller projects would have no staff onsite.

A member added that although more of a solar issue, the IESO appears to be developing the same requirements for market participants and embedded non-market participants that won't be staffed. The member noted that extending uniform requirements to embedded, non-market participants would be overkill for both the IESO and the farms, and difficult and costly to provide. Another member agreed

that cost benefit considerations would be prudent. Len asked the group to provide a current listing of information that was readily available for embedded facilities to allow the IESO to better assess the implications.

A member (on behalf of solar) stated that 10MWs was a crucial number for FIT contracts, noting that there will be 10MW embedded farms that will be unattended. Len responded that any proposed requirements would be for 5MWs and greater, regardless if embedded.

Devon asked which of the wind data requirements were most problematic and for members to submit this information in advance of the next working group session. The member committed to bring the accuracy level of readily available information (for wind) to the next meeting. Another member added that ice conditions, outage information, and available MWs would be problematic, as the farms would need to be staffed.

Jordan requested that the LDC members provide the IESO with information which is currently requested of embedded generators.

A member commented that met towers provided relevant information only in real-time, but were not as useful in the longer term. He questioned how valuable a met tower would be for a 5MW facility, adding weather information could be sought from weather networks.

Devon requested feedback from the group on how current wind farms report ice conditions. A member responded that icing conditions are reported by an operator, depending on how often icing occurs. A member noted that whether a WGF shuts down for icing conditions is a WGF managed risk and not a specific data point. Another member added that the most efficient way to address icing is as a learned condition by the forecasting model.

A member asked how much it costs for a met tower. Another member responded that most met towers meeting industry standards were 60 metres and cost approximately \$45,000, adding anything 80 metres and above required additional lighting requirements.

A member asked why turbine mounted sensors weren't sufficient. Another member added that a learned forecasting model would work out accuracy issues at little to no extra costs. Len requested the member to provide information on what wind farms currently use (based on MWs) for a measurement device, including proximity of measuring devices. Devon added that hub information is not as clean as a met tower – the two can be correlated, but it results in added variability.

A member added that met requirements at other ISO's were for larger directly connected facilities, and that the IESO was driving down those requirements to 5MW farms. He indicated that this was not a valid comparison.

Devon responded the IESO was proposing met tower requirements based on size (greater than or equal to 10MW, less than 10MW). The member responded that you would get similar results based on a market participant vs non-market participant basis.

A member suggested all data requirements (including met towers) be changed to less than or equal to 10MW, and greater than 10MW. Devon reiterated that the challenge arises when many small farms in aggregate result in material megawatts.

A member added the success or failure of wind farms to come in service will make a difference as to how extensive the data requirements need to be. Joseph responded that the IESO has received no indication that the expected megawatts will be any different, and that the IESO must be ready for the forecasted amount of wind generation.

A member added that if a farm has an installed capacity of 10MW, the farm will meet 10MW one hour a day. He agreed that the IESO needs data, but at what cost? Jordan solicited the group for written proposals/recommendations.

A member noted that with a 5MW limit, that the IESO will likely encounter multiple 4.9MW projects to avoid IESO requirements. The IESO noted the issue.

Devon requested feedback from the group regarding existing farms under 10MW, and the number of collection points at the farms.

A member asked if the IESO was looking for aggregate output and outage data from a specific site. Devon responded that this was correct. The member reiterated that the smaller the facility, that there was less "bang for the buck" for more stringent data requirements, noting a one model fits all approach was unnecessary - the IESO should leverage existing data. Devon responded that this was the IESO's intent by proposing the greater than or equal to 10MW and less than 10MW, 5km requirements for met towers.

A member asked about the maintenance requirements for met towers, noting that it could take weeks to repair a faulty tower. Dilhan Rodrigo of the IESO responded that for large farms, the existence of multiple met towers would mitigate this risk. Devon responded that the onus would be on the generator to fix the tower as soon as possible.

Item 7 Proposed Static and Dynamic Requirements for Solar Generation Facilities

Dilhan Rodrigo of the IESO provided an overview of the proposed static and dynamic requirements for solar facilities.

A member asked whether the expected solar generation estimates were the OPA's estimates. Dilhan responded the estimates were based on a combination of OPA and IESO information.

A member asked which other ISO's the IESO had spoken to regarding solar requirements. Dilhan responded that discussions occurred with CAISO, Germany and Spain.

A member asked whether the IESO would post all public documents which were used to propose the static and dynamic requirements for solar. Dilhan responded that the links would be provided.

Dilhan asked the group whether there were any other suggested static data requirements for solar. A member responded that panel film technology (thin film versus crystalline) may be useful. Another member suggested proper area definition information (example: may be paralleling of strings) which is readily available.

A member asked what forecast accuracy the IESO was looking to achieve, noting that solar forecasting was still in the initial stages of development and not very accurate. Len responded that the accuracy level has not been determined.

A member cautioned the IESO to be careful when finalizing data requirements and to ensure the requested data adds value to the forecast.

For dynamic solar requirements, a member asked why factors such as wind speed were relevant. Dilhan responded that wind speed would assist in determining the pattern of cloud cover over panels. Another member added that wind speed is relevant for their operations in order to determine when strong winds occur, such that the panels could be placed in storage to prevent them from being blown away.

A member noted that they collected some, but not all the proposed dynamic requirements. Certain information is collected only for tracker panels such as direct irradiance, depending on the angle of the sun. Dilhan responded that some of the data elements, if only relevant to tracker panels may not be required. Dilhan added that if the site has a pyranometer, that most of the dynamic information should be captured.

A member noted that a pyranometer would have the plane-of-array irradiance (POA). However, if the global horizontal irradiance (GHI), global diffused (GDIF), and direct irradiance (DNI) are required, costly, customized weather stations would be required. He noted that most only measure one type of irradiance which should be sufficient. Another member added that GDIF was more important to thin film since it captures light during cloudy conditions. Dilhan added that most forecasters request diffused since they work better in cloudy, snowy conditions. Len requested the group to provide feedback on the dynamic information currently collected by solar facilities.

Dilhan asked the group for feedback on back panel temperature information. A member responded that their facilities are presently collecting this information at their site, and that she would ask if this information provided value. She noted that if the modules get too warm, that efficiency may be impacted.

A member on the phone stated that in order to save costs, the IESO should start by requesting POA irradiance and module temperature. Other requirements would be too costly. The member added there

are few models in use that measure output well, and that they are linear models, concluding he hadn't heard of any models using barometric pressure, wind speed, and other parameters.

A member asked why barometric pressure was relevant. Dilhan responded CAISO collects barometric pressure and wind speed to predict cloud cover which can reduce power output to zero. The member questioned whether this information had to be directly from the site.

A member noted that it appeared the IESO was asking for information to allow the forecaster to predict output of a panel from minute to minute. He asked why this information was required when panels had output inverters which measure how much sun is hitting the panel. Dilhan responded that studies have shown that persistence plus the proposed data requirements would improve forecast accuracy.

A member challenged the IESO to prove that other than POA irradiance, that the other proposed requirements will add significant accuracy to the forecasts (say a 20% increase in forecast accuracy). Dilhan responded that the argument had merit, but that if the facility had a pyranometer, that the requested data items could be captured. Another member on the phone responded that one pyranometer would be required for each measure of data. She added that a pyrhelimeter which is a costly, moving device requiring more maintenance would be required to capture most of the proposed data. The group agreed to place this item on the actions list.

A member noted that available megawatts (item 9 under dynamic plant information) could be calculated using installed capacity/MW output. He further added that for solar, there was no such thing as available MWs.

A member commented that dynamic requirements such as snow/ice conditions could only be provided by a manned station. Dilhan responded that this requirement was more Ontario specific, and similar to sand cover in the desert in CAISO. The member responded that unlike sand, snow and ice melt quickly due to the high temperatures of the panels. Another member noted that persistence may be a better measure of snow and ice. Dilhan noted that the IESO was open to discussion on these matters.

A member noted the composition of solar facilities would have a higher proportion of smaller farms compared to wind, recommending that data requirements should not be required for an immaterial increase in forecast accuracy. Another member added separate rules should apply to wind versus solar.

A member asked whether there would be two separate forecasting tools, one for wind, one for solar. Len responded the RFP was primarily focusing on wind forecasting, and it contained an RFI portion for solar forecasting.

A member asked for CAISO's cutoff for required static and dynamic data. Dilhan responded the cutoff was 1MW for directly connected, and that he was uncertain about the cutoff for embedded.

A member asked whether it was necessary for smaller embedded facilities to have a secondary power source (back-up) adding occasional power outages would be immaterial. Another member noted that their facilities had a secondary source of power, but for purposes of production guarantees and contracts. Dilhan responded that a facility may have one pyranometer powered from one of the panels. If power goes out, no data is provided. The member agreed that if power is supplied from a panel, that there should be an alternate source. However, for 120 volt supply of power, a secondary source would be unwarranted. Dilhan responded that the IESO was suggesting two different sources of power as per CAISO requirements. Another member added that required timelines to have power back in service may make more sense. Joseph added that battery or UPS back-up could be an alternative.

A member asked how maintenance requirements would work. Dilhan responded the standard would require the generator to calibrate/maintain the equipment to standards, and that the generator would be responsible for this.

A member noted all the changes would require market rule changes to register non-market participants as a separate class with specific requirements, or to have the OPA enforce the requirements via the FIT contracts. Another member added that non-market participants have a relationship with the LDCs, not the IESO. Joseph responded that legislation has given the IESO control over embedded resources for the purpose of maintaining reliability of the ICG.

Item 8 Next Meeting Agenda

Jordan thanked members for their valuable input, and reviewed the list of action items in the “parking lot.” He asked that members send any additional feedback to the stakeholder engagement email address. Len indicated the next session would focus on proposed communication technologies and proposal for the IESO to leverage existing communication lines between embedded farms and LDCs.

Action Item Summary				
#	Date	Action	Status	Comments
1	March 3, 2011 - ALL	IESO to ensure static and dynamic data requirements are coordinated with the requirements of the centralized forecasting vendor, in order to eliminate unnecessary data requirements	Open	
2		IESO to add to the terms of reference “communication protocols,” noting the importance of small embedded generators that are not market participants	Closed	Final Terms of Reference Posted with proposed change.
3		IESO/members to identify options for	Open	To discuss at VTWG

		communications, while using existing data paths where possible in order to reduce the redundancy of communication paths, particularly for embedded facilities under LDCs		meeting on March 16 th
4		Members to provide further feedback on proposed outage requirements (frequency, thresholds, process, communication path, etc).	Open	Awaiting Feedback from VTWG Members
5		Members to provide list of static and dynamic data available/currently provided by embedded generators (both wind and solar) to LDCs	Open	Awaiting Feedback from VTWG Members
6		Members to bring the accuracy level of readily available information (for wind) to the next meeting (items 6 ice conditions, 8 outage information, 9 available MW).	Open	To discuss at VTWG meeting on March 16 th
7		LDC members to bring list of information requirements required for outages, available MWs, etc	Open	Awaiting Feedback from VTWG Members
8		Members to provide info on what current wind farms (5MW to 10MW, above 10 MW, proximity of devices) use for measurement devices? (ie. Met towers, turbine mounted sensors, etc)	Open	Awaiting Feedback from VTWG Members
9		Does size of wind farm matter? Considering all new requirements, members to submit ideas/proposals for wind requirements: 10MW or greater, 5km met tower requirement, etc	Open	To discuss at VTWG meeting on March 16 th
10		What happens if met tower fails for extended periods of time?	Open	To discuss at VTWG meeting on March 16 th
11		IESO to provide links to public documents	Open	IESO to provide at next VTWG meeting
12		Does the concept of existing data requirements for generators make sense for solar?	Open	To discuss at VTWG meeting on March 16 th
13		Feedback from members on how tracking requirements affect panels/production	Open	Awaiting Feedback from VTWG Members
14		Area – what is definition?	Open	To discuss at VTWG meeting on March 16 th
15		Discuss new category of market participant in future meeting	Open	To discuss at VTWG meeting on March 16 th
16		What is the accuracy IESO is trying to achieve for solar forecasts? Consider cost benefit of additional data requirements	Open	To discuss at VTWG meeting on March 16 th
17		Additional requirements on when a panel will	Open	Awaiting Feedback from

		to be adjusted due to wind speed?		VTWG Members
18		Should solar data requirements be specified by panel type? (thin film versus poly crystalline)	Open	To discuss at VTWG meeting on March 16 th
19		Solar and wind members to provide feedback on what static and dynamic data is currently collected	Open	Awaiting Feedback from VTWG Members
20		Sunedison to provide actual feedback from their operators on importance of back panel temperature information.	Open	Awaiting Feedback
21		Cost and benefits of dynamic solar data requirements (1-4)	Open	To discuss at VTWG meeting on March 16 th
22		How capture snow/ice conditions for solar? IESO to forecast versus generator provide	Open	To discuss at VTWG meeting on March 16 th
23		For solar and wind, benefits of independent electricity source – timelines, types of sources	Open	To discuss at VTWG meeting on March 16 th
24		How to interact/relationship with LDC/IESO/embedded solar generators	Open	To discuss at VTWG meeting on March 16 th