

The following is a summary of stakeholder responses to IESO's request for written feedback on Centralized Wind Forecasting Questions. To promote openness and at the request of some stakeholders, all references to the organization contributing the comments have been removed. For more information, please see [Embedded and Renewable Generation \(SE-57\)](#).

Stakeholder responses are listed below the original question. General comments are summarized at the end of the document.

Data Requirements

1. For their own forecasting purposes, do wind operators capture additional information beyond that listed in Table 1, and if so, at what frequency?

Measurement	Units	Precision
Wind Speed	m/s	TBD
Wind direction	Degrees from true north	
Barometric Pressure	hPa	
Ambient Temperature	°C	

Stakeholder Comment:

Data Requirements

4. In regards to request for data measurements and frequency [Stakeholder] offers the following details:
 Wind speed – M/S
 Wind Direction – Degrees from True North
 Barometric Pressure – hPa
 Ambient Temperature - Celsius

All the above information can be offered on a 2 second basis via [Stakeholder] RTU/gateway using DNP3 protocol. Currently power output, wind speed and air temperature are available at each WTG. For each phase, # of WTG on line, wind speed, power output and wind direction is available

In addition to the above information [Stakeholder] could offer met data from additional separate met towers located strategically across the wind farm. This would include, wind speed, direction, pressure and temperatures.

It is important to note that Power output and number of WTG available is the only data needed for persistence real-time forecasts.

The IESO has noted that Wind facilities will be expected to record data on a 10 minute average basis, and submit this data to the IESO on an hourly basis (at a minimum). Data is required by the IESO on a 24 hours a day, 365 days a year basis.

Having said that, if persistence data is used in real time forecasts then only power output and capacity changes (outages) would be needed from the Market Participant.

If data is used for day ahead forecasts or longer then why is 10 minute data needed? Historical data to check the forecasting models could be provided in 10 min increments.

Regarding the IESO preference for Static Plant Data, the wind forecasting service provider requires data describing the physical layout of the facility and details of the turbines being used.

Location (latitude and longitude), and elevation of each turbine hub.

Location (latitude and longitude), and elevation of met tower collection points.

Type of turbine.

Manufacturer's power curve.

Cut in and cut out speeds.

Stakeholder Comment:

[Stakeholder] does collect the data listed.

Stakeholder Comment:

1. [Stakeholder] collects considerable wind data from met towers at different heights--2M, 3M, 30M, 50M, 65M and 85m. In addition considerable wind data is collected by each turbine. Information available normally on a 10 minute average. This information can be made available to third party after detailed review with [Stakeholder].

Competitive Forecasting Trial

2. One wind facility has already expressed interest in participating in the competitive forecasting trial, are others also interested?
3. Do wind facility operators have historical met data and turbine outages archived?

4. What is the annual operating cost for a wind facility operator to meet its current wind schedule submission obligations?

Stakeholder Comment:

Competitive Forecasting Trial

1. In regards to participating in the IESO's competitive forecasting trial, [Stakeholder] would be interested in participating on a trial basis to better understand expectations and also help shape requirements that will eventually be placed on wind field operators.
2. [Stakeholder] has a historical archive that can be used to retrieve turbine outage data and historical met data.
3. The primary requirement of providing overall facilities real time offers and forecast data to the IESO, the specific need to provide wind forecast is a relatively small portion of [Stakeholder's] 24x7 scheduling responsibilities. The annual cost to provide persistent wind forecasting to the IESO is negligible. An automatic algorithm looks back 2 hours and sends regular updates to our forecast scheduling desk to provide required changes to IESO. Some programming to set-up and perform diagnostic checks periodically is all that was and is required. This would be less than 2 weeks work annually of technical support or \$10k. Having said that if [Stakeholder] is required to supply additional data there will be a requirement to purchase OSI PI licenses to expand its database needs. This could run in the range of 25-50k annually per farm depending on data requirements.

Stakeholder Comment:

2. [Stakeholder] is interested in participating in the competitive forecasting trial.
3. We do have historical met data and turbine outage information archived with the proposed data requirements.
4. The current wind forecasting requirements are carried out by our regular operations staff and therefore there is no incremental cost to meet these requirements. In addition, we believe that any time saved by reduced forecasting at the plant level will be consumed by ensuring met data is being gathered to IESO standards, and the new requirement for the ongoing submission of availabilities.

Stakeholder Comment:

2. [Stakeholder] will consider participating in the pilot program. Further discussion between [Stakeholder] and the IESO required on this subject prior to final commitment.
3. Archived data is available.
4. Annual costs for forecasting, Emergency Response etc exceeds \$100,000. The 24 hour monitoring/forecasting service completed in the [Stakeholder] 24 hour Control Center costs approximately \$75,000 per year. In addition staff at our offices offer support during normal working hours and allocated salaries are approximately \$30,000 per year. It should be noted that the Central Forecasting proposal will not eliminate these services. In order to meet Emergency response and the curtailment requirement etc. recently introduced will require the 24 hour coverage be continued. The proposed central forecast service costs will be layered on to our existing costs.

Funding Model

The proposed framework: if any wind generator fails to pay their obligation, the outstanding amount will be allocated to all wind generators in a timely manner. Any posted prudential or prepayments/deposits will be utilized first before any allocation of amounts.

5. If participants would like the IESO to manage the credit risk of non payment is the proposed framework acceptable?
6. Alternatively, if participants do not want the IESO to manage the credit risk, or the proposed framework is too costly (i.e. the posting of prudential or prepayment), would they rather a non payment be distributed immediately amongst program participants?

Stakeholder Comment:

Funding Model

1. Pertaining to the IESO's proposal to manage the Market participant's credit risk whereby if one participant fails to pay its obligation for costs to IESO these costs are subsequently allocated to all wind generators in a timely manner if posted prudential's or deposits from a MP is not a possible solution seems a bit unfair. Although [Stakeholder] agrees that the IESO should manage credit risk it does not feel that it should assume additional risk in event one or more operators are in default. Any defaults with an individual operator should be handled via other market mechanisms. Having said that if future years costs need to be adjusted 12 months notice should be given to each MP that forecasting costs will need to be adjusted to allow the MP to adjust its internal budgetary needs.

2. As per question #5, [Stakeholder] prefers that the IESO manage all credit risks and not pass along non-payments immediately to other program participants at least without adequate notice.

Stakeholder Comment:

- 5/6. [Stakeholder] would like the IESO to manage the credit risk of non-payment but does not accept the proposed framework. Allocations of uncollected payments should have a remedy against the defaulting party not all other wind generators in order to remain fair.

Stakeholder Comment:

The IESO is in the process of replacing the current method of receiving information from wind generators with a centralized wind forecast system. The IESO proposes to manage credit related to the wind forecast program but will not take credit risk. Instead, any credit losses would be settled and recovered from the group of wind generators. The [Stakeholder] supports the IESO's proposal. The IESO should take zero risk in managing credit related to the wind program.

Stakeholder Comment:

5. IESO should manage payment requirements.

General Comments

In addition to the responses to the specific questions posed by IESO, stakeholders also provided general comments. Those general comments specific to Centralized Wind Forecasting are provided below.

Stakeholder Comment:

Additional Feedback from [Stakeholder]

1. [Stakeholder] prefers that Production data be used rather than capacity data to

determine allocation of IESO forecasting costs. Although the IESO stated this method would require reading of revenue meter data, this is already done regardless and is readily available from MSP and IESO's metering department.

1. For real time wind forecasting data requirements, [Stakeholder] believes that using a simple persistent forecasting methodology serves this requirement best and has proven that it can supply such data within 8% accuracy well below industry averages for wind forecasting. The IESO could use the real time data from all market participants to automate short-term (5min - 2?Hrs) real-time persistence forecasts. The only data point needed would be power output from each market participant that is currently available at the IESO. This would eliminate the need for regular schedule updates from all MP and improve the overall short term persistence forecast. This is a very economical process and will provide IESO with as good as any 3rd party forecasting service. It will also eliminate any problems with timely schedule updates from all MP. In seeking a 3rd Party contract to forecast, [Stakeholder] recommends that the IESO seek only day ahead and longer range forecasting requirements since this data will have little or no requirement for real time data from the wind farm, but will require more global ambient conditions data as well as marine forecasts which have proven more useful for longer range forecasting needs.
2. [Stakeholder] believes that the IESO needs to establish formal market rules of what forecast error deviations (+/- 15Mw's or some percentage error) are acceptable both for Market Participants and the eventual vendor and hold the forecasting consultant accountable for performance and reduce funding according to delivery performance.
3. Why does the IESO require payments on a 2 day basis? [Stakeholder] feels that payments to IESO for providing centralized forecasting services should be performed on a monthly basis similar to uplift costs and ancillary service contract settlements with the IESO. This will reduce burden to settlement staff and should be agreeable with any vendor who would typically have a monthly payment arrangement with the IESO.
4. The IESO needs to specify requirements and duration of the forecasting trial, plus any risks to the operator in event data fails during the test.
5. In order to calculate forecasts as accurately as possible, it is critical wind facilities provide the IESO with timely updates on available capacity and turbine outages in advance or as soon after as practical of any reduction in actual plant output capacity. What would be the resolution needed for capacity updates: for example, a 10% or greater change to the nameplate capacity. Would a monthly, weekly or daily outage

schedule be sufficient?

[Stakeholder] appreciates the opportunity to supply feedback to the IESO proposed centralized wind forecasting program.

Stakeholder Comment:

[Stakeholder] understands that up-to-date and accurate forecasts are necessary to ensure the reliable, efficient, and environmentally-responsible operation of Ontario's electricity grid, in addition to answering the IESO's questions we would also like to communicate our concerns with the proposal.

Concerns with Proposal

Firstly, wind forecasting is part and parcel of our operation's daily function and therefore centralizing this function will not result in any cost savings.

Secondly, [Stakeholder] does not feel that it is fair to proceed with a capacity based funding model as it does not cost any more to forecast 199 MWs than 10 MWs when information is gathered from a few collection locations. Also, by not charging small wind participants, our competitors, you are creating an uneven playing field, which may act as a subsidy for those generators. [Stakeholder] proposes that costs be divided by data collection locations, and that all generators including those less than 10MW be charged on an equal basis.

Thirdly, because of the significant amount of new generation coming online, the need for accurate forecasting will be exacerbated and therefore a heavier weighting should be placed on those new generators so that there is not unfair discrimination against early investors with different contract terms.

Fourthly, consideration should be given to ensuring that generation, and therefore revenue, is not constrained due to under forecasting by the forecaster.

Finally, valuation and transparency to stakeholders during the RFP process is critical and information on how limits will be placed on the scope of what the forecaster is asked to do compared to what generators did previously should be shared, in order to eliminate the risk of scope and cost creep. Providing a cost-benefit analysis would be valuable.

Stakeholder Comment:

Centralized Wind Forecasting

Hydro One (“HO”) and the local distribution companies (“LDC”) should not be exposed to any credit risk related to the new centralized wind forecast program and the related settlement processes. In the event of default by a wind generator recovery of losses from the rest of the wind generator pool should be reallocated to HO and the LDCs. The IESO should also ensure that provisions in the OPA agreements provide for full recovery of costs of the connection and expansion costs related to the defaulting wind generator.

Wind generators should bear the full costs of the forecast system and the installation of onsite equipment required by the IESO to support the centralized forecast. Non-wind generators and users should not be required to subsidize installations of new equipment such as meteorological towers.

Stakeholder Comment:

[Stakeholder] has reviewed the proposed process and recognises that improving the current system should be of benefit to the wind industry as a whole. Having said this, [Stakeholder] has several concerns with how the program is structured and therefore would like to submit the following comments.

[Stakeholder] does not agree that projects less than 10 MVA should be market participants. Under the current market rules projects under 10 MVA are currently exempt from becoming market participants.

[Stakeholder] encourages the IESO to recognise that having projects under 10 MVA become market participants will be a burdensome task requiring additional staffing in order to satisfy reporting requirements and maintain communications with the IESO.

The current RESOP and FIT pricing does not cater to the additional/new costs that it would require to maintain market participant status

The fiduciary responsibilities being shared when an operator of another plant does not make payment are not reasonable.

The assumption that projects less than 10 MW would have all of the equipment to participate in forecasting project is inaccurate. The cost of installing/maintaining a permanent met mast and equipment is beyond what a small project can absorb.

[Stakeholder] would request that detailed consultation be carried out with individual developers in order to address site specific concerns. [Stakeholder] would be willing to enter into discussions with the IESO in order to discuss the challenges associated with the proposed program.

Stakeholder Comment:

In general, [Stakeholder] is in favour of the IESO's concept of Centralized Forecasting. At a first glance, the proposed concept appears to represent a win-win scenario for all parties by providing the IESO with improved accuracy while removing the burden of hour-to-hour and day-ahead updates for wind farm operators. However, I am concerned that operators will incur additional costs for these benefits. As the IESO will benefit from improved scheduling accuracy, I would argue that it should share the financial burden with the wind farm operators. In addition, I recommend that the costs applicable to each individual wind farm be determined on a per megawatt basis. In my opinion, this would result in the fairest outcome for all installed capacities, including embedded generation. Further, the proposed Centralized Forecasting should also factor in all generation even if there is no direct input of data from the sub-10MW facilities. In conclusion, I can envision this system being fully automated over time. As such, I expect the associated costs for all parties would be relatively minimal.

Stakeholder Comment:

Standard Offer, and other small wind farms that are distribution connected, and not market participants, are not currently required to provide forecasts, and so have no cost of doing so. Most small wind farms do not have met towers once the wind farm is operating. Some don't have telemetry as it was not a requirement. Requiring installation of telemetry, and met masts, with its required communication is an expensive proposition. Is the gain in the accuracy of province wide forecasting for sites that contribute only small output large enough to justify the very high expense of installing telemetry, met towers, and communications?

Hydro One current communications standards are very limited, and VERY expensive, as well as unreliable, requiring a great deal of maintenance. This makes the cost of telemetry in particular very high at some sites.

Currently operating wind farms have fixed price power purchase agreements. It is unfair to burden them with additional costs due to changes in market rules, when these costs

were not accounted for when the wind farm pro formas were done. The cost of the proposed requirements is considerable, raising O+M costs for small sites by as much as 30%.

The outage reporting requirement would seem to generate a lot of data for the IESO, but it is data that is not likely to be used, and would be difficult to manage. Large outages should be reported, such as a large number of wind turbines at one time, or a substation outage should be reported, but maintenance on one turbine would seem to be well within the margin of forecast error for a given site.

Stakeholder Comment:

The curtailment requirement has required [Stakeholder] to put in place procedures to monitor and manage the farm. We have to manage the safety of workers and make sure they vacate the towers before shutting in. The 45 minute window is tight and not yet tested. We also feel that it might be a benefit to keep 4 units operating one in each of our circuits to maintain our scada system operating. There is also a concern that if the curtailment requirement changes on an hourly type basis operational issues will be introduced. Wind turbines are not designed to be paused a number of times in a 24 hour period. Maintenance costs are expected to increase. One possibility that has not been discussed is to reduce output versus shut in if the Market allows. This should be investigated.