

Stakeholder Engagement SE-57

Embedded Generation Status Update



Summary

At the end of 2007, the IESO published a discussion paper on embedded generation that focused on three areas of concern – Connection Assessment and Approvals (CAA) Process, Performance Standards and Visibility. A stakeholder session was held in January 2008 to discuss the issues and possible solutions identified in the paper. Stakeholders were asked to provide comments on the discussion paper. Since that meeting, the IESO has been focusing its attention on developing recommendations for each area, incorporating stakeholder feedback that was received.

A summary of the issues, the IESO recommendations and next steps for each of the three areas are outlined below, along with the stakeholder feedback received.

Written comments on the IESO recommendations and next steps can be sent to stakeholder.engagement@ieso.ca by June 26, 2008.

On December 13, 2007, the IESO published a [discussion paper](#) on embedded generation to assist in facilitating discussions with stakeholders on the integration of embedded generators into the reliable operation of the IESO controlled grid and the efficient administration of the markets.

The paper proposed changes to Market Rules in three general areas - Connection Assessment and Approvals (CAA) Process, Performance Standards and Visibility.

Connection Assessment and Approvals Process (CAA)

The IESO does not yet have the means to ensure IESO-controlled Grid (ICG) reliability for the connection of a significant number of smaller generating units to the distribution system as these types of connections are not subject to its CAA process.

To address this issue, these alternative modifications to the CAA process were proposed:

1. Require Local Distribution Companies (LDCs) to request System Impact Assessments (SIA) where embedded generation could result in 10 MW injection into the ICG at the connection facility under light load conditions.

This option would require amendments to market rules and processes to obligate LDCs to bring forward requests for System Impact Assessments once the aggregate amount of DG proposed reaches the designated threshold.

2. Require Proponents to request a System Impact Assessment from the IESO when their proposed connection results in some specified outcome such as the above noted 10 MW back feed.

The second option would place some Standard Offer Program participants at a disadvantage and may be difficult to implement. Also proponents would need to work with their LDC to determine their placement in a "queue" and whether they needed to proceed with a request to the IESO.

IESO Recommendation

The IESO recommends that the first option be pursued as it will be more inclusive and easily managed than the second option. Changes to the connection process will facilitate connections to the distribution system while ensuring reliability will be maintained.

The IESO also recommends that distributors take into consideration the correlation between the resource mix and the demand profiles. The characteristics of embedded resources must be accounted for when calculating the reserved power flow into the grid and determining when to apply to the IESO. For example, while wind resources are predominantly available during the night, solar resources are only available during the day.

Performance Standards

Market Rule generation performance standards were not formulated with an expectation that a material amount of generation would be connected to the distribution system. For this reason, changes are necessary to facilitate Government of Ontario policy objects as expressed in Ontario Power Authority's (OPA) generation procurement programs while maintaining reliability.

The proposed changes do not impose additional requirements on existing generators and are designed to facilitate all types of generation connections in Ontario especially small generation facilities connecting to the distribution system. The proposed changes and the associated rationale are provided below.

New Provisions

Ride Through Capability

To avoid a material adverse effect on reliability resulting from widespread or cascading generation losses following recognized contingencies on the transmission system, the IESO proposes to add a requirement for generators to remain connected except when disconnected by configuration for recognized contingencies.

Automatic Reconnection

The IESO proposes to add a provision to prevent uncontrolled automatic reconnection of generation to over-generated islands. Automatic reconnection is a common feature of some new generation types (e.g. wind-turbine generators).

Removed Provisions

Power Factor Regulation

The IESO proposes to remove power factor performance requirements for generation connected at voltages under 50kV to avoid conflicts with distributor requirements.

Modified Provisions

The IESO proposes to clarify some definitions and performance standards to assist connection proponents and other market participants to establish and maintain reliable connections.

Reactive Power, Voltage Variations and Automatic Voltage Regulation

The IESO proposes a uniform approach in the expression of these requirements to provide a more level playing field for all generating unit types. Unnecessary barriers to the connection of non-traditional types of generation will be removed by re-expressing requirements in a manner less specific to traditional synchronous machines.

Under Frequency Load Shedding (UFLS)

The IESO proposes to change the existing requirement to recognize the effect of embedded generation loss with the UFLS armed feeders and to make the UFLS requirement more practicable.

Load Power Factor

The IESO proposes to modify the power factor requirements to allow distributors to be able to properly account for embedded generation.

Excitation and Speed Governing Systems

The IESO is proposing to add requirements to level the playing field between all types of generators when it is feasible and required to maintain reliability.

IESO Recommendation

IESO performance standards are being revised to facilitate connections while system reliability is continuously maintained. Some additional flexibility is being added to the rules to assist proponents to utilize emerging technologies in an economically responsible manner and assist the IESO to maintain reliability. Proposed Rule changes should help obligations be more easily identified, facilitate performance validation associated with Market Entry and provide a more level playing field.

Visibility (Telemetry)

Visibility is needed for the following reasons:

- Once embedded generation is in service and exceeds a threshold amount, the IESO's ability to efficiently operate the market may be adversely affected.
- Visibility of embedded generation would allow the IESO to modify forecast methodologies to accommodate the uncertainty of generation not under the IESO dispatch control
- Real-time visibility of embedded generation would assist the IESO in maintaining reliability.

To obtain telemetry representative of embedded generation, the following options are being proposed.

1. OPA could specify requirements in contracts. Generators would need to provide an "internet gateway" connection to communicate the number of MWs being generated. Standard protocols would be used (TCP/IP). Generators would be responsible for the standard communication costs (e.g., high speed Internet Service Provider). The IESO would need to provide an aggregation server in order to integrate the data into IESO systems.
2. Connected hosts such as Connected Wholesale Customers or LDCs would provide a telemetered value of the total MWs per service territory or connection point. These values would be provided to the IESO within less than one minute from change in field monitored quantity (reference Chapter 4, Appendix 4.23 for Minor Dispatchable Load Facility and Non-Dispatchable Load Facility performance standards). LDCs would need to mandate participation through their connection agreements. Both Connected Wholesale Customers and LDCs would need to be obligated to provide this telemetry through market rule changes. As above, the standards can be met through the provision of an "internet gateway" connection to communicate the number of MWs and MVAR being generated behind the meter. Standard protocols would be used (TCP/IP). Hosts would be responsible for the standard communication costs (e.g., high speed Internet Service Provider). IESO would need to provide an aggregation server.

IESO Recommendation

The IESO will work with Local Distribution companies, the Ontario Power Authority and the Ontario Energy Board to develop an effective and inexpensive means of providing real-time visibility of embedded generators to the IESO, and possibly to distributors for effective market and system operation, including the operation of the distribution system.

Stakeholder Feedback

A stakeholder engagement meeting was held on January 31, 2008 and presentations were given on the three areas noted above. Minutes of the meeting and presentations can be found on the web site.

http://www.ieso.ca/imoweb/consult/consult_se57.asp

Along with the comments made at the meeting, stakeholders were asked to provide written comments on the proposed options and changes by February 7, 2008. Six written comments were received. They are posted on the web site along with the IESO response to the comments.

http://www.ieso.ca/imoweb/consult/consult_se57.asp

Next Steps

Based on the comments received at both the meeting and in writing, the IESO is planning to move forward with the following actions.

Connection Assessment and Approvals Process

The IESO will be revising the Connection Assessment and Approval requirements and rules to include the new trigger levels for a system impact assessment. Changes to the Market Rules Chapter 4 and Market Manual 2.10 to reflect the changes will be proposed and discussed with the affected stakeholders.

It is expected that the host distributors will be impacted by the proposed process changes, as they will have to apply for the SIA assessment when the SIA thresholds are met. The proponents of embedded generation will also be impacted, as they have to provide technical data to the host distributor and the IESO for the proper system impact study.

Performance Standards

The IESO will work with market participants through this stakeholder engagement process to review the proposed modifications to the performance standards requirements discussed earlier in this paper. One option that is being considered is a one-day technical conference to address all of the performance standards issues identified in regards to embedded generation facilities.

Visibility/Telemetry

The IESO will work with Local Distribution Companies (LDCs), the Ontario Power Authority and the Ontario Energy Board to develop an effective and inexpensive means of providing real-time visibility of embedded generators to the IESO, and possibly to distributors for effective market and system operation, including the operation of the distribution system.

Further consultation is required with the LDC's to establish a telemetry threshold that would be no more onerous on the LDC's than that which may be required for them to operate their distribution systems. When the threshold has been determined, it is expected that both Connected Wholesale Customers and LDCs would need to be obligated to provide this telemetry through market rule changes. The standards can be met through the provision of an "internet gateway" connection to communicate the number of MWs and MVAR being generated behind the meter. Standard protocols would be used (TCP/IP). Hosts would be responsible for the standard communication costs (e.g., high speed Internet Service Provider). There may be a need for the IESO to provide an aggregation serve

As the market rule/market manual changes are detailed, these proposed changes will be communicated/discussed with stakeholders.

Stakeholders are being asked to review the next steps identified and provide any comments to stakeholder.engagement@ieso.ca by June 26, 2008.