Enabling Flexibility

IESO Response to Stakeholder Feedback – June 24, 2016

The IESO held the first stakeholder meeting for Enabling System Flexibility on June 24th. At this session, the IESO described the nature of the system flexibility need and invited stakeholders to provide feedback on the materials presented and potential solutions the IESO could consider.

IESO received feedback from the following stakeholders:

Brookfield Renewable

Energy Storage Ontario

Energy Storage Hydrogenics

HQ Energy Marketing Group

Nipissing First Nation and FN Power

Ontario Power Generation

Ontario Society of Professional Engineers

IESO Responses are in *italics*.

Stakeholder Engagement

The IESO should release as much information as possible to help interested parties to a) contemplate and formulate new solutions and ideas, b) evaluate the feasibility and economics of their proposals, and c) avoid devoting resources to unlikely projects. For example, the June 24 presentation stated that: "*The IESO recently completed an operability assessment for the period of 2016 to 2020.*" Releasing such information on regional flexibility needs, regional transmission constraints and limitations, as well as other reliability and system studies would help interested parties better create and evaluate proposals for the IESO's consideration.

The IESO should also confirm if conclusions and analysis from recent reports, such as the *2015 NUG Assessment Report*, are still applicable and would be used for project evaluation purposes. Releasing such up-to-date and detailed information would allow interested parties to answer the call in a more productive manner. **(Brookfield Renewable)**

IESO may provide additional information in future sessions as options are developed or feedback indicates a need for specific information.
The IESO will do so as long as it does not compromise confidentiality obligations.

System flexibility need

How many MWs are required to deal with VG forecast uncertainty? Per slide 17 of the Presentation, the quantum by 2020 ranges for 479MW to 1,997MW for an error that occurs 30% of the time to 1% of the time. Could OR help deal with this? **(Nipissing First Nation and FN Power)**

The IESO is targeting about 1000 MW of additional flexible resources, with 300 MW expected to be obtained by the end of 2017 and the remaining 700 MW by the end of 2018.
Regarding whether or not OR could deal with this, as the stakeholder engagement process progresses, we will be in a position to better assess and comment on the merits of various proposals and how they measure against the criteria identified on slide 50 of the June 24th presentation.

We are curious as to how many minutes before the hour when the error rate becomes more normally distributed or at an acceptable level (i.e. the question of when should you make a decision on variable generation to limit errors when predicting for the next hour forward)? **(Nipissing First Nation and FN Power)**

The IESO evaluated our forecast accuracy in the time frames when the IESO commits resources. Our last commitment is made about an hour ahead of real-time, when intertie transactions are confirmed. We found that between an hour ahead and real time, the forecast becomes significantly more accurate. Therefore, the IESO requires flexible resources to be available in real-time that could provide power in 20-30 minutes, if called upon.

Potential Solutions to Consider

The IESO should openly state if it has already determined that certain specific solutions and/or locations would not be accepted. For example, if natural-gas based solutions would not be accepted due to environmental priorities, the IESO should clearly and promptly announce this to ensure that productive ideas can be provided. **(Brookfield Renewable)**

At the June 24th stakeholder meeting, the IESO communicated the principles which would be used to evaluate options against one another (slide 50):

- *Maintaining the reliability of the system*
- *Cost-effective, competitive, transparent and stable*
- *Send efficient price signals*

- *Scalable to system need changes over time*
- *Technology neutral, allowing for the development of new technology and/or maximizing capability from existing assets*

The IESO is approaching potential solutions with an open mind where they can meet the identified needs. Different options will be evaluated against one another and the degree to which they satisfy these criteria.

In response to the feedback elements submitted below, the IESO thanks all stakeholders for providing input on potential solutions which may be considered. As the stakeholder engagement process progresses, we will be in a position to better assess and comment on the merits of various proposals and how they measure against the criteria identified on slide 50 of the June 24th presentation. We also encourage stakeholders, throughout the course of the engagement, to continue to provide input on potential solutions so that they can be considered and assessed against one another and the criteria noted above.

One of the key strengths of energy storage is its ability to offer flexibility on the system. Energy storage fundamentally improves the way we generate, deliver, and consume electricity; it has the capability and versatility to make our power networks more resilient, efficient, cleaner and cost-effective than ever before. **(Energy Storage Ontario)**

Based on the information provided at the initial session from the recently completed 2016-2020 operability assessment, it would appear that newer technologies and solutions may provide viable options to address the needs of scheduling of resources to balance supply and demand (including ramping), regulation services and grid voltage control. **(Energy Storage Hydrogenics)**

Ontario and Québec can mutually benefit from an increased role of the interties, as proven with the 500 MW Capacity Sharing Agreements between IESO and HQEM. Furthermore, Intertie flexibility can provide benefits such as balancing service offers and help resolve issues arising from intermittent generation going forward. An intertie such as the PQAT, which can satisfy the purpose of the engagement, should be taken into consideration. **(HQ Energy Marketing Group)**

The IESO likely needs additional asset that can generate and consume power (as errors are either a shortfall or too much power) quickly, which would be critical to maintain system reliability. [Suggest introducing a] proven modular natural gas generation plant with a grounding grid that can consume power in periods where excess generation is occurring. **(Nipissing First Nation and FN Power)**

Suggest that the IESO provide more information to the market to react to VG. [Inform if there is a] VG forecast error (for the 1 hour ahead pre-dispatch) which exceeds X% (say 5%), and what the error looks like. If a VG forecast error does occur and exceeds X% (to be determined by simulation and modeling), we would recommend that the IESO for the time being procure additional OR (beyond the requirement) for the next hour in the meantime as a stop gap measure. **(Nipissing First Nation and FN Power)**

The IESO likely needs additional asset that can generate and consume power (as errors are either a shortfall or too much power) quickly, which would be critical to maintain system reliability – To date many jurisdictions would meet energy generation shortfall by assets utilized to meet the 10-minute synch Operating Reserve (OR) requirements. **(Nipissing First Nation and FN Power)**

The IESO should consider obtaining and publishing information on embedded generation similar to the data for grid-connected supply and demand. **(Ontario Power Generation)**

Currently IESO market operating tools do not allow a unit to provide both Regulation and Operating Reserve (OR). Co-optimization of energy, Regulation and OR could yield a lower cost solution for the market and may stimulate the introduction of more competition in the Regulation market. **(Ontario Power Generation)**

New ancillary products could be developed to provide a lower cost and slower response service than Regulation. **(Ontario Power Generation)**

15-minute scheduling / dispatch, which could be designed as part of a modified load following service, may result in smaller and less frequent changes thereby improving the availability of hydroelectric systems as the number of lock-out situations would be reduced . 15 minute schedules would also enable hydroelectric generation to be dispatched and respond to load variations throughout the hour not just at the beginning of the hour. **(Ontario Power Generation)**

Another option for the short-term, if feasible from a market impact perspective, would be to allow dispatchable hydroelectric resources up to 15 minutes to respond to the dispatch signal. **(Ontario Power Generation)**

Many of the system capability limits include parameters that can change with real-time conditions (so-called dynamic limits). Lack of this information makes it difficult to forecast and conduct advance assessments of the risks of system constraints to generation facilities. This is particularly relevant to hydroelectric plant operation which is governed by multiple environmental and safety regulations. **(Ontario Power Generation)**

The following lower cost modifications to the current DACP process are suggested to enhance flexibility:

- Provide a schedule guarantee for energy storage facilities similar to the production cost guarantees for non-quick start units as part of the Day Ahead Commitment Process

- Eliminate the financial barriers of non-energy charges for energy storage facilities supplying services to the market. This could be implemented as a reimbursement of costs similar to the existing Uplift Reimbursement Charge Code 119. **(Ontario Power Generation)**

Fuel switching applications would constitute a significant dispatchable (interruptible) load and could solve some (if not all) of IESO's system flexibility challenges with variable generation. Fuel switching would also make far better use of curtailed zero-emission electricity to reduce emissions in other sectors and to reduce fossil fuel costs for consumers without imposing any additional cost onto electricity consumers. **(Ontario Society of Professional Engineers)**