MRP Market Power Mitigation
Reference Level Guide and Workbooks

Stakeholder Feedback Form

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OPG appreciates the opportunity to provide comments on the IESO Reference Level Cost Workbooks and the November, 2020 *Reference Levels and Reference Quantities Pre-Reading Document*, acknowledging the IESO's work modifying sections to respond to Market Participant (MP) feedback. Reference levels have broad operational impacts, and OPG stresses that they must be properly integrated with the new calculation engine and hydroelectric parameter design. OPG has included comments on changes to the pre-reading document, as well as general comments on concepts discussed throughout the stakeholdering process.

General:

- The IESO indicated in its response to the Grid & Market Operation Integration Detailed Design Document comments that many of the hydroelectric parameters available to the Pre-dispatch and Day Ahead calculation engines could not feasibly be included in the Real Time calculation engine. The IESO stated that instead,

  "Market participants can manage the opportunity cost of balancing real-time deviations from DAM schedules by adjusting their offer prices in the hours that starts are scheduled. Submitting higher opportunity costs to reflect the additional use of starts, in effect, provides a way for the real-time calculation engine to consider whether additional starts should be used now or saved for subsequent hours."

  OPG agrees that if the new hydroelectric parameters cannot be integrated into the RT Calculation Engine, the additional costs required to manage operational constraints will by necessity need to be reflected as an opportunity cost in the reference levels. While the opportunity cost calculation as outlined by the IESO addresses some technical restrictions, it does not fully address all opportunity costs. For example:

  a. Good utility practice dictates that hydroelectric resources reserve at least one hour of energy for use in system contingencies and OR activations. The IESO should consider the system value of such contingency energy in reference levels. Such energy needs to be either offered as a different category or at a high enough price to reflect its value and avoid dispatch outside of contingencies.
  b. If a resource has only one unit hour of energy available, the energy could be scheduled as one hour of energy, or as many hours of OR (extending for the entire duration of its storage horizon). The opportunity cost for that quantum of energy should reflect the total OR revenue that an energy dispatch would cause it to forego.
  c. Similarly, resources with a Maximum Number of Starts Per Day (MNSPD) incur energy and OR opportunity costs. For example, if a resource exhausts its MNSPD by HE6, it will be unable to provide OR for the remaining hours of the day. The reference level will need to capture a higher offer price that reflects both lost opportunity costs for OR as well as any energy costs.
  d. Cascade resources incur an opportunity cost for all stations in the cascade. When an energy dispatch at one generating station requires the other stations to generate or spill due to SEAL restrictions, all stations on the cascade incur an opportunity cost. These multiple opportunity costs will need to be included in the reference levels at each station.

- The IESO should present worked examples of both the Storage Horizon and Intra-day Opportunity Cost calculations to assist MPs in understanding the workbook. The sample table of LMPs provided in section 2.4.6.2 was helpful, but OPG believes that a fully worked example in the implementation phase would allow MPs to provide more insightful feedback.

#	Section/Work book	Comment Name	Detailed Comment
1	2.4.6 Opportunity Costs	**Opportunity Cost (Volatility)**	OPG recommends that the Opportunity Cost adders include a real time volatility index based on individual interval prices. Each interval's dispatch can require a hydroelectric resource to synch or de-synch, generate water reserved for later in the day, or cause additional cascade impacts. The resource incurs an opportunity cost in all of these situations, and the IESO's current calculation does not consider that interval prices can be higher than the average hourly price. For example, an interval priced at $60 / MWh may drive dispatches at a hydroelectric resource, but the hourly price that is used by the opportunity cost calculation may be much lower. The opportunity cost adder needs to consider this real time volatility if it is to accurately represent costs for generators.
2	2.4.6 Opportunity Costs	**Storage Horizon Opportunity Cost (Clarity Required)**	Please provide clarity on the definition and registration process for the storage horizon. OPG interprets this term to describe the maximum length of time in days that a resource can store energy before operational restrictions require it to generate that energy. For a hydroelectric resource, such a value varies substantially with water conditions, discharge from upstream stations, and regulatory requirements - all of which may change hourly. Requiring this value to be updated regularly by market participants seems overly complex and of little benefit. For simplicity, OPG recommends that the storage horizon value included in the workbooks reflects the maximum storage horizon (i.e., under low-flow conditions).
3	2.4.6 Opportunity Costs	**Storage Horizon Opportunity Cost (Seasonality)**	OPG appreciates the IESO's work to update the Opportunity Cost calculation to include the Storage Horizon opportunity cost and Intra-day Opportunity Cost. By using the previous 28 days' LMPs as an input to the calculation, the new formula will likely correlate better with market prices. However, the look back period results in inaccurate opportunity costs during any period where market prices are significantly higher than they were in the historical study period. For example, at the beginning of summer or winter, prices are higher than in the shoulder seasons preceding them. This results in low opportunity cost adders that do not capture the higher market prices that historically occur during summer and winter. To partially mitigate this issue, OPG is recommending that the IESO considers: I. a 90 day look back period, and / or II. a multiplier that accounts for seasonal price variations.

#	Section/Work book	Comment Name	Detailed Comment
4	2.4.6 Opportunity Costs	**Storage Horizon Opportunity Cost (Use of NY Zone A)**	The storage horizon opportunity cost calculation uses the ratio of NYZA forward DAM prices to settled DAM prices to calculate the On-Peak and Off-Peak multipliers. OPG assumes the intention of this factor is to adjust for differences between forecasted LBMPs and settled LBMPs in Ontario. OPG agrees that a basis to account for forecast errors is necessary. However, the structural differences between Ontario and New York's markets may cause the chosen measure to be inaccurate. For example: I. Differences between each market's generation fuel mix may lead to differences between forward/settled bases. II. Ontario is currently a net exporter, while Zone A receives imports from Ontario and flows directionally eastward to Zones G, J, and K. III. The Ontario DAM timeline is not aligned with NYISO DAM timelines (which closes at 05:00 EPT). This is significant because the NY DAM is solved prior to Next Day Gas trading later in the morning which ultimately determines the physical gas price. Every market has dynamics that may not reflect those in Ontario and relying on a single zone's price might lead to inaccurate opportunity costs. OPG suggests that a better approach would be to also include price data from Ontario, MISO Indiana Hub and PJM West Hub. A broader selection of data might resolve the issues with using a single zone in the calculation.
5	2.4.6 Opportunity Costs	**Storage Horizon Opportunity Cost (On- & Off-Peak Multipliers)**	OPG suggests that the use of unique multipliers for On- and Off-Peak hours may not reflect current dynamics in Ontario. Penetration of variable generation has led to a more complex price profile, often leading to a mid-afternoon "drop out" period caused by embedded solar. OPG understands that there may be practical factors that make On- and Off- Peak multipliers easier to implement, but the IESO should review the efficacy of such measures on a regular basis and adjust accordingly.
6	2.5.2.1 Total Fuel-Related Costs (Hydroelectric)	**Adjustments to GRC formula**	OPG appreciates the IESO's work to update the Gross Revenue Charge (GRC) reference price component to reflect the marginal rate. This method is better aligned with the actual method of calculating GRC and should better reflect MPs' actual costs.

#	Section/Work book	Comment Name	Detailed Comment
7	3.4.1.6 MGBDT (Thermal)	**Clarity on Acceptable forms of Documentation**	In the IESO's response to stakeholder feedback on the August 27 Reference Level Guide, the IESO states: *"Market participants must provide minimum generation block down time and supporting documentation with recommendations from the OEM on minimum time required for the resource. This documentation that shall include the resource shutdown curve and relevant limitations on the equipment recommended by the OEM before the resource can be restarted after a shutdown."* This requirement seems inconsistent with the IESO's statement that they would in general accept: *"...documentation developed by the relevant market participant, evaluated on a case by case basis by the IESO."* Please clarify for which cost categories the IESO will require OEM documentation and / or recommendations.
8	4.2.4 Energy Reference Quantity for Hydroelectric Resources	**Registration of minimum head-based capability**	OPG appreciates the IESO's work updating the Energy Reference Quantity calculation to align with the minimum head-based capability of the resource. This value is more accurate and simpler than the DEL-based proposal in the August 27 pre-reading document. Please explain how the minimum head-based capability will be registered and the process for updating this value. Will this term be strictly limited to use in MPM or will it be used by the calculation engines?
9	4.2.4 OR Reference Quantity for Hydroelectric Resources	**OR Reference Quantities should be based on minimum head-based capability**	The proposed OR reference quantity calculation is based on four different (winter/summer on-peak/off-peak) OR ramp rates. Most hydroelectric units, however, are limited by energy capability, not ramp rates. To simplify the calculation, OPG proposes the use of a single OR reference quantity based on a resource's minimum head-based capability and adjusted for operational restrictions that might limit OR capability. This is similar to the energy reference quantity, and better reflects the changing capabilities of hydroelectric resources. De-rates to a resource's OR capability could be communicated to the IESO via Ancillary Service or Protection Out of Service (ASPOOS) slips. The IESO indicated they were open to the use of ASPOOS slips for OR de-rates in Comment #212 of their response to feedback on the MPM detailed design document.
10	4.2.4 OR Reference Quantity for Hydroelectric Resources	**10S and 10N Operating Reserve Quantities should be credited for other categories**	In the current market, participants offering 10S operating reserve can be scheduled for 10N and 30R operating reserve. If the IESO continues to make use of this flexibility after Market Renewal, it should be reflected in the operating reserve reference quantities. This would simplify calculations, as a resource offering 10S OR in excess of its 10S OR reference quantity could be credited as offering 10N and 30R categories. Similarly, 10N offers above the 10N reference quantity should be credited for 30R.

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11	2.5.1.5 Total Fuel-Related Costs	**Use of Alternate Fuel Index**	Section 2.5.1.5 was modified to state: *"Market participants may request use of either a different fuel index, or a modification to use of the Dawn hub price to account for distance from the Dawn hub. These modifications will be evaluated on a case-by-case basis."* OPG appreciates this clarification and looks forward to developing a solution with the IESO for thermal generators whose gas transportation costs do not solely rely on the Dawn Hub price.