MRP Market Power Mitigation Reference Level Guide and Workbooks

Stakeholder Feedback Form

Date Submitted:	**Feedback Provided By:**	
2020/09/29	Company Name:	Ontario Power Generation
	Contact Name:	Jeffery Sauer
	Contact Email:	[redacted]

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General feedback on Reference Level Workbooks and Guide

OPG appreciates the opportunity to provide comments on the IESO Reference Level Cost Workbooks and August 27, 2020 *Reference Levels and Reference Quantities Pre-Reading Document*, acknowledging the high level of detail contained in each document. OPG believes that more time is necessary to analyze the implications of the IESO's reference level design framework and looks forward to the opportunity to provide constructive recommendations where needed. OPG has also reproduced some of its comments on the *Market Power Mitigation Detailed Design 1.0,* given their relevance to the development of reference levels and greater ease in cross referencing between comment submissions. Feedback to some of these concerns will affect the types of cost categories and the frequency of dynamic updates. OPG looks forward to the IESO's feedback on our comments, and to our constructive discussions in the up-coming resource-specific Reference Level Workbook sessions.

The comments below primarily refer to Hydroelectric facilities. However, some general comments that were included in OPG's September 24, 2020 submission are repeated below due to their relevance to hydroelectric facilities.

General:

- The IESO should clarify expectations and obligations regarding the differences between the derived Reference Price levels and actual Market Participant (MP) offer behaviour in the markets. It is not explicitly clear if the IESO expects MPs to offer at the price levels specified in the workbooks, which form the basis for the Reference Level. If the IESO does not have any expectation of MP offer behaviour in the context of MPMF, then it should be explicitly clear that in the context of the IESO General Conduct Rule (GCR), there are no assumed obligations on the MP to offer at their Reference Price Levels, and in fact, subject to the GCR, MP are not obligated to offer in any prescribed manner.

- In addition to the comment above, OPG seeks clarity that MPs are not obligated to provide costs for inclusion into the workbooks which do not actually reflect those costs included in offers, but subject to clarification of the above comment, may have the option to do so.

- The market power mitigation process needs to recognize that OPG has filed costs as part of our regulatory rate filing that are subject to the jurisdictional authority of OPG's economic regulator, the OEB. Other costs have been negotiated with OPG's contract counterparty, the IESO. Any potential difference between some of these costs in the regulated / contractual process and the market power mitigation process as a result of a different methodology or approach in their derivation needs to be carefully reviewed with the IESO.

- Section 3.2.3 of the Single Schedule Market High Level Design discusses the potential for market power abuse via uneconomic production, which the IESO describes as occurring when resources intentionally offer below cost in order to increase their settlement price. As the document states:

"The IESO will determine when resources are contributing to congestion and if their offers meet criteria specific to uneconomic production. In this case, mitigation will result in offers being increased to their reference levels."

This language is inconsistent with Tables 3-5, 3-7, 3-9 of the *Market Power Mitigation Detailed Design 1.0*, which state that resources whose offer prices are below $25/MWh will be excluded from economic withholding tests. The IESO should clarify whether it intends to develop a process for mitigating uneconomic production.

Hydroelectric Resources:

- Chapter 7 Section 3.4.4A of the *Market Rules* states:

  "Every submission of dispatch data with respect to a self-scheduling generation facility or an intermittent generator shall specify a price, in $/MWh, at and below which the applicable registered market participant reasonably expects to reduce the energy output of such self-scheduling generation facility or intermittent generator to zero. Such price may be zero or negative but may not be less than negative MMCP."

  Since the negative offer prices required by the above rule fall below the lower price threshold of $25/MWh specified by the IESO in the *Market Power Mitigation Detailed Design 1.0* Tables 3-5, 3-7, and 3-9, OPG believes the information required by the Hydroelectric price workbook may be excessive. As a minimum OPG proposes that self-scheduled and intermittent generators be exempt from mitigation.

- A historical comparison of OPG's offers to the estimated reference levels based on the IESO workbook appears to indicate that the cost components and proposed estimations are not accurate. Depending on the constrained area application, there are resources that may exceed reference level thresholds on a daily basis. Such an outcome in practice would prove inefficient for both OPG and the IESO. OPG's offer strategy has been discussed in several Market Surveillance Panel (MSP) reports. See, for example, *MSP Report 32* issued July 2020:

  "...when water is scarce – either in times of drought or when water storage levels behind the dam are below capacity – hydro generators may increase offers to reflect water scarcity and the high opportunity cost of precluding generation in the future when prices are high. They will store water when they expect that stored water will earn a higher price in the near future. Time-shifting of output based on these opportunity costs and some ability to store water results in opportunities for these generators to provide energy when it is most valuable to the system..."

  Additionally, the *Monitoring Document: Monitoring of Offers & Bids in the IESO-Administered Electricity Markets* issued March 2010 indicates the MSP:

"...recognizes that, in practice, the storage capacity and the time horizon over which energy can be produced affect the alternatives available to a hydro generator. Variations in water flows and storage levels can lead to changing opportunity costs for a plant in different hours. Moreover, decisions must be made on a forecast basis by the generator at the time that offers are finalized. The Panel considers the imperfect information that generators have when estimating their opportunity costs or making allocation decisions, rather than assuming perfect information based on after-the-fact outcomes."

Flexible hydroelectric has value in its ability to provide energy when real time demand exceeds forecasts, often by displacing carbon-emitting resources like natural gas or oil. If reference levels are too low, the IESO may schedule flexible hydroelectric in the Day Ahead time frame at the reference price due to market power mitigation. The outcome may be the scheduling of energy exports to other jurisdictions, instead of providing real time flexibility in Ontario. Depending on the degree of over-scheduling, the reduction in real time flexibility could persist for days as storage reservoirs refill. The opportunity cost component of hydroelectric should reflect this value to avoid limiting system flexibility.

- The consultation process will need to be an extensive collaborative discussion between market participants and the IESO. The IESO should recognize that each hydroelectric plant and river system is unique in terms of both its water management plans and operational/physical constraints. Determining opportunity costs during periods of low flows combined with operational constraints is particularly complicated. A blanket approach for all hydroelectric units is not feasible. The process for determining the energy offer curves will likely require further review on a monthly or seasonal basis based on prevailing conditions.

- Day Ahead schedules for energy limited resources create a new risk for the market participant to physically manage resources to both meet day ahead schedules and to provide flexibility in the real-time market. In comments submitted following the economic withholding stakeholder session held on September 27, 2019, OPG identified the following situations where risk premiums may be required to address costs:

  I. When the Day Ahead Market closes at 10:00 EPT of current day, the market participant is already committed to the remaining hours of the current day (HE11-24) and has submitted offers that may lead to a generation schedule for 24 hours in the day ahead;
  II. Due to cascade operation of hydroelectric stations, there is a risk that the remainder of the day's schedule would need to change at multiple stations to balance the cascade river system recognizing that it is an energy limited resource. A risk premium on offer submissions would allow hydroelectric resources to offer at a price that would include the costs of providing the generation either earlier or later than the day-ahead schedule in order for the system to use this flexibility if required in real time.
  III. This change from a day-ahead schedule to a real-time schedule could also necessitate changes at upstream and downstream stations resulting in the possible unintended use of water and the potential for spill.
  IV. This can become even more complicated with the balancing market settlements for both energy and operating reserve at a number of different hydroelectric stations.

V. A risk premium is necessary to allow a market participant to offer flexibility in real time above the day-ahead schedule taking into account the need for physical schedule changes in future hours for both energy and operating reserve.

- Setting reference quantities for hydroelectric will be challenging given that offer quantities rely on available head/flows. OPG highlighted this concern and proposed an alternative approach in OPG's comment submission following the Physical Withholding stakeholder session in January 2020. The comment is reproduced below and we look forward to the IESO's written feedback to address OPG's concern and alternative proposal:

  The IESO's proposed methodology for calculating reference quantities (page 6 of the *Market Power Mitigation Detailed Design 1.0*), states:

  "For energy, the initial estimate of the reference quantity shall be equal to the unit's installed capacity (or the IESO's centralized forecast for variable generators), modified by any relevant operating restrictions or de-ratings."

  This proposal does not consider changes to hydroelectric capability that occur due to changes in hydraulic head. A unit's actual head and thus hourly capability fluctuates in real-time based on operating conditions including: water inflow, discharge (based on IESO dispatch), upstream and downstream relationships, lake level and river flow limitations, station storage characteristics, etc.

  Under this proposal, prior to day ahead market submissions, OPG anticipates that market participants would be required to submit hourly derates/outages based on forecast expectations of head with expected hourly capabilities for the next day. In real time, hydroelectric operating conditions are re-evaluated/reconciled every hour, which will likely require revision to the previously submitted derates/outages for the remainder of the day. This approach could significantly increase the administrative burden on both market participants and IESO operations staff.

  In our comments on the *Market Power Mitigation Detailed Design 1.0,* OPG proposed registering a new parameter called "minimum head-based capability" for each hydroelectric generator which can then be used to calculate a physical withholding reference:

  Physical Withholding Reference Level (single unit) = Max ((min head-based capability - derates/outages), 0)

  The above calculation could then be summed for resources with more than one unit. Hydroelectric units would register this new parameter as part of facility registration.

- Ex-ante offer mitigation for economic withholding may override a market participant’s offers causing facilities to operate in a manner not intended by market participants. This could compromise a market participant’s ability to manage its resources efficiently and ensure compliance with operating limits.

- Hydroelectric resources can be energy limited and offers are used to reflect the opportunity cost of water in what is expected to be the most valuable hours. If these offers fail the conduct and impact test, the ex-ante engine automatically overrides the market participant’s offers with reference prices. This could result in MPs declaring SEAL limitations as reference prices may not accurately represent the opportunity cost of the water, as it is a dynamic value. This may also have operational implications on the market participant and lead to sub-optimal market outcomes.

- The IESO's strategy of establishing reference levels for non-financial data is not suited to hydroelectric. Hydroelectric characteristics can change significantly within seasons and even months and a simple winter/summer divide is not sufficient. OPG proposes that during the reference level negotiations a process is established that will allow daily inputs by market participants to be used in the reference level curves for energy and operating reserve.

- OPG encourages the IESO to recognize that some hydroelectric generators can be connected to the electricity system in different configurations. In these cases, the registered resource in the IESO-Administered Market (IAM) may be the output transformer, while the generators that inject via that transformer can vary based on configuration. Reference levels for these resources may need to be developed at the generator level, rather than the IESO resource level.

#	Section/Workbook	Theme	Comment Name	Detailed Comment
1	Hydroelectric	Incorrect label	**Operating Reserve Cost Component Typo**	Cell B20 in workbook incorrectly labeled 'Opportunity Costs' – should be labeled Operating Reserve.
2	Hydroelectric Workbook	Startup Costs & Speed-No-Load Costs	**Startup Costs, Speed-No-Load, and Condense Costs Should be Accepted for Hydroelectric**	OPG believes that there are incremental costs associated with Startup/Shutdown, Speed-No- Load, and Condense mode for hydroelectric resources. If market participants can quantify and justify these costs through documentation, they should be accepted as an input to reference levels by the IESO.
3	Hydroelectric Workbook	Startup and Shutdown Costs	**Opportunity Costs Associated with Operational Limitations**	OPG believes that there is an opportunity cost associated with different operational limitations for hydroelectric resources. Such limitations may prevent a resource from generating during hours with higher LMPs, and MPs should be able to include these costs in their reference levels. This is over and above the establishment of the hydroelectric parameters. Some examples of limitations are: I. Limits on startup/shutdown cycles, II. Cascade operational limitations, and III. Contingency energy reserved for Operating Reserve. As an example, consider a resource with a limit of one synch/desynch per day. If that resource is dispatched to generate in HE7, and then dispatched offline in HE8, it will be unable to generate for the rest of the day, foregoing any revenue later in the day.

4	Hydroelectric Workbook	Opportunity Cost for Operating Reserve	**Incremental Opportunity Cost Exists for Operating Reserve**	OPG maintains there is an incremental cost associated with providing operating reserve. When a resource is scheduled for operating reserve, the resource's energy dispatches are limited to account for the quantity dispatched for operating reserve. In this way the resource is unable to collect the potentially higher energy LMP for the portion of its capacity supplying operating reserve. If the resource is eventually required to spill water as a result of its OR schedule, the resource may not be held whole by a make whole payment alone, as the make whole payment will only assess the current hour and not the remaining hours of the day. An incremental opportunity cost for OR would allow the market to joint optimize energy and OR based on market drivers for both products. An OR incremental opportunity cost should at minimum incorporate the energy LMP of the resource and any risk premium required to mitigate buying back a day ahead position for energy. Finally, resources within the same cascade may be prevented from generating because an upstream resource has been scheduled for operating reserve. These examples all represent an incremental opportunity cost that should be accepted by the IESO in development of reference levels.
5	2.4.6.1 Opportunity Cost	Economic Reference Level	**Opportunity Cost Floor Price**	The section states that the minimum value for the opportunity cost adder is $0/MWh. Please provide the rationale for this floor price. Some resources may incur a negative opportunity cost, i.e. avoided costs (e.g., Must-run Hydro resources) which incentivizes the unit to remain online. As stated in OPG's general comments above, the IESO has been inconsistent about its intentions to mitigate negatively priced resources. If resources can be mitigated for negative prices, the framework should allow for negative opportunity costs.

6	2.4.6.1 Opportunity Cost	Opportunity Costs	**Opportunity Cost Calculation Does Not Capture Price Variation**	OPG is concerned that the formula proposed by the IESO does not accurately capture opportunity cost. **Prior Year LMPs:** The use of prior year LMPs in the calculation could cause unintended outputs, given the many other variables that may vary from year to year, such as: I. Large generator outages. II. Transmission outages – outages caused by extreme weather events such as tornadoes are not planned and may lead to periods of higher/lower LMPs. III. River flows – during freshet, when river flows reach their peak, a large portion of hydroelectric capacity is priced low to reflect the surplus of water. This can result in lower market prices. The timing and severity of freshet, however, is highly variable year to year. IV. Changes in weather, which impact demand as well as variable generation. V. Intermittent restrictions on water systems by governmental bodies, such as the Ministry of Natural Resources. Such phenomena are temporary and may have little bearing on prices a year later. A year with lower than average LMPs would reduce the supposed opportunity cost in the next year, even though the conditions that caused those lower LMPs may have changed. This could lead to overly restrictive reference levels. **Day Ahead Union Dawn NGX Price:** It is OPG's understanding that the IESO intends to account for year-to-year price variations by using the Day Ahead Union Dawn NGX Price. OPG believes that such a measure would not capture the volatility of the electricity market as electricity prices are not sufficiently coupled with natural gas prices. Natural gas prices can be impacted by factors not strongly linked with electricity prices, including storage availability, extreme weather events near production facilities or pipelines, and demand for natural gas as a heating fuel in winter. Further, Ontario's energy prices can

				be set by more expensive oil burning resources. The prices of these resources should not be expected to vary linearly with the price of natural gas, as the IESO's calculation supposes. OPG proposes that an index tied to forward electricity prices may yield a more accurate opportunity cost adder. Some indices that could be used include: I. Ontario forward electricity prices. II. Forward electricity price curves of connected jurisdictions, such as NYISO or MISO. OPG is aware of third-party vendors that could provide such information, and the IESO should engage these entities to provide input into a more robust opportunity cost adder.
7	2.4.6.1 Opportunity Cost Calculation	Opportunity Costs	**Opportunity Cost Calculation Does Not Value Scarcity**	The section states that the Opportunity Cost Adder is the 95th percentile value of the set of hourly ratios multiplied by the NGX Union Dawn Day Ahead Index. OPG notes that the calculated opportunity cost could be lower for a resource with a longer storage horizon. For example, if the LMPs in the fourth day of a look back period were much lower than the LMPs in the first three days of the period, the 95th percentile value for a resource with a four-day storage horizon would be less than the 95th percentile value for a resource with only three days of storage. In this scenario, the resource with a four-day storage horizon would be said to have a lower opportunity cost than the resource with a three-day storage horizon. An opposite scenario could yield higher opportunity costs for the resource with a four-day storage horizon. If, rather than the 95th percentile, the IESO used the maximum LMP in the look back period, the results would be consistent. OPG finds this treatment of opportunity cost inconsistent and, as stated above, believes a forward-looking methodology would be more useful and accurate.

8	2.4.7 Speed-No-Load Costs	Economic Reference Level - Hydro	**Speed-No-Load costs for Hydroelectric Resources**	The section states that speed-no-load costs reflect: "*…the fuel burn that would be hypothetically consumed if the resource were to back down to a zero power output while staying synchronized to the IESO-controlled grid.*" OPG argues that since hydroelectric resources do operate in such a manner, the cost component is not "hypothetical". Further, this mode of operation results in a loss of water through the unit with no related production. OPG believes that such operation has an associated opportunity cost.
9	2.5.2.1.1 Gross Revenue Charges	Economic Reference Level - Hydro	**GRC Formula Does Not Reflect Marginal Cost**	The proposed contribution from the Gross Revenue Charge (GRC) is lower than the marginal GRC rate paid by market participants. As per section 92.1 (4) of the *Electricity Act, 1998* the GRC is calculated similar to a progressive tax bracket, where the marginal GRC rate for a resource increases with its energy production. Therefore, the marginal cost to generate will always be the highest GRC rate the resource qualifies for. The proposed methodology of averaging past GRC costs therefore does not capture the marginal cost for generators.
10	2.5.2.1.1 Gross Revenue Charges	Economic Reference Level - Hydro	**GRC Formula May Have Unintended Outputs**	Further to the above, any cases where a resource has an abrupt change in GRC costs may lead to overly restrictive reference levels. For example: I. Any resource that receives a GRC holiday exemption from the Ministry of Finance for a period of ten years will have an artificially low average GRC. When the period ends, the reference level will be based on those artificially lower GRC values, and thus not representative of the actual GRC rate for the resource. II. Any resources that undergo major maintenance will have significantly lower generation in the maintenance year(s), and thus lower $/MWh GRC cost. The lower GRC rate from the maintenance year would reduce the reference level for the resource for the next 10 years. III. The retirement of large assets may significantly increase the total generation required from hydroelectric resources. Reference levels based on the GRC prior to these retirements may not reflect actual GRC after the retirements. An accurate GRC calculation would need to adjust for the above changes. OPG notes that a GRC formulation based on market participants' forecasted production could address these variations.

11	2.5.2.1.1 Gross Revenue Charges	Economic Reference Level - Hydro	**List of GRC Components is not Exhaustive**	As the IESO states in the section, the provided list of GRC elements is not exhaustive. An example of an additional cost that may vary with production is the St. Lawrence Seaway Water Conveyance fee. OPG expects that if MPs can document and substantiate additional costs, the IESO should accept them as part of the reference level.
12	2.5.2.2 Operating and Maintenance Costs	Maintenance Cost Categories	**List of Eligible Incremental Variable Maintenance Costs is not Exhaustive**	OPG views the list of eligible maintenance costs provided by the IESO as incomplete. Any other incremental variable costs that can be documented, quantified, and substantiated by MPs should be accepted in the reference level workbooks.
13	2.5.2.4 Opportunity Costs	Incorrect Reference	**Opportunity Cost Typo**	In section 2.5.2.4 Opportunity Costs – incorrect reference to Section 2.4.5, it should be referencing Section 2.4.6 Opportunity Cost.
14	4.2.1.1 Methodology for Dispatchable Hydroelectric Resources that have Submitted a Maximum DEL	DEL	**Energy Reference Quantity Does Not Account for Real Time Schedules**	The IESO's formulation of energy reference quantity for energy limited resources is the DEL from the previous day, less the DAM schedule from the previous day. This approach does not account for real time dispatches or Operating Reserve activations above DAM schedule from the previous day, which would reduce DEL for current day. OPG recognizes that in the DAM timeframe, real time production values are not yet available, but suggests that real time reference quantities should account for dispatches above the DAM schedule.
15	4.2.2 Methodology for Dispatchable Hydroelectric Resources that have not Submitted a Maximum DEL	Reference Quantity Calculation	**Calculation is subject to annual variation**	The section states that the reference quantity for hydroelectric resources will be based on: *"Data for the same calendar date from the previous 7-years of energy production of the resource is collected for each hour in a dispatch day."* OPG asks the IESO to provide rationale for the 7-year look back period proposed in section 4.2.2 to calculate the hydroelectric reference quantity. OPG suggests that outlier years (e.g., years with higher than normal river flows) could reduce the accuracy of the proposed calculation.

16	4.2.2.1 Methodology for Dispatchable Hydroelectric Resources that have not Submitted a Maximum DEL	Reference Quantity	**Clarification Needed**	In its discussion of reference quantities for hydroelectric resources that have not submitted a DEL, the guide states: *"If an outage or de-rate has occurred in any hour of the past seven historical years, the quantity of that outage or de-rate is added back to the hourly production identified."* OPG reads this statement to imply that, for the purposes of calculating the Outage Adjusted Hourly Production MW value, resources that were on outage in a look back period will contribute their full capacity to the calculation. If this is true, the IESO's calculation would result in a higher reference quantity for resources that are frequently on outage. OPG suggests this procedure would introduce excessively high reference quantities. The IESO should also provide clarification about the method of calculation of the resources capacity.
17	4.2.2.2 Operating Reserve	Operating Reserve Resource type incorrect	**Operating Reserve Quantities for Hydroelectric Resources not Listed.**	Sections 4.2.2.2.2 and 4.2.2.2.3 are in the hydroelectric operating reserve reference quantity section but refer to thermal operating reserve. OPG believes this may be a typo but would like clarification.