

# IESO Response to Feedback on MRP Energy Draft Reference Level and Reference Quantity Methodologies – Written Guide and Workbooks



Below are the IESO’s responses to stakeholder feedback on the draft written guide and workbooks, as published as pre-reading materials for the August 27, 2020 meeting on market power mitigation reference levels and reference quantities.

ID	Stakeholder	Stakeholder Feedback	IESO Response
1	Gemini Power Corp	<p>It is not clear that the information to be collected is really helpful in defining short or long term incremental costs. Hydro generation costs are typically described as PUEC [O+M+A] \$/MWhr TUEC [ PURC+ CAPEX] \$/MWhr and LUEC \$/MWhr which represents is a long term levelized total cost.</p> <p>For hydro stations these costs are very dependent on capacity factor ,plant head, hydrological characteristics of the site which usually determine plant type (Run of River or Peaking) and physical characteristic of the control dam, spill ways ,number of units as well as the age etc</p> <p>Unlike Pump Generator Stations and Gas Fired Plants the dispatch of a hydro station is largely dependant on the conditions of the day and not any short term specific costs for that day</p>	<p>Only dispatchable resources are subject to market power mitigation.</p> <p>Short-run marginal costs are eligible to be included in financial reference levels. Long-term costs necessary to keep the resource in service and available are not included in the energy or operating reserve market reference levels.</p> <p>Operating and maintenance costs that are incurred as a result of providing incremental supply of energy or operating reserve are eligible to be included in reference levels. O&amp;M costs that do not vary as a result of incremental supply of energy or operating reserve, referred to as fixed O&amp;M costs, are not eligible costs and cannot be included in determining a reference level.</p>
2	Gemini Power Corp	<p>There are no “hydro industry cost standards” FERC Form 1 is a possible proxy to the extent of the reporting accuracy. The best information in this area will probably be the OPG hydro plant costs, Those developed by the ORNL US Dept of Energy <a href="https://www.energy.gov/sites/prod/files/2018/04/f51/Hydropower%20Market%20Report.pdf">https://www.energy.gov/sites/prod/files/2018/04/f51/Hydropower%20Market%20Report.pdf</a> [ref page 59] and those under study by CEATI International</p>	<p>The IESO acknowledges that costs do vary in accordance to plant characteristics. When considering if costs follow general industry standards, various benchmarks will be considered, including those referenced in the comment.</p> <p>Market participants may provide relevant benchmarking studies to support its costs.</p>

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3	Gemini Power Corp	<p>“Cost Workbook for Reference Levels - Hydro Resources”</p> <p>The costs as outlined in the B1 of the workbook seem limited and not fully capture the wide range of hydro facility operation, maintenance, and capital cost components related to the production of energy, capacity, auxiliary services, water management, environment public safety, heritage ,and regulatory requirements</p> <p>By way of illustration a listing of those components that appear not to be included:</p> <ul style="list-style-type: none"> <li>Static Excitation</li> <li>Station service</li> <li>Power House Cranes</li> <li>Main Power house building and storage facilities</li> <li>Main Power Dam</li> <li>Water storage and control dams</li> <li>Spill ways, weirs</li> <li>Sluice gates &amp; operating structures</li> <li>Head gates &amp; hoists</li> <li>Log Lifters and dam stop logs ( hundreds)</li> <li>Roads &amp; bridges ( many km year round maintenance including snowplowing )</li> <li>Fencing –security systems</li> <li>Public safety systems –navigation buoys</li> <li>Log booms</li> <li>Control Rooms (In plant and remote)</li> <li>Regulatory monitoring reporting (MNR,MOE,TSSA,MOL,HONE,IESO,MOT, Nav Canada etc)</li> <li>Possibly for clarity the first sentence in B1 could be expanded for clarity</li> <li>“Major maintenance refers to all expenditures [for clarity meaning capital , non-standard, routine and administration ] related to hydro plant component maintenance repairs, replacements, maintenance activities or inspection of the resource that occur during the resource’s life.” (and or its retirement or required upgrade such as “transfer trip” )</li> </ul>	<p>The cost components that were proposed in the comment do not vary as a result of incremental supply of energy or operating reserve, and therefore they are not eligible costs for determining the reference level as per page 8 of the written guide.</p>
4	Gemini Power Corp	<p>C- 1 An emphasis may have been placed on start stops ; I note that the additional labour per Start Stop is n/a ...In cases of those plants not having automated sluice gates and or remote control there will be an additional labour per start stop especially in winter and if the plant is not staffed 24/7</p> <p>C-2 Similarly a start stop Maintenance adder is n/a being accounted for via an EOH adjustment ? more explanation needed</p>	<p>Any costs that are short-run marginal costs and vary with incremental supply of energy or operating reserves are eligible to contribute to a reference level.</p> <p>Costs submitted by market participants will be evaluated on the basis of that criteria.</p> <p>The inclusion of those fields in the hydro workbook was an oversight, as those resources do not submit start offers or speed no load offers.</p> <p>The workbook will be updated to address this issue. This change does not represent an IESO view on short-run marginal costs of a hydro resource; it aligns the fields in the workbook with the offer parameters available to hydro resources.</p>

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5	Gemini Power Corp	<p>Referencing the 2017 Hydropower Market Report April 2018 Prepared for Prepared by the U.S. Department of Energy Oak Ridge National Laboratory Water Power Oak Ridge, Tennessee 37831 Technologies Office Managed by UT-Battelle, LLC for the U.S. Department of Energy  <a href="https://www.energy.gov/sites/prod/files/2018/04/f51/Hydropower%20Market%20Report.pdf">https://www.energy.gov/sites/prod/files/2018/04/f51/Hydropower%20Market%20Report.pdf</a>                      “» Daily hydropower generation profiles in ISO/RTO markets are highly correlated with electricity use patterns; the hydropower feet provides substantial load-following flexibility. During fall and winter, generation from hydropower follows the early morning and mid-evening electricity demand peaks; in summer, there are sustained hydropower ramps from mid-morning to late afternoon in all ISO/RTOs, especially in CAISO, MISO, and PJM. In CAISO, solar generation profiles also influence the daily hydropower generation profile significantly.”</p> <p>“» Unit availability ratio—the number of hours that a hydropower unit is connected to the grid or stands ready to connect as needed divided by the total number of hours in a period—decreased over the last decade for all hydropower unit size categories as well as PSH units. From 2005 to 2008, the availability ratio in these ISO’s was 84% for large units, 85% for small units, and 88% for PSH units. The 2009-2016 average availability ratio has been 81%, 83%, and 83% for those three unit types respectively. General economic conditions played a role in reduced availability during the recession and subsequent period of weak electricity demand. A slight rebound is visible in 2012 but, after that, it has declined again except for PSH units.”</p> <p>“» A trade-off between planned and unplanned outages is visible when comparing the change in availability factor for large and small units. For large and PSH units, planned outages accounted for approximately 80% of total outage hours in the last 4 years and the average number of forced (i.e., unplanned) outages did not surpass 450 (the equivalent of 3 weeks) any year since 2013. For small units, however, forced outages have been more than 50% of total outage hours in the last 4 years. Since O&amp;M costs per kW installed are highest for small units (&lt; 50 MW ) and the cost of an unplanned outage is highest for larger units, plant owners tend to concentrate their O&amp;M budgets on the latter.”</p>	<p>Generator availability trends are accounted for in determining reference levels through the inclusion of eligible operating and maintenance costs.</p>

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6	Gemini Power Corp	<p>The emphasis in the calculation model appears to increase the ramping frequency and rates of the Province of Ontario’s Hydro assets. A consequence of this may be that the decline in reliability (and consequent cost increases) will likely trend as in other ISO’s as the Ontario assets are smaller and older</p> <p>The OPG reported availability in 2009 was 93.6 % and in 2017 88.0%</p> <p>[OPG Annual Reports <a href="https://www.yumpu.com/it/document/read/9023256/2010-annual-report-ontario-power-generation">https://www.yumpu.com/it/document/read/9023256/2010-annual-report-ontario-power-generation</a>]</p> <p>Given that the aggressive starting /stopping and off efficiency ramping of units might result in the low availability of hydro in other ISO’s and loss of as 800MW of hydro generation being available with the consequent loss of energy generation it would seem prudent to undertake forecast studies</p>	<p>The Market Renewal Program is adding additional parameters into the design so that hydroelectric units can provide the more complete picture on their flexibility. Please refer back to the Detailed Design discussion on what those additional parameters are, and how that information will be used in the renewed market.</p>
7	Gemini Power Corp	<p>In addition to the Hydro Work book I have by comparison reviewed that of the Thermal Resources. In particular I note that the plan is to identify the Incremental Heat Rate and the Heat Rate of the fuel. These two thermal statistics highlight that the same considerations are not noted for the Hydro Resources. The equivalent of a heat rate for a hydro unit is its mechanical electrical unit efficiency usually defined as a percentage %</p> <p>Given that a hydro unit is in reasonably condition the best efficiency lies in the range of 85 to 90% Over the full non -damage operating range of a hydro its low to high output the efficiency will be in the range of 30% at low loads ,to 90% at best efficiency, usually reducing to 85% at full power</p> <p>The hydro equivalent of the heat rate of the fuel essentially relates the hydraulic head across the facility that determines the water to electric conversion efficiency within the designed , again expressed in KW/cms</p> <p>By way of illustration (and unlike Thermal units the characteristics are essentially fixed by natural flow conditions given Ontario has negligible storage</p> <p>OPG’s Aquasabon GS having a net head of 91.0 m at 745 KW/cms , Arnprior GS net head 21.2m 176 KW/cms Mcvitti GS 11,5m 85KW/cms</p>	<p>The heat rate for thermal resources is used to calculate the fuel cost.</p> <p>The Fuel Cost for hydro is covered by the Gross Revenue Charges. These charges are based on energy generation only (regardless of how much water the station uses), and therefore unit efficiency does not come into the equation for the fuel cost.</p>
8	Gemini Power Corp	<p>As a final suggestion I would urge that every effort be made to simplify the MRP calculation engine as the information requirements outlined in the workbooks are very onerous and in many instances will just not be available to any level of accuracy however fiercely demanded</p>	<p>The IESO is thankful to stakeholders for their time and effort in reviewing this documentation, and bringing forward their comments and suggestions to improve the design of the renewed market. We are looking for opportunities to streamline and reduce the burden on participants, and look forward to discussing those opportunities with stakeholders.</p> <p>In order to establish a reference level of a value greater than \$0.10/MW, market participant must provide eligible supporting documentation. A market participant that requests a reference level lower than \$0.10/MW is not required to provide any supporting documentation.</p>

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9	Power Advisory	For variable (i.e., wind and solar) generators (VGs), the proposed short-run marginal cost components seem reasonable, and are in-line with short-run marginal cost components used within U.S. wholesale electricity markets.	The IESO has looked to neighbouring jurisdictions for advice on how to build a Market Power Mitigation framework, and while there are many similarities with neighbouring markets, the IESO has worked to reflect the intricacies and nuances of the Ontario market.
10	Power Advisory	For hydroelectric generators, the proposed list of short-run marginal cost components is a good starting point to begin discussions between hydroelectric generators and IESO. Because hydroelectric generation facilities are very site specific regarding their costs, IESO should expect wide variation of actual costs across all hydroelectric generation facilities. It is not clear why certain costs (e.g., labour, etc.) that are incremental relating to energy production or operating reserve (OR) supply were not including within the list of short-run marginal cost components. Opportunity costs will require analysis and further discussions, as this concept must necessarily respect the characteristics of respective hydroelectric generation facilities to produce energy and supply OR given facility-specific operational capabilities, while effectively valuing energy and OR within the IESO-Administered Markets (IAM). The Consortium notes that within the Hydro Resources Workbook that short-run marginal cost component #E.1 definition of opportunity cost is listed as “to be provided by IESO” within the “Definition of Cost Components” worksheet. The Consortium strongly believes an open and constructive dialogue is needed to collectively determine applicable opportunity costs – both definition and methodologies for calculations.	<p>Costs that are eligible to be included in reference levels are those that vary with incremental supply of energy or operating reserves. The IESO welcomes comments regarding eligibility of specific costs.</p> <p>The IESO looks forward to discussing resource-specific characteristics and their potential impact on determination of opportunity cost in the one-on-one consultations with market participants starting in 2021.</p>
11	Power Advisory	For energy storage resources, the Consortium notes that integrating most energy storage technologies within all wholesale electricity markets is relatively new, and notes the lack of experience within U.S. wholesale electricity markets regarding application of market power mitigation to most energy storage resources (i.e., other than pumped storage). Even though there presently are no ‘hybrid’ energy storage resources co-located with VGs within Ontario, the Consortium is curious to learn and explore how ‘hybrids’ will be addressed within market power mitigation, as ‘hybrids’ are rapidly being developed and integrated within many wholesale electricity markets.	<p>The IESO designed the approach for reference levels and quantities for energy storage resources based on how these resources currently participate. Hybrid resources are currently out of scope.</p> <p>New storage technologies or changes to the participation model in the IESO-administered markets will be accommodated in the mitigation framework on an as-needed basis.</p>
12	Power Advisory	The Consortium is pleased and supports IESO’s revised proposal to use their centralized forecast energy production for VGs as Reference Quantities rather than the initial proposal of using capacity factors (or similar) for VGs as had been used within past IESO power system planning documents.	The IESO appreciates the feedback that the approach to setting variable generation reference quantities is appropriate.
13	Power Advisory	Nameplate capacity less planned outages and de-rates is a reasonable starting point to determine Reference Quantities for energy storage resources. Due to the newness of most energy storage technologies being integrated within wholesale electricity markets, the Consortium supports IESO’s position to update methodologies to determine Reference Quantities for these resources.	The IESO designed the approach for reference levels and quantities for energy storage resources based on how these resources currently participate. New storage technologies or changes to the participation model in the IESO-administered markets will be accommodated in the mitigation framework on an as-needed basis.

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14	Power Advisory	<p>The proposed two methodologies to calculate Reference Quantities for hydroelectric generators with a maximum daily energy limit (max DEL) and without a max DEL require more discussion and analysis. This is because of potential deviations from offer quantities and actual dispatch resulting from estimates of minimum available energy (in the case of max DEL being applied) and use of historical energy production profiles (in the case without max DEL being applied). That is, both methodologies may or may not be accurate indicators of actual energy production capability or actual capability to supply OR within real-time dispatch hours and intervals. This is a good example where market participant (MP) recourse needs to be clarified if respective hydroelectric generators become subject to physical withholding mitigation unfairly.</p>	<p>Based on stakeholder feedback, the IESO has modified the methodology for energy reference quantities for hydro resources. The newly adopted methodology relies on minimum head-based capability of each resource to determine energy reference quantities for hydro resources.</p> <p>The written guide will be modified to reflect the specifics of this approach.</p> <p>The process to assess physical withholding includes a consultation step, at which point the market participant is able to provide relevant materials to the IESO regarding the reference quantity of the resource.</p>
15	Power Advisory	<p>Reference Levels based on short-run marginal costs, and their application when mitigation has been applied, limit revenues generators and other resources can receive within IAM through energy and OR markets. Therefore, when these generators are mitigated this way, fixed cost recovery and return on investments cannot fully be recovered and met. The Consortium believes this dynamic exacerbates the need for capacity revenues from Capacity Markets (as administered in NYISO, ISO-NE, and PJM). Further, where full Capacity Markets are not administered within respective U.S. wholesale electricity markets (e.g., MISO, SPP, CAISO, ERCOT), other forms of 'out of market' revenues, through contracts or regulated rates, are then typically used to ensure fixed cost recovery and return on investments for generators and other resources.</p> <p>Therefore, the Consortium believes that given the proposed design of the Conduct &amp; Impact Test relating to application of Reference Levels to mitigate for economic withholding, this will necessarily result in the need for Ontario to continue using contracts, supplemented with Capacity Auctions (i.e., participation from some, but not all, resources), to ensure fixed cost recovery and return on investments. The Consortium further believes these points then place more importance on IESO working with MPs and stakeholders through the forthcoming IESO Resource Adequacy stakeholder engagement<sup>4</sup> towards developing a workable and effective framework to ensure resource adequacy within Ontario, including the use of contracts as a procurement mechanism resulting from competitive procurement processes. The Consortium looks forward to continuing dialogue and analysis regarding Reference Levels and Reference Quantities within future IESO stakeholder engagement meetings, including meetings between IESO and individual Consortium members and/or sub-groups (by fuel-type and technology).</p>	<p>There is an ongoing discussion with stakeholders regarding Resource Adequacy, and how to meet Ontario's future resource needs.</p> <p>The IESO is committed to on-going reference levels and quantities engagement with market participants.</p>

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16	Power Advisory	<p><u>Comparison with Other Wholesale Electricity Markets</u>                      We note that four U.S. wholesale electricity markets administer Conduct &amp; Impact Tests (i.e., NYISO, ISO-NE, MISO, and SPP).                      The Consortium requests IESO to provide data/information on the short-run marginal cost components relating to Reference Levels, methodologies used to determine Reference Levels, and methodologies used to determine Reference Quantities, within U.S. wholesale electricity markets that administer Conduct &amp; Impact Tests.                      The Consortium also requests IESO to provide commentary on the application of Reference Levels and Reference Quantities within applicable U.S. wholesale electricity markets regarding:</p> <ul style="list-style-type: none"> <li>• Frequency of changes to Reference Levels and Reference Quantities;</li> <li>• Frequency market power mitigation actually applies resulting in revisions to respective offer prices and applicable changes to financial settlements and charges to MPs; and,</li> <li>• Framework for oversight including governance, decision-making, and MP recourse relating to establishing Reference Levels and Reference Quantities, changes to financial settlements, and application of financial charges and penalties.</li> </ul>	<p>Information on the short-run marginal cost components in other jurisdictions is publicly available. This information can be found in their relevant tariffs or market manuals. The IESO will not be gathering this information.</p> <p>The IESO has no data on how frequently market participants in other jurisdictions change registered reference levels or quantities. In the Ontario market, these data should be kept up to date .</p> <p>Data on application of ex-ante mitigation is sparse, though some aggregated data are reported in the relevant state of the market reports for various jurisdictions. These reports generally indicate that ex-ante mitigation is applied at a frequency of low single digit percentage.</p> <p>The IESO is developing a proposal for an independent review process of reference levels and quantities. This proposal will be shared with stakeholders later in 2020.</p>
17	Power Advisory	<p><u>Other Aspects of Market Power Mitigation Need Specific Stakeholder Engagement</u>                      The Consortium is pleased to have the opportunity to provide comments on IESO’s proposed Reference Levels and Reference Quantities. We are also pleased that during the August 27, 2020 IESO webinar (i.e. MRP Implementation – Market Power Mitigation), IESO stated that they have been reviewing submissions from MPs and stakeholders and have determined that a revised draft version of Market Power Mitigation Detailed Design 1.0 (i.e., issue 2.0) will be released this fall.                      In addition to scheduled stakeholder engagement meetings regarding Reference Levels and Reference Quantities, IESO needs to plan and schedule for additional stakeholder engagement meetings to address other components within the market power mitigation framework. For example, as discussed within the Consortium’s July 31, 2020 submission commenting on the draft Market Power Mitigation Detailed Design 1.0, IESO needs to further engage on the conditions to test for market power mitigation. That is, MPs need to clearly and transparently understand how IESO will determine Constrained Areas, as all applicable generators and other resources located within respective Constrained Areas will then be assessed by IESO for potential exercise of market power and potential mitigation under the Conduct &amp; Impact Test.</p>	<p>The IESO is committed to transparency of its market power mitigation processes and decision-making. The IESO is in the process of responding to feedback regarding the posted Market Power Mitigation Detailed Design 1.0 and will publish responses to the feedback.</p>

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18	Power Advisory	<p><u>Need for Enhanced Governance, Decision-Making, and Recourse</u></p> <p>Also as stated within the Consortium’s July 31, 2020 submission commenting on the draft Market Power Mitigation Detailed Design 1.0, and in previous Consortium submissions dated February 20, 2018 and December 1, 2017<sup>5</sup>, the framework for governance, decision-making, and MP recourse within other wholesale electricity markets provides MPs and stakeholders with more robust input and/or decision-making authority regarding market design changes and rule amendments, as well as regulatory oversight, compared to IAM. Regarding regulatory oversight, for all U.S. wholesale electricity markets under the Federal Energy Regulatory Commission’s (FERC’s) authority<sup>6</sup>, FERC has oversight regarding wholesale electricity market rules or their equivalent. Therefore, specifically for market power mitigation, all design changes and rule amendments are ultimately decided by FERC through transparent and inclusive regulatory proceedings.</p> <p>The Consortium is particularly concerned by the inclusion of Reference Levels and Reference Quantities within applicable IESO Market Manuals, considering that Market Manuals are not subject to any appeals to the Ontario Energy Board (OEB) – that is, only amendments to the IESO Market Rules can be appealed to OEB.</p> <p>Therefore, the Consortium recommends that IESO reconstitute the Governance and Decision-Making Advisory Group<sup>7</sup> now to begin working with IESO, and then MPs and stakeholders, towards further enhancements to the framework of governance, decision-making, and recourse within IAM – specifically regarding all relevant aspects of IESO’s proposed market power mitigation framework, including but not limited to Reference Levels and Reference Quantities.</p>	<p>The IESO understands the significance of an enhanced governance process to our Market Participants.</p> <p>The IESO is continuing to act on the advice of the Governance and Decision-Making Panel, including looking at opportunities for additional participant recourse. The IESO will be engaging stakeholders on an independent review process for reference levels and quantities, as a response to the Panel’s advice, and the comments from stakeholders.</p>
19	Power Advisory	<p>Considering the importance and financial implications of market power mitigation, including but not limited to IESO application of Reference Levels and Reference Quantities, proposed IESO timelines are too tight – especially considering the very technical nature of the market power mitigation framework planned for by IESO and its newness to IAM and its MPs.</p>	<p>The IESO is taking a tailored approach to stakeholder engagement efforts, and is always open to the consideration and advice of stakeholders.</p> <p>Recognizing the importance of these discussions to stakeholders, we have started the Reference Level and Reference Quantities discussions early, to accommodate for the time needed, and the importance of these issues.</p> <p>We will be working with stakeholders throughout 2021 to engage and bring these discussions to an effective conclusion.</p>
20	Power Advisory	<p>Within generation companies, key staff that do not have responsibilities to track the Market Renewal Program (MRP) and all of its planned changes need to be engaged so as to comment on IESO’s proposed Conduct &amp; Impact Test components (e.g., Reference Levels, Reference Quantities, etc.), and then be in position to prepare for technology-specific then facility-specific discussions with IESO.</p>	<p>Recognizing the importance of the MPM Framework, the IESO is working to provide considerable notice, and transparency to these deliberations, in the hope that stakeholders can have the opportunity to discuss within their organizations the input and the expertise needed to participate effectively in these discussions.</p>

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21	Power Advisory	For some generators (e.g., hydroelectric generators in particular), IESO proposed Reference Levels and Reference Quantities will require time to reach agreement, with potential for 'negotiation-like' meetings lasting over multiple months.	<p>The IESO agrees that the process to determine reference levels and quantities will take significant time and has accounted for these requirements accordingly.</p> <p>Technology-specific engagement sessions about the approach for setting reference levels and quantities are scheduled to occur until the end of 2020.</p> <p>Starting in 2021, the IESO will work with Market Participants to establish reference levels and reference quantities for each relevant resource.</p>
22	Power Advisory	More clarity is needed regarding what "Final Posted Materials" are being scheduled for December 2020 – is this relating solely to the technology-specific Workbooks and their cost components or something additional?	<p>"Final Posted Materials" refers to the revised technology specific workbooks and the written guide.</p> <p>The written guide will be used to inform drafting of the reference level market manual. The final posted version of the written guide will account for stakeholder feedback received during the technology-specific sessions. The written guide and workbooks will be used by market participants to determine reference levels and reference quantities for relevant resources starting in 2021.</p>
23	Power Advisory	What are the timelines to finalize facility-specific Reference Levels and Reference Quantities?	<p>Starting in 2021, the IESO will work with Market Participants to establish reference levels and reference quantities for each relevant resource.</p>
24	Power Advisory	Decisions made regarding facility-specific Reference Levels and Reference Quantities will have financial implications for generators, which will then have implications for MRP-related amendments to contracts triggered by MRP-related amendments to the IESO Market Rules, therefore timelines to amend contracts need to be factored in.	<p>The IESO has accounted for time to carry out any required contract amendments to existing contracts as a result of the Market Renewal Project.</p>
25	Power Advisory	As stated above, MPs require enhanced governance, decision-making, and recourse within IAM (especially applicable to the market power mitigation framework within MRP), and therefore this needs to be addressed and resolved as soon as possible – otherwise the planned timelines in the graphic below will simply not be met.	<p>The IESO understands the significance of an enhanced governance process to our Market Participants.</p> <p>The IESO is developing a proposal for an independent review process of reference levels and quantities. This proposal will be shared with stakeholders later in 2020.</p>
27	Energy Storage Canada	Recognizing energy storage resources are relatively new to wholesale electricity markets there is limited ability to leverage the learnings of other ISO/RTOs in how reference levels are developed. In general, the cost components for energy storage align with those for other resources within the market but also those developed in other markets. The one exception is allocation of station service. The proposal does not define a process to measure the station service consumption required in the operation of a storage facility.	<p>Section 2.5.6.2 of the written guide describes the two possible approaches for accounting for station service costs for energy storage resources in determination of financial reference levels. These approaches vary according to the configuration of the resource.</p> <p>The first approach is for resources where station service is provided behind the meter and the second approach is for resources where station service is provided using a separate feed with its own revenue meter.</p> <p>The IESO is open to discussing any additional necessary configurations which are not addressed by these two approaches.</p>

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28	Energy Storage Canada	<p>Another concern is the calculation of “Opportunity Cost”. The reference levels will be utilized in all market timeframes but the value of quick responding energy storage resources in real-time is different than Day-Ahead or Pre-Dispatch and as such the opportunity cost for this asset should be reflected in a real-time reference level. Mitigating real-time offers and limiting the economic opportunity might reduce the incentive for these resources to provide additional flexibility.</p>	<p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.</p> <p>The mandatory offer window restricts offer changes closer than 2 hours to real-time. As a result, market participants have no ability to modify offer prices in real-time to respond to short-notice changes in conditions, including changes to opportunity cost.</p>
29	Northland Power	<p>First off, just a general comment about the process. Establishing the methodology for this process is a very important one to the generation community. Providing such a short turn around for comments (~2 weeks) really is not sufficient when asked to review a 70+ page detailed document and multiple workbooks. Hopefully the IESO can provide more time in the future for participants to be able to review and provide comments on time. Regarding the workbooks, this gets into some very specific information that requires business users to coordinate responses with facility operations at times to understand the types of costs or to try and interpret what the IESO is seeking based on the description in the workbook. Therefore providing comments on the workbooks is better suited for when the IESO kicks off individual technology related discussions and the IESO has an opportunity to explain the workbooks in greater detail.</p>	<p>The IESO acknowledges that participating in Market Renewal is a significant draw on limited stakeholder resources and the time that stakeholders take to participate is appreciated.</p> <p>The IESO understands that the topic of reference levels and reference quantities is complicated and a priority issue. The intent was to provide a significant amount of time for review of these materials.</p> <p>The IESO posted materials on August 13 and requested comments by September 15. In total stakeholders were allowed almost 5 weeks of review time with the reference level materials.</p> <p>The IESO will continue to work with stakeholders to assure that we allow sufficient time to prepare for these topics, while balancing the timing requirements to meet the targeted go-live date in 2023.</p>

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30	Northland Power	<ul style="list-style-type: none"> <li>Section 4 – “Inputs required for the calculation of reference quantities can vary according to seasonality. Market participants shall provide summer and winter values for parameters and inputs used in the determination of reference quantities where applicable. If the default approaches described in this section do not account for the specific operational characteristics of a resource in a reasonably complete manner, market participants may submit requests for modifications to this methodology to be applied on a resource-specific basis. Any such requests must be accompanied by supporting documentation to the IESO during the Facility Registration process. The IESO will review and consider use of these modifications where appropriate to establish the reference quantity for each resource.”                             <ul style="list-style-type: none"> <li>This statement addresses some concerns I have laid out below related to seasonality. It would have been better to see this statement up front to understand this was being considered. I have not changed my comments below to reemphasize the point where necessary.</li> </ul> </li> </ul>	<p>The IESO has added language in Section 1 of the written guide to clarify that seasonality can impact reference levels and reference quantities.</p>
31	Northland Power	<ul style="list-style-type: none"> <li>Section 1 - Page 4, second paragraph – <i>“Reference levels for non-financial dispatch data parameters are IESO-determined estimates for a resource’s operational capabilities. Examples of non-financial dispatch data parameters are energy ramp rate and lead time.”</i> &amp; <i>“The IESO will determine reference levels for financial and non-financial dispatch data parameters of each resource”</i> <ul style="list-style-type: none"> <li>I get that my interpretation of the phrase IESO will determine may just be semantics, however in my opinion this should say approved. This process can’t be like the RT-GCG preapproved value framework where the IESO determined values that the IESO accepted as reasonable for the broader generation community for simplicity without taking into account individualistic costs and risks for generators. Comparing a CES style contract that has a 20 year PPA with the IESO with a off contract generator that has no contract whatsoever is not a fair comparison, and the IESO needs to consider all costs that a generator incurs in coming up with reference levels. If a generator has no other market ability to recover its costs that they otherwise would via a capacity payment mechanism, then how does the IESO expect this facility to recover its costs to continue operating? Also, each facility is unique in its operating characteristics which will depend on O&amp;M and Fuel related contracts they have in place. Again, comparing assets that have a 20 year PPA where fixed costs are recovered vs. a generator that does not can’t be ignored.</li> </ul> </li> </ul>	<p>The IESO will review this language in the written guide and make changes to clarify the issue of whether reference levels are IESO determined or IESO approved.</p> <p>The IESO notes that in the event that documentation does not exist to support a non-financial reference level, the IESO could be required to use OEM information for similar equipment to determine the appropriate reference level.</p> <p>In regards to the comment on fixed costs, energy reference levels are intended to support efficient energy market outcomes. Such outcomes are achieved from offers representing short-run marginal costs. The IESO Resource Adequacy stakeholder engagement provides the opportunity for dialog regarding Ontario's future resource needs and procurement.</p>
32	Northland Power	<ul style="list-style-type: none"> <li>Section 2 – Page 5, first paragraph – “The IESO uses a cost-based approach to determine financial reference levels for eligible resources before they can participate in the IESO-administered markets.”                             <ul style="list-style-type: none"> <li>This implies that the IESO will use a generator’s costs and we would reiterate it has to be their actual costs, not those determined by the IESO</li> </ul> </li> </ul>	<p>Reference levels for each resource will be based on the short-run marginal costs of that resource.</p> <p>For each cost category, the written guide describes the approach that will be taken to determine the appropriate reference level for each resource.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
33	Northland Power	<ul style="list-style-type: none"> <li>• Section 2.4 – “The IESO has designed the financial reference levels to include all short-run marginal costs (SRMCs).”                             <ul style="list-style-type: none"> <li>o Is this clear what types of costs are included in SRMC? Does the IESO plan on being prescriptive or open to interpretation?</li> </ul> </li> </ul>	<p>The written guide states the criteria for what constitutes an eligible cost and provides specific line item costs that are eligible or not eligible where they have been identified to date.</p> <p>Additional line item costs that are not explicitly addressed in the written guide are eligible where they meet the eligibility criteria in the written guide. These costs will be submitted by the market participant with the workbooks and relevant supporting material. Where the IESO finds them to be eligible, they can be accounted for in the relevant reference level.</p>
34	Northland Power	<ul style="list-style-type: none"> <li>• Section 2.4.2 – “Fossil fuel resources are allowed to include the costs associated with emissions based on the relevant emissions policy, such as the Federal Carbon Pricing Backstop, and the emission rate. This rate indicates the quantity of emissions by the resource for each MWh of power produced.”                             <ul style="list-style-type: none"> <li>o The RT-GCG program is defining what the allowable GHG methodology will be. Will this match the decisions made in that program?</li> </ul> </li> </ul>	<p>The IESO will use an approach for representing emissions costs that is consistent with the relevant legislation. The approach that will be used for the mitigation framework is found in Section 2.4.2 and other applicable sections. These sections have been updated based on the recent emissions policy changes in Ontario.</p>
35	Northland Power	<ul style="list-style-type: none"> <li>• Section 2.4.4                             <ul style="list-style-type: none"> <li>o Participants have gone through a similar process when having fuel and O&amp;M values pre-approved from the RT-GCG Framework several years ago and recently going through the process of refreshing those values for the next 3 years. Will participants be able to leverage those reports in this process? The IESO is leveraging the same consultant in that process as this one. It would be helpful to leverage as much of that information and determinations already made by the IESO, where appropriate, as they may or may not reflect actual costs and not just those determined to be reasonable costs.</li> </ul> </li> </ul>	<p>While there are some apparent similarities between the underlying costs that both the RT-GCG pre-approved values and the reference levels identify, there are fundamental differences between the RT-GCG program and market power mitigation. Pre-approved RT-GCG values are not determined in the same manner as reference levels will be determined.</p> <p>When reviewing and approving reference level submissions for resources, the IESO intends to take advantage of synergies from the work that has been done to date on the RT-GCG pre-approved values. However, given that the pre-approved values for the RT-GCG were intended to address a different quantum of costs than reference levels, the occurrence of any such synergies may be limited.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
36	Northland Power	<ul style="list-style-type: none"> <li>• Section 2.4.4.1 – “The design life of the resource is the number of years that the resource was expected to operate for at the time that it came into service. Design life is established with the market participant as part of determining reference levels.”                             <ul style="list-style-type: none"> <li>o This seems very subjective. Some of these assets went COD 30 years ago. How would this be determined? To answer this questions relies heavily on the maintenance program a facility applies.</li> <li>o How long is your new car expected to last when you first buy it? I don’t see any OEM indicating you’ll be able to drive your car for 10 years? It obviously depends heavily on how many km’s you drive, whether they are highway/city, what maintenance you perform or don’t perform, how you drive your car, etc.</li> </ul> </li> </ul>	<p>Design life is typically established in the design basis for a facility. The design basis for a generation facility will have a specific design life mentioned in design documentation and it is not fluid. The design life used to make key decisions for allowances and material selection in a generation facility. (e.g. tube thickness allowances in boilers when the boiler is designed and manufactured).</p> <p>Design life is used to test whether proposed expenses are intended to extend the life of the asset and would not be a considered a sustaining maintenance activity.</p> <p>Maintenance activities to maintain the asset in current condition will be considered eligible.</p> <p>In the example of car, this point is illustrated in the difference between regular maintenance (e.g. oil change) and electing to buy a new engine for your car.</p> <p>When setting reference levels for go-live of market renewal, market participants will be required to provide relevant supporting documentation that identifies the remaining expected design life of the resource. Relevant documentation can be in the form of design documentation for the resource or reputable studies and assessments of generation facility life.</p>
37	Northland Power	<ul style="list-style-type: none"> <li>• Section 2.4.4.1 – “Any costs associated with performance improvements of a resource or any life extension activities beyond the design life established during the initial process to determine reference levels are ineligible costs and may not be included in reference levels.”                             <ul style="list-style-type: none"> <li>o Some of these resources are 30+ years old, how does the IESO expect that this type of documentation may exist? Why would any upgrades since the initial build be excluded? Also, what if facility has made modification to its facility since it was first build and swapped out parts with not-like for like parts?</li> <li>o I don’t understand why this matters to the IESO.</li> </ul> </li> </ul>	<p>Design life is typically established in the design basis for a facility. The design basis for a generation facility will have a specific design life mentioned in design documentation and it is not fluid. The design life used to make key decisions for allowances and material selection in a generation facility. (e.g. tube thickness allowances in boilers when the boiler is designed and manufactured).</p> <p>Design life is used to test whether proposed expenses are intended to extend the life of the asset and would not be a considered a sustaining maintenance activity. These expenses will not be considered eligible.</p> <p>Maintenance activities to maintain the asset in current condition will be considered eligible.</p> <p>In the example of car, this point is illustrated in the difference between regular maintenance (e.g. oil change) and electing to buy a new engine for your car.</p> <p>When setting reference levels for go-live of market renewal, market participants will be required to provide relevant supporting documentation that identifies the remaining expected design life of the resource. Relevant documentation can be in the form of design documentation for the resource or reputable studies and assessments of generation facility life.</p>

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38	Northland Power	<ul style="list-style-type: none"> <li>Section 2.4.6 – <i>"The opportunity cost adder is applicable for resources that can store fuel across a multi-day period or a "storage horizon". Where the opportunity cost adder does not address all relevant aspects of opportunity cost for a particular resource, market participants may request that the IESO add a resource-specific additional opportunity cost adder."</i> <ul style="list-style-type: none"> <li>What methodology will the IESO apply for the opportunity cost adder? Please be transparent about this. Will the IESO define this adder depending on how long the water can be stored for? For e.g. water that can be stored for 24 hours has a different value than water that can be stored for 7 days.</li> </ul> </li> </ul>	<p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.</p> <p>The IESO will account for storage horizon in opportunity cost calculations. Please refer to Section 2.4.6 for details on the methodology for determining Opportunity Costs in reference levels.</p>
39	Northland Power	<ul style="list-style-type: none"> <li>Section 2.4.7 – <i>" Thermal resources are allowed to submit different start-up fuel volumes for starting up from a cold, intermediate and hot state."</i> <ul style="list-style-type: none"> <li>Similar to comments we have previously made, the IESO did consider and did approve some generators to register a state referred to as "very cold start". The state that a Generating Turbines are in after 72 hours which may occur weekly if a generator was shut down Friday in the middle of summer and is off line for the weekend to then be restarted on a Monday is very different than if resources are shut down in the middle of winter, and are offline for a month. Bringing those resources back online will take much longer and it's unclear to me why the IESO fails to recognize this operating state.</li> </ul> </li> </ul>	<p>There are three thermal states in design ('hot', 'warm', and 'cold'). There is no explicit 'very cold' state in the design, as the 'cold' state design provides flexibility for values to be submitted that are 'colder' than the registered reference level for 'cold' via the conduct thresholds.</p> <p>Market participants will be able to choose the points on their lead time curve that show their desired hot/warm/cold reference levels. The choice of the cold lead time reference value is limited to ensure that the resource is able to be scheduled in a 24 hour look-ahead period.</p> <p>The limitation on the cold reference level is expressed via the following equation:</p> $24 \geq \text{MGBRT}_{\text{ref}} + \text{Cold Lead Time}_{\text{ref}} + 6$ <p>or</p> $\text{Cold Lead Time}_{\text{ref}} \leq 18 - \text{MGBRT}_{\text{ref}}$ <p>The value 6 above is derived from the combined conduct thresholds of 3 hours for the lead time and 3 hours for the MGBRT.</p> <p>A cold lead time reference level higher than this value could allow a market participant to prevent the resource from being scheduled through use of submitting a lead time parameter. Market participants should manage occasions when a resource has a lead time that is longer than this limit through use of outage slips, as the resource will not be able to be scheduled by the DSO due to the lead time.</p>
40	Northland Power	<ul style="list-style-type: none"> <li>Section 2.5.1.3.1 – <i>"Energy Reference Levels – Emissions Costs &amp; Start Up Reference Level – Up Emissions Costs"</i> <ul style="list-style-type: none"> <li>What methodology will the IESO be applying for this cost in the Energy Offer and Start Up costs? It would appear to me as the Start Up Reference Level ought to be a volume*\$, what methodology are participants expected to apply to apply Emissions costs per start?</li> </ul> </li> </ul>	<p>Please refer to Sections 2.4.2, 2.5.1.5.5, 2.5.1.7.3, and 2.5.1.9.1 for details and formula to calculate emission costs. Market participants are required to provide their calculation on how they allocate the emissions costs to start-up costs and energy offers.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
41	Northland Power	<ul style="list-style-type: none"> <li>Section 2.5.1.5.1 – <i>"For natural gas, the applicable NGX Union Dawn Day-Ahead Index price for the gas day in \$US/MMBtu is the acceptable fuel commodity index and the IESO will use the values published daily by Intercontinental Exchange where reasonably possible. Other fuel indices may be proposed. The IESO will ask participants to provide information explaining why the NGX Union Dawn Day-ahead Index price is not applicable for their facility."</i> <ul style="list-style-type: none"> <li>The IESO should consider adopting an NGX Union Dawn Day Ahead Index + basis. Given that the Dawn hub is the only liquid trading point in Ontario, it makes sense to use this price, however the IESO needs to recognize that depending on where a facility is located as well as the contracts it may (may not) have in place there are other variable costs that they incur. Recognizing the location of the facility as well as these other variable costs should be reflected in the adder applied to the NGX Dawn price.</li> </ul> </li> </ul>	<p>Market participants will be able to request use of either a different fuel index, or a modification to using just the Dawn hub price to account for distance from the Dawn hub. These modifications will be evaluated on a case-by-case basis. Where a methodology is supported by relevant documentation and appropriately reflects the relationship between the Dawn (or other) trading hub and the resource it will be eligible for use.</p> <p>The IESO will modify the written guide to make this clear.</p>
42	Northland Power	<ul style="list-style-type: none"> <li>Section 2.5.1.5.4 – <i>"Performance factors are the calculated ratio of actual fuel burn to either theoretical fuel use (design heat input) or the most recent heat rate performance test and can be represented by the following formula"</i> <ul style="list-style-type: none"> <li>Is this trying to capture seasonal efficiency? I'm a bit confused. This information is already provided to the IESO via Form 1230 that captures a range of temperatures representative of winter and summer conditions. How will this information be applied?</li> </ul> </li> </ul>	<p>Performance factor is intended to capture how efficient the resource is given ambient temperature. Where provided, performance factors can result in values for financial reference levels that differ according to the season. For example, a resource could have a higher energy or start-up reference level in the season when it is less efficient.</p> <p>Form 1230 contains information about the effect of ambient temperatures on maximum continuous rating, not on heat rates.</p>
43	Northland Power	<ul style="list-style-type: none"> <li>Section 2.5.1.6.1 – <i>"The contribution of each major maintenance cost to the relevant reference level is determined according to the formula for pro-rating these costs as provided in the following sections (either on an equivalent operating hour (EOH)-basis or on a per-start basis)."</i> <ul style="list-style-type: none"> <li>Just restating a previous question, whether the IESO will leverage the previous work completed in the RT-GCG Framework that provided evidence to support all of this and where the same consultants the IESO is leveraging for this process already reviewed and opined on the acceptable values for some of the same data requirements?</li> </ul> </li> </ul>	<p>While there are some apparent similarities between the underlying costs that both the RT-GCG pre-approved values and the reference levels identify, there are fundamental differences between the RT-GCG program and market power mitigation. Pre-approved RT-GCG values are not determined in the same manner as reference levels will be determined.</p> <p>When reviewing and approving reference level submissions for resources, the IESO intends to take advantage of synergies from the work that has been done to date on the RT-GCG pre-approved values. However, given that the pre-approved values for the RT-GCG were intended to address a different quantum of costs than reference levels, the occurrence of any such synergies may be limited.</p>

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44	Northland Power	<ul style="list-style-type: none"> <li>Section 2.5.1.6.1, top of page 27 <i>"The supporting documentation required from market participants is described in Section 2.3. The historical study period for scheduled maintenance costs for thermal resources is 5 years to determine the applicable contribution to the determination of the energy, start-up cost, or speed no-load reference level."</i> <ul style="list-style-type: none"> <li>What is this saying? Above it indicates costs are applicable for major maintenance cycle, yet not sure what's being referred to here for 5 years.</li> </ul> </li> </ul>	<p>As discussed in section 2.2 of the written guide, data regarding energy injections and costs incurred during the historical study period is used to determine the contribution of a specific cost to a reference level.</p> <p>For the energy reference level, the eligible value for a particular cost is calculated by dividing the total annual eligible costs per year from the historical study period by the MWh injections in that same year.</p> <p>For scheduled maintenance costs, the historical study period is 5 years. So the contribution of scheduled maintenance costs to the energy reference level is determined by dividing the total annual scheduled maintenance costs in each of the past 5 years by the energy injections for that year.</p> <p>The average annual value across the historical study period (in this case the past 5 years) is the amount that should appear in the energy reference level for scheduled maintenance costs.</p> <p>The written guide outlines the relevant historical study periods to apply for each technology according to the cost category.</p>
45	Northland Power	<ul style="list-style-type: none"> <li>Section 2.5.1.8 – <i>"The eligible speed no-load cost is the hourly cost required to hypothetically maintain the thermal resource in a speed no-load state. This type of hypothetical operation is not actually carried out by these resources. This reference level methodology uses the approach of separating the fixed hourly costs of synchronized operation from costs associated with incremental production. It is calculated as follows"</i> <ul style="list-style-type: none"> <li>Can you please define what fixed hourly costs this is referring to?</li> </ul> </li> </ul>	<p>The speed no load cost in Section 2.5.1.8 refers to fuel consumption that are potentially fixed on hourly basis.</p> <p>Depending on the resource, heat rate curves may show that there is some level of fuel consumption that is not attributable to incremental production.</p> <p>For example, if a resource had the following heat rate curve and incremental heat rate curve, some fuel cost is fixed and not attributable to incremental production:</p> $HR(MWh) = (5 * MWh^2) + (2 * MWh) + 5$ $\text{Incremental } HR(MWh) = 10MWh + 2$ <p>For this resource, the speed-no-load cost of fuel is 5.</p> <p>Another way of explaining the speed-no-load cost in section 2.5.1.8 is that it is the y-intercept of the heat rate curve.</p> <p>The presence of speed-no-load costs in reference levels does not signify that the IESO that will model NQS resources in this operating state (synchronized but not injecting). Rather, it is a method to allow reference levels to more accurately match the shape of cost curves, where appropriate.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
46	Northland Power	<ul style="list-style-type: none"> <li>• Section 2.5.1.9 – <i>“Speed no-load heat consumption is the minimum fuel burn that would be hypothetically consumed if the resource were to back down to a zero-power output while staying synchronized with the IESO-controlled grid.”</i> <ul style="list-style-type: none"> <li>o Is it fair to assume the amount of fuel consumed then in the 5 minute interval just before synchronization (multiplied by 12) represents the hourly value for this? If not, can the IESO please provide the methodology that participants should use or at least the methodology that the IESO will approve in calculating this cost.</li> </ul> </li> </ul>	See response to comment ID 45.
47	Northland Power	<ul style="list-style-type: none"> <li>• Section 2.5.2.4 – <i>“Eligible opportunity costs for hydroelectric resources include the opportunity cost adder. The dispatchable hydroelectric resource shall provide to the IESO the value, measured in a unit of time, of the maximum storage capability of its resource operating under normal conditions along with relevant supporting documentation. Supporting documentation of the storage capacity may include water management plans specific to the resource.”</i> <ul style="list-style-type: none"> <li>o Storage will always depend on the amount of inflows coming into the facility and the general water management plan of passing inflows with some variability. The IESO states under normal conditions. What does normal conditions mean considering the variability can change quite a bit throughout the year.</li> </ul> </li> </ul>	<p>The IESO will account for storage horizon in opportunity cost calculations. Please refer to Section 2.4.6 for details on the methodology for determining Opportunity Costs in reference levels.</p> <p>The opportunity cost methodology is intended to account for variability through the year either through incorporating relevant data inputs, or making assumptions about conditions which are not publicly available.</p> <p>Normal conditions refers to how the resources are expected to operate absent restrictions to competition.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
49	Northland Power	<ul style="list-style-type: none"> <li>Section 3.1.1.2 – <i>"The lead time reference level is determined for dispatchable non-quick start thermal resources. It is the amount of time, in hours, needed for a generation unit to start-up and reach its MLP from an offline state. The length of the lead time depends on the thermal operating state of the generation unit as either hot, warm or cold."</i> <ul style="list-style-type: none"> <li>Including season. Could take longer to bring a resource online in very cold state during winter vs cold state in summer.</li> </ul> </li> </ul>	<p>There are three thermal states in design ('hot', 'warm', and 'cold'). Although there is no explicit 'very cold' state in the design, as the 'cold' state design provides flexibility for values to be submitted that are 'colder' than the registered reference level for 'cold' via the conduct thresholds.</p> <p>Market participants will be able to choose the points on their lead time curve that show their desired hot/warm/cold reference levels. The choice of the cold lead time reference value is limited to ensure that the resource is able to be scheduled in a 24-hour look-ahead period.</p> <p>The limitation on the cold reference level is expressed via the following equation:</p> $24 \geq \text{MGBRTref} + \text{Cold Lead Timeref} + 6$ <p>or</p> $\text{Cold Lead Timeref} \leq 18 - \text{MGBRTref}$ <p>The value 6 above is derived from the combined conduct thresholds of 3 hours for the lead time and 3 hours for the MGBRT.</p> <p>A cold lead time reference level higher than this value could allow a market participant to prevent the resource from being scheduled through use of submitting a lead time parameter. Market participants should manage occasions when a resource has a lead time that is longer than this limit through use of outage slips, as the resource will not be able to be scheduled by the DSO due to the lead time.</p>
50	Northland Power	<ul style="list-style-type: none"> <li>Section 3.4.1.5 – "Market participant must provide minimum generation block run-time and supporting documentation with recommendations from the OEM on minimum time required for the resource." <ul style="list-style-type: none"> <li>This isn't really an OEM mandated value, this is in part an economic decision to reduce the amount of wear and tear on resources from the oscillation of resources up and down unnecessarily. The IESO should be prepared to provide evidence where they have seen this in OEM documentation to suggest it exists in OEM documentation as defined in the IESO market rules.</li> </ul> </li> </ul>	<p>The documentation provided to support a MGBRT reference level should be consistent with the documentation that is submitted today to register the MGBRT of a resource. Market participants in the current market submit a recommendation from the OEM on a value for MGBRT based on good operating practices for the equipment at the resource. This documentation would form the basis for approval of seasonal MGBRT reference levels.</p> <p>Where a participant already has a registered MGBRT and is satisfied with the same MGBRT reference value for winter and summer, no additional supporting materials need to be submitted. The IESO will use the currently-approved value of MGBRT as the MGBRT reference level.</p> <p>This language will be added to the written guide.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
51	Northland Power	<ul style="list-style-type: none"> <li>Section 3.4.1.6 – <i>"Market participant must provide minimum generation block down time and supporting documentation from the operating and maintenance manual for their resource that state the minimum number of hours after being dispatched below MLP after which the resource can reach MLP again."</i> <ul style="list-style-type: none"> <li>Is this referring to internal maintenance manual or from the OEM? If from OEM, please provide examples of where the IESO has seen this in previous OEM manuals as per definitions in the IESO market rules.</li> </ul> </li> </ul>	<p>Supporting materials for minimum generation block run-time should include the resource shutdown curve and relevant limitations on the equipment recommended by the OEM before the resource can be restarted after a shutdown.</p>
52	Northland Power	<ul style="list-style-type: none"> <li>Section 3.4.1.7 – <i>"The maximum number of starts per day is determined based on non-financial reference levels for lead time, minimum generation block run-time, and minimum generation block down time, rounded down to the nearest whole number"</i> <ul style="list-style-type: none"> <li>Interesting to see the IESO set this as a calculated value. To date this has always been a business decision to limit the wear and tear on equipment for inefficient dispatch to prevent units from being oscillated up and down unnecessarily. Please explain why this parameter is only being proposed for thermal resources and not other resources like hydroelectric? What's the methodology being applied for hydro facilities to determine the maximum number of starts per day?</li> </ul> </li> </ul>	<p>Maximum number of starts per day for thermal facilities is a calculable value based on the parameters described.</p> <p>For Hydro, using the same methodology would not provide a sensible limit given that they do not have MGBRTs or MGBDTs.</p> <p>The methodology for determining this reference level for hydro resources has been added to Section 3.4.2 of the written guide.</p>
53	Northland Power	<ul style="list-style-type: none"> <li>Section 3.4.1.8 – <i>"The number of hours required for the resource to ramp from synchronization to its MLP during normal operation when the resource is in a hot thermal state."</i> <ul style="list-style-type: none"> <li>I'm assuming normal operation in reference to a CCGT would be when the facility reaches its MLP and not individual turbines. You can't decouple individual resources and assess them in isolation for a CCGT. You must consider the plant overall.</li> </ul> </li> </ul>	<p>Ramp time of individual turbines can be assessed for times when the resource is operating in simple cycle mode of operation.</p> <p>The IESO will assess non-financial reference levels for combined cycle facilities based on the most restrictive configuration at that facility. For example, if the MLP of the facility in 1x1 configuration is the highest, the 1x1 MLP will be the MLP reference level registered for use when the resource is in combined cycle mode of operation.</p> <p>The IESO will modify the written guide to clarify this approach.</p>
54	Northland Power	<ul style="list-style-type: none"> <li>Section 4.1.1. – <i>"In the report, capability is measured as the maximum potential output of the resource under current conditions, which includes maximum unit de-rates and outages for that hour."</i> <ul style="list-style-type: none"> <li>Please clarify that current conditions also refers to ambient conditions.</li> </ul> </li> </ul>	<p>This report is informed by seasonal capacity numbers, which account for ambient conditions.</p>
55	Northland Power	<ul style="list-style-type: none"> <li>Section 4.2.1 – <i>"If multiple hydroelectric resources share a common forebay, and submit a common DEL that applies to multiple hydroelectric resources, then the IESO will determine a single operating reserve and energy reference quantity per dispatch day that will apply jointly to those hydroelectric resources."</i> <ul style="list-style-type: none"> <li>I won't say that I know every hydroelectric facility in the province, but I'm not familiar with any hydroelectric facility that shares a forebay. Can the IESO please explain how it's assessing whether a hydroelectric facility shares a forebay?</li> </ul> </li> </ul>	<p>Market participants will identify occasions when hydro resources share a forebay and provide supporting materials to that effect.</p> <p>Section 3.6.1 of the Registration detailed design document contains the subsection "Shared Daily Energy Limits" that describes this new registration parameter.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
56	Northland Power	General Workbook question – I see references to peak and offpeak – Can the IESO explain their definition of peak and offpeak and the significance of peak vs. offpeak in this process.	<p>It is possible that resources could have cost structures that vary according to whether the operating hour is a peak or off-peak hour. The mitigation design affords the ability for the relevant financial reference levels to so vary, where supported. For resources where costs do not vary according to peak or off-peak hours, no such variation is required.</p> <p>The reference to peak or off-peak applicability for NFRLs has evolved since this document was published and the IESO will update the workbooks to remove reference to on peak and off peak for NFRLs.</p> <p>Peak and off-peak definitions are consistent with IESO practice.</p>
57	Northland Power	<p>Has the IESO sat down with the Contract Management group at the IESO to understand the structure of contracts many generators may have with the IESO to identify where there are conflicting signals of ways to mitigate risk based on contracts (or lack thereof) vs. based on IESO’s expectations of Short Run Marginal Costs for these facilities?</p> <p>There is a process underway to review contracts in light of potential changes due to Market Renewal, and that process is connected to the process to codify the detailed design into Market Rules and Market Manuals.</p>	<p>Reference levels for each resource will be based on the short-run marginal costs of that resource. Reference levels are independent of contracts.</p> <p>For each cost category, the written guide describes the approach that will be taken to determine the appropriate reference level for each resource.</p>
58	OPG	<p><u>Reference Level Design:</u> Please confirm if the reference level design in the Day Ahead timeframe and the Real time frame will be different. Particularly for hydroelectric resources, there may need to be a different approach given the hourly variability in conditions and balancing risk between the two timeframes. Real time operations involve a variety of additional SEAL restrictions that cannot be accounted for fully in DA.</p>	<p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic. The intraday opportunity cost adder will be added to the reference level for use in the real-time market.</p> <p>The DAM and pre-dispatch calculation engine also respect the newly introduced hydroelectric operating parameters such as the maximum/minimum daily energy limit, hourly must-run and minimum hourly output.</p> <p>A resource minimum constraint will be used by the RT calculation engine to enforce the hourly must run dispatch data parameter. A resource minimum constraint will also be used to respect the minimum daily energy limit dispatch data parameter if the preceding PD calculation engine run determines this constraint to be binding for a resource across the dispatch day.</p> <p>Conduct and impact testing thresholds also provide for variability between the two timeframes. Market participants will be able to submit requests to update their reference level values for fuel cost issues up to 30 minutes before the close of the offer window for the DAM and the mandatory window in the real-time market.</p>

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59	OPG	<p><u>Reference Level Design:</u>                      Contrary to the IESO’s workbooks, OPG maintains that generators incur an opportunity cost for providing OR. The IESO process should use fuel costs, opportunity costs, risk premiums, etc., in the development of Operating Reserve (OR) Reference Levels during negotiations with stakeholders. Opportunity costs for OR reference levels are distinct and may be derived differently from the opportunity cost for energy.</p>	<p>As stated in Section 2.5.2.5, operating reserve reference levels are determined based on incremental costs incurred by the resource to make the operating reserve capability available.</p> <p>Costs that meet this criteria are eligible to contribute to an operating reserve reference level.</p> <p>Market participants are free to submit costs in the relevant workbooks and the IESO will evaluate those costs on the basis of the eligibility criteria.</p>
60	OPG	<p><u>Reference Level Design:</u>                      Reference quantities used in Economic Withholding may need to be different from the reference quantities used in Physical Withholding.                      On page 54 of the Market Power Mitigation Detailed Design 1.0, the design states:  <i>"For an energy offer, the IESO will establish an energy offer reference level curve for each set of dispatch data values. This will include up to 20 non-decreasing values of the energy reference level to form a monotonically increasing cost curve. This energy reference level curve will be used for the conduct and impact testing of the price quantity pairs submitted by the market participant."</i>                      Please clarify how the energy offer reference level curves will interact with the calculation of the physical withholding reference quantity. For some resources, the MW quantities associated with each offer lamination vary daily or hourly according to real time observations of weather, energy limits, operational constraints, and forecasted conditions. As these conditions cannot be predicted at the time of reference level negotiations, OPG finds the requirement to develop a reference level curve overly complicated and operationally restrictive.</p>	<p>The IESO does not use reference quantities in the assessment or application of mitigation for economic withholding. The reference level is used for this purpose.</p> <p>There is no requirement that a reference level must be have more than one point on a curve. Where the cost of production for a resource does not vary across potential production levels, the reference level will only have 1 value. It is only where the cost of production increases depending on how much a resource produces that the reference level curve will have more points on it.</p>
61	OPG	<p><u>Reference Level Implementation:</u>                      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. If the IESO does not have any expectation of MP offer behaviour in the context of MPM, 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, MPs are not obligated to offer in any prescribed manner.</p>	<p>Market power mitigation does not introduce an obligation to offer at prices consistent with reference levels. The IESO will include clarifying language to the written guide to that effect.</p> <p>Financial reference levels are only used by mitigation if competition is restricted and the resource fails the conduct and impact tests.</p>
62	OPG	<p><u>Reference Level Implementation:</u>                      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. As an example, if a resource has a negative opportunity cost (e.g., Must-run Hydro or Nuclear), this value would not be accepted in the IESO’s framework according to section 2.4.6.1, which states the floor price for opportunity costs is \$0/MWh. Would such a resource be obligated to offer in accordance with the \$0/MWh opportunity cost proposed by the IESO?</p>	<p>Market power mitigation does not introduce an obligation to offer at prices consistent with reference levels. The IESO will include clarifying language to the written guide to that effect.</p>

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63	OPG	<p><u>Reference Level Implementation:</u>                      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.</p>	<p>The goal of the MPM framework is efficient market outcomes; it is not a cost-recovery program. Such outcomes are achieved from offers representing short-run marginal costs.</p> <p>For each cost category, the written guide describes the approach that will be taken to determine the appropriate reference level for each resource.</p> <p>The IESO is developing a proposal for an independent review process of reference levels and quantities. This proposal will be shared with stakeholders later in 2020.</p>
64	OPG	<p><u>Reference Level Implementation:</u>                      OPG would appreciate further details on how the IESO intends to apply Administrative Pricing principles (Market Manual 4.3, Section 9) to LMPs (as opposed to the current uniform pricing) in the event reference prices are determined to be incorrect. This is important as the two-day timeline associated with the IESO issuing administrative pricing means participants must have the opportunity to appeal the issued reference price within two days. Section 3.15 of the Market Power Mitigation Detailed Design 1.0 states that if a participant disagrees with the IESO determined reference price and the price is not changed prior to dispatch <i>"Market participants will be able to submit a NoD when the reference level that was used as an input in the settlement process utilized a value for an eligible cost that was lower than ought to have been the case."</i> As the NoD process cannot be initiated until the preliminary settlement statement is received (ten business days after the fact), the IESO will be unable to administer prices with the correct reference prices. OPG believes a more expeditious process should be available for market participants to appeal reference prices prior to administrative pricing deadlines.</p>	<p>If an MP updates a reference level via a NOD, the IESO will only recalculate make-whole payments for the resource. It is not implementable for the IESO to re-settle the market in such a case. Therefore, a more expeditious process will not be made available for use.</p> <p>With a higher reference level, the make-whole payments for a resource can be increased. This can occur if the resource was found to be uneconomically scheduled when the higher reference level is applied.</p>
65	OPG	<p><u>Reference Level Implementation:</u>                      Section 3.13.1.1 of the Market Power Mitigation Detailed Design 1.0 states:  <i>"If a resource has not established an operating reserve reference level, the IESO will use a default reference level of \$0.10/MW."</i>                      A default reference level for OR would need to be negotiated with MPs. Foregoing such negotiations may not yield a collaborative outcome with maximum system benefit.</p>	<p>As per the Market Power Mitigation detailed design document, when a market participant submits a request for an energy or operating reserve reference level equal to or lower than \$0.10/MW, no supporting materials are required to be submitted.</p>
66	OPG	<p><u>Reference Level Implementation:</u>                      The first paragraph of Section 3.15 of the Market Power Mitigation Detailed Design 1.0 states:  <i>"As discussed in Section 3.13: Reference Levels, the IESO will set the cost-based reference levels for financial offers in advance of the day ahead market trading day. The IESO will provide market participants with an opportunity to update certain cost values that will be used to set the reference level for a resource prior to running the DAM, PD and the RT calculation engines as described in Section 3.13.1."</i>                      OPG would like some clarity on how these reference levels will be reported and at what time. OPG proposes that Reference Levels are published prior to DAM submission deadline and hourly during the Pre-dispatch timeframe for market participants to review and update their offers/bids accordingly.</p>	<p>Reference levels will be available to market participants before the DAM submission deadline in order to allow them to review them and update their offers accordingly. Timing of publication of the reference level report in the pre-dispatch timeframe will continue to be developed during this phase.</p> <p>The IESO is currently drafting Reference Levels and Reference Quantities market manual which will contain details on the process and timing of reporting and updating reference levels. This market manual will be available for market participant review in 2021.</p>

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67	OPG	<p><u>Reference Level Implementation:</u>                      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 MPs intentionally offer below cost in order to increase their settlement price. As the document states:  <i>"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."</i>                      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. Could the IESO confirm that this is consistent with their intent?</p>	<p>The quoted text is not part of the Market Power Mitigation framework in Detailed Design 1.0 and is no longer valid. The IESO confirms that energy offers below \$25/MWh will be excluded from tests for economic withholding.</p>
68	OPG	<p><u>Nuclear Resources:</u>                      The proposed reference level methodology for nuclear is overly complex with limited benefits to the IESO, market participants, and customers. OPG finds the proposed cost methodology does not align with the offer strategy employed by OPG described in the Market Surveillance Panel (MSP) reports. MSP Report 32 issued July 2020 notes:  <i>"Ontario's nuclear plants are either rate-regulated or subject to contract prices. In the current monitoring period, they set the MCP in less than 1% of all intervals (see Figure A-7 in Appendix A). Because marginal costs are very low, the Panel expects these plants to offer close to zero, but because shutdown is extremely costly for nuclear plants, they might offer very negative prices to ensure they are dispatched."</i>                      The unique operational constraints for nuclear generators ensure that OPG would never reasonably risk offering at high prices to trigger the conduct test. Given these drivers, as well as the observations of the MSP, OPG believes the information required by the Nuclear reference price workbook is excessive. Instead, OPG proposes a simpler approach applying the \$25/MWh (\$35 / MWh in Cdn \$ as proposed by OPG in its comments on the Market Power Mitigation Detailed Design 1.0) floor price provided by the IESO in the Market Power Mitigation Detailed Design 1.0 (Tables 3-5, 3-7, and 3-9) as a reference level. As OPG's nuclear offer prices are always below \$25/MWh (\$35 / MWh Cdn), and the trigger for a conduct test is \$25 / MWh (\$35 / MWh Cdn), there is little benefit to identifying and negotiating cost components for financial reference levels.</p>	<p>The current approach allows market participants to avoid unnecessary administrative burden.</p> <p>Nuclear resources that offer at low prices can elect to receive an energy reference level of \$0/MWh. In this case, they are not required to submit any supporting materials for the energy reference level.</p> <p>As stated in the high level design, reference levels will be based on actual short-run marginal costs of a resource. Setting a default reference level of \$25/MWh due to administrative convenience would be a significant departure from this approach.</p> <p>In addition, due to the approach for assessing economic withholding a resource with a reference level of \$25/MWh would be able to offer up to \$100/MWh before failing the conduct test for the BCA. This outcome would not be consistent with efficient market outcomes.</p>
69	OPG	<p><u>Nuclear Resources:</u>                      In the case of a nuclear unit's return to service, a risk premium may be needed in the DAM to insure against possible late return to service and real time losses. OPG proposes that the IESO explicitly include such a premium in reference levels for nuclear units.</p>	<p>Return to service date and time is within the market participants control to manage, along with any accompanying risks, as such these risks are not considered in reference levels.</p>

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71	OPG	<p><u>Thermal Resources:</u> Regarding dual fueled resources, Section 3.13.1.2 of the Market Power Mitigation Detailed Design 1.0 states that: <i>"The IESO will use the least expensive fuel type among the registered primary and secondary fuel types for a resource's reference level for the timeframe when it tests a submitted offer for market power. Market participants can request the IESO to change this default fuel type selection if the least expensive fuel (in \$/MWh), as flagged by the market participant and approved by the IESO, is unavailable or not preferred because of an acceptable reason for the specific subset of hours during the trading day."</i> This methodology is simplistic and does not take into consideration the number of factors that determine which fuel is least expensive. OPG recommends further discussion between market participants and the IESO as part of the reference level negotiation for energy offer curves to account for situations where the energy offer curves of the two fuels cross.</p>	<p>The approach to determine the least expensive fuel type will be based on the total hourly reference level cost of operating the resource at maximum capacity:</p> $\text{Total Hourly Cost} = (P_1 * Q_1 + P_2 * Q_2 + \dots + P_{\text{max}} * Q_{\text{max}}) + (\text{SUC}_{\text{ref}} / \text{MGBRT}_{\text{ref}}) + \text{SNL}_{\text{ref}}$
72	OPG	<p><u>Thermal Resources:</u> Determining fuel costs for facilities that do not have firm gas contracts is challenging in both day-ahead and real-time. The IESO needs to recognize the unique challenges around fuel availability, procurement, and transportation. This will be a key consideration in discussions with the IESO in setting appropriate reference levels for dual-fuel resources and reporting on the use of different fuels.</p>	<p>Market participants will be able to request use of either a different fuel index, or a modification to using just the Dawn hub price to account for distance from the Dawn hub. These modifications will be evaluated on a case-by-case basis. Where a methodology is supported by relevant documentation and appropriately reflects the relationship between the Dawn (or other) trading hub and the resource it will be eligible for use.</p> <p>The IESO will modify the written guide to make this clear.</p>
73	OPG	<p><u>Thermal Resources:</u> In addition, there should be a method for market participants to submit outages for specific 'fuel types', without impacting the availability of the resource, as they would be available on the alternative fuel. Without such a system, MPs could foreseeably trigger ex ante economic withholding tests when a less expensive fuel type is unavailable. Solving the treatment of reference levels for dual fuel resources during negotiations will avoid the administrative burden discussed in Market Settlements DES-28 Section 3.13.2 Reference Level Settlement Charges (RLSC) and 3.13.3 Reference Level Settlement Charge Uplift (RLSCU).</p>	<p>Section 3.13.1.2 of the detailed design document provides information on Dual-Fuel Resource Treatment. This information will also be present in Reference Level and Reference Quantity market manual, to be released for market participant review in 2021.</p>

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74	OPG	<p><u>Thermal Resources:</u>                      The Offers, Bids, and Data Inputs Detailed Design 1.0 states:  <i>"The PD calculation engine will determine which one of the three MGBDT values to use based on the number of hours the generation unit has been offline. A NQS generation unit will be considered offline by the PD calculation engine if it is scheduled below its MLP value by the PD calculation engine."</i></p> <p>Using predefined MGBDT values to determine if Hot/Warm/Cold dispatch data applies for pre-dispatch calculation may not accurately reflect the condition of a plant. The condition of thermal plants can vary start-to-start, and thus modifications to hot, warm and cold lead times may be necessary during the day. The thermal state of a NQS unit is determined by its turbine temperatures and can only be accurately determined by the unit operator. OPG requests the IESO publish an hourly standardized confidential report to indicate the inferred state of the generation unit and suggests that a mechanism or process be put in place that allows modification of the Lead Time parameter for SEAL and operational reasons to ensure the accurate thermal state is reflected in the market.</p>	<p>The IESO agrees that a confidential report to indicate the inferred state of a resource is required for transparency. This new confidential report will be included in the Publishing and Reporting detail design document.</p> <p>The design allows market participants to modify the Lead Time parameter subject to revision rules as outlined in Section 3.3.7.6 of Grid and Market Operations Integration detail design chapter.</p> <p>This comment was received in relation to the Offers, Bids and Data Inputs chapter of the detailed design and this response was provided in that forum.</p>
75	OPG	<p><u>Energy Storage Resources (ESRs):</u>                      OPG notes that NYISO, MISO, and ISONE do not subject ESRs to Market Power Mitigation. Given the lack of precedent, OPG would appreciate an explanation from the IESO and Hatch that describes potential abuse of market power by ESRs, as well as more detail on the development of the reference level framework proposed for ESRs.</p>	<p>The market power mitigation framework is applied to all dispatchable resources that supply energy or operating reserve as suppliers of a product can benefit from exercise of market power for that product.</p>
76	OPG	<p><u>Energy Storage Resources (ESRs):</u>                      As stated in 2.4.6 Opportunity Costs:  <i>"Dispatchable resources with intertemporal production limitations, such as hydroelectric and storage resources, may face an opportunity cost when they offer to inject energy. These resources may sacrifice the opportunity to produce energy in a future interval by producing it in the current one given operational limitations... Such intertemporal opportunity costs can be included in the energy reference level for relevant resources. Opportunity costs for these resources represent the expected future revenues that market participants give up when these resources produce a MWh of energy in the current time period."</i></p> <p>OPG agrees that ESRs incur an opportunity cost. However, there is currently no entry for Opportunity Cost in the Energy Storage workbook. This cost should be reflected as a separate cost category in the ESR Reference Level Workbook. As with hydroelectric resources, market participants should have the chance to defend opportunity cost formulations that differ from the IESO's proposal in Section 2.4.6.</p>	<p>The IESO will update the energy storage workbook to allow for an entry for opportunity cost.</p>

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77	OPG	<p>Section 2.3 Supporting Documentation  <u>More Forms of Documentation Should be Acceptable</u> - The list of accepted supported documentation provided by the IESO should be expanded beyond what the IESO has identified in this section. In the event that original manufacturers’ manuals are unavailable, the IESO should accept documentation developed by the asset owner.</p>	<p>Eligibility of documentation developed by the relevant market participant will be evaluated on a case by case basis. In determining the eligibility of specific documentation, the IESO will consider the reasonableness of the content of the documentation and will compare the documentation to information for similar types of equipment (e.g. independent 3rd party research reports or recommendations).</p> <p>Section 2.3 of the written guide will be updated to reflect this approach for documentation developed by the relevant market participant .</p>
78	OPG	<p>Section 2.4.6.1 Opportunity Cost  <u>Opportunity Cost Floor Price</u>                      The section states that the minimum value for the opportunity cost adder is \$0/MWh. Some resources may incur a negative opportunity cost, i.e. avoided costs (e.g., Nuclear resources and Must-run Hydro resources) which incentivizes the unit to remain online. OPG recommends allowance for negative opportunity costs.</p>	<p>Opportunity costs are bounded to a \$0/MWh floor. Similar to today, market participants will be able to offer at negative prices to obtain a schedule.</p> <p>The IESO will not be mitigating up low offers.</p>
79	OPG	<p>Section 2.4.6.1 Opportunity Cost  <u>Opportunity Cost Calculation May have Unintended Outputs</u>                      OPG is concerned that formula presented by the IESO does not accurately capture costs as the IESO intends. In particular, OPG has reservations about the use of prior year LMPs to calculate opportunity cost given the number of other variables that could affect market prices, such as:                      I. unit outages,                      II. transmission outages,                      III. changes in weather, and                      IV. differences between LMPs on weekdays and weekends.</p>	<p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.</p>

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80	OPG	<p>2.5.1.5.3 Service Price Adder  <u>Variability of Non-Firm Transport Costs</u>                      Determining fuel costs for facilities that do not have firm gas contracts is challenging in both the day-ahead and real-time. The IESO needs to recognize the unique challenges around fuel availability, procurement, and transportation. In the absence of a firm contract, gas transport costs can vary substantially due to factors like weather, demand, and scarcity. These conditions cannot be predicted with any accuracy during reference level negotiations. In the Thermal Reference Level workbook, the IESO suggests the service price adder can be substantiated with “Copies of the transportation, storage and load balancing contracts outlining the requirement to provide fuel to acquire the services.” For a resource without a firm transport contract, OPG maintains that such documentation of gas transactions usually becomes available only in the DA timeframe, and in some cases not until real-time. OPG suggests a process must be in place to allow MPs to submit and receive approval of this documentation in real time.                      If the IESO is unable to enhance their processes, OPG suggests the settlement process should use timelines similar to the current RT-GCG program which allows expense information to be submitted within a reasonable number of days after the fact.</p>	<p>Market participants will be able to request use of either a different fuel index, or a modification to using just the Dawn hub price to account for distance from the Dawn hub. These modifications will be evaluated on a case-by-case basis. Where a methodology is supported by relevant documentation and appropriately reflects the relationship between the Dawn (or other) trading hub and the resource it will be eligible for use.</p> <p>The IESO will modify the written guide to make this clear.</p> <p>After-the-fact of materials to support determination of financial reference levels is not a viable approach. Efficient dispatch and pricing instead achieved when all costs are optimized by the dispatch engine.</p>
81	OPG	<p>Section 2.5.1.5.5 Emissions Costs  <u>Output-Based Performance Standards No Longer Applicable</u>                      As the IESO is likely aware, since publishing of the workbooks, the federal government has accepted Ontario’s Emissions Performance Standards program as an alternative to the Output-Based Pricing System. This section should be updated to reflect the change.</p>	<p>Emissions policy reference level methodology in the written guide has been updated to reflect the Ontario’s Emissions Performance Standards program that is currently in effect in Ontario. Section 2.4.2 and other applicable sections will be updated based on the recent emissions policy changes in Ontario when sufficient information is available regarding specific implementation of the provincial emissions policy.</p>

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82	OPG	<p>Section 2.5.1.6 Operating and Maintenance Costs  <u>List of Eligible Incremental Variable Maintenance Costs is not Exhaustive</u>                      OPG has identified incremental variable costs that are not included in the reference level workbook. Some of these costs are:                      I. biomass material handling systems including pulverizer maintenance,                      II. feedwater piping repair,                      III. high voltage electrical equipment maintenance,                      IV. water treatment plant service.                      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.</p>	<p>The list included in the materials is not an exhaustive list. Market participants may submit eligible costs and supporting documentation for review.</p> <p>The IESO agrees that the following operating and maintenance costs are incremental and eligible to be included in reference levels for the relevant technology types:</p> <ul style="list-style-type: none"> <li>-Biomass material handling systems including pulveriser maintenance (biomass)</li> <li>-Feedwater piping repair (hydro)</li> <li>-water treatment plant service (hydro)</li> </ul> <p>The written guide will be updated to reflect these additions.</p> <p>Further discussion will be required to establish whether costs associated with high voltage electrical equipment maintenance is eligible to be included in reference levels.</p>
83	OPG	<p>Section 2.5.6 Energy Storage  <u>Pumped Hydro Fuel Costs Should be Included in ESR Workbooks</u>                      Section 2.5.6 states <i>"Energy storage resources store energy in the form of compressed air, flywheel, flow battery, rechargeable battery and hydrogen storage."</i>                      Under the Interim Storage Design Project (SDP), new Market Rules/Manuals may require current and future Pumped Hydro facilities to be registered as Energy Storage Resources (ESRs). Pumped Hydro facilities are inherently complex. Specifically, OPG's PGS is not a stand-alone facility, and has intertemporal effects with other hydroelectric generators. In order to provide flexibility for market participants, the cost components associated with pumped storage should be factored into both the Hydroelectric and Energy Storage workbooks.</p>	<p>Pumped hydro storage resources will be addressed in one place in the written guide and workbooks.</p> <p>Pumped hydro storage resources are addressed in the hydro section of the written guide and the hydro workbook as these are permutations of hydro resources.</p>
84	OPG	<p>Section 3 Non-Financial Dispatch Parameters  <u>Changes to Non-Financial Dispatch Parameters</u>                      The opening paragraph of this section states:  <i>"If the registered values are not static, the reference level values for non-financial dispatch data parameters are determined, where applicable by season (summer and winter)."</i>                      The above text implies that only seasonal variation in non-financial reference levels will be accepted. OPG maintains that some nonfinancial reference levels (e.g., lead time) vary hourly. Can the IESO clarify whether intra-day changes to non-financial dispatch variables will be accepted?</p>	<p>Conduct thresholds for non-financial reference levels are intended to accommodate changing ambient conditions beyond seasonal variation.</p> <p>Section 3.3 of the Grid and Market Operation Integration detailed design chapter outlines conditions under which submission or revision of hourly and daily dispatch data will be restricted.</p> <p>Market participants can submit changed values for lead time in the real-time market. The updated values will be used in the subsequent run of the pre-dispatch engine.</p>

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85	OPG	<p>Section 3.2 Ongoing Updates to Non- Financial Reference Levels  <u>Process to Request a Change to Reference Levels is not Clear</u>                      The section states:  <i>"At its own volition, the IESO may initiate the process to request a change to reference levels if the IESO is of the view that the registered non-financial reference level is no longer representative of the operational characteristics of the resource."</i>                      Please outline the "process to request a change to reference levels" that is referenced in this section.</p>	<p>Processes to update non-financial reference levels have yet to be finalized and will be documented in the relevant Market Manual. This Market Manual will be outlined and stakeholdered through the Market Manual review process.</p> <p>The process to request a change to a non-financial reference level will closely resemble the process to update a financial reference level. Please refer to Section 3.13.1.1 of the Market Power Mitigation detailed design document.</p>
86	OPG	<p>Section 3.4.5.1 Nuclear Energy Ramp Rate  <u>Ramp Rates Vary Depending on System Conditions</u>                      The section states:  <i>"Market participants must provide ramp rates and supporting documentation with relevant sections from operating and maintenance manuals for the resource that show the ramp rates (MW/min) for the resource across its dispatchable range."</i>                      OPG contends that the ramp rates of nuclear units vary substantially depending on reactor conditions. The ramp profile of a nuclear unit cannot be specified ahead of time in reference level negotiations.</p>	<p>This section is referring to nuclear resource ramp rates for incremental change in energy production, not the profile for start. Clarification language will be added in Reference Level and Reference Quantity SE document.</p> <p>If nuclear ramp rate capabilities can be very different for the same range of production depending on reactor conditions, the energy ramp rate reference level for nuclear resources will be set based on least flexible profile of the resource.</p>
87	OPG	<p>Section 4.1.1 Energy  <u>Clarification of Process for Determining Reference Quantities</u>                      The section states that reference quantities will be determined in accordance with the methodology of the Generator Output and Capability report. OPG requests the IESO to confirm which values are used as the unit capability in this report (e.g., registered capacity, MCR, nameplate capacity, etc.).</p>	<p>Energy reference quantities for thermal resources and nuclear resources will be determined based on the average hourly generation capability, which is the maximum potential output of the resource under current conditions, which includes maximum unit de-rates and outages for that hour.</p>
88	OPG	<p>Section 4.2.2.2 Operating Reserve  <u>Possible Typo in Subheadings</u>                      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.</p>	<p>Section 4.2.2.2.2 will incorporate the following update, "For non-synchronized 10-minute operating reserve, the reference quantity for hydroelectric resources is calculated as follows:".</p> <p>Section 4.2.2.2.3 will incorporate the following update, "For non-synchronized 30-minute reserve, the reference quantity for hydroelectric resources is calculated as follows:".</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
89	OPG	<p>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.</p>	<p>Market power mitigation does not introduce an obligation to offer at prices consistent with reference levels. The IESO will include clarifying language to the written guide to that effect.</p>
90	OPG	<p>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.</p>	<p>Reference levels for each resource will be based on the short-run marginal costs of that resource.</p> <p>For each cost category, the written guide describes the approach that will be taken to determine the appropriate reference level for each resource.</p> <p>Market participants are not obligated to provide reference levels that are greater than \$0/MWh. Where market participants request reference levels greater than \$0/MWh, they are required to provide workbooks and supporting materials that illustrate the values of eligible costs.</p> <p>Where a market participant does not request or substantiate an eligible reference level cost, it will not be included in the reference level.</p>
91	OPG	<p>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.</p>	<p>See response to comment ID 63.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
92	OPG	<p>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:</p> <p>“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.”</p> <p>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.</p>	<p>The IESO does not intend to develop a process for mitigating uneconomic production. Energy offers below \$25/MWh will be excluded from tests for economic withholding.</p>
93	OPG	<p>Chapter 7 Section 3.4.4A of the Market Rules states:</p> <p>“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.”</p> <p>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.</p>	<p>Dispatchable resources (including hydroelectric resources) are subject to market power mitigation. Intermittent and self-scheduling generating resources are not subject to mitigation.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
94	OPG	<p>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:</p> <p>"...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..."</p> <p>Additionally, the Monitoring Document: Monitoring of Offers &amp; Bids in the IESO-Administered Electricity Markets issued March 2010 indicates the MSP:</p> <p>"...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."</p> <p>Flexible hydroelectric has value in its ability to provide energy when real time demand exceeds forecasts, often by displacing carbonemitting 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.</p>	<p>Reference levels for each resource will be based on the short-run marginal costs of that resource.</p> <p>For each cost category, the written guide describes the approach that will be taken to determine the appropriate reference level for each resource.</p> <p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.</p> <p>Market participants are free to submit costs in the relevant workbooks and the IESO will evaluate those costs on the basis of the eligibility criteria.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
95	OPG	<p>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.</p>	<p>The opportunity cost methodology in the written guide is intended to create a base opportunity cost applicable for all energy-limited resources.</p> <p>Additional resource-specific operational characteristics that affect opportunity costs that not captured by this methodology may be substantiated and demonstrated by market participants. Such opportunity costs that are approved by the IESO will be added to the financial reference level of a specific resource.</p> <p>These approvals will be determined during the one-on-one consultations starting in 2021.</p>
96	OPG	<p>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:</p> <p>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;</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	<p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.</p> <p>Additional resource-specific operational characteristics that affect opportunity costs that not captured by this methodology may be substantiated and demonstrated by market participants. Such opportunity costs that are approved by the IESO will be added to the financial reference level of a specific resource.</p> <p>These approvals will be determined during the one-on-one consultations starting in 2021.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
97	OPG	<p>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:</p> <p>The IESO’s proposed methodology for calculating reference quantities (page 6 of the Market Power Mitigation Detailed Design 1.0), states:</p> <p>“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.”</p> <p>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.</p> <p>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:</p> <p>Physical Withholding Reference Level (single unit) = Max ((min head-based capability - derates/outages), 0)</p> <p>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.</p>	<p>The IESO agrees to use minimum head-based capability to determine energy reference quantities for hydro resources. The written guide will be modified to reflect the specifics of this approach.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
98	OPG	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.	<p>Ex-ante mitigation is required to support efficient market outcomes with locational pricing.</p> <p>The ability to request manual constraints when issues around safety or equipment or personnel, applicable law or regulation would otherwise occur are still available to market participants under market renewal.</p> <p>The IESO is developing a proposal for an independent review process of reference levels and quantities. This proposal will be shared with stakeholders later in 2020.</p>
99	OPG	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.	See response to comment ID 98.
100	OPG	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.	<p>Non-financial reference levels are required as part of the Market Power Mitigation framework to prevent market participants from exercising market power via operational parameters.</p> <p>Non-financial reference levels are based on operational capabilities of the equipment that makes up the resource. The IESO also notes that non-financial reference levels have conduct thresholds to allow for flexibility in operational parameter variations.</p> <p>Market participants can update their non-financial reference levels as needed, via the processes discussed in Section 3.13.2 of the Market Power Mitigation detailed design document.</p> <p>Reference level curves, referred to in the comment, are energy reference levels and are determined according to Section 3.13.1.1 of the Market Power Mitigation detailed design document. Financial reference levels can be updated on a day-to-day basis due to changes in fuel costs as indicated in that section.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
101	OPG	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.	The IESO will address this issue during the one-on-one consultations to determine resource-specific reference levels starting in 2021. Where the costs of production for a resource vary according to which connection point is used to inject energy, the reference level for each modeled resource will appropriately assesses their respective costs of production.
102	OPG	Hydro workbook: <u>Operating Reserve Cost Component Typo</u> Cell B20 in workbook incorrectly labeled 'Opportunity Costs' – should be labeled Operating Reserve.	Cell B20 of the hydro workbook will be updated with the correct labelling, "Operating Reserve".
103	OPG	Hydro workbook: <u>Startup Costs, Speed-No-Load, and Condense Costs Should be Accepted for Hydroelectric</u> 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.	Start-up and speed-no-load maintenance costs may be incorporated into energy reference levels as hydroelectric resources only submit energy offers and do not submit start-up offers. For a non-exhaustive list of eligible costs, please refer to Section 2.5.2.2 of the written guide.  Market participants are free to submit costs in the relevant workbooks and the IESO will evaluate those costs on the basis of the eligibility criteria.
104	OPG	Hydro workbook: <u>Opportunity Costs Associated with Operational Limitations</u> 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.	The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.  Additional resource-specific operational characteristics that affect opportunity costs that not captured by this methodology may be substantiated and demonstrated by market participants. Such opportunity costs that are approved by the IESO will be added to the financial reference level of a specific resource

ID	Stakeholder	Stakeholder Feedback	IESO Response
105	OPG	<p>Hydro workbook:  <u>Incremental Opportunity Cost Exists for Operating Reserve</u>                      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.</p> <p>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.</p>	<p>The economics of the trade-off between energy and operating reserve is reflected in energy and operating reserve prices. The DSO jointly optimizes energy and operating reserve outcomes and considers the opportunity costs of scheduling one product over the other. It is only when a resource is economic for both its entire energy offer and its OR offer is there a trade off between energy and OR. When only part of the energy offer is economic, no such trade-off exists.</p> <p>Any necessary additions to the opportunity cost methodology for hydro resources that are part of a cascade system to account for resource-specific characteristics will be done during one-on-one consultations starting in 2021.</p>
106	OPG	<p>2.4.6.1 Opportunity Cost  <u>Opportunity Cost Floor Price</u>                      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.</p> <p>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.</p>	<p>Opportunity costs are bounded to a \$0/MWh floor. Similar to today, market participants will be able to offer at negative prices to obtain a schedule.</p> <p>The IESO will not be mitigating up low offers, market participants are free to use negative offer prices to drive dispatch as they do today.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
107	OPG	<p>2.4.6.1 Opportunity Cost  <u>Opportunity Cost Calculation Does Not Capture Price Variation</u>                      OPG is concerned that the formula proposed by the IESO does not accurately capture opportunity cost.</p> <p>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:</p> <ul style="list-style-type: none"> <li>I. Large generator outages.</li> <li>II. Transmission outages – outages caused by extreme weather events such as tornadoes are not planned and may lead to periods of higher/lower LMPs.</li> <li>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.</li> <li>IV. Changes in weather, which impact demand as well as variable generation.</li> <li>V. Intermittent restrictions on water systems by governmental bodies, such as the Ministry of Natural Resources.</li> </ul> <p>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.</p>	<p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
108	OPG	<p>(Same section as above. Comment split into two) Day Ahead Union Dawn NGX Price:</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	<p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.</p>
109	OPG	<p>2.4.6.1 Opportunity Cost Calculation <u>Opportunity Cost Calculation Does Not Value Scarcity</u> 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.</p> <p>OPG finds this treatment of opportunity cost inconsistent and, as stated above, believes a forward-looking methodology would be more useful and accurate.</p>	<p>The IESO has updated the methodology for determining opportunity cost in the written guide in response to various stakeholder feedback on the topic.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
110	OPG	<p>2.4.7 Speed-No-Load Costs  <u>Speed-No-Load costs for Hydroelectric Resources</u>                      The section states that speed-no-load costs reflect:</p> <p>“...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.”</p> <p>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.</p>	<p>This mode of operation is not something that the IESO DSO models or dispatches. Hydroelectric resources operating in such a manner do so of their own volition, not in response to a dispatch instruction.</p> <p>As a result, there is no mitigation that is applied to this mode of operation and thus no reference level that needs to be applied.</p>
111	OPG	<p>2.5.2.1.1 Gross Revenue Charges  <u>GRC Formula Does Not Reflect Marginal Cost</u>                      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.</p>	<p>The GRC formula will be updated to make clear that the relevant value for GRC is the previous year gross revenue charge marginal rate.</p>
112	OPG	<p>2.5.2.1.1 Gross Revenue Charges  <u>GRC Formula May Have Unintended Outputs</u>                      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:</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	<p>Market participants may request a modification to the historical study period where there is a material difference between the past operation during the historical study period and the projected future operation of the resource. In order for the IESO to approve such a modification, the market participant must demonstrate to the satisfaction of IESO that the adjustment is warranted.</p> <p>Section 2.2 of the written guide will be updated to reflect this change.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
113	OPG	<p>2.5.2.1.1 Gross Revenue Charges  <u>List of GRC Components is not Exhaustive</u>                      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.</p>	<p>Costs can be included in reference levels where they are eligible according to the criteria in the written guide. Supporting materials are required to be submitted for any costs to be included in reference levels.</p> <p>Resource-specific reference levels will be determined during one-on-one consultations starting in 2021.</p> <p>Market participants should submit additional eligible costs that the IESO will evaluate for inclusion reference levels.</p>
114	OPG	<p>2.5.2.2 Operating and Maintenance Costs  <u>List of Eligible Incremental Variable Maintenance Costs is not Exhaustive</u>                      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.</p>	<p>Costs can be included in reference levels where they are eligible according to the criteria in the written guide. Supporting materials are required to be submitted for any costs to be included in reference levels.</p> <p>Market participants should submit additional eligible costs that the IESO will evaluate for inclusion reference levels.</p>
115	OPG	<p>2.5.2.4 Opportunity Costs  <u>Opportunity Cost Typo</u>                      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.</p>	<p>The opportunity cost section reference has been corrected from Section 2.4.5 to Section 2.4.6.</p>
116	OPG	<p>4.2.1.1 Methodology for Dispatchable Hydroelectric Resources that have Submitted a Maximum DEL  <u>Energy Reference Quantity Does Not Account for Real Time Schedules</u>                      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.</p>	<p>The IESO agrees to use minimum head-based capability to determine energy reference quantities for hydro resources. The written guide will be modified to reflect the specifics of this approach.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
117	OPG	<p>4.2.2 Methodology for Dispatchable Hydroelectric Resources that have not Submitted a Maximum DEL  <u>Calculation is subject to annual variation</u>                      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.”</p> <p>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.</p>	<p>The IESO agrees to use minimum head-based capability to determine energy reference quantities for hydro resources. The written guide will be modified to reflect the specifics of this approach.</p> <p>The updated methodology no longer utilizes a 7-year historical study period for energy reference levels.</p>
118	Workbench Energy	<p>IESO has provided a significant volume of material with significant consequences for review with a short turnaround time for comments. IESO needs to ensure that there is sufficient time for Market Participants to understand the material, its implications on operations, planning, contracts, risk management and revenue before providing valuable feedback.</p>	<p>The IESO acknowledges that participating in Market Renewal is a significant draw on limited stakeholder resources and the time that stakeholders take to participate is appreciated.</p> <p>The IESO understands that the topic of reference levels and reference quantities is complicated and a priority issue. The intent was to provide a significant amount of time for review of these materials.</p> <p>The IESO posted materials on August 13 and requested comments by September 15. In total stakeholders were allowed almost 5 weeks of review time with the reference level materials.</p> <p>The IESO will continue to work with stakeholders to assure that we allow sufficient time to prepare for these topics, while balancing the timing requirements to meet the targeted go-live date in 2023.</p>
119	Workbench Energy	<p>The information is significant in both volume and criticality. The exercise to provide the requested supporting documentation, examine and understand the IESO’s development of the reference levels, and proceed through communication of any disagreements requires an understanding of the context of applicability of reference levels. Market Participants need to understand, with real world examples, where, when and system constraints identify circumstances of market power in order to assign appropriate resourcing to this process.</p>	<p>Information on constrained zones, based on historical data, will be made available to market participants in Q1, 2021.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
120	Workbench Energy	IESO has verbally indicated the intention to take the appropriate time to engage with stakeholders to establish accurate and acceptable reference levels and values. This verbal commitment is an encouraging step, but given the importance of this process, IESO must assure Market Participants that there will be a process in place to review, amend or dispute reference levels and quantities, not only during Market Renewal development but also post deployment. Such a process is not outlined in the Market Power Mitigation manual or this document.	<p>The IESO will continue to work with stakeholders to assure that we allow sufficient time to prepare for these topics, while balancing the timing requirements to meet the targeted go-live date in 2023.</p> <p>The IESO is developing a proposal for an independent review process of reference levels and quantities. This proposal will be shared with stakeholders later in 2020.</p>
121	Workbench Energy	It appears from the material provided that the IESO has not considered or accounted for the requirement for facilities to align their market activity with contractual obligations. Participants will require sufficient flexibility in the determination of reference levels and quantities to maintain compliance with existing obligations. IESO must not force facilities, by way of these reference levels, to provide a product that conflicts with its must-offer obligation[1] or its ability to maintain a contracted capacity factor. Must-offer obligations include applicable days, hours, and capacities for energy only. At this time, there are no must-offer obligations for operating reserve.	<p>Market power mitigation does not introduce an obligation to submit offer prices or quantities consistent with reference levels or quantities.</p>
122	Workbench Energy	IESO has developed a “cost-based approach” to the determination of financial reference levels. As a result, IESO must accept the cost submissions by facilities in the development of reference levels and let the competitiveness of those values reside with the participants. Market drivers will determine whether costs are competitive or non-competitive. The IESO as an independent system and market operator has no place in determining the competitiveness of costs, only in the identification and mitigation of Market Power.	<p>Reference levels for each resource will be based on the short-run marginal costs of that resource, not set based on a benchmark.</p> <p>For each cost category, the written guide describes the approach that will be taken to determine the appropriate reference level for each resource.</p> <p>The IESO is developing a proposal for an independent review process of reference levels and quantities. This proposal will be shared with stakeholders later in 2020.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
123	Workbench Energy	IESO acknowledges that speed no-load costs are hypothetical and do not relate to physical operation in the IESO-administered market. Given that the IESO has stated this is a cost-based approach, it is inconsistent to force facilities to develop and offer a hypothetical cost.	<p>The speed no load cost in Section 2.5.1.8 refers to fuel consumption that are potentially fixed on hourly basis.</p> <p>Depending on the resource, heat rate curves may show that there is some level of fuel consumption that is not attributable to incremental production.</p> <p>For example, if a resource had the following heat rate curve and incremental heat rate curve, some fuel cost is fixed and not attributable to incremental production:</p> $HR(MWh) = (5 * MWh^2) + (2 * MWh) + 5$ $\text{Incremental } HR(MWh) = 10MWh + 2$ <p>For this resource, the speed-no-load cost of fuel is 5.</p> <p>Another way of explaining the speed-no-load cost in section 2.5.1.8 is that it is the y-intercept of the heat rate curve.</p> <p>As described in Section 2.5.1.6, thermal resources can allocate eligible operating and maintenance costs on a per hour basis to the speed-no-load reference level according to the criteria discussed therein. There is no obligation to rely on this allocation methodology, it is an option.</p> <p>The presence of speed-no-load costs in reference levels does not signify that the IESO that will model NQS resources in this operating state (synchronized but not injecting). Rather, it is a method to allow reference levels to more accurately match the shape of cost curves, where appropriate.</p>
124	Workbench Energy	OR is a competitive market and offered jointly with energy. Can a resource be determined to hold market power on energy but not reserve, or reserve but not energy? Operational examples are requested.	<p>A resource that is offering in both energy and operating reserve (OR) market will be tested for mitigation independently for the different offers.</p> <p>For more clarity, refer to Sections 3.6.1 and 3.6.2 of the Market Power Mitigation detailed design document which outline the conditions for testing for economic withholding in the energy market and the operating reserve market.</p> <p>During the implementation phase, the IESO will be discussing various examples as part of the process to present market manuals and market rules to stakeholders.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
125	Workbench Energy	Opportunity costs on the joint optimization need further consideration and detail. Where a facility offers OR, upon activation, the incremental energy associated with the activation may yield fuel consumption in excess of or misaligned with planned delivery, potentially encountering penalty costs. This joint optimization opportunity cost belongs in reference levels.	<p>Increased fuel costs can be accommodated via intra-day change energy reference levels as per the process described in sub-section "Processing and Maintaining Reference Levels" in Section 3.13.1 of the Market Power Mitigation detailed design chapter.</p> <p>As described in Section 2.5.1.5.3 of the written guide, the service price adder for natural gas-fired resources is added to the fuel price for the additional service charge for transporting, balancing and storing natural gas plus the marketer risk premium.</p>
126	Workbench Energy	In the document package, there is inconsistency in the IESO’s discussion on fuel costs. The thermal spreadsheet package allows participants to submit alternative fuel rates to Dawn Index, with appropriate supporting information, but the draft document does not. IESO needs to ensure consistency between its documents and must consider fuel-related cost components on a resource-specific basis. Dawn is not an appropriate fuel cost reference across the gas generation fleet.	Section 2.5.1.5.1 of the written guide, titled "Fuel Commodity Index", will be updated to clarify that requests to use a different fuel index or a modification to use of the Dawn hub price can be submitted where appropriate.
127	Workbench Energy	It is unclear why the IESO includes non-financial parameters in the MPM framework when the parameters are managed through registration and not through daily offers. The nature of the Market Renewal framework is such that the IESO engine optimizes for competitiveness, and where a resource has a non-financial parameter that is operationally relevant but non-competitive, that resource will not get scheduled. Procedural clarification is requested.	Withholding supply to exercise market power can be done via high offer prices or low offer quantities. Absent validation of non-financial dispatch data, a market participant could withhold supply from a resource by submitting non-financial dispatch data that prevented a resource from being scheduled. The DSO would then be forced to select a more expensive resource, potentially increasing prices.
128	Workbench Energy	Is the IESO requiring resources to re-register all non-technical parameters to participate in the market under the Market Renewal Framework? The IESO should not expect changes in operational capability because of new market rules. Facilities that have been operating with specific characteristics in the existing market framework.	<p>All dispatchable resources will be required to register the relevant non-financial and financial reference level parameters in order to participate in the market.</p> <p>When reviewing and approving non-financial reference level submissions for resources, the IESO intends to take advantage of synergies from the work that has been done. However, the occurrence of any such synergies may be limited as current registered parameters may not be answers to same question that reference levels ask.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
129	Capital Power	<p>Capital Power agrees with the IESO that these are critically important elements of the MPM framework and appreciates the opportunity to provide feedback. It should be noted that review of the reference levels and quantities is a comprehensive exercise and will require significant stakeholder time and work particularly as this undertaking must be done on an asset-by-asset basis. Moreover, fundamental differences exist across resource technologies (e.g., wind vs. thermal), such that distinct consideration and treatment may be required. Given this, Capital Power provides its preliminary comments below but notes the feedback is subject to change as the review and assessment process of asset-specific levels and quantities remains ongoing. Lastly, they should be considered in conjunction with and in the context of Capital Power’s previously submitted comments on draft MRP design such as the IESO’s Energy Stream Design Document</p>	<p>The IESO recognizes this is a complex and challenging framework, so we have been have early discussion with stakeholders, and provide the time to work through all of the questions and issues that stakeholders have.</p>
130	Capital Power	<p><b>IESO Cost-Based Approach to Determine Reference Levels &amp; Quantities Principles and Key Terms are Unclear and Require Clarification</b>                      i. “Unrestricted Competition”                      The IESO describes reference levels and quantities in its Stakeholder Engagement Pre-Reading: Reference Levels and Reference Quantities (the “Pre-reading Document”) as estimates for what prices and quantities a market participant “might have offered for a resource in the energy and operating reserve markets had they been subject to unrestricted competition.” However, it is unclear what the IESO means by “unrestricted competition.” Capital Power understands this to simply mean the counterfactual market condition wherein factors that would otherwise limit a competitive response from other market participants (e.g. transmission constraints) are absent. If not, IESO clarification is required.</p>	<p>The IESO confirms that unrestricted competition means the counterfactual market condition absent the restriction to competition.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
131	Capital Power	<p>“Incremental Supply” &amp; “SRMC”</p> <p>Section 2 of the Pre-reading Document states that the IESO “uses a cost-based approach to determine financial reference levels for eligible resources before they can participate in the IESO-administered markets.”<sup>3</sup> The section elaborates on the “cost-based approach” as follows:</p> <p>Eligible cost components for financial reference level calculations are the costs that are incurred as a result of providing incremental supply of energy or operating reserve. The IESO has designed the financial reference levels to include all short-run marginal costs (SRMCs).<sup>4</sup></p> <p>Clarity of the terms “incremental supply” and “SRMC” is critically important to understanding how cost eligibility is determined. In reviewing the remainder of the Pre-reading Document, Capital Power understands the IESO’s cost-based approach contemplates allowing resources to establish reference levels reflective of costs that vary with output resulting from IESO dispatches. However, not all production-related costs can be uniformly categorized as fixed or variable using a generalized approach applied across all resources given that fundamental differences can exist among different technologies. Consequently, IESO clarification on how it establishes cost eligibility, including, criteria for each technology would be helpful.</p> <p>Examples of completed workbooks with functioning formulas for each technology calculating the reference levels would also significantly augment market participants’ understanding of the IESO’s proposed approach. The calculations therein should show the conversion from the raw input of eligible costs to the technology’s energy and operating reserves reference level.</p>	<p>Reference levels for each resource will be based on the short-run marginal costs of that resource.</p> <p>For each cost category, the written guide describes the approach that will be taken to determine the appropriate reference level for each resource.</p> <p>Market participants are free to submit costs in the relevant workbooks and the IESO will evaluate those costs on the basis of the eligibility criteria.</p> <p>The IESO is developing a proposal for an independent review process of reference levels and quantities. This proposal will be shared with stakeholders later in 2020.</p> <p>The IESO has prepared and will provide example workbooks per technology types will populated values for relevant costs for certain illustrative hypothetical resources.</p>
132	Capital Power	<p>Ensuring an Appropriate Opportunity for Cost-Recovery</p> <p>Capital Power believes it is not the IESO’s intent to require resources to operate at a loss. However, MRP elements such as the proposed physical withholding mechanism in conjunction with the MPM framework could produce such outcomes for some resources. In particular, resources with no contract or other revenue streams to recover fixed costs such as rate-regulation or capacity payments could be required to run at a loss if dispatched and mitigated to their SRMC. If no flexibility is provided to such resources, premature retirement may ultimately result. Capital Power, therefore, strongly recommends that exemptions be considered as part of MPM and the proposed physical withholding framework in cases where such resources are not benefitting from other cost recovery mechanisms.</p>	<p>Short-run marginal costs are eligible to be included in financial reference levels. Long-term costs necessary to keep the resource in service and available are not included in the energy or operating reserve market reference levels.</p> <p>Operating and maintenance costs that are incurred as a result of providing incremental supply of energy or operating reserve are eligible to be included in reference levels. O&amp;M costs that do not vary as a result of incremental supply of energy or operating reserve, referred to as fixed O&amp;M costs, are not eligible costs and cannot be included in determining a reference level.</p> <p>For each cost category, the written guide describes the approach that will be taken to determine the appropriate reference level for each resource.</p> <p>Market power mitigation does not introduce an obligation to submit offer prices or quantities consistent with reference levels or quantities.</p> <p>The IESO Resource Adequacy stakeholder engagement provides the opportunity for dialog regarding Ontario’s future resource needs and procurement.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
134	Capital Power	<p>Performance Factors</p> <ul style="list-style-type: none"> <li>• Subsection 2.4.3: Performance Factors – These can vary widely on a daily basis, even within the seasons defined by the IESO. Capital Power recommends building in the necessary flexibility to account for the wide range of variability without putting undue administrative burden on the IESO and participants.</li> </ul>	<p>Performance factors are seasonal and are set through the process to register non-financial reference levels. Conduct thresholds providing flexibility to account for variability around seasonal values due to changing ambient conditions.</p> <p>Table 3-4 in the Market Power Mitigation detailed design document lists the conduct thresholds applied for validation of non-financial dispatch data.</p> <p>As an example of these thresholds, the conduct threshold for MGBRT is 3 hours, so that only values more than 3 hours above the seasonal MGBRT reference level value would fail the conduct test and be rejected.</p>
135	Capital Power	<p>Fuel Costs &amp; Consumables</p> <ul style="list-style-type: none"> <li>• Subsection 2.4.7: Start-up costs (General) – Fuel volume will need to allow for a significant level of flexibility. Start profiles vary widely based on the amount of time off-line between starts and considerable differences can exist within the three starting conditions defined.</li> <li>• Subsection 2.4.6: Opportunity cost – The IESO allows some flexibility for participants to make requests for additional opportunity costs that may not be contemplated in this document. The flexibility should be extended to thermal units where opportunity costs such as Storage and Transport limits are permitted to be included.</li> <li>• Subsection 2.5.1.5.1: Fuel Commodity Index (Gas) – The index price does not reflect the cost of gas for Quick Start (“QS”) gas-fired generating facilities. These units are dispatched with no prior notice and gas should be reflective of the real-time trading of gas as quoted on electronic platforms such as ICE or through the brokered market. For Non-Quick Start (“NQS”) facilities, the “Dawn Day-ahead Index” may be appropriate for day-ahead scheduling, but flexibility must be built in for real-time scheduling including incremental schedules to day-ahead.</li> <li>• “Operating consumables” – Other consumables not listed in the document may be used in resource specific processes as they provide incremental supply. The rules should be sufficiently flexible to accommodate these elements.</li> </ul>	<p>In regards to the start-up costs, the conduct thresholds applied to hot, warm and cold start-up offers are intended to afford the variability required as they allow an offer that is some amount above the reference level to nonetheless pass the conduct test.</p> <p>In regards to opportunity costs, Section 2.4.6 of the written guide indicates that where the methodology communicated in this section does not address all relevant aspects of opportunity cost for a particular resource, market participants may request a resource-specific additional opportunity cost adder. The same section details the evaluation criteria that the IESO will apply to evaluate any such requests.</p> <p>In regards to fuel commodity indices, market participants will be able to request use of either a different fuel index, or a modification to using just the Dawn hub price to account for distance from the Dawn hub. These modifications will be evaluated on a case-by-case basis. Where a methodology is supported by relevant documentation and appropriately reflects the relationship between the Dawn (or other) trading hub and the resource it will be eligible for use. The IESO will modify the written guide to make this clear.</p> <p>In regards to operating consumables, the written guide does not provide an exhaustive list of eligible costs. It outlines the criteria that will be applied to determine eligibility of a particular line item cost as well as any line item costs for which the IESO has already made a decision regarding eligibility. The IESO will evaluate the eligibility of line item costs that are not specifically addressed in the written guide according to the criteria therein.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
136	Capital Power	<p>Operating Reserves (“OR”)</p> <ul style="list-style-type: none"> <li>• Subsection 2.4.9: OR Costs – The IESO is proposing that market participants seeking OR reference levels greater than \$0.10/MW are to provide supporting materials for approval. The proposed threshold appears to assume no costs are incurred in providing OR. Capital Power disagrees. Consider the following:                             <ul style="list-style-type: none"> <li>o Power consumed to keep plant in a state of readiness;</li> <li>o Opportunity cost of operating at a lower output to provide OR resulting in operating at a higher heat rate (“HR”);</li> <li>o Opportunity costs may also result from OR restricting the maximum output that an asset can reach; and</li> <li>o OR can affect the dispatch level of an asset and impact variable payments under maintenance agreements.</li> </ul> </li> <li>• Subsection 2.5.1.9.2: OR Reference Levels – Though currently absent, Capital Power strongly recommends that OR reference levels include opportunity cost given the above list of considerations. For a thermal unit, take for example, the higher heat rate by operating at its minimum loading point (“MLP”) compared to being at baseload. There may also be opportunity costs based on how contracts settle and how profit is calculated under the settlement design. Flexibility to account for these individual situations should exist in the design. Including opportunity cost as part of the OR reference level would assist in providing this necessary flexibility.</li> </ul>	<p>Reference levels are based on short-run marginal costs of resources. This approach is consistent with stakeholder feedback from high-level design.</p> <p>The requirement that requests for reference levels greater than \$0.10/MWh be supported is consistent with the approach by which reference levels are based on actual costs.</p> <p>The proposed approach requires requested operating reserve reference levels greater than \$0.10/MWh to be supported. It does not assume that provision of operating reserve is costless.</p> <p>Section 2.4.6 of the written guide indicates that where the methodology communicated in this section does not address all relevant aspects of opportunity cost for a particular resource, market participants may request a resource-specific additional opportunity cost adder. The same section details the evaluation criteria that the IESO will apply to evaluate any such requests.</p>
137	Capital Power	<p>Combined Cycle Maintenance &amp; Operations</p> <ul style="list-style-type: none"> <li>• Subsection 2.4.4.1: Major Maintenance costs (General) – Costs associated with performance improvements of a resource or life extension are considered ineligible under the IESO proposal. This is a disincentive for resource owners in making investments that could be beneficial to the market. Additionally, this appears to be unduly discriminatory as these same costs are eligible for other technology types. Costs associated with nuclear refurbishment and extension are specifically permitted providing that class with a favorable treatment compared with other technologies. No basis was provided for the distinct difference in treatment between these technologies. Therefore, Capital Power strongly encourages the IESO that such costs also be considered for thermal resources.</li> </ul>	<p>A consistent methodology and review criteria will be applied for all resource types when assessing eligible maintenance costs. Types of eligible costs listed across the sections for the different resources was intended to include terms that are commonly used for those specific resource types. Any maintenance activity regardless of the name will consist of multiple tasks. Each individual task that make-up as a whole the maintenance activity will be reviewed against the criteria for eligible maintenance costs for inclusion into the reference level.</p>
138	Capital Power	<p>Subsection 2.5.1.1: Combined Cycle Financial Reference Level – Thermal assets may operate as single cycle and combined cycle in the same trade date. Flexibility in applying the financial reference levels for combined cycle must, therefore, be included to account for when an asset switches between operating modes throughout the day.</p>	<p>The IESO will have reference levels for both single cycle and combined cycle on record and will apply the appropriate value as an input to the DSO based on the operating configuration of the resource.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
139	Capital Power	Subsection 2.5.1.1.1: Deriving Pseudo-Unit Reference Levels for a Combined Cycle Resource – Reference levels for pseudo units will similarly need to have enough flexibility to account for changes based on different configurations. MLP for example may be different in a 1x1 configuration compared to a 3x1.	The IESO will have reference levels for both each configuration of combined cycle operation for that resource on record and will apply the appropriate value as an input to the DSO.
140	Capital Power	Subsection 2.5.1.3.2: For Resources Not Eligible for Generator Offer Guarantees (“GOG”) – For QS thermal units, it is Capital Power’s view that their energy reference level should be amortized over MLP and minimum run time vs. average, otherwise an asset risks not recovering their costs.	<p>The sub-section of the Market Power Mitigation detailed design document titled "Average Cost Resource Treatment" in Section 3.13.1.2 outlines the approach for this issue.</p> <p>The IESO will set reference levels that appropriately amortize start-up costs over a set number of operating hours for these resources. The energy reference level for these resources will account for the start-up costs of the resource. The set number of hours will default to the Minimum Run Time for the resource and may vary where operating characteristics of a specific resource warrant such treatment.</p>
141	Capital Power	<p>Shutdown Costs</p> <ul style="list-style-type: none"> <li>Capital Power could not identify in the document where, if at all, shutdown costs of a resource are considered. If this cost category has not been considered, Capital Power strongly recommends that it be added and developed in consultation with market participation. If they are contemplated in the IESO materials, it would be helpful for market participants the IESO to specify these in detail.</li> </ul>	The ramp-down settlement amount addresses costs that are incurred during ramp-down that are not otherwise recovered. This settlement amount is discussed in detail in Section 3.7.16.7 of the Market Settlement detailed design document.
142	Capital Power	<p>Non-financial Parameters</p> <ul style="list-style-type: none"> <li>Section 3: Process for Establishing Reference Levels for Non-Financial Dispatch Data Parameters, Table 3-1                             <ul style="list-style-type: none"> <li>Lead-time reference levels will need to be flexible enough to accommodate multiple ramp profiles determined by the length of time a resource is offline. If this flexibility cannot be built into the process, the IESO should apply the most conservative conditions.</li> <li>Several MLPs may need to be considered as this value could be dependent on the configuration that is scheduled [MLP(1x1) ≠ MLP(3x1)]</li> <li>A “Full Speed No-Load” starting condition should also be added as the IESO establishes the minimum generation block down-time reference level of a resource. Failing to incorporate this operating state would unnecessarily remove flexibility from the system.</li> </ul> </li> </ul>	<p>The IESO will have lead time reference levels for each thermal state; hot, warm and cold.</p> <p>For relevant non-financial reference levels such as MLP, the IESO will determine the most restrictive reference level depending on configuration of the facility: 1x1, 2x1 ... Nx1. For the example of the MLP reference level, the IESO will apply the most restrictive of these - the highest MLP reference level - for the purpose of carrying out validation of non-financial reference levels for combined cycle resources. This will mean that the IESO will avoid rejecting non-financial dispatch data due to information issues around configuration of the combined cycle facility.</p> <p>The IESO does not currently intend to modify design to model resources in full-speed-no-load operating state (synchronized but not injecting).</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
143	Capital Power	<p>Subsection 4.1.1: Process for Establishing Energy Reference Quantities of Thermal Resource – Utilizing the methodology of the current output and capability report will require derate slips based on ambient conditions on a daily basis at certain times of the year. Capital Power recommends building more flexibility into this methodology to avoid the onerous administration this would require. Reference quantities, for example, should have tolerance thresholds to account for daily changes in conditions.</p>	<p>Market power mitigation does not change any obligations regarding outage management.</p> <p>Tolerance thresholds to account for daily changes in conditions take the form of conduct thresholds for physical withholding.</p>
144	Capital Power	<p>Design Clarity Needed to Properly Assess the Proposed Framework</p> <p>i. Eligible Costs</p> <ul style="list-style-type: none"> <li>• Subsection 2.5.1.7: Thermal Start Up Costs – Transmission charges do not appear to be included in the currently proposed framework (e.g. NSC). Capital Power believes these should be included. If the IESO does not agree, it would be helpful to understand why these are not considered eligible. More detail is required on other elements listed in the Pre-reading document including:                             <ul style="list-style-type: none"> <li>o Station Service – More detail is required about what can be included in the station service rate. In Capital Power’s view, energy, uplifts, and global adjustment should all be included, and the rate should be reset as frequently as possible. The network service charge is also related to plant operations and should likewise be included.</li> <li>o Emission Costs – Further clarity is needed around the associated variables such as fuel carbon content as an example. Capital Power also requests that an output-based standard needs to be well defined including the calculation of variables and conversion rates, among others.</li> <li>o Escalating Startup costs – Resources that start late in the day may require the completion of their MGBRT to carry over to the following trade date. These resources will need to submit escalating startup costs. It is not clear from the materials how this situation will be reflected in reference levels.</li> </ul> </li> </ul>	<p>In regards to transmission charges, whatever portion of that cost for a resource that is a short-run marginal cost and meets the criteria in the written guide is eligible to contribute to a reference level. Where a portion of the cost is fixed and does not vary with incremental supply, that portion of the cost is not eligible.</p> <p>In regards to station service, whatever portion of that cost for a resource that is a short-run marginal cost and meets the criteria in the written guide is eligible to contribute to a reference level. Where a portion of the cost is fixed and does not vary with incremental supply, that portion of the cost is not eligible.</p> <p>In regards to emissions costs, the IESO will use an approach for representing emissions costs that is consistent with the relevant legislation. Section 2.4.2 and other applicable sections will be updated based on the recent emissions policy changes in Ontario.</p> <p>In regards to escalating start costs, the sub-section of the Market Power Mitigation detailed design document titled "Late Day Start Offers Treatment" in Section 3.13.1.2 outlines the approach for this issue.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
145	Capital Power	<p>ii. Operating Configurations and Characteristics</p> <ul style="list-style-type: none"> <li>• Subsection 2.5.1.1.2: Pseudo Configuration – In addition to Capital Power’s comments provided following the IESO’s Pseudo Unit Technical Session,5 added clarity regarding the following would improve stakeholder assessment and ensure dispatch is reflective of actual operating constraints and costs.                             <ul style="list-style-type: none"> <li>o Reference levels are set by the configuration scheduled. However, a participant will not know ahead of time what configuration it will secure and, therefore, will face uncertainty as to how it should offer. For example, an asset may be faced with a decision to offer based on a 1x1 configuration and risk mitigation or offer 3x1 and risk not recovering costs. Such scenarios should and can be avoided by ensuring that, among other things, pseudo units are modeled appropriately.</li> </ul> </li> <li>• Subsection 2.5.1.4: Incremental HR – It is unclear to Capital Power how HR curves will be used to mitigate offers that are monotonically increasing. Please clarify.</li> <li>• Subsection 2.5.1.5.5: Emissions – For the Federal Output-Based Pricing System (“OBPS”), please provide the fuel emission factor that will be used. For non-OBPS, if invoices showing cost/GJ are produced then the purpose of the calculation provided is unclear to Capital Power. The cost per GJ will be approved by the OEB. Please clarify.</li> </ul>	<p>In regards to pseudo configuration, this issue is related to market participant offer strategy and pseudo unit modeling in general, not to reference levels or market power mitigation.</p> <p>In regards to incremental heat rate, when conditions are met to test for economic withholding the reference level curve will be compared to the offer curve (the "conduct test"). If the conduct and impact tests are failed, then the offer curve is replaced with the reference level curve. The logic that describes this process can be found in the calculation engine detailed design documents.</p> <p>In regards to the fuel emission factor, this value should be consistent with the fuel emission factor for that specific resource, rather than a single factor for all resources in the market.</p>
146	Capital Power	<p>C. Dispute Resolution and Effective IESO Stakeholder Engagement</p> <p>1) Establish Details for Updating Financial Dispatch Data Parameters as well as the Dispute Resolution Framework of Reference Levels &amp; Quantities</p> <p>The Pre-reading Document outlines process details affording market participants the ability to revise non-financial reference levels at subsection 3.2 – Ongoing Updates. Capital Power appreciates the IESO’s consideration in proposing such a process but seeks the following clarification:</p> <ul style="list-style-type: none"> <li>• What is the dispute resolution process if the IESO does not accept requested changes to the non-financial reference levels?</li> <li>• More information regarding the five-day requirement is necessary. For example, what are the repercussions of not meeting this timeline? Are reference level adjustments forbidden if this deadline is not met?</li> </ul> <p>Additionally, no such details were provided for updating financial dispatch data parameters. Throughout the Pre-reading document, it was only noted that these could be updated on an “as-needed basis.” This and details of the dispute resolution process regarding any related parameters remain absent to date. Therefore, the concerns noted in the Capital Power Comments on Draft Market Power Mitigation Design remain.6 It is strongly recommended that the IESO engage with stakeholders on appropriate processes for updating and resolving disputes related to the parameters. The established update procedures and dispute resolution framework should then be reflected in future versions of the MRP Energy Detailed Design documents.</p>	<p>In regards to dispute resolution, the current dispute resolution process will continue to be available to market participants. In addition, the IESO will be engaging with market participants on the independent review process for reference levels and reference quantities in the future.</p> <p>In regards to the five-day period, this will be an obligation under the Market Rules. However, given that this clock does not start until the resource finishes commissioning the change to operational capability and that these changes should be known well in advance of completing commissioning, market participants will be able to schedule this update in advance of completion of commissioning.</p> <p>In regards to updates to financial dispatch data parameters, these updates to registered values will be carried out as part of the IESO's existing registration process. This process is available to market participants as needed.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
147	Capital Power	<p>2) IESO Must Consider Interconnectedness of Related Stakeholder Engagements                      The MRP-related changes, particularly those related to market power mitigation, are affected by and effect other initiatives currently being considered by the IESO. The Resource Adequacy and Capacity Auction initiatives being undertaken by the IESO, along with MRP, collectively make-up key elements to ensuring the continued reliability of the Ontario interconnected electric system.</p> <p>Capital Power remains concerned about certain energy market changes, particularly those related to market power mitigation, as the overall framework to ensure revenue sufficiency of resources has, to date, been done in a disjointed manner. With the Resource Adequacy engagement about to commence, Capital Power strongly suggests that work be undertaken in close coordination with, and consideration, of MRP (and vice versa).</p>	<p>The IESO Resource Adequacy stakeholder engagement provides the opportunity for dialog regarding Ontario's future resource needs and procurement.</p> <p>The IESO is aware of the interconnections with other engagement, and will work to ensure consistency whenever necessary.</p>
148	Capital Power	<p>3) Stakeholders Must be Afforded a Reasonable Amount of Time for Review                      Capital Power appreciates the IESO's efforts to ensure the timely development of the Detailed Design documents and its reassurance that stakeholders will have an opportunity to review them collectively. However, two issues remain:</p> <ul style="list-style-type: none"> <li>• Detailed Design documents must be drafted such that market participants can understand the meaning of the language being used. Where terms are undefined (e.g. SRMC) or used inconsistently, it is not possible for stakeholders to review and comment on implications.</li> <li>• An appropriate amount of time must be provided for review. Effective stakeholder engagement cannot occur if sufficient time for review is not provided. There must be a reasonable opportunity for dedicated resources to consider the draft documents.</li> </ul> <p>Capital Power has deployed significant resources to reviewing the draft documents and effectively participate in the IESO's Stakeholder Engagement Processes but has nevertheless observed that both the detail and timelines provided for comment have presented challenges and contributed to protracted timelines for feedback. Capital Power respectfully submits that providing stakeholders adequate detail and time to provide feedback early in the design process will ensure a superior and more sustainable market design. Further, this would reduce the likelihood of potentially debilitating complications in the draft rules or approval processes.</p>	<p>The IESO acknowledges that participating in Market Renewal is a significant draw on limited stakeholder resources and the time that stakeholders take to participate is appreciated.</p> <p>The IESO understands that the topic of reference levels and reference quantities is complicated and a priority issue. The intent was to provide a significant amount of time for review of these materials.</p> <p>The IESO posted materials on August 13 and requested comments by September 15. In total stakeholders were allowed almost 5 weeks of review time with the reference level materials.</p> <p>The IESO will continue to work with stakeholders to assure that we allow sufficient time to prepare for these topics, while balancing the timing requirements to meet the targeted go-live date in 2023.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
149	Cardinal	<p>It is understood that the IESO and its contractor are working to define the data and supporting material required to establish reasonable Reference Levels for the mitigation of Market Power in the post-Market Renewal IESO market. However, the level of detail requested, both for financial and non-financial parameters is extreme, and requests a significant investment of time and resources from Market Participants.</p>	<p>The IESO acknowledges that participating in Market Renewal is a significant draw on limited stakeholder resources and the time that stakeholders take to participate is appreciated.</p> <p>The IESO understands that the topic of reference levels and reference quantities is complicated and a priority issue.</p> <p>The IESO will continue to work with stakeholders to assure that we allow sufficient time to prepare for these topics, while balancing the timing requirements to meet the targeted go-live date in 2023.</p> <p>Resources can elect what value of energy reference level they request. This will directly impact the supporting materials they are required to submit. In general, the IESO expects that less supporting materials would be required to support lower energy reference levels.</p> <p>Resources may elect to request an energy reference level of \$0/MWh. In this case, they are not required to submit any supporting materials for the energy reference level.</p>
150	Cardinal	<p>At a high level, we wish the IESO to provide some context to this request.</p> <p>1. Is this level of detail representative of the Market Power Mitigation procedures in other jurisdictions?</p>	<p>The level of detail requested for both financial and non-financial reference levels is consistent with the approach in other jurisdictions.</p> <p>It is important to note that when a resource offers at low prices, it can request a reference level of \$0/MWh for energy and operating reserve and avoid having to provide supporting materials. To the extent that a resource intends to offer below the energy no-look threshold (\$25/MWh) and the operating reserve no-look threshold (\$5/MWh), the resource will have little exposure to mitigation.</p> <p>In addition, where a resource submits ramp rate reference levels that are sufficiently fast to ramp the resource from 0 to maximum capacity in one interval, no supporting materials are required.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
151	Cardinal	<p>At a high level, we wish the IESO to provide some context to this request.</p> <p>2. Where information is simply not available, what is the default reference level that IESO will establish?</p>	<p>As stated in the high level design, reference levels will be based on actual short-run marginal costs of a resource.</p> <p>Reference levels will be determined based on eligible short-run marginal costs that are supported. Where a cost is not supported, it may not be included in the reference level.</p> <p>If a resource does not submit any supporting materials, the relevant reference level will be \$0.</p> <p>It is important to note that when a resource offers at low prices, it can request a reference level of \$0/MWh for energy and operating reserve and avoid having to provide supporting materials. To the extent that a resource intends to offer below the energy no-look threshold (\$25/MWh) and the operating reserve no-look threshold (\$5/MWh), the resource will have little exposure to mitigation.</p> <p>In addition, where a resource submits ramp rate reference levels that are sufficiently fast to ramp the resource from 0 to maximum capacity in one interval, no supporting materials are required.</p>
152	Cardinal	<p>At a high level, we wish the IESO to provide some context to this request.</p> <p>3. Can IESO identify where Market Power is likely to be deemed? That is, what regions or resources across the province are susceptible to the conditions that the renewed market will deem to be “market power” under the MPM framework?</p>	<p>Information on constrained zones, based on historical data, will be made available to market participants in Q1, 2021.</p>

ID	Stakeholder	Stakeholder Feedback	IESO Response
153	Cardinal	<p>For Cardinal Power, the time and resources required to assemble this detailed information seems to far exceed the value of the process. The facility offers a reliable source of capacity to the IESO grid, but runs infrequently in a region where transmission constraints are seemingly uncommon. In reviewing the level of detail requested by IESO in the first draft Workbook for Thermal Resources, there are several sections that request data that isn't currently available. To make that data available would require external resources and potentially capital investment in system upgrades, neither of which seems reasonable at this stage.</p> <p>For example, the requests for Combustion Turbine Cost components include fuel heat content, actual and theoretical consumption with a supporting document request for one year's worth of 5-minute interval fuel consumption data. This data is also requested to support start-based emissions measurements. This level of data is simply not available. Further, the allocation of operating and maintenance costs to start-up and incremental operation is a significantly more complex and contentious process than the data request insinuates. At Cardinal, historic operating and maintenance costs are available for 20+ years of baseload operation and 5+ years of infrequent cycling operation. The impact of cycling on maintenance cycles is significant, and is not accurately represented by historical data that includes years of steady-state, predictable operations.</p>	<p>The IESO acknowledges that participating in Market Renewal is a significant draw on limited stakeholder resources and the time that stakeholders take to participate is appreciated.</p> <p>The IESO understands that the topic of reference levels and reference quantities is complicated and a priority issue.</p> <p>The IESO will continue to work with stakeholders to assure that we allow sufficient time to prepare for these topics, while balancing the timing requirements to meet the targeted go-live date in 2023.</p> <p>As stated in the high level design, reference levels will be based on actual short-run marginal costs of a resource.</p> <p>Reference levels will be determined based on eligible short-run marginal costs that are supported. Where a cost is not supported, it may not be included in the reference level.</p> <p>In regards to the historical study period, market participants may request that the IESO approve a modification to a relevant historical study period for a particular resource where there is a material difference between the past operation during the historical study period and the projected future operation of the resource.</p> <p>In order for the IESO to approve such a modification, the market participant must demonstrate to the satisfaction of IESO that the adjustment is warranted.</p> <p>Section 2.2. of the written guide will be updated to reflect this change.</p>
154	Cardinal	<p>Cardinal Power requests the IESO ensure that the process is transparent, reasonable and that the effort required is commensurate with the value of the result.</p>	<p>The IESO agrees on the importance of transparency in this process. The IESO is adhering to the IESO's engagement principles, and implementing the recommendations of the Governance and Decision Making Framework.</p>