EB-2024-0331

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Electricity Act, 1998*, S.O. 1998, c. 35 (the "**Electricity Act**" or "**Act**");

AND IN THE MATTER OF an Application by Capital Power Corporation, Thorold CoGen L.P., Portlands Energy Centre L.P. dba Atura Power, St. Clair Power L.P., TransAlta (SC) L.P. (collectively, the "**NQS Generation Group**" or "**Applicants**") for Review of Amendments to the Independent Electricity System Operator Market Rules

IESO MARKET RENEWAL PROGRAM RULE AMENDMENTS REVIEW RESPONDING EVIDENCE

January 6, 2025

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TABLE OF CONTENTS

1. Overview of the IESO's Responding Evidence

On November 8, 2024, Capital Power Corporation, Thorold CoGen L.P., Portlands Energy Centre L.P. doing business as Atura Power, St. Clair Power L.P. and TransAlta (SC) L.P. (**Applicants** or **NQS Generation Group**) applied to the Ontario Energy Board (**OEB** or **Board**) for a review of amendments (**Amendments**) to the Market Rules for the Ontario Electricity Market (**Market Rules**) made by the IESO to enable and operationalize the IESO's Market Renewal Program (**MRP**).

The Amendments constitute the full set of market rule amendments necessary to enable and operationalize MRP. The Amendments are effective as of November 11, 2024, facilitating registration activities in advance of the planned launch of the renewed market on May 1, 2025.

The core components of the Amendments are a new Single Schedule Market (**SSM**) with locational marginal prices (**LMP**), a Day Ahead Market (**DAM**) and an Enhanced Real-Time Unit Commitment Process (**ERUC**). On December 11, 2024, the IESO filed descriptive evidence that focuses on these core components of MRP, as well as the rule amendments that will create a revised Market Power Mitigation framework (**MPM Framework**), in accordance with the Board's request to explain the Amendments in clear language (**IESO Descriptive Evidence**).

The IESO's responding evidence builds upon the IESO Descriptive Evidence by responding to the conclusions of the Expert Evidence in Appeal dated December 18, 2024 prepared by Power Advisory LLC on behalf of the Applicants (**Power Advisory Report**). Power Advisory opines that the Amendments will introduce financial risk to non-nuclear non-quick start resources (**NQS resources** or **NQS generators**), and that other supply resources will not face a similar level of financial risk, principally due to:

- reduced commitment and dispatch of NQS resources under the Amendments due to the use of a broader cost envelope (i.e. three-part offers that include energy costs,

start-up costs and speed no-load costs) that will result in a negative financial impact to the Applicants of more than $23 million annually; and

- the greater number of operational parameters for NQS resources that will be subject to the MPM framework, which will include ex-ante mitigation carried out automatically by the IESO's tools, than other non-NQS supply resources.

For the reasons detailed below, the IESO does not accept the accuracy of either of these conclusions as presented in the Power Advisory Report. While the conclusions and analysis of these two points is intertwined in the Power Advisory Report, the IESO's evidence is structured into separate sections that respond to Power Advisory's conclusions with respect to the unit commitment programs (DAM and ERUC) (section 2) and the MPM framework (section 3).

In each of these sections, the IESO provides an overview of its key disagreements with Power Advisory's conclusions in sections 5 and 6 and appendixes B and C of the Power Advisory Report and then indicates, on a paragraph-by-paragraph basis, where it agrees and disagrees with material aspects of Power Advisory's analysis.[1] Where the IESO disagrees with a material aspect of the Power Advisory Report, the IESO has provided a detailed explanation as to why with appropriate references to supporting documents where necessary. [2]

The IESO Descriptive Evidence discussed the Amendments, the purposes of the Amendments, how the Amendments will achieve their intended purposes, and how they are expected to impact market participants or classes of market participants. The IESO

[1] In this responding evidence, any discussion of financial impact to the Applicants pertains to financial impact under the IESO-administered markets, not the procurement contracts. The Applicants' procurement contracts entitle them to negotiate amendments to their contracts, failing which they have recourse to binding arbitration. Continuing contract amendment negotiations or arbitration are the lawful and exclusive forum for the Applicants to pursue contract amendments to mitigate and remedy any adverse impacts resulting from the Amendments. See the IESO's Written Submissions in advance of November 26, 2024 Pre-Hearing Conference for further information on the contractual regime and the available remedies if the parties fail to reach an agreement on the appropriate contractual amendments. In accordance with the directions of the Board in its decision released on January 3, 2025, the IESO has disregarded the portions of the Power Advisory Report that opine on the implications of MRP for MRP-related contractual amendments.

[2] Documents referenced in the IESO's evidence are included in the IESO's Brief of Exhibits.

incorporates and relies upon the IESO Descriptive Evidence in its responding evidence and will not reiterate the points covered in that filing here unless it is necessary to do so to respond to specific points made by Power Advisory.

2. Response to Power Advisory Conclusions with respect to Unit Commitment Programs

2.1 Key Points of Disagreement with respect to Unit Commitment Programs

At a high level, the IESO's disagreements with Power Advisory's opinions and statements on the operations and impacts of the IESO's unit commitment programs can be summarized into five core themes.

First, the IESO does not agree with the extent of Power Advisory's statements that the Amendments will introduce new risks or features that are not present in the current market, when in fact many of the identified risks or features already exist today. These include:

- commitments and schedules made in the day-ahead timeframe, with a pre-dispatch process that transitions to real-time by balancing the day-ahead commitments and schedules based on changing system conditions;
- consideration of local transmission constraints and NQS resources' operational characteristics when deciding whether to commit NQS resources;
- registration of NQS operational characteristics, including minimum load point (**MLP**) and minimum generator block run time (**MGBRT**);
- committing NQS resources based on three-part offers in the day-ahead timeframe, and compensating NQS resources for day-ahead commitments based on three-part offer costs; and
- obliging resources to submit offers day-ahead if they wish to participate in the real-time market, among other features.

Further information on the IESO's current unit commitment programs, and its evolution since market opening, can be found in the sections of the IESO Descriptive Evidence related to the Day Ahead Commitment Process (**DACP**) and the Real-Time Generation Cost Guarantee Program (**RT-GCG**).

Second, Power Advisory asserts that the Amendments introduce unfair changes to the IESO-administered market without acknowledging the changes rectify long recognized flaws in the current market design and improve competition and market efficiency overall. Power Advisory particularly objects to the changes in the design of cost guarantee payments for NQS resources, even though these changes will improve the efficiency of the IESO-administered markets and are consistent with longstanding recommendations from the Market Surveillance Panel (**MSP**) and the Auditor General of Ontario to address inappropriate wealth transfers and susceptibility to gaming. The limitations of the IESO's current programs, the commentary from the MSP and the Auditor General of Ontario, and the measures that the IESO is taking to address those limitations are detailed in the IESO Descriptive Evidence.

Third, the IESO disagrees with Power Advisory's evaluation that the Amendments will cause reduced commitment and dispatch of NQS resources resulting in financial harm. The Amendments will result in more efficient and economic commitment of resources, including NQS resources. To the extent there is a reduced commitment and dispatch of a particular NQS resource, it will primarily be a result of competition amongst NQS generators – i.e. between more competitive/efficient NQS generators and less competitive/efficient NQS generators – and is not expected to uniformly impact NQS generators ***as a class*** as Power Advisory has assumed. Power Advisory also simplistically associates reduced commitment and dispatch with financial harm to NQS generators. The function of a cost guarantee payment is to ensure that NQS generators are placed in a revenue neutral financial position as it relates to bringing their resource online and operating the resource over a particular period of time; consequently, fewer commitments may reduce a particular NQS resource's ***gross*** market revenue but will not necessarily reduce its ***net*** market revenue.

Power Advisory fails to consistently distinguish between gross and net revenues in its analysis.

Fourth, Power Advisory repeatedly makes the point that NQS generators are being treated differently than other suppliers by being committed and scheduled based on start-up and speed no-load costs, not just energy offer prices. As described in the IESO Descriptive Evidence, the IESO scheduled NQS resources at market opening solely based on energy offers but this did not enable NQS resources to recover all of their costs, including their start-up and speed no-load costs. The IESO changed this approach to provide NQS resources with cost guaranteed commitments that are not available to other types of supply resources. Under the Amendments, three-part offers are required for NQS resources only if they wish to be eligible for cost guarantee payments; indeed, an NQS resource is free to forgo three-part offers and compete in the IESO-administered markets based on an energy-only offer as quick start (**QS**) resources do. However, if an NQS resource decides to compete based on an energy only offer, then it must do so on the same basis as other resources and it will not be eligible for cost guarantee payments. Power Advisory's opinion appears to be that NQS resources should be able to recover all of their costs but, unlike other supply resources, should only be required to compete to be committed and scheduled based on a portion of their costs.

Fifth, Power Advisory's estimated $23 million annual financial impact on the Applicants is based on a historical analysis of the Amendments had they been in force for the 2018 to 2023 period, which inherently presents an inaccurate and speculative forecast given that future market conditions, dynamics, and outcomes under MRP will differ from these historical circumstances. Further, Power Advisory extrapolates the assumed daily financial impacts on a proxy generator to all of the Applicants' NQS resources in Ontario without appreciating that any impact will not be uniform. Nor does Power Advisory's analysis consider positive impacts where a second NQS resource is committed and dispatched in place of the proxy generator. The IESO presents a detailed critique of the proxy generator example and the related historical financial impact analysis below to show that Power

Advisory has significantly overestimated the financial impact of the Amendments on NQS resources. In addition, the IESO will utilize Power Advisory's proxy example to demonstrate the inefficiencies of the IESO's current process and explain how these inefficiencies will be addressed by the Amendments.

The following subsections provide a paragraph-by-paragraph description of where the IESO agrees and disagrees with sections 5 and 6 and appendixes B and C of the Power Advisory Report's description of the operation and impact of the unit commitment on NQS resources. The sections have been structured to respond to specific portions of the Power Advisory Report.

2.2 Response to Power Advisory's Description of the IESO's Current Unit Commitment Programs

Power Advisory discusses the IESO's current commitment process in section 5 of its report, specifically in paragraphs 33 through 36, 39 through 45, and Figure 4:

- The IESO agrees with paragraphs 33 through 36, 41(a) and (c), 42(a), (d), and (f), and 43 through 45.
- The IESO disagrees with paragraphs 39, 40, 41(b), 42(b), (c), and (e), and Figure 4.

In paragraph 39, Power Advisory states, "the financial and operational risk of the two-settlement system is not present in the current IAM." The IESO rejects the contention that, on balance, the Amendments increase the financial and operational risk to market participants, particularly NQS resources. A financially binding day-ahead market, combined with a 27-hour look-ahead period (**LAP**) that optimizes all resources based on their operational characteristics, offers greater financial and operational certainty to market participants, especially to NQS generators who purchase fuel day-ahead and have long lead times and long minimum run times. Furthermore, market participants may increase both their schedules in real-time, creating opportunities for additional revenues.

In paragraph 40, Power Advisory states that the Amendments include a number of features not included in the IESO's current process, including "optimization of supply resources by

simultaneously incorporating physical and economic constraints in different locations on the electricity grid." The IESO's current pre-dispatch process commits NQS resources based on the constrained schedule, which takes transmission constraints, system operating limits, and other physical constraints at each location into account. With these constraints accounted for, it commits, where necessary to satisfy demand, what appears to be the most economic NQS resources in each location based on energy offer price, but without considering total costs and without optimizing over multiple hours. The difference is that the price of energy in the current system does not accurately reflect these constraints. Under the Amendments, the price of energy will reflect these constraints.

Paragraph 40 also states that the Amendments include "incorporating the actual ramping capabilities of supply resources to be able to produce energy (whereas the current model assumes they can ramp up and down faster than their physical capabilities)." Currently, the unconstrained schedule multiplies ramp rates by three when determining the market clearing price for Ontario. However, the constrained schedule uses actual ramp rates to determine dispatch instructions for all resources. This results in energy prices that do not reflect the actual generation ramp capabilities of Ontario supply resources as discussed in the IESO Descriptive Evidence.

In paragraph 41(b), Power Advisory states, "NQS generators must participate in the DACP through energy offers (both supply (MW) and price ($/MWh)), start-up costs and SNL costs (i.e. three part offers)." This is not correct. NQS generators are not obligated to use three-part offers. Start-up costs and speed no-load costs are optional submissions.[3] An NQS resource is free to forgo three-part offers and compete in the IESO-administered markets on the same basis as QS resources (energy-only offers) if they wish to do so. Three-part offers are only required for NQS resources if they wish to be eligible for cost guarantee payments. The IESO understands that most NQS resources choose to submit three-part offers because they prefer to receive a cost guarantee. Such guarantees are not available to QS resources.

[3] MR Ch. 0.7 ss. 3.5.12, 3.5.13.

Paragraph 42(b) also states that, "while historically, most commitments of NQS generators occurred through the PD and RT processes rather than the DACP, even recent increases in DACP commitment continue to allow NQS Generators the opportunity to be committed in RT [real-time] through incremental energy offers only." This statement requires further context. In 2018, the IESO introduced changes to the RT-GCG program that replaced compensation based on after-the-fact cost submissions with compensation based on costs approved by the IESO in advance of the commitment, commonly called "pre-approved costs". Since this change, the DACP has produced approximately half of all NQS resource commitments. In 2024, the DACP produced approximately two-thirds of all NQS resource commitments. These "recent increases in DACP commitment" are not a historical aberration, as the Power Advisory Report appears to imply, but an enduring structural change to commitment patterns caused by improvements to the IESO's process for administering cost guarantee compensation for NQS resources. Additionally, as Power Advisory's own example in paragraph 56 shows, self-commitment leads to inefficient market outcomes.

In Figure 4, Power Advisory states that the DACP, "provides physically binding schedules for NQS generators only." The DACP provides selected NQS generators physically binding commitments up to their MLP for the duration of their MGBRT. These commitments set the minimum energy schedules that committed NQS resources will receive. The DACP may also schedule NQS generators for additional energy beyond their MLP and MGBRT, if they are economic. However, these incremental energy schedules beyond MLP and MGBRT are not physically binding.

Figure 4 also states that, "the RT-GCG program allows NQS generators to voluntarily commit when incremental energy offers are economic for half of their MGBRT. PD optimization of schedules is limited to one hour at a time and energy and OR prices are uniform across the province." This seems to imply that the RT-GCG program permits NQS generators to voluntarily commit when they are economic for half their MGBRT based on the market clearing price for Ontario. That is not the case. RT-GCG commitments are based on an

economic evaluation under the constrained schedule, which takes system limits at each location into account. When determining whether an NQS generator is eligible for an RT-GCG commitment, the IESO compares its energy and operating reserve offer prices against the incremental cost of supplying energy and operating reserve at that location under the constrained schedule, *not* the uniform market clearing price for Ontario.

2.3 Response to Power Advisory's Description of the IESO's New Unit Commitment Processes (DAM and ERUC)

Power Advisory discusses the new commitment processes (DAM and ERUC) in paragraphs 47 through 50:

- The IESO agrees with paragraphs 47(a), 48(a) and (e), and 49(a).
- The IESO disagrees with all other paragraphs and figures, for the reasons set out below.

Paragraph 47(b) states that, "DAM participation will be mandatory for all NQS generators that want to participate in the RTM." This seems to imply that ***only*** NQS resources are subject to the requirement to participate in DAM if they wish to participate in the real-time market, and that QS resources may participate in the real-time market without first participating in DAM. The requirement is the same for QS and NQS resources alike.[4] Further, the same requirement applies in the current market for all resources to submit an energy offer to the DACP if they wish to participate in the real-time market.

Paragraph 47(b) also states that, "Generators that receive a schedule in the DAM need to meet that schedule in the RTM or be subject to a clawback in revenue by the IESO". The IESO disagrees with referring to real-time balancing as a "clawback in revenue" – the real-time balancing operates to adjust the financially-binding DAM schedule to account for the real-time supply/consumption. In the example provided in paragraph 47(b), the alleged "clawback in revenue" is an adjustment required to ensure the resource in question is not paid for the 10MW that it did not supply. Further, Power Advisory only provides a singular

[4] MR Ch. 0.7 s. 3.1.11.

example where the real-time schedule is less than the DAM schedule[5] and fails to consider situations where the real-time schedule remains the same as the DAM schedule (there would be no difference in revenue) or where the resource has a higher real-time schedule (the resource receives increased revenue).

Paragraph 47(c) discusses the calculation of cost guarantee payments under the new GOG program compared to cost guarantee payments under the current system. The IESO will address this issue in more detail below where the IESO discusses the assertions made in paragraph 56 of the Power Advisory Report related to financial implications of the changes to the IESO commitment programs. The Amendments base the calculation of cost guarantee payments on the same envelope of costs and revenues that the IESO will use when deciding whether to commit NQS resources. The cost guarantee calculation under the Amendments will more comprehensively account for all revenues earned and costs incurred over the course of the commitment, consistent with longstanding recommendations from the MSP[6] and the Auditor General of Ontario.[7] The IESO does not agree with Power Advisory's claim in paragraph 48(c) for the same reason.

Paragraph 47(d) states, "the PD and RT schedules are key elements of commitment and dispatch in the current IAM." As discussed above, the IESO's pre-dispatch process is no longer the dominant process for committing NQS generators, with two-thirds of NQS commitments now originating in the DACP. Paragraph 47(d) continues: "Going forward, the DAM is expected to be the primary driver of commitment in the future IAM under MRP, with

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[5] Risks that may result in a reduced real-time schedule, such as forced outages, are not specific to NQS generators and there are benefits for suppliers from the greater financial certainty they get from locking-in DAM prices and the possibility of being able to inject more in real-time if the LMP increases in real-time. The DAM High Level design provides a simplified view of the settlement equations and a discussion of the opportunities and risks associated. See IESO, *Day-Ahead Market High-Level Design Final Report* (August 2019), available online at the at the IESO's Website

[6] Ontario Energy Board, Market Surveillance Panel, *Monitoring Report on the IESO-Administered Electricity Markets for the Period from November 2012 – April 2013* (January 2014) at 174, available online at the Ontario Energy Board Website.

[7] Auditor General of Ontario, 2017 Annual Report (December 2017) at 347 and 354-355, available online at the Auditor General of Ontario Website

all supply resources receiving a financially binding commitment (unlike the current IAM), while the PD and RTM processes are expected to largely operate as balancing services in response to changing conditions on the grid." This statement is incorrect – only non-nuclear NQS resources are eligible to receive commitments, not all supply resources. While DAM schedules will be financially binding in a way that DACP schedules are not, the Amendments do not change the fundamental function of the pre-dispatch process as a means to transition from day-ahead to real-time while responding to changing system conditions. Further, the IESO's current pre-dispatch and real-time processes also operate as balancing services to respond to changing conditions on the grid compared to the forecasts, schedules, and commitments resulting from the DACP.

Paragraph 48(b) discusses the 27-hour LAP introduced to the pre-dispatch process as part of the Amendments. It states:

> this [the 27-hour look-ahead period] is also bespoke design compared to other US ISO/RTO wholesale electricity markets, which do not include such a significant LAP and, as such, the IESO, to Power Advisory's knowledge, has not considered whether the many changes that can occur as a result of a maximum and contiguous 27-hour LAP will result in additional financial harm to NQS generators.

ISOs and RTOs in the United States use shorter LAPs because they are less reliant than Ontario on combined cycle gas plants to meet peak demand. Combined cycle gas plants have long lead times, long minimum run times, slow ramp up to MLP, and long cooldown periods following shutdown. Instead, unit commitment programs in American jurisdictions focus on simple cycle combustion turbines, which have shorter lead times, shorter minimum run times, faster ramping capabilities, and shorter cooldown periods. A shorter LAP is sufficient for committing and scheduling simple-cycle combustion turbines. However, it is less well-suited to committing and scheduling combined cycle gas plants, which Ontario relies on to satisfy peak and intermediate demand. The 27-hour LAP reliably accommodates Ontario's unique operational requirements and supply mix.

The IESO sees no reason to believe that the 27-hour LAP will cause any negative financial impacts to NQS resources. On the contrary, the 27-hour LAP accommodates NQS generators' longer start-up, lead time, minimum run time, and minimum down time, ensuring that these are available for both morning and evening demand peaks. A longer LAP also allows NQS resources to more efficiently manage their gas supply.

Paragraph 48(b) continues, stating, "to Power Advisory's knowledge, the IESO has not performed analysis regarding alternate options to the ERUC design of a maximum and contiguous 27-hour LAP." The IESO solicited stakeholder feedback and consultation on the length of the pre-dispatch LAP as part of the ERUC High-Level Design. The final report on the ERUC High-Level Design discusses this decision extensively.[8]

Paragraph 48(d) continues, "given the more extensive LAP and the various constraints and inputs being applied in the PD calculation engine, schedules and commitments of NQS Generators from the DAM will be more volatile (and subjected to potentially multiple changes) than the fixed commitment in the DACP in the current IAM." The IESO sees no basis for the claim that commitments from the DAM will be more volatile than commitments from the DACP. DAM will commit NQS resources to their MLP for the duration of their MGBRT, the same as the DACP. DAM commitments cannot be reduced in pre-dispatch or real-time, the same as DACP commitments. DAM commitments are just as fixed as DACP commitments.

Discussing the IESO's real-time process,[9] paragraph 49(c) states, "unlike the current IAM where NQS Generators are committed based on incremental energy offers, the MRP Amendments will result in commitment on three-part offers, as discussed in other parts of this evidence." The DACP already commits NQS resources based on three-part offers. It is

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[8] See IESO, *Enhanced Real-Time Unit Commitment High-Level Design Final Report* (August 2019) at 14-18, available online at the at the IESO's Website.

[9] In paragraph 49(b), Power Advisory asserts that the introduction of LMP will make "the forecasting of prices significantly more challenging." While the IESO acknowledges that pricing determinations, and therefore forecasting may be more complicated with LMP, the reduced use of after-the-fact settlement programs (such as Congestion Settlement Management Credits (**CMSC**)) will improve overall efficiency, transparency, and real-time decision making.

only the pre-dispatch process that relies solely on incremental energy offers when committing NQS resources.

Paragraph 50(c) states, "the design of the RT-GOG program is significantly different and more financially restrictive than the current RT-GCG and DA-PCG programs." The IESO rejects the claim that RT-GOG compensation is financially restrictive. As explained in more detail below in response to paragraph 56 of the Power Advisory Report, the RT-GOG cost guarantee will more comprehensively account for revenues earned and costs incurred during the commitment period, consistent with recommendations from the MSP and the Auditor General of Ontario.

Paragraph 50(c) continues, stating:

> the combination of three-part offers, a maximum and contiguous 27-hour LAP and other constraints included in the MRP Amendments are expected to reduce commitment and dispatch of NQS Generators, while the RT-GOG and DA-PCG programs will provide less comprehensive guarantee payments when NQS Generators do not fully recover their commitment costs through IAM revenues than the current RT- GCG program.

The IESO cannot agree with Power Advisory's assertion that the Amendments will result in fewer commitments and reduced dispatch of NQS resources ***as a class***. The Amendments will result in more efficient and economic commitment and dispatch of NQS resources. To the extent there is a reduced commitment and dispatch of a particular NQS resource, the IESO expects it will primarily be a result of competition ***amongst*** NQS generators – i.e. a more competitive/efficient NQS generator will receive a commitment that may have gone to a less competitive/efficient NQS generator under the current regime. For this reason, the IESO cannot agree with Power Advisory's assumption that the Amendments will uniformly impact NQS generators as a class. This point is discussed in greater detail in the IESO's critique of Appendices B and C of the Power Advisory Report in sections 2.7 and 2.8 below.

In the IESO's view, Power Advisory has not established that there will be a ***net*** reduction in commitments for NQS resources ***as a class***.

The IESO also rejects the claim that the GOG cost guarantee does not provide a comprehensive guarantee, for reasons set out in response to paragraph 56, below.

2.4 Response to Power Advisory's Description of the MRP Implications for NQS Generators

Power Advisory describes the implications of the new commitment process in section 6 of its report, specifically in paragraphs 52 through 55, and Figures 4 through 11:

- The IESO agrees with Figure 7 noting that this figure describes the current pre-dispatch commitment process and not the process under the Amendments, and Figure 10.
- The IESO disagrees with all other paragraphs and figures, for the reasons set out below

Paragraph 52 claims that the Amendments will have a negative financial impact on NQS resources. Power Advisory's analysis does not support its claim that NQS resources as a class will be worse off under the Amendments. Paragraph 52 further states that the Amendments are "targeted specifically" at NQS resources. This is not true. The Amendments include new registration parameters and enhanced processes to more efficiently and economically model and dispatch hydro-electric resources, electricity storage resources, and import and export transactions. The Amendments also facilitate the participation of new resource types into the IESO-administered markets, including price-responsive loads and virtual resources, as is detailed in the IESO Descriptive Evidence. The introduction of a DAM and an SSM with LMP will improve the efficiency of dispatch for all resources. MPM will guard against the exercise of market power and applies equally to any market participant who exercises market power when competition is restricted, not just NQS resources (see section 3.2 below for further details on this issue).

Figure 4 of the Power Advisory Report notes six categories of market rule amendments which Power Advisory asserts have varying levels of financial impact on NQS generators. These categories of market rule amendment largely apply to all supply resources and impact all supply resources to differing and varying degrees. Power Advisory's evaluation of the financial impact (limited/moderate/significant) in Figure 4 is not substantiated nor is the analysis transparent.[10] Further, the analysis appears to be comparing the financial impact of the Amendments relative to the current position of NQS resources and does not include a comparative analysis between classes of market participants.

The evaluations in Figure 4 also appear to be based on misunderstandings:

- The second column of the Day Ahead Settlement row in Figure 4 states: "the future DA-GOG program will incorporate changes to the schedule throughout the PD process when calculating the guarantee payment." Pre-dispatch schedules are irrelevant to cost guarantee compensation under the Day-Ahead Generator Offer Guarantee (**DA-GOG**). So long as NQS resources ramp up to their MLP on time and continue to inject at or above their loading point for the duration of their MGBRT, the DA-GOG compensates NQS resources based on their as-offered costs submitted day-ahead. Start-up cost compensation under DA-GOG is almost identical to the start-up cost compensation offered today under the Day-Ahead Production Cost Guarantee (**DA-PCG**) for commitments made in the DACP.

[10] For example, in Figure 4 Power Advisory assesses a "Moderate" impact for real-time dispatch because "The constrained and unconstrained mode will be retired and replaced with a SSM that will dispatch supply resources based on the cost of energy at each node in the IAM. Elimination of payments of CMSCs". Power Advisory provides no analysis provided of locational data which would suggest that NQS resources are moderately impacted by this change, either individually or as a class. Also, while CMSC is being retired, the NQS evidence does not take into account make-whole payments, which compensate generators when they face a shortfall between their offer price and the revenue earned through market clearing prices, and which, unlike CMSC, will never be negative. While the cost of make-whole payments will drop dramatically with an SSM in place, these payments will be limited to just cases where it is necessary still be required occasionally to ensure market participants will not lose money as a result of following IESO instructions to maintain system reliability.

- The second column of the Pre-Dispatch and Real Time Settlement column in Figure 4 states: "when committed by ERUC, the associated RT-GOG payment will be reduced by all revenues earned on all supply, including [operating reserve (**OR**)]." In the new market, NQS resources will receive cost guarantee payments that consider not only the revenues earned on all supply but also the costs associated with providing that supply, including the cost of providing OR. The GOG cost guarantee will comprehensively account for all revenues earned and costs incurred during the commitment, including revenues and costs associated with OR, to ensure that NQS resources fully recover the costs of their commitments.

Paragraph 54 states:

> The MRP Amendments will – holding demand, energy offers, and other variables (e.g., transmission, etc.) constant – result in less commitment and dispatch of NQS Generators. Therefore, the MRP Amendments will result in less IAM revenues for the NQS Generators resulting from lower energy production and supply of energy and OR due to being committed and dispatched less. The impact will be experienced in all of the DAM, PD, and the RTM calculation engines and dispatch schedules compared to the current DACP, PD, and the RTM calculation engines. Overall, the combination of less commitment and dispatch will result in a negative financial outcome for NQS Generators.

As discussed above in connection with paragraph 50(c), the IESO cannot agree that Power Advisory's analysis of the Amendments demonstrates that they will result in fewer commitments and reduced dispatch for NQS generators ***as a class***. The IESO expects that more efficient NQS resources may receive more commitments, while less efficient NQS resources may receive fewer commitments.

Nor can the IESO agree with Power Advisory that reduced commitments will necessarily negatively impact NQS resources. Cost guarantee payments are intended to ensure that

NQS generators recover the costs associated with a commitment. Therefore, an NQS generator that receives a cost guarantee payment for a commitment should be placed in a revenue neutral financial position (they are not intended to provide additional profit). Most commitments in the IESO-administered markets are revenue neutral in this way. As such, fewer commitments may reduce an NQS resource's ***gross*** market revenue, but in most cases should not reduce the generator's ***net*** market revenue.

Paragraph 55(b) states, "NQS Generators will be required to submit three-part offers throughout the DAM and PD commitment processes." That is not true. NQS resources will be ***eligible*** to submit three-part offers but are not required to do so.[11] NQS resources need only submit three-part offers if they wish to benefit from the GOG cost guarantee. If they prefer, NQS resources may forgo submitting three-part offers and compete on the same basis as QS resources, including all their costs in their energy offer price. The IESO expects that most NQS resources will choose to submit three-part offers because most NQS resources prefer the benefit of a cost guarantee.

Paragraph 55(b) continues, "The broader consideration of costs included within the MRP Amendments throughout the DAM to RTM calculation engines will limit commitment opportunities for NQS Generators, particularly when compared to other supply resources that will continue to largely participate on an incremental energy basis only." The Amendments do not limit NQS resources' commitment opportunities "when compared to other supply resources" because other supply resources are not eligible for commitments.

Furthermore, resources that submit single-part offers do not participate on an "incremental energy basis only." Resources that use single-part offers must recover all their costs through their energy offer price. It is only the three-part offer structure that allows NQS resources to recover incremental costs through energy offers while recovering other costs through different three-part offer components. A possible reading of Power Advisory's position is that NQS generators should be evaluated solely based on their incremental costs –

[11] MR Ch. 0.7 ss. 3.5.12, 3.5.13.

excluding start-up and other costs – while all other resources should be evaluated based on their total costs.

Finally, as stated above, the Power Advisory Report does not demonstrate that the Amendments will limit commitment opportunities for NQS resources compared to the current system.

Paragraph 55(c) states, "While the current DACP includes three-part offers for NQS generators, it is the PD commitment process – and the RT-GCG program that is based on the PD timeframe – that has historically accounted for a majority of commitments of NQS Generators." As explained above, the pre-dispatch process no longer accounts for the majority of NQS resource commitments. In 2024, the DACP accounted for approximately two-thirds of NQS commitments.

Paragraph 55(c) continues, "In the current IAM, the PD commitment provides a second opportunity – or hedge – for commitment if an NQS Generator is not successful in the DACP. Under the MRP Amendments, there will be a far more limited opportunity to receive a commitment following DAM, significantly reducing the second opportunity for NQS Generators to receive a commitment." It is unclear to the IESO how the IESO's pre-dispatch process provides a "hedge" for NQS resources. However, the purpose of the IESO's pre-dispatch process is to transition from day-ahead to real-time, taking account of changing system conditions, not to provide financial hedging opportunities.

Paragraph 55(d) provides an example which purports to show an "economic barrier" to NQS resources for pre-dispatch commitments under the Amendments compared to the current system. In the IESO's view, this example – in which the IESO evaluates the sample generator's total costs – demonstrates the inefficiency of the IESO's current pre-dispatch commitment process. As can be seen in the example, the current pre-dispatch commitment process leads to inefficient commitment decisions, increasing the number of uneconomic pre-dispatch commitments and requiring increased cost guarantee payments to ensure NQS resources recover their costs. By taking NQS resources total costs into account, the

Amendments will increase the efficiency of pre-dispatch commitments, selecting a greater proportion of economic commitments and reducing the need for cost guarantee payments.

Figure 5 purports to illustrate the example from paragraph 55(d), but it is drawn incorrectly. Paragraph (d) stated that the sample generator has a six-hour MGBRT yet Figure 5 shows it generating at or above its MLP for only five hours. Further, based on a six-hour MGBRT, the unit would not be able to ramp down to 0 MW by Hour Ending 12, but would still have to be at its MLP of 300 MW during that hour.

Paragraph 55(e) states, "In the current IAM, only the costs related to an NQS Generator's incremental energy offers for half of its MGBRT are used to invoke a commitment – if those offers are below the market clearing price, the NQS Generator can self-commit." This is incorrect. As explained above, the current pre-dispatch commitment process does not permit NQS resources to self-commit based on the Ontario market clearing price. The economic evaluation for pre-dispatch commitments under the current system is based on the incremental cost of providing energy and operating reserve at each location in the constrained schedule, taking transmission constraints and other physical limitations into account.

Paragraph 55(e) continues, "Under the MRP Amendments, the broader suite of costs is significantly higher and reduces the opportunity for economic commitment." By comparing NQS resources' total costs with market conditions at each location when making commitment decisions, the Amendments will increase the proportion of commitments that are economic, reducing the need for cost guarantee payments.

Paragraph 55(e) continues further, stating, "as shown in the table above, the economic "barrier" to commitment in the calculation engines under the MRP Amendments is $70,000 compared to $22,000 under the current IAM. As a result, the same NQS generator is rendered significantly less competitive due to the MRP Amendments, leading to negative financial outcomes relative to the current IAM." On the contrary, the example does not show any negative financial outcome for the sample generator under the Amendments compared

to current system. By failing to take the sample generator's total costs into account, the current pre-dispatch process likely would have committed it in uneconomic conditions. Market revenue would have been insufficient to allow the sample generator to recover its costs, obliging the IESO to pay it a cost guarantee payment. Since cost guarantee payments are intended to be revenue neutral (i.e. they allow NQS resources to recover their costs ***and nothing more*****)**, this outcome should not have negative financial consequences for the sample generator.

The IESO also rejects the assertion that, by taking their total costs into account, the Amendments render NQS generators "significantly less competitive." The Amendments do not change NQS resources total costs, which are a feature of their own business operations. The Amendments oblige the IESO to consider NQS resources' total costs when committing and scheduling them. The competitive position of each NQS resource – vis-à-vis other NQS resources and other resource types – will be commensurate with its actual costs.

Paragraph 55(f) states, "All else being equal, the unit with the higher incremental energy costs would never be committed over the one with lower incremental offers in the current PD process. When the total costs are included – as will occur under the MRP Amendments – the lower marginal cost unit with higher total costs and longer MGBRT will no longer be committed and dispatched." The IESO sees no reason why the IESO should favor an NQS resource with higher total costs over an NQS resource with lower total costs.

In this regard, the MSP and the Auditor General of Ontario have both criticized the IESO's current pre-dispatch unit commitment process for committing higher cost NQS resources over lower cost NQS resources.

- As early as 2010, the MSP found that the IESO's failure to take NQS resources' total costs into account often caused the IESO to commit more expensive resources

ahead of cheaper competitors.[12] The MSP recommended that the IESO calculate cost guarantee payments based on an offered value or "another solution that would require actual generation costs to be taken into account at the time of scheduling decisions."[13]

- In 2014, the MSP found that the IESO's reliance on energy offer price only when committing NQS resources during the pre-dispatch timeframe weakened competitive pressure on NQS resources and compounded the costs of commitments generally.[14] In 2016, the MSP urged the IESO to expand the use of three-part offers to commitment decisions made during the pre-dispatch timeframe, finding that it would "result in more efficient unit commitment through a more refined scheduling process and further emphasis on competition."[15]
- As recently as September 2024, the MSP criticized the IESO's pre-dispatch commitment process and the RT-GCG program, finding that the IESO's failure to account for total costs when committing NQS resources caused the IESO to favour higher cost resources over lower cost resources, produced inefficient outcomes, and distorted price signals.[16]
- The Auditor General of Ontario has also criticized the IESO's pre-dispatch unit commitment process and the RT-GCG program. In its 2017 annual report, the Auditor

[12] Ontario Energy Board, Market Surveillance Panel, *Monitoring Report on the IESO-Administered Electricity Markets for the Period from November 2009 to April 2010* (August 2010) at 134, available online at the Ontario Energy Board Website.
[13] *Ibid*. at 140.
[14] Ontario Energy Board, Market Surveillance Panel, *Monitoring Report on the IESO-Administered Electricity Markets for the Period from November 2012 – April 2013* (January 2014) at 167, available online at the Ontario Energy Board Website.
[15] Ontario Energy Board, Market Surveillance Panel, *Monitoring Report on the IESO-Administered Electricity Markets for the Period from May 2015 – October 2015* (November 2016) at 117, available online at the Ontario Energy Board Website.
[16] Ontario Energy Board, Market Surveillance Panel, *State of the Market Report 2023* (September 2024) at 85, available online at the Ontario Energy Board Website.

General stated, that the IESO's pre-dispatch unit commitment process "has led to the IESO's inefficiently selecting which gas generators will produce electricity."[17]

2.5 Response to Power Advisory's Analysis of the Financial Implications of the Changes to the IESO's Commitment Programs

Paragraph 56 of the Power Advisory Report outlines the alleged financial implications of changes to the IESO's commitment programs to NQS generators. The IESO does not agree with Power Advisory's analysis in paragraph 56 and is of the view that the Amendments will ensure that NQS resources will be adequately compensated as discussed below.

In paragraph 56(a), Power Advisory states "the elimination of the RT-GCG program and replacement with RT-GOG program that will produce negative financial outcomes for NQS Generators." The IESO disagrees with Power Advisory's evaluation that NQS generators will be negatively financially impacted when the RT-GCG cost guarantee (which is based on pre-approved costs) is replaced by the GOG cost guarantee (which will be based on as-offered costs and selected through a transparent process).

Paragraphs 56(b) and (c) discuss a hypothetical example comparing the current RT-GCG cost guarantee compensation with GOG cost guarantee compensation under the Amendments. Power Advisory supplements this example with Figure 8, which claims to illustrate RT-GCG cost guarantee compensation under the current pre-dispatch commitment process.

Figure 8 is drawn incorrectly. Despite the sample generator having a six-hour MGBRT, Figure 8 shows the resource operating above its 300 MW MLP for only five hours. The sample generator must continue to generate at least 300 MW until Hour Ending 13, not Hour Ending 12 as shown in Figure 8. Furthermore, RT-GCG compensation does not account for energy market revenues below MLP during ramp down. Accordingly, values below 300 MW during ramp down on Figure 8 should not be shaded blue but should instead be blank.

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[17] Auditor General of Ontario, *2017 Annual Report* (December 2017) at 349, available online at the Auditor General of Ontario Website.

Power Advisory's example omits crucial context of how the ERUC will commit NQS resources during the pre-dispatch timeframe, as well as how the IESO will calculate cost guarantee compensation under the new GOG program. Under the Amendments, the IESO will determine whether an NQS resource is economic for a commitment based on ***all*** the resource's scheduled energy and operating reserve, not just its injections up to its MLP during its MGBRT. As the economic evaluation considers the NQS resource's energy and operating reserve costs and revenues over its entire schedule, GOG cost guarantee compensation is also based on the resource's energy and operating reserve costs and revenues over its entire schedule. Excluding from the calculation a portion of these costs and revenues – the costs and revenues based on which the IESO made the commitment decision in the first place – would incorrectly compensate NQS resources and risk over-compensation. This approach is very similar to the calculation of Day-Ahead Production Cost Guarantee (**DA-PCG**) payments for NQS resources committed in the DACP under the current system.

Both the MSP and the Auditor General of Ontario have criticized how the IESO calculates RT-GCG compensation. In 2014, the MSP criticized the IESO's approach of excluding NQS resources' costs and revenues beyond their MLPs during their MGBRTs when calculating RT-GCG payments, finding that this led to over-compensation and weakened the incentive for NQS resources to participate economically in the DACP.[18] The MSP recommended revising the calculation of cost guarantee payments to take revenues earned on NQS resources' entire schedule into account:

> <u>Recommendation 3-2</u>
>
> If the IESO, after performing its detailed analysis, determines that the RT-GCG program continues to be needed, the Panel recommends that the IESO modify the RT-GCG program such that the revenues that are used to offset

[18] Ontario Energy Board, Market Surveillance Panel, *Monitoring Report on the IESO-Administered Electricity Markets for the Period from November 2012 – April 2013* (January 2014) at 169-171, available online at the Ontario Energy Board Website.

guaranteed costs under the program are expanded to include any profit (revenues less incremental operating costs) earned (a) on output above a generation facility's minimum loading point during its minimum generation block run time (MGBRT), and (b) on output generated after the end of the facility's MGBRT.

In 2017, the Auditor General of Ontario criticized the IESO for failing to implement the MSP's recommendations related to the RT-GCG program, including the recommendations in the 2014 report.[19] The approach to calculating cost guarantee payments under the new GOG program addresses these longstanding criticisms.

Paragraph 56(d) states that NQS resources will be worse off due to changes in the calculation of the cost guarantee under the Amendments. In the IESO's view, the Amendments ensure that NQS resources will be adequately compensated, avoiding the risk of over-compensation in certain scenarios present with the calculation of cost guarantee payments under the current RT-GCG program.

Figure 9 purports to show how the IESO will commit NQS resources under ERUC as well as how the IESO will calculate GOG cost guarantee compensation. However, Figure 9 is incorrect. Figure 9 shows the IESO making the commitment decision based on start-up costs, speed no-load costs, and incremental energy costs up to the resource's MLP, colored green and labelled "A." However, under ERUC, the IESO will commit NQS resources based on revenues and costs across the resource's entire energy schedule – that is, considering all the production shown within the solid blue line. The legend for Figure 9 also states, "for revenues counted against the guarantee payment, all revenues earned in the commitment are considered." This should say "all *net* revenues earned in the commitment are considered," as the IESO will also take the costs into account. Given the costs associated

[19] Auditor General of Ontario, *2017 Annual Report* (December 2017) at 347 and 354-355, available online at the Auditor General of Ontario Website.

with commitments, the difference between gross and net revenues for commitments is significant.

Paragraph 56(e) states that the IESO will take OR revenues into account when calculating GOG cost guarantee payments. This is an incomplete view of how the payments are established. ERUC will consider OR revenues and costs when committing NQS resources. Accordingly, GOG cost guarantee payments will account for not only OR revenues, but also the associated costs.

Paragraph 56(f) states, "In the current PD process, NQS Generators compete on an incremental energy only basis to serve the significant portion of load not served by DACP commitments, which are limited to NQS Generators." In the IESO's view, this misrepresents the IESO's current scheduling process. The DACP does not "leave over" demand to be addressed by the pre-dispatch process later. The DACP commits and schedules NQS resources and schedules all other resources to meet all forecast Ontario demand in the day-ahead timeframe. The pre-dispatch process then commits and schedules additional resources if necessary to meet changing system conditions, evaluating all resources, not just NQS resources. Under the Amendments, the pre-dispatch process continues to serve this same basic function.

Paragraph 56(f) continues, stating, "During this [the pre-dispatch] period, NQS Generators receive ongoing market signals (i.e., wholesale prices) and have repeated opportunities to adjust offers to meet RT-GCG program commitment criteria (scheduled to MLP for half-MGBRT) and invoke a commitment." Power Advisory claims that NQS resources adjust their offer prices for the purpose of triggering commitments that may well be uneconomic, rather than because their actual costs have changed. This conduct would result in inefficient outcomes and increased costs for all resources. This demonstrates the inefficiency of the IESO's current unit commitment process and underscores the need for ERUC. The Amendments incentivize resources to offer into the market based on their actual costs and allows the market to evaluate the most economic way to address system needs based on those costs. Accordingly, the Amendments provide for a much more efficient process.

Finally, paragraph 56(f) states, "This provides them [NQS resources] with repeated opportunities for commitment if they are not scheduled in the DACP and also allows them to compete against other supply resources on an incremental energy basis throughout the PD process." NQS resources still have the opportunity to receive commitments under the Amendments. Further, as the IESO has already discussed, committing based only on incremental energy costs instead of total costs leads to inefficient outcomes.

Paragraph 56(g) repeats Power Advisory's unsupported claim that the NQS resources will have fewer opportunities for commitment in the pre-dispatch timeframe under the Amendments compared to the current system. The opportunity is the same, for the reasons discussed above.

Paragraph 56(h) repeats Power Advisory's unsupported claims that the Amendments will lead to fewer commitments for NQS resources as a class and that fewer commitments will result in negative financial outcomes for NQS generators as a class. For reasons already stated above, the IESO cannot validate either of these claims made by Power Advisory.

For the same reasons, the IESO rejects the illustration of the IESO's commitment and scheduling process shown in Figure 11.

2.6 Response to Power Advisory's Analysis of the Alleged Financial Risk of Reduced Commitment for NQS Resources

Power Advisory discusses the alleged financial risk of reduced commitments at paragraphs 57, 61 through 64. The IESO disagrees with the analysis in these paragraphs in their entirety for the reasons set out below.

Paragraph 57(a) states, "The inclusion of operational parameters – such as MGBRT and MLP – in the calculation engines of DAM and ERUC dispatch and scheduling algorithms will result in commitment and dispatch that varies from commitment and dispatch in the current IAM." The IESO already models MGBRT and MLP in its current commitment and scheduling processes. The Amendments introduce a number of new operational parameters which will

allow the IESO to dispatch resources more consistently with their operational characteristics.[20]

Paragraph 57(a) continues, "Essentially, the operational constraints of different supply resources can result in dispatch that does not align with the economic merit order of the supply resources." The IESO rejects the assertion that incremental energy offers appropriately represent "economic merit order." The Amendments are premised on the principle that total costs should be determinant of economic merit.

Paragraphs 57(b) through (g) discuss an example that, according to Power Advisory, demonstrates the potential inefficiencies of ERUC. Instead, the example shows the clear superiority of ERUC over the IESO's current pre-dispatch process. If the same scenario were to occur in the current system, the sample units would receive the following pre-dispatch schedules:

- Unit A – 350 MW
- Unit B – 125 MW
- Unit C – 0 MW

The forecast pre-dispatch price would be $30/MWh because the unconstrained market schedule would not take Unit B's MLP into account, allowing it to set the price. Unit B could not invoke an RT-GCG commitment because its pre-dispatch schedule would be below its MLP. Further, since Unit B cannot run below its MLP, the IESO would not be able dispatch it to its pre-dispatch schedule. In addition, with a pre-dispatch price of $30, Unit B would not be economic to recover its costs.

In this scenario, the current market design would commit Unit A only. The IESO will not commit Unit B or Unit C, both of which will be shutdown generating 0 MW as real-time approaches, leaving the IESO 125 MW short of meeting demand. The IESO would have no choice but to manually constrain on Unit C to meet this demand, as Unit B's MLP is too high

[20] See, for example, MR Ch. 0.7 ss. 3.5.3, 3.5.4, 3.5.21, 3.5.22.

and would put the IESO-controlled grid in an over-generation condition. Unit C would then set the real-time price at $40, $10 higher than forecast in pre-dispatch.

Ultimately, the current system would select the same units – A and C – as under ERUC. The difference is that in the current system, the pre-dispatch price forecast would have been incorrect and the IESO would have had to manually intervene to ensure a reliable dispatch outcome. Under ERUC, the pre-dispatch calculation engine would produce a schedule that would reliably satisfy demand while correctly predicting the price ($40/MWh in both pre-dispatch and real-time) and avoiding manual intervention. ERUC produces a more reliable and efficient outcome, while the current commitment process offers no advantages to the IESO or Units A, B, or C.

In paragraph 61 Power Advisory states "NQS Generators are being treated differently under the MRP Amendments than other supply resources (e.g., nuclear, hydroelectric, wind and solar generation, energy storage, imports, and dispatchable loads)". This is a narrow view that excludes necessary context. The Amendments treat NQS generators differently to accommodate the technical characteristics of their resources to better ensure consistency of treatment across resource types. As a result of the Amendments, NQS resources will now be treated similarly to other resource types, as each resource will offer its all-in costs associated with providing energy and/or operating reserve to the market. This will provide better optimization decisions that lead to the least overall costs to meet demand in a reliable way.

Similarly, in paragraph 62 Power Advisory states that "NQS Generators are the only supply resources facing material changes in the financial settlement and dispatch related to commitment programs… None of wind, solar, hydroelectric and nuclear generators rely on cost guarantee programs… As such, no other supply resource will face the negative financial impact of changes to these guarantee programs". While it is true that NQS generators are the only supply resources eligible for such commitment programs, Power Advisory fails to acknowledge that these programs exist to accommodates NQS resources' unique technical requirements that require commitment decisions over multiple hours. As discussed above,

NQS resources are not obligated to participate in the cost-guarantee programs. In that event, they may forgo three-part offers and compete in the IESO-administered markets on the same basis as QS resources if they wish to do so.

Paragraph 63 asserts that "the risk of lower commitment and dispatch and a greater reliance on a financially binding DAM, maximum and contiguous 27 hour-LAP in the PD calculation engine and optimization of all costs in the DAM, PD and RT calculation engines are risks faced primarily – and in some cases exclusively – by NQS Generators, while having little impact on other supply resources in the IAM." As previously explained, the IESO disagrees with Power Advisory's assertion that these Amendments will lead to fewer commitments for NQS generators as a class. Furthermore, as also previously explained, the Amendments place no greater reliance on the day-ahead process for committing NQS resources than the current system. Unit commitments, cost guarantees, and three-part offers are features that are offered exclusively to NQS resources. Other resources are not eligible for these features.

Paragraph 63 continues, "the ability in the current IAM for NQS Generators to voluntarily invoke the RT-GCG program, for example, provides NQS Generators with flexibility in managing commitment and dispatch throughout the PD process, where most resources are currently committed." As Power Advisory's own examples illustrate, this conduct by NQS resources comes at the price of greater cost and less efficient dispatch outcomes for Ontario's wholesale electricity market. Furthermore, as previously explained, the pre-dispatch process is no longer responsible for the majority of NQS resource commitments in the current process.

Paragraph 64 states:

> other supply resources such as qualified hydroelectric generators – contrary to facing the risk of reduced commitment and dispatch as a result of the MRP Amendments – will have a variety of parameters included in the calculation engines that will provide greater control over their commitment. As part of the MRP Amendments, these hydroelectric generators will be able to specify a

> number of operational parameters – such as maximum starts and must-run daily energy amounts, among multiple other parameters – that will limit the calculation engine's ability to commit and dispatch these resources in a manner that differs from the preferences of the resource's operators.

The Amendments will significantly improve the IESO's ability to schedule and dispatch hydro-electric resources consistently with their operational characteristics. Hydroelectric resources have many unique operating characteristics that impact the amount of energy and operating reserve they are able to produce. Some relate to physical equipment and water supply limitations, while others are determined by regulatory and environmental requirements related to public safety and fish spawning. Operating characteristics common to most hydroelectric resources include minimum output requirements, limited start-up cycles, daily energy limits and scheduling dependencies with adjacent upstream or downstream resources on the same river system. Hydro-electric resources can be infeasibly and inefficiently scheduled in an energy market if these operating characteristics are not respected by energy market software.

Furthermore, several of the parameters that Power Advisory cites in paragraph 64 are optional for NQS resources, including start up offer, speed no-load offer, single cycle mode, maximum daily energy limit, and maximum number of starts per day.[21] Furthermore, maximum daily energy limit and maximum number of starts per day are not exclusive to NQS resources.[22] Other resources may register these parameters if they are relevant to that resource's operating characteristics and the resource would like the IESO to model those characteristics. Finally, hydro-electric resources must provide evidence establishing a start indication value if they wish to submit a maximum number of starts per day.[23]

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[21] MR Ch. 0.7 ss. 3.5.12 (start up offer), 3.5.13 (SNL offer), 3.5.25 (max DEL), 3.5.27 (single cycle mode), and 3.5.28 (max # of starts/day).
[22] MR Ch. 0.7 ss. 3.5.25 (max DEL), 3.5.28 (max # of starts/day).
[23] MR Ch. 7 ss. 2.2.6A.2, 3.5.28.

2.7 Response to Power Advisory's Unit Commitment Example in Appendix B

Appendix B to the Power Advisory Report discusses unit commitment under the current system in paragraph 1 and unit commitment under the Amendments in paragraph 2 for a proxy NQS generator. Power Advisory then presents a comparison of the two scenarios to conclude that the daily financial impact of the Amendments is $40,909 for the proxy generator.

The IESO disagrees with Power Advisory's analysis in both paragraphs 1 and 2 of Appendix B.

Paragraph 1(a) states that Appendix B relies on pre-dispatch forecast prices from three hours prior to real-time ("**PD-3**") as a proxy for prices in the DACP, stating that these prices "would be similar." The IESO disagrees that PD-3 prices would likely be similar to DACP prices. Pre-dispatch prices can vary significantly from a price generated in DACP because of differences in optimization and bid/offer behaviour from participants. For example, export transactions that appear in pre-dispatch but not in DACP would create a large price differential, all else held equal. The IESO reviewed the PD-3 constrained schedule shadow prices for 2024 at the location of an NQS generator with similar operating characteristics as the proxy generator. On average, PD-3 energy prices were $15/MWh higher than DACP prices.

Further, the DACP co-optimizes energy and operating reserve schedules when committing and scheduling NQS resources and scheduling other resources. Operating reserve market prices and schedules will often impact commitment and scheduling decisions in the DACP. It is difficult to predict whether the DACP will commit the proxy generator without knowing its OR offers and the constrained schedule shadow prices for OR at the proxy generator's location.

Additionally, Power Advisory does not disclose whether the IESO committed the proxy generator during the historical hours relied upon to create the sample PD-3 prices and HOEP in Figure 19. If these prices included commitments for the proxy generator, then not committing the proxy generator during those hours will change the prices.

Paragraph 1(b) states that the proxy generator could invoke two separate RT-GCG commitments in the pre-dispatch timeframe: "from HE [Hour Ending] 5 – 10 where its incremental energy offers are economic (i.e. in merit) for 3 of the 6 hours of its MGBRT" and "in HE [Hour Ending] 15 – 20 for the same reasons as the previous commitment." In making this claim, Power Advisory appears to be comparing the proxy generator's energy offer price with the PD-3 prices set out in Figure 19. However, the PD-3 column in Figure 19 lists market clearing prices determined using the unconstrained schedule. The IESO commits NQS resources based on the constrained schedule, not the unconstrained market clearing price. Without knowing the constrained schedule shadow prices at the proxy generator's location, one cannot determine whether the proxy generator would be eligible to invoke these RT-GCG commitments.

The IESO also notes that not all NQS generators in Ontario would be able to shutdown in Hour Ending 10 and then start back up by Hour Ending 15.

Paragraph 1(d) describes the IESO twice committing the proxy generator uneconomically in circumstances in which the proxy generator cannot recover its costs from market revenue and then paying the proxy generator cost guarantee payment to allow it to recover its costs. The proxy generator ends the commitments with net energy market revenue of $0. This is an inefficient outcome that does not benefit the proxy generator.

Paragraph 2(a) states, "based on 24-optimization [*sic*] and three-part offers, the NQS Generator is likely not committed in the DAM, as the IAM energy market and OR revenues are significantly below its as offered costs." Appendix B does not include sufficient information to support this conclusion for three reasons.

- Power Advisory's analysis is based on market clearing prices and HOEP determined in the unconstrained schedule. These are uniform prices for Ontario that do not take transmission constraints, system operating limits, and other physical constraints in each location into account. Under the Amendments, the IESO will determine LMP for

each location in Ontario, taking physical constraints into account. Accordingly, the LMP will differ materially from unconstrained market clearing prices and HOEP.

- DAM optimization would likely consider a single, longer commitment for the NQS resource, instead of the two separate commitments assumed under paragraph 1. To validate Power Advisory's conclusion, the IESO would have to know what the LMP would be in each hour both with and without committing the proxy generator and then assess the cost difference of committing or not committing the proxy generator across the day-ahead timeframe. Appendix B does not include this information.

- Power Advisory does not disclose whether the IESO committed the proxy generator during the historical hours relied upon to create the sample prices. If these prices included commitments for the proxy generator, then removing those commitments would change the prices.

Paragraphs 2(a) and 2(b) attribute the lack of commitment in DAM and pre-dispatch to '24-optimization [*sic*] and three-part offers' and 'the 27 hour-LAP and its multi-hour optimization'; however, it is the resources' costs and operating parameters that are the limiting factors.

Paragraph 2(d) states that, based on Power Advisory's conclusion that the sample generator would not receive a commitment, there is no settlement for which to account. If the IESO did not commit or schedule the proxy generator, then the proxy generator would receive net energy market revenue of $0. This is the exact same net energy market revenue it would receive under the current system as described in paragraph 1.

2.8 Response to Power Advisory's Estimation of Historical Annual Financial Impact of the Amendments in Appendix C

Appendix C to the Power Advisory Report presents an estimate of the annual financial impact of the Amendments on the proxy NQS generator from Appendix B using historical pricing data from 2018 to 2023. Power Advisory's analysis concludes that the total impact of the Amendments over the 2018 to 2023 period for the proxy generator would have been

approximately $21 million. Power Advisory then extrapolates that analysis to conclude, as stated at paragraphs 17 and 18 of its report, that "the market impact of the MRP Amendments across the entire NQS Generation Group would be more than $140 million over the 6-year timeframe, or more than $23 million annually."

Power Advisory's financial impact is flawed. Power Advisory's assessment is founded on the single proxy resource considered in Appendix B. The critiques made by the IESO above in respect of Appendix B apply equally to Appendix C. As discussed above, the IESO does not agree with Power Advisory's analysis that NQS generators as a class will necessarily be committed and dispatched less under the MRP Amendments or experience negative financial impacts.[24]

In any event, the IESO also disagrees with Power Advisory's simplistic extrapolation of the financial impact on the proxy NQS generator to all of the Applicants' NQS resources.[25] By myopically focusing on a single proxy NQS resource, Power Advisory's analysis ignores that a second resource that would need to be committed to replace the energy not provided by the proxy NQS generator. This second resource is likely to be another NQS resource. However, Power Advisory's analysis does not account for the ***positive*** financial impact of the replacement commitment to the second NQS resource and instead assumes that the negative impact of the proxy NQS generator will be shared by the entire NQS class. As a result, the extrapolation incorrectly amplifies the alleged negative financial impact on the proxy NQS generator instead of cancelling it out.

[24] The IESO does not understand the source of the figures utilized by Power Advisory to calculate the Annual Financial Impact on the proxy NQS generator contained in Figure 22 of Appendix C.
[25] The IESO notes that the Applicants do not include all NQS resources in the province and, its objects to the exercise aside, fails to understand why Power Advisory did not extrapolate to all NQS resources as a class.

3. Response to Power Advisory's Comments on the Impact of the Market Power Mitigation Amendments on NQS Generators

3.1 Key Points of Disagreement with respect to MPM

At a high level, the IESO's disagreements with Power Advisory's opinions and statements on the impact of the MPM amendments can be summarized into four core themes.

First, Power Advisory misstates and exaggerates the nature and extent of the changes being made by the Amendments to the current MPM framework. The IESO has had a framework to address the exercise of market power since market opening.[26] Under the Amendments, the IESO is moving from an ex-post (after the exercise of market power occurs) to an ex-ante approach that mitigates economic withholding before it occurs – a shift that prevents market participants from affecting dispatch schedules, market prices and settlement when competition is restricted.

Second, Power Advisory misstates and exaggerates the extent to which NQS Generators (or other market participants) will be impacted by MPM under the Amendments. MPM is subject to numerous requirements and thresholds and an NQS Generator's offers may only be mitigated after these requirements and thresholds have been satisfied (see description below and the Categories of Restricted Competition Table in Appendix A).

Third, Power Advisory incorrectly states that NQS Generators will be differently treated and disproportionately impacted by the new MPM framework relative to other classes or subclasses of market participants, including misstating the nature and extent of parameters applicable to NQS Generators that are subject to mitigation relative to parameters applicable to other market participants and classes of market participants that will be subject to mitigation. The new MPM framework applies to all dispatchable resources and Power Advisory provides no reliable evidence to support its contention that NQS Generators

[26] See Chapter 7, Appendix 7.6: Local Market Power and Market Manual 2.12: Treatment of Local Market Power.

will be disproportionately impacted. Power Advisory's statements in this regard amount to conjecture.

Fourth, Power Advisory exaggerates the extent to which reference levels are "IESO determined". Reference levels are determined by the IESO at the request of a market participant, based on input from and consultation with that market participant, including NQS Generators, and are subject to independent expert review in the event the market participant disagrees with the IESO's determination.

For purposes of additional context beyond what is contained in the IESO Descriptive Evidence, this evidence first expands on and further explains how the new MPM framework is designed and how it will operate in the renewed market. It then responds on a paragraph-by-paragraph basis to those parts of the Power Advisory evidence with which the IESO disagrees.

3.2 The New Ex Ante MPM Framework

As explained in the IESO Descriptive Evidence, the IESO has had a framework to address the exercise of market power since market opening; however, this framework is applied ex-post, after the exercise of market power occurs. That is because with a uniform price, i.e., HOEP, exercises of market power primarily impact extra-market payments (e.g., CMSC), not market prices.[27] These exercises of market power can be addressed using ex-post processes.

With the alignment of price and dispatch under a SSM and the introduction of LMPs, after the fact mitigation alone will not be sufficient to address the exercise of market power. In a SSM for energy and operating reserve, schedules and LMPs, dispatch and settlement are impacted by market participants' offers and other dispatch data. Under the Amendments, the IESO is therefore moving to an ex-ante approach that addresses economic withholding

[27] Because HOEP is unconstrained, the ability to exploit constraints does not show up in manipulating the clearing price, but in differences between the two schedules -- which is how CMSC is calculated.

before it occurs – a shift that prevents market participants from using market power to affect dispatch schedules, market prices and settlement.

The new ex-ante MPM framework, as further described below, has two main components: ex-ante mitigation[28] and ex-ante validation.[29] Ex-ante mitigation applies to submitted "financial dispatch data". It applies when competition is restricted and uses prescribed conduct and impact tests to determine whether a resource offered materially above its costs and materially impacted price. If this is determined to be the case, the MPM framework enables the IESO to replace the resource's offer with an estimate of the offer that the resource would have submitted under conditions of unrestricted competition, i.e., the "reference level." Ex-ante validation, on the other hand, is conducted on certain submitted "non-financial dispatch data" parameters to determine whether a submitted parameter fell within validation thresholds. If it falls outside those thresholds, the parameter will be rejected and the market participant must resubmit a parameter that falls within the validation thresholds. The prescribed conduct and impact tests described below do not apply to non-financial dispatch data.

The new ex-ante MPM framework is therefore commensurate with the greater impact market power can have under an SSM and LMP system.

3.2.1 Restricted Competition

Energy offers, start-up offers, speed no-load offers, and operating reserve offers may only be mitigated when competition is or may be restricted. Specifically, conduct tests and, as necessary, impact tests (as further described below) may only be undertaken when competition is or may be restricted.

Competition is restricted when insufficient transmission capacity exists to meet demand in an area (this is also called "transmission congestion") or there is insufficient supply. This

[28] See Market Rules, Ch. 0.7, s. 22.14.
[29] See Market Rules, Ch. 0.7, s. 22.13.

reduced competition allows suppliers to increase their offer prices to drive higher LMPs. Parts of the grid where competition is restricted are called "constrained areas".

The Categories of Restricted Competition Table in Appendix A includes a column that summarizes the categories of restricted competition and conditions that will give rise to conduct testing.

3.2.2 Conduct Tests

Conduct tests are applied to a resource's financial dispatch data, i.e. its energy offers, start-up offers, speed no-load offers, and operating reserve offers, when competition is restricted. The conduct test checks whether a resource's offers are materially above the "reference level" that the resource would have offered if competition had not been restricted. The "reference levels" (described further below in section 3.2.5) are predetermined levels that reflect an estimate of what the resource would have offered under conditions of unrestricted competition.

The amount by which a submitted dispatch data value may exceed the reference level is called the "conduct threshold". Conduct thresholds vary according to the extent to which competition is restricted. As competition is more restricted, conduct thresholds are tightened. The applicable conduct thresholds for each type of restricted competition are shown in the Conduct Threshold column in the Categories of Restricted Competition Table in Appendix A.

If any financial dispatch data parameters fail the conduct test, an impact test will be conducted to determine if the resource's offers materially impacted price. If all dispatch data parameters pass the conduct test, no impact test will be conducted and the resource's offers will not be subject to mitigation.

3.2.3 Impact Tests

As noted above, if one or more financial dispatch data parameters for a resource fails the conduct test, an impact test will be performed. The impact test determines whether the parameter that failed the conduct test increased prices by more than the allowable

materiality threshold. Impact test thresholds are shown in the Impact Test Threshold column of the Categories of Restricted Competition Table included in Appendix A.

Resources that fail the impact test will have the offers that failed mitigated to the resource's corresponding reference level and the calculation engine will schedule and dispatch resources using the mitigated offers. Likewise, market participant settlement will be based on the resource's mitigated offers.

3.2.4 Ex-Ante Validation of Non-financial Dispatch Data Parameters

Resources can also raise LMPs by manipulating certain non-financial dispatch data parameters that they submit. These parameters are:

- Minimum generation block run-time;
- Minimum generation block down-time;
- Minimum loading point;
- Energy ramp rate;
- Operating reserve ramp rate;
- Lead time;
- Ramp hours to minimum loading point;
- Energy per ramp hour; and
- Maximum number of starts per day.[30]

The IESO will validate a resource's submitted parameters against its reference levels by evaluating whether a submitted parameter exceeds the resource's reference level plus a predefined validation threshold. If any non-financial dispatch data parameters are outside the acceptable range determined by the reference level and the validation threshold, that parameter will be rejected and the market participant must re-submit the rejected parameter.[31] Failure to resubmit a parameter within the validation threshold would result in

[30] Market Rules, Chapter 0.7, section 22.3.1.
[31] The conduct thresholds for non-financial dispatch data parameters are set out in Chapter 0.7, section 22.13.1. Testing of non-financial dispatch data parameters does not include a price impact test.

a resource not being scheduled and could expose the market participant to an ex-post assessment of physical withholding.

3.2.5 Reference Levels and Reference Quantities

A resource's reference levels represent the financial and non-financial dispatch data that it is expected the resource would have submitted under conditions of unrestricted competition.[32] Likewise, a resource's reference quantities represent the MW offer quantity that it is expected it would have submitted under conditions of unrestricted competition.[33] As further described below, the IESO determines reference levels and reference quantities for each resource based on input from and in consultation with the market participant for the resource.[34]

The process to determine reference levels and reference quantities is initiated by a market participant filling out the appropriate form requesting the applicable reference levels and reference quantities for each of its resources and submitting the required supporting documentation for review and assessment by the IESO.[35]

Before the IESO registers a resource's reference levels and reference quantities, it provides the market participant for the resource with a "preliminary view".[36] The preliminary view sets out the reference levels and reference quantities that will be registered for the resource. Before registration, the market participant may request independent expert review of any reference level or reference quantities in the preliminary view that differs from what the market participant requested.[37] The expert's determination of the reviewed reference level or reference quantities is binding upon the IESO,[38] subject to certain limited exceptions.[39]

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[32] See Market Rules, Ch. 0.7, ss. 22.2.2 and 22.3.2, and Ch. 0.11, definition of "reference level value".
[33] See Market Rules, Ch. 0.11, definition of "reference quantity value".
[34] See Market Rules, Ch. 0.7, ss. 22.1.1.1 and 22.6.1.1 and Market Manual 0.14.2, s.3.3.
[35] Market Manual 0.14.2: Reference Level and Reference Quantity Procedures.
[36] Market Rules, Ch. 0.7., s. 22.8.1.
[37] Market Rules, Ch. 0.7, s. 22.8.2.
[38] Market Rules, Ch. 0.7, s. 22.8.7.
[39] Market Rules, Ch. 0.7., ss. 22.8.8., 22.8.10, and 22.8.13.

Further, a market participant may request updates to a resource's reference levels and reference quantities at any time if the current reference levels do not accurately reflect the resource's short run marginal costs or operational capabilities.[40] The market rules also include other mechanisms for market participants to request temporary changes to their resources' reference levels to ensure that the reference levels accurately reflect the resources' short-run marginal costs.[41]

3.2.5.1 Reference levels for financial dispatch data parameters

Reference levels for financial dispatch data parameters – energy offers, start-up offers, speed no-load offers, and operating reserve offers – are based on a resource's short-run marginal costs – the costs that it incurs to operate and provide energy or operating reserve.[42] These reference levels are dynamic equations that are based on numerous cost components and are not single static numbers. When requesting energy offer reference levels and operating reserve offer reference levels, a market participant must indicate the cost components that vary with increased supply.[43] Where a cost component varies with increased supply, the relevant reference level requires multiple laminations and the market participant must demonstrate its costs accordingly.[44]

3.2.5.2 Reference levels for non-financial dispatch data parameters

A resource's non-financial reference levels represent how the resource would operate in a competitive environment.[45] Unlike reference levels for financial dispatch data parameters, reference levels for non-financial dispatch data parameters are single static numbers. The

[40] See Market Rules, Ch. 0.7, ss. 22.5.4 and 22.7.3.
[41] See, for instance, Market Rules, Ch. 0.7 s. 22.5 and Market Manual 0.14.2, section 5.
[42] Market Rules, Ch. 0.7, s. 22.2.2 and Ch. 0.11, definition of "short-run marginal cost".
[43] For natural gas-fired resources, the reference level values calculated each day also dynamically account for the cost of natural gas.
[44] Market Manual 0.14.2, s.2.1.1. The formulas the IESO uses to determine energy offer, speed no-load offer, start-up offer, and operating reserve offer reference levels are described in Market Manual 0.14.2: Reference Level and Reference Quantity Procedures.
[45] Market Rules, Ch. 0.7, s. 22.3.2.

IESO establishes reference levels for the non-financial dispatch data parameters specified above in section 3.2.5.

A market participant may request that the IESO determine seasonal reference levels for non-financial dispatch data parameters, if applicable. [46]

3.2.5.3 Reference quantities

A resource's reference quantities represents the MW quantities of energy or operating reserve that the resource is expected to offer under conditions of unrestricted competition. [47] The inputs used by the IESO to determine reference quantity values vary according to the resource's technology type. [48] Inputs required for the calculation of reference quantity values may vary seasonally or monthly. [49] Market participants may therefore, where applicable, submit separate summer and winter values for parameters and inputs used in the determination of reference quantity values. Market participants may also submit requests for reference quantity modifiers if the default calculation methodology does not account for the specific operational characteristics of a resource. [50] Market participants can request modifiers per calendar month to reflect resource-specific limits; or, if the limit affects the resource year-round, the same modifier may be requested for the entire year. [51]

3.3 Response to Power Advisory's Description of MPM in the Current Market

Power Advisory addresses in paragraphs 42(c) and 48(f) of its report how NQS Generators are impacted by the IESO's current market power mitigation framework as compared to how they will be impacted by the new MPM framework. The IESO disagrees with these paragraphs for the reasons that follow.

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[46] Market Manual 0.14.2, s, 2.1.
[47] Market Rules, Ch. 0.11, definition of "reference quantity value".
[48] See Market Manual 0.14.2: Reference Level and Reference Quantity Procedures, s. 9.
[49] Market Manual 0.14.2, s, 2.2.
[50] Market Rules, Ch. 0.7, s. 22.6.5.
[51] Market Manual 0.14.2, s, 2.2.

In paragraph 42(c), Power Advisory states, "The DACP also has no MPM, which can allow NQS Generators to adjust offers accordingly depending on how they want to be committed or not." This statement is inaccurate. The current market does not include ex-ante mitigation. Nonetheless, market participants may be subject to an ex-post settlement adjustment if they exercise local market power through their offers submitted to the DACP under the Local Market Power framework set out in Chapter 7, Appendix 7.6: Local Market Power of the Market Rules and Market Manual 2.12: Treatment of Local Market Power.

In paragraph 48(f), Power Advisory states, "Similar to the DAM, the PD process will incorporate the IESO's more extensive MPM framework that will screen on an ex-ante basis multiple financial and operational parameters – increasing the potential of administratively lower wholesale prices (resulting in less revenues from the IAM) and operational decision making for NQS Generators." The underlined statement is misleading. The ex-ante MPM framework does not involve the IESO "administratively" lowering prices. Rather, resources that offer outside conduct thresholds and materially increase prices when competition is restricted are subject to having their offers mitigated to the resource's short-run marginal costs (i.e., its reference level) so that the resulting market clearing price reflects the price that would have been competitively determined.

3.4 Response to Power Advisory's Analysis of MRP Implications for NQS Generators

Power Advisory addresses in section 6 of its report the "significant" adverse financial implications that it says the MRP Amendments will have on NQS Generators, including, at paragraphs 58 to 60, the alleged increased adverse financial impact that the new ex-ante MPM framework will have on NQS Generators. The IESO disagrees with Power Advisory's statements and characterizations of the new MPM framework and how it will impact NQS Generators.

Throughout this section of its report, Power Advisory refers to an extensive new MPM framework that does not currently exist, that will apply extensive screens to financial and other parameters, and that will subject NQS Generators' energy offers to being replaced with offers based on pre-determined reference levels (see paragraphs 58 (a), (b), (c)). Power

Advisory's evidence misstates and exaggerates the scope and effect of the new MPM framework. The current market includes MPM, albeit applied ex-post, and it applies to NQS generators' participation in DACP and PD processes.[52] Further, mitigation of a market participant offer, including a NQS Generators' offer, is subject to numerous preconditions and materiality thresholds, such that offers may only be mitigated:

- when competition is reduced or potentially reduced;
- the offer fails a conduct test based on reference levels determined at the request of and in consultation with market participants;
- the offer fails a conduct test that includes a materiality threshold; and
- the offer fails an impact test that also includes a materiality threshold.[53]

At paragraph 58(a) and (f), Power Advisory states, that the MRP Amendments will disproportionately adversely impact NQS Generators:

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[52] Market Rules, Chapter 7, Appendix 7.6: Local Market Power and Market Manual 2.12: Treatment of Local Market Power.

[53] Power Advisory also misstates or overstates specific components of the MPM framework. For instance, at paragraph 58(c), Power Advisory states, "The future MPM framework under MRP – as discussed previously – will apply extensive screens of energy and operational parameters on an ex-ante basis in all of the DAM, PD, and RTM calculation engines." The underlined statement is incorrect. Ex-ante mitigation for economic withholding is applied in the DAM and PD calculation engines. The RTM calculation engine does not apply any conduct and impact tests, but the results of the DAM and PD conduct and impact tests are carried forward into the RTM calculation engine. Further, at paragraph 58(c), Power Advisory states, "If the resource is determined to have market power and, based on the IESO's assessment, these parameters fall outside IESO-determined ranges (for instance, incremental energy offer exceeds marginal operating cost, or MLP exceeds IESO-determined MLP of the unit), the IESO will replace the MPs submitted parameter with the IESO-determined mitigated parameter." The underlined statement is incorrect. Using Power Advisory's example, the IESO cannot replace a resource's energy offer with its reference level if the resource's energy offer merely exceed its marginal operating cost (i.e., reference level); the energy offer must exceed the resource's energy offer reference level by more than the applicable conduct threshold and, additionally, must have increased prices by more than the applicable price impact test threshold in order for the resource's submitted energy offer to be replaced with its reference level. The IESO cannot replace a resource's submitted MLP. The IESO validates a resource's submitted MLP against the resource's MLP reference level; if the submitted MLP is more than 100% above the resource's MLP reference level, the submitted MLP will be rejected and the market participant must resubmit an MLP that meets the validation threshold (i.e., is less than 100% above the resource's MLP reference level).

> The MRP Amendments are implementing an extensive MPM framework that currently does not exist and will negatively impact NQS Generators. NQS Generators will be disproportionately impacted by the MPM framework given they are likely to experience mitigation back to reference levels that do not result in infra-marginal rents in the IAM.
>
> ....
>
> As noted, NQS Generators are often wholesale market price-setting supply resources when committed in the IAM due to the province's extensive amount of baseload, low marginal cost supply (see following Figure). The potential for NQS Generators to have their energy, OR, and other components of their offers subject to MPM is far greater than other supply resources. The risk of mitigation along with the other financial risks described throughout this report, such as reduction in guarantee payments – imposes significantly greater financial risks to NQS Generators compared to other supply resources.

These statements are incorrect and unsubstantiated. The potential to be mitigated is the same for all resource types, since the conduct and impact thresholds that determine whether a resource is mitigated are applied uniformly to all resources. The percentage of time a resource sets LMPs is not relevant to the criteria and the tests that are administered for purposes of determining whether a resource has exercised market power and warrants being mitigated. Mitigation is driven by a resource failing the conduct and impact tests, not by market clearing. The risks of mitigation are the same for all market participants that are offering competitively in a manner that resembles their resources' costs and operational characteristics. Further, the extent to which a NQS Generator is mitigated is within the generator's control, since it knows its resources' reference levels and the applicable conduct and impact thresholds and validation thresholds.

In paragraph 58(c), Power Advisory states, "This replacement occurs in conjunction with market scheduling, and prior to operation and settlement, such that the impacts of the

mitigation are incorporated into those processes." This statement requires further context. As explained above, the design of the SSM places significant importance on the determination of LMPs. Performing MPM actions ex-ante is therefore required to ensure that market determined prices are reliable for dispatch and for settlement for all market participants. Failing to do so has consequences for other participants settled at the impacted LMP in contrast to the current market's two-schedule system where the IESO's ex-post adjustment to CMSC payments does not broadly impact dispatch and settlement.

Power Advisory states throughout that the new ex-ante MPM framework is subject to "IESO determined" reference levels (see paragraphs 58 (c), (d), 65, and 68). These statements are misleading. As explained above, reference levels for a resource are determined at the request of and in consultation with the market participant for the resource. They are intended to reflect a resource's short-run marginal costs and operational characteristics.[54] The market participant must request a resource's reference levels and provide evidence that supports their request.[55] A market participant that disagrees with the IESO's determination has recourse to a review of any of its reference levels and reference quantities by an expert independent of the IESO and the market participant.[56] The expert's determination is binding upon the IESO, subject to certain limited exceptions.[57] Furthermore, a market participant may request updates to a resource's reference levels at any time if the current reference levels do not accurately reflect that resource's short-run marginal costs or operational capabilities.[58]

At paragraph 58(d), Power Advisory provides an example of an NQS Generator with a reference level energy cost of $30/MWh that sets the energy LMP within a constrained zone through a $100/MWh energy offer. Power Advisory states that the generator would be subject to the IESO's MPM conduct and impact tests and that if the generator failed, its

[54] See Market Rules, Ch. 0.7, ss. 22.2.2 and 22.3.2.
[55] Market Rules, Ch. 0.7, ss. 22.1.1 and 22.1.3.
[56] See MR Ch 0.7, s. 22.8.
[57] See MR Ch 0.7, s. 22.8.10.
[58] Market Rules, Ch. 0.7, s. 22.5.4.

energy offer would be replaced with the predetermined reference level of $30/MWh. It is unclear what the point of this example is and why, in this case, an NQS Generator with a $30/MWh energy offer reference level would offer at $100/MWh – well above its short-run marginal cost – or why, in the circumstances, it would be unfair or inappropriate, if the resource failed the MPM conduct test and impact test, for the IESO to mitigate the resource's offer.

In paragraph 58(e), Power Advisory states that, "The number of NQS Generators parameters that are subject to MPM is far greater than other classes of the supply resources in the IAM (discussed elsewhere). Therefore, under MPM within MRP, there are many more ways for NQS Generators to be captured in the MPM framework than competing resources." This statement requires further context. Each parameter that is tested has the ability to be utilized by NQS Generators to exercise market power. Furthermore, several of the parameters that Power Advisory cites are optional to NQS resources, including start-up cost, speed no-load cost, single cycle mode, maximum daily energy limit, and maximum number of starts per day. Additionally, maximum daily energy limit and maximum number of starts per day are not exclusive to NQS resources. Other resources may register these parameters if they are relevant to the resource's operating characteristics and the resource wishes to submit them as dispatch data and have them modelled by the IESO.

In paragraph 59, Power Advisory states, "The MRP Amendments also include an ex-post review of physical MWs submitted by supply resources. If, for example, a supply resource was found to have withheld MWs in order to exercise market power – or at least is found to have done so by the IESO – the calculation engines will be run with the new reference quantity MW amounts and settlement amounts will be adjusted accordingly. No such ex-post adjustment process exists for similar circumstances in the current IAM." The underlined statement is inaccurate. Settlement amounts are not adjusted as part of the ex-post mitigation of physical withholding. Because the assessment and review process can

take up to 315 days from the dispatch day the MW were withheld, the IESO issues a settlement charge.[59]

In paragraph 60, Power Advisory states, "As part of the MRP Amendments, the IESO will screen and potentially replace OR offers when they are greater than $15/MW and it considers there to be "global" market power across the entire IAM. This creates a de facto $15/MW price cap on OR during certain circumstances, [...]." This statement is incorrect. The $15/MW figure Power Advisory refers to is not a price cap, but the condition that triggers testing of OR offers (i.e., the OR offers will be tested for economic withholding when the unmitigated market clearing price of a class of operating reserve exceeds $15/MW).[60] OR prices will be able to clear beyond $15/MW. The conduct test thresholds are relative to a resource's reference levels; the conduct test will be failed when a resource's offer price is greater than the lesser of 50% or $25/MW above the resource's reference level value.[61]

In paragraph 60, Power Advisory states, "This poses an additional risk for NQS Generators as large providers of OR, whereas nuclear, wind and solar generators are not impacted as they do not provide OR." This statement is misleading. Nuclear, wind, and solar generators offering OR would also be subject to the MPM framework, but they are not eligible to offer OR in the current market and will not be eligible to do so in the renewed market. Further, other resource types offering OR, such as hydroelectric and storage resources, are also subject to the MPM framework.

3.5 Response to Power Advisory's Allegation of Differential Treatment

Power Advisory, at section 6.2 of its report, asserts that NQS Generators will be differentially treated under the MRP Amendments as compared to other classes of market participants (specifically, hydroelectric generators), including, with respect to how it says NQS

[59] See, for instance, Market Rules, Ch.0.7, s. 22.15 and Market Manual 0.14.1, s. 5.1 for timelines for the ex-post assessment of physical withholding process.
[60] See Market Rules, Ch. 0.7, Appendix 7.5, ss. 4.3.8.3 and 10.7.1 and Appendix 7.5A, ss. 4.3.9.3. and 10.7.1.
[61] Market Rules, Ch. 0.7, Appendix 7.5, ss. 4.3.8.36, 4.3.8.37, 11.5.2 and Appendix 7.5A, ss. 4.3.9.30, 4.3.9.31, 11.5.1.2.

Generators will be differentially treated under the new MPM framework. The IESO disagrees with this assertion.

In paragraph 65, Power Advisory states, "Every single parameter (apart from daily energy limit) for NQS Generators is subject to mitigation. This means that the IESO can change these parameters if NQS Generators offer them differently than IESO-determined levels." This statement is incorrect. Certain non-financial dispatch data parameters[62] are subject to ex-ante validation and will be rejected – not replaced – if they fall outside the applicable conduct threshold.[63] The market participant must then resubmit the relevant parameters within the validation thresholds.

Financial dispatch data parameters may be mitigated, but the IESO cannot change a resource's offer solely because it differs from the resource's reference level. Competition must be restricted; the conditions for testing the resource for economic withholding must be present; the resource must have offered outside the applicable conduct threshold; and the resource's conduct must have increased prices beyond the applicable impact threshold. In short, the IESO can only replace submitted offers for an NQS Generator if competition is restricted and the offers are outside the applicable conduct threshold and materially impact price.

In paragraph 65, Power Advisory further states, "Conversely, for hydroelectric generators, only ramp rates and maximum starts per day are subject to mitigation." This statement is incorrect. First, ramp rates and maximum starts per day – as non-financial dispatch data parameters – are subject to ex-ante validation and resubmission by the market participant if they fall outside the validation conduct thresholds, but are not mitigated and replaced with the resource's reference levels. Second, QS hydroelectric energy offers and operating reserve offers may be mitigated if they fail the applicable conduct and impact tests. QS

[62] As set out in section 3.2.4 above, non-financial dispatch data parameters include energy ramp rate, operating reserve ramp rate, lead time, minimum loading point, minimum generation block run-time, minimum generation block down-time, maximum number of starts per day, ramp hours to minimum loading point, and energy per ramp hour.
[63] See Market Rules, Ch. 0.7, s. 22.13.

hydroelectric resources' energy offers and operating reserve offers are also subject to ex-post mitigation assessments of physical withholding. QS hydroelectric energy ramp rate, operating reserve ramp rate, and maximum number of starts per day – as non-financial dispatch data parameters – are subject to ex-ante validation, but are not mitigated.

In paragraph 65, Power Advisory further states:

> This means that these [hydroelectric] supply resources can dictate the minimum amount of energy – among other parameters – that the IESO calculation engine must consider without facing the threat of mitigation and administratively set levels. This is a significant difference between how the NQS Generators are treated under the MRP Amendments, offering hydroelectric generators far more flexibility to manage operational and financial risk relative to NQS Generators. This outcome is a direct result of the MRP Amendments and will contribute to negative financial outcomes for NQS Generators relative to hydroelectric generators.

This statement is misleading and requires further context. Hydroelectric resources have many unique operating characteristics that impact the amount of energy and operating reserve they are able to produce. Some relate to physical equipment limitations, while others are determined by regulatory and environmental requirements related to public safety and fish spawning. Operating characteristics common to most hydroelectric resources include minimum output requirements, limited start-up cycles, daily energy limits and scheduling dependencies with adjacent upstream or downstream resources on the same river system. Hydroelectric resources can be infeasibly and inefficiently scheduled if these operating characteristics are not respected by energy market software.

In Figure 13, Power Advisory states, "More than 12 parameters for NQS Generators subject to mitigation compared to 2 for hydroelectric". This statement is incorrect. Four parameters for NQS generators are subject to ex-ante mitigation (energy offers, start-up offers, speed no-load offers, and operating reserve offers) and nine are subject to ex-ante validation

(minimum generation block run-time; minimum generation block down-time; minimum loading point; energy ramp rate; operating reserve ramp rate; lead time; ramp hours to minimum loading point; energy per ramp hour; and maximum number of starts per day). Two parameters for QS hydroelectric resources are subject to ex-ante mitigation (energy offers and operating reserve offers) and three are subject to ex-ante validation (energy ramp rate; operating reserve ramp rate; and maximum number of starts per day).

In paragraph 68, Power Advisory states:

> As noted, MPM under MRP will apply to a significantly greater number of operational parameters for NQS Generators than other supply resources. Nearly every element of operation of an NQS Generator – including the number of hours it takes to start, MGBRT, MLP and various financial costs – will be screened by the IESO for market power. Other supply resources (e.g., nuclear, hydroelectric, wind and solar generation, energy storage, imports, and dispatchable loads) – that compete on an incremental energy basis will face a much less exhaustive MPM framework under MRP. Not only will these parameters and associated costs limit the commitment and dispatch of NQS Generators, it will also limit their ability to control these parameters due to the implementation of IESO-determined reference levels on nearly every aspect of their financial offers and physical operations. Importantly, many of the dispatch parameters available to other resource types are not subject to mitigation as they are for NQS Generators.

This statement is misleading. As noted above, Power Advisory overstates the difference in the number of NQS generator-related parameters that may be subject to mitigation relative to parameters applicable to other market participant suppliers. Each non-financial dispatch data parameter that is subject to ex-ante validation can be used to exercise market power to inflate prices, transferring wealth from loads to suppliers. Further, Power Advisory has not substantiated its statement that these parameters will "limit the commitment and dispatch of NQS Generators".

Appendix A
CATEGORIES OF RESTRICTED COMPETITION

Category of Restricted Competition	Description and Testing Conditions	Conduct Thresholds	Impact Test Thresholds
Narrow constrained area ("NCA")	These are areas where transmission congestion is expected to be relatively frequent over a long duration. The conditions to test are met when at least one of the transmission constraints that define an NCA is binding in the as-offered scheduling step of the relevant calculation engine.	Energy offers: Offer price is greater than the lesser of 50% or $25/MWh above reference level value; offers below $25/MWh are excluded from economic withholding tests. Start-up offers: Start-up offer is greater than 25% above reference level. Speed no-load offers: Speed no-load offer is greater than 25% above reference level.	Energy LMP in the as-offered step of the relevant calculation engine is greater than the energy LMP from the reference level pricing step by the lesser of 50% or $25/MWh.
Dynamic constrained area ("DCA")	These are areas where transmission congestion is expected to be relatively frequent, but not for a long enough duration to warrant the designation of an NCA. An example of such a condition might be a transmission outage that results in, or is expected to result in, increased congestion for a period of days. The conditions to test are met when at least one of the transmission constraints that define a DCA is binding in the as-offered scheduling step of the relevant calculation engine.	Same as NCA.	Same as NCA.

Category of Restricted Competition	Description and Testing Conditions	Conduct Thresholds	Impact Test Thresholds
Broad constrained area ("BCA")	These are areas where transmission constraints that are not NCA or DCA constraints result in supply resources being dispatched up. Transmission constraints that create load pockets that bind relatively infrequently make up the BCA. The conditions to test are met when any resource that is not a part of an NCA or DCA has an LMP with a congestion component greater than $25/MWh.	Energy offers: Offer price is greater than the lesser of 300% or $100/MWh above reference level value; offers below $25/MWh are excluded from economic withholding tests Start-up offers: Start-up offer is greater than 100% above reference level. Speed no-load offers: Speed no-load offer is greater than 100% above reference level.	Energy LMP in as-offered pricing step of the relevant calculation engine is greater than the energy LMP from reference level pricing step by the lesser of 100% or $50/MWh.
Global market power	Global market power conditions occur when competition is restricted due to reasons other than local transmission constraints and there are conditions that potentially restrict competition across the market as a whole. To assess restrictions to global competition, the IESO will examine conditions at interties that (i) connect Ontario to another wholesale electricity market and (ii) are able to provide an effective competitive discipline for market participant behavior ("**Global Market Power Reference Interties**").	Same as BCA.	Energy LMP at each of the Global Market Power Reference Interties in the as-offered pricing step of the relevant calculation engine is greater than the energy LMP at the same Global Market Power Reference Intertie in the reference level pricing step by the lesser of 100% or $50/MWh.

Category of Restricted Competition	Description and Testing Conditions	Conduct Thresholds	Impact Test Thresholds
	The conditions to test are me when: (1) there is a restricted ability to schedule incremental imports and (2) the intertie border price is greater than $100/MWh.		
Limited operating reserve supply (local)	These are situations when the IESO sets operating reserve requirements for specific localized regions in Ontario so that no less than some positive amount of operating reserve must be scheduled. The conditions to test are met when more than 0 MW must be scheduled in the area.	Operating reserve offer: Offer price is greater than the lesser of 10% or $25/MW above reference level value; offers below $5/MW excluded from economic withholding tests. Start-up offer: Start-up offer is greater than 10% above reference level. Speed no-load offer: Speed no-load offer is greater than 10% above reference level. Energy offers for the range of production up to minimum loading point: Offer price is greater than the lesser of 10% or $25/MWh above reference level value; offers below	Operating reserve LMP in the as-offered pricing step of the relevant calculation engine is higher than operating reserve LMP from the reference level pricing step.

Category of Restricted Competition	Description and Testing Conditions	Conduct Thresholds	Impact Test Thresholds
		$25/MWh are excluded from economic withholding tests.	
Limited operating reserve supply (province-wide)	These are situations when market participants have market power across Ontario for operating reserves. The condition to test is met when an unmitigated LMP for a class of operating reserve exceeds $15/MW.	Operating reserve offer: Offer price is greater than the lesser of 50% or $25/MW above reference level value; offers below $5/MW excluded from economic withholding tests. Start-up offer: Start-up offer is greater than 25% above reference level. Speed no-load offer: Speed no-load offer is greater than 25% above reference level. Energy offers for the range of production up to minimum loading point: Offer price is greater than the lesser of 50% or $25/MWh above reference level value; offers below $25/MWh are excluded from economic withholding tests.	Operating reserve LMP in the as-offered pricing step of the relevant calculation engine is greater than the operating reserve LMP from the reference level pricing step by the lesser of 50% or $25/MW.