ONTARIO POWER GENERATION

May 4, 2018

IESO Engagement

Energy Workstream Comments Re: Day Ahead Market and Enhanced Real-time Unit Commitment

OPG appreciates the opportunity to provide comments following the Market Renewal Energy Workstream stakeholder engagement meetings which discussed design considerations for the Day Ahead Market (DAM) on March 27, 2018 and for the Single Schedule Market (SSM) and Enhanced Real-time Unit Commitment (ERUC) on March 29, 2018. The following comments address the DAM and ERUC presentation materials.

1. **Day Ahead and Real Time Markets**

Optimization of Energy Limited Resources

Given the magnitude of hydroelectric supply within Ontario and their unique operational challenges, OPG continues to stress the importance of optimizing hydroelectric resources in a way that enables them to provide the greatest flexibility and benefit to the province. As previously stated in OPG's February 28 energy workstream comments[1], "*mechanisms need to be developed to incorporate both energy limitations and operational requirements into economic dispatch schedules*"; any day ahead hydroelectric optimization solution cannot be considered in isolation from the real-time mechanisms in the DSO to properly recognize hydroelectric limitations.

Similar to non-quick start units, quick start units in certain circumstances may have a minimum must run requirement due to a number of factors (e.g. equipment restrictions, regulatory requirements). These requirements can be identified by the Market Participant during the DAM timeframe and would become a physical minimum commitment that is transferred from the DAM to Real Time. In combination with quick start unit restrictions identified in Real Time (e.g. unit characteristics or water conditions), this approach would achieve a more efficient dispatch solution and extract additional value for the IESO system and ratepayer.

The Real Time dispatch solution could be designed as an expansion of today's Multi Interval Optimization and would include restrictions such as; preventing unit starts for only one interval; operating for a minimal number of intervals prior to dispatching a resource in the opposite direction,

[1] Market Renewal Program: Energy Workstreams (DAM, ERUC, RT-Market) Feedback from OPG, February 28, 2018

and recognizing a minimum run time once a unit is started. These two mechanisms combined provide equitable treatment in the DAM and Real-Time markets for quick start units with restrictions similar to the ones proposed for non-quick start units. In summary, including these mechanisms in the market design reinforces one of the fundamental principles of Market Renewal, equitable treatment for all technologies.

OPG has suggested the IESO consider removing (or increasing) the 10 MW barrier for registration as a self-scheduler[1]. OPG understands the IESO's concern for loss of flexibility provided by dispatchable resources (Slide #68); however, it was not our intent to compromise the IESO's ability to assess each registration for impact on flexibility (among other factors). Rather, the proposal was intended to provide an option for a supplier to request a review by the IESO for certain facilities that may not be able to provide flexibility to the system but are required to pursue dispatchable registration simply because of their size.

The IESO (Slide #69) recognizes risks where offer curve submissions alone may not result in efficient market outcomes and lists potential solutions; such as, modelling offer parameters, linked offers, retaining ability for Daily Energy Limits and balancing must-offer requirements. OPG supports the assessment of these options and is committed to collaborating with the IESO to further assess the list of potential solutions along with those submitted in its February comments to determine the merits and feasibility of each individually or in combination.

Further, as previously stated, OPG believes the energy limited resource optimization options that have merit should be identified as part of the high level design. OPG understands the IESO's concerns regarding commitment to any specific solution while still deciding on the vendor, but on the contrary, we assert that the failure to include potential options for such a critical element as hydroelectric optimization in its vendor decision could undermine the overall benefits of Market Renewal.

Optimization of Energy Storage Facilities

OPG recommended in its February 28 feedback[1] that "the IESO consider the unique characteristics of energy storage facilities in the preliminary decisions currently being made for each design element". The IESO in its feedback [2] identified that the Non-emitting Resource Subcommittee (NERSC) and the IESO LTEP Implementation Plan Energy Storage Advisory Group (ESAG) were the appropriate forums to discuss any barriers for energy storage and pumped storage. OPG would like to respectively highlight that the Terms of Reference (TOR) for the ESAG[3] indicates the "ESAG will focus on aspects related to the current structure of the market, while the NERSC, which covers all non-emitting resources, is focused on the future market contemplated under Market Renewal. Although these issues could also be discussed in these forums, the ESAG does not plan, as per the TOR, to address Market Renewal

[2] Market Renewal – Day Ahead Market (DAM) and Enhanced Real-time Unit Commitment (ERUC), Meeting #4: Response to Stakeholder Feedback , IESO

[3] IESO Energy Storage Advisory Group Draft Terms of Reference April 5, 2018

design features. No doubt, the feedback from the ESAG will be valuable and it should be integrated into Market Renewal to provide more enduring solutions.

However, even with a plan to link the ESAG recommendations into Market Renewal, OPG would like the IESO to consider, as a minimum, the inclusion of existing energy storage facilities in the preliminary design decisions currently being made for each design element in the energy workstream. Specifically, as the existing Beck facility (including the Pump Generating Station (PGS)) can be characterized as both an energy storage facility and a cascade river system, OPG recommends that the market design for this facility be included in the Market Renewal main energy workstreams and not be addressed solely in the NERSC or the ESAG. Without this consideration, the preliminary design decisions may need to be significantly reworked if it is determined that there are still barriers to participation of energy storage facilities.

Furthermore, OPG recommends that Beck PGS and the associated interdependent generation at Beck 1 and 2 should be optimized together within the DAM. An option would be to register the Beck Complex as one virtual delivery point similar to the NYPA Niagara Power Project. This facilitates more efficient use of the Niagara River diversion and PGS storage; and provides additional Real Time system flexibility from PGS as it increases the operating range for the Beck complex. A virtual delivery point would also minimize the non-energy charges associated with pumping and provide greater opportunities to economically cycle the PGS.

Reference Quantity

OPG would like to clarify terminology used by the IESO in its presentation for the reference quantity design element. Slide 12 indicates the reference quantity "will address how much capacity must be offered into the DAM for different resource technologies". In contrast, the terminology used in the headings for Slide 18 and 19 refer to "Reference Quantity for Energy" which may be confused with a MWh quantity. OPG assumes that any reference quantity refers to a capacity offer obligation in MWs.

Virtual Transactions

OPG supports the inclusion of virtual transactions from the beginning of Market Renewal implementation.

Functional Passes

OPG would like to understand if the DAM engine (scheduling for tomorrow) considers non-quick start commitments scheduled in yesterday's DAM schedule for today; specifically those with MGBRT schedules ending between HE 18-24. If not, is it possible the DAM engine may schedule a unit to start without respecting its minimum down time?

2. **Enhanced Real-time Unit Commitment**

Look-Ahead Period (LAP)

The IESO stated the first run that includes all hours of the next day will be issued at 20:00. OPG strongly urges the IESO to reconsider moving this first run to an earlier time, as the 20:00 timeline only allows participants two opportunities to review and update its Day 2 offers prior to closure of the mandatory window for HE1.

OPG recommends including Day 2 in the first hour following the DAM published results but no later than the 18:00 run.

Intertie Transactions

OPG does not have any comments regarding the materials presented on March 27. We support the scheduling of a one day session to discuss and address intertie transactions across all workstreams. We believe this will improve stakeholder understanding and provide more comprehensive, informed feedback to the IESO on this topic.

On a separate topic concerning intertie transactions, OPG would like to confirm there will not be any failure charges (aside from the buy-back amount) associated with a DAM intertie commitment that does not flow provided it was not scheduled in the T+2 timeframe or later.

Market Participant Data

Regarding the proposal for new registered data for lead time, it is important to recognize that lead time is dependent on unit temperature (not simply hours since last desynchronization) and may vary within the ERUC timeframe due to a number of factors; such as, how the unit was previously shut down, ambient temperature, etc. This can make it difficult to predict lead time.

OPG proposes participants be allowed to revise lead time data prior to receiving a binding ERUC commitment.

Offer Changes

As operating costs are subject to change following an ERUC commitment, OPG believes offer change restrictions should only apply to the MW quantity committed in the advisory schedule.

Calculation of Make Whole Payments

OPG agrees make whole payments should be calculated over the commitment period as opposed to the operating period

Regards,

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