
NOVEMBER 27, 2020

Market Power Mitigation Reference Levels and Reference Quantities Nuclear Resources

Agenda

1. Objectives
2. Update on Stakeholder Engagement Process
3. Refresher: Reference Levels and Reference Quantities
4. Feedback Received
5. Example Workbook
6. Next Steps

1. Objectives

- Engage with Nuclear resources on the reference level and reference quantity methodologies
- Support Nuclear resources in their review of the draft written guide and workbooks
- Answer technical questions on the written guide with the *IESO's* engineering services provider (Hatch)

2. Update on Stakeholder Engagement Process

- Reference level and reference quantity stakeholder engagement kick-off meeting was conducted on August 27, 2020.
- October 30, 2020 – Technology specific meetings held with Dispatchable Loads, Wind and Solar resources
- November, 2020 – Technology specific meetings with Storage, Hydroelectric, Nuclear and Thermal resources
- Next steps in the reference level engagement:
 - Beginning in 2021: 1-on-1 consultations with *market participants* to establish resource-specific reference levels and quantities

3. Refresher: Reference Levels and Reference Quantities

- Reference levels and reference quantities play an important role in the Market Power Mitigation framework
- The Market Power Mitigation detailed design document introduced processes necessary to set, maintain and update reference levels
- Establishing appropriate reference levels is a high priority for both stakeholders and the *IESO*

3. Refresher: Reference Levels and Reference Quantities

Reference levels are *IESO*-approved values for a resource for what would have been offered by a *market participant* in the *energy* and *operating reserve markets* had they been subject to unrestricted competition. The *IESO* will approve reference levels for financial and non-financial *dispatch data* parameters of each resource

- An example of a financial *dispatch data* parameter is *energy offers* (\$/MWh)
- An example of a non-financial *dispatch data* parameter is *energy ramp rates* (MW/min)

3. Refresher: Reference Levels and Reference Quantities

Reference quantities are *IESO*-approved values for the quantity of *energy* and *operating reserve* that a *market participant* would be expected to offer had they been subject to unrestricted competition

These reference quantities can be modified by active *outages*, de-ratings, external factors such as ambient temperature, humidity, water flow conditions and other resource-specific considerations

4. Feedback Received

Reference Level Review: MPs require enhanced governance, decision-making, and recourse within IAM (especially applicable to the market power mitigation framework within MRP)

IESO response: The *IESO* will be engaging with *market participants* on the independent review process for reference levels and reference quantities in the future

4. Feedback Received

List Expansion: The list of accepted documentation in supporting costs and the list of eligible maintenance costs provided by the IESO should be expanded

IESO Response: Eligibility of documentation developed by a market participant and the costs list included in the guideline are not exhaustive lists and will be evaluated on a case-by-case basis. Market participants may submit eligible costs and supporting documentation for review. In determining the eligibility of specific documentation, the IESO will consider the reasonableness of the content of the documentation. Section 2.3 of the written guide will be updated to reflect this approach for documentation developed by the relevant market participant

4. Feedback Received

Offer Obligation: The *IESO* should clarify expectations and obligations regarding the differences between the derived Reference Price levels and actual Market Participant offer behaviour in the markets. It is not explicitly clear if the *IESO* expects MPs to offer at the price levels specified in the workbooks

IESO Response: Market Power Mitigation does not introduce an obligation to offer at prices consistent with reference levels. The *IESO* will include clarifying language in the written guide to that effect

4. Feedback Received

Reference level methodology: Proposed reference level methodology for nuclear resources is overly complex

IESO response: Nuclear resources that offer at low prices can elect to receive an *energy* reference level of \$0/MWh. In this case, they are not required to submit any supporting materials for the *energy* reference level. This approach reduces unnecessary administrative burden

4. Feedback Received

Risk Premium: A risk premium is needed in the DAM to insure against possible late return to service and real-time losses in the case of a nuclear unit's return to service

IESO response: Return to service date and time is within the *market participants'* control to manage, along with any accompanying risks. Therefore, it is not being considered

4. Feedback Received

Ramp Rates: Ramp rates of nuclear units vary substantially depending on reactor conditions. The ramp profile of a nuclear unit cannot be specified ahead of time in reference level negotiations

IESO response: Section 3.4.5.1 is referring to nuclear resource ramp rates for incremental change in *energy* production, not the profile for start. For resources where ramp rate capabilities can be very different for the same range of production depending on changing ambient conditions, the ramp rate reference level will be set based on least flexible profile of the resource

5. Example workbook

Stakeholders requested that the *IESO* insert illustrative information into the workbooks to provide examples of what content was expected

An example nuclear resource workbook, completed for illustrative purposes, is discussed in the following slides

This example workbook is for discussion purposes only. The numbers and content found there are not an indication of expected values

5. Example workbook

- The *IESO* has provided an example of a resource that submits a reference level of \$0/MWh and thus is not required to provide any supporting materials
 - This resource may expect to offer negative prices into the market. As it will be offering below the \$25/MW no-look threshold, the resource reduces the administrative burden by requesting a reference level of \$0/MW
 - In this example, supporting materials are only required for establishing the relevant non-financial reference levels

5. Example workbook

Reference Level Cost Components

	Cost Component	I. Units of measurement/ Additional Information	II. Applicability - Resource Type	III. Time-Based Applicability	III. Input	IV. Supporting Documentation Reference	V. Comments
(A)	Performance Factors						
A.1	Performance Factor	-	-	Applicable in all time periods	0	N/A	N/A
(B)	Fuel Costs						
B.1	Basic Nuclear Fuel Cost	\$/kg (U)	Nuclear	Applicable in all time periods	0	N/A	N/A
B.2	Incremental Fuel Consumption	kg (U))/MWh	Nuclear	Applicable in all time periods	0	N/A	N/A
B.3	Fuel Disposal Cost	\$/kg (U)	Nuclear	Applicable in all time periods	0	N/A	N/A
B.4	Total Fuel Related Costs for Nuclear Resource	\$/kg (U)	Nuclear	Applicable in all time periods	0	N/A	N/A

5. Example workbook

Reference Level Cost Components

	Cost Component	I. Units of measurement/ Additional Information	II. Applicability - Resource Type	III. Time-Based Applicability - Seasonality, On-Peak/Off-Peak Hours	III. Input	IV. Supporting Documentation Reference	V. Comments
(C)	Operating and Maintenance (O&M costs)						
C.1	Corrective Maintenance	\$/MWh	Nuclear	Applicable in all time periods	0	N/A	N/A
C.2	Scheduled Maintenance	\$/MWh	Nuclear	Applicable in all time periods	0	N/A	N/A
C.3	Operating Consumable Costs	\$/MWh	Nuclear	Applicable in all time periods	0	N/A	N/A
C.4	Incremental Third Party Payments	\$/MWh	Nuclear	Applicable in all time periods	0	N/A	N/A

5. Example workbook

Financial Dispatch Data Parameters

Separate for Day Ahead and Real-Time markets				
Parameter	Unit	Description	Formula	Reference value/cost curve
Energy offer	\$/MWh	The energy offer reference level will be used to create an energy cost curve consisting of up to 20 price-quantity pairs that will describe short run marginal costs across the range of energy production. The energy cost curve will be consistent with energy offer requirements as specified in Market Rules Chapter 7 Section 3.5.3.	$\begin{aligned} & \text{Energy Offer Reference level} \left(\frac{\$}{\text{MWh}} \right) \\ & = \text{Incremental Fuel Consumption} \left(\frac{\text{kg} (U)}{\text{MWh}} \right) \\ & * \left(\text{Total Fuel Related Costs} \left(\frac{\$}{\text{kg} (U)} \right) * \text{Performance Factor} \right) \\ & + \text{Maintenance Costs} \left(\frac{\$}{\text{MWh}} \right) + \text{Operating Costs} \left(\frac{\$}{\text{MWh}} \right) \\ & + \text{Incremental Third Party Payments} \left(\frac{\$}{\text{MWh}} \right) \\ & + \text{Prorated Startup Costs} \left(\frac{\$}{\text{MWh}} \right) \end{aligned}$	0

5. Example workbook (6 of 6)

Non-Financial Dispatch Data Parameters

Non-Financial Reference Level	Unit	Description	Summer Value	Winter Value	Supporting Documentation
<i>Energy Ramp Rate</i>	MW/min	The energy ramp rate profile across the dispatchable range that the resource expects to meet during normal operation.	30	30	Station/Unit startup procedure from cold state; Station/Unit procedure for resources with load shedding capabilities; Station/Unit procedures for engaging in and recovering from unit derates

6. Next Steps

- **Feedback:** Stakeholders should submit written feedback on the presented materials to engagement@ieso.ca by **Friday, December 11**
- **December 2020:** *IESO* will post final written guide and workbooks based on stakeholder feedback received during technology-specific sessions
- **Q1 2021 onwards:** *IESO* will start 1-on-1 consultations with *market participants* to establish resource-specific reference levels and quantities



Questions?

Thank You

ieso.ca

1.888.448.7777

customer.relations@ieso.ca

engagement@ieso.ca



[@IESO_Tweets](https://twitter.com/IESO_Tweets)



facebook.com/OntarioIESO



linkedin.com/company/IESO