

Market Renewal Program: Enhanced Real-time Unit Commitment (ERUC)

November 27, 2017

ERUC Stakeholder Engagement

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Recap - ERUC Purpose

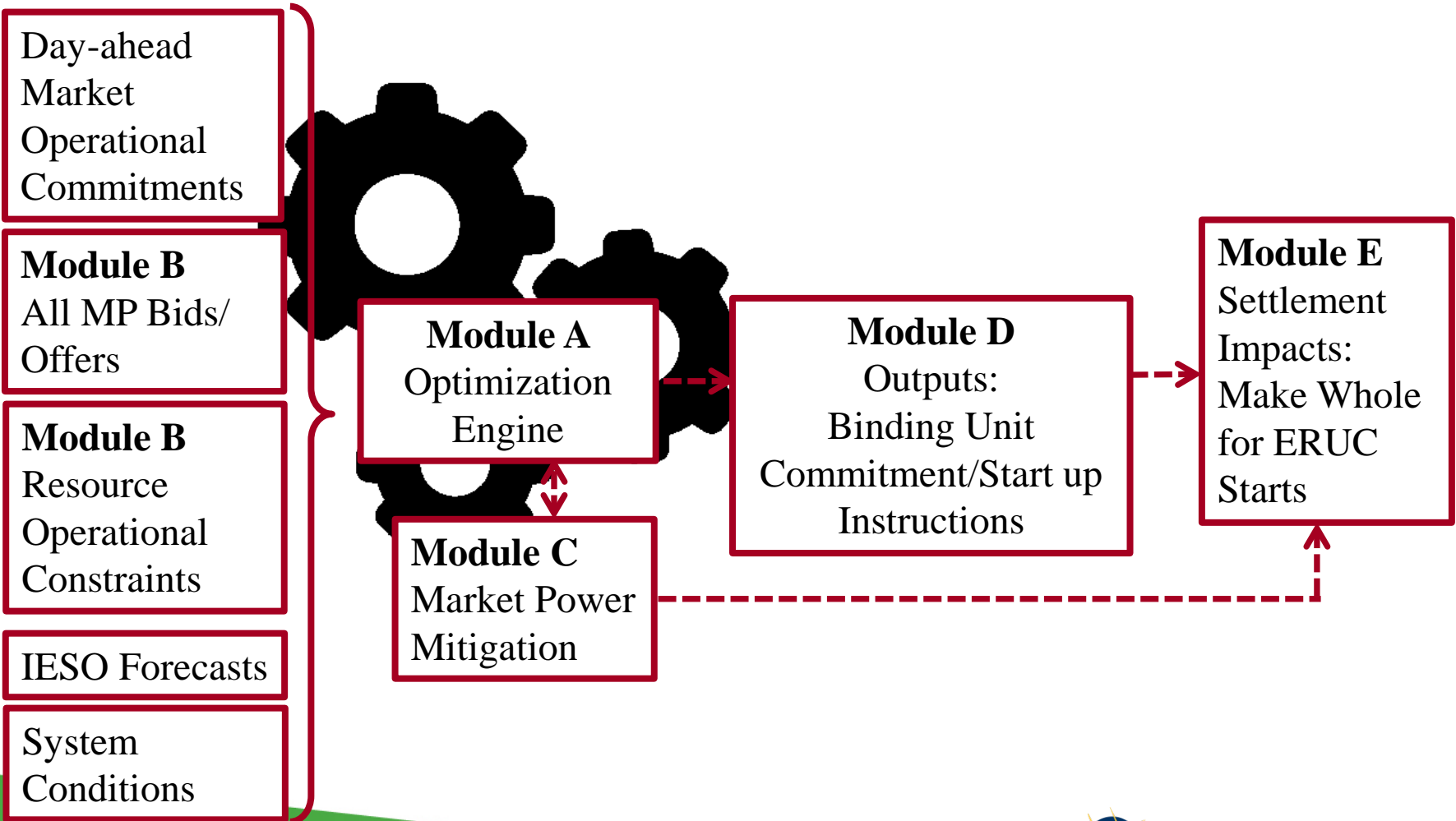
- ERUC will be a security constrained unit commitment, jointly optimizing energy and operating reserves over the look-ahead period, in the pre-dispatch timeframe.
 - Replaces the current RT-GCG program
 - Minimizes overall production costs
- ERUC will consider all resource offers to determine optimal mix of resources to meet load.
- A non-quick start (NQS) generator will be committed by ERUC if it is the lowest cost resource needed to meet system requirements.

Optimization

- ERUC will be different than the current real-time unit commitment in several important ways. It will:
 - Use three-part offers for incremental energy, start-up and speed-no-load costs;
 - Consider resource operational constraints;
 - Conduct an evaluation of unit commitment over the minimum run time of the resource or longer; and
 - Produce binding start-up instructions and operational commitments.

Overview

ERUC Inputs:



Proposed ERUC Design Elements

Module	Module Name	#	Design Element
A	Engine Parameters	1	Functional Passes
		2	Look-Ahead Period
		3	Timing and Frequency of Run
		4	Time Step
B	Participation and Input Data	5	Intertie Transactions
		6	Must Offer Requirements
		7	Eligibility Requirements
		8	Market Participant Data
C	Market Power Mitigation	9	Commitment Cost Mitigation
		10	Offer Changes
D	Output of Engine	11	Binding Start-up Instruction and Operational Constraint
E	Settlements	12	Calculation of Make-whole Payment
		13	Failure Charge

ERUC: Fundamentals

Design Elements 9 – 13

Presented by
Joe Cavicchi, Scott Harvey and Susan Pope

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Toronto, Ontario



Today's Focus: Design Elements 9 - 13

Module	Module Name	#	Design Element
C	Market Power Mitigation	9	Commitment Cost Mitigation
		10	Offer Changes
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E	Settlements	12	Calculation of Make-whole Payment
		13	Failure Charge

Acronyms

DAM	Day-Ahead Market
ERUC	Enhanced Real-time Unit Commitment
MGBRT	Minimum Generation Block Run-Time
MLP	Minimum Loading Point
MPM	Market Power Mitigation
NQS	Non-Quick Start
RT-GCG	Real-Time Generation Cost Guarantee program
SSM	Single Schedule Market

DESIGN ELEMENT NO. 9: COMMITMENT COST MITIGATION

Background - Market Power Mitigation

- Market Power Mitigation (MPM) design under the SSM Project includes tests of market power which may trigger the application of mitigation.
- SSM will also develop reference levels for incremental energy offers, which for NQS generators is the energy offer above MLP.
- This mitigation will be applied in ERUC as well as in real-time.

Description – Commitment Cost Mitigation

- The ERUC Stakeholder Engagement (SE) will determine reference levels for commitment cost offers (start-up, speed-no-load and the energy offer to MLP) and non-price offer parameters.
- ERUC and DAM will carry out market power tests to trigger the application of mitigation to incremental offer prices, commitment costs and non-price offer parameters when competition is insufficient, restricting the exercise of local market power.
 - This will increase the efficiency of DAM schedules and ERUC commitments by committing the resources that will be able to meet load at least overall cost.

Importance and Relevance

- The exercise of local market power through inflated energy and commitment cost offers for units evaluated in ERUC could cause an economic unit to not be committed, increasing real-time energy prices; and
- Similarly, the exercise of local market power through inflated commitment cost offers for units that must be committed to manage transmission congestion could result in excessive make-whole payments.

Importance and Relevance

- Non-price offer parameters that are not consistent with actual unit physical characteristics can be used to physically withhold supply and increase commitment and energy costs. These parameters include:
 - Minimum loading point (MLP)
 - Minimum generation block run-time (MGBRT)
 - Minimum generation block down-time (MGBDT)
 - Lead time
 - Maximum number of starts per day

Importance and Relevance

- The application of the MPM framework to both commitment cost offers and non-price offer parameters is necessary to ensure that offers are structured in a way that ERUC commitments are consistent with expected competitive outcomes.
- Generators that are committed out of market to meet reliability needs will also be subject to mitigation.
 - competition is not able to discipline offers in these cases and resources may anticipate the need to commit them out of market.

Current Status for RT-GCG

- The current market power mitigation design addresses the exercise of market power through a number of controls within the market rules which primarily limit congestion management settlement credit payments.
- The IESO has controls for real-time cost recovery guarantees which require the use of pre-approved start-up cost submissions for generators, impacting the RT-GCG payment.

Other Jurisdictions

Most ISOs with look-ahead unit commitment designs either:

1. apply a market power test in the look-ahead unit commitment and may mitigate commitment cost offer prices and non-price offer parameters if the test is failed (ISO-NE, MISO, NYISO and SPP); or
2. require use of cost-based/proxy offers for all commitment cost offers (no market power test), and restrict changes to non-price offer parameters (CAISO and PJM until recently).

Considerations for Options and Analysis

- Under SSM, the IESO has decided to apply a market power test (conduct and impact) which requires the determination of reference levels for commitment costs and non-price offer parameters.
- The determination of these reference levels will be discussed at an upcoming session.

DESIGN ELEMENT NO. 10: OFFER CHANGES

Description – Offer Changes

- During the period after the DAM clears until real-time dispatch, ERUC will establish any restrictions for:
 - Increases in commitment cost offer prices;
 - Increases in incremental energy offer prices (above MLP); and
 - Changes to non-price offer parameters.

Importance and Relevance

For commitment cost offers & non-price offer parameters

- During the period that a generator has a DAM schedule, an ERUC commitment, or has been committed by the IESO for reliability reasons:
 - Increases in commitment cost offers or changes that make non-price offer parameters more limiting can undermine reliability and increase uplifts.

Importance and Relevance

For incremental offers (above MLP)

- During the period that a generator has an ERUC commitment or has been committed by the IESO for reliability reasons:
 - Increases in incremental energy offers could allow the exercise of market power and lead to inefficient resource dispatch and commitments.
- In contrast, increases to incremental energy offer prices are allowed after a resource receives a DAM schedule because that schedule is financially binding, providing appropriate incentives for resource participation in real-time market.

Importance and Relevance

For all offers

- After final mitigation for the real-time dispatch:
 - Changes in any offers (commitment cost, incremental energy, non-price parameters) could allow the exercise of market power and lead to inefficient resource dispatch and commitments.

Importance and Relevance

- In summary, the ERUC work stream will consider rules restricting offer price increases and changes to non-price offer parameters after the DAM clears, following an ERUC commitment or IESO reliability commitment, and after mitigation has been applied for the real-time dispatch.
- Applying restrictions to prevent changes that can increase uplift costs and possibly allow the exercise of market power will improve ERUC efficiency.

Current Status for RT-GCG

- Generators that increase energy offer prices after receiving a RT-GCG commitment will become ineligible for the guarantee payment, and any associated self-induced payments are clawed back.

Other Jurisdictions

After receipt of a DAM schedule:

- Many ISOs, including MISO, SPP, NYISO, CAISO, ISO-NE and ERCOT, do not allow increases in commitment cost offer prices nor changes in non-price offer parameters that make them more limiting.
- These restrictions avoid the potential for such changes to adversely impact reliability, uplifts, and efficiency.

Other Jurisdictions

Post DAM clearing without a DAM schedule:

- Many ISOs (MISO, NYISO, ISO NE and SPP) allow commitment cost offer changes by these resources.

After mitigation is applied for the RT dispatch:

- ISOs also do not allow changes to any offers because of the impacts on reliability, uplifts and efficiency.

Considerations for Options and Analysis

- In deciding what restrictions to apply to offers, the ERUC SE needs to consider the potential impact on reliability, uplifts and efficiency as a result of changes in:
 - commitment cost offer prices;
 - incremental energy offer prices (above MLP); and
 - non-price offer parameters.

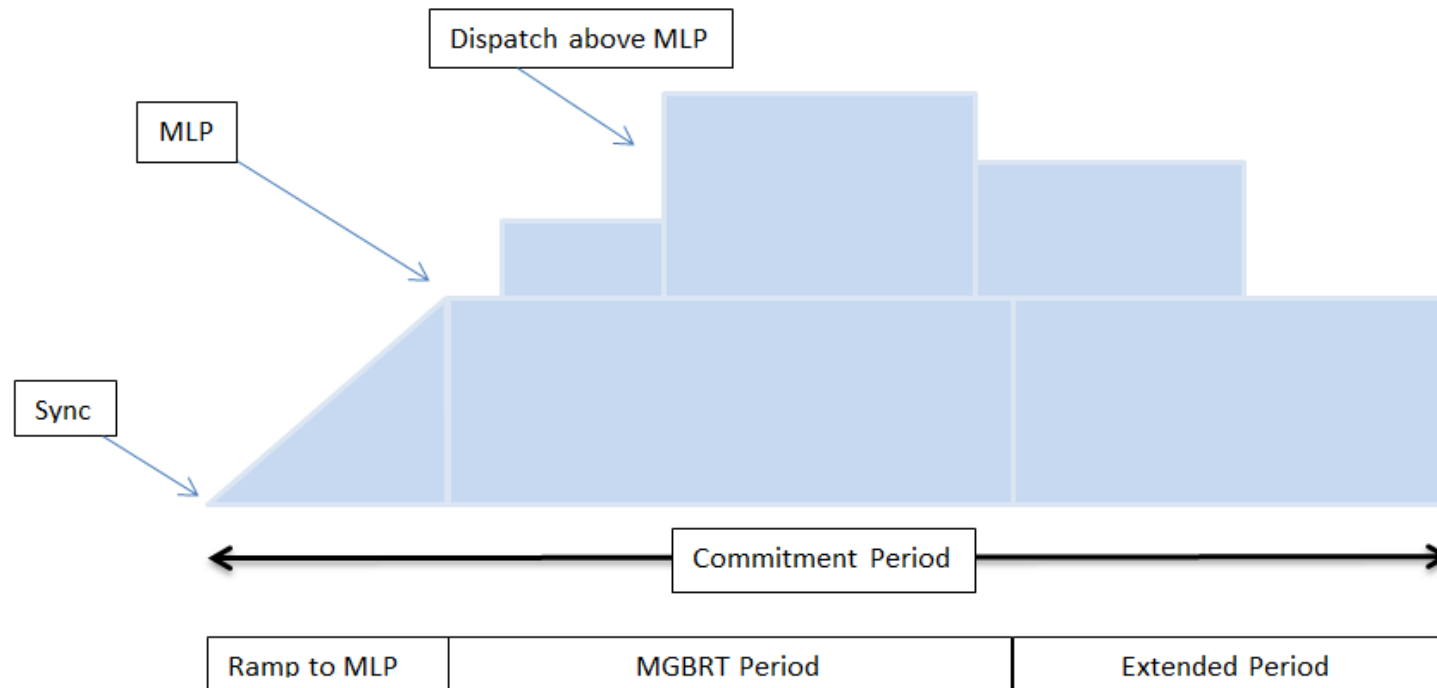
DESIGN ELEMENT NO. 11: BINDING START-UP INSTRUCTION AND OPERATIONAL CONSTRAINT

Description – Binding Start-up Instruction and Operational Constraint

- ERUC will issue an instruction for a NQS generator to come online and stay online for at least its MGBRT period at MLP.
- The generator will receive an operational constraint at MLP.
- ERUC may operationally constrain the generator beyond the MGBRT period.

Definition of Commitment Period

- The commitment period is the entire period of time that the generator is constrained at MLP, which may or may not extend beyond MGBRT.



Definition of Commitment Period

- If a resource has 2 separate starts in one day, it has 2 commitment periods.
- Hours where a resource is constrained on by the IESO operator for reliability reasons are part of the commitment period.

Note:

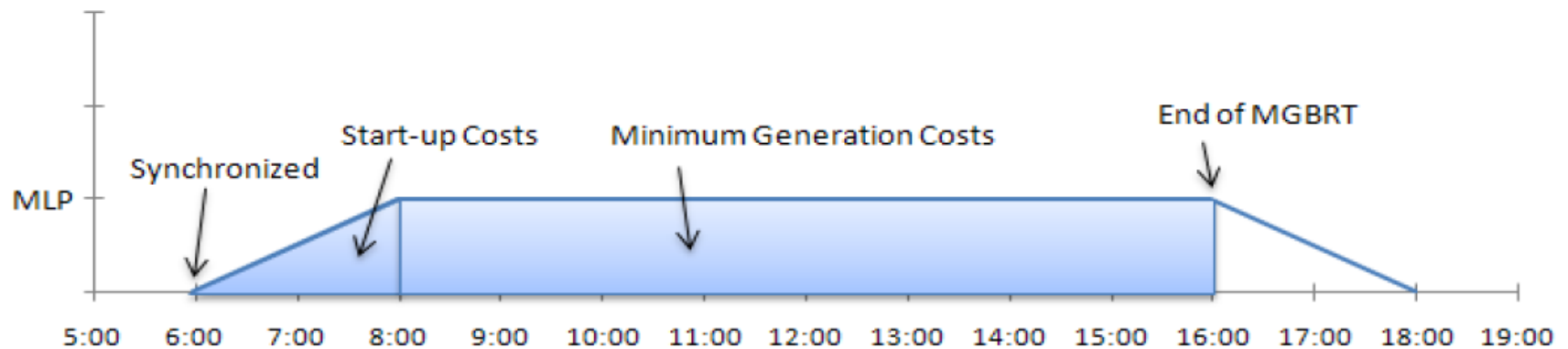
- ERUC will provide advisory schedules only:
 1. for capability above MLP within the commitment period; and
 2. for the entire capability of the generator when not within the commitment period.
- All dispatch instructions will be determined in RT.

Importance and Relevance

- The operational constraint is the key ERUC output which supports efficient resource commitment.
 - ERUC will commit resources to start-up and operationally constrain them at MLP when the ERUC economic evaluation determines it is optimal.
 - ERUC could instruct a resource to remain on line beyond its MGBRT period if the resource is the most economic choice or is needed for reliability.

Current Status for RT-GCG

- When a generator “invokes” the RT-GCG program, indicating that the generator believes it has met eligibility requirements, the IESO provides a binding operational constraint for MLP for MGBRT only.



Other Jurisdictions

- Other ISOs generally evaluate and commit resources for at least the resource minimum run time.
- When it is economic to commit resources beyond minimum run time, ISOs such as CAISO and NYISO utilize their unit commitment process to extend the commitment on an hour-to-hour basis.
- If required for reliability reasons, the ISO operator may decide to commit resources beyond minimum run time.

Considerations for Options and Analysis

- The ERUC SE will consider how ERUC should commit a resource beyond its MGBRT.
- When ERUC projects a resource to be operating beyond MGBRT, the instruction to remain online beyond MGBRT could be provided:
 - at the time of the start-up instruction, or
 - on an hour-to-hour basis prior to the end of the commitment.
- The design may depend upon decisions for other design elements such as the number of hours in the look-ahead period and the frequency of running ERUC.

DESIGN ELEMENT NO. 12: CALCULATION OF MAKE- WHOLE PAYMENT

Description – Calculation of Make-whole Payment

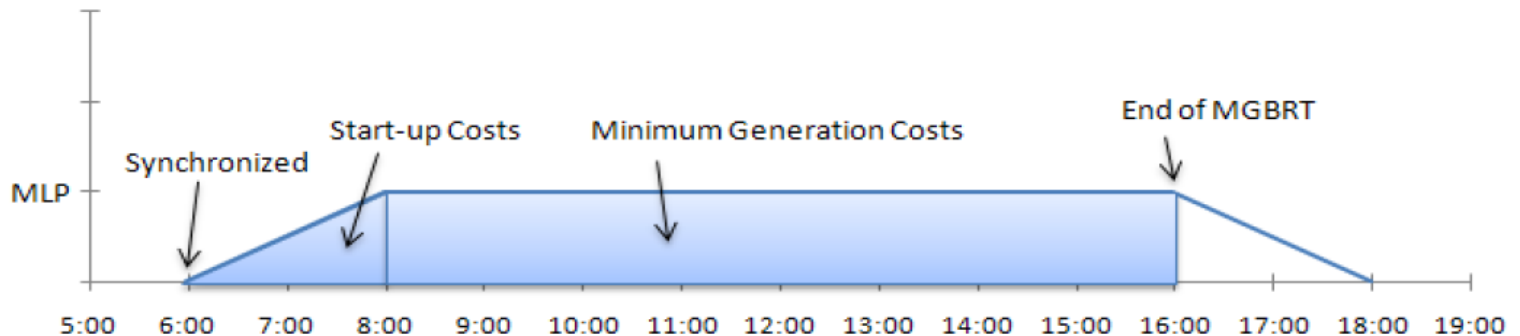
- Ensures that a NQS generator's real-time revenues are sufficient to recover their as-offered costs (subject to mitigation) during the ERUC commitment period.

Importance and Relevance

- Resources committed by ERUC will be guaranteed that if real-time market revenues do not cover their as-offered costs, they will be made whole with a payment for the shortfall.
- The provision for a make-whole payment based on three-part offers incentivizes market participants to make offers that reflect underlying costs; energy offers above MLP need not account for start-up costs.

Current Status for RT-GCG

- Guaranteed costs are:
 - A. Pre-approved start-up costs (fuel and O&M); and
 - B. Minimum generation costs based on energy offer.
- Guarantee payment is made if the guaranteed cost is greater than energy revenues earned up to MLP from synchronization to end of MGBRT.

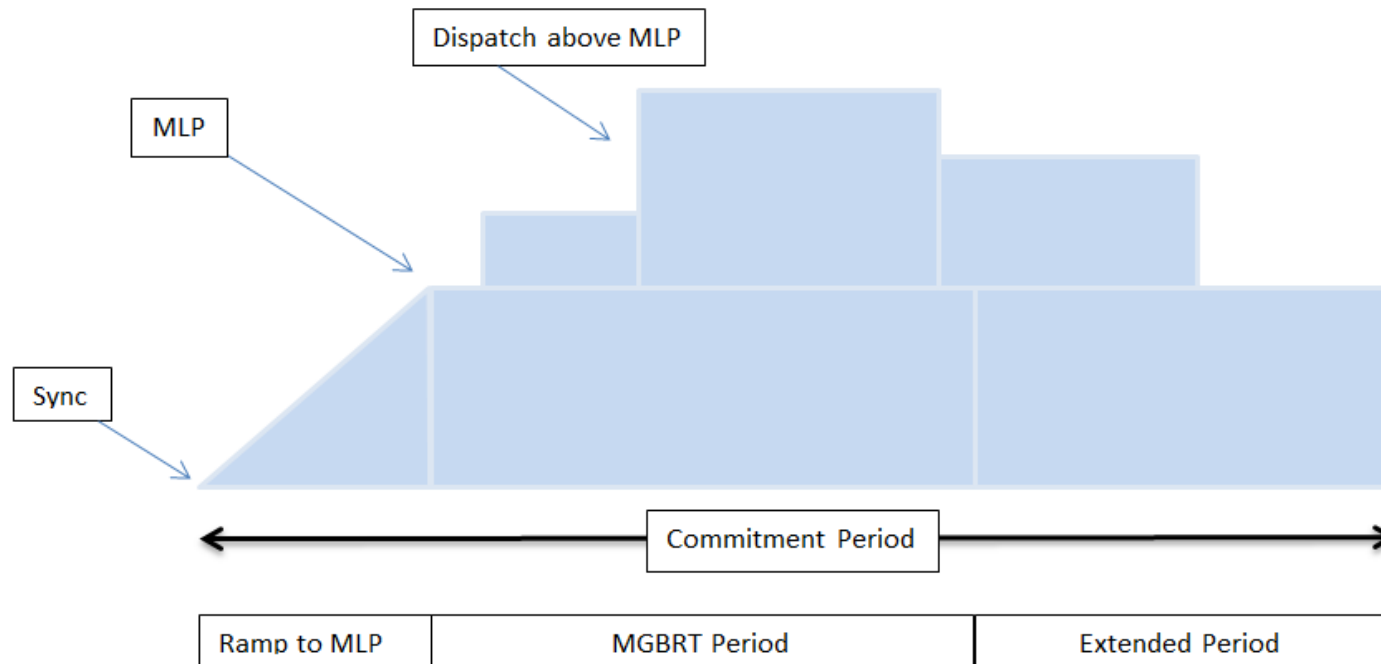


Other Jurisdictions

- All other ISO designs include recovery of commitment costs, incremental energy costs (over MLP) and OR costs over at least the commitment period.
- Some ISOs consider costs and revenues over the entire day.

Considerations for Options and Analysis

- Make-whole payment could include all energy and operating reserve (OR) revenues net of all as-offered commitment costs, incremental energy costs (over MLP) and OR costs over the commitment period.



DESIGN ELEMENT NO. 13: FAILURE CHARGE

Description – Failure Charge

- A potential financial charge if a NQS generator fails to respond to ERUC commitment instructions in real-time.

Importance and Relevance

- Failure charges seek to ensure reliability, efficiency and reduce uplifts by incentivizing generators to meet their ERUC commitment.
- In the absence of a failure charge:
 - resources committed in ERUC but not in the DAM would not have any binding financial obligation if they did not perform.
 - there may be less incentive for the resource to perform in the real-time market even if the resource is required for resource adequacy.

Current Status for RT-GCG

- There is currently no charge for failure of a generator to perform as committed in real-time.
- The generator does, however, become ineligible for cost recovery under the RT-GCG program if it fails to operate for at least MGBRT.

Other Jurisdictions

- There are financial penalties and rules that incentivize performance in real-time, for example:
 - Resources with capacity market obligations are subject to financial penalties for non-performance.
 - Rules requiring units to follow dispatch instructions including potential referral to FERC for repeated non-performance.
 - Rules against physical withholding may also be applicable.

Considerations for Options and Analysis

- Assessment of a failure charge may consider:
 - if the generator gave adequate notice to the IESO of its inability to meet its ERUC commitment;
 - the reasons the generator did not meet its ERUC commitment e.g. conditions within or outside the control of the generating unit operator; and/or
 - financial implications to real-time prices and uplifts paid by loads.
- An alternate approach to an administrative failure charge is compliance investigation for non-performance.

END OF MODULES C, D & E

Next Steps

- Questions for stakeholders:
 - Additional issues to consider for options and analysis?
 - Are there elements that require additional education or clarification?
- Stakeholder feedback due Dec 7, 2017
- Next meeting in late January, 2018