

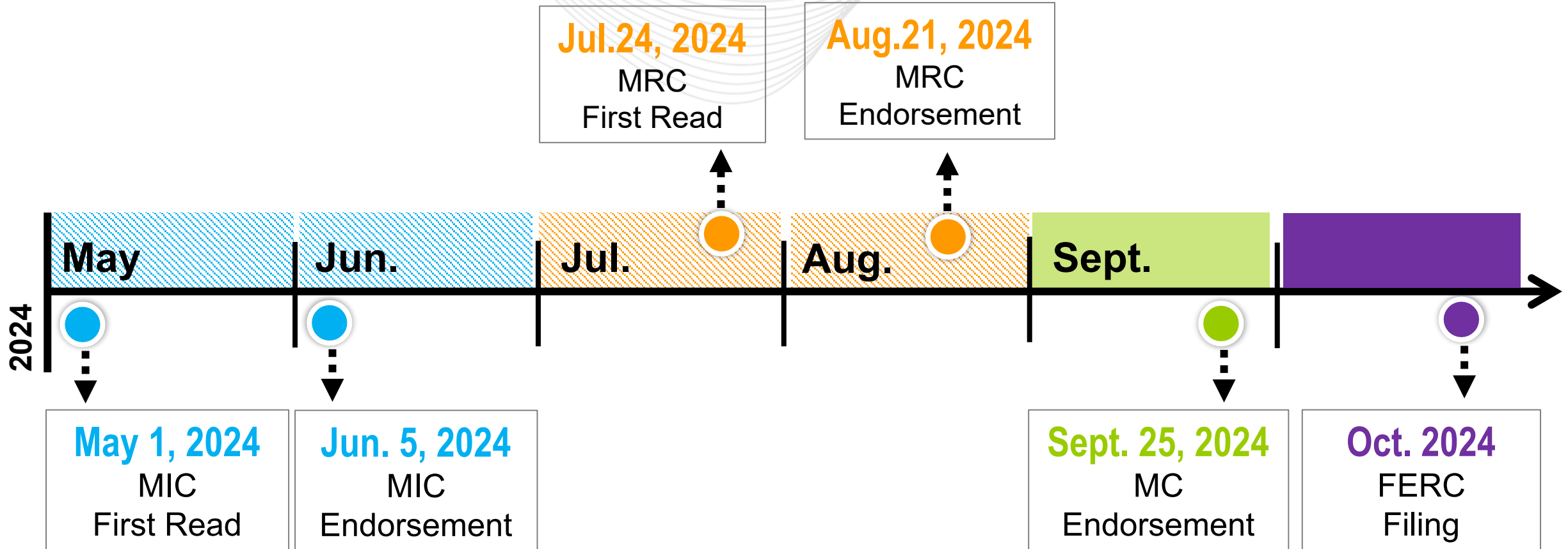


Automating Bid Duration for Economic Demand Response Participating in Energy Markets

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Markets & Reliability Committee

July 24, 2024



Consensus MIC approval (0 objections and 0 abstentions)

- Difficult to align Economic DR load reduction capability with day-ahead energy commitment and/or real-time energy dispatch. Some customers have specific load reduction requirements:
 - Can only reduced load for certain amount of time
 - After DR is released, can only reduce load again after a certain amount of time

This can be done partially today through hourly updates but is administratively difficult

- Economic DR has 2 time related parameters in the Energy Market
 - Notification time : amount of time required prior to full implementation of load reduction
 - Minimum down time : amount of time required after DR is dispatched before it can be released
- Daily values can be specified for both parameters for use in the Day-ahead and Real-time Markets. Hourly differentiated values for both parameters can also be specified but are only for use during the Real-time commitment and dispatch.
- DR is cleared/dispatched when projected LMP > offer price, subject to parameter constraints and released otherwise:
 - DR resource can be cleared/dispatched multiple times per day.
 - If DR resource in RT energy market has been curtailed and released during a market day, then “Notification Time” will be enforced for the next curtailment during the same market day.
- “Notification time” and “Minimum down time” for DR are similar to Generator’s “Cold/Warm/Hot Notification Time” and “Minimum Run Time” respectively

Proposed 2 new Economic DR Parameters for the energy market

- Maximum Down Time - the maximum number of continuous hours for which a DR offer can be cleared/dispatched in the energy Market.
 - DR resource will be released from energy commitment once its continuous curtailment hours are greater than “Maximum Down Time” even if still economic
 - This parameter is optional and is treated as undefined and not enforced by market clearing engine if not submitted.
- Minimum Release Time - the minimum number of continuous hours that must elapse from a DR resource release and its’ next curtailment commitment in the energy market.
 - If DR resource in DA energy market has been curtailed and released during a market day, then Minimum Release Time will be enforced for the next curtailment during the same market day.
 - If DR resource in RT energy market has been curtailed and released during a market day, then maximum of “Minimum Release Time ” and “Notification Time” will be enforced for the next curtailment during the same market day.
 - This parameter is optional and will be treated as 0 by clearing engine if not available.
- Daily values can be specified for both parameters for use in the DA and RT markets.
- Clarify in M11, “Economic DR bid parameters do not impact Load Management (Pre-Emergency and Emergency DR) required availability and associated financial penalties.”

PJM will implement in 6 months after FERC approval

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**Automating Bid Duration for Economic Demand Response
Participating in Energy Markets**



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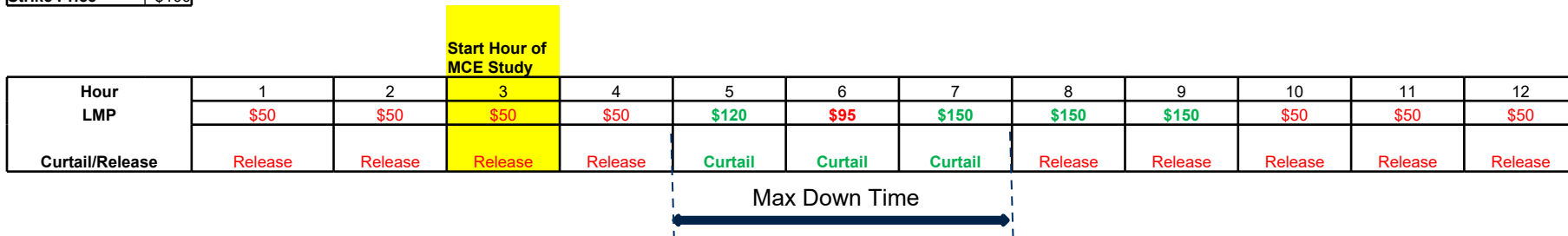
- Examples

Enhancement on DR Parameters

- Examples with these two new parameters “Maximum Down Time ” and “Minimum Release Time ” assuming a DR bids in as available for energy for 24 hours of a market day. “Maximum Down Time” should always be greater or equal to “Minimum down time”.

Example 1 (Max Down Time)

Notification Time	2
Min Down time	2
Max Down time	3
Min Release time	5
Strike Price	\$100



Example 2 (Min Release Time)

Notification Time	2
Min Down time	2
Max Down time	3
Min Release time	5
Strike Price	\$100

			Start Hour of MCE Study													
Hour	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LMP	\$50	\$50	\$50	\$50	\$120	\$95	\$150	\$150	\$150	\$95	\$150	\$150	\$150	\$150	\$150	\$50
Curtail/Release	Release	Release	Release	Release	Curtail	Curtail	Curtail	Release	Release	Release	Release	Release	Curtail	Curtail	Curtail	Release

Max[Min Release Time, Notification Time]

Example 3 (Max Down Time & Min Release Time)

Notification Time	2
Min Down time	2
Max Down time	3
Min Release time	5
Strike Price	\$100

			Start Hour of MCE Study													
Hour	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LMP	\$50	\$50	\$50	\$50	\$150	\$150	150	\$150	\$150	\$150	\$150	\$150	\$150	\$95	\$50	\$50
Curtail/Release	Release	Release	Release	Release	Curtail	Curtail	Curtail	Release	Release	Release	Release	Release	Curtail	Curtail	Release	Release

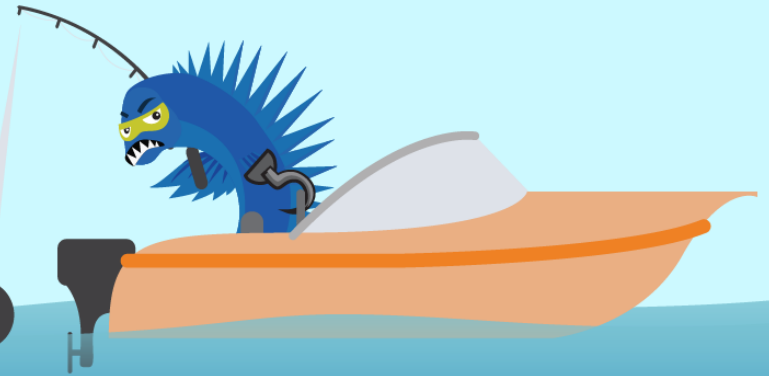
Notification Time
Max Down Time
Max[Min Release Time, Notification Time]

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