FERC Order 825 – Shortage Pricing

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Order 825 – Shortage Pricing Overview

- Order 825 directs ISOs/RTOs to trigger shortage pricing for any interval that a shortage of energy or operating reserves is indicated
  - Differs from PJM's current practice, which requires shortage to be forecast for a sustained period of time before it can be triggered in real-time (avoids "transient shortages")
  - FERC ordered an implementation date of May 11, 2017
- Any suggested changes to the operating reserve demand curves (ORDC) used in pricing shortages must be filed in a separate docket

PJM concerns with Order 825 Shortage Implementation

- PJM has two concerns with the pricing of transient shortages
  1. Triggering shortage pricing on a 5-minute basis before settling on a 5-minute basis
     - This further exacerbates price distortion for resources following the 5-minute pricing signal but getting paid the hourly average price
     - PJM requested a simultaneous implementation on Feb 1, 2018 in its compliance filing submitted January 11
  2. Use of the current ORDC to price shortage on a 5-minute basis
     - Will result in peak reserve prices during minimal/transient shortages
     - May result in overstating the severity of system conditions
     - PJM is proposing the addition of a permanent second step to the ORDC

PJM ORDC Proposal

	Current		Proposed	
	Penalty Factor	MW	Penalty Factor	MW
Step 1	$850	Economic Maximum of the single largest contingency	$850 (No change)	Actual output of the single largest contingency (changes dynamically in real-time)
Step 2 (Permanent)	N/A	N/A	$300	Step 1 MW + 190 MW 190 MW = (MAD Synch Reserve Deficit Mean + 1 Standard Deviation)
Step 2 (Extended)	$300	Step 1 MW + Additional Reserve MW	$300 (No change)	Step 2 MW + Additional Reserve MW

Why Add a Permanent 2nd Step?

- Absent a change to the demand curve, the change to start pricing transient shortages will result in $850/MWh reserve prices during minimal / transient shortages
  - This pricing could overstate the severity of system conditions
  - Will likely result in operational volatility if participants respond heavily to these transient events

- Adding a smaller step to the demand curve will:
  - Better reflect the lower reliability concern of small reserve deficiencies
  - Create better price signals prior to when synchronized reserves are less than the largest contingency
    - Resources and interchange will be incentivized earlier, potentially avoiding a larger reserve shortage at the $850/MWh level

Associated Manual 11 Changes

Three different reasons for changes to Manual 11

1) Order 825 Compliance allowing transient shortages (blue highlight in M11 redline)
   a) Based on language to be filed on January 11, 2017
   b) Proposed February 1, 2018 effective date

2) 205 Filing to include a permanent second demand curve step (green highlight in M11 redline)
   a) Based on current PJM's proposal
   b) Proposed February 1, 2018 effective date

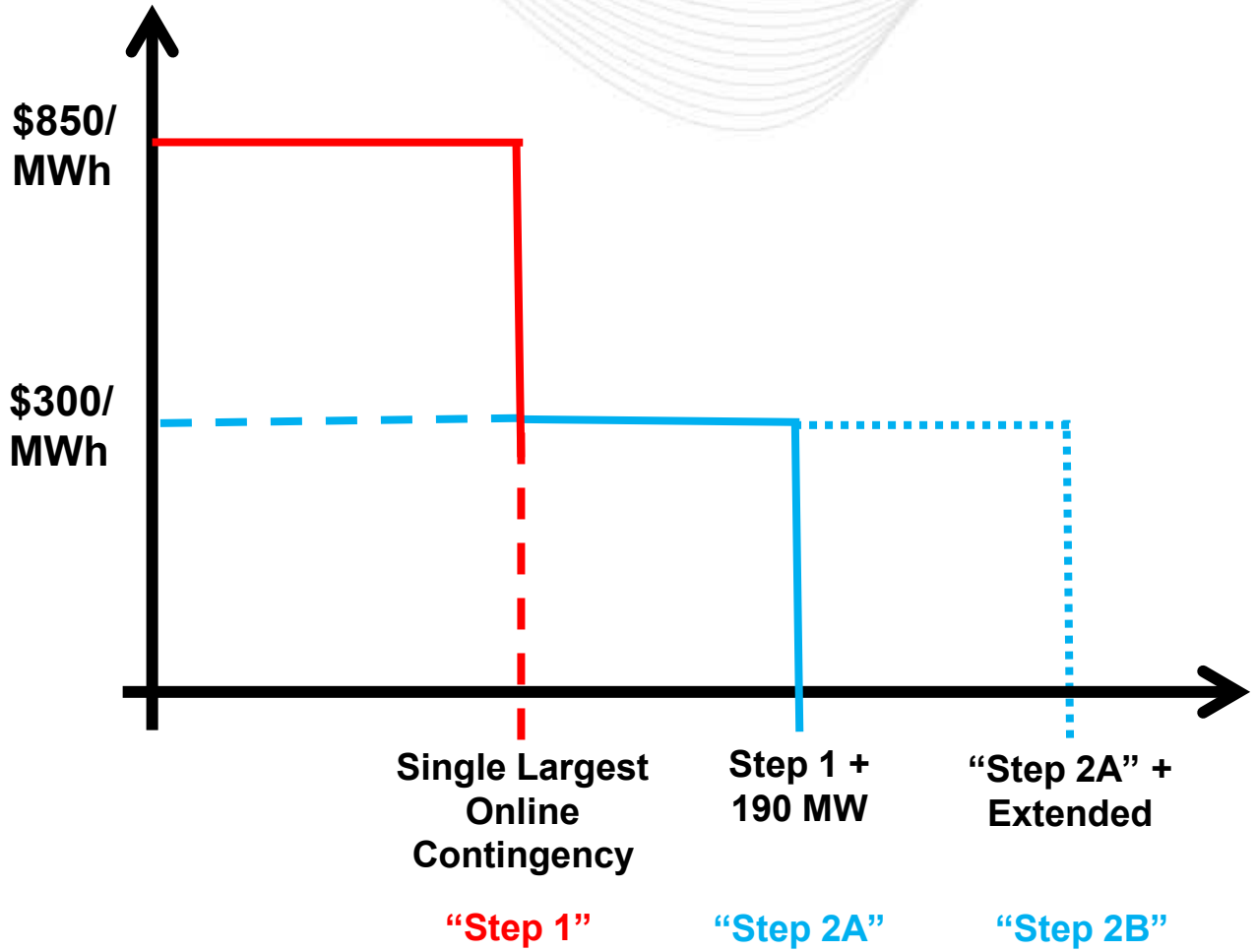
3) Changes conforming with M13 (yellow highlight in M11 redline)
   a) Will become effective upon endorsement of manual changes

OATT / OA changes for Demand Curve Proposal

- Minimal tariff changes are needed to implement the permanent second step on the demand curve
  - Language for the two step demand curve already exists as a result of the ERPIV enhancements that were implemented in 2015
  - Updated the definitions of “Extended Synchronized Reserve Requirement” and “Extended Primary Reserve Requirement” to include the additional 190 MW being added to the second step of the ORDC.
  - Clarifying changes in the following sections of OATT Attachment K – Appendix to make existing rules clearer:
    - Section 2.5: Calculation of Real-time Prices
    - Section 3.2.3A: Synchronized Reserve
    - Section 3.2.3A.001: Non-Synchronized Reserve

Appendix

PJM Proposed Recommendation - Graph



M11 - Order 825 Compliance Changes
(Desired Feb 1 2018 implementation date)

The following changes were made to M11 to achieve compliance with FERC Order 825's directive to allow transient shortages

- Section 2.3.2 and 2.3.3 - added clarifying language to which step in the demand curve is used
- Section 2.5 – removed wording describing the demand curve and penalties and reworded in Section 4.2
- Section 2.9 - removed IT SCED from determining shortage
- Section 4.2.2, 4.2.2.1, 4.2.9 and 4b.2.2 – incorporated language from Section 2.5 and clarified how the demand curves, penalties and requirements are structured
  - Section 4.2.2.1 outlining the shape of the demand curve is new
- Other ministerial changes to address capitalization

M11 - Section 205 Filing Changes
(Desired Feb 1 2018 implementation date)

The following change was made to M11 to implement the PJM proposal to add a permanent second step on the demand curve

- Section 4.2.2.1 – Within the newly created section, three words were added to Step 2
  - *Step 2*
    - *Penalty Factor = $300/MWh*
    - *Desired Reserve MW = locational reserve requirement for the specified reserve product as defined in M13 plus 190 MW plus any additional reserves that are being carried in anticipation of heavy load conditions, as referenced in Section 4.2.2 above.*

M11 - Conforming / Ministerial Changes
(Effective upon manual endorsement)

Section 4.2.2

- Clarified wording describing additional reserves carried during outage conditions that cause the largest single contingency to become a loss of more than one generator (historically referred to as a ‘double spin’ event)
- Removed on-peak/off-peak differentiation during such conditions to conform with operational change

Section 4b.2.3

- Corrected NSR MW equation to add missing floor at 0 MW (ministerial change)