

Market Monitor Report

MC Webinar
April 19, 2021

IMM



Monitoring Analytics

SMP Capping

- **In 2015, PJM began implementing a cap on the energy component of LMP (system marginal price or SMP).**
- **PJM posted a whitepaper to explain on April 12, 2021.**
- **The PJM governing documents do not describe or define the SMP capping process.**
- **The PJM Operating Agreement limits the number of reserve shortage penalty factors that may apply.**
- **The SMP may reach the cap level based on any combination of high energy offers, shortage penalty factors, or transmission constraint penalty factors.**

System Marginal Price Capping

- **PJM caps the SMP at \$3,750 per MWh during the reserve shortages.**
- **The cap is derived from**
 - **+ the Energy Offer Cap (\$2,000 per MWh)**
 - **+ Synchronous Reserve Penalty Factor from the first step on the demand curve (\$850 per MWh)**
 - **+ Primary Reserve Penalty Factor from the first step on the demand curve (\$850 per MWh)**
 - **+ a threshold (\$50 per MWh).**
- **Section 2.9 of Manual 11 does not reference a cap.**

Example of SMP Exceeding \$3,750

- **Loss Factor = 1.0**
- **Incremental cost of providing Energy = \$100/MWh**
- **Congestion cost from two violated transmission constraints with 0.5 dfax each to the marginal unit**
 - $0.5 * \$2000 + 0.5 * \$2000 = \$2,000$
- **Lost Opportunity Cost associated with three reserve constraints**
 - $850 + 850 + 850 - 10 = \$2,540/\text{MWh}$
- **SMP = \$4,640/MWh**
 - $1.0 * \{100 + (0.5 * 2000 + 0.5 * 2000) + (850 + 850 + 850) - 10\}$

SMP Capping Logic

- **If the SMP exceeds \$3,750 per MWh, PJM resolves RT SCED by progressively relaxing reserve constraints until the SMP falls below the cap.**

SMP Capping Logic

- **Example**
 - **Original SMP is above \$3,750 per MWh.**
 - **PJM resolves, disabling MAD primary reserve constraint.**
 - **If the SMP is still above \$3,750 per MWh,**
 - **PJM resolves, enabling the MAD primary reserve constraint and disabling the MAD synchronized reserve constraint.**
 - **If SMP is still above \$3,750 per MWh,**
 - **PJM resolves, disabling both MAD primary reserve constraint and synchronized reserve constraints.**
 - **PJM continues the relaxation of reserve constraints until the SMP falls below \$3,750 per MWh.**

SMP Capping Since 2018

- Since January 2018, SMP was capped in 95 SCED cases
- Among the 95 SCED cases, four cases have been approved and used in the five minute interval pricing

Five Minute Interval	Reserve Constraint	Disabled	Shadowprice (\$/MWh)	MCP (\$/MWh)	SMP (\$/MWh)
01OCT2019:15:00:00	MAD Primary Reserve	No	\$0.00	\$300.00	\$3,651.02
01OCT2019:15:00:00	MAD Synchronized Reserve	Yes	\$0.00	\$1,150.00	\$3,651.02
01OCT2019:15:00:00	RTO Synchronized Reserve	No	\$850.00	\$1,150.00	\$3,651.02
01OCT2019:15:00:00	RTO Primary Reserve	No	\$300.00	\$300.00	\$3,651.02
13NOV2020:18:00:00	MAD Primary Reserve	Yes	\$0.00	\$850.00	\$3,166.28
13NOV2020:18:00:00	MAD Synchronized Reserve	No	\$850.00	\$2,550.00	\$3,166.28
13NOV2020:18:00:00	RTO Primary Reserve	No	\$850.00	\$850.00	\$3,166.28
13NOV2020:18:00:00	RTO Synchronized Reserve	No	\$850.00	\$1,700.00	\$3,166.28
02MAR2021:06:30:00	MAD Synchronized Reserve	Yes	\$0.00	\$2,782.22	\$2,994.68
02MAR2021:06:30:00	MAD Primary Reserve	No	\$149.36	\$999.36	\$2,994.68
02MAR2021:06:30:00	RTO Primary Reserve	No	\$850.00	\$850.00	\$2,994.68
02MAR2021:06:30:00	RTO Synchronized Reserve	No	\$1,782.86	\$2,632.86	\$2,994.68
17MAR2021:10:10:00	MAD Synchronized Reserve	No	\$850.00	\$2,000.00	\$3,653.98
17MAR2021:10:10:00	RTO Primary Reserve	No	\$300.00	\$300.00	\$3,653.98
17MAR2021:10:10:00	RTO Synchronized Reserve	No	\$850.00	\$1,150.00	\$3,653.98
17MAR2021:10:10:00	MAD Primary Reserve	Yes	\$0.00	\$300.00	\$3,653.98

Fast Start Pricing

- **PJM is expecting to implement Fast Start (FS) Pricing on May 1, 2021.**
- **Under Fast Start Pricing, PJM will calculate and post two different prices:**
 - **Dispatch run prices, based on the true least cost solution economic dispatch. Not to be used in settlements.**
 - **Pricing run prices, based on the fast start method. To be used in settlements.**
- **The IMM recommends that PJM post the preliminary results of the FS prices prior to implementation.**
- **This is consistent with practices from other RTOs.**

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