

# Synchronized Reserve Capability and Performance Proposal

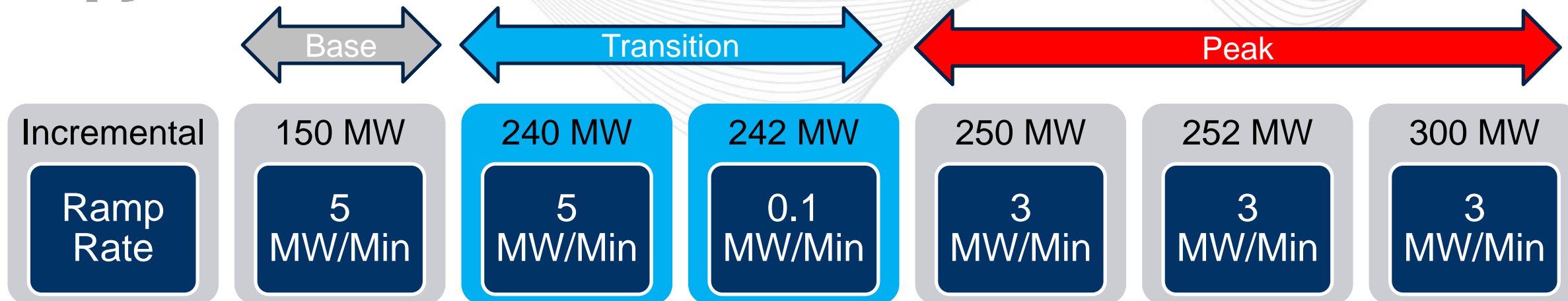
MIC Special Session – Reserve Price Formation Order  
June 30, 2020  
Performance Compliance  
Thomas Hauske

- PJM currently has two Markets Gateway changes in progress to allow Market Sellers to better represent break points in the offer curves for CC configurations, changes in duct burner operation due to ambient conditions, coal unit mill points, and pump storage pump operation.
  - Increase the number of segments on the energy offer curve from 10 to 20, and
  - Provide market participants with the ability to submit Hourly Differentiated Segmented Ramp Rates for resources in the Day Ahead and update them in Real Time

- Market Sellers will be able to provide PJM hourly differentiated segmented ramp rates and update them intraday to reflect changing conditions on the operations of their units.
- For on-line resources, PJM will utilize the hourly differentiated ramp rates to determine the unit's current capability for providing reserves. **Capability will be capped at lower of Economic Maximum or Synchronized Reserve Maximum.**
- For synchronous condensers, PJM will utilize condense to gen time, ramp rate, and Eco Min to calculate 10-minute and 30-minute MW reserve capability.

- PJM will allow hourly differentiated segmented ramp rates in both the Day Ahead and Real Time Markets
- Provide the ability to change segmented ramp rate Intraday
- Follow existing Intraday logic rules
  - Updates permitted after the Reliability Assurance Commitment (RAC) run up to 65 minutes prior to operating hour
  - Intraday updates can be submitted for multiple hours
- Hourly differentiated segmented ramp rates provide PJM the capability to perform more accurate reserve calculations

# Example Capability Calculation using Ramp Rates

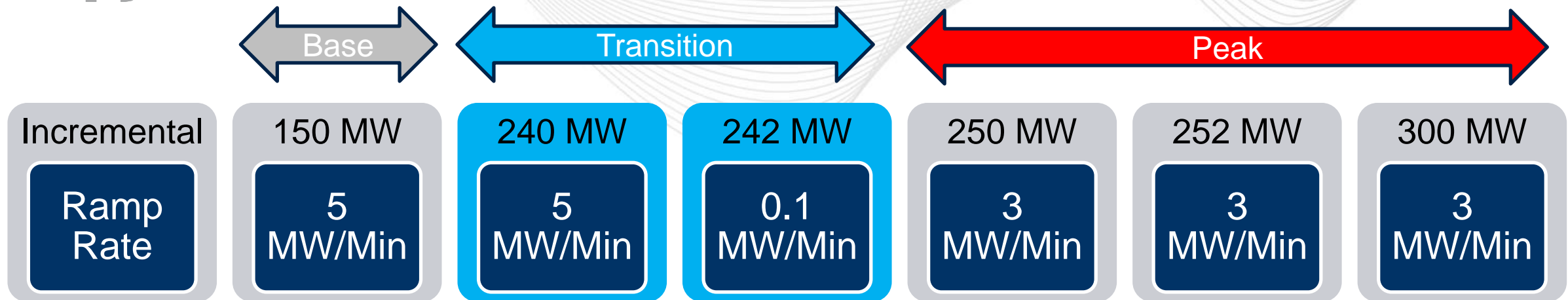


Committed/SE MW= 240 mw, Eco Max =300 MW, Synchronized Reserve Max = 300 MW

10 Minute Reserve =  $0.1 \text{ MW/Min} * 10 \text{ Min (240 to 241 MW)} = 1 \text{ MW}$

30 Minute Reserve =  $0.1 \text{ MW/Min} * 10 \text{ Min (241 to 242 MW)}$   
 $+ 3 \text{ MW/Min} * 10 \text{ Min (242 MW to 272 MW)} = 31 \text{ MW}$

# Example Capability Calculation using Ramp Rates



Committed/SE MW = 240 mw, Eco Max = **260 MW**, Synchronized Reserve Max = **260 MW**

10 Minute Reserve =  $0.1 \text{ MW/Min} * 10 \text{ Min (240 to 241 MW)} = 1 \text{ MW}$

30 Minute Reserve =  $0.1 \text{ MW/Min} * 10 \text{ Min (241 to 242 MW)}$   
 $+ 3 \text{ MW/Min} * 10 \text{ Min (242 MW to 272 MW)} = 31 \text{ MW}$   
 but Eco Max & Synchronized Reserve Max = **260 MW**  
 30 Minute Reserve capped at **19 MW**

- In order to address unit operating conditions when the hourly differentiated segmented ramp rates do not reflect the unit's reserve capability:
  - PJM will allow approved units to telemetry to PJM the times when they are incapable of providing reserves.
  - Market Sellers must obtain prior approval through a unit specific parameter like process where they submit supporting documentation to PJM and the IMM to identify operating conditions where they are incapable of providing reserves.



- For on-line resources, PJM will utilize the units **actual response** **and** the applicable hourly **assignment** to determine the unit's performance during any Synchronous Reserve Event.
- For Synchronous condensers, PJM will use the **units actual response and the applicable hourly assignment to determine the unit's performance** during any Synchronous Reserve Event.
- PJM will also verify that all resources telemetering they are incapable of providing reserves during the event have an approved exception.