



RCSTF Initial Solution Packages Overview

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Comprehensive Topics on Reserve and Energy Market

- [Issue Charge](#) and [Problem Statement](#) approved at September MRC.
- Addresses immediate-need issues and longer-term issues

Immediate-Need Scope

Begin immediately, worked over 6 – 9 months

Addresses current Synchronized Reserve performance concerns, observation on reserve price formation implementation, and deployment of reserves

Longer-Term-Need Scope

Begin on 6 – 9 month lag, worked over 12 – 18 months

Addresses future system needs for reserve and flexibility, with evaluation of the Operating Reserve Demand Curve (ORDC), operational metrics, and enhancements or additional market solutions (ramping, multi-interval, etc.)

The RCSTF has worked on solutions addressing the immediate-need scope over the past 8 months. Additional time would be needed to reach consensus on a broad package of reforms, many of which could not be implemented before Winter 2024/2025.

Path Forward

Now:

Vote on two targeted reforms that provide incremental improvement to the status quo, and which may be implemented before next winter:

1. Adjustments to the reserve requirements
2. Changes to synchronized reserve deployment

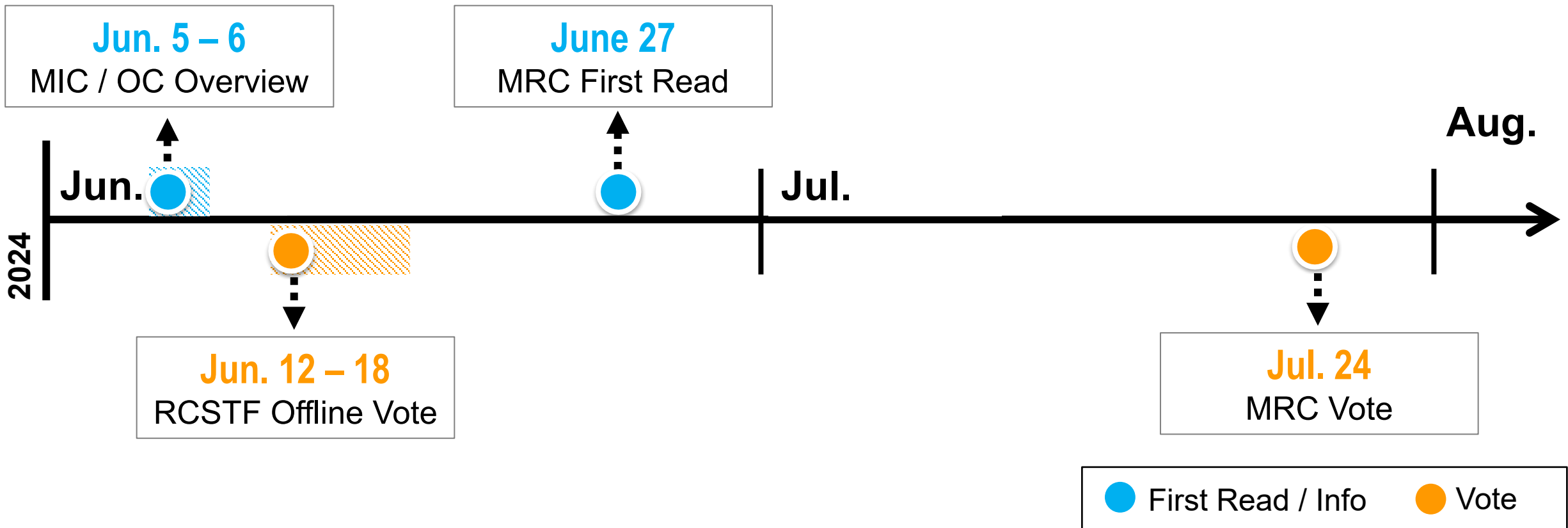
Up Next:

Address the alignment of the reserve offer structure and compensation with resource fuel procurement

Further Ahead:

Begin discussions on the scope addressing the longer-term needs towards the end of this year

The RCSTF will be asked to take two separate, independent votes: one on the reserve requirements proposal and one on the reserve deployment proposal.





Solution Package 1: Reserve Requirement Definitions

Challenge: The 30-minute reserve requirement does not currently reflect the operational risks that PJM dispatcher must account for on a day-to-day basis.

Change the 3,000 MW quantity the 30-minute Reliability Requirement to better capture day-to-day risks in alignment with current operational practice, using the methodology previously used under the Day-Ahead Scheduling Reserve:

30-Min Requirement = MAX(Load Forecast Peak*(Avg. Load Forecast Error + Avg. Forced Outage Rate), Primary Reserve Requirement, Active Gas Contingency)

Challenge: Extending one of the extended reserve requirements to address operational uncertainty would cascade into all three, and could force the over-procurement of unneeded reserves.

For example, if PJM needed to procure additional 30-minute reserves to address operational uncertainty, that would require also procuring the same amount of additional SR and PR.

Clarify that Synchronized Reserve, Primary Reserve and 30-Minute Reserve extended reserve requirements (i.e., Step 2B of each ORDC) can be increased independently. Product substitution and nesting rules would still apply as they do in status quo.

- Detailed how the minimum operating reserve value would be calculated, based on the load forecast peak, average load forecast error and average generator forced outage rate
- Detailed how each quantity in the operating reserve calculation is derived
- Explained the process for calculating the average load forecast error and average generator forced outage rate annually
- Clarified how the 30-Minute Reliability Requirement is set



Solution Package 2: Synchronized Reserve Deployment

- Communication delays caused by the All-Call
- Inconsistency between how instructions are given during a spin event and during normal dispatch
- Confusion on what PJM is requesting from resources during a spin event
- Dispatchers lack tools to deploy less than 100% of the reserves held

- Dispatcher initiates the reserve event, entering the amount of reserves to be deployed
- **Reserve deployment instructions to generators will be transmitted as an update to basepoints.** Deployed reserve MWs are added to the current output of each resource and sent out immediately through telemetry
 - The automated notification that we are in a spin event, and the All-Call notification will still be issued.
- For demand response resources, deployment instructions continue to go through DR Hub
- While the event persists, dispatch instructions to dispatch-following resources with a reserve deployment assignment would be the greater of a) the original deployment instruction sent at the start of the event or b) the new economic dispatch point calculated by SCED



Less than 100% Reserve Deployment Proposed Solution

- To the extent possible, all resources will be deployed pro rata
 - Example: A resource has a 10 MW SR assignment and PJM deploys 80% of held reserves. The resource would be instructed to deploy 8 MW.
- Inflexible generation resources will be deployed to the greater of a) EcoMin and b) the pro rata reserve deployment instruction*
 - Example: A condenser has an EcoMin of 10 MW, a 30 MW SR assignment, and PJM deploys 50% of held reserves. The resource would be instructed to deploy 15 MW.
 - Example: A condenser has an EcoMin of 20 MW, a 30 MW SR assignment, and PJM deploys 50% of held reserves. The resource would be instructed to deploy 20 MW.
- Resources without a dispatchable range will be deployed to their SR assignment*

**Due to these constraints, actual reserves deployed may be greater than the pro rata calculation*

- Updated PJM Actions to specify that the reserve deployment quantities will be added to resource basepoints and sent out immediately during a SR Event
- Added information about demand response SR deployment through DR Hub
- Updated PJM Member Actions to specify that resources shall continue to follow their basepoints, which will reflect the SR deployment instructions
- Specified that if resources holding a SR assignment either a) do not receive a basepoint or b) cannot deploy less than 100% of their assignment in the case of a partial deployment event, these resources should immediately deploy their full SR assignment

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<ul style="list-style-type: none"> The RCSTF will be conducting an offline vote on two solution packages following the June 12 meeting 	<ul style="list-style-type: none"> The reserve requirements proposal seeks to amend the 30-minute reserve requirement and provide additional flexibility when extending the 2nd step on the reserve demand curves. <p>The goal is to better reflect operational needs in the market clearing.</p>	<ul style="list-style-type: none"> The reserve deployment proposal seeks to add reserve deployment instructions to resource basepoints in order to reduce communication issues. <p>The existing All Call and ICCP event notifications are not changing.</p>

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Appendix: Additional Manual Revisions

- Clarified that each of the reserve services has its own Extended Reserve Requirement
- Clarified that each reserve service's Extended Reserve Requirement can be increased discretely
- Replaced the 3,000 MW value in the 30-Minute Reliability Requirement with the new minimum operating reserve quantity, and referenced Manual 13 where that calculation is detailed

Acronym	Term & Definition
LMP	<p>Locational Marginal Price is defined as the marginal price for energy at the location where the energy is delivered or received. For accounting purposes, LMP is expressed in dollars per megawatt-hour (\$/MWh). LMP is a pricing approach that addresses Transmission System congestion and loss costs, as well as energy costs.</p>
SCED	<p>Security Constrained Economic Dispatch is the optimization engine used to calculate dispatch and reserve assignments and to set prices.</p>
MW	<p>A Megawatt is a unit of power equaling one million watts (1 MW = 1,000,000 watts) or one thousand kilowatts (1 MW = 1,000 KW). To put it in perspective, under non-severe weather conditions, one MW could power roughly 800 to 1,000 average-sized American homes.</p>

Acronym	Term & Definition
SR	Synchronized Reserves is a reserve capability that can be converted fully into energy within 10 minutes following the request of PJM. Equipment providing Synchronized Reserve must be electrically synchronized to the power system.
PR	Primary Reserves is a reserve capability that can be converted fully into energy within 10 minutes following the request of PJM. The Primary Reserve service can be provided by both Synchronized and Non-Synchronized Reserves.
ORDC	Operating Reserve Demand Curve is used to articulate the value of maintaining reserves at specified levels

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