

MARKET SURVEILLANCE COMMITTEE

RUC BCR Cost Discussion

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Topics

- High RUC BCR Costs
- Causes of High RUC BCR Costs
- Conclusions

High RUC BCR Costs

RUC BCR costs for uneconomic commitments appear to have reached very high levels in the second half of 2024.

- Figure 1.33 California ISO, Department of Market Monitoring, 2023 Q3 Report on Market Issues and Performance, February 2024
- Slide 142 California ISO, Market Performance and Planning Forum, December 14, 2023
- Figure 2, December 6, 2023 California ISO, Department of Market Monitoring Board memo.

I do not have direct knowledge of whether the calculation of “RUC BCR “ costs only includes BCR on long start units committed in RUC, also includes BCR on units scheduled in RUC but committed in STUC or RTPD, nor of how real-time margins on long start units committed in RUC are accounted for. These methodologies may differ between CAISO and DMM calculations.

- The discussion in these slides assumes that the reported “RUC BCR” costs are largely associated with the commitment of long start units.
- The policy implications could be different if a substantial proportion of the “RUC BCR” costs were actually associated with the commitment of units in RTPD or STUC or were not netted with real-time margins.

Causes of High RUC Costs

Procurement of RUC capacity to cover potential net load forecast uncertainty at a higher probability level will tend to increase RUC BCR costs, likely causing a larger commitment of long-start capacity to cover higher levels of net load forecast error.

- High RUC BCR costs can be a result of a high coverage target but this is not the only potential driver of high RUC BCR costs.
- Other factors that could affect the level of RUC BCR costs include:
 - High RUC BCR costs per megawatt of RUC capacity scheduled
 - High levels of long start capacity scheduled in hours when there should be unloaded capacity in IFM
 - High reliance on long start capacity relative to capacity that could be committed in RTPD or STUC
 - Anomalously high uncertainty requirements for the target coverage level

Causes of High RUC Costs

High RUC BCR costs per megawatt of RUC capacity scheduled

The BCR cost of RUC capacity appears to be anomalously high.

- October RUC BCR costs were around \$27 million ¹
- October average hourly RUC adjustments appear to be around 2700MW ²
- The DMM figures imply an average BCR cost of \$13.4/MWh

This is a pretty high level of commitment costs for reserves.

1. See, Figure 2, California ISO, Department of Market Monitoring December 6, 2023 board memo. RUC BCR costs appear to be even higher, perhaps \$32 million, in Slide 142 California ISO, Market Performance and Planning Forum, December 14, 2023.
2. See Figure 2, California ISO, Department of Market Monitoring February 1, 2024 board memo.

Causes of High RUC Costs

\$13.4/MWh is a pretty high average commitment cost for long start units.

- The NYISO's cost of 30 minute reserves averaged right around \$4/MWh in every NYISO reserve region in October 2023.¹
 - This is a marginal price, not an average cost.
- If the minimum load capacity was around $\frac{1}{4}$ of the total RUC scheduled capacity, this implies an **average** out of merit cost of over \$50/MWh on the minimum load blocks.²
- If the average October FMM price was around \$50 in October, this implies that the minimum load capacity had an **average** cost of \$100/MWh.

1. See NYISO Market Operations Report, Business Issues Committee Meeting, December 13, 2023 Slide AF number 34
2. See Figure 1.23 California ISO, Department of Market Monitoring, 2023 Q3 Report on Market Issues and Performance, February 2024

Causes of High RUC Costs

Are RUC BCR costs high on many days or are they very high on a few days on which RUC committed very high cost units to meet incremental projected net load uncertainty.

- The NYISO procurement of 30 minute reserves is governed by a demand curve.
- It is envisioned that imbalance reserve procurement will be governed by a demand curve.
- Was any form of demand curve implemented in RUC in 2023 or did RUC commit long start resources to meet the net load uncertainty target without regard to cost?

Causes of High RUC Costs

High Levels of Long Start Capacity Scheduled in off peak hours.

My understanding of the CAISO data on RUC commitments is that a material amount of long start capacity was scheduled in October during hours ending 1-5 and 22-24.

- RUC should not commit long start units to meet the RUC target if there is sufficient unloaded capacity on units scheduled in the IFM.
- It is surprising that there was not enough unloaded capacity on resources scheduled in the IFM to cover 1000-2000MW of net load uncertainty in off-peak hours.
 - Did RUC operate as intended in scheduling RUC capacity to cover adjustments for net load uncertainty, or was a bug introduced with the new methodology?
 - Has the CAISO resource mix changed to the point that there is no unloaded capacity in the overnight hours?
 - Are there CAISO or CPUC rules that are having the unintended impact of reducing available supply in the overnight hours?

Causes of High RUC Costs

High Levels of Long Start Capacity Scheduled in off-peak hours

It would be informative if the CAISO were to report data that show the amount of long start minimum load committed, and total capacity committed, on average over each hour of the day by month for the August to December period .

- Such data would guide understanding what aspects of the forecasting model and RUC engine may have contributed to the high level of BCR costs.

The CAISO could also compile data showing the MW of minimum load amount of RUC committed long start capacity on line in each hour with a minimum run time of 6 hours or less and 6 hours or more.

- This information would provide insight into the role of long minimum run times in contributing to high RUC BCR costs.

Causes of High RUC Costs

High reliance on long start capacity relative to capacity that could be committed in RTPD or STUC

- The apparent high level of long start minimum load commitments over the hours of the day suggests that not only was there little or no unloaded IFM capacity in off-peak hours, but also that there was little or no capacity that could have been committed in STUC or RTPD instead of committing long-start units.
- This is surprising. One would generally expect that the units committed to meet the net load peak could have been committed earlier or kept on longer if needed to meet net load uncertainty.

Causes of High RUC Costs

High reliance on long start capacity relative to capacity that could be committed in RTPD or STUC

Why might this be the case?

- What were the start times used to determine to commit resources in RUC instead of waiting until STUC or RTPD?
- Perhaps operators in the past were only making load adjustments in net load peak hours because they could commit capacity through exceptional dispatch if needed in off-peak hours? Is the new model resulting in high long start costs by not doing this?
- What kind of ramp limits were enforced in RUC with the new design and did they bind?
- When the changes in RUC forecasting were implemented, was there an unintended change in RUC commitment cost logic?
- Is there some regulatory or resource adequacy factor that prevented use of units other than long start units to cover net load uncertainty in off-peak hours during October, November and December?
- Is the monthly shaping of resource adequacy requirements, combined with maintenance outages, leaving nothing but long start units available to meet variations in net load in the shoulder months?

Causes of High RUC Costs

The MOSAIC methodology apparently predicted a relatively uniform high level of net load uncertainty across all months during the August to December period.¹

- This is a noteworthy pattern.
- It would be straightforward to calculate the actual average positive net load uncertainty over all hours of each month, and the average positive net load uncertainty over hours with positive values for each month, and assess whether the high levels of predicted uncertainty in October, November and December relative to prior months were consistent with outcomes.

The CAISO should explain the historical look back period used for the period, or for each month if it varied over the July to December period, so stakeholders can assess how the look back period may have impacted forecast accuracy.

1. See Figure 2 California ISO, Department of Market Monitoring February 1, 2024 board memo.

Conclusions

There are several aspects of the high RUC BCR costs over the past several months that are surprising and raise questions about the RUC commitment logic and the MOSAIC model.

We should not simply assume that the core problem is a high target coverage level for net load uncertainty. We should also analyze potential sources of these high costs in RUC commitment logic, MOSAIC estimation methods, and market participant behavior.

Statements such as: ¹

- “*similar* to DAME approved design” slide 131
- “utilizing an ‘Imbalance Reserve’ like methodology” slide 134
- “Profiles for July-November were based on Mosaic-like calculations” slide 139
- “The current calculation relies on a more conservative approach than the one from imbalance reserves” slide 143

are too vague to allow either the MSC or stakeholders to understand the CAISO implementation, identify issues, or suggest improvements.

1. California ISO, Market Performance and Planning Forum, December 14, 2023