RUC Uncertainty Requirement

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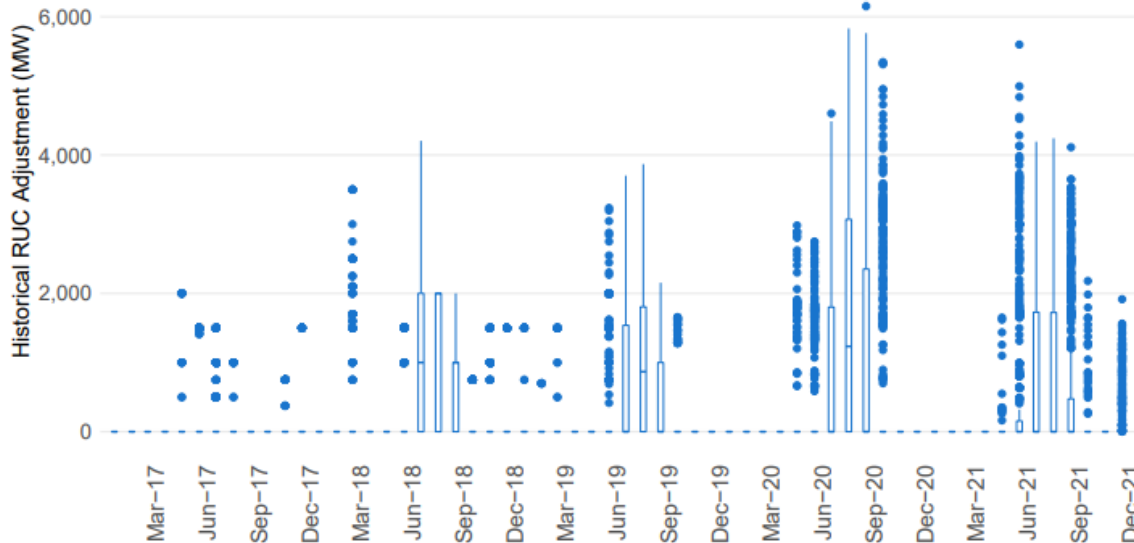Market Surveillance Committee Meeting

General Session

April 11, 2024

Outline

- Forecasting analysis
    - Background
    - Performance review and summary
    - Takeaways

Motivation

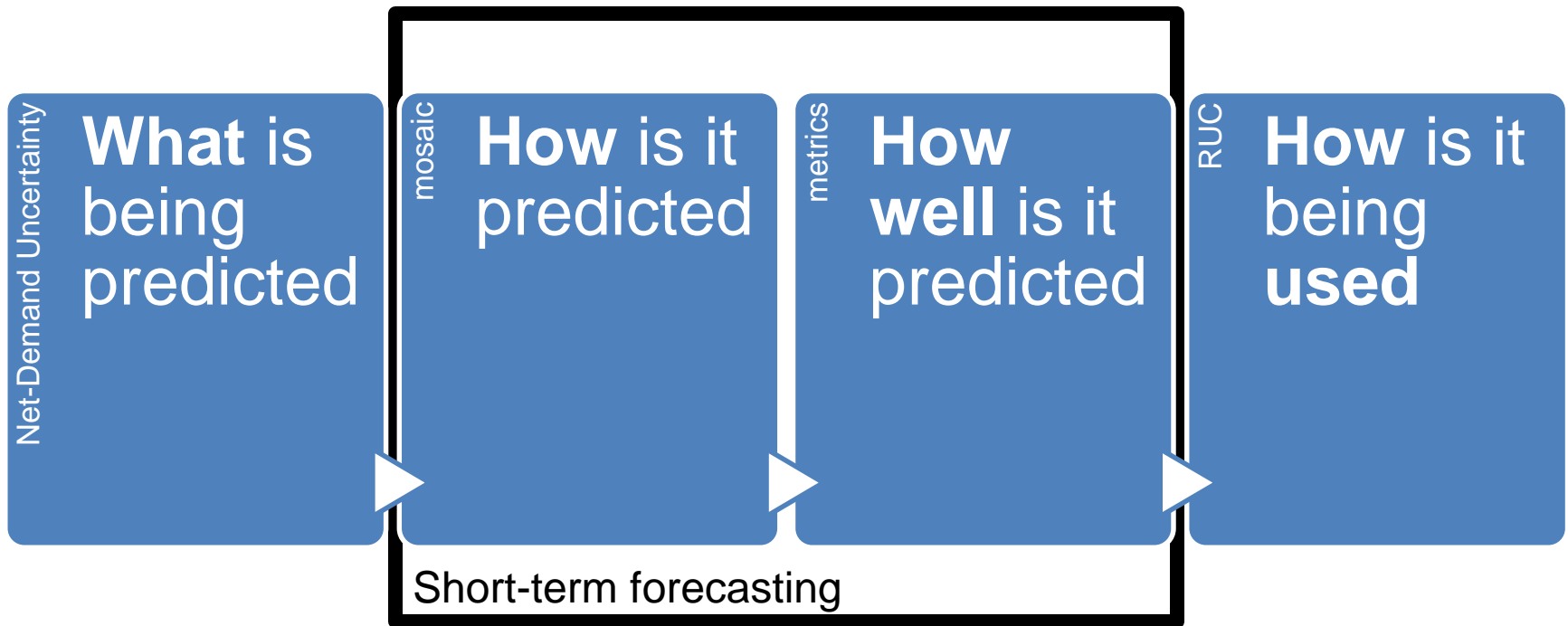Above: Figure 8 from DAME Analysis Report (Jan 2022)

RUC adjustments have been shown to increase in magnitude and frequency.

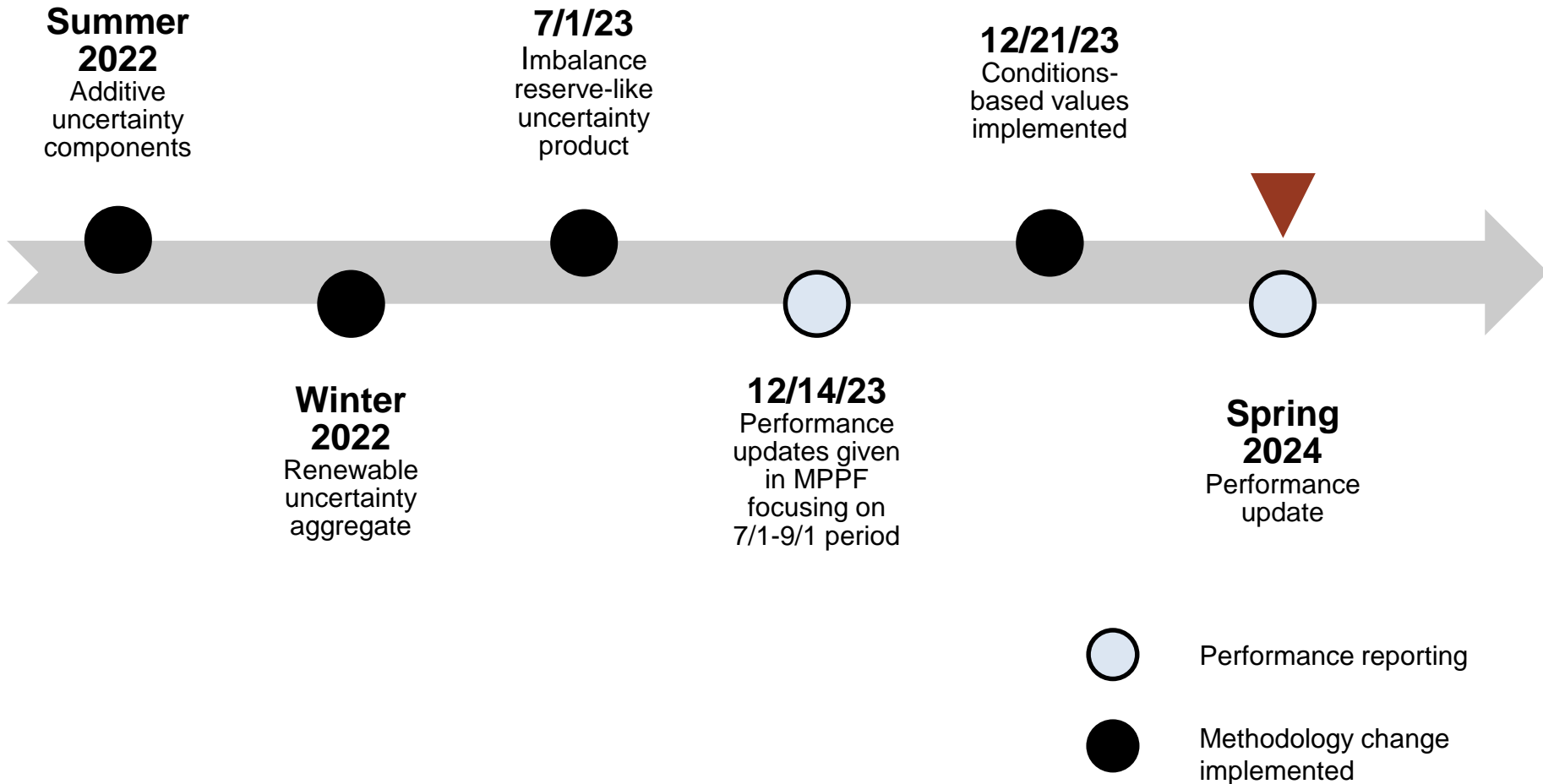Net load uncertainty continues to grow with increasing renewables.

ISO continues to enhance the guiding logic for RUC adjustments through techniques similar to the proposed Imbalance Reserves to assist with growing net load uncertainty and RUC adjustments.

DAME, and the imbalance reserve product, is not going live until 2026.

This review and analysis is a *subset* of a larger process

What is being predicted

Net-Demand Uncertainty

How is it predicted

mosaic

How well is it predicted

metrics

How is it being **used**

RUC

Short-term forecasting

California ISO

ISO Public

Timeline

Summer 2022
Additive uncertainty components

Winter 2022
Renewable uncertainty aggregate

7/1/23
Imbalance reserve-like uncertainty product

12/14/23
Performance updates given in MPPF focusing on 7/1-9/1 period

12/21/23
Conditions-based values implemented

Spring 2024
Performance update

○ Performance reporting

● Methodology change implemented

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Current RUC methodology
Conditions-based values implemented 12/21/23

- ISO operator may adjust RUC Net Short as necessary.

- Conditions-based values allowed for lower percentiles on non-alert days, driving lower requirements.

Uncertainty is defined as the hourly max difference between the hourly net load DA forecast and 15-min net load FMM forecast

$$\text{uncertainty} = \max(NL_{\text{FMM}} - NL_{\text{DA}})$$

Conditions for RUC adjustment considerations as listed in A.3.2.3. in Operating Procedure 1210 (v19.4)

- Demand Response.
- Load Forecast errors – Risk Predictor.
- Fire dangers – Cal Fire and PTO updates.
- Weather changes – updated weather forecasts and PTO updates.
- Reliability Coordinator next-day analysis – from the RC.
- Potential loss of resources – test energy, update from PTOs, subsequent Outages.
- Stranded Capacity – potential for transmission Outages or overloads.
- Address reliability concerns or need for additional capacity "insurance" to cover the following non-summer operational risks:
  - Tighter Resource Adequacy (RA) supply margins as identified by the Assistance Energy Transfer (AET) Yellow System Conditions Alert email, including days where the CAISO opts-in to AET.
  - Weather forecasts where additional Regulation is procured to cover cloudy and other weather-related volatility.
  - West-wide grid impacts where the WEIM footprint is experiencing weather as designated by a Peak Outlook alert as extreme conditions within the 95-98th percentile of normal ranges.

Condition	Method	Percentile
Operational RA	Mosaic DA-FMM (max)	97.5%
Uncertain Forecast	Mosaic DA-FMM (max)	75%
West-Wide Grid Impacts	Mosaic DA-FMM (max)	97.5%

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Definitions

- Uncertainty: $x_h = \max(NL_{\mathrm{FMM}} - NL_{\mathrm{DA}})$

- Performance metrics

  - Coverage: $\frac{1}{N}\sum_h^N (r_h \geq x_h)$

    - Average of binary coverage over hourly intervals

    - Ought to be considered in tandem with daily RUC Net Short adjustments and targets

  - Requirement: $\frac{1}{N}\sum_h^N r_h$
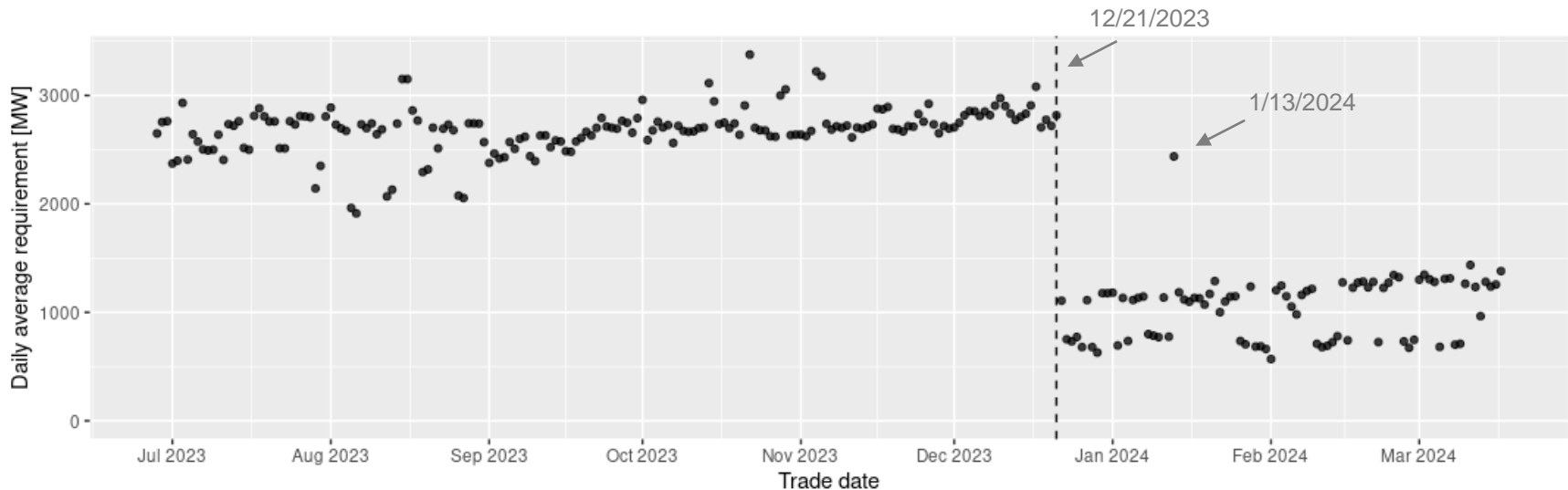
    - Average of requirement values over hourly intervals

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Summary metrics

	Coverage [-]	Requirement [MW]
Normal (50th)	0.52	723
Uncertain forecast (75th)	0.68	1231
Operational RA or West-wide grid impacts (97.5th)	1.00	2438

Metrics given for sample period 12/21/2023 to 3/13/2024
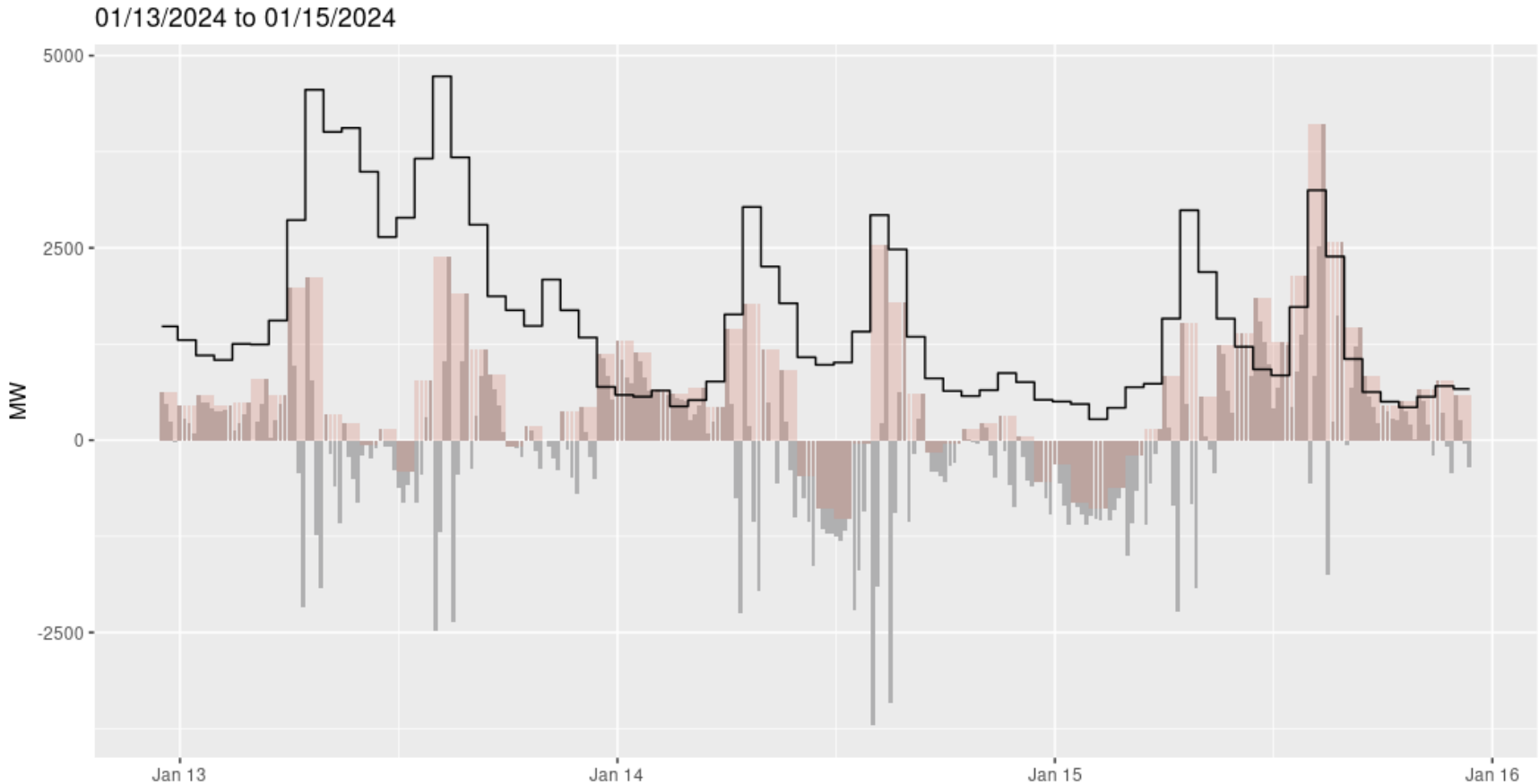
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Takeaways

- ISO continues to assess the best methodology for the need and the use of load conformance in RUC to protect against net load uncertainty in varying conditions.

- Operator-adjusted conditions-based targets allowed lower percentiles on non-alert days.

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APPENDIX

January cold event days. RUC percentiles on 1/14 forward were adjusted following excessive coverage on 1/13. RUC performed as expected during this event.
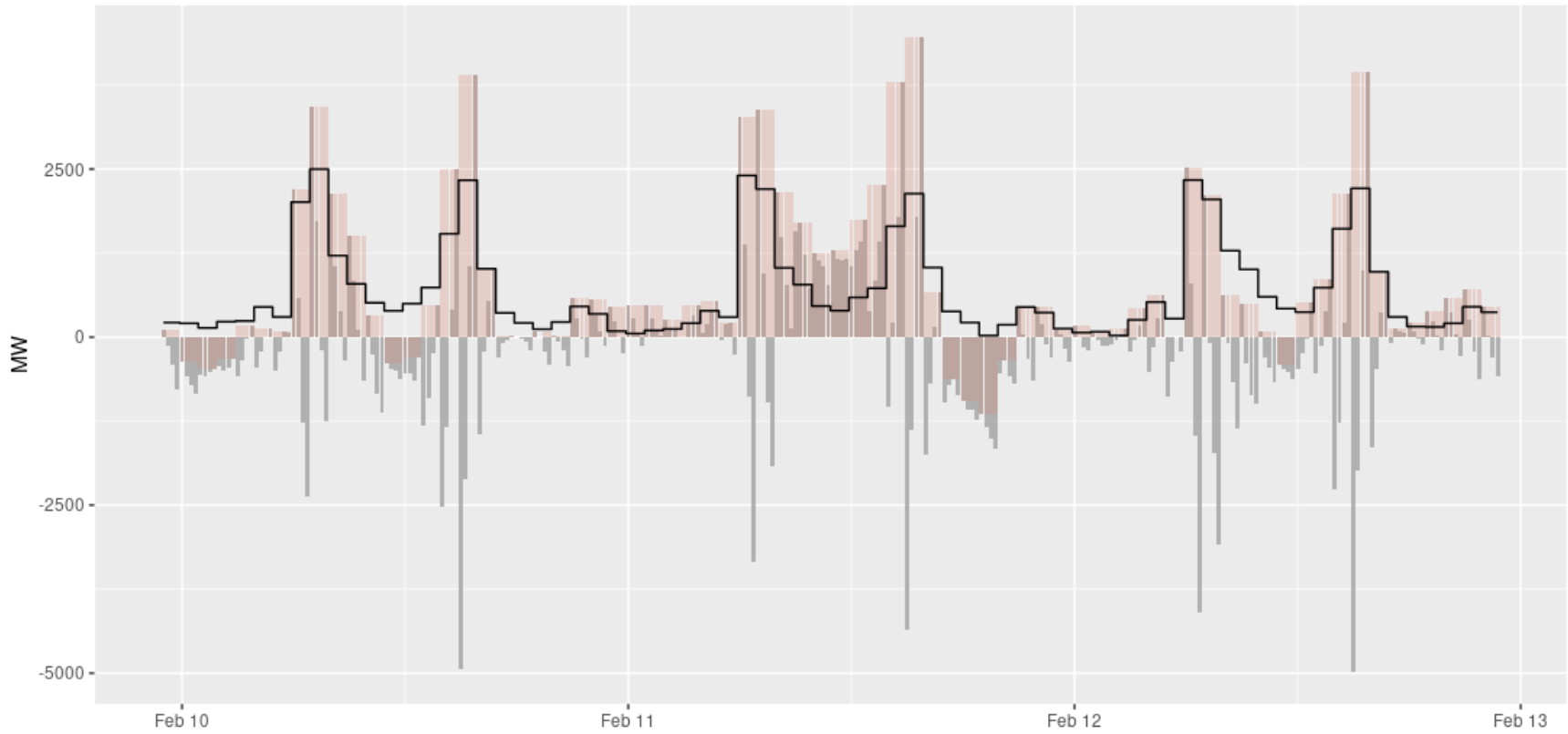

01/13/2024 to 01/15/2024

For a sample of recent days under normal conditions, requirement magnitudes are comparable to max hourly uncertainty, though coverage falls below target during this period.

02/10/2024 to 02/12/2024

Legend: RUC Net Short — Interval uncertainty — Max hourly interval uncertainty

50th

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