



California ISO

Data Quality Procedure for Operational Requirements

Short Term Forecasting

25 March 2026

Housekeeping



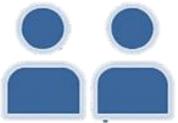
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The meeting is structured to stimulate dialogue and engage different perspectives.



Please engage in a respectful and professional manner. Introduce yourself and your organization when speaking. Follow the facilitator's guidance for speaking or asking questions.



Please keep comments brief and avoid repeating points already made to ensure everyone has an opportunity to participate in a robust discussion.



You can access Closed Captioning and the Transparency Viewer using the controls located at the bottom of the Webex screen.

Instructions for raising your hand to ask a question



Please remember to state your name and affiliation before making your comment.



If you are connected to audio through your computer or used the 'call me' option, select the raise hand icon located on the bottom of your screen. Start speaking after 2 second after your unmuted.



If you are connected on the phone line only and not the Webex dial *3 to be added to the raise hand queue.



You may also send question via chat to all panelists.



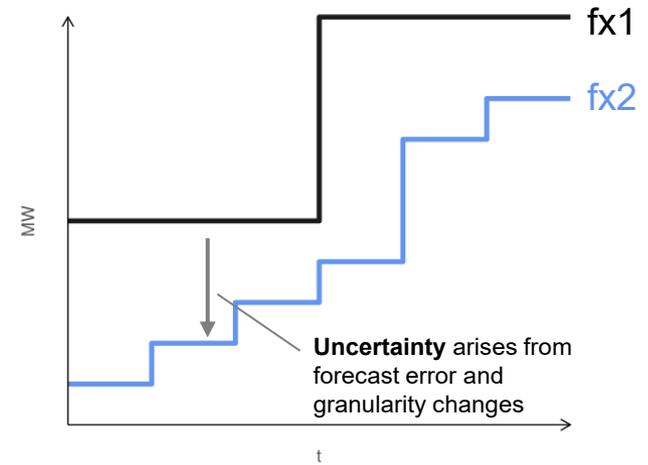
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Data Quality Procedure for Operational Requirements

Brief Background on Operational Requirements

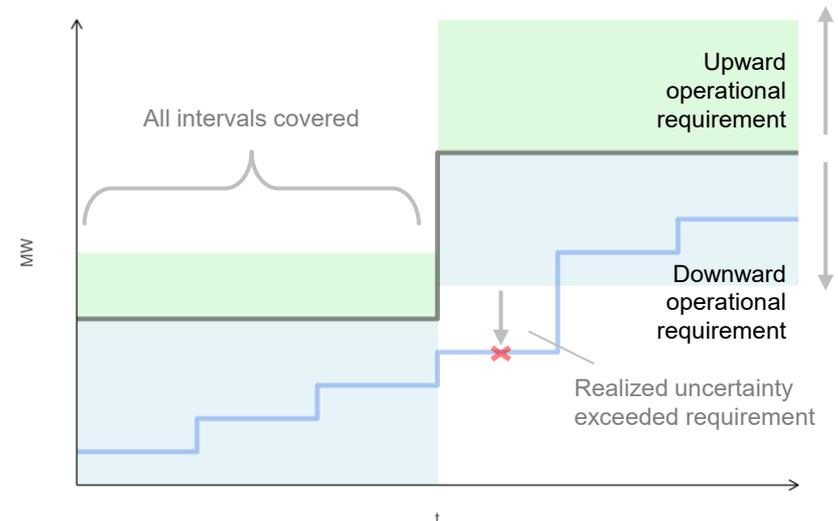
Operational requirements are used to cover uncertainty in forecasted net load and use forecasts as a predictor for future uncertainty

- Uncertainty: *Forecast to forecast* differences
- Flexible Ramp Product (FRP)
 - Operational requirement for RT market
- Imbalance Reserve (IR)
 - Operational requirement for DA market

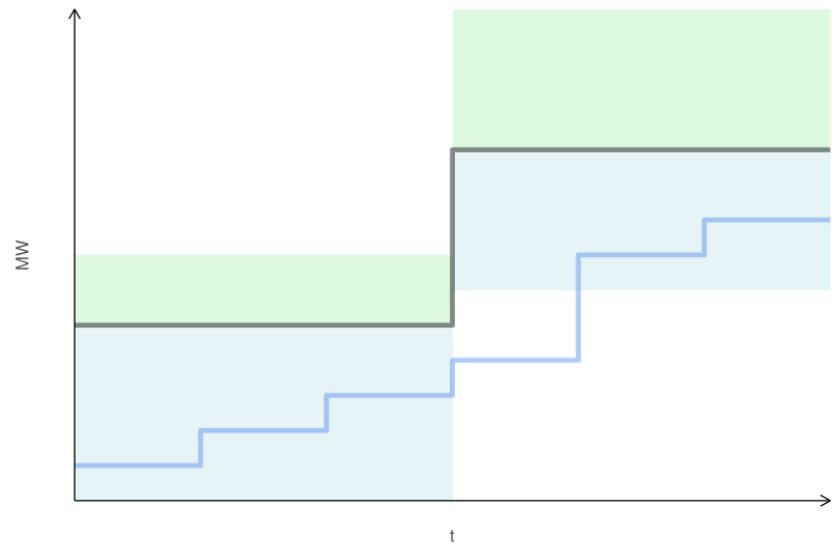
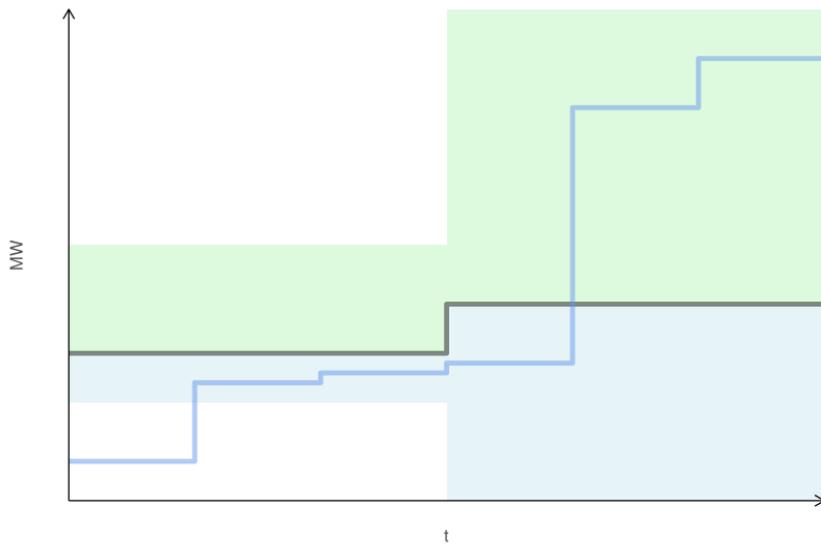


Additional terms

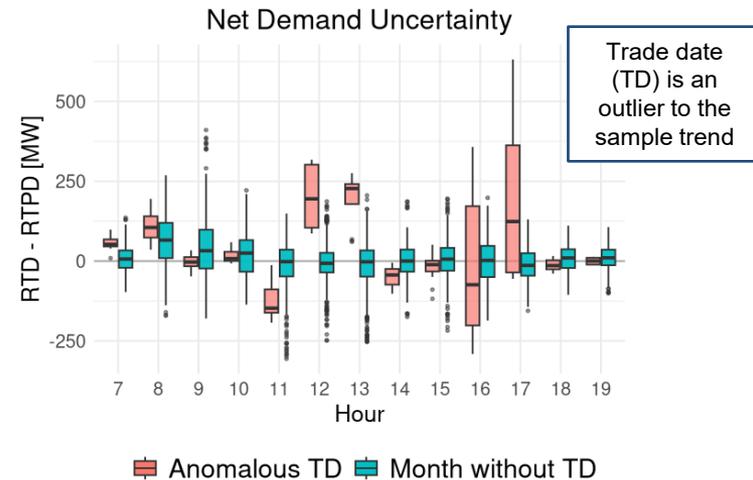
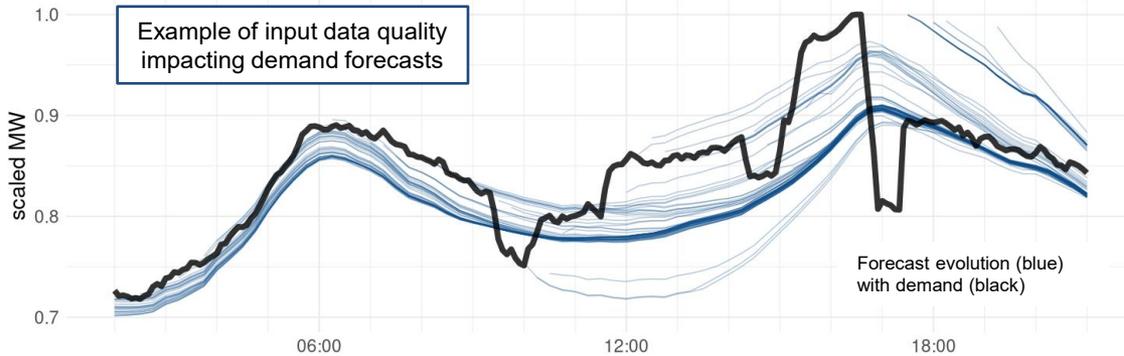
- FRP and IR are both calculated using the **mosaic** methodology
- Both products cover net load uncertainty (net load = demand – solar – wind)
- Solar and wind are collectively referred to as variable energy resources (**VERs**)
- **Discard ranges** are datetime periods excluded from requirement calculations



How do we approach extremes while maintaining performance in normal conditions?



Overview of the data quality challenge to uncertainty



Meter quality

Forecast

Uncertainty
(FRP/IR)

- Flexible Ramp Product (FRP) and Imbalance Reserve (IR) are susceptible to data anomalies
 - Quantile regression is intentionally sensitive to extremes
- Data quality impacts requirements, thresholds, and accuracy
- Guardrails protect products from anomalous results, but we still need to maintain the road for long term performance
- We need clear definitions and procedures for handling outliers



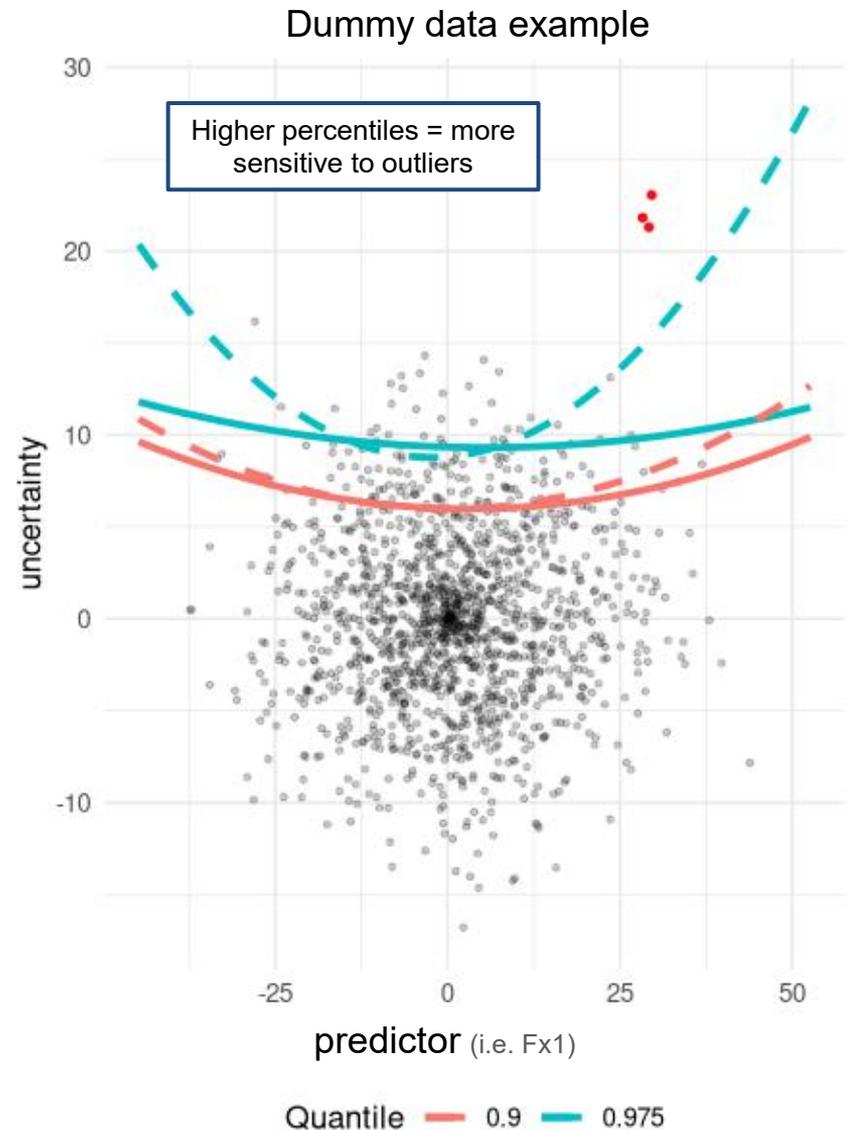
What is an outlier?

Outliers are context-dependent and judged on a few dimensions:

- Statistical extremeness
- Ongoing validity
- Influence on raw model output

What causes an outlier?

- Uncertainty = $Fx2 - Fx1$
 - Either $Fx1$ or $Fx2$ can be impacted by data errors creating an outlier in historical uncertainty
- Mosaic assumes a relationship between forecasts and forecast uncertainty



Dashed lines use samples that include outliers

Procedure to manage data quality in operational requirement tools

1. **Discard ranges are identified** through:
 - a. Algorithmic scans of net load uncertainty samples per BAA [daily]
 - b. Customer-identified issues (submitted through CIDI)
 - c. Large changes to dynamic [daily] and static [quarterly] thresholds
2. **Manual review of each discard range** [weekly]
 - a. Review for scale, net load component, potential link to known events
3. **Submit change request (CR)** per discard range for approval
4. **Implement** discard range in operational requirement tool
5. **Communicate** snapshot of discard range history per entity with each static threshold update [quarterly]

[Example process frequency]

Data quality principles for Short Term Forecasting (STF)

		Demand	VER
Guiding principle		Real demand forecast error is included and kept in historical samples	Real VER generation forecast error is included and kept in historical samples
Examples	Real (include)	<ol style="list-style-type: none"> 1. Large non-market participating battery moving load 2. Severe weather, monsoon impacts leading to forecast movement 3. Poorly forecasted demand response event 	<ol style="list-style-type: none"> 1. Sudden storm activity causing drop in solar generation 2. Persistent error in outage handling leading to bias 3. Out-of-market curtailment not uniformly applied through all forecast horizons
	Not Real (discard)	<ol style="list-style-type: none"> 1. Market participating battery, scheduled into the market, moving load 2. Large forecast movement triggered by transmission loss event (materially real, but exceptional in forecast to uncertainty distributions) 3. Stale telemetry 	<ol style="list-style-type: none"> 1. Missing VER forecast submissions due to external IT outage 2. Solar eclipse (materially real, but anomalous event in scope of FRP) 3. Persistence forecast error due to internal IT issue

Bookends to data management and impacts

Under-discard Perform no data cleaning	Over-discard Perform aggressive data cleaning
<ul style="list-style-type: none">• Some (unknown) impact to model performance as historical correlation between forecast and uncertainty is weakened by outliers• Requirements and thresholds may grow faster than otherwise	<ul style="list-style-type: none">• Lose some ability to capture outliers

Because discard ranges will impact model output, metrics may be affected and sensitive to specific implementation timings.



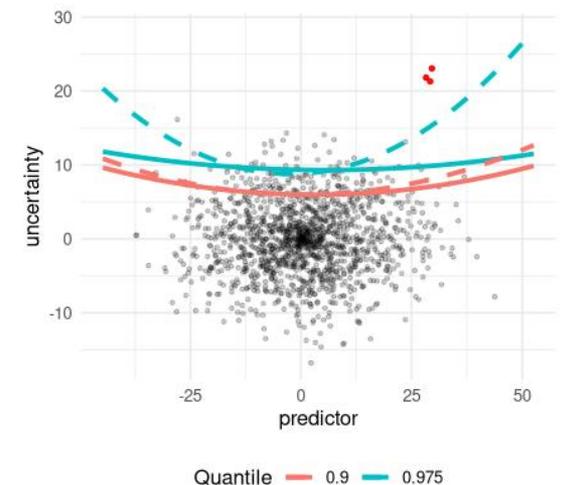
Currently we use thresholds / guardrails for protection

Next Steps for Short Term Forecasting (STF)

- 1) Implement data quality procedures on ongoing basis
- 2) Work holistically through the historical sample period for discard range review
- 3) Integrate discard range reporting with static threshold process

How do we approach extremes while maintaining performance in normal conditions?

(1) Consider context-dependent factors, (2) assess supporting evidence, and (3) maintain guiding principles to ensure reasonable levels of data quality and preserve model integrity.



Next Steps (continued)

- All meeting materials are available on the [Forecasting Forum webpage](#).
- Comments are due by end of day **April 8, 2026**.
 - For submitting stakeholder comments, please visit the Forecasting Forum page linked above, and complete the comment template word document. Upon completion of this template, please submit it to isostakeholderaffairs@caiso.com.
- Questions? Please email ISOStakeholderAffairs@caiso.com

Questions or comments?



This Week at the ISO – 3/23/26

Stakeholder Meetings

All public stakeholder meetings are also listed on the [CAISO Calendar](#)

- Tuesday, March 24th – Technical User Group
 - 10am-11am PT (developer account required)
- Tuesday, March 24th - Day-Ahead Market Enhancements (DAME) Configurable Parameters Implementation
 - 1:00pm – 3:00pm PT ([link](#))
- Wednesday, March 25th – Settlement User Group
 - 10:00am – 11:00am PT ([link](#))
- Wednesday, March 25th – Forecasting Forum - Operational Requirements Data Quality Procedure
 - 1:00pm – 2:30pm PT ([link](#))
- Thursday, March 26th - Commitment Cost Bidding Flexibility
 - 9:00am – 11:00am PT ([link](#))
- Thursday, March 26th - Annual Interregional Coordination Meeting
 - 12:00pm – 3:00pm PT ([link](#))

Comment Submission Deadlines

- Monday, March 23rd – 2027 Local Capacity Requirements Process
- Monday, March 23rd – Resource Adequacy Modeling and Program Design Track 2 RAIM Reform Options
- Tuesday, March 24th – Large Loads Initiative - Technical Requirements
- Friday, March 27th - Demand and Distributed Energy Market Integration

Trainings .

- None Scheduled this week.

This Week at the ISO continued

Market Simulations

- Please refer to our [Release Schedule](#) for the most recent updates of initiatives scheduled for MAP- and Production- stage market sims
- Monday, March 23rd – Parallel Operations - DAME, EDAM, EDAM CAISO Balancing Authority Area Participation Rules Market Simulation and Parallel Ops Meeting
 - 9:00am – 10:00am PT ([link](#))
- Thursday, March 26th – Parallel Operations - DAME, EDAM, EDAM CAISO Balancing Authority Area Participation Rules Market Simulation and Parallel Ops Meeting
 - 1:00pm – 2:00pm PT ([link](#))

To participate in the DAME and EDAM Implementation pre-Market Simulation meeting series, please follow these steps:

Submit a CIDI Request:

- Log in to the CAISO Customer Inquiry, Dispute, and Information (CIDI) system.
- Create a new request with the 'Functional Environment' set to "Market Simulation."
- In the request, specify your intent to participate in the DAME & EDAM Market Simulation.
- Include the following information:
 - Market Simulation initiative(s) you will participate in.
 - Any specific resources or systems you plan to test.
 - Contact names and email addresses for coordination.

Email Option:

- If you do not have access to CIDI, you may send an email to marketsim@caiso.com with the subject line "DAME & EDAM Market Simulation Registration."

Business Practice Manual (BPM) Updates

- The status of all PRRs and updated BPMs in the [BPM Library](#) are published on the [BPM Change Management Website](#).



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matters

The California ISO's blog highlights its most recent news releases, and includes information about ISO issues, reports, and initiatives.

Energy Matters blog provides timely insights into ISO grid and market operations as well as other industry-related news.

<https://www.caiso.com/about/news/energy-matters-blog>



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