

# Evolving Performance Evaluation Methodologies (PEM) – Tariff or BPM?

- FERC 2010 ruling predates EIM go-live (2014)
  - In 2010 all DR programs were under CAISO BA (regulated by CPUC)
- RT-only market participants outside of CA are under distinct jurisdictions with varied requirements
- The DR requirements in CAISO's Tariff (Section 4.13) may be more specific and restrictive than the metering requirements for regular resources (Section 10)
  - Baseline Methodology is a proxy to direct metering – CAISO's Tariff separates out SCMEs and allows a separate path for SCMEs to provide their own Settlements Quality Meter Data to CAISO

PGE believes the interpretation of FERC's comments could be reassessed. Options include:

- Resubmission to FERC justifying new context,
- Developing DR requirements similar to the existing metering section of the tariff.

# CAISO Tariff – Traditional Participating Resource Metering Requirements for WEIM Entities

- **10.1 General Provisions** – Shows a clear distinction between CAISO Metered Entities and SCMEs
- **10.2.9 Validation, Estimation & Editing of Meter Data** – Likely closest section to a baseline methodology. Defers to the BPM to define Settlement Quality Meter Data
  - Requires actual meter data from Revenue Grade Meters, and adjusting the meter data, which is not defined in the Tariff
- SQMD Plan provides CAISO the metering details, which includes the details for how an entity's participating resource will be metered, and what data will be used to achieve Settlements Quality Meter Data – it is a document that is submitted to CAISO, which is linked to the NRI process and documentation, that CAISO approves

# PGE's preferred future state

Establishing a new participation model for DR resources:

Allowing for current and future programs to receive RSE credit and be responsive to price signals

- Formal DR agreement for WEIM entities, similar to traditional participating resources:
  - An NRI process
  - A SQMD plan or equivalent agreement between CAISO and the WEIM entity
    - Entity would provide details of how each program's performance will be evaluated
- New functionality to scale individual DR programs as the customer base changes
- Option for WEIM entities to aggregate programs >10 MWs without telemetry, at the BA's discretion
- Allowing for operational flexibility:
  - Ability to accurately reflect the dynamic variability of the resources in bids, hourly profiles, and outage cards (if derates are needed)
- Implementing logical telemetry options (for EDAM and WEIM) that can feed back into the load forecast
- Allowing WEIM entities to provide manual adjustments to DR forecasts and logical telemetry (similar to existing VER forecasts)

# Potential Interim Solution

## Allowing automation of existing DRs under the LFA requirements

Create a Non-Participating Model for DRs – new specific resource model

- Preserving LFA minimalistic requirements:
  - Attestation/written agreement between CAISO and WEIM Entity
- Allowing entities to Base Schedule the resource – (allows for automation)
- Using the Base Schedule as Logical Telemetry back to ALFS
- Adding functionality for WEIM entities to provide manual adjustments to the DR forecasts (similar to VER forecasting)



PGE's Flex Load programs make up a ~ 100 MW virtual power plant that engages over 20% of our customers

**107 MW**

summer capacity across **7 programs**  
spanning residential, multi-family,  
commercial, and industrial

**24%**

of residential households  
participate in one or more  
programs

**9.6 MW**

additional summer capacity  
expected in 2025

# Flex Load programs span all customer segments



## Behavioral / Manual DR (Large C&I)



**Peak Time Rebates:** Customers receive day ahead and day of notifications for events and are asked to shift their electrical energy use outside event hours (includes batteries)

**Time of Day:** Customers shift energy, taking advantage of lower prices for using less energy during the high demand weekday hours of 5–9 pm



**Energy Partner On Demand (Sch 26):** Customers manually participate in events based on their load curtailment plan (includes batteries)

## Direct Load Control / Auto DR (Large C&I)

**Residential Smart Thermostat:** PGE adjusts t-stat between 1-3 degrees during events

**Residential Smart Charging:** PGE pauses charging EVs during events

**Multi-Family Water Heater:** PGE adjusts water heating to times when demand is low; controls ensure hot water is available for tenants

**Energy Partner Smart Thermostats (Sch 25):** PGE adjusts t-stat between 1-3 degrees during events

**Energy Partner On Demand (Sch 26):** PGE dispatches event signal for automatic participation in events (includes batteries)

# Summer flex load capacity\*

## Peak Time Rebates

- 17 MW
- 143.8k customers

## Residential Smart Thermostat

- 43.8 MW
- 54.1k t-stats summer

## Residential Smart Charging

- 1.9 MW
- 6.4k chargers

## Multi-Family Water Heater

- 1.8 MW
- 10.2k water heaters

## Energy Partner Smart Thermostat (Sch 25)

- 1.7 MW
- 2.9k t-stats summer

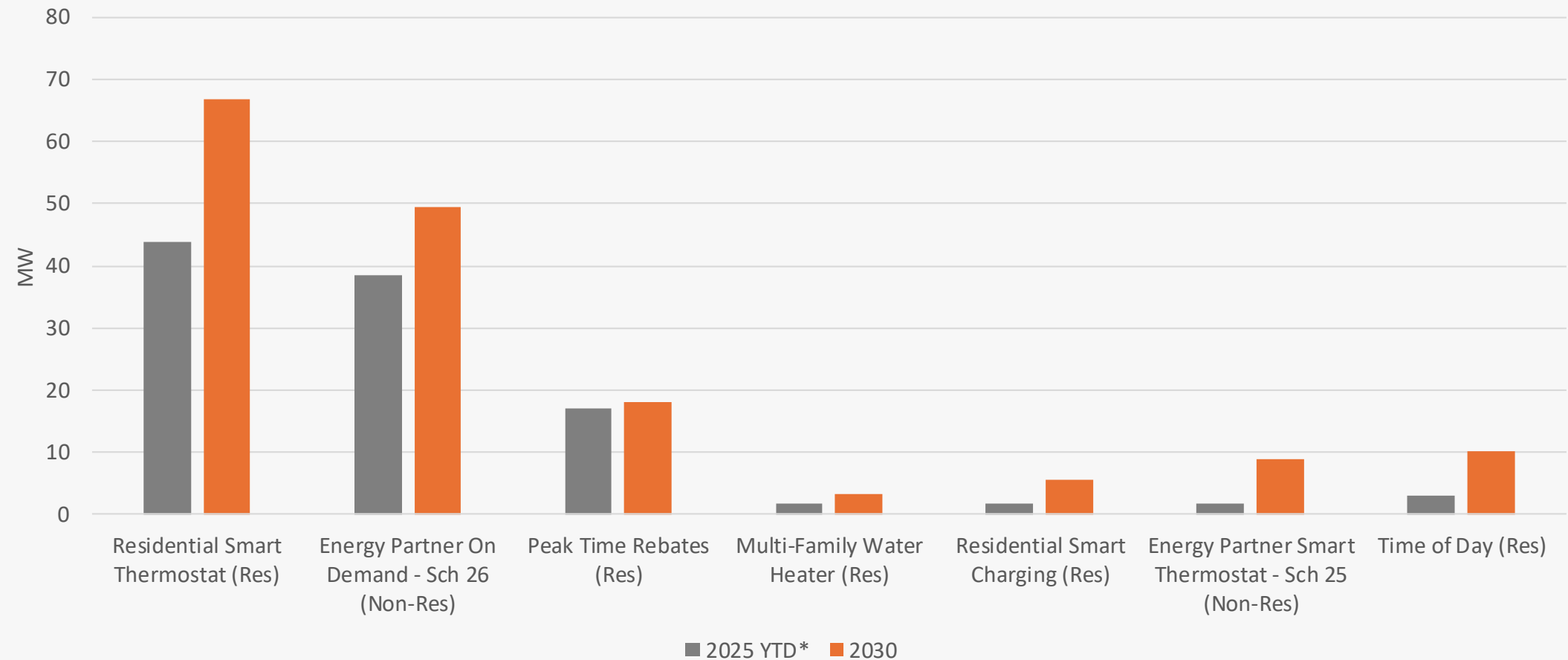
## Energy Partner On Demand (Sch 26)

- 38.4 MW
- 140 customers

\*As of 3/31/2025



# Mix of mature/large & growing/small programs



\*As of 3/31/2025



# PGE's Current Event Calls/Process

- Some of our programs are more flexible than others – PGE's teams are actively working to assess and improve our programs from both PGE Customer and Grid Operations perspectives
- Our diverse portfolio of programs offer a notification window range from 10-min to 18hrs, however, for operational efficiency, PGE has taken to scheduling 'all-call events', which requires 18 hours (min) notifications to all programs – so the decision is made in the Day-Ahead time frame
  - We can provide up to 60 MWs of load reduction (at peak conditions) when utilizing our 4 hour and 10-minute notification programs.
- For Summer, we have 2 timeframe options, 16:00 – 19:00 or 17:00 – 20:00
- For Winter, we also have a morning call option of 07:00 – 10:00

# Event performance data

Day before event:

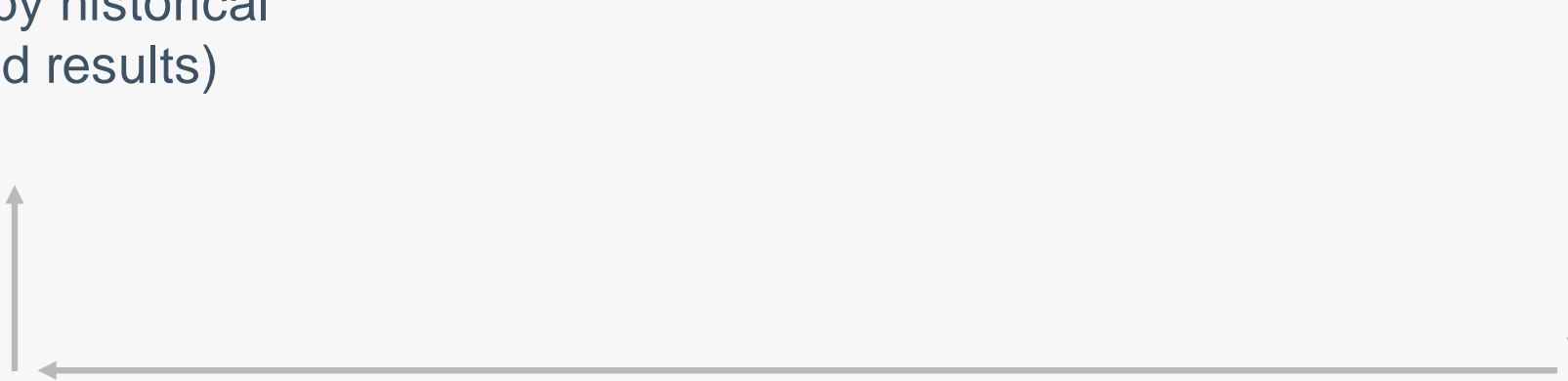
**Forecast** of expected  
MW reduction  
provided to Power Ops  
(informed by historical  
evaluated results)

2-3 days post-event:

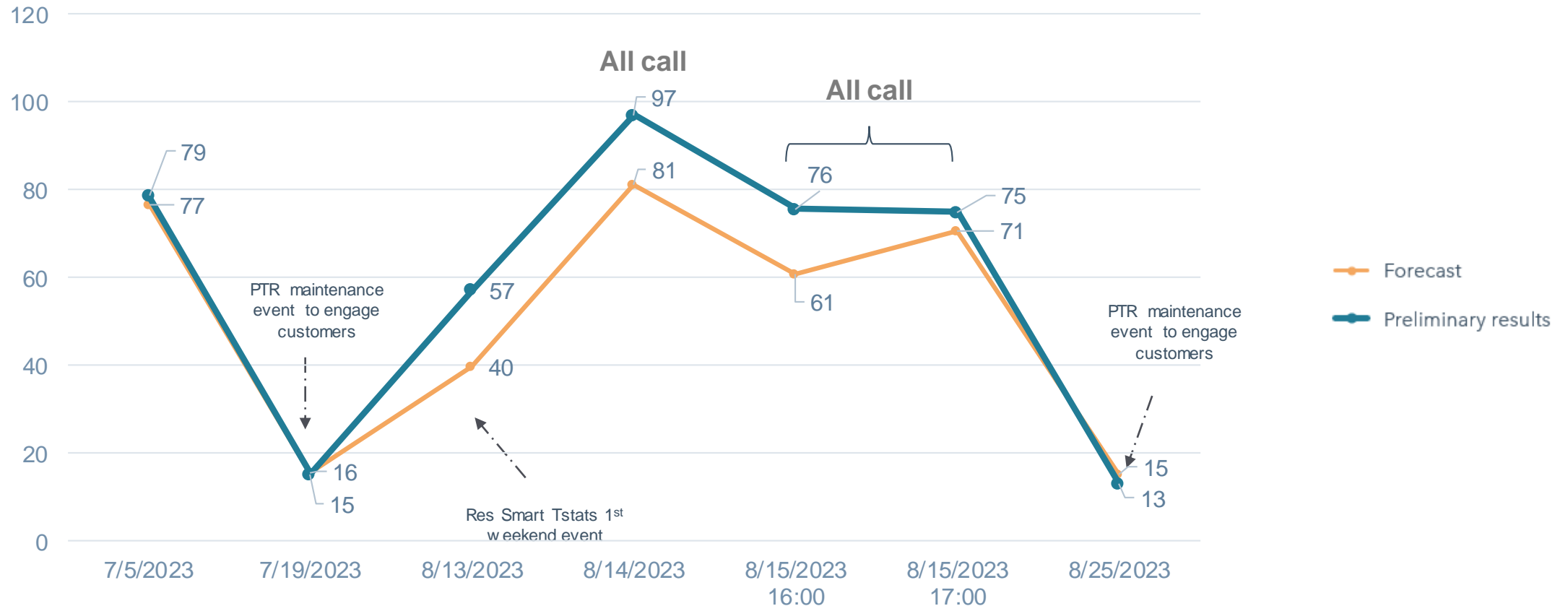
**Preliminary results**  
(based on DRMS  
algorithms)

~6 months post-event:

**Evaluated results**  
(based on 3<sup>rd</sup>-party  
analysis of AML meter  
data)

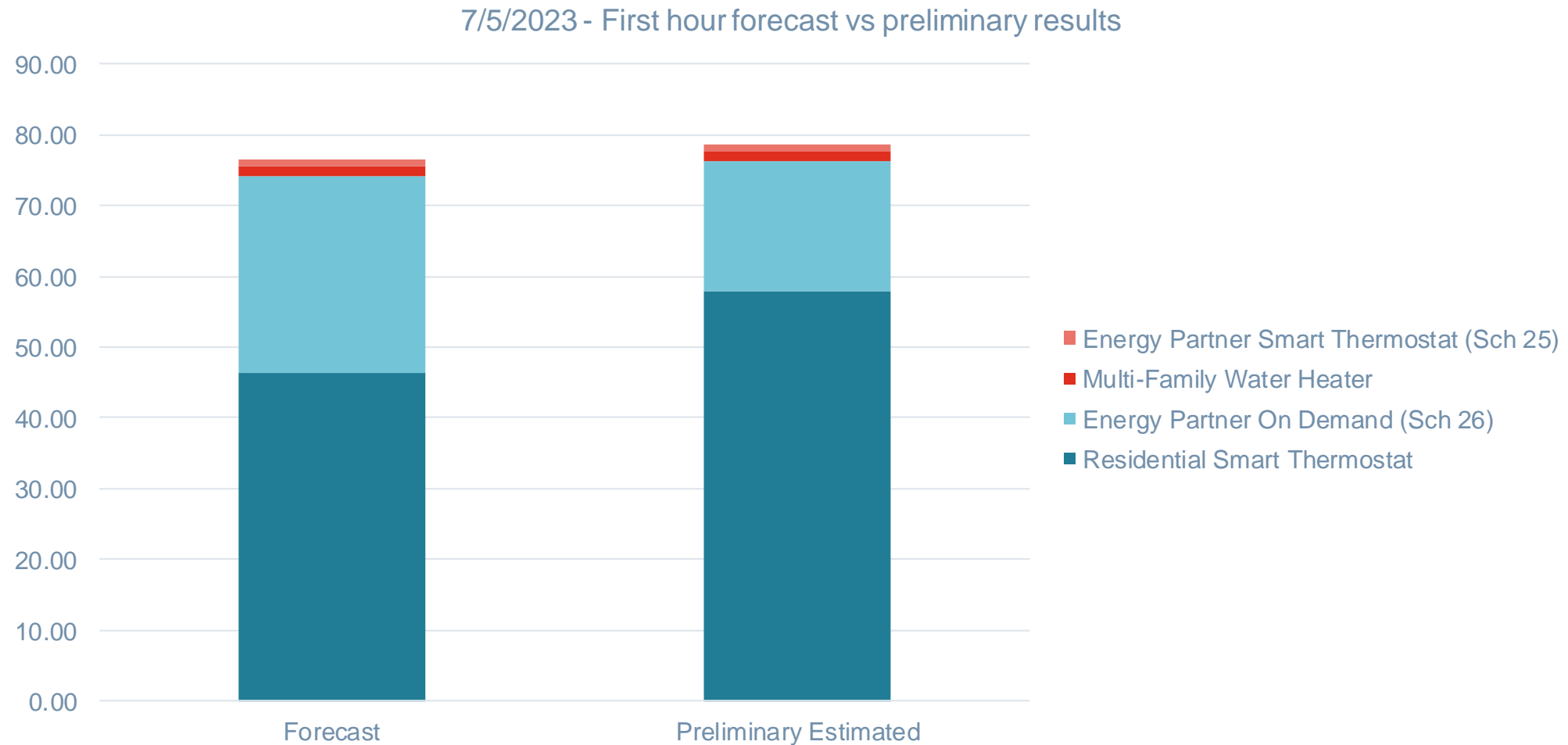


# First hour forecast vs preliminary results\*

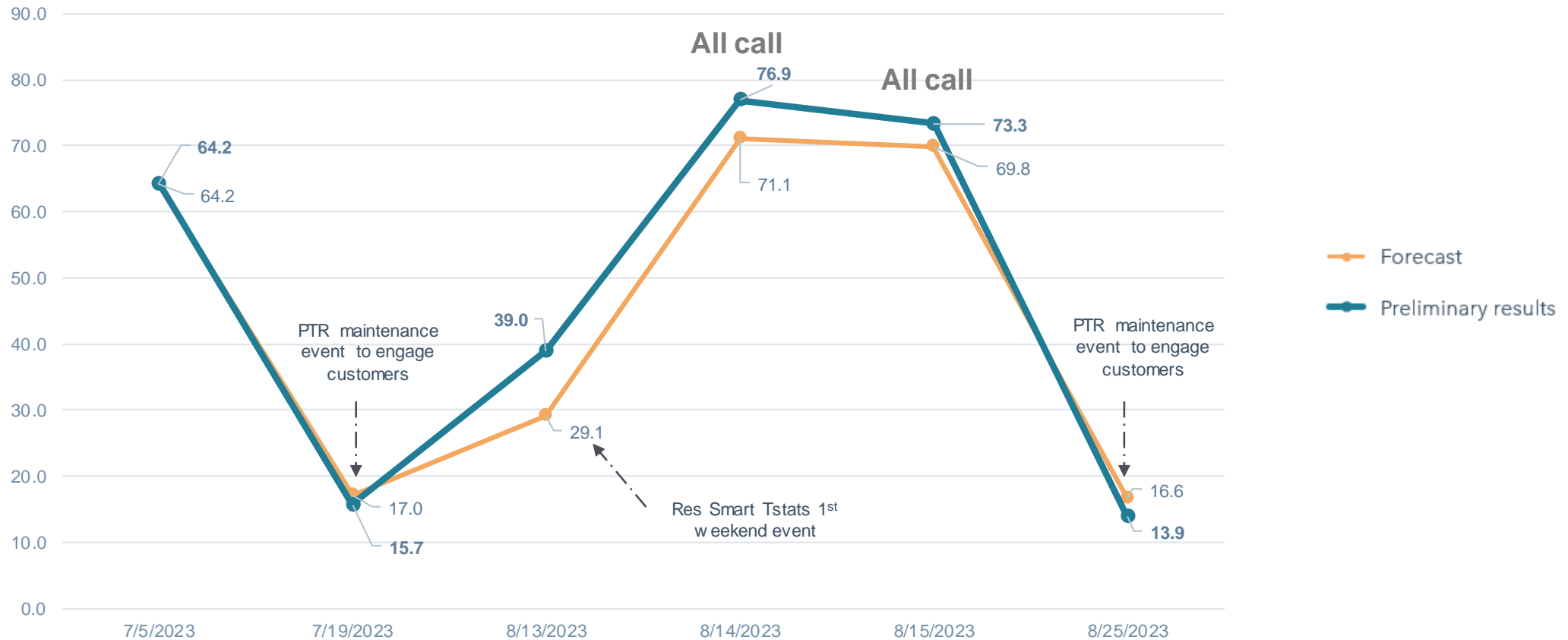


\*For August 15 event, the program start times were staggered. Therefore the 5 pm results include the second hour for PTR and residential Smart Thermostat program.

# First hour forecast vs preliminary results\*



# Average forecast vs preliminary results\*



\*Both forecast and results are an average of MW reduction over entire three or four-hour event.



# Data sources for **preliminary** vs evaluated

| Program   | Preliminary      | Evaluated |
|---|------------------|-----------|
| Residential Smart Thermostat                        | Device Telemetry | AMI       |
| C&I Energy Partner on Demand (Schedule 26)          | KYZ / AMI        | AMI       |
| Peak Time Rebates                                   | AMI              | AMI       |
| Multifamily Water Heater                            | Planning values  | AMI       |
| Energy Partner Commercial Thermostats (Schedule 25) | Planning values  | AMI       |

# Energy Partner Large C&I Example

## Program Details

- MW Size:
  - 40 MW Summer (80-85% derate, primarily weather dependent load)
  - 30 MW Winter (80-85% derate, primarily weather dependent load)

## Customers Participation

- Number of Customers: ...+ Commercial & Industrial sites
- Customer Participation Selections create sub-group segmentation and :
  - Notification Timeframes: 18-hr, 4hr, 10 min
  - Number of participating hours: 20-hr, 40-hr, 80-hr
  - Available to participate windows: 11-4, 4-8, 8-10, All windows (Winter includes 7-11am)

## Baseline and Customer Incentive Settlement

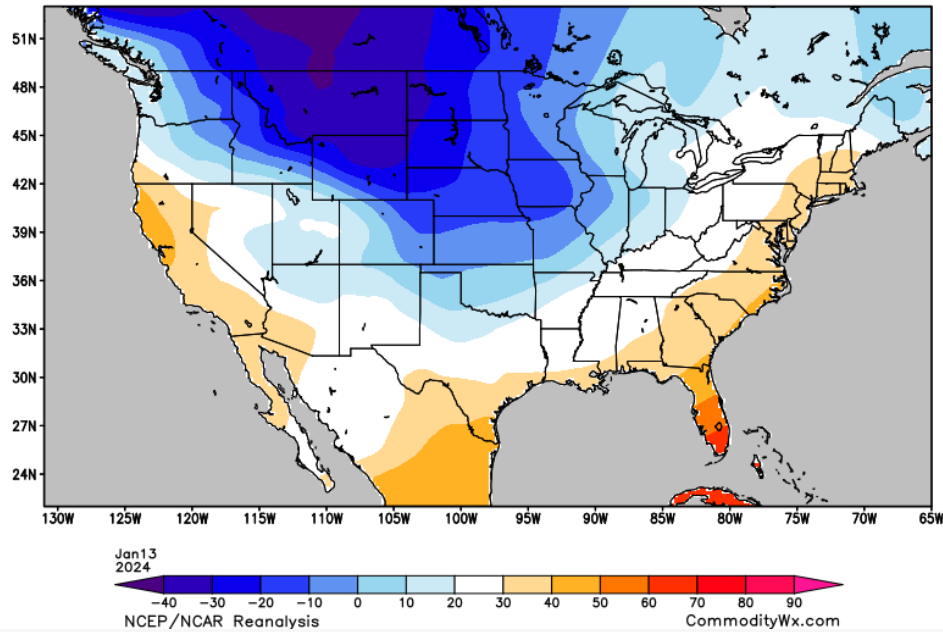
- Data sources: AMI and KYZ
- Baseline and performance calculations fit to customer:
  - 5 of 10 with adjustment
  - 5 of 10 no adjustment
  - Firm Service Level

\*Adjustments include weather and additional 2hr adjustments for customers with same day election notifications – details can be found in PGE's Schedule 26 operating tariff.

# January 13<sup>th</sup>-16<sup>th</sup> 2024



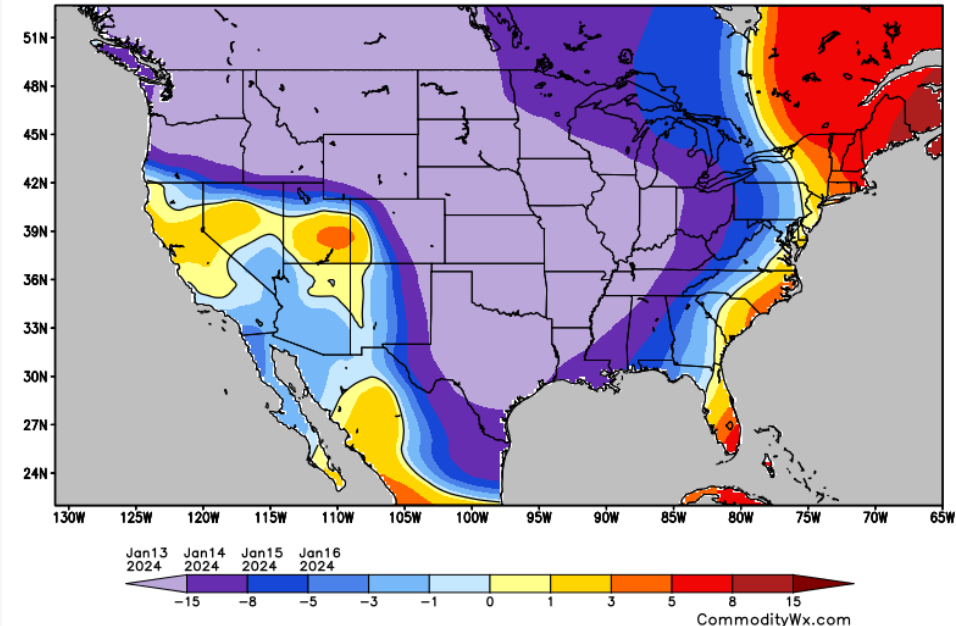
U.S. Station Surface Min Temperature (°F)



Jan 13<sup>th</sup> (peak cold) Minimum Temperatures

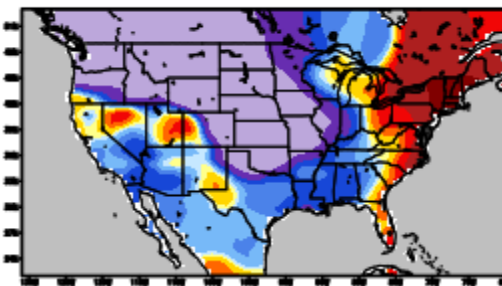
U.S. Station Surface Temperature (°F) anomaly

(1991–2020 Climatology) Avg Dly Gas HDD: 40 Pop CDD: 0 Elec CDD: 0

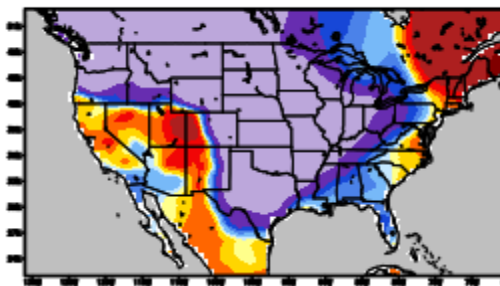


Average Temperature Anomaly 4-day Composite

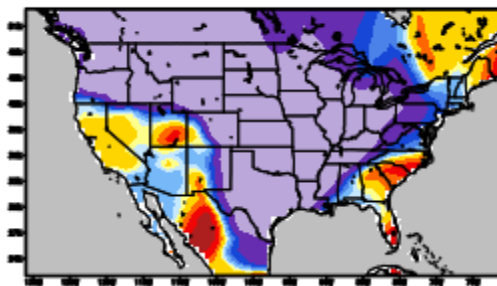
2024Jan13  
Gas HDD: 33 Pop CDD: 0 Elec CDD: 0



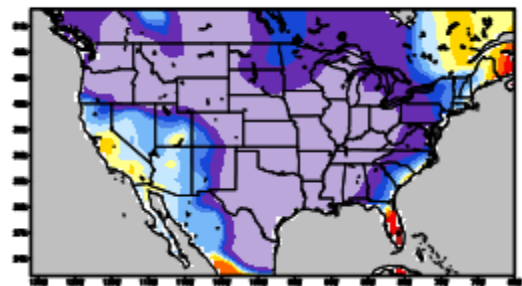
2024Jan14  
Gas HDD: 41 Pop CDD: 0 Elec CDD: 0



2024Jan15  
Gas HDD: 44 Pop CDD: 0 Elec CDD: 0



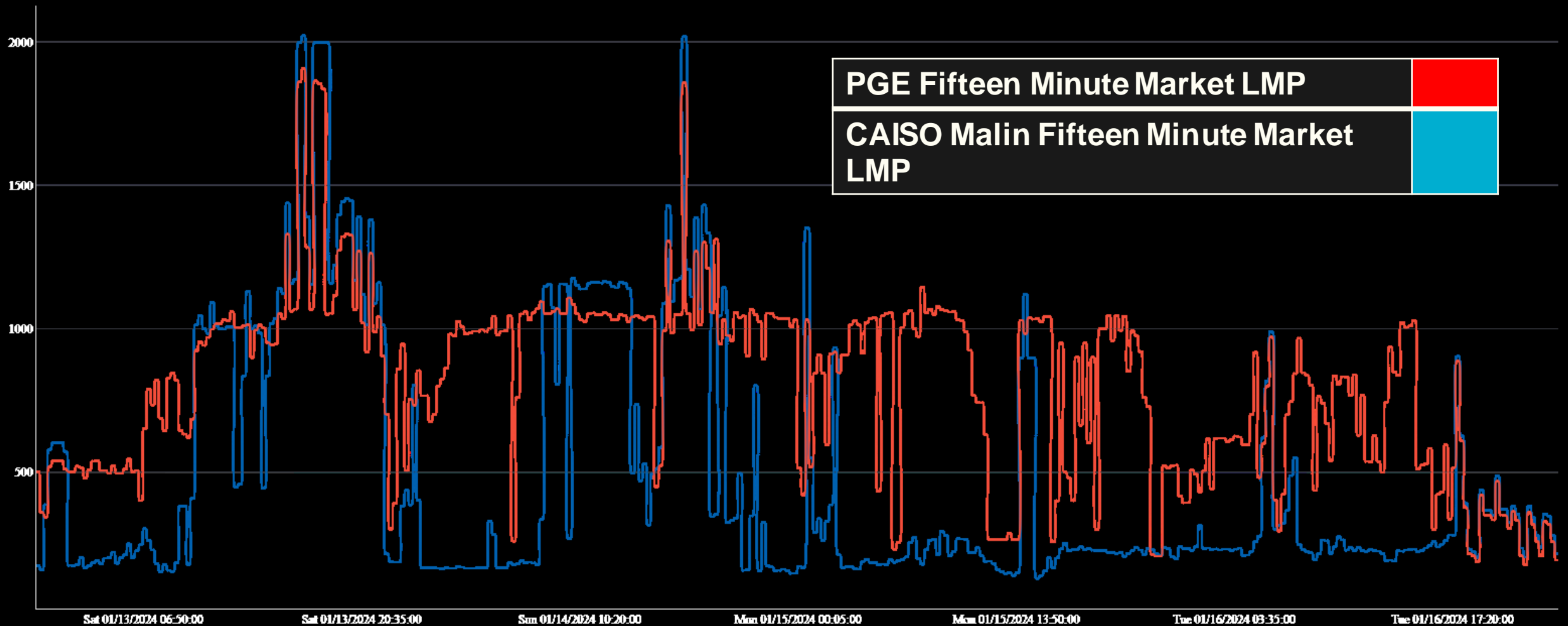
2024Jan16  
Gas HDD: 43 Pop CDD: 0 Elec CDD: 0



Daily Average Temperature Anomaly



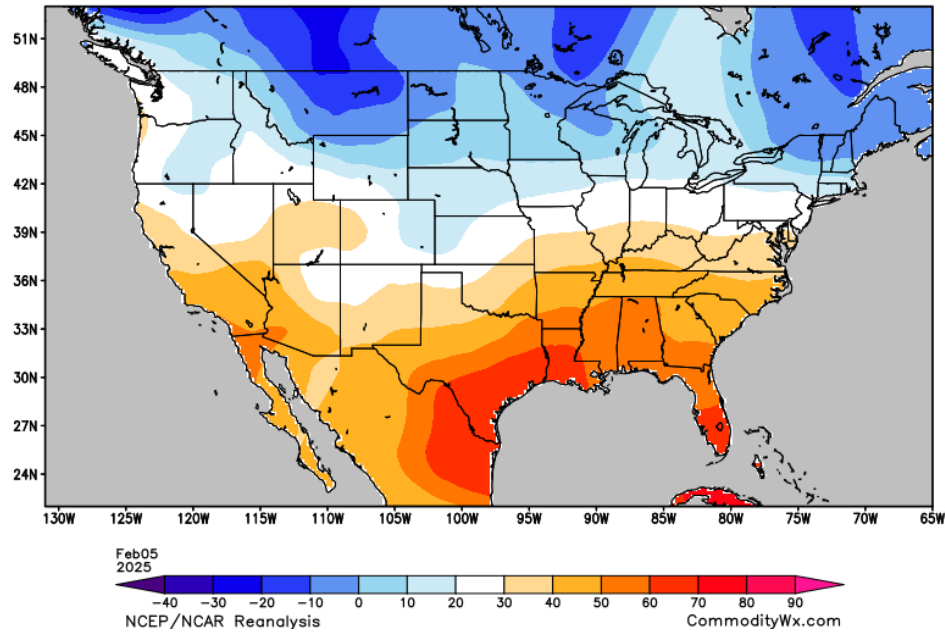
# January 13<sup>th</sup>-16<sup>th</sup> 2024



# February 3<sup>rd</sup>-6<sup>th</sup> 2025

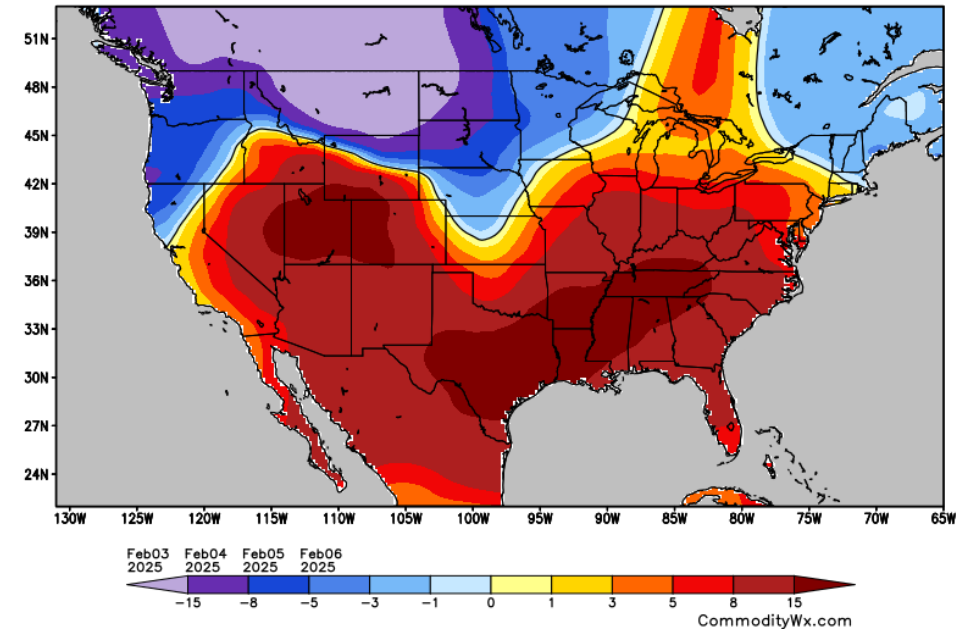


U.S. Station Surface Min Temperature (°F)



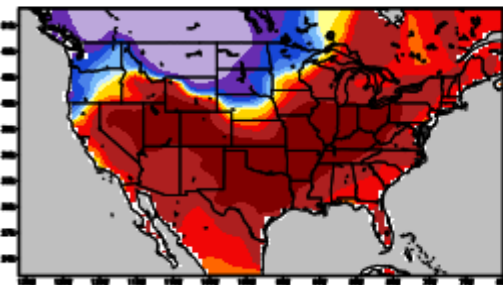
Feb 5<sup>th</sup> (peak cold) Minimum Temperatures

U.S. Station Surface Temperature (°F) anomaly  
(1991–2020 Climatology) Avg Dly Gas HDD: 24 Pop CDD: 1 Elec CDD: 1

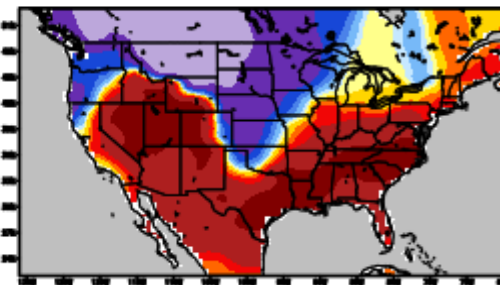


Average Temperature Anomaly 4-day Composite

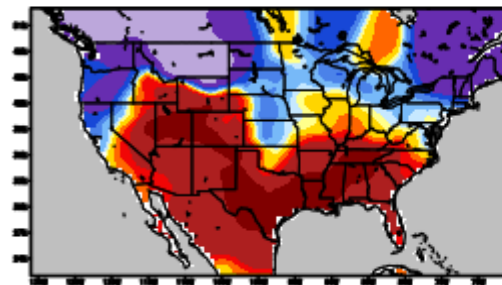
2025Feb03  
Gas HDD: 19 Pop CDD: 1 Elec CDD: 1



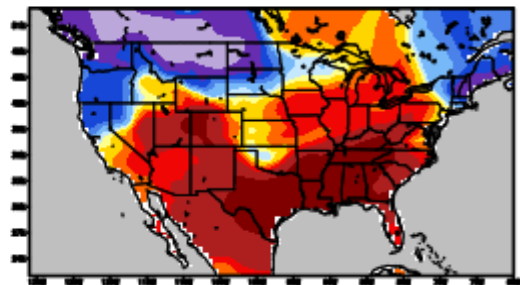
2025Feb04  
Gas HDD: 24 Pop CDD: 1 Elec CDD: 1



2025Feb05  
Gas HDD: 27 Pop CDD: 1 Elec CDD: 1

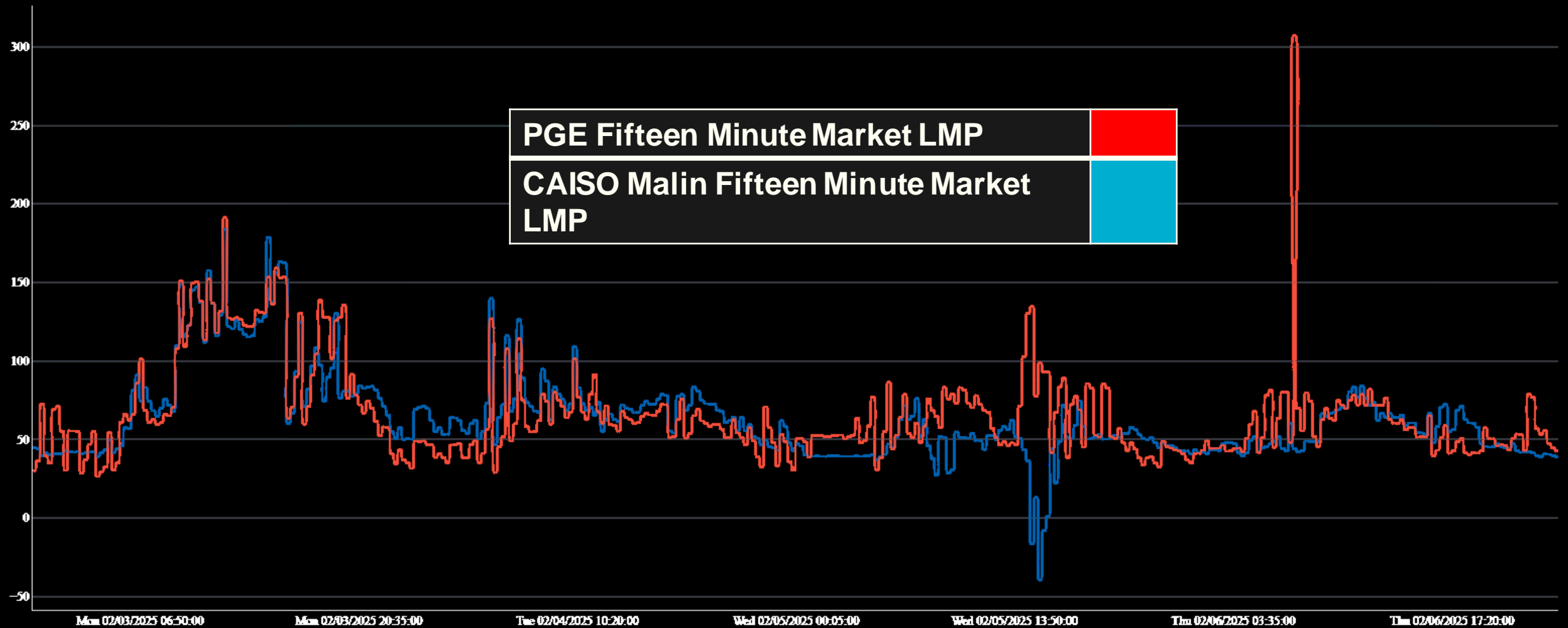


2025Feb06  
Gas HDD: 25 Pop CDD: 1 Elec CDD: 2



Daily Average Temperature Anomaly

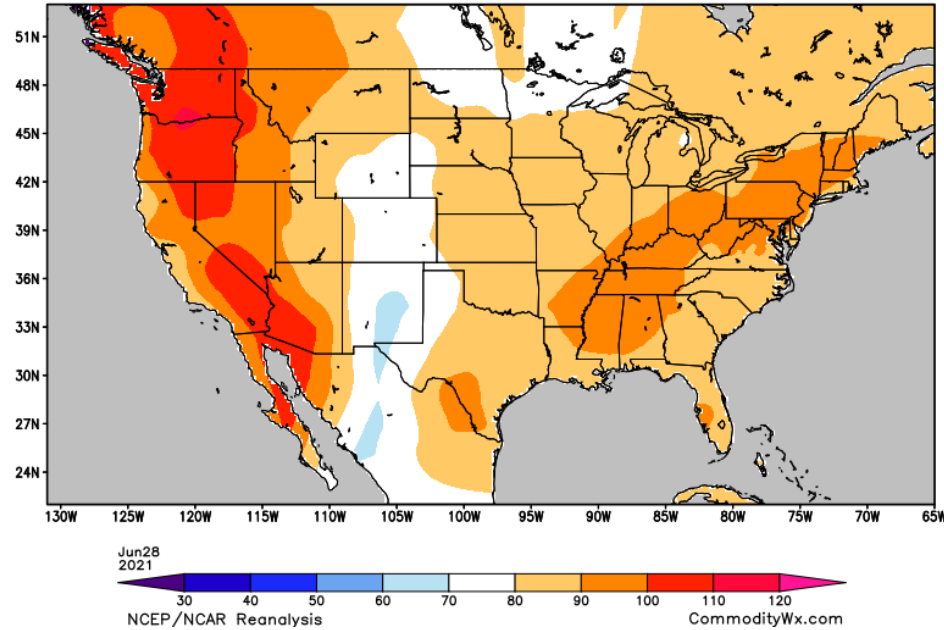
# February 3<sup>rd</sup>-6<sup>th</sup> 2025



# June 26<sup>th</sup>-28<sup>th</sup> 2021

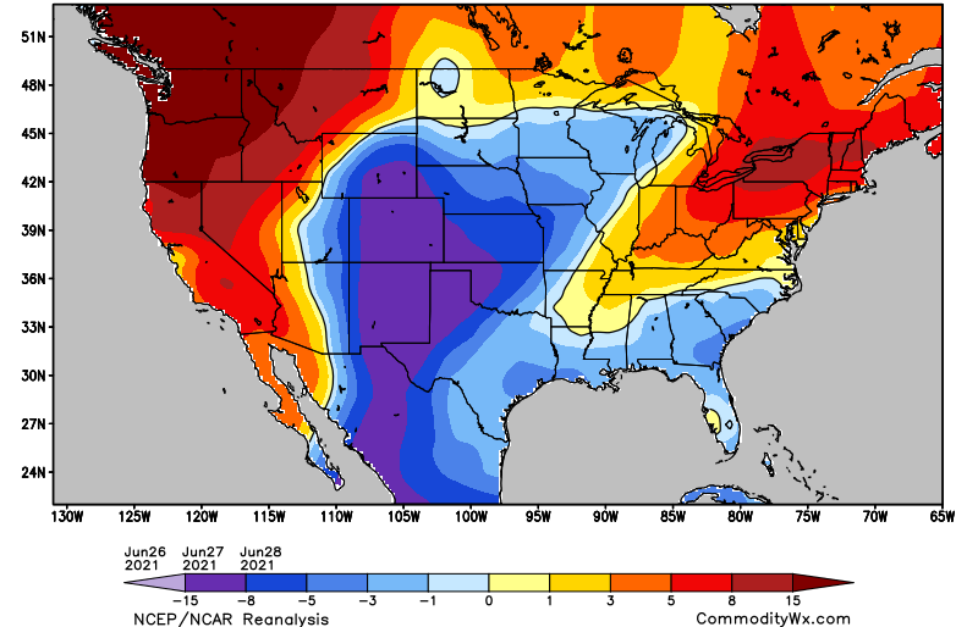


U.S. Station Surface Max Temperature (°F)

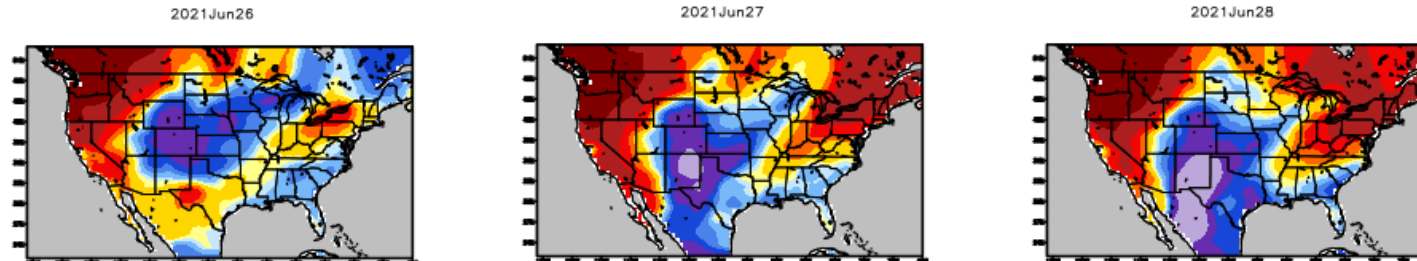


June 28<sup>th</sup> (peak KPDX heat) Max Temperatures

U.S. Station Surface Max Temperature (°F) anomaly  
(1991–2020 Climatology)

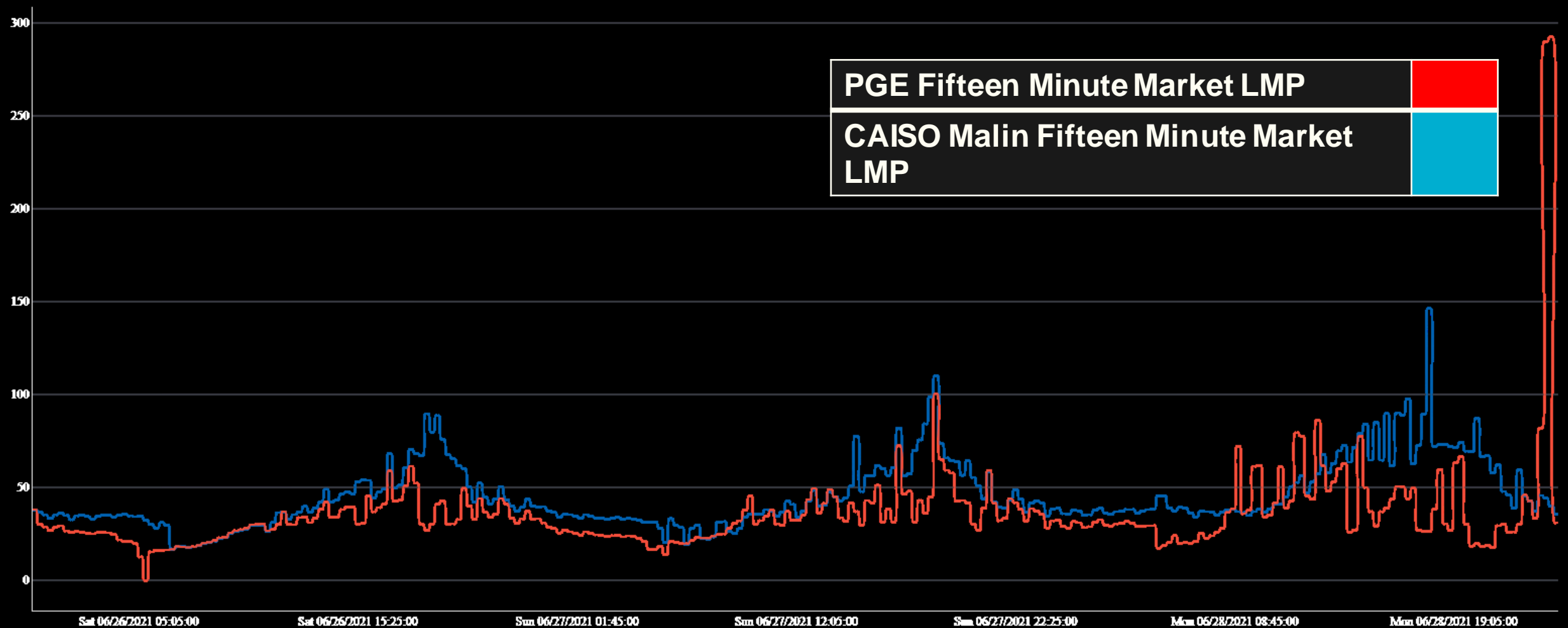


High Temperature Anomaly 3-day Composite



Daily Average Temperature Anomaly

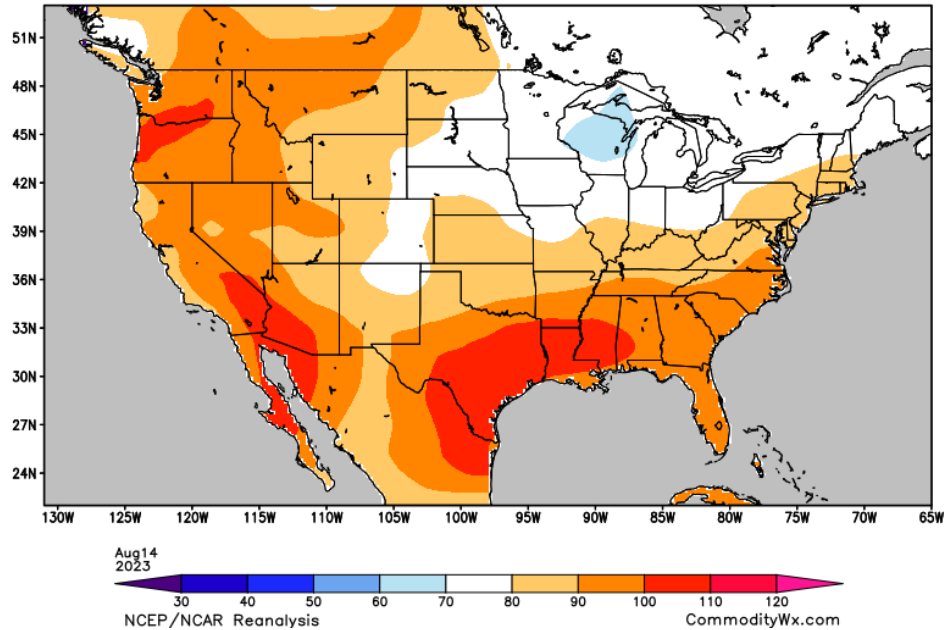
# June 26<sup>th</sup>-28<sup>th</sup> 2021



# August 13<sup>th</sup>-16<sup>th</sup> 2023

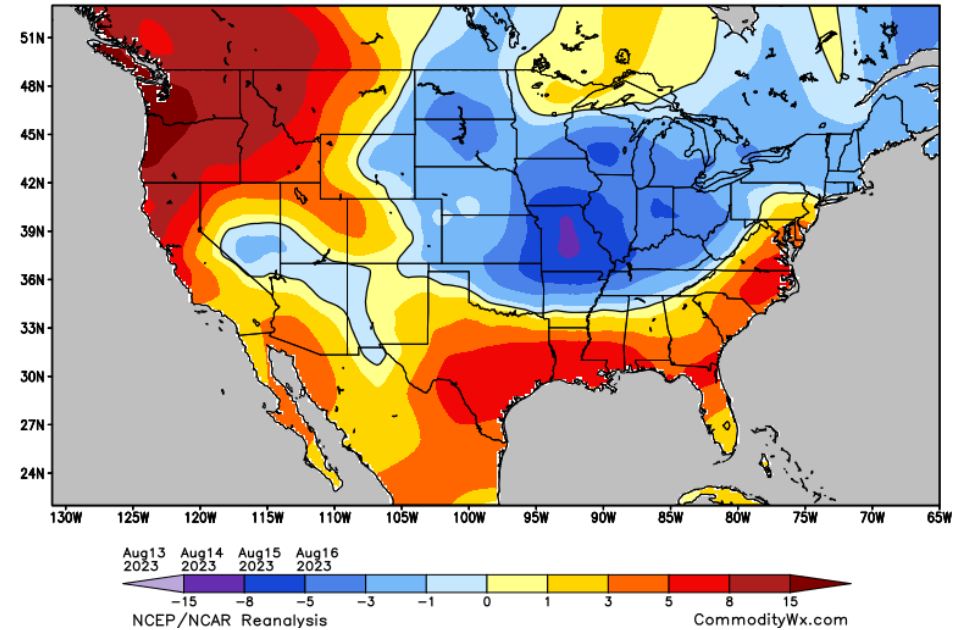


U.S. Station Surface Max Temperature (°F)

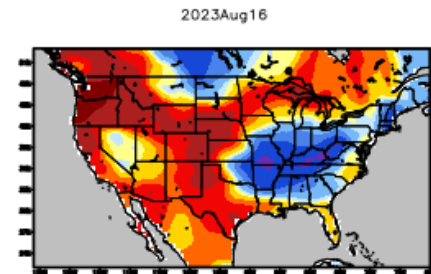
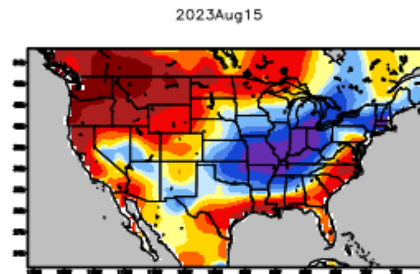
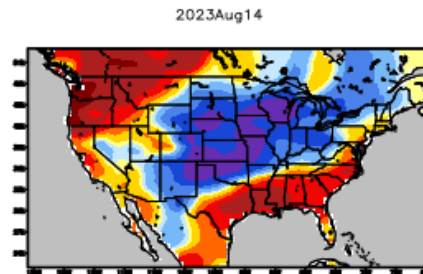
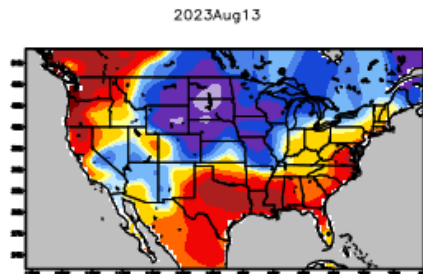


August 14<sup>th</sup> (peak KPDX heat) Max Temperatures

U.S. Station Surface Max Temperature (°F) anomaly  
(1991–2020 Climatology)



High Temperature Anomaly 4-day Composite



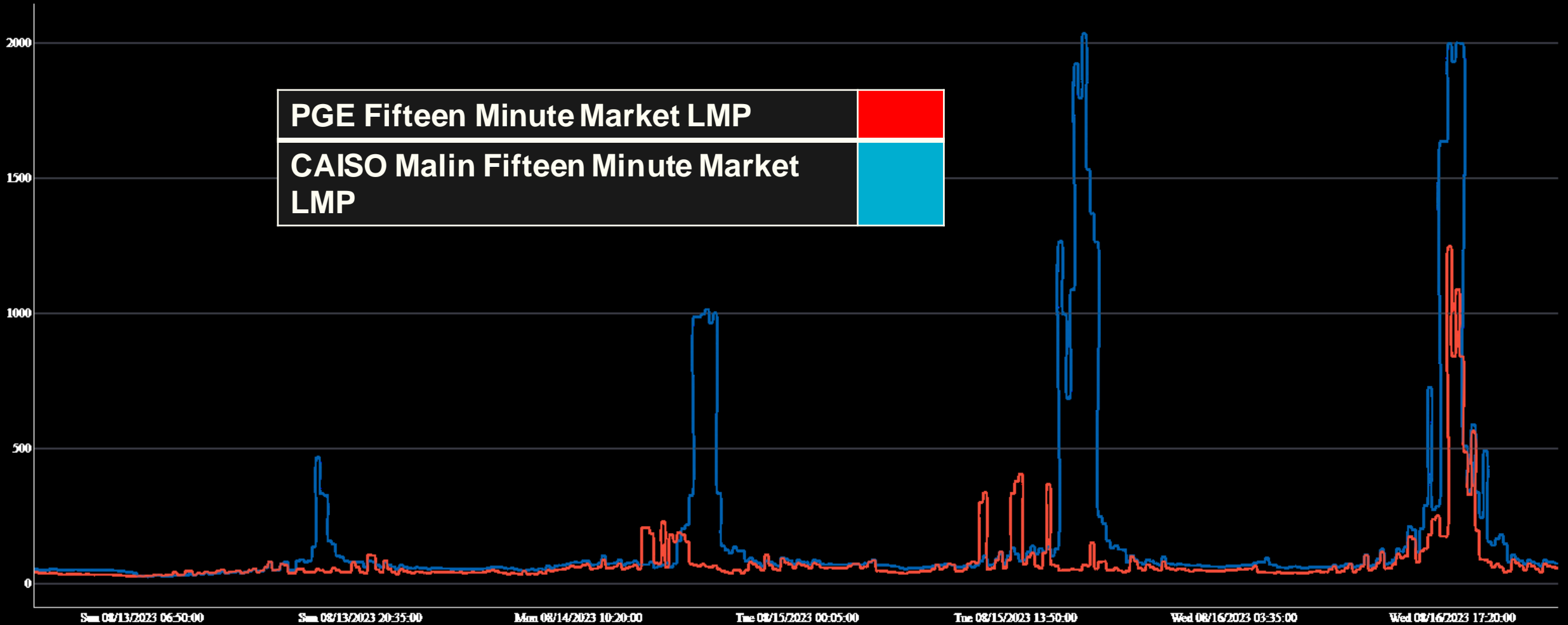
Daily Average Temperature Anomaly

# August 13<sup>th</sup>-16<sup>th</sup> 2023



**PGE Fifteen Minute Market LMP**

**CAISO Malin Fifteen Minute Market  
LMP**

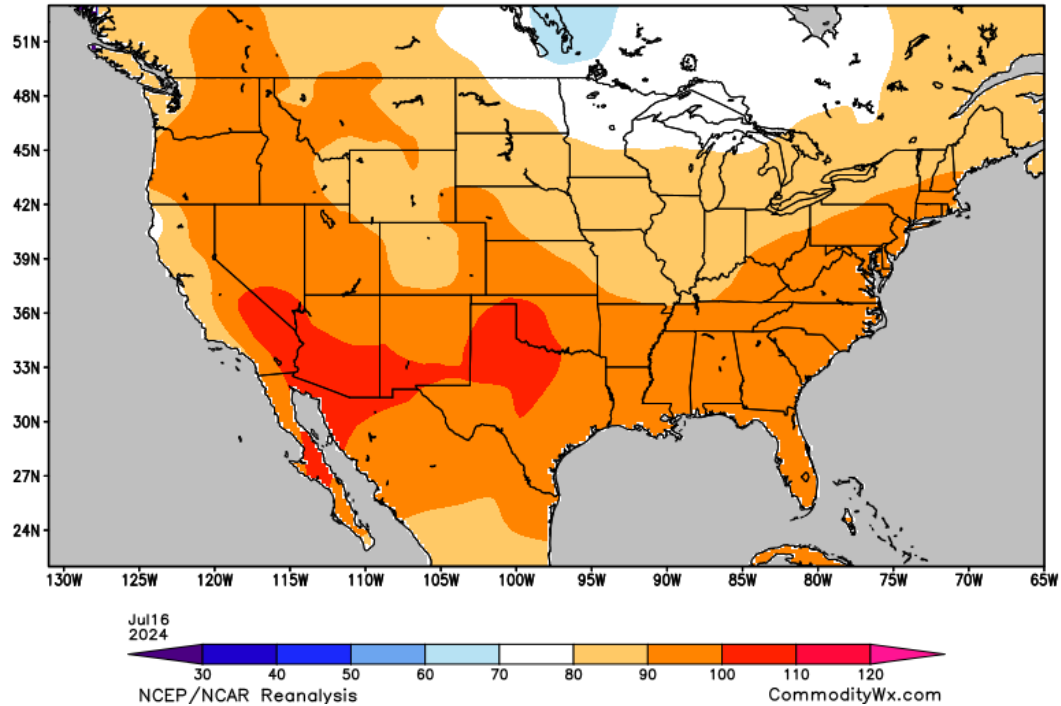




# July 16<sup>th</sup>, 2024

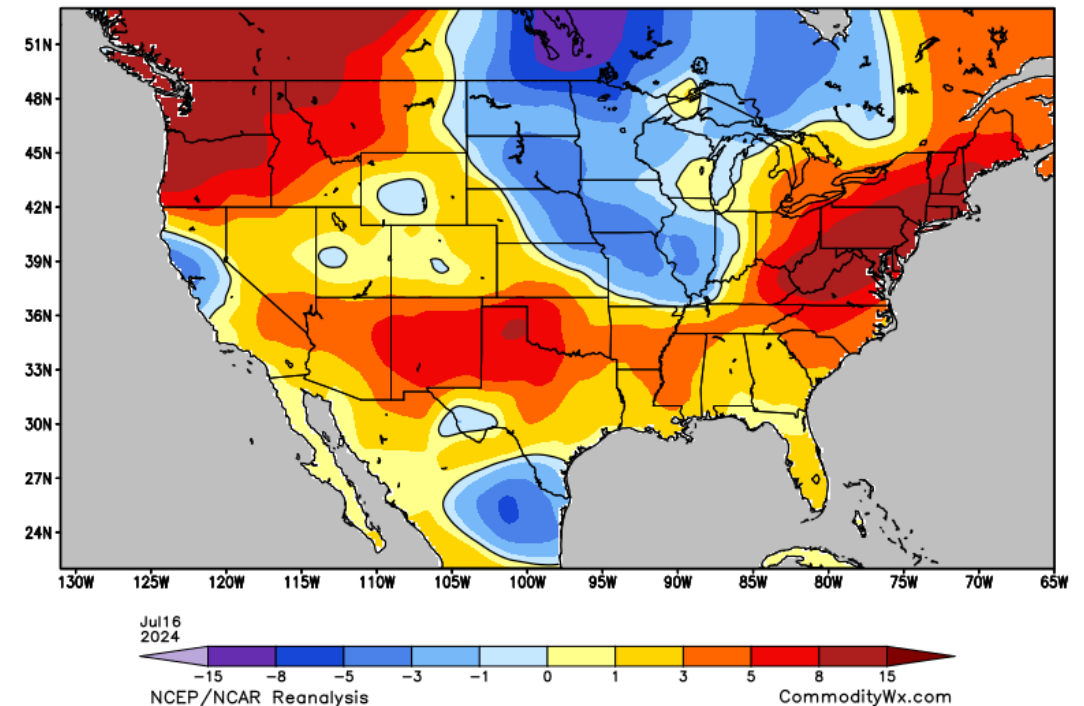


U.S. Station Surface Max Temperature (°F)



July 16<sup>th</sup> Max Temperatures

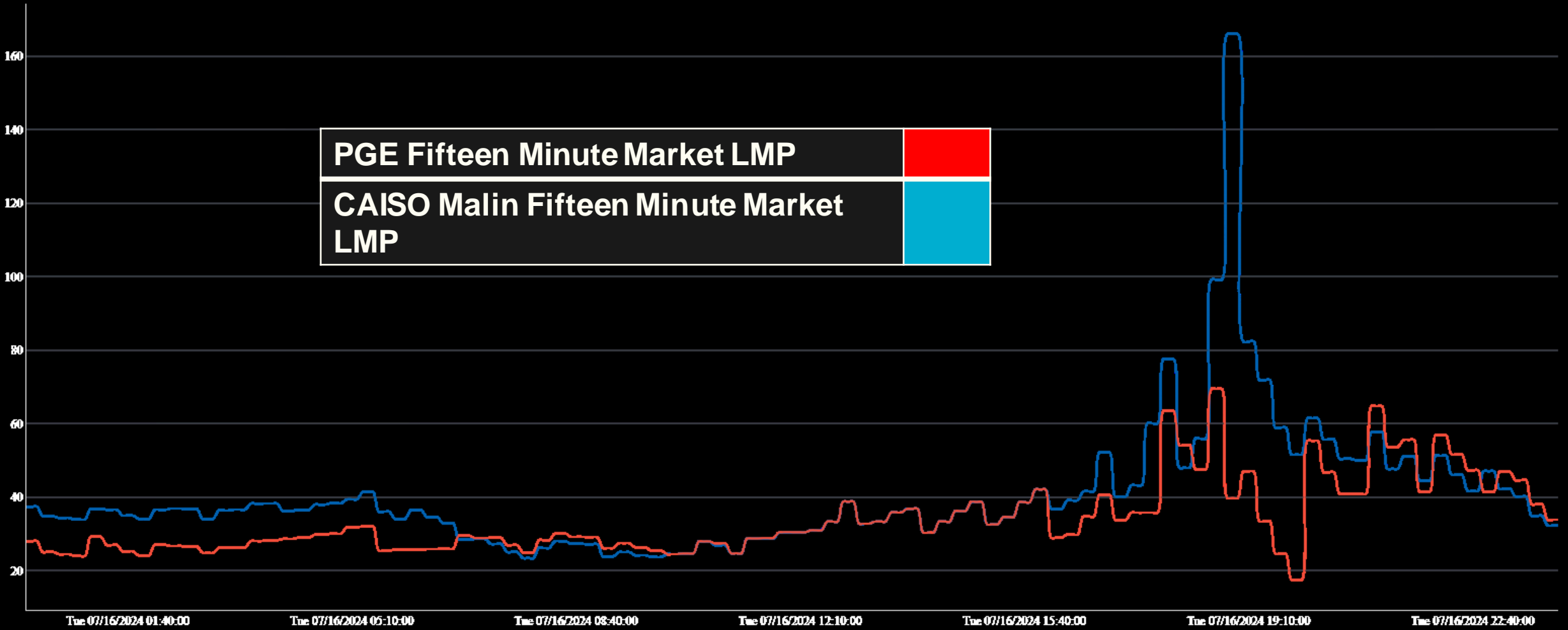
U.S. Station Surface Max Temperature (°F) anomaly  
(1991–2020 Climatology)



High Temperature Anomaly



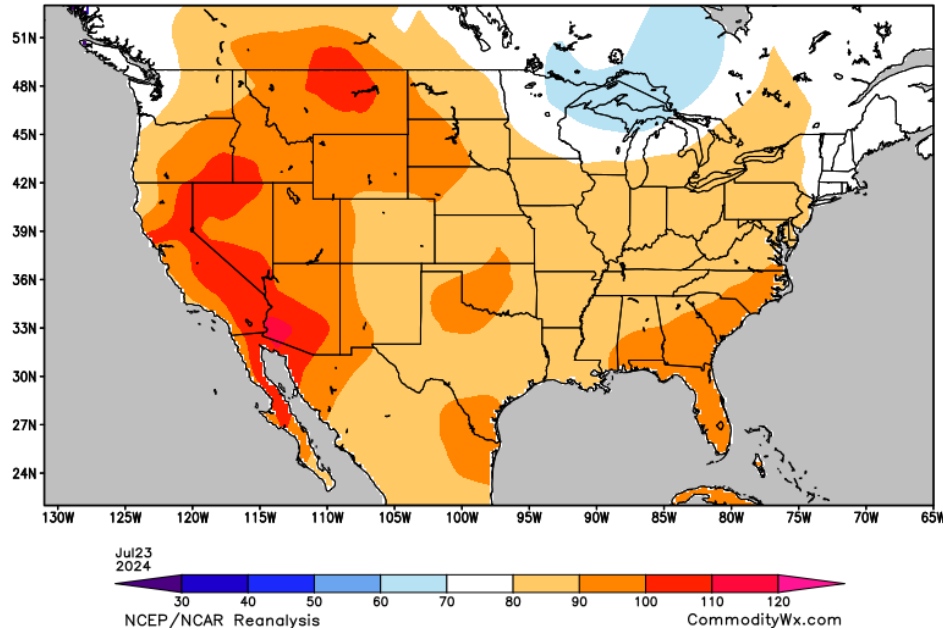
# July 16<sup>th</sup> 2024



# July 22<sup>nd</sup>-26<sup>th</sup> 2024

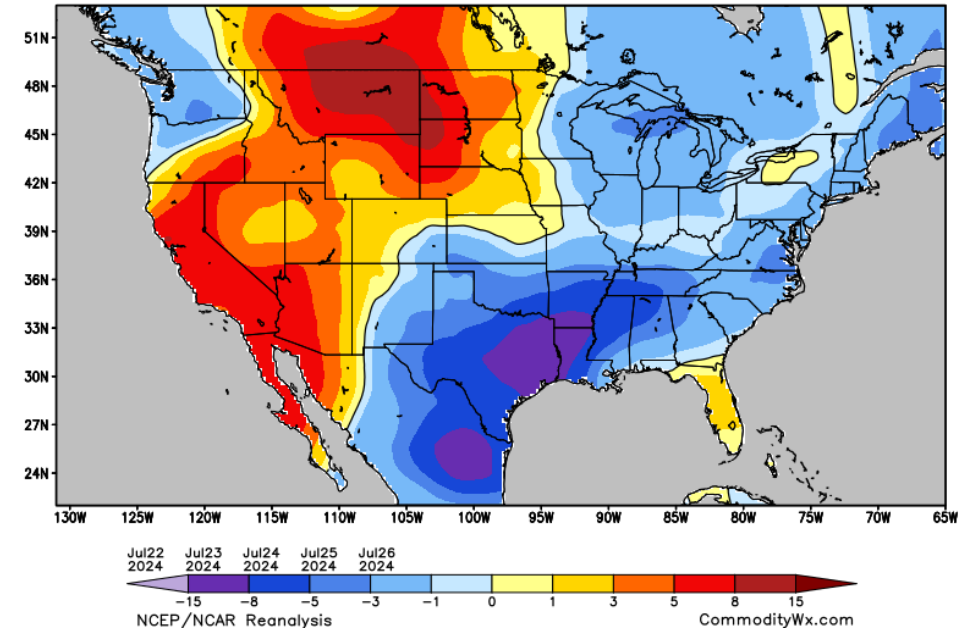


U.S. Station Surface Max Temperature (°F)

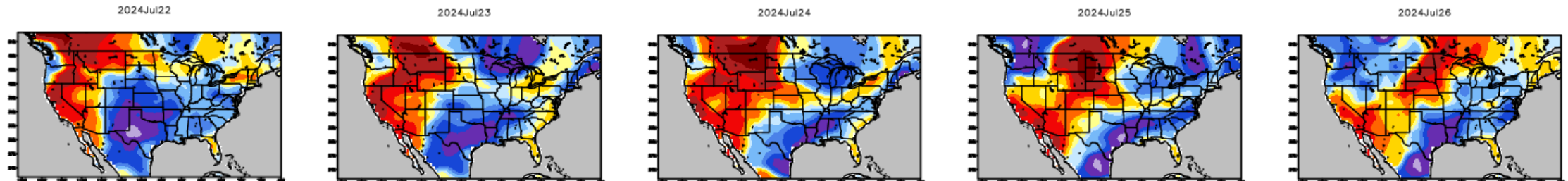


July 23<sup>rd</sup> (peak CAISO heat) Max Temperatures

U.S. Station Surface Max Temperature (°F) anomaly  
(1991–2020 Climatology)



High Temperature Anomaly 5-day Composite



Daily Average Temperature Anomaly

# July 22<sup>nd</sup>-26<sup>th</sup> 2024

