



California ISO

Resource Performance Expectations - Summer Readiness Refresher 2025 Training

Prepare for increased electricity demand during the summer season and focus on emergency response, communication, and operational coordination

Slides and recording will both be available on [caiso.com](https://www.caiso.com)

Agenda

- **Lessons learned from summer 2024**
- **Operational actions associated with unit response to Dispatch Operating Targets (DOTs), Dispatch Operating Points (DOPs) and Operating Instructions, including batteries**
- **Outage management, including batteries**
- **Emergency assistance protocols and communications**
- **Where to find additional information**

Participate



Add questions and comments in the Chat



Raise hands in WebEx to ask questions



Please stay muted until asking questions

LESSONS LEARNED FROM 2024

2024 Statistics

Peak demand

48,323 MW

Sept 5 at 4:59 p.m.

Previous year:

44,534 MW on Aug 16 at 5:59 p.m.

Based on 1-minute averages, and includes dynamic transfers.

New record

Peak demand served by renewables

20,612 MW (51.8%)

Aug 12 at 5:03 p.m.

Previous year:

15,524 MW (38.2%) on July 18 at 5:57 p.m.

This indicates the highest amount of renewables serving peak electricity demand on any given day.



1 MW



900 homes

New record

Solar peak

19,650 MW

Aug 23 at 12:10 p.m.

Previous year:

16,056 MW on Sept 26 at 11:32 a.m.

Wind peak

6,322 MW

May 15 at 10 p.m.

Previous year:

6,317 MW on May 28 at 5:39 p.m.

Peak net imports

9,566 MW

July 3 at 2:52 a.m.

Previous year:

10,480 MW on May 20 at 11:36 p.m.

100 MW

90,000 homes

Added installed storage capacity

4,190 MW

Previous year:

2,684 MW

Total installed storage capacity:

11,454 MW

Western Energy Imbalance Market (WEIM)

Gross benefits:

\$1.57 billion

Previous year:

\$1.65 billion

Total gross benefits:

\$6.62 billion

Visit [WEIM](#)

WEIM ISO GHG savings:

117,466 mTCO₂

Previous year:

133,507 mTCO₂

Total WEIM ISO GHG savings:

1,043,034 mTCO₂

See [ISO GHG emissions tracking reports](#)

20,000 MW

18,000,000 homes

48,000 MW

43,200,000 homes

Prepare for summer operations

Summer Loads and Resources Assessment

evaluates expected 2025 summer supply and demand conditions for the California Independent System Operator (ISO) balancing authority area (BAA)

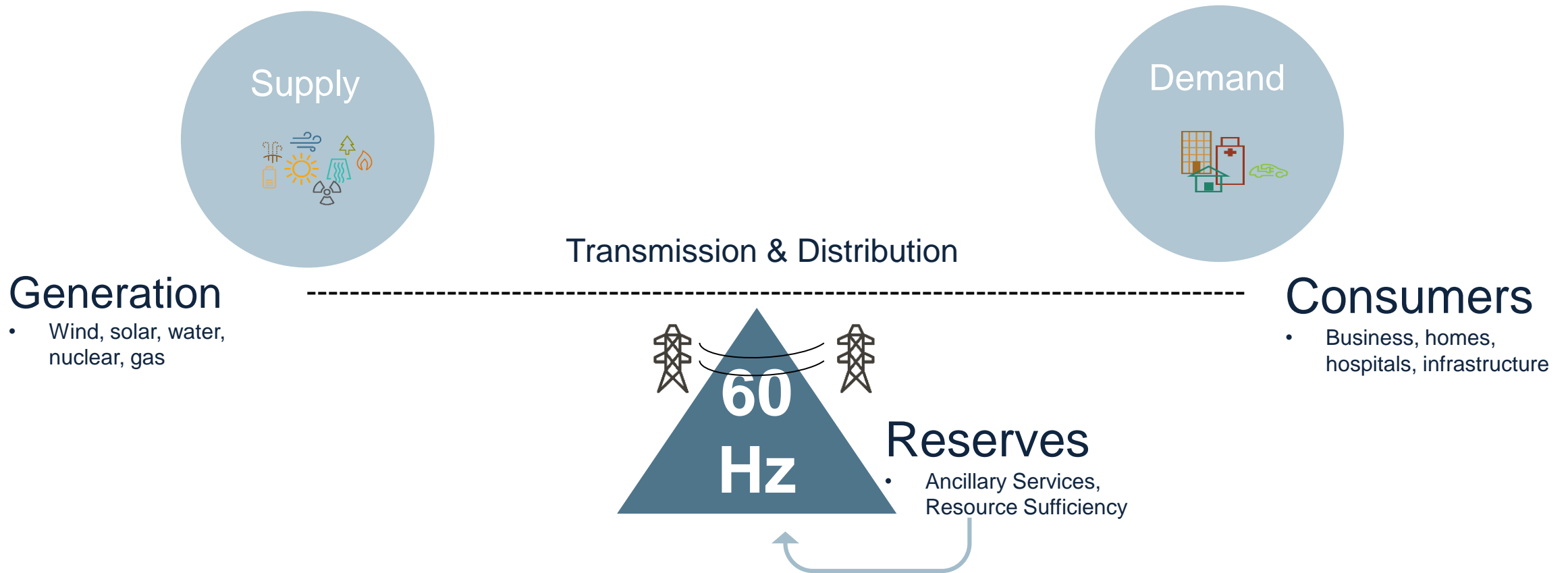
This document indicates continued improvement in resource availability for the upcoming summer driven by accelerated resource development



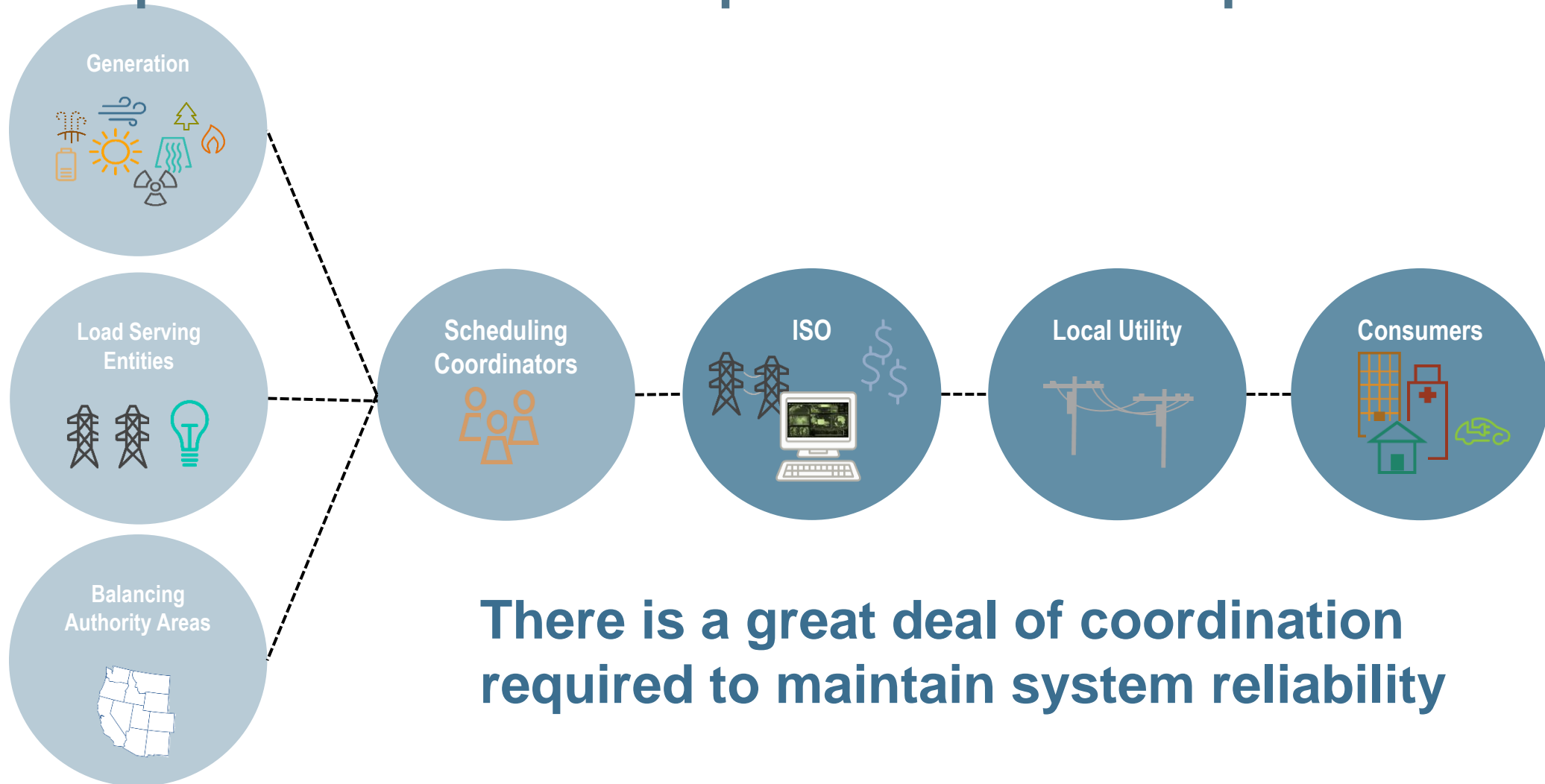
OPERATIONAL ACTIONS ASSOCIATED WITH UNIT RESPONSE AND PERFORMANCE

System Reliability

System reliability requires a constant and instantaneous match between supply and demand

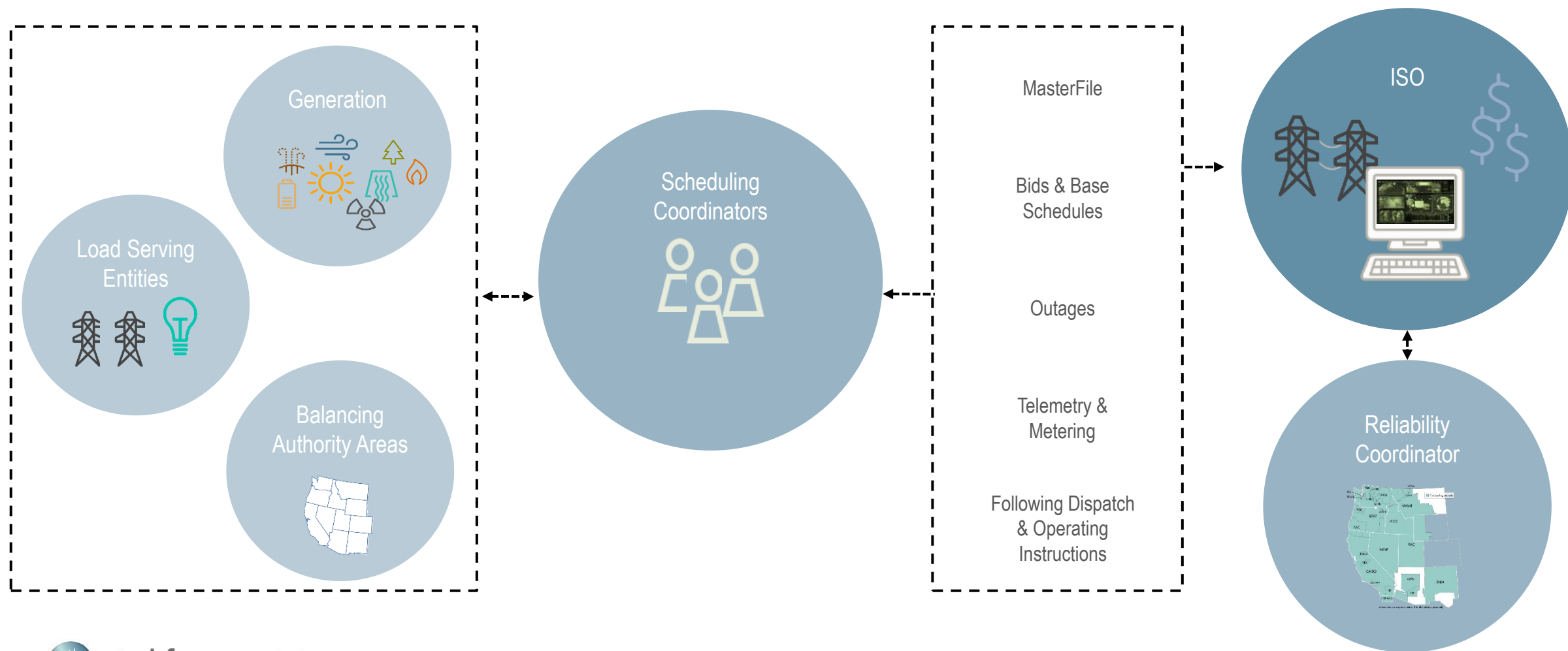


Participation with the ISO depends on services provided



There is a great deal of coordination required to maintain system reliability

Communication + Coordination = Reliability



Three part conversation pursuant to [NERC COM-002](#)

This is the ISO Generation Dispatcher and I need for you to take Unit ABC_123 offline within the next 10 minutes.

This is the Resource Operator and I understand you are instructing me to take Unit ABC_123 offline within the next 10 minutes.

That is correct.
Thank you.

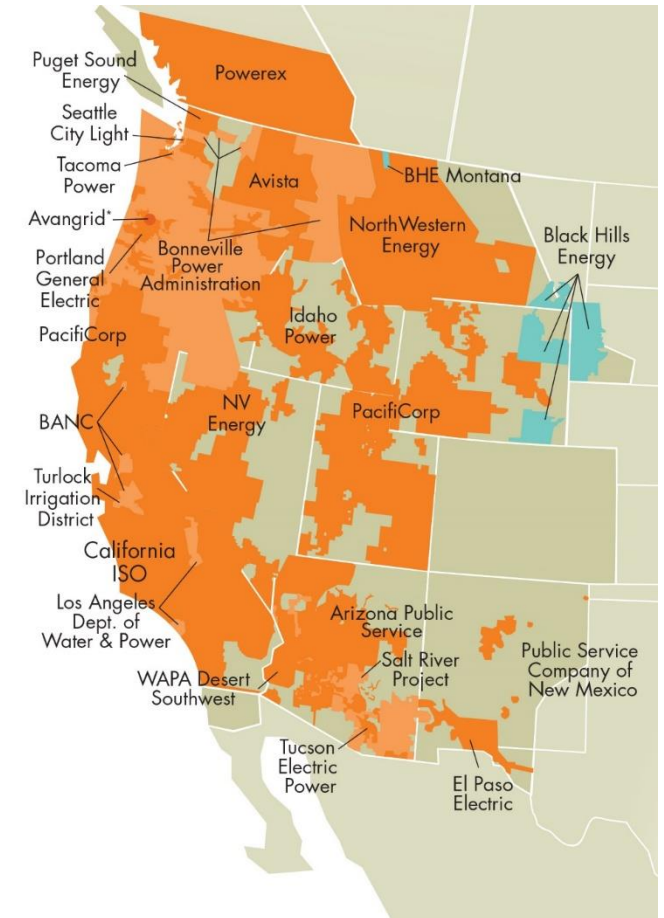
ISO Market and Reliability Footprints



ISO BAA / EDAM



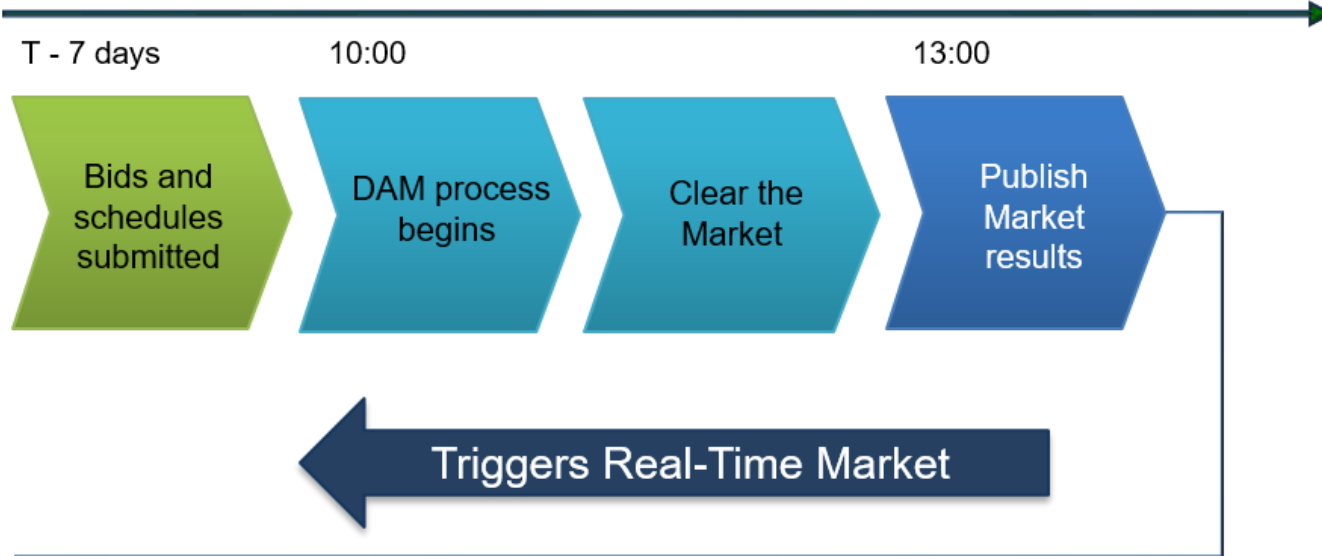
RC West



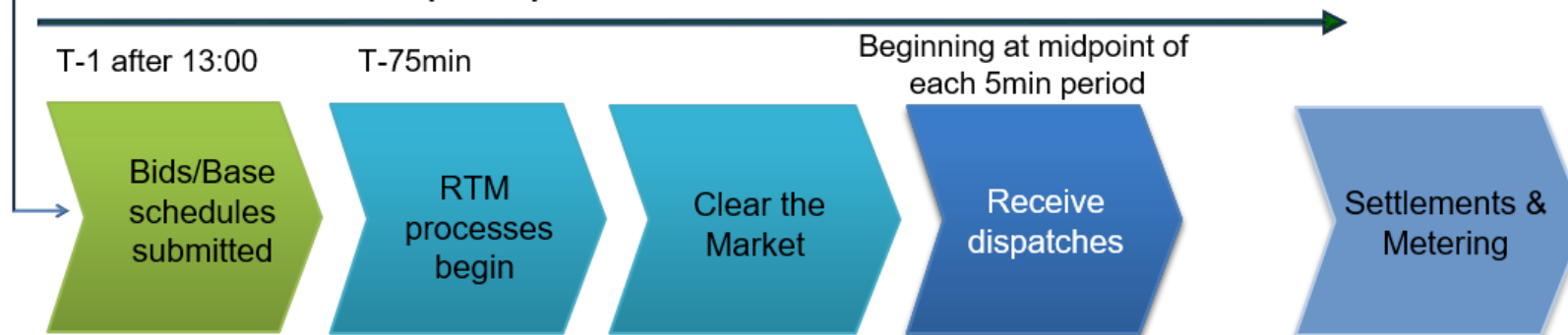
WEIM

Market process timelines

Day-Ahead Market (DAM)



Real-Time Market (RTM)



Market optimization

Security Constrained Unit Commitment (SCUC)

Used in the **Day-Ahead** timeframe

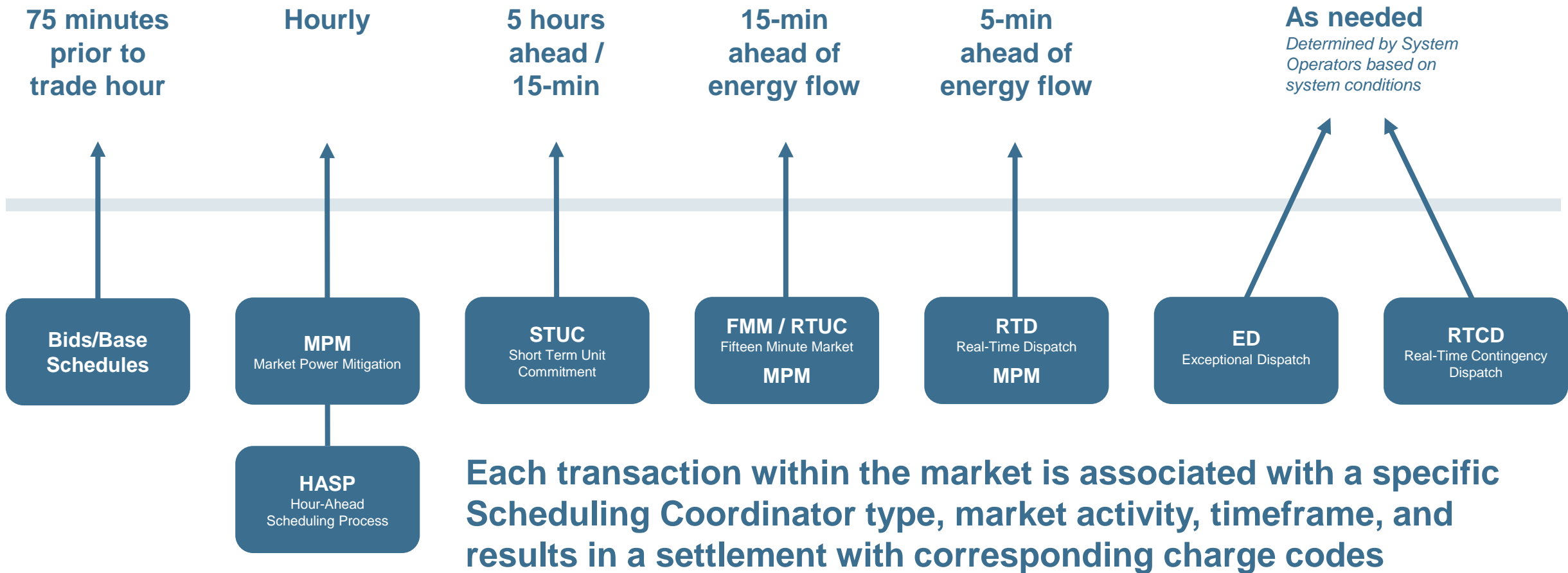
- Minimize start-up time
- Minimize load costs, bid in energy costs and ancillary services costs
- Subject to network and resource-related constraints over the entire time horizon

Security Constrained Economic Dispatch (SCED)

Used in the **Real-time** timeframe

- Reduce cost of serving demand
- Resolve transmission constraints economically
- Provide transparency on constraints and costs

Real-time milestones



Contingency dispatch

Real-time Contingency Dispatch (RTCD)

- Real-time contingency dispatch (RTCD) dispatches energy to respond to a grid disturbance or a system emergency such that waiting until the next normal real-time economic dispatch (RTED) run is not adequate
- Produces a 10-minute dispatch
- Dispatch instructions override previously issued instructions Real-Time Economic Dispatch (RTED)
- Ancillary service awards for spinning or non-spinning reserves designated as contingency only are made available to the market
- Energy produced as a result of RTCD settles at real-time Locational Marginal Price (LMP)

Exceptional Dispatch (ED)

- Exceptional dispatch (ED) is used to prevent a situation that impacts system reliability, or an imminent system emergency, that cannot be addressed through normal market operations
- Entered manually by ISO operator into the real-time market optimization software
- May be used to meeting reliability requirements for voltage and contingencies
- Cannot set the Locational Marginal Price (LMP)
- Called “Manual Dispatch” when performed by WEIM Entity Operator

Resource instructions sent via Automated Dispatch System (ADS)

For each **fifteen-minute interval** the market is:

- Starting-up or shutting down resources
- Transitioning multi-stage generators (MSG)



For each **five-minute interval** the market is:

- Issuing real-time dispatch instructions



EXPECTED RESPONSE TO DISPATCH AND OPERATING INSTRUCTIONS

Interval

RT DOT/FR

Hourly DOT

Exceptional

Commitment

FMM AS

Current Interval

23:55-00:00

23:00-00:00

Active

23:45-00:00

23:45-00:00

Dispatch Interval

00:00-00:05

01:00-02:00

Fixed Max Min

00:30-00:45

00:30-00:45

Received/Status

23:56:19

13:12

23:56:19

23:57:40

23:57:40

Batch Status and Interval Grid

System Messages

Query Tool

Configurations

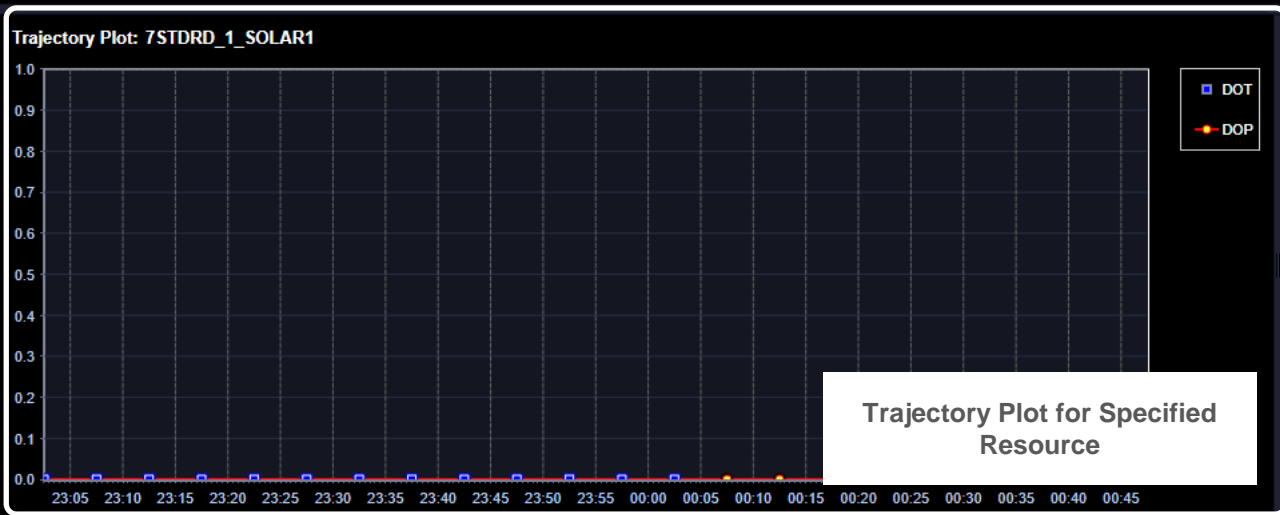
Operator

Options Menu and System Messages Grid

Real Time

Hourly Pre-Dispatch

Valid	Res Type	Resource ID	Config ID	DOT Type	SC ID	RT Prev DOT	RT DOT	RT DOT Delta	Current DOT Delta	DOT Start Time	DOT End Time	RTD FRD	RTD FRU	ED Fixed	ED Max	ED Min	Unit Commitment	Commitment Start Time	Commitment End Time	Commitment To Config	FMM Dispatch Energy	Current AS Total	Current Spin	Dispatch AS Total	Dispatch Spin	Dispatch Non Spin	Dispatch Regl Up	Dispatch Regl Down	AS Test Constraint MW	Opr Ins Start Time	Opr Ins Reason	Priority	Base Schedule
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		8.01	8.01	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	-78.47	-78.47		00:02												0.00	0.00	0.00	0.00	0.00	0.00				2	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		0.00	0.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	
	GEN			DOT		15.00	15.00	0.00		00:02												0.00	0.00	0.00	0.00	0.00	0.00				3	0.00	



Instructions - Resource ID: 7STDRD_1_SOLAR1

Valid	Instruction Type	Accept DOT	Accept Status	Award MW	ED Energy Code	Instr MW	Min Accept	Self Sched MW	Start Time	End Time	Prev Goto	Responder	From Config Id	To Config Id
✓	DOT	0.00				0.00			00:02		0.00			
✓	DOT	0.00				0.00			23:57		0.00			
✓	DOT	0.00				0.00			23:52		0.00			
✓	DOT	0.00				0.00			23:47		0.00			
✓	DOT	0.00				0.00			23:42		0.00			
✓	DOT	0.00				0.00			23:37		0.00			
✓	DOT	0.00				0.00			23:32		0.00			
✓	DOT	0.00				0.00			23:27		0.00			
✓	DOT	0.00				0.00			23:22		0.00			
✓	DOT	0.00				0.00			23:17		0.00			
✓	DOT	0.00				0.00			23:12		0.00			
✓	DOT	0.00				0.00			23:07		0.00			
✓	DOT	0.00				0.00			23:02		0.00			

Instruction Details Grid for a Specified Resource

Resource Management Priorities

- 1. Immediately follow Operating Instructions when issued by the ISO**
2. Notify the ISO immediately if your resource is incapable of following your Dispatch Operating Target
3. Ramp linearly to follow Dispatch Operating Points mid interval to mid interval
4. Follow Dispatch Operating Targets & Operating Instructions accurately

SCs and Resource Owner/Operators must work together

Role of the CAISO Generation Dispatcher

Mitigation

Manage and mitigate within System Limits

~26,000 circuit miles of transmission

ISO Transmission collaborate with Utilities Participating Transmission Owners

Scheduling Coordinators collaborate with Resources

Balancing

Manage Supply to meet Real-Time Demand

Serve ~80% of California demand

Scheduling Coordinators collaborate with Resources

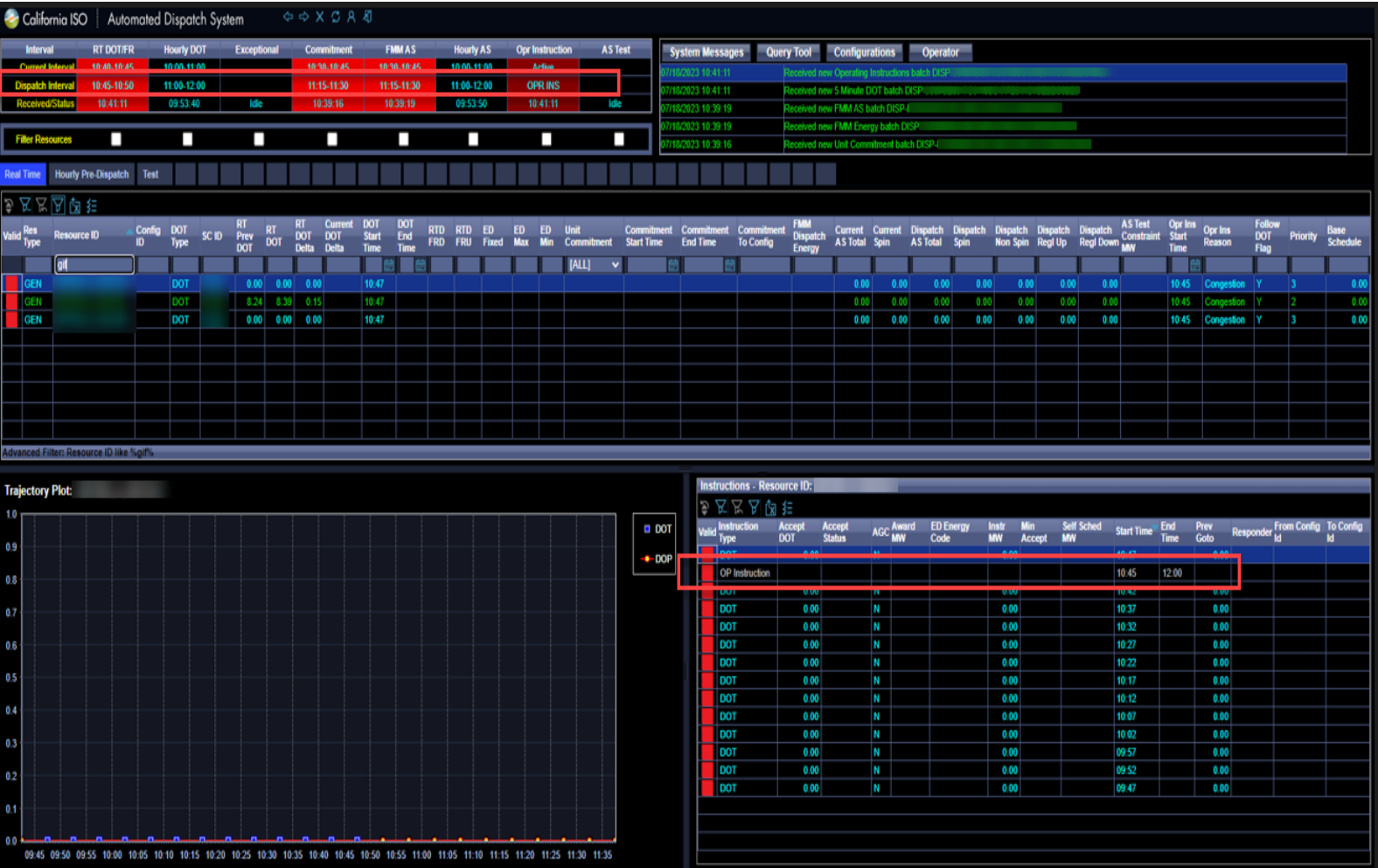
Reliability Coordinators collaborate with Generation Dispatchers

Communication

Operating Instructions

- Commands by Operators to preserve the state, status, output or input of a Bulk Electric System resource
- Emergency instructions may be received via **Energy Management System (EMS)** and/or **verbal communication**
- Emergency instructions may be received via Automated Dispatch System (ADS) as a result of Operator intervention
- Emergency instructions are **required to be followed within given timelines and ramp requirements** unless physically impossible, per Tariff Section 4.2.1

Example Operating Instruction



Note Field will indicate “Do not exceed DOT due to <Reason>”

Resource obligated to comply with Operating Instruction within 10 minutes, ramping linearly with DOT

The message will only pop up once per user per time horizon of the instruction, and will remain until acknowledged by the user

Example – Resource Not Following AGC Set Point Instruction



Tip to Improve Visibility

Make six (6) columns visible to see flags when resources are not following DOTs:

Opr Ins Start Time, Opr Ins End Time, Opr Ins Reason, Opr Ins Flag, Follow DOT Flag, RT Suppl Energy

California ISO Automated Dispatch System

Interval RT DOT/FR Hourly DOT Exceptional Commitment FMM AS

Filter Resources

Real Time Hourly Pre-Dispatch

Valid Res Type Resource ID

API Acknowledged By
API Acknowledged
☒ Opr Ins Start Time
☒ Opr Ins End Time
☒ Opr Ins Reason
☒ Opr Ins Flag
☒ Follow DOT Flag
☐ Hourly Prev DOT

Ok Cancel

California ISO Automated Dispatch System

Interval RT DOT/FR Hourly DOT Exceptional Commitment FMM AS

Filter Resources

Real Time Hourly Pre-Dispatch

Valid Res Type Resource ID

RT Ramp Energy
RT Scheduled MW
RT Scheduled Energy
RT Non-Spin Energy
RT Spin Energy
☒ RT Suppl Energy
Previous Supp
RT Supp Delta

Ok Cancel

Resource Management Priorities

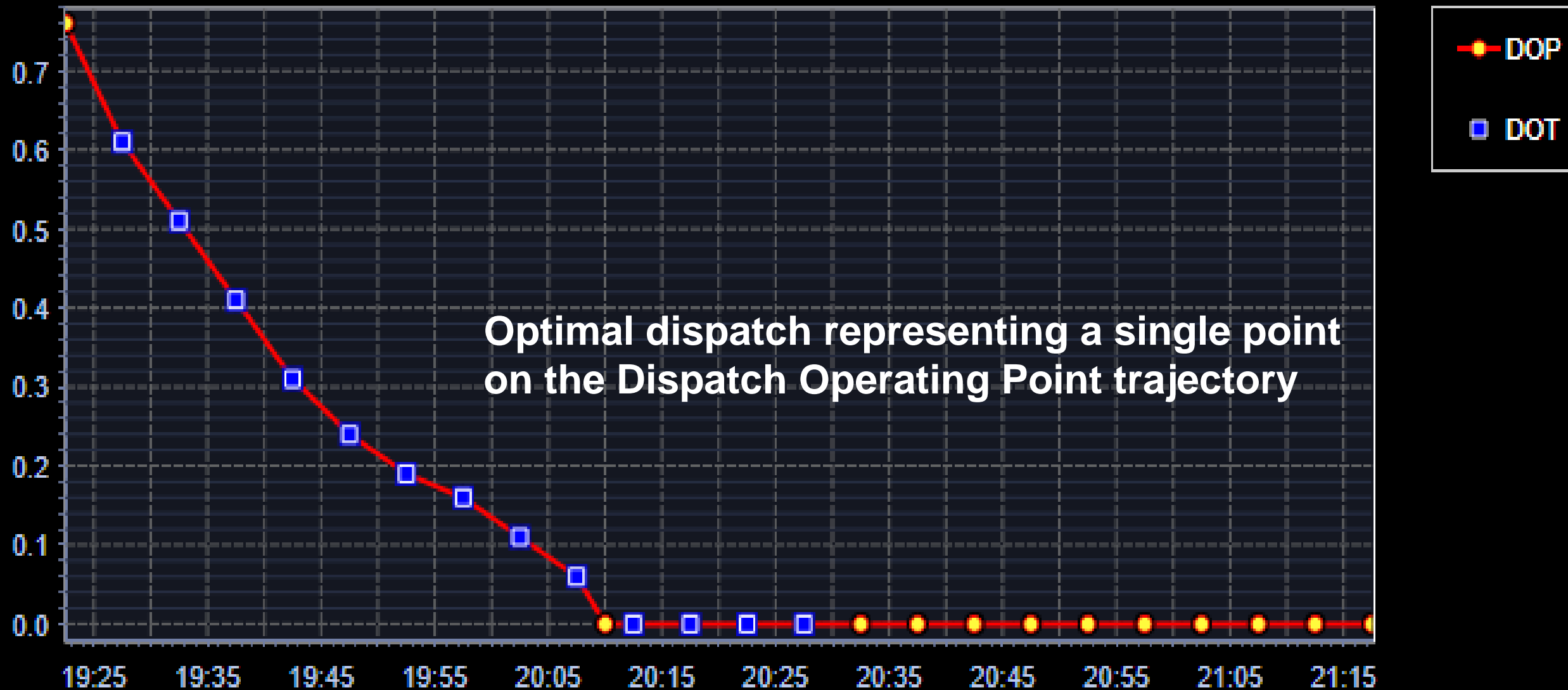
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Dispatch Operating Targets (DOT)

- Optimal dispatch representing a single point on the Dispatch Operating Point (DOP) trajectory
- Daily instructions are received via Automated Dispatch System (ADS)
- Resources expected to **perform as instructed**
- Eligible Intermittent Resources (EIRs) expected to **produce as capable** unless they receive an Operating Instruction

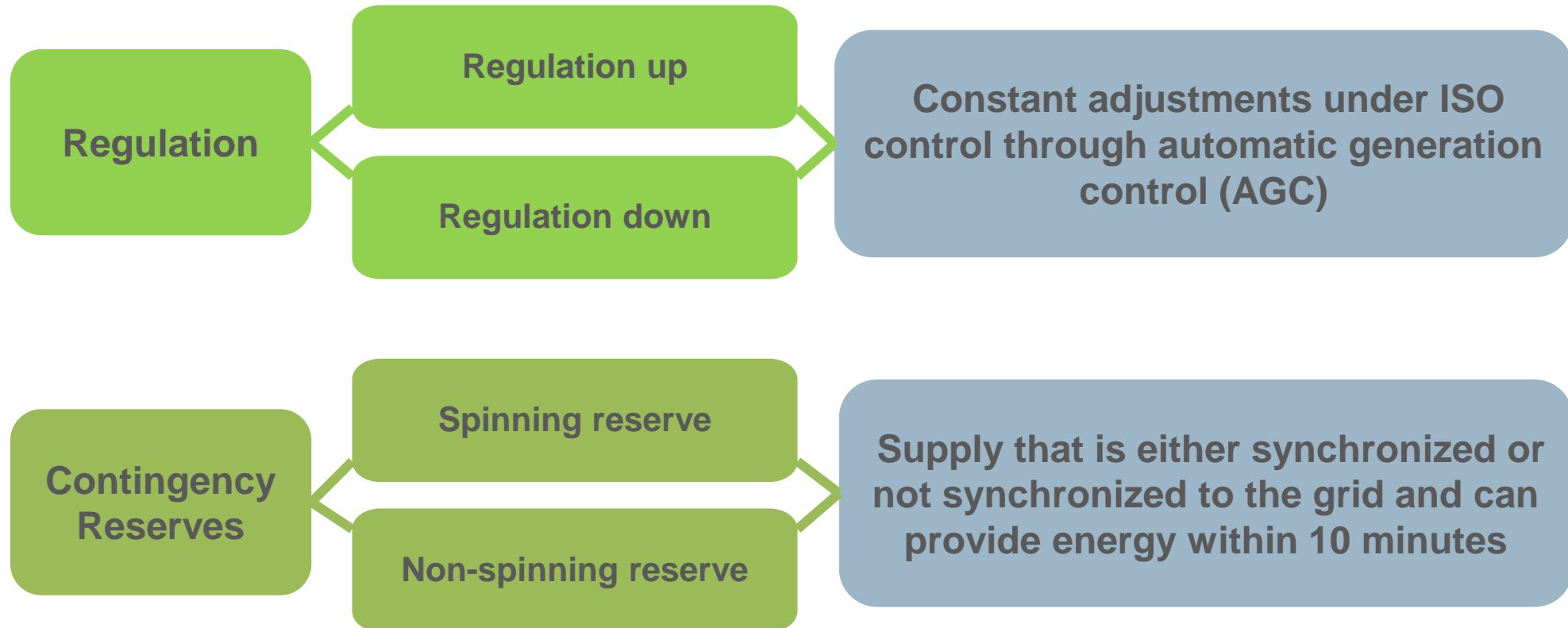
Trajectory Plot:



Set Points vs. Base Points

- **Set points** are a megawatt output target for a participating generator
- **Base points** are set by non-economic dispatches called manual base points (MBP)
- CAISO Automatic Generation Control (AGC) is normally set to send a direct MW set point **signal to all participating units every four seconds**
- The difference between the set point and base point is the MW quantity of regulation service that a unit is providing at a given moment in time, commonly called '**mileage**'

Contingency Reserve (CR) instructions sent through Automated Dispatch System (ADS)



Communicating unavailability of resources using outages



When **should** an outage be submitted?

When a physical restriction limits a unit's output and must be submitted regardless of whether it is expected to be a long or serious outage



When should an outage **NOT** be submitted?

For economic reasons



Where can I learn more about outages?

[Business Practice Manual Outage Management](#)

Outage timeframes Section 2.4
Outage types Section 3.1

The screenshot shows the CAISO Outage Management System (OMS) form. Callouts point to specific fields:

- your SCID** points to the **Participant Name** dropdown menu.
- Market Resource ID** points to the **Resource** dropdown menu.
- Refer to Procedure 3220 Section 3.3.1 Nature of Work (NOW) Categories** points to the **Nature of Work** dropdown menu.

Other visible fields include:

- Outage Class**: Generation
- Start Date/Time**: 06/29/2023 11:45
- End Date/Time**: 06/29/2023 20:00
- Outage Duration**: 0 day(s) 8 hour(s) 15 minute(s)
- Discovery Date/Time**: 06/29/2023 11:45
- Emerg. Return Time/Type**: Duration
- BA/TOP Confirmed**: ☐
- Emergency**: ☐ **Operational**: ☐
- RAS/SPS Out of Service**: ☐ Y ☐ N ☐ N/A
- RAS/SPS Reduced Redundancy**: ☐ Y ☐ N ☐ N/A
- Protection Zones**: ☐ Y ☐ N ☐ N/A
- EHS/ICCP Outages**: ☐ Y ☐ N ☐ N/A
- Opportunity**:

Resource availability provided via outage data



Generation



Transmission



Master File provides the market with information on generating resources

Resource availability values are sent to market systems - setting the limits for forward schedules and real-time dispatches

The market runs a power flow calculation which takes into account the status of the bulk electrical system

Outage Management System (webOMS)



Solar Example

NEW GENERATION OUTAGE

Participant Name:

your SCID

Outage Class:

Market Resource ID

Resource:

Start Date/Time: 07/18/2023 09:36

End Date/Time: 07/18/2023 10:00

Outage Duration: 0 day(s) 0 hour(s) 24 minute(s)

Discovery Date/Time: 07/18/2023 09:36

Emergency: ☐ Nature of Work: Operational: ☐

Refer to Procedure 3220 Section 3.3.1 Nature of Work (NOW) Categories

Emergency: ☐ RAS/SPS Out of Service: ☐ Y ☐ N ☐ N/A

RAS/SPS Reduced Redundancy: ☐ Y ☐ N ☐ N/A

Protection Zone: ☐ Y ☐ N ☐ N/A

EMS/ICCP Outage: ☐ Y ☐ N ☐ N/A

Opportunity:

Participant Outage ID:

CADS Cause Codes:

Time To Start Up:

Short Description: *

Test Outage

Be as detailed as possible in describing the issue with your resource

Availability(Pmax) = VER Capability

Availability Notes A/S Availability PMIN Re-Rate Ramp Re-Rate Max Energy Min Energy Load Max Load Min Use Limited RIMS

Resource:

	Availability Date/Time	OOS <input type="checkbox"/>	NOC <input type="checkbox"/>	MAX	Availability MW	Outage Curtailment	Total Curtailment	Overlapping Outages
+	07/18/2023 09:36	<input type="checkbox"/>	<input type="checkbox"/>	0	20.00	0.00	0.00	
	07/18/2023 10:00			20	20.00	0.00	0.00	

Regulation Up
Regulation Down
Spin/Non-Spin

Can your resource provide their awards?
If not, Enter 0 for the appropriate product.

If your resource minimum output needs to be adjusted up

Outages are treated differently in Day-ahead vs. Real-time

Day-Ahead

After the outage planned **end time**, the market adds the start-up time to the end of the outage, before awarding the unit

Real-Time

The market assumes that **start-up time** is part of the outage

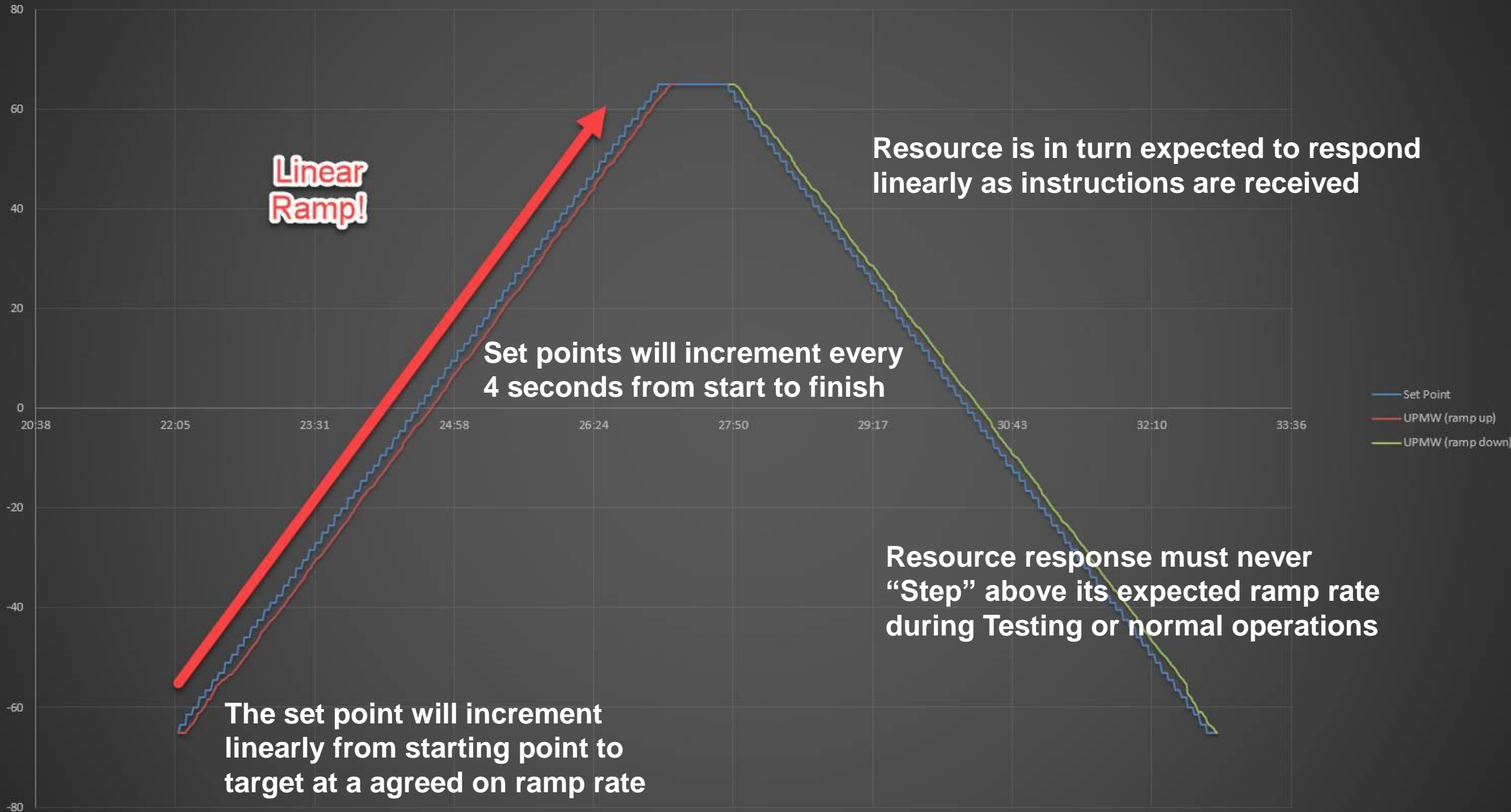
Example: If an outage ends at 6:59am and there's a bid for HE8 (7am – 8am) the market could dispatch the resource

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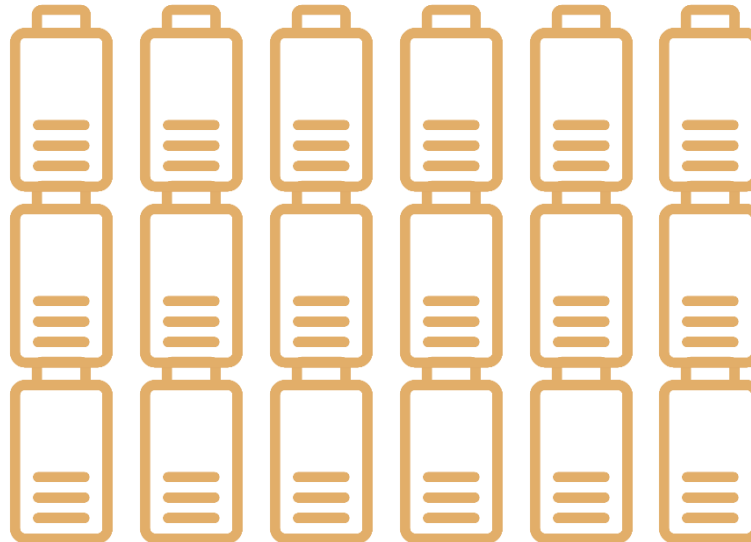
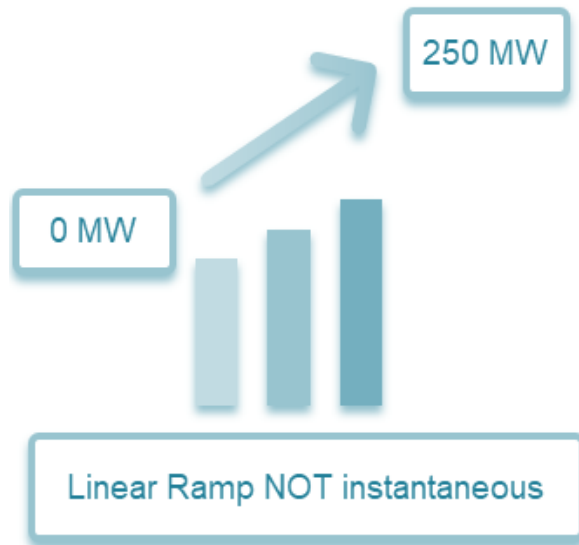
SCs and Resource Owner/Operators must work together

Regulation Certification Test

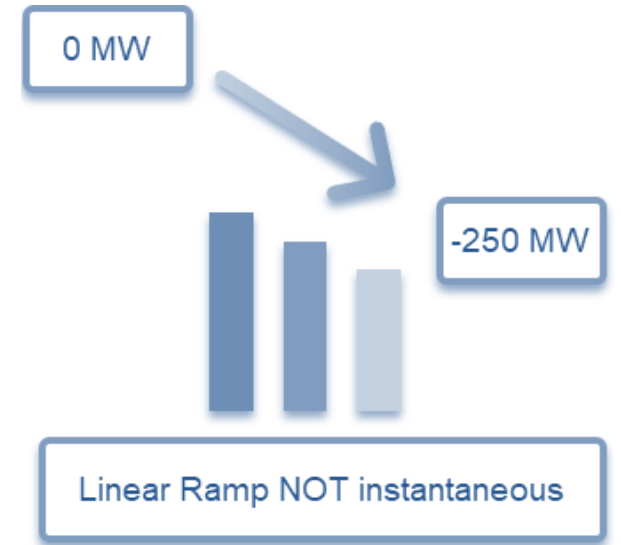


Battery Linear Ramping

Discharge (+)



Charge (-)



Storage Key Terms

Primary Frequency Response (PFR)

First stage of frequency control and is the response of generator governors and loads to arrest locally detected changes in frequency

Droop (FERC Order 842)

Variation in real power (MW) output due to variations in system frequency and is typically expressed as a percentage -- e.g. 5% droop -- and reflects the amount of frequency change from nominal e.g. 5% of 60 Hz is 3 Hz necessary to cause the main prime mover control mechanism of a generating facility to move from fully closed to fully open

Deadband (FERC Order 842)

Represents a minimum frequency deviation e.g. ± 0.036 Hz from nominal system frequency -- 60 Hz in North America -- that must be exceeded in order for the generating facility to provide primary frequency response

Primary Frequency Response (PFR)

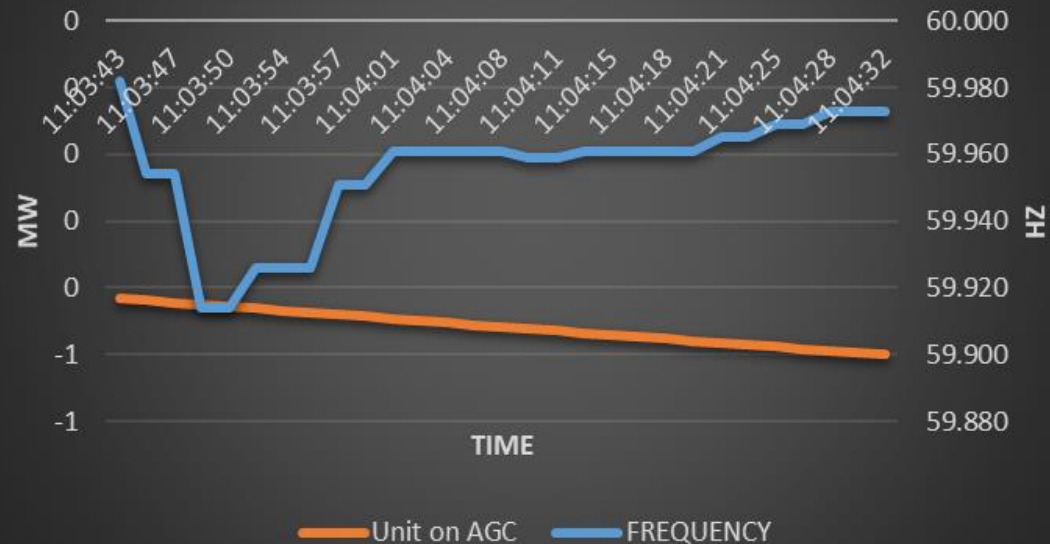
PFR needs to be the Primary Control Mode and be additive to other control modes

Most battery storage facilities have Automatic Generation Control (AGC) as the primary control mode

Unit C on AGC with PFR as Primary Control Mode



Unit D on AGC with PFR Secondary to AGC Control Mode



Managing State of Charge (SOC) for resources

Day-Ahead Market

Resources submit SOC for HE01 into Scheduling Infrastructure and Business Rules (SIBR)

Real-Time Market

Monitors resources SOC using telemetry -- the measurement of flow on the lines – and ensures that sufficient SOC is reserved to support market awards



Regulation Energy Management (REM)

The REM SOC is 50% so they have equal upward/downward mobility

Non-Regulation Energy Management (NREM)

The market tracks a resource's SOC and uses it to determine when to charge/discharge in order to optimize it across the 24-hour period

Managing State of Charge (SOC) for storage resources

Reserves

Spinning and Non-Spinning awards ensure that 30 minutes of SOC is reserved in the Fifteen Minute Market (FMM) and Real-time Dispatch (RTD)

Regulation

Regulation Up and Regulation Down awards ensure that 30 minutes of SOC is reserved in the Fifteen Minute Market (FMM) and Real-time Dispatch (RTD) and 20 minutes of SOC for **Real-Time Contingency Dispatch (RTCD)***

*** For the 1st RTCD the market reserves 20 minutes and releases 10 minutes**

*** For the 2nd and beyond it releases all**

Self Schedules

Self-Schedules are respected by reserving SOC for Self-schedules outside of the RTD horizon and then RTD ensures that SOC is reserved to meet the Self-Schedule for the hour

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4. **Follow Dispatch Operating Targets & Operating Instructions accurately**

SCs and Resource Owners / Operators must work together

Rules, guidelines and instructions define market and reliability processes



Resource Performance Issue for resources within the ISO BAA

- Increases the awareness of resource performance issues by notifying SCs via email when resources fail to perform as expected and in accordance with the ISO Tariff
- SCs are responsible for coordinating with resource owners and scheduling desks to ensure understanding and corrective actions are being taken
- Categories to be monitored:

Resource failed to follow CAISO Dispatch Operating Instruction (DOT)

Resource failed to ramp in a linear manner

Resource failed to transition correctly between Automated Generator Control (AGC) to DOT

Resource failed to be on and/or follow AGC

Possible Consequences of Non-response

Settlements

Economic Consequences

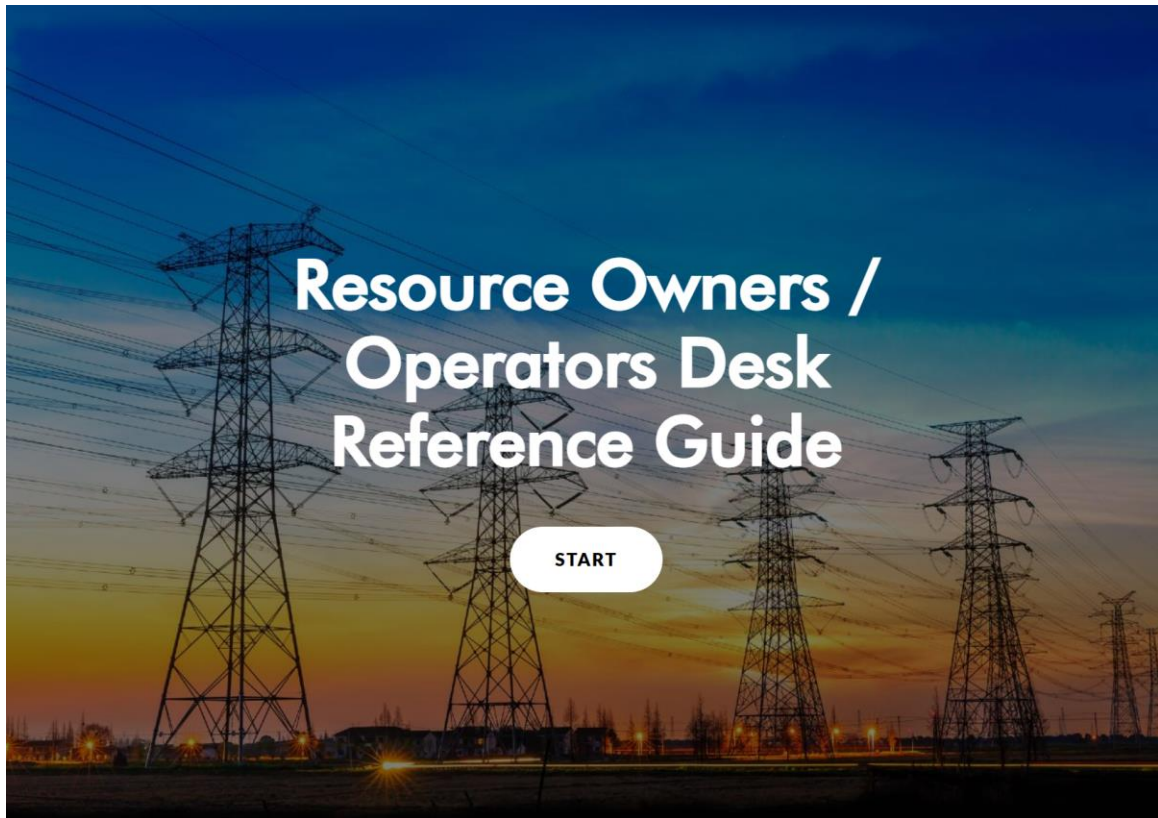
Regulatory

Contractual Consequences

Enforcement

Report to FERC, NERC/WECC, CAISO DMM

Resource Owner / Operators Desk Reference Guide



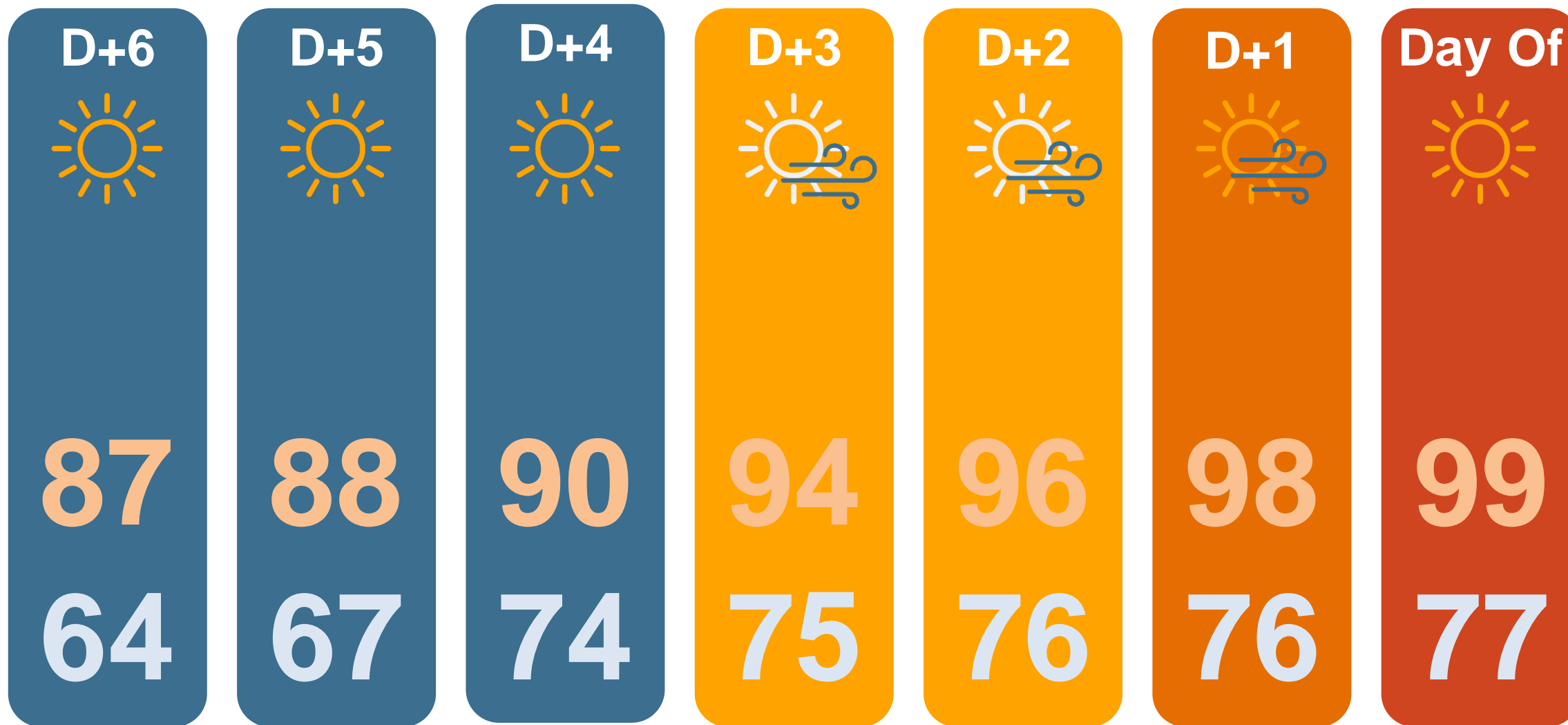
- [Resource Owners / Operators Desk Reference Guide – Overview](#)
- Training Resources
- Knowledge Articles
- Policies & Procedures
- New Resource Implementation Documents

Summer Readiness

- **Communicate** between Scheduling Coordinator and Resource Operator to ensure adequate control of resources
- **Respond to Operating Instructions** within required time parameters, consistent with Tariff requirements
- **Submit detailed outage cards** reflecting physical limitations
- **Ensure proper set up for resource testing and performance**
- **Be ready** to respond to emergency notifications
- **Register accurate information in Master File**
- **Actively monitor your resources**
- **Report suspicious activity**

CAISO EMERGENCY PLAYBOOK

7 Day Outlook



7-day resource adequacy capacity trend

Today's Outlook

Demand

Supply

Emissions

Prices

AS OF 11:00 05/05/2025

Current

Demand trend

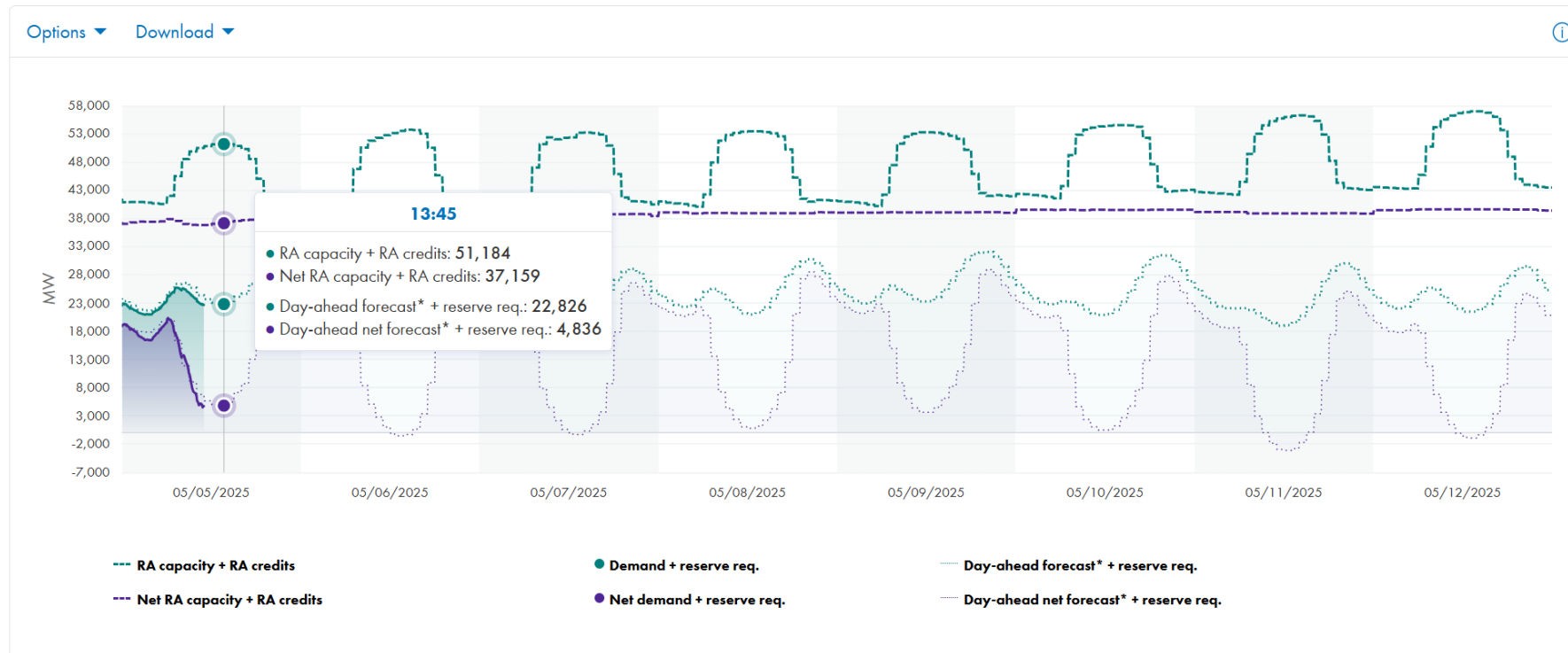
Net demand trend

Resource adequacy trend

7-day resource adequacy trend

7-day resource adequacy capacity trend

Resource adequacy capacity forecast for today plus the next 7 days, in megawatts, compared to demand forecast plus reserve requirements.



4 – 7 Days Out

D+6



D+5



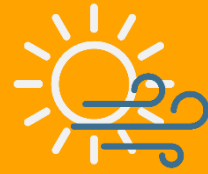
D+4



D+3



D+2



D+1



Day Of



Monitor demand forecast 7 days out, assess resource adequacy, system conditions, weather, and other potential grid impacts, and plans for next possible steps

4 – 7 Days Out

Operational Coordination

- Utilities
- Neighboring Balancing Authorities (BA)
- Emergency Load Reduction Program (ELRP) Board
- RC West

Depending on actual and potential system conditions, outreach and coordination re: possible extreme event to:

- Governor's Office (GO)
- Long-start strategic reserve resource scheduling coordinators (LS-SRR SCs)

Consider need for DOE 202c orders and whether other government agency assistance may be needed

Public and Customer Communications

CAISO may issue Flex Alert and/or EEA Watch notice via:

- ISO Today mobile app
- MNS
- Email
- Today's Outlook
- News release
- Daily Briefing notice
- Social media
- FlexAlert.org

De-escalate / all-clear notices issued via:

- ISO Today mobile app
- MNS
- Email
- Today's Outlook
- Social media

CAISO may issue High temperature heads up via:

- CAISO website
- CAISO social media

1 – 4 Days Out

D+6



D+5



D+4



D+3



D+2



D+1



Day Of



Review and validate most current information on actual and potential system conditions, resource adequacy, weather, and other potential factors impacting the grid

1 – 4 Days Out

Operational Coordination

To prepare entities for possible conservation efforts and free up additional supply, CAISO may initiate communication to:

- Water agencies (CDWR, MWD)
- Neighboring Balancing Areas
- Emergency Load Reduction (ELRP) Board
- Utilities
- RC West
- Regulatory Agencies

Coordinate the following:

- Requests for Department of Energy (DOE) 202c Orders
- Emergency supply above approved permit and/or GIA
- Governor's Office (GO) Proclamation of a State of Emergency and/or GO Executive Orders

Public and Customer Communications

CAISO may issue Restricted Maintenance Operations (RMO) via:

- ISO Today mobile app
- MNS
- Email
- Today's Outlook

Also publicly posted:

- DOE Orders
- GO Proclamations and Orders

1 Day Out

D+6



D+5



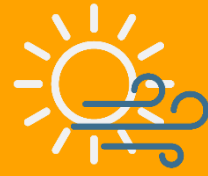
D+4



D+3



D+2



D+1



Day Of



Review and validate Day Ahead Market results and most current information on actual and potential system conditions, resource adequacy, weather and other potential factors impacting the grid

1 Day Out

Operational Coordination

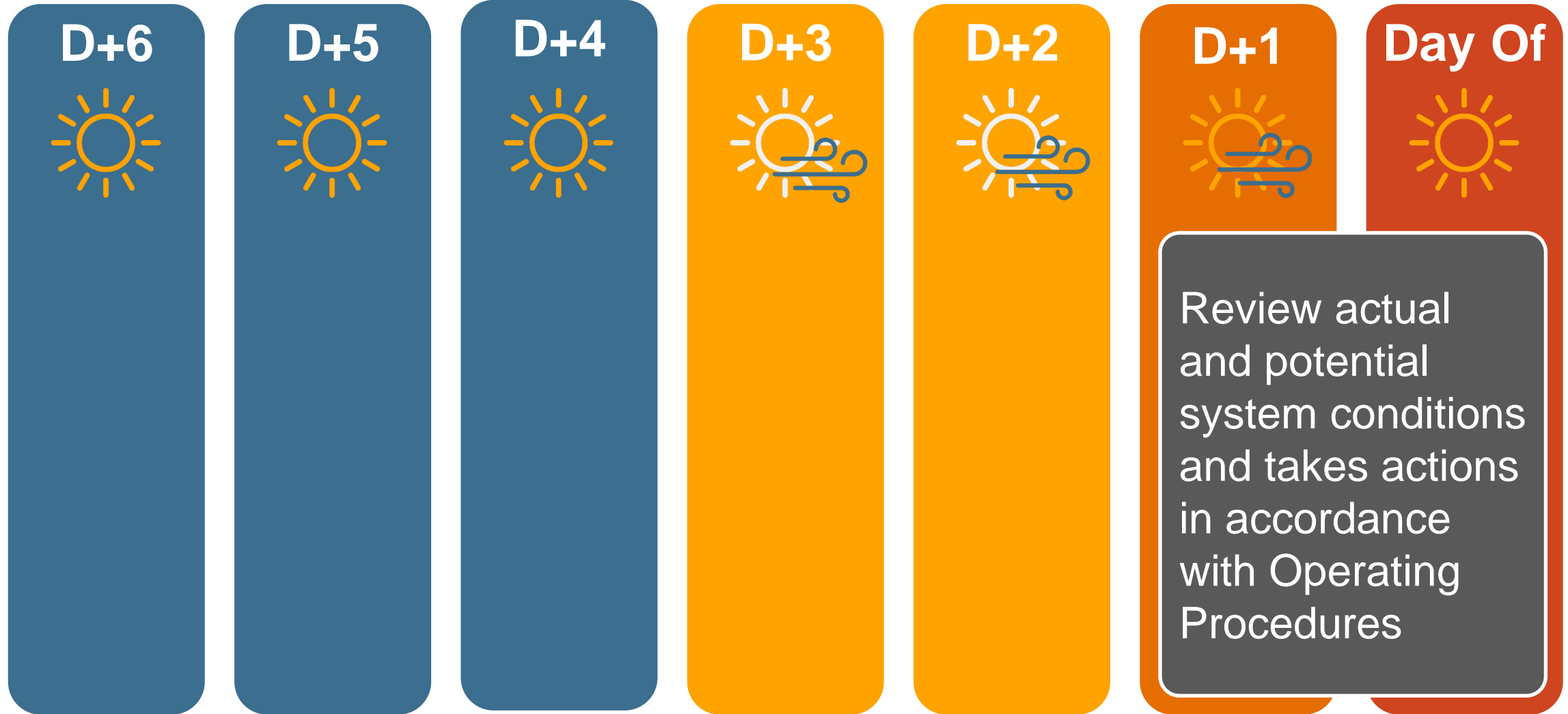
- Utilities
- Neighboring BAs
- ELRP Board
- RC West

Public and Customer Communications

CAISO may issue Flex Alert and/or EEA Watch notice via:

- ISO Today mobile app
- MNS
- Email
- News release
- Daily Briefing notice
- Social media
- FlexAlert.org

Operating Day



Operating Day

Operational Coordination

- Utilities
- Neighboring Balancing Authorities (BA)
- Emergency Load Reduction Program (ELRP) Board
- RC West

Public and Customer Communications

CAISO may issue Flex Alert and/or EEA Watch notice via:

- ISO Today mobile app
- MNS
- Email
- Today's Outlook
- News release
- Daily Briefing notice
- Social media
- FlexAlert.org

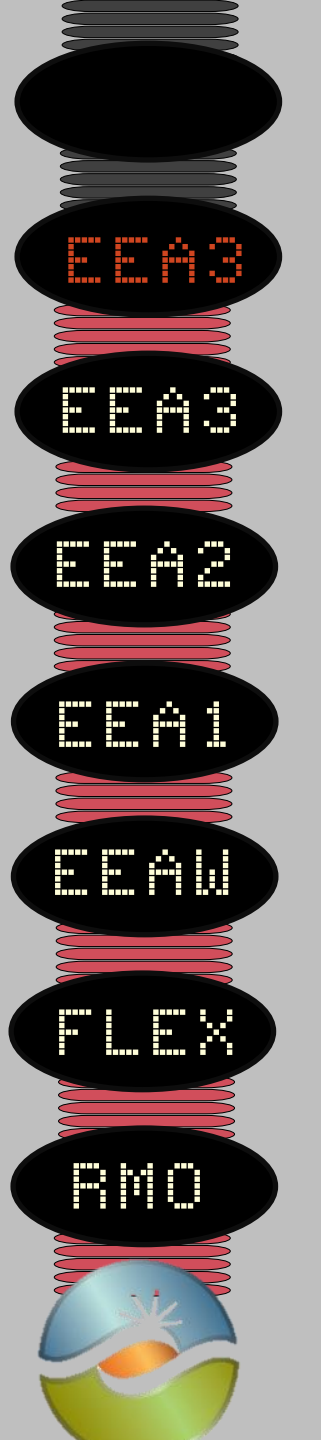
De-escalate / all-clear notices issued via:

- ISO Today mobile app
- MNS
- Email
- Today's Outlook
- Social media

ENERGY EMERGENCY ALERTS (EEA)



**World's Tallest Thermometer
Baker, CA**



Firm Load Interruption / Ordering Rotating Outages

Prepare For Possible Rotating Outages

Load reduction programs and emergency operating plans

Real-time energy supply tight

Day-ahead energy supply tight

Incentivize customers to conserve energy

Maintenance postponed to ensure resource availability

Heat Event

- 7 day outlook indicating record high temperatures across the Western U.S.
- CAISO BA peak load forecast is above 50,000 MW
- CAISO RA capacity is below forecast load
- Rest of WECC reporting potential record high loads
- No major transmission or generation outages

Labor Day Weekend 2022

Trade Date	RMO	Flex Alert	EEA Watch	EEA 1	EEA 2	EEA 3
August 31						
September 1						
September 2						
September 3						
September 4						
September 5						
September 6						
September 7						
September 8						
September 9						

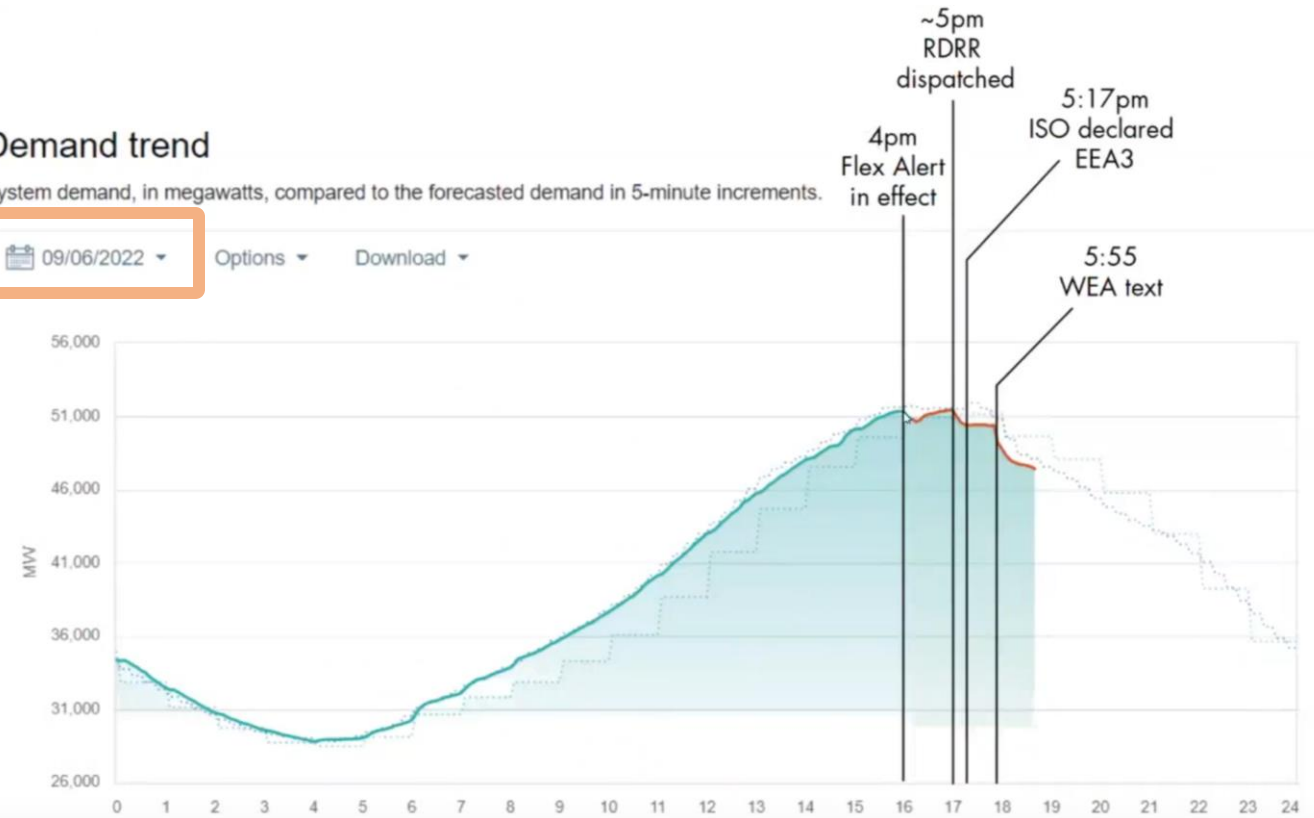
Demand trend

System demand, in megawatts, compared to the forecasted demand in 5-minute increments.

09/06/2022

Options

Download



Emergency Notifications

Energy shortages can be caused by persistent high heat, equipment failure, weather events, or natural disasters, such as wildfires. When electricity supply is tight, the California ISO uses an alert system to keep the public informed. The ISO recently transitioned to a series of notifications that match the North American Electric Reliability Corporation's (NERC) Energy Emergency Alert (EEA) system to be consistent with alerts used by the RC West and other balancing authorities in the Western Electricity Coordinating Council (WECC).

[Learn more about EEAs.](#)

● Flex Alert

A Flex Alert is a call to consumers to voluntarily conserve electricity when the ISO anticipates energy supply may not meet high electricity demand. Reducing energy use during a Flex Alert can prevent more dire measures, such as moving into EEA notifications, emergency procedures, and even [rotating power outages](#). Visit the ISO's [Flex Alert](#) website for energy conservation tips and to sign up for notifications.



● Restricted Maintenance Operations

When high demand is anticipated, the ISO will caution utilities and transmission operators to avoid taking grid assets offline for routine maintenance to assure that all generators and transmission lines are available.

● Transmission Emergency

Declared for any event threatening or limiting transmission grid capability, including line or equipment overloads or outages.

To learn more about emergency notifications, go to [ISO System Emergency procedures](#).

To monitor grid conditions, visit [Today's Outlook](#) and download the [ISO Today mobile app](#).

● Energy Emergency Alert Watch (EEA Watch)

Analysis shows all available resources are committed or forecasted to be in use, and energy deficiencies are expected. This notice can be issued the day before the projected shortfall or if a sudden event occurs. Consumers are encouraged to conserve energy.

● Energy Emergency Alert 1 (EEA 1)

Real-time analysis shows all resources are in use or committed for use, and energy deficiencies are expected. Consumers are encouraged to conserve energy.

● Energy Emergency Alert 2 (EEA 2)

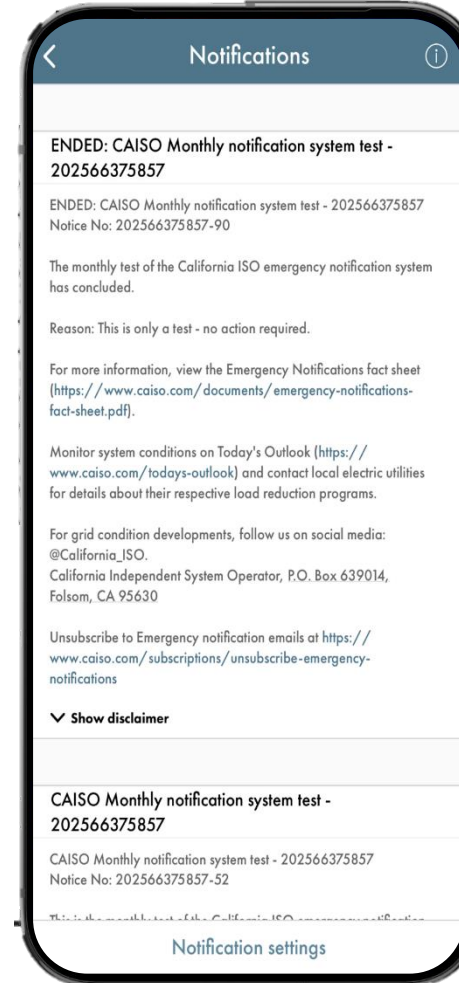
ISO requests emergency energy from all resources and has activated emergency energy programs. Consumers are urged to conserve energy to help preserve grid reliability.

● Energy Emergency Alert 3 (EEA 3) – Preparing for rotating power outages

The grid operator is unable to meet minimum reliability reserve requirements and has declared the initial step of an EEA 3. Utilities have been alerted to prepare for outages, but rotating outages have not been ordered.

● Energy Emergency Alert 3 (EEA 3) – Ordering rotating power outages

The grid operator has ordered utilities to begin rotating power outages to protect grid reliability. The final step of an EEA 3 is declared when electricity supply is not sufficient to meet demand and required reserves are unable to be maintained.



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Restricted Maintenance Operations (RMO)

What is happening in the Balancing Area (BA)?

Actual or potential impacts to balancing and/or transmission operation

What's needed?

Reschedule planned work to keep equipment and resources in service if outages could threaten grid reliability

By when?

Ideally issued in advance, day ahead

Flex Alert

What is happening in the Balancing Area (BA)?

Potential energy shortages or gas curtailments, ongoing grid issue (fire, natural disaster), variable or uncertain temperature forecast, cloud cover, etc.

What's needed?

Public awareness to reduce the demand for energy by voluntary means

By when?

Ideally issued in advance, day ahead

EEA Watch

What is happening in the Balancing Area (BA)?

Day ahead analysis is forecasting one or more hours energy deficient

RC Confirm / Translate

All available generation projected to be in use

What's needed?

Additional bids, incremental dispatch

By when?

Issued in advance, day ahead by 15:00 PPT

EEA 1

What is happening in the Balancing Area (BA)?

Real time analysis is forecasting one or more hours energy deficient

RC Confirm / Translate

All available generation in or projected to be in use

What's needed?

Be prepared for use of load management programs

By when?

Issued in real time, ideally hours ahead

EEA 2

What is happening in the Balancing Area (BA)?

All available resources are in use expected energy requirements will no longer be met
BA is still able to maintain Contingency Reserve (CR) requirements

RC Confirm / Translate

Load management procedures in effect

What's needed?

Additional bids, incremental dispatch, incrementally reduce exports, emergency assistance, evaluate transmission limitations

By when?

Issued in real time, current or next hour(s)

EEA 3 / Prepare for Potential Rotating Outages

What is happening in the Balancing Area (BA)?

Counting armed firm load as non-spin contingency reserves

RC Confirm / Translate

BA unable to maintain Contingency Reserves (CR), firm load interruption is imminent

What's needed?

Emergency assistance, evaluate transmission limitations

By when?

Issued in real time, current or next hour(s)

EEA 3 / Prepare for Possible Rotating Outages

- The notice issued by Operations will be titled “**EEA 3**”, but note that social media and news releases will indicate “**EEA 3 – Prepare for Possible Rotating Outages**”
 - Title difference is due to a limitation with the current operations notification system. This will be addressed later this year with a notification system replacement project.
- CAISO BA will contact the UDC/MSS entities capable of interrupting load (rotating outages) in 10 minutes
 - Could be needed if a contingency occurs to help keep the grid stable

**EEA 3 – Prepare for Possible Rotating Outages
is NOT an instruction to interrupt firm load**

**CAISO will issue Operating Instructions for firm load removal
DO NOT act based on System Status Update emails**

EEA 3 – Firm Load Interruption / Ordering Rotating Outages

What is happening in the Balancing Area (BA)?

Unable to maintain CR, manual load shedding is starting / in progress

RC Confirm / Translate

BA unable to maintain Contingency Reserves (CR), firm load interruption is in progress

What's needed?

Receive firm load shed operating instructions (rotating outages) via blast call

By when?

Issued in real time, “within in 10 minutes” in current or next hour(s)

EEA 3 – Firm Load Interruption / Ordering Rotating Outages

- The notice issued by Operations will be titled **EEA 3 – Firm Load Interruption** but note that social media and news releases will indicate **EEA 3 – Ordering Rotating Outages**
- This notice is a separate notice from the initial **EEA 3**
- CAISO BA no longer able to meet demand and will initiate firm load shed operating instructions (rotating outages) **via blast call**.
- Will still require load armed as contingency reserve to be available for contingency

Utilities should communicate with customers and rotate load blocks hourly in accordance with your respective emergency plans

Year	2022	MW Shed	500	Display Load Column
Shed Values				CAISO
	Zone	Fixed Pro-Rata Share	MW Curtailed	
<input checked="" type="checkbox"/>	Pacific Gas and Electric	46.38%	232.06	
<input checked="" type="checkbox"/>	Southern California Edison	39.09%	195.59	
<input checked="" type="checkbox"/>	San Diego Gas & Electric	8.50%	42.52	
<input checked="" type="checkbox"/>	NCPA	2.30%	11.51	
<input checked="" type="checkbox"/>	Riverside	1.22%	6.11	
<input checked="" type="checkbox"/>	Anaheim	1.00%	5.01	
<input checked="" type="checkbox"/>	Pasadena	0.51%	2.55	
<input checked="" type="checkbox"/>	Vernon	0.36%	1.80	
<input checked="" type="checkbox"/>	Valley Electric	0.30%	1.50	
<input checked="" type="checkbox"/>	Azusa	0.13%	0.66	
<input checked="" type="checkbox"/>	Banning	0.10%	0.50	
<input checked="" type="checkbox"/>	Corona	0.04%	0.20	

Restoration – Emergency Downgrade and Return to Normal

- 1. If firm load shed was required, CAISO BA will restore firm load as soon as system conditions allow**
- 2. MW restoration values will be determined by Shift Manager pro rata**
- 3. Downgrade from EEA 3 to EEA 2**
Operating Instructions to restore firm load
Operating Instructions to no longer “arm” firm load as Contingency Reserves
- 4. Downgrade from EEA 2 to EEA 1**
Operating Instructions and dispatch ended for RDRR and all available energy from UDC/MSS
- 5. End EEA 1 and EEA Watch**
- 6. Continued updates to Reliability Coordinator (RC) until event over and CAISO BA returned to EEA 0 with all Emergency notices cancelled**

CAISO communication methods

	X (formerly Twitter)	GMS	Emergency notification, MNS, Today's Outlook, ISO Today mobile app	Notice	Customer service email	System status update email	Blast call
Restricted Maintenance Operations		X	X				
Flex Alert (day ahead)	X		X	X			
Flex Alert (day of)	X		X	X			
EEA Watch (day of)	X	X	X	X		X	
EEA 1	X	X	X	X		X	
EEA 2	X	X	X	X		X	
EEA 3	X	X	X	X		X	X
All clear	X	X	X	X	X		

Subscribe or Unsubscribe

If you **would like to be added** to the Emergency Alert (EA) notification distribution list, sign up on the [caiso.com Emergency notifications page](#)

RC West area alerts also available on the [RC West subscriptions page](#)

Operational Procedures

NERC Standards

- [COM-002-4 - Operating Personnel Communications Protocol](#)
- [EOP-011-1 – Emergency Operations](#)

RC West Procedures

- [RC0410 – System Emergencies](#)

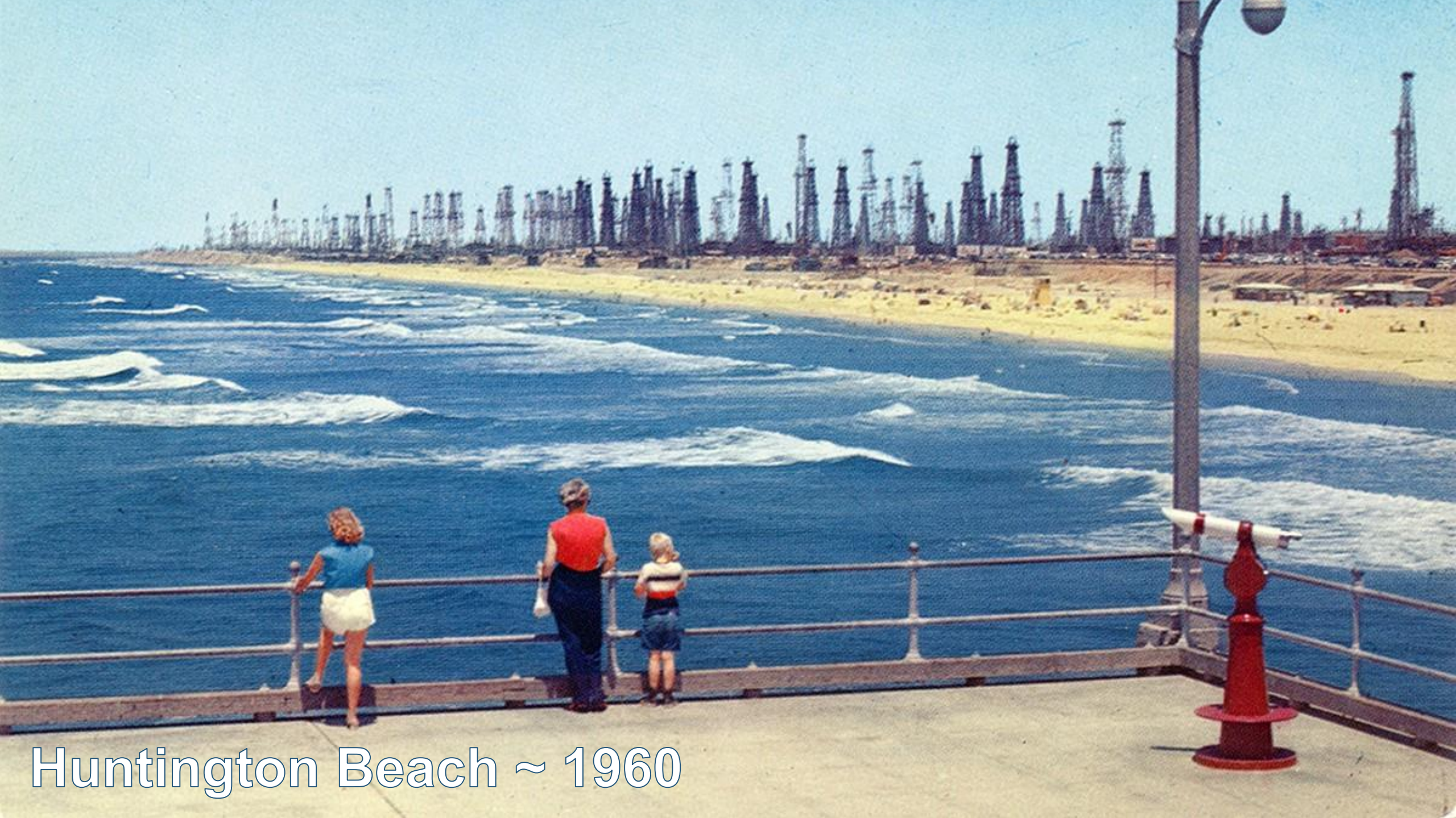
CAISO BA Procedures

- [4420 – System Emergency](#)
- [4410 – Emergency Assistance](#)
- [4510 – Load Management](#)
- [4510A](#)

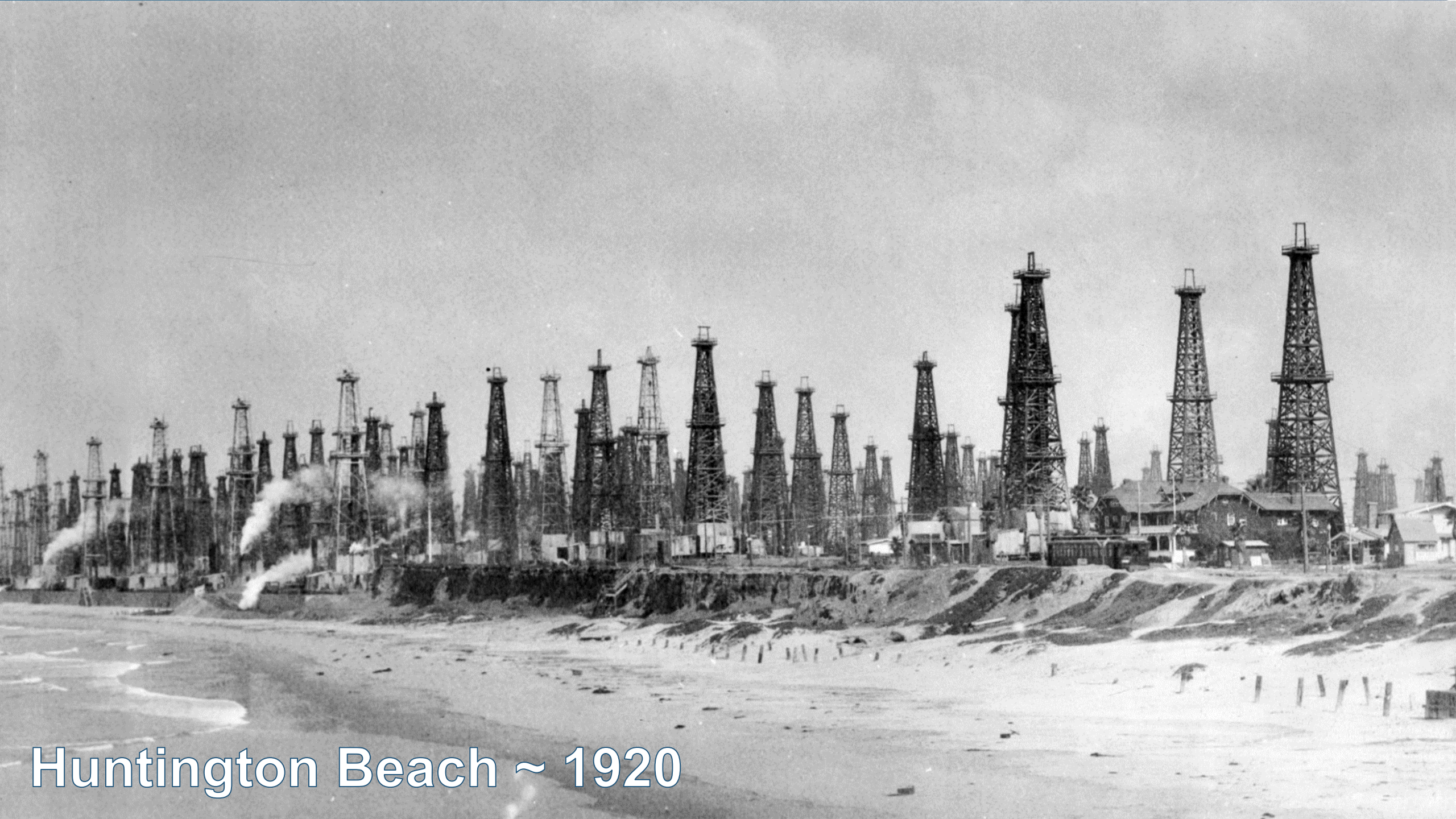
<https://www.caiso.com/rules/Pages/OperatingProcedures/Default.aspx>



Questions & Answers



Huntington Beach ~ 1960



Huntington Beach ~ 1920



For more details visit www.caiso.com or
contact CustomerReadiness@caiso.com