



Resource Performance Expectations

Welcome

Our presentation will begin shortly.

Today's Trainer:

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Why are we here?



To prepare resource owner/operators to effectively manage their resources to maintain market efficiency & grid reliability

It requires a partnership to ensure the safety and reliability of the grid!

What Will I Be Learning?



- Where do I fit within the ISO footprint?
- What are the differences between a Dispatch Instruction and an Operating Instruction?
- What are my resource performance expectations?
- What are my communication responsibilities?
- What are the consequences of not following my instructions?
- What happens during the different stages of the Energy Emergency Alerts process?
- What should you do if a threat to the grid is suspected?

Housekeeping



Keep yourself muted to minimize background noise



Unmute to ask verbal questions or write questions in the chat pod



Raise your hand using WebEx interactivity tools

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What's next?

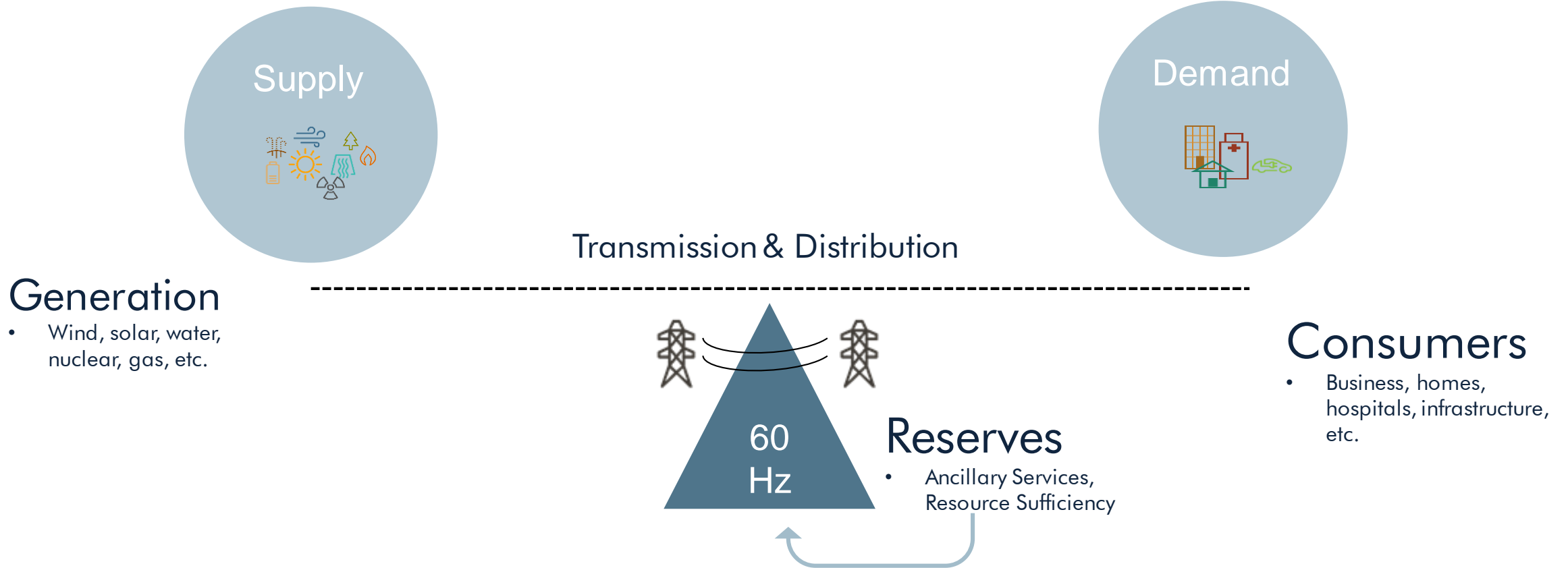
- This training is being recorded
- Recordings and presentations will be posted on the [ISO Learning Center](#) within 3 business days
- Questions gathered during this course will be collected and turned into a comprehensive Q&A guide after the conclusion of the 4 training course series
- This series kicks off Customer Education efforts to create a Resource Owner/Operator training track – stay tuned!



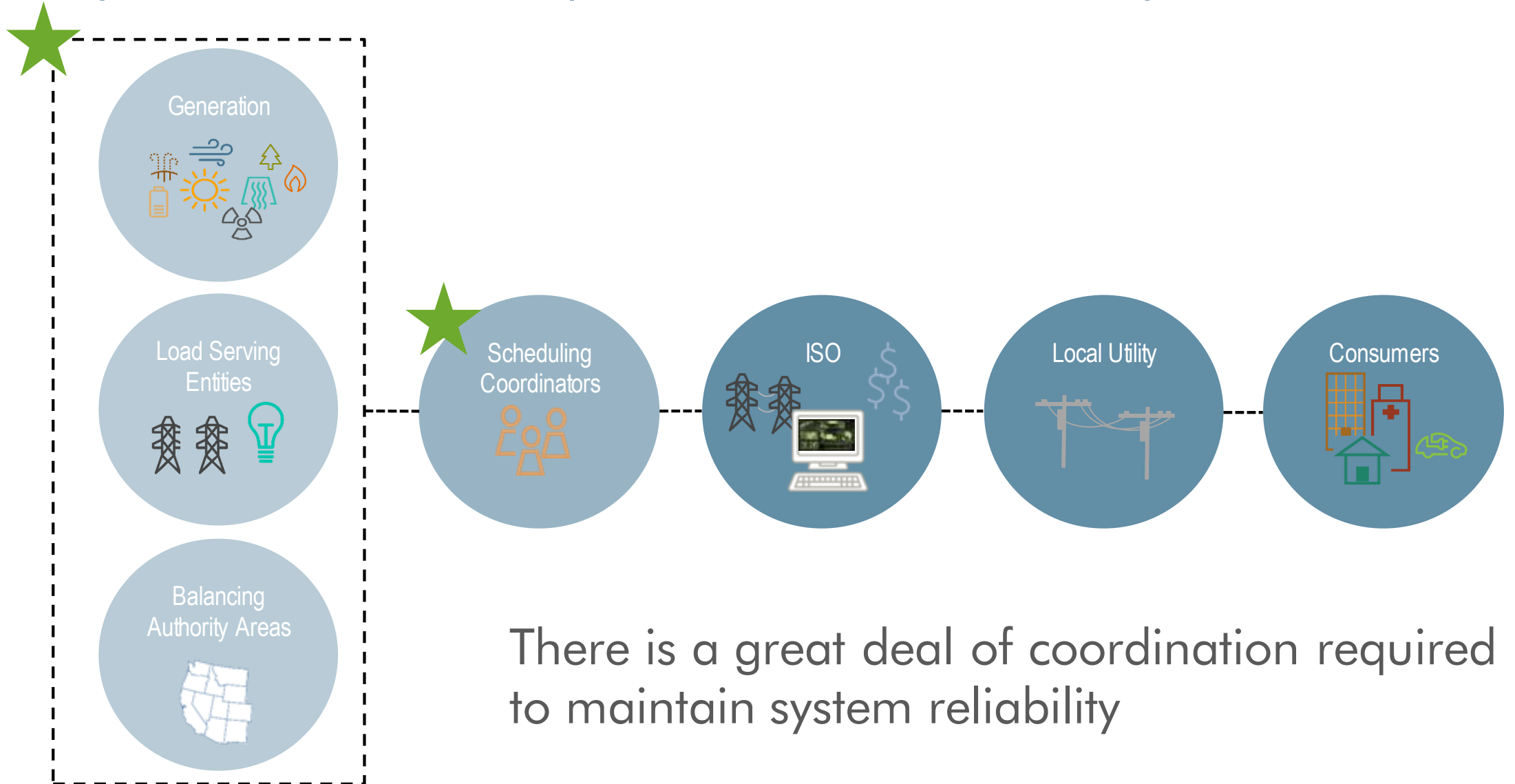
Foundational Information

How do you fit into the overall picture?

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



Participation with the ISO depends on the service to be provided



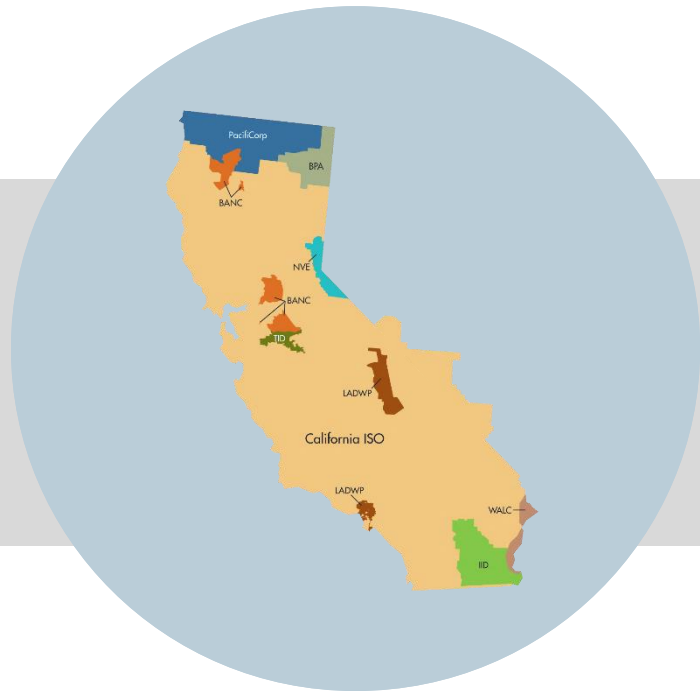
There is a great deal of coordination required to maintain system reliability

California Independent System Operator

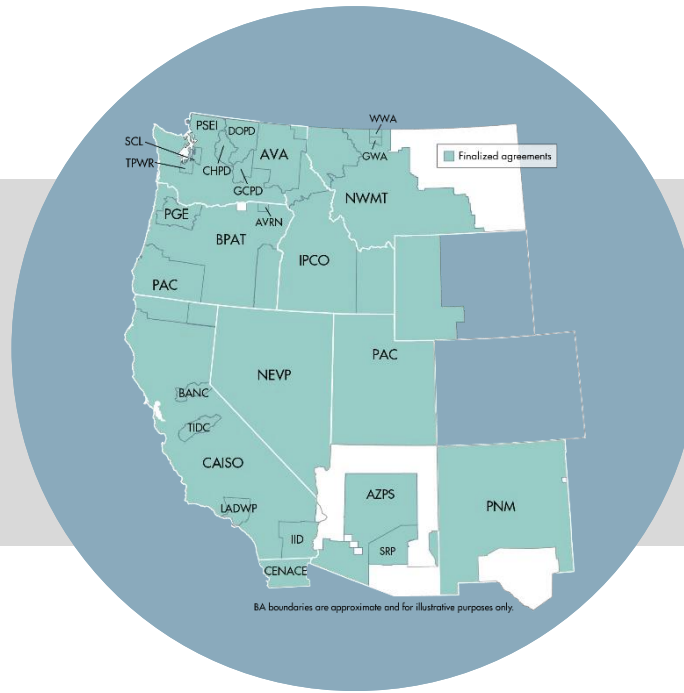
- Maintains reliability on the grid
- Manages the flow of energy
- Oversees the transmission planning process
- Operates the wholesale electric market
- Registered NERC entity



ISO Market and Reliability Footprints



ISO BAA



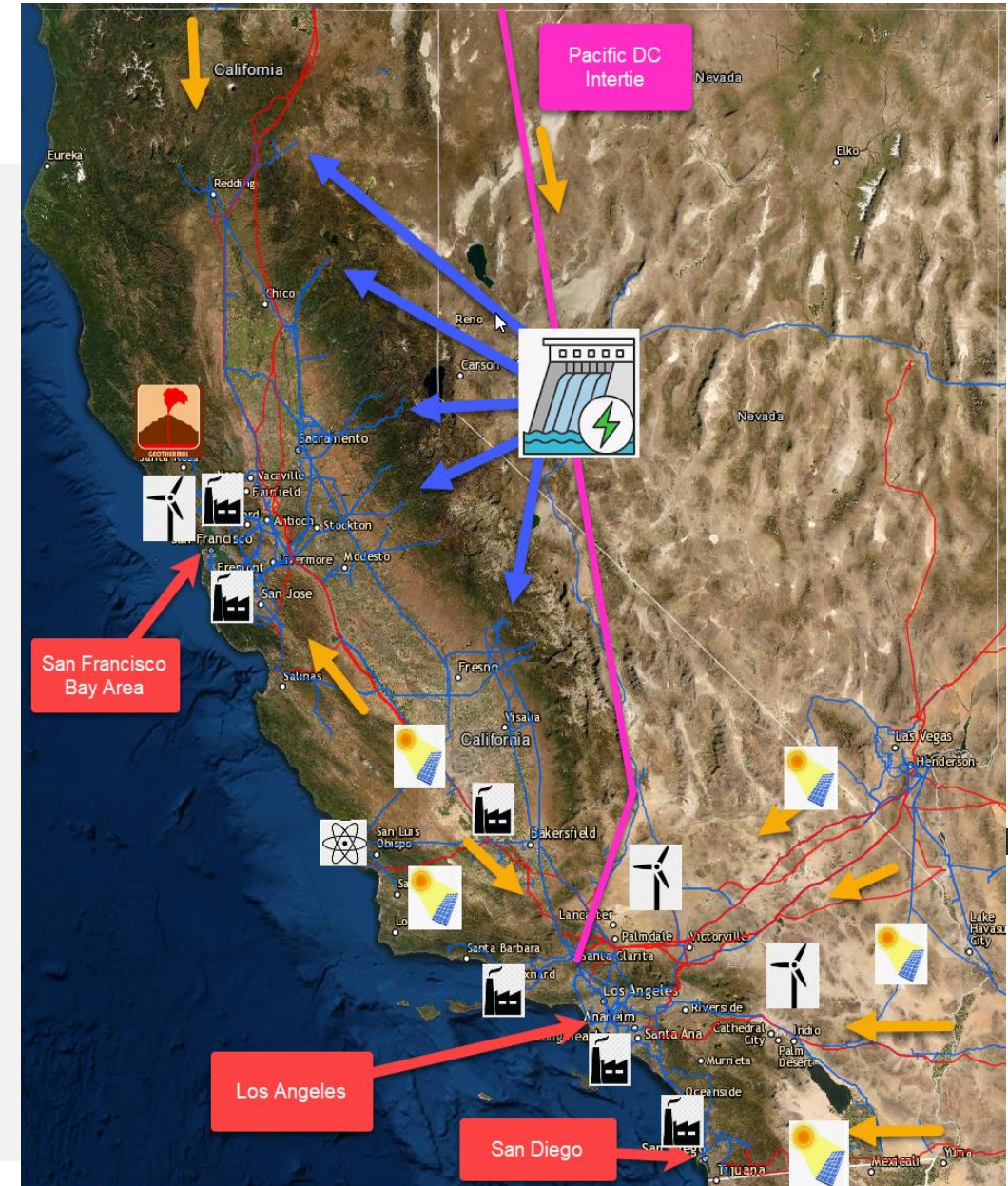
RC West



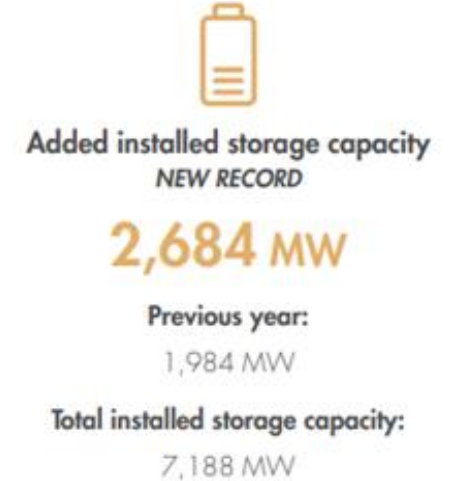
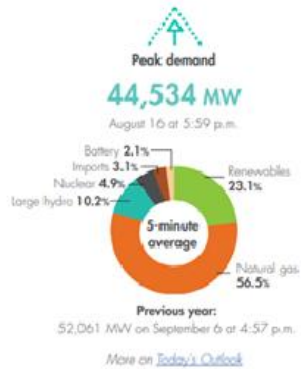
WEIM

Overview of CAISO's Grid

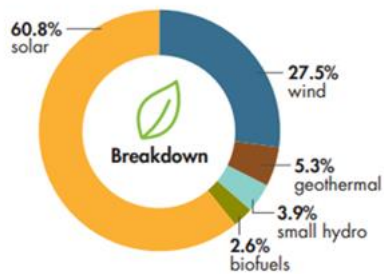
- 3 Major Load Centers and Investor Owned Utilities (IOU's)
 - Pacific Gas & Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E)
- Hydro power from the eastern mountain range (Sierra Nevada)
- 1 nuclear power plant (current retirement in 2030)
- DC Intertie (PDCI) from the Pacific Northwest's hydro power (3,100 MW)
- World's largest geothermal system ("The Geysers") 835 MW
- Natural gas fleet largely near the coastlines of the load centers
- Solar and Wind in less populated inland areas



2023 Statistics



Installed renewable resources (as of 02/01/2024)



	Megawatts
Solar	18,517
Wind	8,358
Geothermal	1,610
Small hydro	1,180
Biofuels	778
TOTAL	30,443

See [Today's Outlook](#)

Installed battery capacity⁴
7,261 MW
 As of 02/07/24; subject to change.

www.aiso.com



Commissioning of New Resources

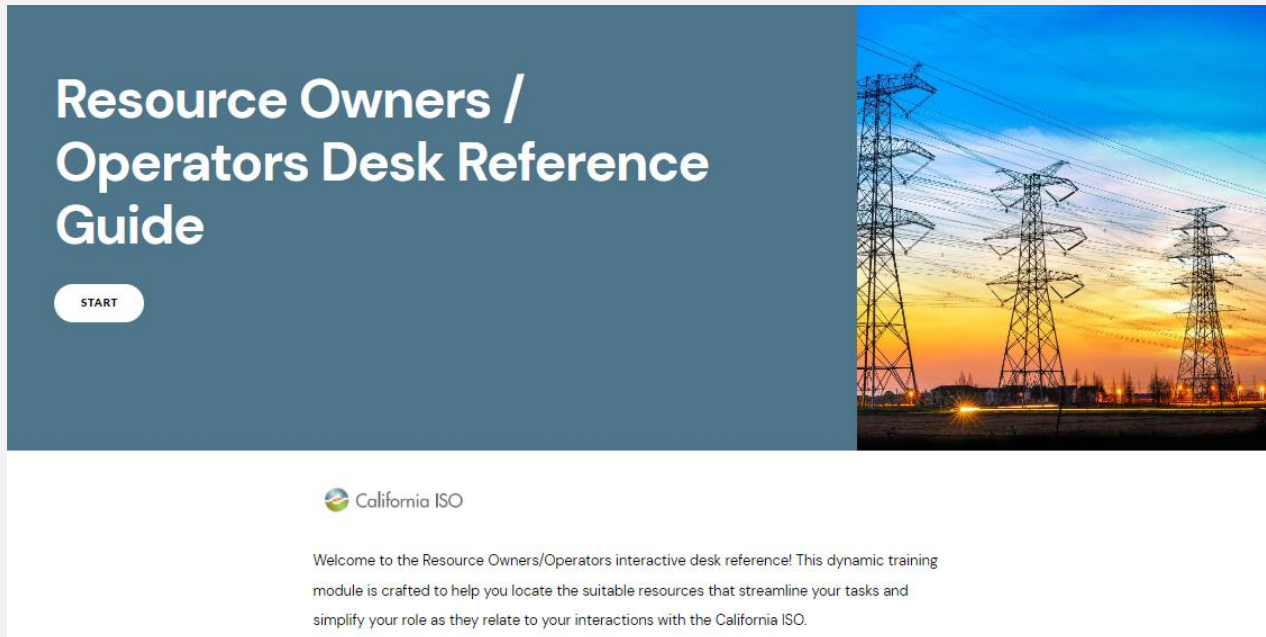
Resource Testing & Performance Guidelines

Initial set up and testing procedures

- Ensure proper set up and communication for resource testing and performance
- Communicate to ensure adequate control of resources
 - Operating Instructions
 - Respond to Operating Instructions (OI) within required time parameters
 - Must have control of resource(s) at all times
- Ensure proper updates for resource testing and availability
- Actively monitor your resource
 - Who is running the resource? Who has control? Can I manually place my resource on AGC?
If needed, can I take the site offline within 10 minutes
- Review CAISO Operating Procedures:
 - OP 5320 – Resource Trial Operations and Test Energy Process
 - OP 5320A – Test Energy for NGR Resources
 - OP 5330 – Resource Testing Guidelines
 - OP 5330A – Resource Test Request Form

What is your handoff process?

New reference guide to help Resource Owner/Operators find important information



Resource Owners / Operators Desk Reference Guide

START

California ISO

Welcome to the Resource Owners/Operators interactive desk reference! This dynamic training module is crafted to help you locate the suitable resources that streamline your tasks and simplify your role as they relate to your interactions with the California ISO.

Includes helpful links such as:

- Training Resources
- Knowledge Articles
- Policies & Procedures
- New Resource Implementation Documents

Available on the ISO Learning Center under the Market and Operations Learning Track

[California ISO - Learning center \(caiso.com\)](https://caiso.com)

New Resource Implementation (NRI) Webpage

California ISO

ABOUT US PARTICIPATE STAY INFORMED PLANNING MARKET & OPERATIONS RULES ISO EN ESPAÑOL

Search...

You are here

Transmission-level resource interconnection (using ISO procedures) ISO interconnection request ISO interconnection study ISO interconnection agreement ISO new resource implementation Sync date Trial operations COD date

Distribution-level resource interconnection (using utility procedures) Utility interconnection request Utility interconnection study Utility interconnection agreement

In parallel (outside of ISO/utility procedures) Permitting, engineering, procurement, construction

About Us
Participate
Resource Interconnection Guide
Become a Scheduling Coordinator
Scheduling Coordinator Ongoing Obligations
Energy Imbalance Market
Generation
Generator interconnection application process
● New resource implementation process
Demand Response and Load
Distributed Energy Resource Provider
Dynamic Transfers
Storage
Metered Subsystem
Transmission
Utility Distribution Company
Metering and Telemetry
Market Products
Application Access
Learning Center
Stay Informed
Planning

New Resource Implementation process and requirements

This webpage contains the guidelines, deliverables and activities needed during the final days of interconnection projects to successfully complete resource implementation to the ISO grid.

Getting started

- Determine how to start a project at the ISO.**
Using the resource list below, determine how you will submit your project request to the ISO.

Resource project types to be created through NRI:	Use:
<ul style="list-style-type: none">Distributed Energy Resource (DERP)SCM WEIM onboardingSCM WEIM updatesExisting resources converting from ISOME to SCME	<ul style="list-style-type: none">New Resource Implementation Quick Start GuideProject Details Form
- Review New Resource Implementation Guide**
Follow the guide to ensure a smooth transition from build to bid in the ISO markets.
- Review New Resource Implementation Checklist**
The checklist provides requirements based on project type.
- Review Resource Owners/Operators Desk Reference Guide**
Use this Interactive desk reference guide that provides links to training, knowledge articles, process documents, checklist, etc. regarding effective interactions with your SCs and the ISO.

If you have questions, please submit them either through the CIDI application or using the [Contact Us](#) form. If you have a project code, please include it (i.e. 19GEN1234) in the Subject field in CIDI. If submitting your question(s) through [Contact Us](#), please select "Other" from the subject drop down and include the project code, if you have one, in the Comment field.

All other project types to be created through RIMS:	Use:
	<ul style="list-style-type: none">RIMS Quick Start GuideRIMS Project Details FormCreate RIMS Project

Provides guidance & ways to connect to help you through get your resource connected to the grid

[California ISO - New Resource Implementation \(caiso.com\)](https://caiso.com)

Learning Activity



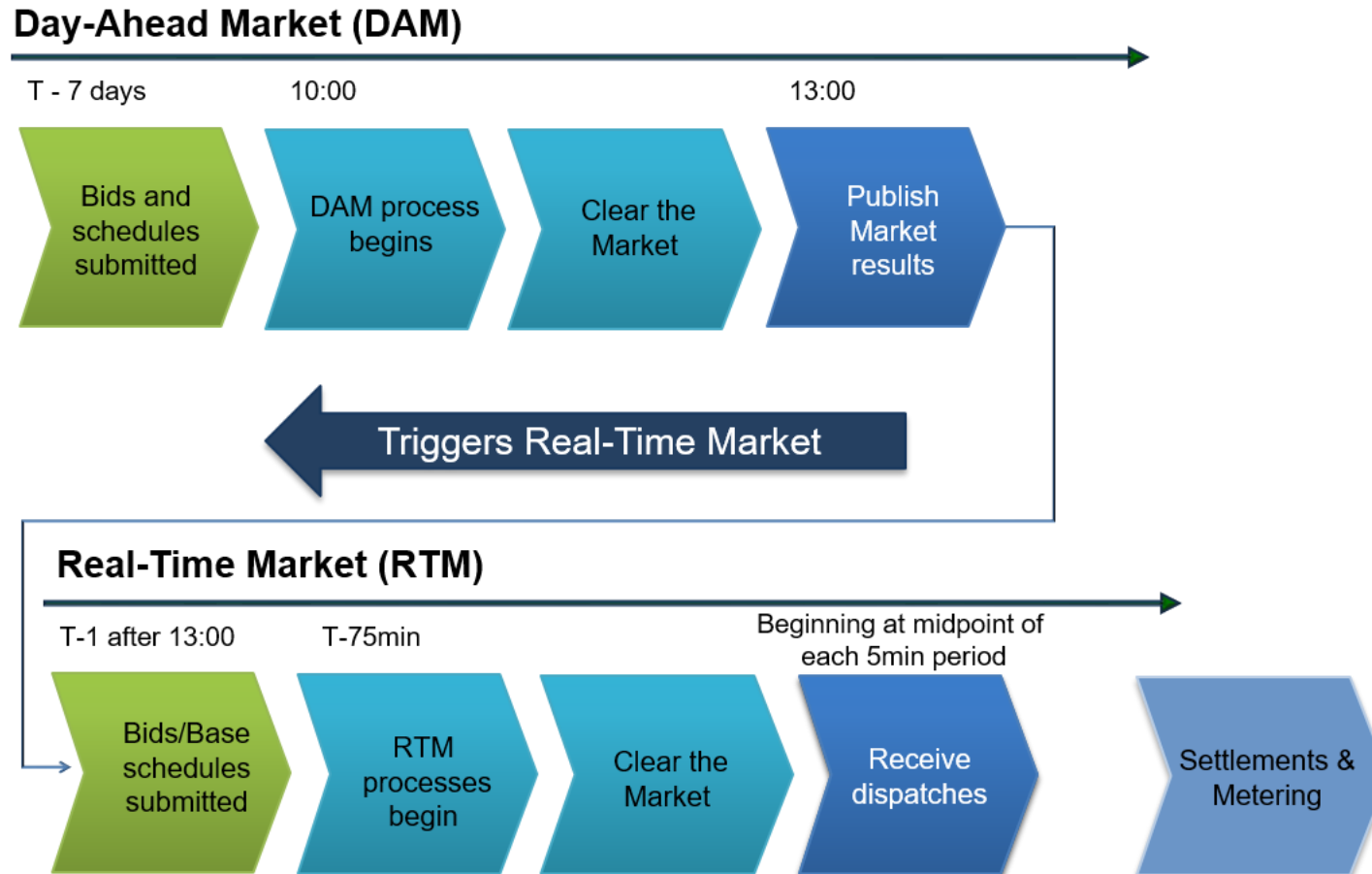
- Where do I fit within the ISO footprint?



Management of Resources

Expected Response to Dispatch and Operating Instructions

Market process timelines



Each transaction within the market is associated with a specific Scheduling Coordinator type, market activity, timeframe and charge code



Annual

Month Ahead

Day-Ahead

Hour-Ahead

Fifteen Minute

Five-Minute

The ISO uses SCUC to run the processes associated with the commitment of resources



- SCUC objective:
 - to minimize start-up and minimum load costs, bid in energy costs, and ancillary services costs, subject to network and resource-related constraints over the entire time horizon
- SCUC methodology:
 - maximizes economic efficiency, relieves network congestion, and considers physical constraints to achieve least-cost resource commitment and scheduling

SCUC –
Day-Ahead

Security constrained unit commitment

The ISO uses SCED as a centralized economic dispatch that optimizes the use of all resources

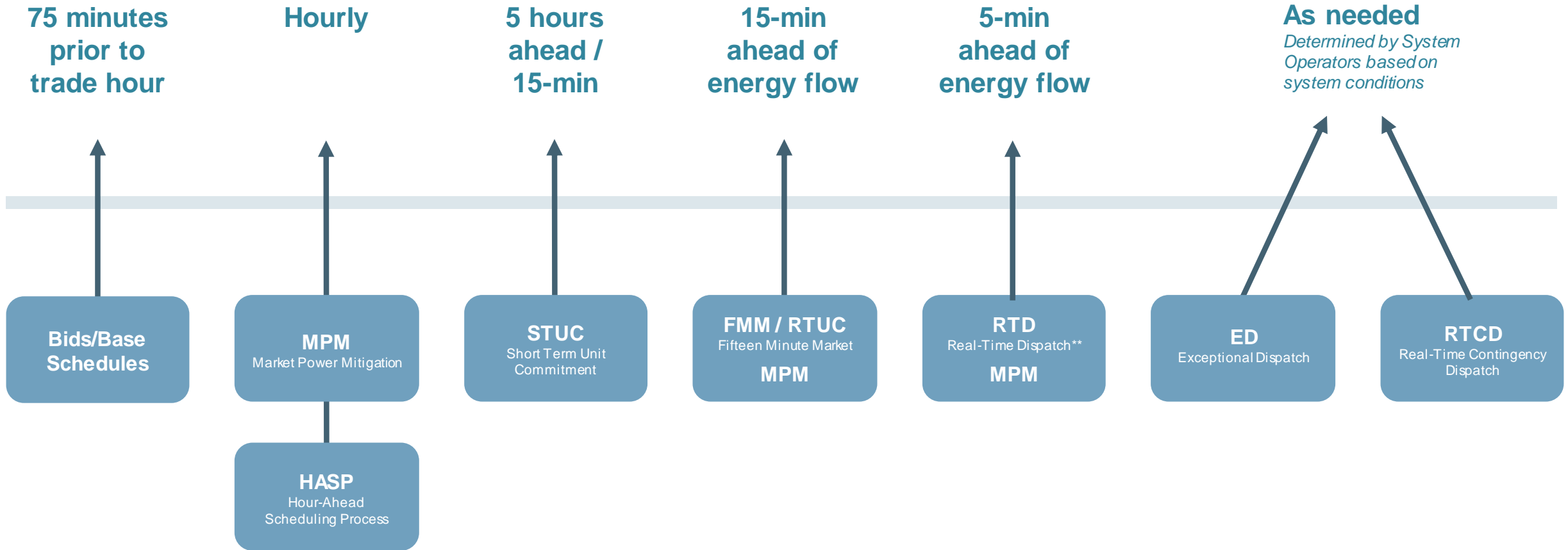


SCED – Real-Time

- SCED objective:
 - Reduces cost of serving demand
 - Resolves transmission constraints economically
 - Provides transparency on constraints and costs
- SCED methodology:
 - Re-dispatches system every five minutes to meet current system conditions

Security constrained economic dispatch

Real-time milestones



Resource instructions are sent via Automated Dispatch System (ADS)

RTM Outputs

- For each **fifteen-minute interval** the market is:
 - Starting-up or shutting down resources
 - Transitioning multi-stage generators
- For each **five-minute interval** the market is:
 - Issuing real-time dispatch instructions



Real-time contingency dispatch (RTCD) dispatches energy to respond to a grid disturbance or a system emergency such that waiting until the next normal economic (RTED) run is not adequate

RTCD

- 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)

Real-Time Market Process

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

ED

- 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

Real-Time Market Process

Role of the CAISO Generation Dispatcher

Mitigation



Communication

Balancing

Manage and mitigate within System Limits

~26,000 circuit miles of transmission

- ISO Transmission ↔ Utilities Participating Transmission Owners
- Scheduling Coordinators ↔ Resources

Manage Supply to meet Real-Time Demand

Serve ~80% of California demand

- Scheduling Coordinators ↔ Resources
- Reliability Coordinator ↔ Gen Dispatcher



Automated Dispatch System (ADS)

The screenshot displays the California ISO Automated Dispatch System (ADS) interface. It features several key components:

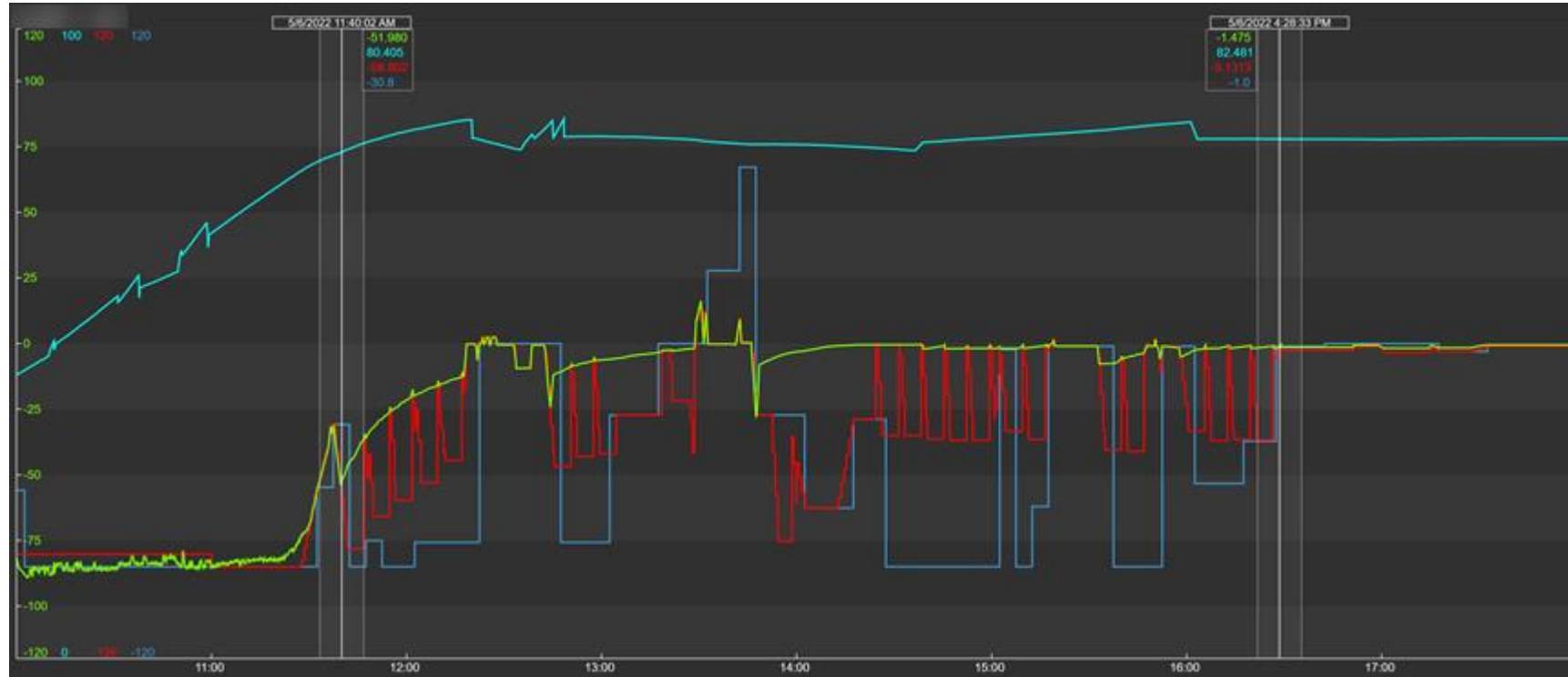
- Batch Status and Interval Grid:** A table at the top left showing dispatch intervals. The 'Current Interval' is 23:55-00:00, and the 'Dispatch Interval' is 00:00-00:05. The 'Received/Status' for the current interval is 23:56:19, 13:12.
- Options Menu and System Messages Grid:** A panel at the top right containing 'System Messages', 'Query Tool', 'Configurations', and 'Operator' tabs. It lists system messages such as 'Received new Hourly AS batch' and 'Received new Hourly DOT batch'.
- Resource Data Grid:** A large table in the center showing resource details. Columns include Resource Type (GEN), Resource ID, Config ID, DOT Type, SC ID, RT Prev DOT, RT DOT, RT Delta, Current DOT Delta, DOT Start Time, DOT End Time, and various commitment and dispatch metrics.
- Trajectory Plot for Specified Resource:** A line graph at the bottom left titled 'Trajectory Plot: 7STDRD_1_SOLAR1'. The y-axis represents power (0 to 1.0) and the x-axis represents time (23:05 to 00:45). It shows two data series: DOT (blue squares) and DOP (orange diamonds).
- Instruction Details Grid for a Specified Resource:** A table at the bottom right titled 'Instructions - Resource ID: 7STDRD_1_SOLAR1'. It lists individual dispatch instructions with columns for Instruction Type, Accept DOT, Accept Status, Award MW, ED Energy Code, Instr MW, Min Accept, Self Sched MW, Start Time, End Time, Prev Goto, Response, From Config Id, and To Config Id.

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 accurately

SCs and Resource Owner/Operators must work together

Example – Resource Not Following AGC Set Point Instruction



Green Plant MW Output
Red AGC Setpoint
Light Blue SOC as % of Max
Dark Blue DOT

Example – Energy Resource Not Following Dispatch Instruction



Command by Operators to preserve the state, status, output or input of a Bulk Electric System resource

Operating
Instructions

Emergency Instructions

- May be received via EMS and/or verbal communication
- May be received via ADS as a result of Operator intervention
- Required to be followed within given timelines and ramp requirements unless physically impossible

Complying with Operating Instructions

Tariff Requires Compliance with Dispatch and Operating Instructions

4.2.1 Comply with Dispatch Instructions and Operating Instructions

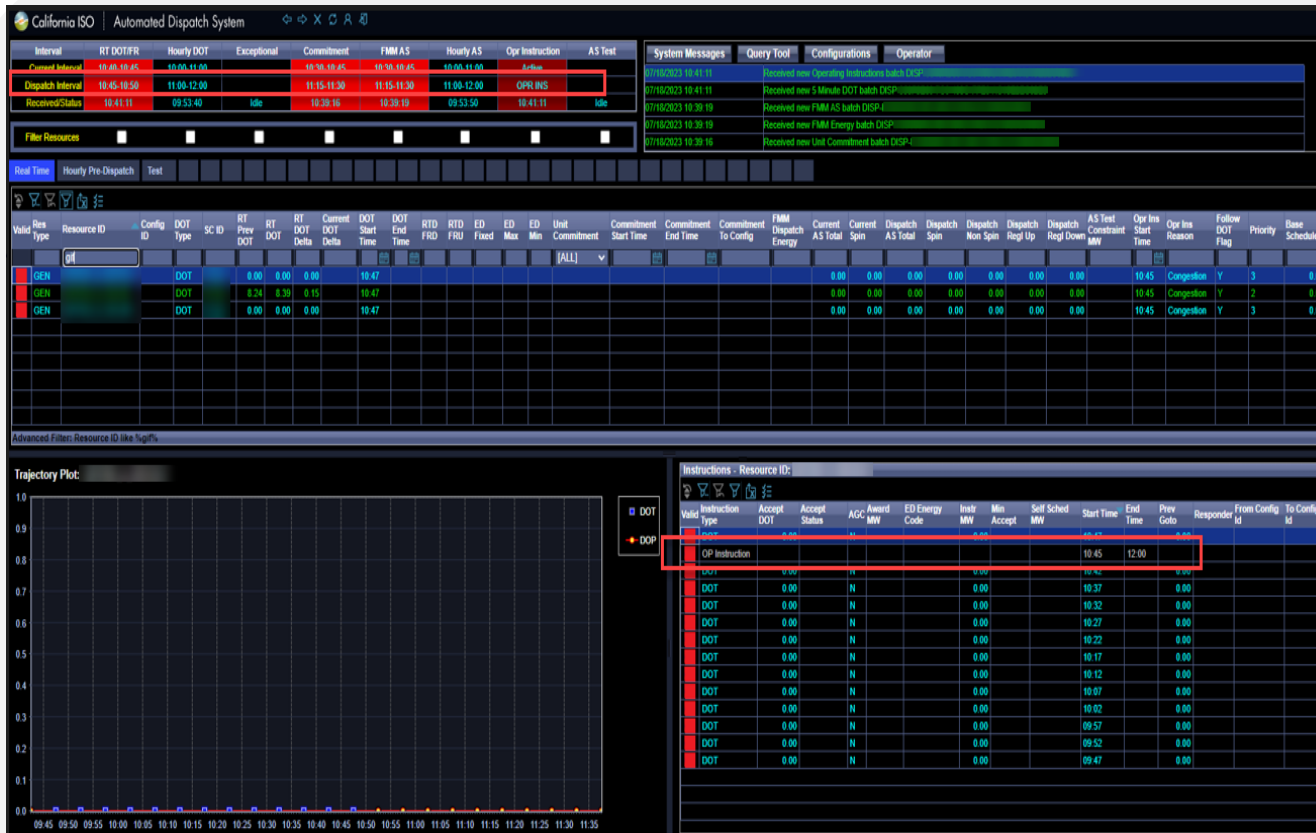
- With respect to this Section 4.2, all Market Participants, including Scheduling Coordinators, Utility Distribution Companies, Participating Transmission Owners, Participating Generators, Participating Loads, Demand Response Providers, Distributed Energy Resource Providers, Balancing Authorities (to the extent the agreement between the Balancing Authority and the CAISO so provides), and MSS Operators within the CAISO Balancing Authority Area and all System Resources shall comply fully and promptly with the Dispatch Instructions and Operating Instructions, unless such compliance (1) would impair public health or safety; (2) is otherwise exempted pursuant to Section 34.13.1; or (3) it is physically impossible for the Market Participant to perform in compliance with the Dispatch Instruction or Operating Instruction. Shedding Load for a System Emergency does not constitute impairment to public health or safety. The Market Participant shall immediately notify the CAISO of its inability to perform in compliance with the Operating Instruction.

Clarification of the differences between regulation set points in AGC, DOTs in ADS and Operating Instructions

- **Set Points**

- A megawatt output target for a participating generator. The ISO's 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 .
 - The total regulation for the whole system is allocated among all participating regulating units.
 - Base points that are set by non-economic dispatches are called **manual base points** (MBPs).

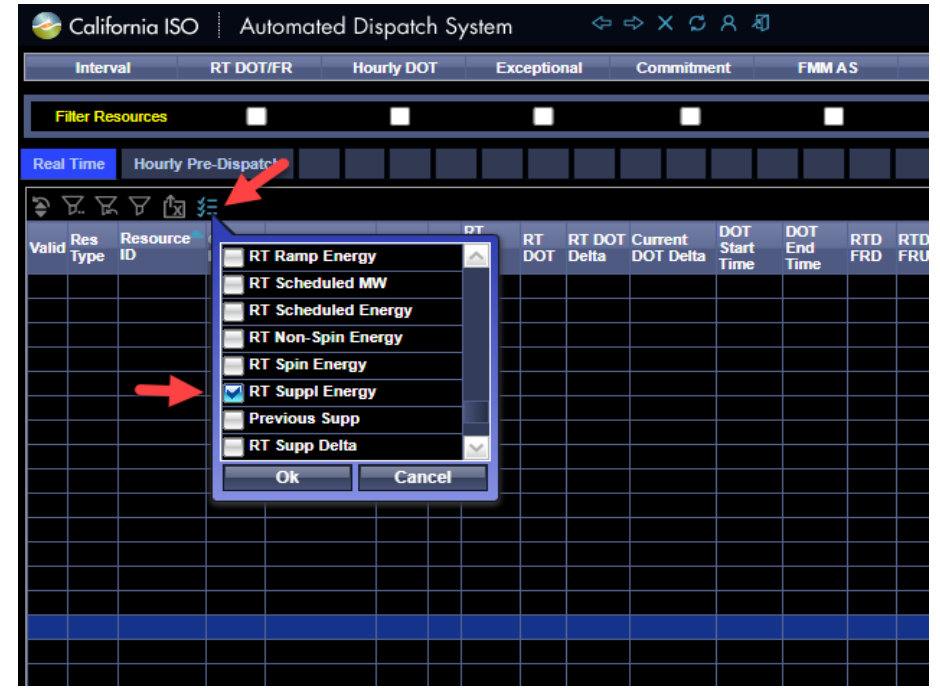
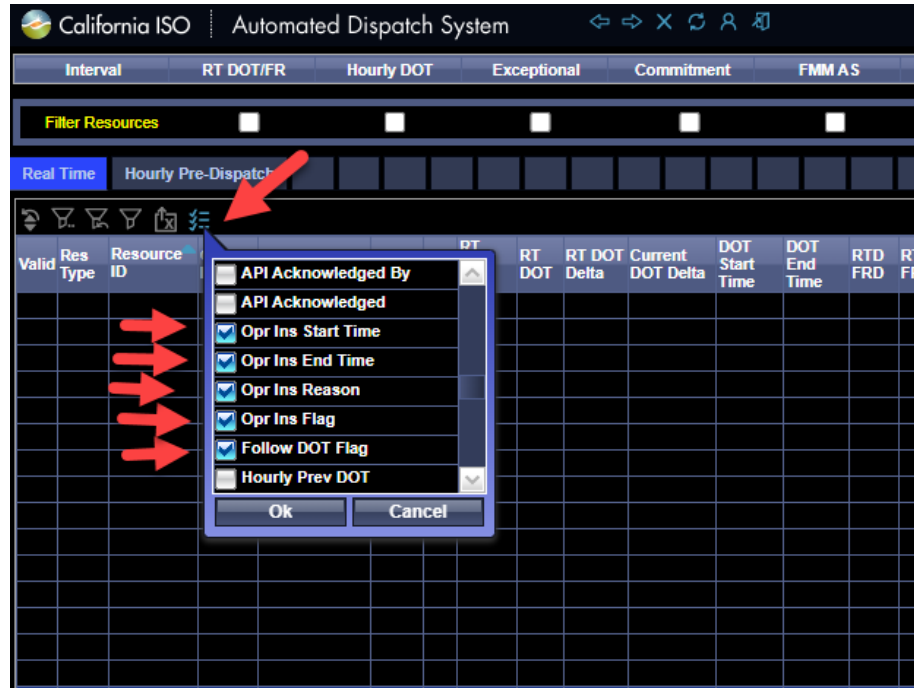
Example of Operating Instruction



- 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 acknowledgement should be visible when the first user from the SC organization acknowledges the pop up.
- The message shall only pop up once per user per time horizon of the instruction, and will remain until acknowledged by the user.

What Are Some Steps You Can Take To Improve Visibility?

Make These 6 Columns Visible To See Flags When Resources Are Not Following DOTs



This may significantly reduce the length of time resources fail to follow their DOTs

Resource Management Priorities

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4. Follow Dispatch Operating Targets accurately

SCs and Resource Owner/Operators must work together

Optimal dispatch representing a single point on the Dispatch Operating Point trajectory

Dispatch
Operating
Target

Daily Instructions

- Received via ADS
- Resources expected to perform as instructed and, for Eligible Intermittent Resources (EIRs) only, “produce as capable” unless they receive an Operating Instruction

Communicating unavailability of resources may be done using outages

When **should** an outage be submitted?

When a **physical** restriction limits a unit's output
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

What happens when the outage is ended or cancelled?

Update outage tool as soon as resource is available
The bidding tool does not check a resource's availability

Outages are treated differently in Day-Ahead vs. Real-Time

Day-Ahead

- After the outage's 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

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

Day-Ahead to Real-Time

Resource availability provided via outage data



Generation

- 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

Transmission

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

Resource outages may be **forced** or **planned**

What tool is used to communicate your outage?

Use OMS to Reflect Physical Limits of Resources

- The Outage Management System (OMS) is the primary method of communicating Outage related information. OMS provides an automated mechanism for parties to communicate all aspects of Outage information.
- OMS should be used for all physical limitations at the plant.
 - Early submission is highly encouraged.
 - Non-urgent outages should be scheduled based on the practices established in the Outage Management BPM.
 - Reference § 8.2 Outage Management BPM for Real-Time Outage Submissions.

Coordination & communication
ensure the safety of the grid!

What Information Is Required For Outages?

Solar Example

NEW GENERATION OUTAGE

Participant Name:

Outage Class: Generation

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

Emerg. Return Time/Type: Duration

Nature of Work: PLANT_TROUBLE

BA/TOP Confirmed:

Emergency: Operational:

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

RAS/SPS Reduced Redundancy: Y N N/A

Protection Zone: Y N N/A

EHS/ICCP Outage: Y N N/A

Opportunity:

Participant Outage ID:

GADS Cause Codes:

Time To Start Up:

Short Description: *
Test Outage

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

your SCID

Market Resource ID

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

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"/>	NDC <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

Nature of Work

your SCID

Market Resource ID

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

Participant Name:

Outage Class: Generation

Resource:

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

Emergency: Operational:

Nature of Work: PLANT_TROUBLE

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

RAS/SPS Reduced Redundancy: Y N N/A

Protection Zone: Y N N/A

EHS/ICCP Outage: Y N N/A

Opportunity:

- All Outage requests submitted to the CAISO OMS must have an associated NoW category assigned to it
- Captures relevant data for outage coordination, and increase consistency in the level of information reported
- Use of certain NoW categories will determine whether an Outage de-rate for an RA resource will be subject to Resource Adequacy Availability Incentive Mechanism (RAAIM) provisions

Refer to the Outage Management Business Practice Manual

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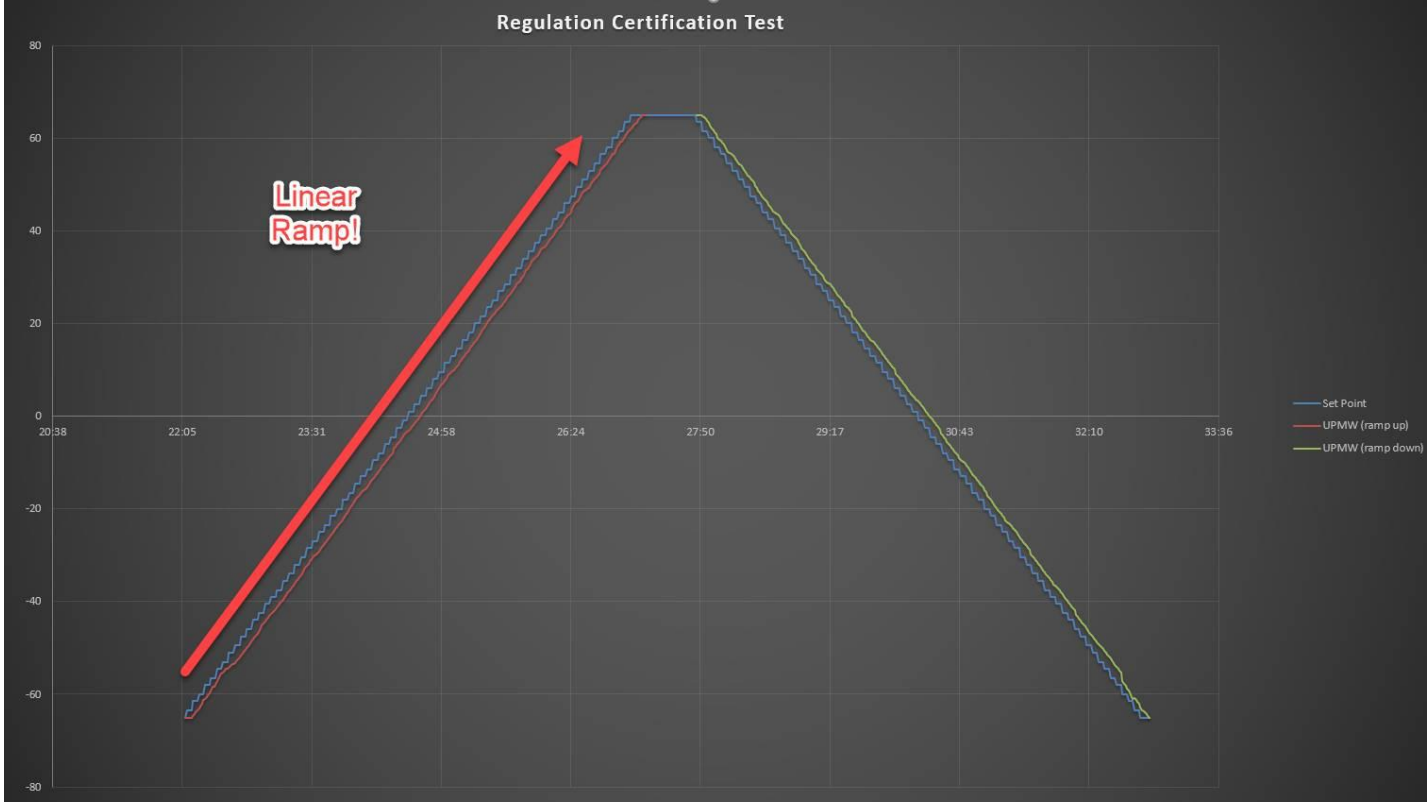
SCs and Resource Owner/Operators must work together

Ramping in Accordance with Operator Instructions

Linear Ramp Rate

- The set point will increment linearly from starting point to target at an agreed upon ramp rate.
- Set points will increment every 4 seconds from start to finish.
 - Resource expected to respond linearly as instructions are received.
- Resource response must never “Step” above its expected ramp rate during testing or normal operations.
- Default ramp rate should be a controlled value.

Example of a Successful Test with a Linear Ramp



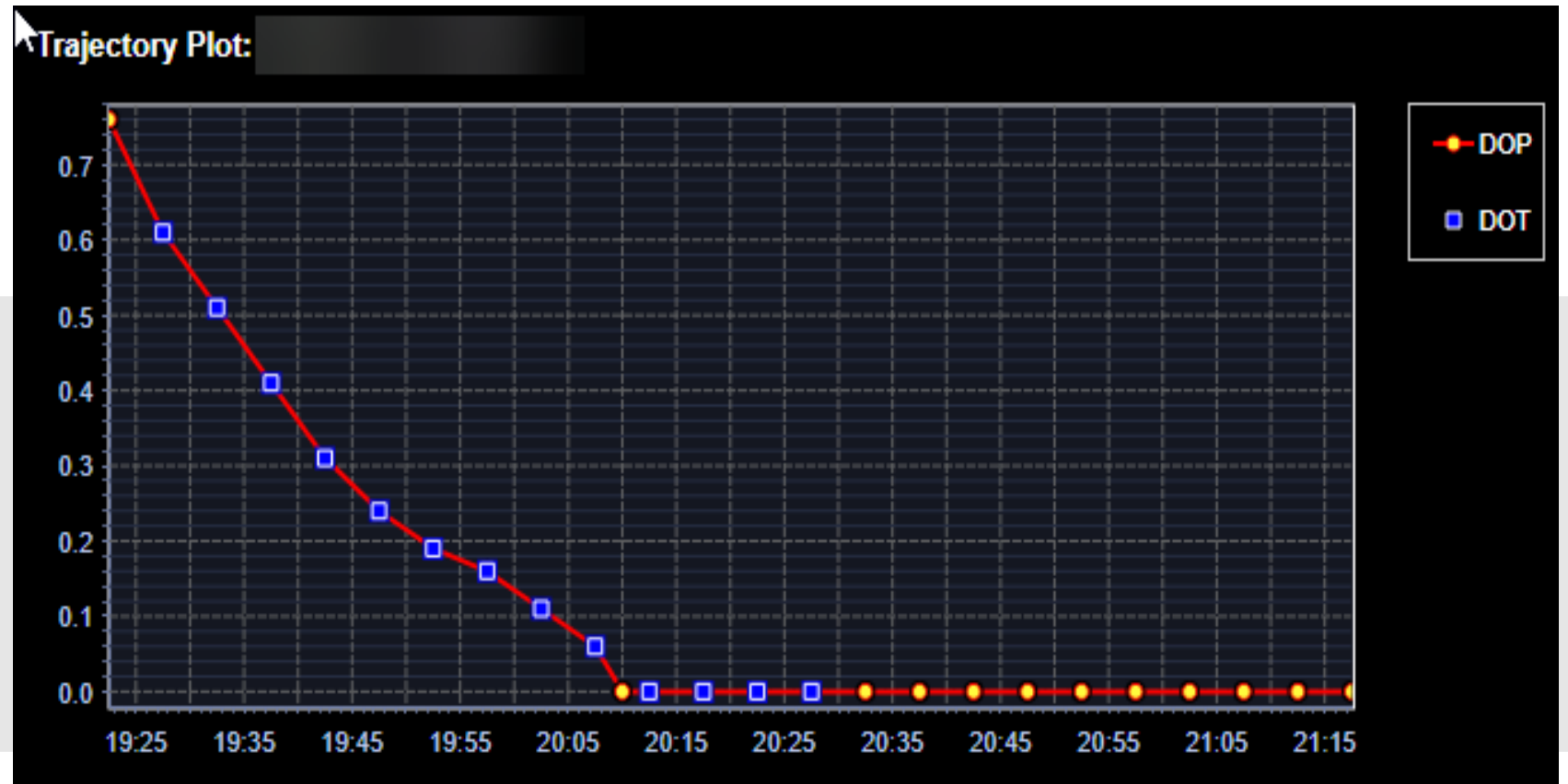
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Optimal dispatch representing a single point on the Dispatch Operating Point trajectory

Daily Instructions



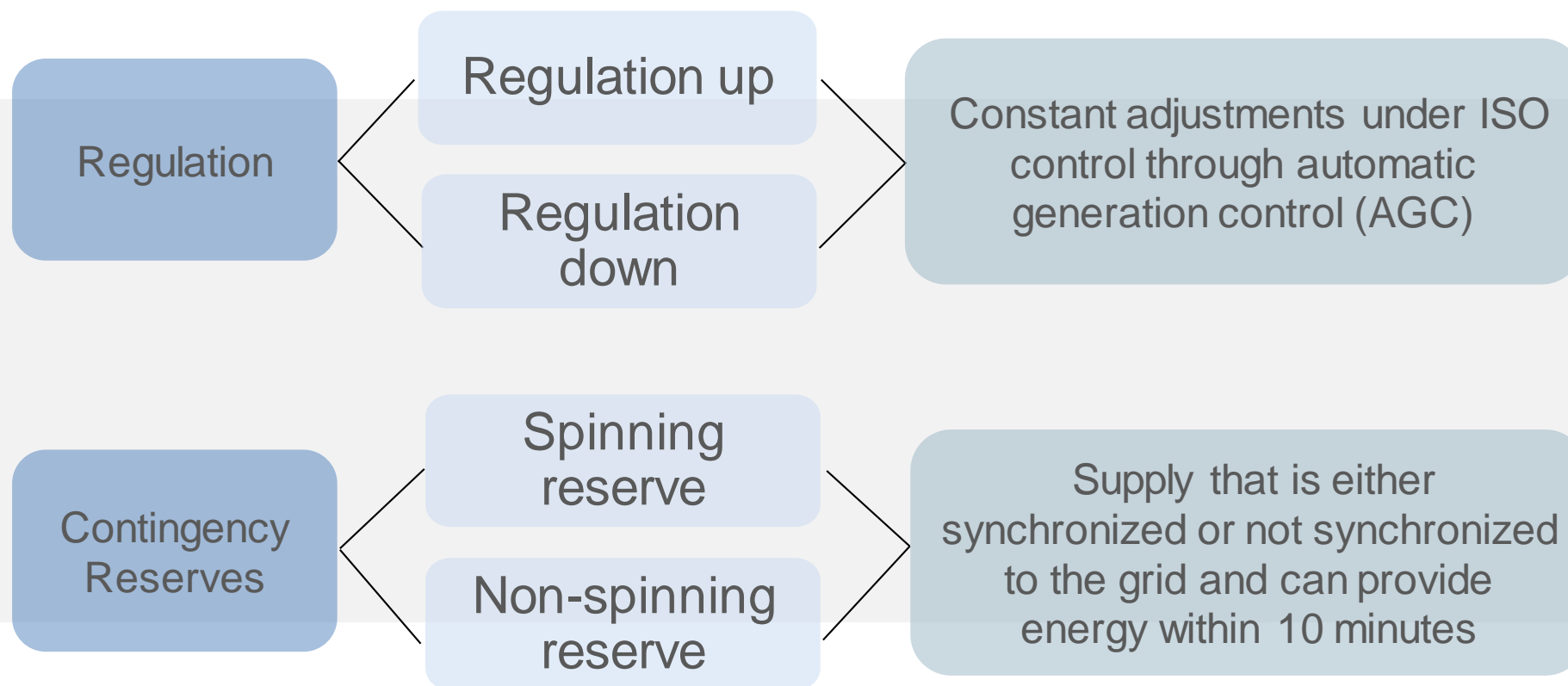
Ancillary Services

Ancillary Service (AS) awards in Real-Time

- Used to account for change in system conditions
 - Replacement for day-ahead awards that are not available in real-time
 - Changes to load forecast
 - Replacement of converted capacity (DA AS awards used)
 - Additional requirements in regional areas
- AS awards:
 - are designated as contingency only capacity
 - may be converted from capacity into energy in the event of a system disturbance

Applicable to ISO Balancing Authority Area Only

Ancillary services ensure reliability as electricity is moved from generating sources to customers



Ancillary Services Requirements

- Resources with awards for A/S must submit real-time energy bids for those awards
- Nuances for Regulation:
 - **Regulation Down** must submit a self-schedule in real-time (we need to ensure that they are at the top of the Regulation range to bring them down)
 - does not apply to storage resources
 - **Regulation Up** can submit a self-schedule or an economic bid

Section 7.1.6 of the BPM for Market Operations, Real-Time Energy Bids

Expectations for Ancillary Services (A/S) Certified Resources

Performance for Reliability

In order to provide Regulation, be able to:

- ramp on and off Automatic Generation Control (AGC) to DOP in linear fashion
- stay on AGC for entire duration of A/S award and have manual controls to place on AGC
 - The ADS AGC flag is a courtesy feature for AGC notification; however, the resource must have the capability to have manual control to place on AGC
 - *Note: Do not program your controllers to rely on the ADS AGC feature alone*
- follow 4 second set points accurately
- show that regulation range reflects accurate capability
- ensure Outage Management System (OMS) reflects true capability and availability of resource
 - Resource cannot be on AGC providing Regulation with failed Telemetry
 - OMS Metering Telemetry card required with A/S fields set to 0 availability

What steps does the ISO take if you cannot perform and have not communicated your resource limitations?

Performance for Reliability

- CAISO Generation Dispatcher will create internal tickets flagging a resources inability to perform:
 - CAISO will issue the following:
 - an official letter stating importance of reliability and adhering to regulatory standards, requesting;
 - completion of training
 - detailed root cause analysis that led to inability to perform and what has been done to rectify the situation
 - potential Ancillary Service (AS) block preventing AS awards
 - potential removal from market
 - for repeat offenders; potential referral to Department of Market Monitoring (DMM)

Resolution requires submission of proof through CIDI and approval from ISO Operations Management

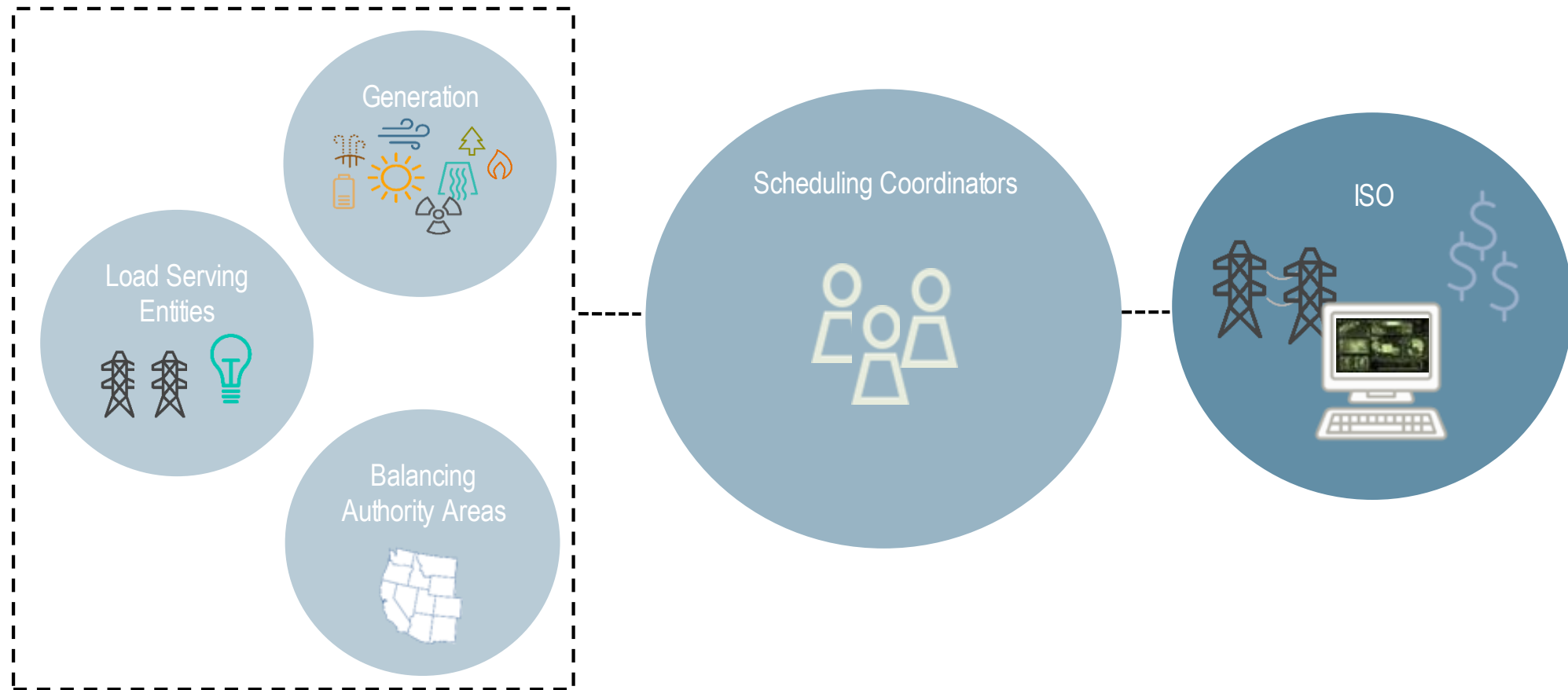
Learning Activity



- What are the differences between a Dispatch Instruction and an Operating Instruction?
- What are my resource performance expectations?

Communication

A great deal of coordination and appropriate communication is required to maintain reliability



Learning Activity



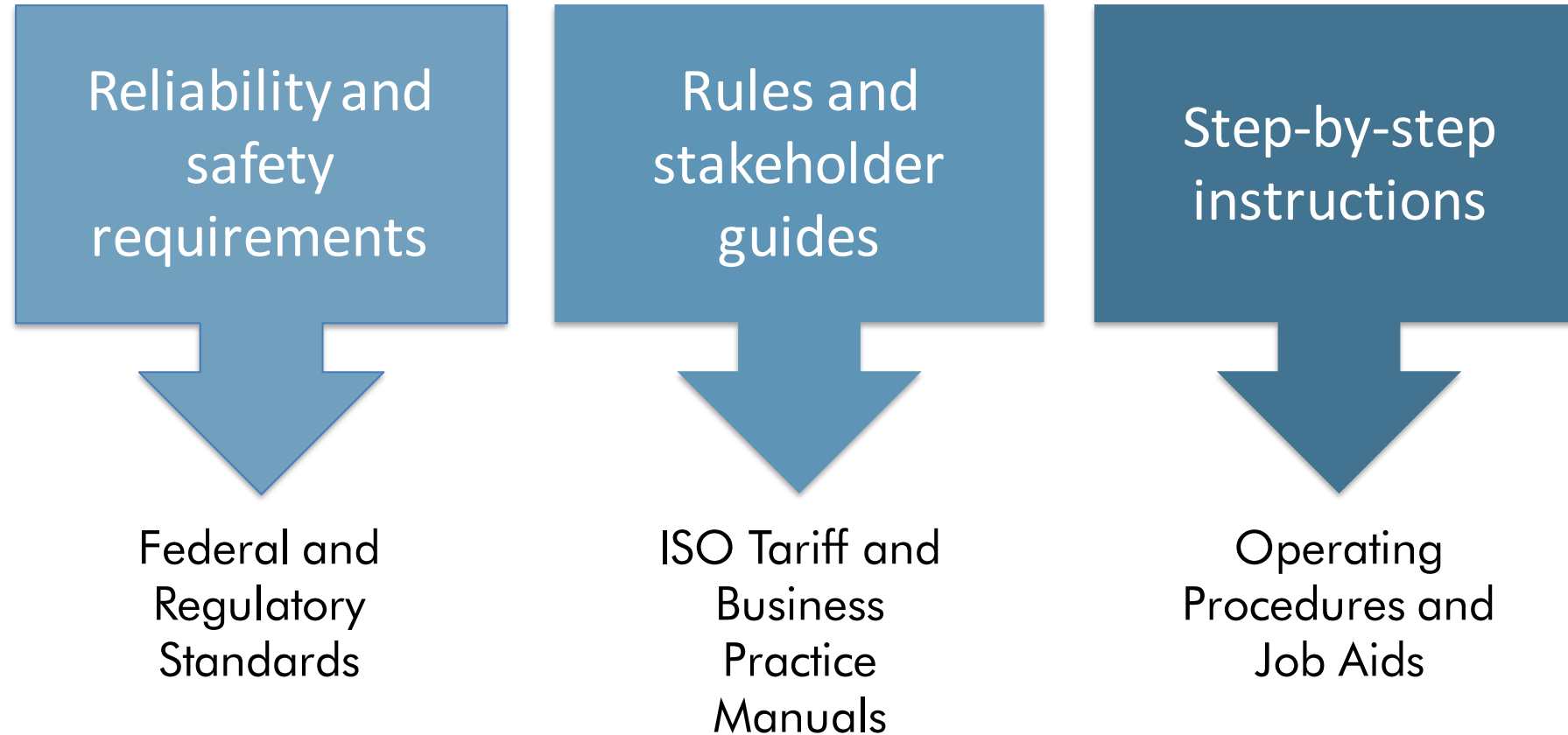
- What are my communication responsibilities?



Failure to Comply with Operator Instructions

Settlements, Regulatory, and Enforcement Implications

Rules, guidelines and instructions define market and reliability processes



Possible Implications of Non-Response

Settlements

Economic
Consequences

Regulatory

Contractual
Consequences

Enforcement

Report or referral to
FERC,
NERC/WECC
CAISO DMM

Resource Performance Issue for resources within the ISO BAA

- New process to increase 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:

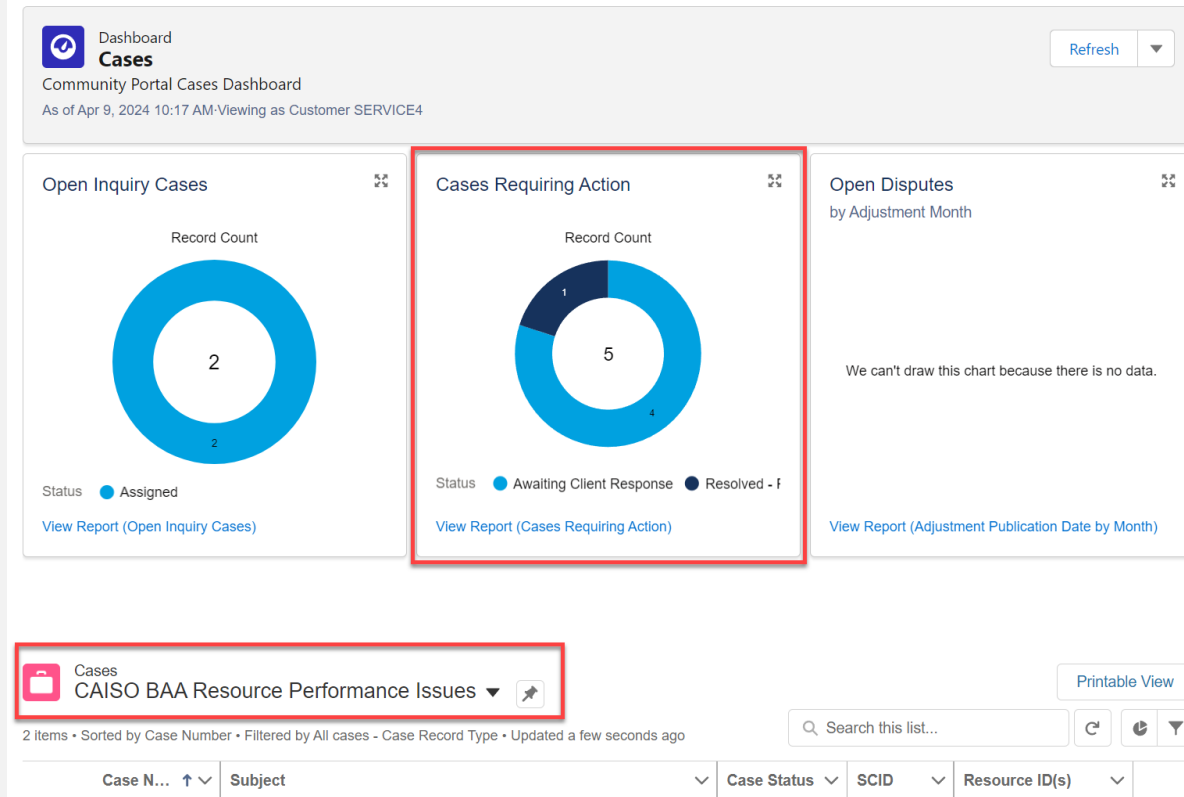
Failed to follow DOT

Failed to ramp in linear manner

Failed to transition correctly between AGC to DOT

Failed to be on and/or follow AGC

Resource Performance Issues will be tracked in CIDI



- Primary, Compliance, and Regulatory contacts will be notified of the new CIDI Case
- Important to monitor and respond to performance issues in a timely manner
- New CIDI list found under the reports titled CAISO BAA Resource Performance Issues

Your cooperation in maintaining system reliability is critical & appreciated!

Learning Activity



- What are the consequences of not following my instructions?



Emergency Response

How does it work?

Emergency Playbook Review

Emergency Playbook

4 – 7
Days Out

Operational Assessments	Monitors demand forecast 7 days out, assesses resource adequacy, system conditions, weather, and other potential grid impacts, and plans for next possible steps
Operational Coordination with External Entities	Depending on actual and potential system conditions, outreach and coordination re: possible extreme event to: <ul style="list-style-type: none">• 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 High temperature heads up via <ul style="list-style-type: none">• CAISO website• CAISO social media

Available on the caiso.com website with this link
(or search “Summer Heat Event”): <http://www.caiso.com/Documents/SummerHeatEvent-ProcessandCommunications.pdf>

Emergency Playbook

1 – 4
Days Out

<p>Operational Assessments</p>	<p>Reviews and validates most current information on actual and potential system conditions, resource adequacy, weather, and other potential factors impacting the grid.</p>
<p>Operational Coordination with External Entities</p>	<p>To prepare entities for possible conservation efforts and free up additional supply, CAISO may take the following actions: Initiate communication to:</p> <ul style="list-style-type: none"> • Water agencies (CDWR, MWD) • Neighboring Balancing Areas • Emergency Load Reduction (ELRP) Board • Utilities • RC West • Regulatory Agencies <p>Coordinate the following:</p> <ul style="list-style-type: none"> • Requests for DOE 202c Orders • Emergency supply above approved permit and/or GIA • GO Proclamation of a State of Emergency and/or GO Executive Orders
<p>Public and Customer Communications</p>	<p>CAISO may issue Restricted Maintenance Operations (RMO) via:</p> <ul style="list-style-type: none"> • ISO Today mobile app • MNS • Email • Today's Outlook <p>Also publicly posted:</p> <ul style="list-style-type: none"> • DOE Orders • GO Proclamations and Orders

Emergency Playbook

1 Day
Out

Operational Assessments	Reviews and validates Day Ahead Market results and most current information on actual and potential system conditions, resource adequacy, weather and other potential factors impacting the grid.
Operational Coordination with External Entities	Operational coordination with: <ul style="list-style-type: none">• Utilities• Neighboring BAs• ELRP Board• RC West
Public and Customer Communications	CAISO may issue Flex Alert and/or EEA Watch notice via: <ul style="list-style-type: none">• ISO Today mobile app• MNS• Email• News release• Daily Briefing notice• Social media• FlexAlert.org

Emergency Playbook

Operating Day

Operational Assessments	Reviews actual and potential system conditions and takes actions in accordance with Operating Procedures.
Operational Coordination with External Entities	Operational coordination with: <ul style="list-style-type: none"> • Utilities • Neighboring BAs • ELRP Board • RC West
Public and Customer Communications	CAISO may issue Flex Alert and/or EEA Watch notice via: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • ISO Today mobile app • MNS • Email • Today's Outlook • Social media

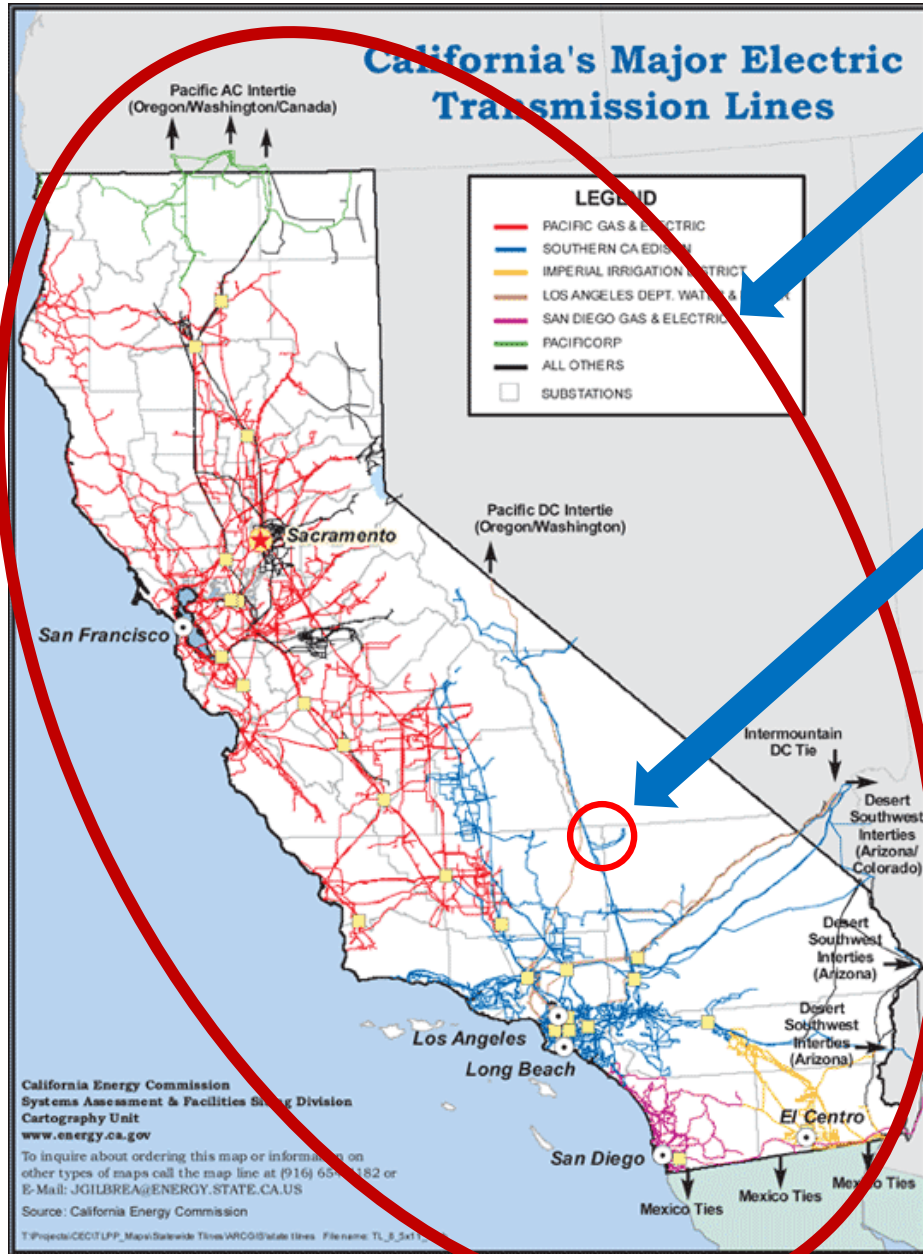
Energy Emergency Alerts (EEA) Overview

Emergency Alert Levels

EEA

Emergency Alert Levels
Flex Alert
Restricted Maintenance Operations
Transmission Emergency
EEA Watch
EEA 1
EEA 2
EEA 3*
EEA 3 – Firm Load Interruption*

coordination of both voluntary and mandatory load interruption programs



Being short on energy (**Flex Alerts, EEAs**) affects the whole system.

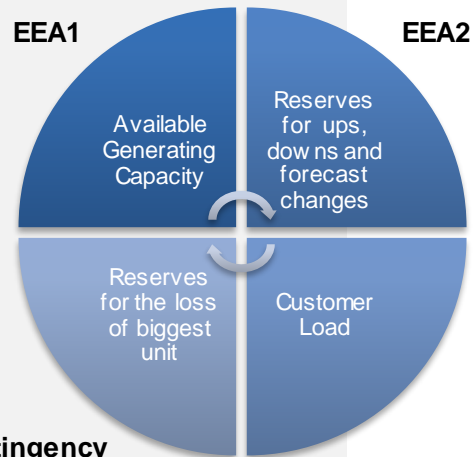
A **Transmission Emergency** affects only a particular location based on transmission lines, flows, and equipment.

It's possible to have one or both alerts at the same time.

Emergency Notification Levels

Notifications Levels	BA What is happening?	What's Needed?	By When?
Flex Alert	Potential energy shortages or gas curtailments, ongoing grid issue (fire, natural disaster), variable or uncertain temperature forecast, cloud cover, etc.	Public awareness to reduce the demand for energy by voluntary means	Ideally issued in advance – day ahead
Restricted Maintenance Operations	Actual or potential impacts to balancing and/or transmission operations	Reschedule planned work to keep equipment and resources in service if outages could threaten grid reliability	Give advanced notice (1 day+) if possible
Transmission Emergency	Could be system wide or could be local transmission limitation DR/interruptible/non-firm load dispatched-off	Load management procedures may be in effect in impacted area Additional bids, incremental dispatch, emergency assistance, evaluate transmission limitations	Issued in real time – current/ next hour(s)

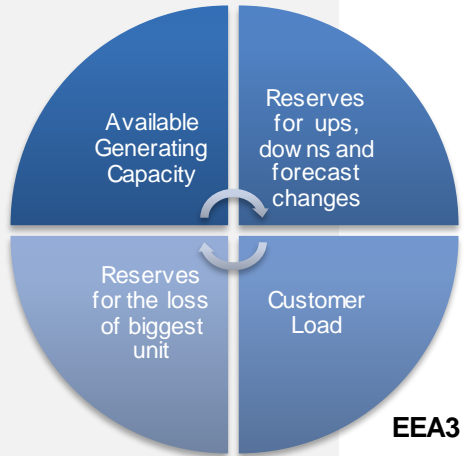
Emergency Notification Levels (cont.)



Contingency Reserves MUST be maintained

NERC EEA Levels	BA What is happening?	RC Confirm/Translate	What's Needed?	By When?
EEA Watch	<u>Day-ahead</u> analysis is forecasting one or more hours energy deficient	All available generation projected to be in use	Additional bids, incremental dispatch	Issued in advance – day ahead by 1500
EEA 1	<u>Real-time</u> analysis is forecasting one or more hours energy deficient	All available generation in or projected to be in use	Be prepared for dispatch of DR resources	Issued in real time, ideally hours ahead
EEA 2	All available UDC/MSS energy DR/ interruptible/ non-firm load dispatched-off	Load management procedures in effect	Additional bids, incremental dispatch, incrementally reduce exports, emergency assistance, evaluate transmission limitations	Issued in real time – current/ next hour(s)

Emergency Notification Levels (cont.)



NERC EEA Levels	BA What is happening?	RC Confirm/Translate	What's Needed?	By When?
EEA 3 (Prepare for Potential Rotating Outages)	Counting armed firm load as non-spin contingency reserves	BA unable to maintain CR, firm load interruption is imminent	Emergency assistance, evaluate transmission limitations	Issued in real time - current/next hour(s)
EEA 3 – Firm Load Interruption (Ordering Rotating Outages)	Unable to maintain CR, manual load shedding is starting/in progress	Unable to maintain CR, firm load interruption is in progress	Receive firm load shed operating instructions (rotating outages) via blast call.	Issued in real time – “w/ in 10 minutes” current/next hour(s)

EEA 3 Notifications

Prepare for Potential Rotating Outages

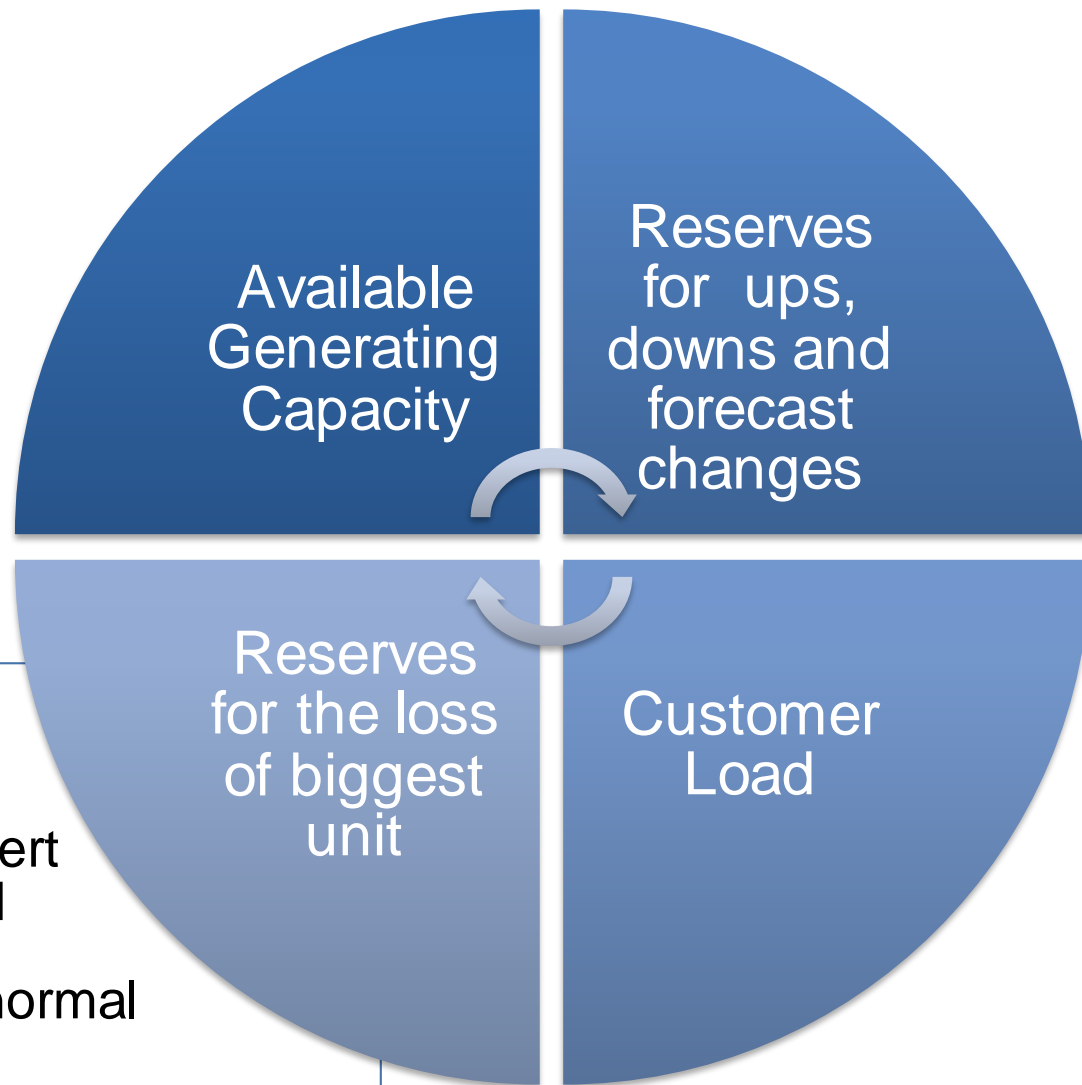
- Details in the operations notice will indicate using load as reserves, and no firm load interruption at this time

CAISO will issue Operating Instructions for firm load removal – **do not act based on System Status Update emails.**

Ordering Rotating Outages

- Separate from initial EEA3 notice
- ISO BA no longer able to meet demand & will initiate firm load shed operating instructions via blast call
- Load armed as contingency reserve still required to be available
- Continue hourly updates to UDC/MSS entities

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




- **EEA 0** = Alert Terminated
- Return to normal operations

Subscribing to Emergency Notifications

ISO Communication Methods

The ISO Communications Method document houses information on all of the ways that we send out emergency notification information



ISO communication methods

The ISO offers various communications methods to keep stakeholders and customers informed of grid events. The following communication methods are available on a subscription basis or publicly available.

- **Daily Briefing** is a summary of the day's notices; [subscribe here](#)
- **Twitter**; follow the ISO via the following handles
 - [@ISONotices](#) all ISO notices
 - [@California_ISO](#) primary channel
 - [@FlexAlert](#) Conservation tips and Flex Alerts when a grid warning or emergency event is issued
- **MNS – Market notification system**; system notices
 - Publicly via [OASIS](#), click "System Notices"
 - By [registering for MNS service](#)
 - In CIDI tool, upper right corner of the CIDI tool
 - In the [Market Participant Portal](#) (see [Market Participant Portal](#))
- **GMS – Grid messaging system**
 - Messages sent to all balancing authorities
- **Customer service emails**, primary contact for each scheduling coordinator, transmission operators, public information officers, and Emergency Services as provided to the distribution list
- **Emergency notifications (formerly A/N)**
 - If you want to receive emergency notifications, you must be added to the distribution list.
 - Emergency notifications are auto-published to the distribution list.
- **System status update e-mails**
 - This is an operations distribution list of operational staff. To be added to this list, you must request to be added.

Day-ahead Warnings are sent through

- Notices (Daily Briefing)
- GMS
- Customer service e-mail to all primary contact information
- System status update e-mail sent at 3:00 p.m.

Energy Emergency Alert (EEA) Watch are sent through

- Twitter
- MNS, EN e-mail, Today's Outlook & ISO Today mobile app
- GMS
- System status update e-mail sent at 8:00 a.m., 10:00 a.m., 12:00 p.m. and then hourly until warning has ended

EEA 1 notifications are sent through

- Notices (Daily Briefing)
- MNS, EN e-mail, Today's Outlook & ISO Today mobile app
- Twitter
- GMS
- System status update e-mail hourly from time EEA 1 is called until event has ended

EEA 2 notifications are sent through

- Notices (Daily Briefing)
- MNS, EN e-mail, Today's Outlook & ISO Today mobile app
- Twitter
- GMS
- System status update e-mail hourly from issuing EEA 2 until event has ended

EEA 3 notifications (preparing for rotating outages and or ordering rotating outages) are sent through

- Notices (Daily Briefing)
- MNS, EN e-mail, Today's Outlook & ISO Today mobile app
- Twitter
- GMS
- System status update e-mail hourly from issuing EEA 2 until event has ended
- Load serving entity blast call – a single call to all load serving entities

Cancellation or downgrading of events will have the same communication method as the original issuance.

	Twitter	GMS	Emergency notifications (MNS, EN e-mail, 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		

www.caiso.com | 250 Outcropping Way, Folsom, CA 95630 | 916.351.4400 | California Independent System Operator
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Notification Methods

	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		

<http://www.caiso.com/Documents/ISOCommunicationMethods.pdf>

Subscribing and Unsubscribing

If you **would like to be removed** from the EA notification distribution list:

- Submit a CIDI ticket requesting to be removed from the distribution list

If you **would like to be added** to the EA notification distribution list:

- Submit a CIDI ticket with “**EA request for addition**” in the Subject field requesting to be added

Remember to check your junk and/or trash folders in case the notification emails ends up in one of these folders!

Additional Resources – Operational Procedures

NERC Standards

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

RC West Procedures

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

- [RC0410 – System Emergencies](#)

CAISO BA Procedures

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

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

Learning Activity



- What happens during the different stages of the Energy Emergency Alerts process?



Threat Response

How does it work?

Scenario:

You receive a voice call stating it is someone from the California ISO, but it seems suspicious to you, and you suspect it may be a phishing attempt.

What do you do?

- Who do you notify?
- How do you verify?
- What forms need to be filled out?
- Who is responsible?



Considerations for submitting a DOE form

U.S.
Department
of Energy
Form
DOE-417

U.S. Department of Energy Form DOE-417	ELECTRIC EMERGENCY INCIDENT AND DISTURBANCE REPORT	OMB No. 1901-0288 Approval Expires: 05/31/2024 Burden Per Response: 1.8 hours
<p>NOTICE: This report is mandatory under Public Law 93-275. Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. For the sanctions and the provisions concerning the confidentiality of information submitted on this form, see General Information portion of the instructions. Title 18 USC 1001 makes it a criminal offense for any person knowingly and willingly to make to any Agency or Department of the United States any false, fictitious, or fraudulent statements as to any matter within its jurisdiction.</p>		
<p>RESPONSE DUE: Within 1 hour of the incident, submit Schedule 1 and lines N - S in Schedule 2 as an Emergency Alert report if criteria 1-9 are met. If criterion 2 is met, also submit the <u>Cyber Attributes</u> on line T in Schedule 2. Within 6 hours of the incident, submit Schedule 1 and lines N - S in Schedule 2 as a Normal Report if only criteria 10-13 are met. By the end of the next calendar day after a determination, submit Schedule 1 and lines N - S and the <u>Cyber Attributes</u> on line T in Schedule 2 as an Attempted Cyber Compromise if criterion 14 is met. By the later of 24 hours after the recognition of the incident <u>OR</u> by the end of the next business day submit Schedule 1 and lines N - S in Schedule 2 as a System Report if criteria 15-26 are met. <i>Note: 4:00pm local time will be considered the end of the business day.</i> Submit updates as needed and/or a final report (all of Schedules 1 and 2) within 72 hours of the incident. For NERC reporting entities registered in the United States; NERC has approved that the form DOE-417 meets the submittal requirements for NERC. There may be other applicable regional, state and local reporting requirements.</p>		
<p>METHODS OF FILING RESPONSE (Retain a completed copy of this form for your files.)</p> <p>Online: Submit form via online submission at: https://www.oe.net.doe.gov/0E417/ FAX: Form DOE-417 to the following facsimile number: (202) 586-8485. Alternate: If you are unable to submit online or by fax, forms may be e-mailed to doehqoc@hq.doe.gov, or call and report the information to the following telephone number: (202) 586-8100.</p>		
<p align="center">SCHEDULE 1 -- ALERT CRITERIA (Page 1 of 4)</p> <p align="center">Criteria for Filing (Check all that apply) -- See Instructions For More Information</p>		

<p>EMERGENCY ALERT File within 1-Hour</p> <p>If any box 1-9 on the right is checked, this form must be filed within 1 hour of the incident; check Emergency Alert (for the Alert</p>	<p>1. <input type="checkbox"/> Physical attack that causes major interruptions or impacts to critical infrastructure facilities or to operations</p> <p>2. <input type="checkbox"/> Reportable Cyber Security Incident</p> <p>3. <input type="checkbox"/> Cyber event that is not a Reportable Cyber Security Incident that causes interruptions of electrical system operations.</p> <p>4. <input type="checkbox"/> Complete operational failure or shut-down of the transmission and/or distribution electrical system</p> <p>5. <input type="checkbox"/> Electrical System Separation (Islanding) where part or parts of a power grid remain(s) operational in an otherwise blacked out area or within the partial failure of an integrated electrical system</p>
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Schedule 1 – Alert Criteria Schedule 2 – Narrative Description

SCHEDULE 1 – TYPE OF EMERGENCY		
Check all that apply		
K. Cause	L. Impact	M. Action Taken
<input type="checkbox"/> Unknown <input type="checkbox"/> Physical attack <input type="checkbox"/> Threat of physical attack <input type="checkbox"/> Vandalism <input type="checkbox"/> Theft <input checked="" type="checkbox"/> Suspicious activity <input type="checkbox"/> Cyber event (information technology) <input type="checkbox"/> Cyber event (operational technology) <input type="checkbox"/> Fuel supply emergencies, interruption, or deficiency <input type="checkbox"/> Generator loss or failure not due to fuel supply interruption or deficiency or transmission failure <input type="checkbox"/> Transmission equipment failure (not including substation or switchyard) <input type="checkbox"/> Failure at high voltage substation or switchyard <input type="checkbox"/> Weather or natural disaster <input type="checkbox"/> Operator action(s) <input type="checkbox"/> Other <input type="checkbox"/> Additional Information/Comments:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Control center loss, failure, or evacuation <input type="checkbox"/> Loss or degradation of control center monitoring or communication systems <input type="checkbox"/> Damage or destruction of a facility <input type="checkbox"/> Electrical system separation (islanding) <input type="checkbox"/> Complete operational failure or shutdown of the transmission and/or distribution system <input type="checkbox"/> Major transmission system interruption (three or more BES elements) <input type="checkbox"/> Major distribution system interruption <input type="checkbox"/> Uncontrolled loss of 200 MW or more of firm system loads for 15 minutes or more <input type="checkbox"/> Loss of electric service to more than 50,000 customers for 1 hour or more <input type="checkbox"/> System-wide voltage reductions or 3 percent or more <input type="checkbox"/> Voltage deviation on an individual facility of >10% for 15 minutes or more <input type="checkbox"/> Inadequate electric resources to serve load <input type="checkbox"/> Generating capacity loss of 1,400 MW or more <input type="checkbox"/> Generating capacity loss of 2,000 MW or more <input type="checkbox"/> Complete loss of off-site power to a nuclear generating station <input type="checkbox"/> Other <input type="checkbox"/> Additional Information/Comments:	<input checked="" type="checkbox"/> None <input type="checkbox"/> Shed Firm Load: Load shedding of 100 MW or more implemented under emergency operational policy (manually or automatically via UFLS or remedial action scheme) <input type="checkbox"/> Public appeal to reduce the use of electricity for the purpose of maintaining the continuity of the electric power system <input type="checkbox"/> Implemented a warning, alert, or contingency plan <input type="checkbox"/> Voltage reduction <input type="checkbox"/> Shed Interruptible Load <input type="checkbox"/> Repaired or restored <input type="checkbox"/> Mitigation implemented <input type="checkbox"/> Other <input type="checkbox"/> Additional Information/Comments

Alert Status (check one)	Emergency Alert <input type="checkbox"/> 1 Hour	Normal Report <input type="checkbox"/> 6 Hours	Attempted Cyber Compromise <input type="checkbox"/> 1 Calendar Day	System Report <input type="checkbox"/> 1 Business Day	Update <input type="checkbox"/> As required	Final <input checked="" type="checkbox"/> 72 Hours
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Learning Activity



- What happens when you receive a credible threat to bulk electric system safety?



Wrap Up

Summary, Q&A

To Recap: It Takes All Of Us To Maintain Safety and Reliability of the Grid!

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

Share information with your colleagues!

Resource Operations Readiness Training

Training Goal: to prepare customers in advance of summer to meet ISO expectations for successful resource management, especially during tight conditions.

These courses build on concepts shared during the May 1st Resource Interconnection Fair.



Resource Performance
Expectations
May 7th

- Dispatch/Operating instruction response
- Hybrid resource management
- Outage cards completion
- Flex Alerts/EEA response

Battery Performance
Expectations
May 15th

- Resource capabilities
- Correct Nature of Work
- Off-Grid Charging Indicator
- Physical management requirements

Managing Inertie
Transactions
May 16th

- Wheel-through concepts
- Export priority
- Tagging expectations
- Flex Alert/EEA

WEIM Resource
Performance Expectations
May 22nd

- Assistance Energy Transfer
- Demand Response process for WEIM

Register today at: <https://caiso.regfox.com/resource-operations-readiness-training-series>

Contact CustomerReadiness@caiso.com with questions.

Share this information with your staff!



Thank you for your participation!

For more detailed information on anything presented, please visit our website at: www.caiso.com or send an email to: CustomerReadiness@caiso.com.

For resource specific questions or concerns, please submit a CIDI ticket.