Resource Performance Expectations

Welcome
Our presentation will begin shortly.

Today’s Trainer:
Heidi Holmberg Carder, Lead Customer Education Trainer
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.

Supply

- Wind, solar, water, nuclear, gas, etc.

Demand

Consumers

- Business, homes, hospitals, infrastructure, etc.

Transmission & Distribution

60 Hz

Reserves

- Ancillary Services, Resource Sufficiency
Participation with the ISO depends on the service to be provided

- Generation
- Load Serving Entities
- Balancing Authority Areas
- Scheduling Coordinators
- ISO
- Local Utility
- Consumers

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
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

- **Peak Demand:** 44,534 MW (August 17 at 5:29 p.m.)
  - Solar peak: NEW RECORD 16,056 MW (September 7 at 11:32 a.m.)
    - Previous year: 14,352 MW (June 28)
  - Wind peak: 6,317 MW (May 29 at 5:59 p.m.)
    - Previous year: 6,465 MW (May 28)
  - Peak net imports: 10,480 MW (May 20 at 11:36 p.m.)
    - Previous year: 11,465 MW (February 10)

- **Total installed storage capacity:** 2,684 MW
  - Previous year: 1,984 MW

- **Installed renewable resources (as of 02/01/2024):**
  - Solar: 60.8%
  - Wind: 27.5%
  - Geothermal: 5.3%
  - Small hydro: 3.9%
  - Biofuels: 2.6%

- **Megawatts: Total:** 30,443
  - Solar: 18,517
  - Wind: 8,358
  - Geothermal: 1,610
  - Small hydro: 1,180
  - Biofuels: 778

- **Installed battery capacity:** 7,261 MW (As of 02/07/24; subject to change)

[www.caiso.com](http://www.caiso.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
New reference guide to help Resource Owner/Operators find important information

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)
New Resource Implementation (NRI) Webpage

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

California ISO - New Resource Implementation (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

**Day-Ahead Market (DAM)**
- T - 7 days
- 10:00
- DAM process begins
- Clear the Market
- 13:00
- Publish Market results

Triggers Real-Time Market

**Real-Time Market (RTM)**
- T-1 after 13:00
- T-75min
- RTM processes begin
- Clear the Market
- Beginning at midpoint of each 5min period
- Receive dispatches
- Settlements & Metering
Each transaction within the market is associated with a specific Scheduling Coordinator type, market activity, timeframe and charge code.
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
The ISO uses SCED as a centralized economic dispatch that optimizes the use of all resources

- 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
Real-time milestones

75 minutes prior to trade hour

Hourly

5 hours ahead / 15-min

15-min ahead of energy flow

5-min ahead of energy flow

As needed

75 minutes prior to trade hour

Hourly

5 hours ahead / 15-min

15-min ahead of energy flow

5-min ahead of energy flow

As needed

Determined by System Operators based on system conditions

Bids/Base Schedules

MPM
Market Power Mitigation

STUC
Short Term Unit Commitment

FMM / RTUC
Fifteen Minute Market MPM

RTD
Real-Time Dispatch** MPM

ED
Exceptional Dispatch

RTCD
Real-Time Contingency Dispatch

HASP
Hour-Ahead Scheduling Process

Market Power Mitigation

Short Term Unit Commitment

Fifteen Minute Market MPM

Real-Time Dispatch** MPM

Exceptional Dispatch

Real-Time Contingency Dispatch

Hour-Ahead Scheduling Process
Resource instructions are sent via Automated Dispatch System (ADS)

- 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.

- 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) 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
Role of the CAISO Generation Dispatcher

Mitigation

Manage and mitigate within System Limits
~26,000 circuit miles of transmission

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

Communication

Balancing

Manage Supply to meet Real-Time Demand
Serve ~80% of California demand

- Scheduling Coordinators ↔ Resources
- Reliability Coordinator ↔ Gen Dispatcher
Automated Dispatch System (ADS)

- Options Menu and System Messages Grid
- Batch Status and Interval Grid
- Resource Data Grid
- Trajectory Plot for Specified Resource
- 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 accurately

SCs and Resource Owner/Operators must work together
Example – Resource Not Following AGC Set Point Instruction
Example – Energy Resource Not Following Dispatch Instruction
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

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

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

**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

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.
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?

- 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.
What Information Is Required For Outages?

Solar Example

- Market Resource ID
- Refer to Procedure 3220 Section 3.3.1 Nature of Work (NOW) Categories
- Availability (Pmax) = VER Capability

- Regulation Up Regulation Down Spin/Non-Spin
- Can your resource provide their awards? Yes/No
- If No, Enter 0 for the appropriate product.

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

Your SCID
Nature of Work

- 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.
Resource Management Priorities

1. Immediately follow Operating Instructions when issued by the ISO
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4. Follow Dispatch Operating Targets accurately

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
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
Optimal dispatch representing a single point on the Dispatch Operating Point trajectory
ADS Instructions: Real-Time Supplemental Energy

Conventional Resource:
- SUPP = difference between last DOT and latest DOT

Variable Energy Resource:
- SUPP = DOT – Forecast
  - **SUPP will be blank until you get an instruction**
  - When the DOT is equal to its forecasted output, the SUPP field will be blank and the VER may produce to its capability, even if that capability exceeds the DOT/forecast

Real-Time DOT is below the forecast value, a negative number will show up in the “RT Suppl Energy” field of ADS
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

### DAM Processes Step 2

- **Regulation**
  - Regulation up
  - Regulation down

- **Contingency Reserves**
  - Spinning reserve
  - Non-spinning reserve

- **Constant adjustments under ISO control through automatic generation control (AGC)**
  - Supply that is either synchronized or not synchronized to the grid and can provide energy within 10 minutes
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

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?
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

- Reliability and safety requirements
  - Federal and Regulatory Standards

- Rules and stakeholder guides
  - ISO Tariff and Business Practice Manuals

- Step-by-step instructions
  - Operating Procedures and Job Aids
Possible Implications of Non-Response

- Settlemets
- Regulatory
- Enforcement

- Economic Consequences
- Contractual Consequences
- 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:
- 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
- CAISO website
- CAISO social media

# Emergency Playbook

## Operational Assessments

Reviews and validates most current information on actual and potential system conditions, resource adequacy, weather, and other potential factors impacting the grid.

## Operational Coordination with External Entities

To prepare entities for possible conservation efforts and free up additional supply, CAISO may take the following actions:

- 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 DOE 202c Orders
- Emergency supply above approved permit and/or GIA
- 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
# 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
- 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
# Emergency Playbook

## Operating Day

<table>
<thead>
<tr>
<th>Operational Assessments</th>
<th>Reviews actual and potential system conditions and takes actions in accordance with Operating Procedures.</th>
</tr>
</thead>
</table>
| Operational Coordination with External Entities | Operational coordination with:  
  - 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  
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  - FlexAlert.org  
De-escalate/ all-clear notices issued via:  
  - ISO Today mobile app  
  - MNS  
  - Email  
  - Today’s Outlook  
  - Social media |
Energy Emergency Alerts (EEA) Overview
# Emergency Alert Levels

<table>
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<tr>
<th>Emergency Alert Levels</th>
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<tbody>
<tr>
<td>Flex Alert</td>
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<td>Restricted Maintenance Operations</td>
</tr>
<tr>
<td>Transmission Emergency</td>
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<tr>
<td>EEA Watch</td>
</tr>
<tr>
<td>EEA 1</td>
</tr>
<tr>
<td>EEA 2</td>
</tr>
<tr>
<td>EEA 3*</td>
</tr>
<tr>
<td>EEA 3 – Firm Load Interruption*</td>
</tr>
</tbody>
</table>

The EEA (Emergency Export Alert) is a system designed to coordinate both voluntary and mandatory load interruption programs. It helps in managing emergency situations by communicating the need for load shedding or other operational adjustments to ensure the stability of the grid.

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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

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

<table>
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<tr>
<th>NERC EEA Levels</th>
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<th>RC Confirm/Translate</th>
<th>What’s Needed?</th>
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<tr>
<td><strong>EEA Watch</strong></td>
<td>Day-ahead analysis is forecasting one or more hours energy deficient</td>
<td>All available generation projected to be in use</td>
<td>Additional bids, incremental dispatch</td>
<td>Issued in advance – day ahead by 1500</td>
</tr>
<tr>
<td><strong>EEA 1</strong></td>
<td>Real-time analysis is forecasting one or more hours energy deficient</td>
<td>All available generation in or projected to be in use</td>
<td>Be prepared for dispatch of DR resources</td>
<td>Issued in real time, ideally hours ahead</td>
</tr>
<tr>
<td><strong>EEA 2</strong></td>
<td>All available UDC/MSS energy, DR/ interruptible/ non-firm load dispatched-off</td>
<td>Load management procedures in effect</td>
<td>Additional bids, incremental dispatch, incrementally reduce exports, emergency assistance, evaluate transmission limitations</td>
<td>Issued in real time – current/next hour(s)</td>
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<td><strong>EEA 3</strong> (Prepare for Potential Rotating Outages)</td>
<td>Counting armed firm load as non-spin contingency reserves</td>
<td>BA unable to maintain CR, firm load interruption is imminent</td>
<td>Emergency assistance, evaluate transmission limitations</td>
<td>Issued in real time - current/next hour(s)</td>
</tr>
<tr>
<td><strong>EEA 3 – Firm Load Interruption</strong> (Ordering Rotating Outages)</td>
<td>Unable to maintain CR, manual load shedding is starting/in progress</td>
<td>Unable to maintain CR, firm load interruption is in progress</td>
<td>Receive firm load shed operating instructions (rotating outages) via blast call.</td>
<td>Issued in real time – “w/in 10 minutes” current/next hour(s)</td>
</tr>
</tbody>
</table>
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

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

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

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

Reserves for ups, downs and forecast changes

Reserves for the loss of biggest unit

Customer Load

- **EEA 0** = Alert Terminated
- Return to normal operations
Subscribing to Emergency Notifications
The ISO Communications Method document houses information on all of the ways that we send out emergency notification information.
## Notification Methods

<table>
<thead>
<tr>
<th></th>
<th>Twitter</th>
<th>GMS</th>
<th>Emergency notification, AINS, Today’s Outlook, ISO Today mobile app</th>
<th>Notice</th>
<th>Customer service email</th>
<th>System status update email</th>
<th>Blast call</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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<tr>
<td>Flex Alert (day ahead)</td>
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<td>Flex Alert (day of)</td>
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<tr>
<td>EEA Watch (day of)</td>
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<td></td>
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<td>X</td>
<td></td>
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<tr>
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<td>X</td>
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<td>X</td>
</tr>
</tbody>
</table>

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
• 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 is may be a vishing 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

**ELECTRIC EMERGENCY INCIDENT AND DISTURBANCE REPORT**

**OMB No. 1991-0251**

**Approved Expires: 05/31/2014**

**Initial Per Response: 3.5 hours**

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**NOTICE:** This report is mandatory under Public Law 94-375. Failure to comply may result in criminal fines, up to $100,000 and other sanctions as provided by law. For questions and for providers concerning the confidentiality of information contained on this form, use Federal Information Center (FIC) at 877-959-6477. This form is for use by electric utilities and is to be submitted to CAISO, the relevant utility, or the appropriate CAISO. This form is not for use by any Agency or Department of the United States any State, Territory, or transplant area.

**RESPONSE DUE:**

Within 1 hour of the incident, submit Schedule 1 and Forms 2 and 3 in Schedule 2 as an Emergency Alert report if criteria 1 or more are met. If criteria 5 is met, also submit the Cyber Incident Form on page 7 in Schedule 2.

Within 1 hour of the incident, submit Schedule 1 and Forms 2 and 3 in Schedule 2 as a Non-Emergency report if criteria 1 or more are met. By the end of the next calendar day after the day of the incident, submit Schedule 1 and Forms 2 and 3 in Schedule 2 as an Ancillary Cyber Compliance Form on page 7 in Schedule 2.

On the last day of the incident or, for the end of the next business day submit Schedule 1 and Forms 2 and 3 in Schedule 2 as a System Report if criteria 1 or more are met. On the Day 200th day after the Day 10th day, Schedule 1 and Forms 2 and 3 in Schedule 2 shall be used and updated as necessary.

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**METHODS OF FILING RESPONSE**

- Submit forms via online submission at: [https://www.ercotsys.com/ercot/](https://www.ercotsys.com/ercot/)
- If you are unable to submit online or by fax, forms may be emailed to: [cyberalerts@caiso.com](mailto:cyberalerts@caiso.com), or call and report the information to the ERCOT Emergency Response at [909-684-3100].

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**SCHEDULE 1 — ALERT CRITERIA**

(page 1 of 4)

**Schedule 1 — Alert Criteria**

**Criteria for Filing: Check all that apply — See Instructions For More Information**

**EMERGENCY ALERT**

Fit within 1 hour

1. Physical threat that poses major interruptions to critical infrastructure facilities or to operations
2. Cyber threat that poses major interruptions to critical infrastructure facilities or to operations
3. Cyber threat that is not a Reliable Cyber Security Incident but that causes interruptions of electrical systems operations.
4. Completeness operational failures or out-tows, or the malfunction of one or more transmission electrical systems.
5. Electrical System Security (ESS) events that are not parts of a power grid (e.g., communications) operational in an isolated network area or within the partial failure of an interconnected electrical system.

**Emergency Alert**

Fit within 1 hour

1. 1 Hour

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**Schedule 2 — Narrative Description**

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• 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 Intertie 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


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.