California ISO

New Scheduling Coordinator and Resource Owner Reference Guide

Document Owner: Customer Readiness and Customer Experience

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REVISION HISTORY

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1.1	9/29/2023	R. Madrigal and G. Arechavaleta	Updates to the following sections: Interconnection and New Resource Implementation (NRI) and Participating in the Market.

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Purpose of this Document

The **New Scheduling Coordinator and Resource Owner Reference Guide** was created by our Subject Matter Experts for Scheduling Coordinators (SC) and Resource Owners who are new to the New Resource Implementation (NRI) process. It contains helpful information, links and resources to enable users to find what they need to successfully work with the California Independent System Operator (CAISO/ISO) to interconnect their resources to the grid and participate in the wholesale power market.

This document has five sections:
- **Purpose of this Document** – Introduction
- **Getting Started** – Basic information for new SCs and Resource Owners
- **Best Practices** – Helpful links and tips for working with the ISO
- **Online Resources** – Links for general ISO information and training
- **Common Terminology and Acronyms** – Definitions of terms used throughout this guide

Getting Started

Becoming a Scheduling Coordinator (SC)

To participate in the ISO Market a company must be a certified Scheduling Coordinator or retain the services of a certified SC to act on their behalf. SCs can directly bid or self-schedule resources as well as handle the settlements processes. The ISO's SC Request Team will guide interested companies through the onboarding process.
- Submit questions about the SC Onboarding process to SCRequests@caiso.com.

Useful Links:
- Scheduling Coordinator page
- List of Scheduling Coordinators, CRR Holders, and Convergence Bidding Entities
- Scheduling Coordinator ongoing obligations, forms, and change notifications

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Application Access

The Access Identity Management (AIM) application allows your company's authorized representatives to grant access to employees who need to use ISO applications.

- The AIM application provides the registered User Access Administrators (UAAs) the ability to manage the ISO digital certificates and application access roles for the users in their organization.
- UAAs can submit an initial endorse user access request to another UAA in a different organization.
- Submit any questions about the UAA role to UAARequests@caiso.com.

Useful Links:
- User Access Administrator Agreement
- ISO User Access Administrator Establishment and Requirements
- Access Identity Management (AIM User Guide)
- Access and Identity Management Access Control List Training
- AIM Overview CBT
- Tutorial – User Access Administrator to Grant Endorsed User Access to RIMS RIMS Project Codes
- Application Access Request Form Reference Guide
- ISO Secure File Transfer Protocol (SFTP) Provisioning and Set-up Procedure
- Application Access Request Form
- SFTP Application Access Form
- Device Certificate Request Form
- ISO Developer site

Secure File Transfer Protocol (SFTP)

The ISO maintains a network protocol called Secure File Transfer Protocol (SFTP) to provide secure file transfers to users. It is mainly used to transfer settlement statements.
- For first time user setup for SFTP access, a new public key and SFTP Application Access Request Form (AARF) are required.
- To request access for additional SCIDs for an existing user, only a SFTP AARF submission is required; no new public key is required. Certain requests may require additional public keys.

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- To reset a key or password, a new public key and SFTP AARF submission are required.

Useful Links:
- [ISO Secure File Transfer Protocol (SFTP) Provisioning and Set-up Procedure](#)
- [SFTP Application Access Form](#)

Environments

In additional to our production environment, the ISO has additional environments available to test upcoming changes and fixes. Please contact your UAA to be granted access to these environments.
- Production   https://weboms.caiso.com
- Stage   https://stage-weboms.caiso.com
- MAP Stage   https://mapstage-weboms.caiso.com

Best Practices

Interconnection and New Resource Implementation (NRI)

Interconnection refers to the technical aspects and equipment required to connect generators or other resources, such as energy storage devices, to the transmission system. The New Resource Implementation (NRI) process is a process comprised of guidelines, deliverables, and activities new resources must complete to connect to the transmission system.

The first step in integrating a resource is to determine whether to interconnect via the ISO's interconnection process or via the local utility's interconnection process. If a resource interconnects via a utility's transmission interconnection process, it must still complete all of the subsequent ISO requirements in order to participate in the wholesale power market. Evaluating the criteria and notifying the ISO and/or your local utility as far in advance as possible of your intent to interconnect is most appreciated. For more information, see the [Interconnection Basics](#) presentation or visit the [Resource Interconnection](#) page.

Project Interconnection
Interconnecting projects within the ISO balancing authority area, whether the project interconnects via the ISO's interconnection process or via a utility's interconnection

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process will depend on which transmission facility the project uses to connect to the grid. If your project connects directly to one of the high voltage transmission lines described below by territory, then it will follow all of the requirements for an interconnection with the California ISO, otherwise it will follow all of the requirements for an interconnection with the utility that serves the territory where the project is located.

Facilities under ISO operational control (ISO interconnection process) are:
- PG&E area — transmission lines 60 kV and higher
- Southern California Edison area — transmission 220 kV and 500 kV; some 115kV and 66 kV lines
- San Diego Gas & Electric area — transmission 69 kV and higher
- Municipal areas — some facilities owned by a municipal utility but outside the municipal boundaries; and
- Other transmission lines — Startrans, Trans Bay Cable, Trans-Elect NTD Path 15, Western Area Power Administration Path 15, and several transmission lines outside the ISO Balancing Authority Area for which it has operational control (i.e., Eldorado-Moekopi-Four Corners, Mead-Adelanto, Mead-Phoenix, IPP-Adelanto, etc.).

Maps of the above utility and balancing authority areas can be found on the California Energy Commission website at the following link: https://cecgis-caenergy.opendata.arcgis.com/pages/pdf-maps. If your project is located in a non-ISO balancing authority area, you will need to contact that balancing authority or local utility for interconnection.

If the project is outside of the ISO balancing authority area and interconnection to the ISO is desired, this will likely require an import allocation. Import allocations are based on available capacity and available Resource Adequacy import capacity. For more information on available import allocation, please click here or review ISO Tariff Section 40.4.6.2. There are also options for dynamic transfers. For more information on dynamic transfers, please click here.

If you are still unsure where to interconnect your project, please contact your local utility. Please note that interconnection is the first of several processes that must be completed.

Minimum Capacity
While there is no explicit minimum capacity needed in order to connect to the ISO grid,

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there are economic and market considerations that should be made. Costs associated with interconnection are up-front funded by the project (see Interconnection Basics presentation). Per the ISO Tariff, a participating generator is a generator with a rated capacity of 1 MW or greater, or a resource with a rated capacity of from 500 kW up to 1 MW if the resource elects to be a participating generator, or a set of unit providing ancillary services or imbalance energy through aggregation arrangements approved by the ISO.

Testing Phase

The SC must contact the ISO Generation Desk for initial and all subsequent synchronization and testing. **The ISO Generation Desk can fully or partially curtail trial operations at any time due to real-time events, system conditions, and grid reliability risks.**

- If a resource has not gone Commercial Operation Date (COD) and is testing, the SC must contact the ISO Generation Desk to obtain approval prior to testing and must contact the ISO Generation Desk for permission to separate from the grid when testing is complete. The resource must also follow Operating Procedures 5320. The resource must develop test plans and coordinate with the Scheduling Coordinator to submit planned test energy schedules to the ISO for approval through the Outage Management System (webOMS) application.
- If a resource is COD, the SC should follow operating instructions in the Automated Dispatch System (ADS) application and should follow Operating Procedures for any testing that takes place after COD. For more information on ADS, review the section on dispatching resources.

Useful Links:
- NRI process and requirements page
- NRI Guide
- NRI Checklist
- Operating Testing Procedures:
  - 5330 Resource Testing Guidelines
  - 5320 Resource Trial Operations and Test Energy Process
  - 5320A Test Energy Process for NGR Resources
  - 5330A Resource Test Request Form

Participating in the Market

The ISO administers an energy and ancillary services market, but does not participate nor compete in it. The market is a place where resources and customers bid or self-schedule available supply or needed demand for energy products and services.

The ISO is responsible for economically and efficiently clearing the available supply to meet the forecasted demand, using the available transmission and at the most reasonable cost. The ISO is also responsible for procuring sufficient ancillary services to meet reliability requirements for unforeseen events.

To participate in the wholesale power market, there are several steps, including interconnection of a resource, modeling the unit in the ISO's systems, contract implementation, installation of metering and telemetry equipment, and signing agreements. Each process has its own milestones and timelines, and can take up to two years or longer to complete.

The information below provides some guidelines that will ensure a smooth transition for new resources participating in the ISO markets.
- Clear, timely, and effective communication between the Scheduling Coordinator, Resource Owner, and resource/site team is necessary to respond to potential issues and/or instructions from the ISO Generation Desk.
- Scheduling Coordinators and resources must comply with any verbal operating instructions issued by the ISO operators; otherwise, it is a reliability risk and potential violation of the Tariff.
- Resources should respond (follow instructions) within 10 minutes of receiving operating instructions and/or verbal instructions from the ISO Generation Desk.
- SCs and Resource Owners should review and abide by Tariff Section 4 which details CAISO's expectations for complying with dispatch and operating instructions, responsibilities, and working relationships. **Failure to comply with dispatch and operating instructions in a timely manner can be considered a grid reliability risk and a Tariff violation. Tariff violations can result in financial penalties, operational and market restrictions, and even decertification depending on the event.**

Useful Links:
- [Operating Procedures](#)
- [Business Practice Manuals (BPMs)](#)
- [Proposed Revision Requests (PRRs) for BPM changes](#)

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- [California ISO Tariff](#)
- [Appendix A – Master Definition Supplement](#)

Dispatching Resources - Automated Dispatch System (ADS)

The ADS User Interface (UI) is the application Scheduling Coordinators use to view market dispatch instructions provided by the Real Time Market. The ADS UI can be used to view:

- Dispatch Instructions
  - Dispatch Operating Targets (DOT)
  - Commitment Instructions (startup, shutdown, transition)
  - Energy Instructions
  - Ancillary Service Awards
- Critical ISO Operator Messages
- Historical Data

ADS is a real-time application therefore the data provided through the UI is only available for the current day. The current ADS data retention policy supports a 90 day look back period. Scheduling Coordinators can utilize the query tool to retrieve historical data via the UI or Application Program Interface (API) for up to 90 days.

Resources are expected to follow a linier ramp profile when transitioning from following a regulation set-point to following a DOT/DOP. As soon as a resource is no longer providing Regulation, it is critical that they do not instantaneously jump to their DOT. Doing so can have significant impacts to the grid and can cause ACE Excursions if multiple resources have similar behavior in the same direction. SCs and Resource Owners are expected to ramp smoothly, in a linear fashion, to meet their ADS DOT time. A symmetric ramp between mid-point to mid-point between two five dispatch needs to be honored. Resources need to ramp based on the 5 minute duration instead of instantaneously ramping. Please review:

- Ramping Logic document
- Section 7.2.3.6 Trajectory Data of the Market Operations BPM
- EIR Dispatch Operating Target Tariff Clarification
- Section 11.1 ADS Instruction Cycle of the Market Instruments BPM

Useful Links:

- [Automated Dispatch System (ADS) User Guide](#)
- [Automated Dispatch System (ADS) page](#)

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- [New Market DOP Ramping Logic](#)
- [New Market ADS DOT Breakdown](#)
- [EIR Dispatch Operating Target Tariff Clarification](#)
- [Ramping Logic document](#)
- [Section 7.2.3.6 Trajectory Data of the Market Operations BPM](#)
- [Section 11.1 ADS Instruction Cycle of the Market Instructions BPM](#)
- Knowledge Articles (located in the Help Center link)
  - Accepting HASP schedules can limit FMM awards in ADS
  - ADS – accepting HASP schedules can limit FMM awards
  - AGC Flag in ADS

Managing Planned Outages

Scheduling Coordinators report and manage generation outages through the Outage Management System (OMS/webOMS). Here are some key facts about planned outages once they begin:

- Planned outages cannot be extended beyond the end of the day (EOD) of the planned end date in OMS. To adjust a planned outage, SCs should enter a new forced outage with any changes to the outage.
- The derate quantity of a planned outage cannot be increased beyond the maximum curtailment for that trade date.
- If a resource with a Resource Adequacy (RA) obligation fails to provide substitution for a planned outage, the planned outage will be denied.

Useful Links:
- [Outage Management BPM](#)
- [ISO Tariff Section 9 (Outages)](#)
- [Section 9 Resource Adequacy Substitution of the Reliability Requirements BPM](#)
- [Substitution Rules Matrix for Generic and Flexible Resource Adequacy](#)
- [Outages Computer Based Training](#)
- [Outage Management page](#)
- [OMS CBT Outage Overview](#) (ISO digital certificate required)
- [OMS CBT Basics](#) (ISO digital certificate required)
- [OMS CBT Advanced](#) (ISO digital certificate required)
- [WebOMS BA Approval Delegation presentation](#) and [video](#)
- [RAS Flag presentation](#) and [video](#)
- Operating Procedures:

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- o [3210 Transmission Outage](#)
- o [3220 Generation Outage](#)
- o [RC0630 Outage Coordination Process](#)

Contacting ISO Operations Desks:

- Email
  - o Ops-North-Outage@caiso.com
  - o Ops-South-Outage@caiso.com

- Phone
  - o For **Real-Time outages**, please contact the Real-Time Operations Engineer (RTOE) Desk at 916-351-2415.
  - o For **Day-Ahead outages**, please contact the Day-Ahead Operating Engineers (DAOE) Desk at 916-608-1083.
  - o For **Reliability Coordinators (RC) outages**, please refer to the 'Contact List' tab on the [RC West portal page](#) (ISO digital certificate required).

Resource Adequacy (RA) Requirements

The Resource Adequacy program ensures that there is reliable capacity available so that the ISO can meet demand in all hours. Below is a summary of the key milestones that must occur before the SC for a new RA resource can submit their plans to the ISO:

- The NRI Process is successfully completed and the resource achieves COD/COM.
- The SC submits Net Qualifying Capacity (NQC) requests in the Customer Interface for Resource Adequacy (CIRA) application.
  - o The Qualifying Capacity (QC) of a resource is determined by the California Public Utilities Commission (CPUC) or Local Regulatory Authority (LRA). Scheduling Coordinators should work with the CPUC/LRA for any questions or concerns regarding QC. The ISO will calculate NQC based on the QC provided by the CPUC/LRA (Reliability Requirement BPM Section 6).
  - o NQC requests can take up to 14 calendar days to process; keep this in mind when considering RA deadlines outlined in the Resource Adequacy and Competitive Solicitation Process Due Dates on the Reliability Requirements page (Reliability Requirements BPM Exhibit A-1).
- Once NQC is approved, the SC submits Effective Flexible Capacity (EFC) request through the Customer Inquiry Dispute and Information (CIDI) application.

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- o EFC requests can take up to 14 calendar days to process; keep this in mind when considering RA deadlines outlined in the Resource Adequacy and Competitive Solicitation Process Due Dates on the Reliability Requirements page (Reliability Requirements BPM Exhibit A-1).
- Once EFC is approved, the SC for the RA resource submits their plan in CIRA
  - o Scheduling Coordinators of Load Serving Entities (LSE) and generating resources are strongly encouraged to communicate and coordinate with each other when creating and submitting RA Plans (submitted by LSE) and Supply Plans (submitted by generator) to avoid errors in CIRA.

Additional Information about NQC:

- NQC values cannot be reduced unless it meets one of the reasons outlined in Section 6.1.3.1 of the Reliability Requirements BPM. If it meets one of these requirements, NQC can only be reduced in the annual submission and cannot be reduced once the final NQC list is published. NQC values can be increased and requests to increase NQC values should be submitted in the same manner as initial NQC requests.
- Annual NQC submissions are required for the annual NQC report used to calculate NQC for the coming year. SC's should provide the expected NQC for each month for the entire year when submitting annual NQC. SCs can submit changes (increases) to NQC on a monthly basis (monthly NQC). The ISO will use either the annual NQC values, if there are no changes, or the updated monthly NQC values for its final calculations.
- Since EFC is calculated from NQC, EFC cannot be changed unless it meets one of the reasons outlined in Section 10.1.3 of the Reliability Requirements BPM.
- All planned outages irrespective of the nature of work are considered for analysis and require RA substitution; except for Off Peak Opportunity and Transmission Induced outages. If no substitution is provided, the planned outage will be denied (Sections 9 and 9.2 of the Reliability Requirements BPM).

Useful Links:

- Reliability Requirements page
- Reliability Requirements BPM
- RA Computer Based Training
- RA Training page
- Tariff Section 40 (Resource Adequacy Demonstration)
- CIRA User Guide
- CPUC Resource Adequacy Homepage

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Non-Generating Resources (ex. Storage Resources)

Because storage resources both charge from the grid and discharge energy they present a unique challenge in the New Resource Implementation process. However, to participate as a **Non-Generating Resource (**NGR**)** resource, the CAISO will use the existing business processes and agreements including:

- Scheduling Coordinator Agreement
- Participating Load Agreement (PLA)
- Participating Generator Agreement (PGA)
- Metered Entity (ISO or SC)
- Resource Data Template (RDT)

Key features of new storage resources:

- Batteries are modeled as a generator on positive (generation) and/or negative (consuming energy/load) energy and they have negative PMins. Their PMin is the lowest level at which the resource is 'empty' and the PMax is the highest level at which the resource is 'full'.
- Scheduling Coordinators should understand that to place a battery storage resource out of service via OMS, **the availability should be shown as 0 MW and the Load Max tab must show out of service.**
- State of Charge (SOC):
  - Batteries can be dispatched seamlessly within their entire capacity range and are constrained by an energy (MWh) limit called State of Charge (SOC) to generate or consume on a continuous basis.
  - The SOC telemetry in real-time from the batteries will be used in conjunction with its energy bid, ramp rate, charge efficiency, minimum stored energy and maximum stored energy in the Fifteen-Minute Market (FMM) and Real-Time Dispatch Market (RTD) to determine MW awards and dispatch.

Useful Links:

- Ramping Logic document
- Market Operations BPM - Section 7.2.3.6 Trajectory Data
- EIR Dispatch Operating Target Tariff Clarification
- Market Instructions BPM – Section 11.1 ADS Instruction Cycle
- Today's Outlook for Storage trends

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- [New video on historic growth of battery storage (03/04/22)](#)
- [2022-2023 Transmission Planning Process (09/28/22)](#)
- [Market Operations BPM](#)
- [Market Instruments BPM](#)
- [Operating Procedure 5320](#)
- [Storage](#) page on www.caiso.com
- [NGR-REM overview](#)
- [Full Network Model schedule for 2022 and 2023](#)
- [Master File User Guide](#)
- [Generator Resource Data Template (GRDT)](#)

Available Knowledge Articles in the Help Center page:
- State of Charge level necessary to receive a DOT for a battery
- What additional bid components apply to Non-Generator Resources (NGRs)?
- No Overlapping Outages for NGRs
- NGR Regulation awards and dispatches, as it relates to OMS availability via PMax and PMin rerates
  Regulation Energy Management
- Distributed Energy Resource (DER) and Non-Generator Resource (NGR) FAQs
- NGR Sample XML SIBR Bid

Online Resources

Learning Center

The ISO provides a menu of high-quality training courses on the ISO market functionality and individual market applications. These self-paced courses are organized into learning tracks that are designed to be an industry resource for market participants and the general public to learn about electric grids and markets, and the ISO's role in the electricity system.

Useful Links:
- [Learning Center](#)
- [Computer-based training course listing](#)

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Customer Inquiry and Dispute Information (CIDI)

Scheduling Coordinators submit questions, issues, and requests to the ISO through the Customer Inquiry and Dispute Information (CIDI) application. An ISO digital certificate is required to use the CIDI application. For more information about how to use CIDI, review the following links:

- CIDI User Guide
- Training Video

Knowledge Articles

Knowledge Articles provide information about commonly asked questions. They reside in the CIDI application which can be accessed through the Help Center. The links below will enable you to search articles by keyword, view by topic categories, view featured articles, or view articles that are trending. An ISO digital certificate is required to access Knowledge Articles.

The Help Center icon is available at the following locations:

- Market Participant Portal (MPP)
- Market Applications Portal
- EIM Portal
- WEIM Portal
- RC West Portal

Common Terminology and Acronyms

Roles and Responsibilities

Roles	Description
Scheduling Coordinator (SC)	An SC submits balanced supply and demand energy schedules to the ISO for their organization. An entity certified by the ISO for the purposes of undertaking the functions specified in Section 4.5.3, of the ISO tariff, including any entity certified by the ISO as an EIM Entity Scheduling Coordinator or an EIM Participating Resource Scheduling Coordinator for the purposes of undertaking the functions specified in Tariff Section 29.

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Resource Owner (Generation/Transmission owner)	Responsible for coordinating with their SCs to submit outages and schedules and respond to any issues or instructions from the ISO.
User Access Administrator (UAA)	Designated individual(s) that is responsible for managing their organizations' ISO digital certificates and application access.

Common Terms and Acronyms

Terms	Description
Automated Dispatch System (ADS)	ADS is the primary communication tool to SC's in real-time. If an SC is planning to participate in the Real Time Market, ADS is required to receive instructions by the ISO. Ability to view all generation and all tie instructions dispatched by ADS (accepted/declined).
Automatic Generation Control (AGC)	A system for adjusting the power output of multiple generators at different power plants in response to changes in the load. Since a power grid requires that generation and load closely balance moment by moment, frequent adjustments to the output of generators are necessary. The balance can be judged by measuring the system frequency: • If it is increasing, more power is being generated than used, which causes all resources in the system to accelerate. • If it is decreasing, more load is on the system than the instantaneous generation can provide, which causes all resources to slow down. AGC generation equipment automatically responds to signals from the ISO's EMS control in real-time to control the power output of generating units within a prescribed area in response to a change in system frequency, tie-line loading, or the relation of

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	these to each other, so as to maintain the target system frequency and the established Interchange with other Balancing Authority Areas (BAA) within the predetermined limits. AGC is a separate product that is awarded in the ISO Day Ahead Market and the Fifteen-Minute Market (FMM/RTPD) as a result of a resource having submitted a bid for Regulation Up and/or Regulation Down.
Automatic Generation Control (AGC) Set-point	The AGC setpoint is the required output for a resource that is in AGC mode. The AGC setpoint is driven by system frequency, with units on AGC getting setpoints to increase generation if frequency is low and to decrease generation if frequency is every 4 seconds. Units which do not have an AGC award will not receive an AGC setpoint. AGC setpoints are automatic in response to frequency, may be sent at any time within the 15 minute period that a resource receives a regulation up or regulation down award, and are distinct from a resources' normal Five-Minute Market dispatch (DOT).
Ancillary Service (AS)	Ancillary services are energy products used to help maintain grid stability and reliability. There are four types of ancillary services products: Regulation Up, Regulation Down, Spinning Reserve and Non-spinning Reserve. Regulation energy is used to control system frequency, which must be maintained very narrowly around 60 hertz, and varies as generators change their energy output. Resources providing regulation are certified by the ISO and must respond to automatic control signals to increase or decrease their operating levels depending upon the need. Spinning reserve is standby capacity from generation units already connected or synchronized to the grid and that can deliver their energy in 10 minutes when dispatched. Non-spinning reserve is capacity that can be synchronized to the grid and ramped to a specified load within 10 minutes.
Ancillary Service Award	The notification by the ISO indicating that a Bid to supply an Ancillary Service has been selected to provide such service in the DAM or RTM (FMM).

Ancillary Services Bid	The Bid component that indicates the quantity in MWs and a price in dollars per MW for specific Ancillary Services including Regulation-Up, Regulation-Down, Spinning Reserve and Non-Spinning Reserve, that a Scheduling Coordinator is offering to supply in a ISO Market from a Generating Unit, and System Resources, and only for Non-Spinning Reserve from Participating Loads.
Commercial Operation Date (COD)	The commercial operation date is defined as the date after which all testing and commissioning has been completed and is the initiation date to which the seller can start producing electricity for sale and the resource can start participating in the ISO markets (i.e. when the project has been substantially completed).
Commercial Operation Market (COM)	The commercial operation for markets process is designed for projects with a phased implementation plan and to grant projects partial commercial operation for market participation. This is needed to allow the project to continue to operate in the market while also participating in trial operations with test energy for remaining megawatt capacity.
Dispatch Operating Target (DOT)	The optimal dispatch of a resource as calculated by the ISO and representing a single point on the Dispatch Operating Point trajectory. It also identifies where the unit is expected to be at the end of the dispatch time interval. The 5-minute target MW value for a given resource. An 'Internal DOT' refers to what the market software actually used to solve (based upon telemetry), i.e., what the market used at the start of the market run. An 'external DOT' is the value produced by the market software as a result of a market run and is the value transferred to the Automated Dispatch System (ADS). A DOT specific to a WEIM entity has been referred to as EIMDOT.
Dispatch Operating Point (DOP)	The operating level at which a unit is expected to be operating at a given point in time.
Limited Energy Storage Resource (LESR)	Usually refers to batteries. Also referred to as Energy Storage Resource (ESR, or just LES), which includes flywheels, liOn batteries, electric cars, and pumped hydro. LESRs are Non-Generator Resources (NGR).

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New Resource Implementation (NRI)	A process comprised of guidelines, deliverables, and activities new resources must complete to achieve successful implementation to the ISO grid.
Non-Generator Resource (NGR)	Resources that operate as either Generation or Load and that can be dispatched to any operating level within their entire capacity range but are also constrained by a MWh limit to (1) generate Energy, (2) curtail the consumption of Energy in the case of demand response, or (3) consume Energy.
PMin	Equivalent to Minimum Load.
Real-Time Dispatch (RTD)	The Security Constrained Economic Dispatch (SCED) and Security Constrained Unit Commitment (SCUC) software used by the ISO to determine which resources to Dispatch and to calculate LMPs.
Regulation Energy Management (REM)	A market feature for NGR resources located within the CAISO Balancing Authority Area that require Energy from the Real Time Market to offer their full capacity as Regulation, as described in Tariff Section 8.4.1.2.
Scheduling Coordinator (SC)	An entity certified by the CAISO for the purposes of undertaking the functions specified in Tariff Section 4.5.3, of the ISO tariff, including any entity certified by the CAISO as an EIM Entity Scheduling Coordinator or an EIM Participating Resource Scheduling Coordinator for the purposes of undertaking the functions specified in Tariff Section 29. A SC submits balanced supply and demand energy schedules to the ISO for his/her organization.
State of Charge (SOC)	The Instantaneous State of Charge, or State of Charge, is the amount of energy (MWh) that a battery, in real time, has available for ISO participation. For resources that have defined minimum and maximum energy limits in the Master File, the SOC will be maintained within these energy limit constraints. Data should be updated every 4 seconds and vary from zero to maximum energy limit. State of Charge is the equivalent of a fuel gauge for the battery pack in a battery electric vehicle (BEV), hybrid vehicle (HV), or plug-in hybrid electric vehicle (PHEV). The

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	units of SOC are percentage points (0% = empty; 100% = full). MSOC = Minimum State of Charge.
Transmission Induced Generator Outage (TIGO)	A generator outage where nothing is wrong with the generator but a transmission outage requires it to be offline. TIGO also can refer to the `outage card` created for this type of outage in the Outage Management System (OMS). In OMS, an `outage group` is created for the TRANSMISSION_INDUCED resource. Although it is more common for CAISO to submit the TIGOs, external users have the ability to submit TIGOs for their resources if the transmission outage is occurring at the distribution level. The CAISO can only create TIGOs for our BA areas, i.e. SCE, PG&E, SDGE, and VEA. Please note, the Reliability Coordinator (RC) areas are responsible for submitting their own TIGOs.

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