Day-Ahead Market Enhancements

Business Practice Summary (BPS)

Version 1

Approval History

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BPS Owner: Tricia Johnstone

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Revision History

Version	Date Posted	Description	Author
1.0	4/24/2024	Created first version for Day Ahead Market Enhancements (DAME)	Michael Martin / Jacob Fox
1.1	4/15/2025	Updated approval date typo	Mohan Koya

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1.　　Introduction

Welcome to the ISO *Business Practice* **Summary** for **Day-Ahead Market Enhancements** In this Introduction you will find the following information:

- ➢ The purpose of ISO Business Practice Summary

- ➢ What you can expect from this ISO BPS

- ➢ Other ISO BPMs or documents that provide related or additional information

1.1　　Purpose of ISO Business Practice Summary

The Business Practice Summary is intended to introduce participants to upcoming requirements for the project prior to its implementation.

1.2　　Purpose of this Business Practice Summary

This Business Practice Summary covers the rules, design, and operational elements of the ISO Markets. The Business Practice Summary is intended for those entities that expect to participate in the ISO Markets, as well as those entities that expect to exchange Power with the ISO Balancing Authority Area.

This BPM benefits readers who want answers to the following questions:

- ➢ What are the roles of the ISO and the Scheduling Coordinators in the ISO Markets?

- ➢ What are the concepts that an entity needs to understand to engage in the ISO Markets?

- ➢ What does a Market Participant need to do to participate in the ISO Markets?

- ➢ What are the market objectives, inputs, and outcomes?

The provisions of this Business Practice Summary are intended to be consistent with the ISO Tariff. If the provisions of this Business Practice Summary nevertheless conflict with the ISO Tariff, the ISO is bound to operate in accordance with the ISO Tariff. Any provision of the ISO Tariff that may have been summarized or repeated in this Business Practice Summary is only to aid understanding.

A reference in this Business Practice Summary to the ISO Tariff, a given agreement, any BPM or instrument, is intended to refer to the ISO Tariff, that agreement, BPM or instrument as modified, amended, supplemented or restated.

The captions and headings in this Business Practice Summary are intended solely to facilitate reference and not to have any bearing on the meaning of any of the terms and conditions of this BPM.

1.3 References

The definition of acronyms and words beginning with capitalized letters are given in the *BPM for Definitions & Acronyms*.

Other reference information related to this Business Practice Summary includes:

- ➤ ISO BPMs
  - ➤ Market Instruments
- ➤ ISO Tariff

2. Day-Ahead Market Enhancements Overview

Welcome to the *DAME* Business Practice Summary section of the ISO Business Practice Summary *for DAME*. In this section, you will find the following information:

2.1 Day-Ahead Market Enhancements (DAME) Release Impacts

2.1.1 Scheduling Infrastructure and Business Rules (SIBR)

Business Rule changes for DAME have the following elements defined below to give a quick overview of expected changes to the systems that interface with the Business Rules.

Application	Element	Change	Comment
SIBR	SIBR UI	YES	New Products IRU/IRD/RCU/RCD
	SIBR Web Services	YES	XSD change for SIBR services
	SIBR Rules	YES	Imbalance Reserve and Reliability Capacity
BSAP	BSAP UI	NO	
	BSAP Web Services	NO	
	BSAP Rules	NO	
RC-BSAP	RC-BSAP UI	NO	
	RC-BSAP Web Services	NO	
	RC-BSAP Rules	NO	

The Release notes can be found on the CAISO web site under the Participate/Application Access page.
California ISO - Application access (caiso.com)

https://www.caiso.com/Documents/SIBRReleaseNotesRulesDAMEv12Base.pdf

This will include SIBR Rule details for the new product types for Imbalance Reserve Up/Down and Reliability Capacity Up/Down (IRU/IRD/RCU/RCD) for both the Day-Ahead Market (DAM) and the Real-Time Market (RTM).

There is also a new SIBR Scheduling Coordinator User Guide for DAME that has a mock up for the new UI location and use for the IR and RC components.

https://www.caiso.com/Documents/SIBR_SCUserGuide_80.pdf

We also have new the latest SIBR Tech Spec posted on the Developer Site to reference the latest xsd change for the new enumeration of the Products.

https://developer.caiso.com

2.1.2   MF GRDT impact

- RESOURCE tab – Reference-only data

RDT Column Name	Unit	Definition	
CERT_IRU	Y/N	Certified for Imbalance Reserve Up	Y means the resource is eligible for providing Imbalance Reserve in upward direction
CERT_IRU_MW	MW	Certified capacity for Imbalance Reserve Up	Calculated by System when the resource is eligible to provide the corresponding product
CERT_IRD	Y/N	Certified for Imbalance Reserve Down	Y means the resource is eligible for providing Imbalance Reserve in downward direction
CERT_IRD_MW	MW	Certified capacity for Imbalance Reserve Down	Calculated by System when the resource is eligible to provide the corresponding product
CERT_RCU	Y/N	Certified for Reliability Capacity Up	Y means the resource is eligible for providing Reliability Capacity in upward direction
CERT_RCU_MW	MW	Certified capacity for Reliability Capacity Up	Calculated by System when the resource is eligible to provide the corresponding product
CERT_RCD	Y/N	Certified for Reliability Capacity Down	Y means the resource is eligible for providing Reliability Capacity in downward direction
CERT_RCD_MW	MW	Certified capacity for Reliability Capacity Down	Calculated by System when the resource is eligible to provide the corresponding product

- RESOURCE tab – Modifiable data

RDT Column Name	Unit	Definition	
PRC_RANK_IRU	1, 2	A method of calculating Default Day Ahead Bids for IRU based on costs	Default setting is 1
NEGO_RANK_IRU	1, 2	A method of calculating Default Day Ahead Bids for IRU based on a negotiation with the CAISO	Default setting is 2
PRC_RANK_IRD	1, 2	A method of calculating Default Day Ahead Bids for IRD based on costs	Default setting is 1
NEGO_RANK_IRD	1, 2	A method of calculating Default Day Ahead Bids for IRD based on a negotiation with the CAISO	Default setting is 2
PRC_RANK_RCU	1, 2	A method of calculating Default Day Ahead Bids for RCU based on costs	Default setting is 1
NEGO_RANK_RCU	1, 2	A method of calculating Default Day Ahead Bids for RCU based on a negotiation with the CAISO	Default setting is 2
PRC_RANK_RCD	1, 2	A method of calculating Default Day Ahead Bids for RCD based on costs	Default setting is 1
NEGO_RANK_RCD	1, 2	A method of calculating Default Day Ahead Bids for RCD based on a negotiation with the CAISO	Default setting is 2

2.1.3   CMRI/OASIS Reporting Changes

As part of the DAME release, the CAISO is adding new reports to the CMRI and OASIS platforms, as well as updating existing CMRI and OASIS reports. CMRI, or Customer Market Results Interface, is accessible by Scheduling Coordinators to view market results and other relevant data parameters for their resources. OASIS, or the Open Access Same-time Information System, is accessible to any member of the public and reports externally-available market and pricing information. The following table indicates both new reports and the high-level scope of changes to existing reports for both CMRI and OASIS.

System	Report Name	Description

CMRI	Default Availability Bid Curves	• New report
		
		• Similar structure and permissions to Default Energy Bid Curves report, but for IRU, IRD and RCU, RCD DAM bids.
		
		• Report will contain:
		
		    ○ Date
		
		    ○ Resource
		
		    ○ Market Product Type (IRU, IRD, RCU, RCD)
		
		    ○ MW
		
		    ○ Bid Price
		
		Shall publish original data (no corrections).

CMRI	DA Generation Market Results	• Existing report. • IFM and RUC will be covered under DAM Market/Process dropdown menu. • Show additional row for resource-specific hourly Proxy MW (Scheduling Type: Proxy). Shall publish original and corrected data.
CMRI	DA Generation Commodity Prices	• Existing report. • IFM and RUC will be covered under DAM Market/Process dropdown menu. • Add IRU, IRD, RCU, RCD as new Market Product enumeration. • Publish price breakdown for IRUMP/IRDMP prices. • Publish single total prices for RCUMP/RCDMP (no price breakdown). Shall publish original and corrected data.
CMRI	DA Import-Export Schedules	• Existing report. • IFM and RUC will be covered under DAM Market/Process dropdown menu. • Add IRU, IRD, RCU, RCD as new Market Product enumeration. • Show additional row for resource-specific hourly Proxy RCU MW (Scheduling Type: Proxy). • Shall publish original and corrected data. **Notes** • The Proxy RCU Awards can co-exist for same resource and hour with RCU Awards.

System	Report Name	Description
CMRI	DA Import-Export Commodity Prices	- Existing report. - IFM and RUC will be covered under DAM Market/Process dropdown menu. - Add IRU, IRD, RCU, RCD as new Market Product enumeration. - Publish price breakdown for IRUMP/IRDMP prices. - Publish single total prices for RCUMP/RCDMP (no price breakdown). Shall publish original and corrected data.
CMRI	DA Imbalance Reserve and Reliability Capacity Bid MPM Results	- New report - Similar structure and permissions to DA MPM Results report, but for IRU and RCU bid mitigations. Shall publish original and corrected data.
CMRI	Lost Opportunity Cost and Overlapping Resource Adequacy Capacity	- New report - Similar structure to DA Generation Commodity Prices report, but for IRU and IRD for all RA-Resource-Specific 15-min LOC for Overlapping RA Capacity as well as IRU/IRD and RCU/RCD Overlapping RA Capacity. - Shall be accessed by each resource's SC and by each resource's associated LSE. Shall publish original and corrected data.
CMRI	Resource Level Movement	- Existing report - Both DA Schedule Forecasted Movement (for CAISO and EDAM BAAs) and Base Schedule Forecasted Movement (for WEIM BAAs) will be covered under execution type 'IFM' - Shall be accessed by each resource's SC. - Report will contain: - Date - Hour Ending - Resource - Market = IFM - Forecasted Movement MW Shall publish original and corrected data.
CMRI	DA RUC Capacity	- Existing report. - The report will be archived to reflect future non-existence of RUC Capacity (RC awards will be reported in other reports above so no need to report only RC in a dedicated report) RUC Capacity shall be maintained for historical data reporting, but shall be set to zero for future trade dates starting from Go-Live.

System	Report Name	Description
CMRI	Two Day-Ahead RUC advisory Schedules	• Existing report. • The report will be archived to reflect future non-existence of RUC product RUC advisory schedules shall be maintained for historical data reporting, but shall be set to zero for future trade dates starting from go-live.
CMRI	Two Day-Ahead Reliability Capacity Advisory Schedules	• New report • Similar structure and permissions to Two Day-Ahead RUC Advisory Schedules report • Shall show 2DA advisory RCU and RCD awards Shall publish original and corrected data.
OASIS	Capacity Prices	• New report • Similar structure to Prices/Energy Prices/Locational Marginal Prices report. • Publish price breakdown for IRUMP/IRDMP prices. • Publish single total prices for RCUMP/RCDMP (no price breakdown). Shall publish original and corrected data.
OASIS	Scheduling Point/Tie Combination Capacity Prices	• New report • Similar structure to Prices/Energy Prices/ Scheduling Point/Tie Combination Locational Marginal Prices report. • Publish price breakdown for IRUMP/IRDMP prices. • Publish single total prices for RCUMP/RCDMP (no price breakdown). Shall publish original and corrected data.
OASIS	Nomogram/Branch Shadow Prices	• Existing report. • RUC will be covered under DAM Market/Process dropdown menu. • Add Energy, Imbalance Reserve, and Reliability Capacity as Market Product Type Column. Shall publish original and corrected data.
OASIS	Intertie Constraints Shadow Prices	• Existing report. • RUC will be covered under DAM Market/Process dropdown menu. • Add Energy, Imbalance Reserve, and Reliability Capacity as Market Product Type Column. Shall publish original and corrected data.

System	Report Name	Description
OASIS	Imbalance Reserve Constraint Results	• New report • Similar structure to Flexible Ramping Constraint Results report. • Shall publish original and corrected data.
OASIS	Reliability Capacity Constraint Results	• New report • Similar structure to Flexible Ramping Constraint Results report. • Shall publish original and corrected data.
OASIS	Capacity Constraint Shadow Prices	• New report • Report imbalance reserve constraint shadow prices to participants. • Similar structure to Flexible Ramping Constraint Shadow Prices report. • Shall publish original and corrected data.
OASIS	Imbalance Reserve Scheduling Constraint Shadow Prices	• New report • Similar structure to Flexible Ramping Scheduling Constraint Shadow Prices report. • Shall publish original and corrected data.
OASIS	MPM DA Capacity Prices	• New report • Similar structure to Prices/Market Power Mitigation/MPM DA Locational Marginal Prices report. • Publish price breakdown for IRUMP/IRDMP prices. • Publish single total prices for RCUMP/RCDMP (no price breakdown). Shall publish original and corrected data.
OASIS	MPM Nomogram/Branch Shadow Prices	• Existing report. • RUC will be covered under DAM Market/Process dropdown menu. • Add Energy, Imbalance Reserve, and Reliability Capacity as Market Product Type Column. Shall publish original and corrected data.

System	Report Name	Description
OASIS	MPM Intertie Constraint Shadow Prices	- Existing report. - RUC will be covered under DAM Market/Process dropdown menu. - Add Energy, Imbalance Reserve, and Reliability Capacity as Market Product Type Column. Shall publish original and corrected data.
OASIS	MPM Nomogram/Branch Competitive Path	- Existing report. - RUC will be covered under DAM Market/Process dropdown menu. - Add Energy, Imbalance Reserve, and Reliability Capacity as Market Product Type Column. Shall publish original and corrected data.
OASIS	MPM Intertie Constraint Competitive Path	- Existing report. - RUC will be covered under DAM Market/Process dropdown menu. - Add Energy, Imbalance Reserve, and Reliability Capacity as Market Product Type Column. Shall publish original and corrected data.
OASIS	Capacity Aggregate Awards	- New report - Similar structure to Energy/Flexible Ramping/Flexible Ramp Aggregate Awards report. - Shall publish original and corrected data. Combined to include both IR and RC aggregate award data
OASIS	Imbalance Reserve Requirements & Surplus	- New report - Similar structure to Energy/Flexible Ramping/Flexible Ramp Requirements report. - Include IRU/IRD Requirements (IRUR/IRDR) - Include IRU/IRD Surplus (IRUS/IRDS) - Associated Imbalance Demand Hub/IR Surplus Zone Apnode Shall publish original and corrected data.

System	Report Name	Description
OASIS	Imbalance Reserve Requirement Thresholds	- New report - Similar structure to Energy/Flexible Ramping/Flexible Ramp Requirement Thresholds report. Shall publish original data (no PCA corrections).
OASIS	Imbalance Reserve Requirements Input Polynomials	- New report - Similar structure to Energy/Flexible Ramping/Flexible Ramp Requirements Input Polynomials report. Shall publish original data (no PCA corrections).
OASIS	Imbalance Reserve Requirements Uncertainty Histograms	- New report - Similar structure to Energy/Flexible Ramping/Flexible Ramp Requirements Uncertainty Histograms report. Shall publish original data (no PCA corrections).
OASIS	Imbalance Reserve Forecasts	- New report - Similar structure to Energy/Flexible Ramping/Flexible Ramp Forecasts report. Shall publish original data (no PCA corrections).
OASIS	Imbalance Reserve Demand Curves	- New report - Similar structure to Energy/Flexible Ramping/Flexible Ramp Surplus Demand Curves report. Shall publish original data (no PCA corrections).
OASIS	IFM Forecast Movement	- New report - Similar structure to Energy/Flexible Ramping/Uncertainty Movement by Category report. Shall publish original and corrected data.
OASIS	Resource-Specific Uplift	- Existing report. - Same structure - Add data enumeration for Uplift Category to include new settlement charge codes
OASIS	Zonal Uplift Payment	- Existing report. - Same structure - Add data enumeration for Uplift Category to include new settlement charge codes

System	Report Name	Description
OASIS	Public Bids	• Existing report. • Add IR and RC to Market Product Type. • This report will not include proxy RCU bids Shall publish original data (no PCA corrections).

2.1.4   Default Availability Bid Calculation

The Default Availability Bid (DAB) is a new parameter introduced as part of the DAME initiative. The DAB is analogous to the existing Default Energy Bid (DEB); while the DEB approximates the variable cost for a resource to provide energy during instances of market power mitigation, the DAB approximates the costs related to a resource's ability to provide reserve products. The DAB is set at a default system-wide value of $55/MWh that is used in instances of imbalance reserve up and reliability capacity up mitigation. Unlike DEBs, which are distinct per MW segment, the DAB applies to the resource's entire MW capacity range.

The CAISO will also support an option for scheduling coordinators to negotiate a DAB where the scheduling coordinator believes the $55/MWh value does not sufficiently capture their costs to provide reserves. The negotiated DAB option will not be immediately available upon DAME implementation because the CAISO would not have sufficient experience with the new products to validate the reasonableness of a proposed negotiated rate at that time. The CAISO will communicate through a market notice once the negotiated DAB option is available to scheduling coordinators, approximately one year after implementation but no later than 18 months after implementation.

It is important to note that the $55/MWh bid cap on imbalance reserves, combined with the $55/MWh DAB, means that the mitigation procedures on imbalance reserves initially would not be triggered. However, the CAISO will examine the appropriateness of the DAB value after gaining experience with imbalance reserves and may re-evaluate the DAB value with stakeholders, updating it as appropriate.

2.1.5   Constraint Deactivation for IRU/IRD

When a transmission constraint is activated for energy it will also be active for IRU/IRD by default. If activation of a constraint with IRU/IRD creates operational issues with deployment scenario results, then the EDAM entity can request to have the constraint deactivated. IRU/IRD constraints can be requested to be deactivated through a CIDI ticket. Upon approval, the ISO will deactivate

the constraint within 5 business days and confirmed with EDAM entity. Should activation be required a separate request for reactivation will need to be submitted through CIDI. Constraint flowgate and nomogram results will be available in CMRI and OASIS.

2.1.6   IRU/IRD Requirement Calculation and Publication

Prior to the running of the IFM each day, imbalance reserve requirements will be automatically calculated and published at approximately 6am and each half hour until 9am including a five minute buffer time to allow for payload processing prior to the RSEE run for each trading hour of trading days D+1 for each BAA and DAM area. The CAISO market operator will not manually adjust the calculated IRU/IRD requirements.

Should the RSEE or IRU/IRD processes fail, the operator may take action to correct the issue and manually rerun the processes. If the RSEE and IRU/IRD processes do not recalculate successfully within 30 minutes, then the operator shall send a market message and rely on the successful execution in the next 30 minutes. Should the automatic 10am RSEE fail to execute completely and accurately the DA operator will coordinate manual execution and also hold the market execution until a successful binding RSEE execution can be completed.

IRU/IRD requirements created for D+2 & D+3 are for advisory purposes only and may change in the final trade day D+1 requirement determination. For D+2 and D+3 execution the calculated factors will be copied from the D+1 execution. However the load forecast will reflect the D+2 or D+3 trade date.

2.1.7   Calculation of Historical Uncertainty Measurements (IRU/IRD)

The Calculation of Imbalance Reserve Requirement (IRU/IRD) utilize the same methodology as Flexible Ramping Product (see Market Operations BPM Appendix N). The distinction between the two calculations is listed below, namely the difference in relevant market horizons.

https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market+Operations

Uncertainty measurements are the underlying data used to form the uncertainty histograms and the uncertainty quantile regressions. Separate uncertainty measurements will be calculated for Demand, Solar, Wind, and Net Demand.

For the day-ahead market (DAM), the ISO will construct uncertainty based on the following measurements.

- The difference of the forecast the market used in the DAM and the maximum forecast the market used for the four corresponding FMM binding intervals

- The difference of the forecast the market used in the DAM and the minimum forecast the market used for the four corresponding FMM binding interval

2.1.7.1   Initially set configurable parameters for IRU calculation

- **Percentile Utilized (mosaic):** The specified symmetric set of quantiles used to solve the mosaic regression

   o   Initially: 2.5% and 97.5%

- **Percentile Utilized (thresholds):** The specified symmetric set of quantiles used to solve the histogram values that provide thresholds for mosaic regression output

   o   Initially: 1% and 99%

- **Data Retention Period:** Available historical data for mosaic regression, as difference to current day

   o   Initially: 365

- **Sampling Scheme:** Rolling or Symmetric

   o   Initially: Symmetric

- **Sample Days:** Amount of total sample days used in the mosaic regression

   o   Initially: 180

The testing approach and parallel operations plan regarding these configurable parameters can be found here

2.1.8   IRU/IRD Deployment factors

Awards for IRU/IRD will be modeled such that if the uncertainty arises in RT a configurable percent of energy that would be dispatched from imbalance reserve awards will not exceed transmission constraints and scheduling limits enforced in the deployment scenarios, including EDAM transfer limits. The effectiveness of imbalance reserve deployment scenarios will be determined by the product of the deployment factor, shift factor as described in §27.4.3.5 of the

tariff. The default deployment factor for IR constraints is set to 1. The ISO market operator will not manually adjust IRU/IRD deployment factors.

2.1.9   IRU/IRD Penalty Prices

Imbalance reserve penalty price may be updated as a result of review of issues or improvements identified after go-live. Any adjustment to such penalty prices will identify LPT self-schedule exports with exports to comply with Tariff: §31.3. Penalty prices are available in the EDAM BPM and will only be updated through the PRR process for BPMs.

Note: Penalty price costs in EDAM for IRU/IRD resource are also used in the RSE evaluation.

2.1.10   Holding the Market open

For equal opportunity for all EDAM participants to bid fairly into the CAISO Day-Ahead market, any interruption to CAISO computer systems or inability to access CAISO systems especially in the timeframe immediately prior to 10:00 PPT, the CAISO may hold open the Day-Ahead market per Tariff Section 31.6.1 Criteria for Temporary Waiver of Timing Requirements. This criterion may also be utilized to hold the market open in the event only one EDAM entity is experiencing an issue, where the absence or correctness of such bids may endanger the successful completion of the Day-Ahead market and, in turn, potentially affect System Reliability.

A significant CAISO application issue, such as the SIBR application, database and/or website access issues prevent all EDAM Entity equal access to submit and validate their bids. From the time period between 09:00 and 10:00 PPT for the next trade day, the Day-Ahead market may be held open for as much as an equal time it was unavailable (i.e., for a 15-minute interruption the Day-Ahead market may be held open until 10:15 PPT). The market should be held open for fair amount of time for every SC to submit or adjust their bids. Operator will send details on the new market close timing in a market message and will close the market on that timeframe.

If an individual EDAM entity reports issues submitting or validating bids but the CAISO has confirmed its systems are available and are working correctly, then the Day-Ahead market should close as normal at 10:00 PPT. However, if the absence of bids from the given EDAM entity could potentially prevent a successful Day- Ahead market execution and, in turn, potentially affect System Reliability the subsequent day, then the Day-Ahead market may be held open for a reasonable time for the affected entity to complete their bidding to an acceptable or reasonable level on a case-by-case basis.

Should SIBR be unavailable between 0900 and 1000 the market will be held open to allow entities to complete their bidding.

2.1.11   Initial Conditions

Initial conditions tracks the last known online or offline status and duration of each resource at the starting point of the DA market. Details for the initial conditions can be found in the market operations BPM section X.X. The market operator shall only adjust initial conditions if necessary based upon a data transfer issue. For example, resource initial condition is online in 3x1 in HE24, for HE1 the next day, 3x1 is offline as well as 2x1, but plant level is online to 1x1 MW level, as the only remaining configuration is 1x1, the market operator will make the correction to the initial condition to online 1x1. In addition the market operator may also correct an infeasible initial condition such as, if the resource is operating in 3x1 in HE24, which is not a shutdown capable configuration, and in HE1, the plant and configuration are offline, correct the initial conditions all to offline.