California ISO

Business Requirements Specification

Energy Imbalance Market Enhancements 2020

Document Version: 1.2

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Revision History

Date	Version	Description
3/23/2020	1.0	Initial Document Release.
6/17/2020	1.1	Section 1.1: - Item #12: Noted that feature was deployed to production in “coming soon” tab - Item #15: “Info Button” feature removed from project scope. Will be evaluated in a future project. Note that the EIM Portal, which has some overlap in functionality, will be implemented in 2021. - Item #24: New MRI-S feature to allow EIM Third Party User to access common BAA bill determinant files - Item #25: Noted new Pumped Storage Hydro (PSH) feature was recently deployed into production. Section 3: Updates to glossary of acronyms, terms used in this document. Section 4: Added “EIM Third Party” users to impacted parties for MF Exchange upgrade. Section 5: BRQ-020: Remaining Ramping Calc applies to active MSG Configuration (Display shows MSG Plant) BRQ-040: Contingency activation/deactivation overrides will apply to STUC, RTPD, and RTD markets. BRQ-042: Correction: Applies to Item #12 rather than #11 (per Section 1.2) Add BRQ-120: Application of lock and unlock button for STUC, RTPD, and RTD (independently). Add BRQ-122: Existing filter persists after refresh Add BRQ-124: System shall apply timestamp of last lock/unlock action. Add BRQ-185: Balancing and flex ramp sufficiency tests applies EIM PSH. Add BRQ-205: Clarifications with of BAA and Resource Bal Viewer; new Available Base Schedule column added BRQ-206: Clarified conditions for inclusion of manual dispatch in base deviation for trade hour. BRQ-207: Clarified displays will include manual dispatch and outage deviation impacts in same column; add new Available Base Schedule column; overlapping manual dispatch instructions of same type will use most restrictive (if qualified) BRQ-210: Clarified description of manual instruction deviation impact calculation Removed BRQ-211 as was made redundant with clarifications in prior BRQs.

		BRQ-215: Clarifications of BAA Balance Viewer UI display Add BQR-290: Real-Time Markets will support EIM PSH base schedules (+/-) BRQs -360, -370: Minor clarifications BRQ-405: Load Bias Report will display forecast bias and reason information on a rolling 90-day basis. BRQ-410/-411: 2nd instance of BRQ-410 was changed to BRQ-411 Add BRQ-651 to BRQ-660: Addition of Item #24 scope (MRI-S support of EIM Third Party user access); will be deployed to production by late summer 2020 MSIM-003, -004, and -005: Clarified information will display in CMRI report. MSIM-006: Clarified METER_INTERVAL_LENGTH data will be provided through the MasterFile Data Exchange platform MSIM-007: Includes EIM Third Party access to MRI-S as possible structured scenario. Appendix E: CMRI Mockups provided for Available Balance Capacity, MW Infeasibility Report, and Load Bias Report Mockups (actual design may differ slightly) Appendix G: Revision of BSAP base deviation calculation logic and example scenarios.

3/5/2021	1.2	• Clarified several requirements
		• Item #1
		  ○ EIM20-BRQ-003:
		  ▪ Remove this requirement since it has been moved to EIM Enhancements 2021.
		• Removed the following scope items and their related requirements as they were deployed in production.
		  ○ Item #17
		  ○ Item #24
		  ○ Item #25
		• Item #26
		  ○ Added EIM20-BRQ-500:

All information contained in this draft Business Requirements Specification (BRS) as provided by the California Independent System Operator Corporation (ISO) is prepared for discussion and information purposes only. The

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1 Introduction

1.1 Purpose

The purpose of this document is to capture and record a description of what the Users and Business Stakeholders of the project wish to obtain, by providing high level business requirements. This document establishes the basis for the agreement between the initiators and implementers of the project. The information in this document serves as input to determine the scope of projects and all Business Process Modeling and System Requirements Specifications efforts.

Business requirements are what must be delivered to provide value for the Users and Business Stakeholders. Systems, software, and processes are the ways (how) to deliver, satisfy or meet the business requirements (what).

This document is for the Energy Imbalance Market Enhancements 2020 project, which collectively addresses important issues identified by EIM participants through submission of enhancement requests via the ISO's Customer Inquiry, Dispute and Information system (CIDI).

The ISO technology and customer services teams reviewed 66 enhancement requests, as well as additional internal requests shared by the ISO Real-Time Operations team. From the combined list, the following items were addressed:

ID#	CIDI Case Number	Request Summary
#1	00215444	Fix/Improve existing defects within SVG One Lines operator display. EIM Operator requests ability to view SE and telemetry values for all substation flows and elements. *ISO Note: At this time, state estimator and telemetry values will not be provided in the SVG one-line displays due to the size of the technology upgrade required.*
#2	00215447	In RTD/RTPD Dispatch Control display, in the Dispatch Instruction Review table, request to add columns for UP and DN remaining ramp capacity (5/15 minute respectively). In addition, include the sum of these columns at bottom of table.
#3	00215478	**DEFERRED TO FUTURE 2021 PROJECT** Enhancement Request for BAAOP's Manual Dispatch function. Fix the functionality for Manual Dispatches. Users should be able to utilize MSG functions, such as designating a specific configuration, and users should be able to do commitment override.

ID#	CIDI Case Number	Request Summary
		ISO Note: Capability for MSG configuration transition manual dispatch instructions will be deferred to an independent project expected in the Late 2020 – Early 2021 ("Exceptional Dispatch Enhancements"), which will provide this feature to both ISO market and EIM participants.
#4	00215453	Request to add Manual Dispatch information to BSAP Resource Bal Viewer. Add any applicable deviations to BSAP BAA Bal Viewer. This information will enhance EIM Entity SC market transparency for EIM Operators, providing access to historical data.
#5	00215371	Request to provide EIM Entities with access to their BAA's MW infeasibility data and resource ABC Up and Down Dispatches. Please publish the data for EIM participant to download. Request ISO to publish the data for MW infeasibility data and ABC Up and Down Dispatches. CMRI. We would like this change to be made for both RTD and RTPD (5 min and 15 min).
#6	00215436	Publish load conformance and reason codes for the STUC, RTPD, RTD market runs. This will provide EIM Entities the ability to review historical forecasts, load conformance, and reason codes for binding intervals.
#7	00215446	**CURRENTLY IN PRODUCTION.** Publish the effective ETSR import and export limits for the market run for RTPD and RTD.
#8	00215370	**CURRENTLY IN PRODUCTION.** The Net EIM transfer limit report in OASIS is not available for download via API. Please add this report to the API.
#9	CAISO Internal	For the Bid Range Capacity Test Results report, Requirement Amount Column needs to publish the true requirement, which is used for assessing bid capacity test based on generation, demand, base NSI and histogram introduced additional requirements not just the INCREMENTAL/ DECREMENTAL requirement.
#10	CAISO Internal	**REMOVED** EIM Entities have a notification status of market inputs, showing if BAAOP received the latest payload of critical market inputs. Example Critical data submissions: (not all inclusive) • BAAOP Dynamic Limits • BAAOP RTSI

ID#	CIDI Case Number	Request Summary
		• ALFS (load forecast and/or VER forecast) • ICCP link *ISO Notes: Upon assessment, it was determined the required technology upgrades to ISO infrastructure could not be supported under the EIM Enhancements 2020 project budget and schedule.*
#11	CAISO Internal	Allow EIM entity override activation for the contingencies up to 15 in NA contingency list.
#12	00215416	**RECENTLY DEPLOYED IN BAAOP "COMING SOON" TAB** Add EIM entity visibility of adjacent BAA's ETSR locks and reasons.
#13	00215442	Add Static ETSR transfer data to RTD Dispatch Control Display (ETSR tab) and BAAOP ETSR Detail Display (in RTD).
#14	00215450	Add Supplemental DOT to VER resources to Dispatch Control displays Detail: In BAAOP RTD/RTPD Dispatch Control, add SUPP DOT column.
#15	CAISO Internal	**REMOVED – EVALUATE FOR FUTURE PROJECT** Utilize the "information" button in the market UI to connect to Knowledge Articles. *ISO Notes: To accommodate additional enhancements for Fall 2020 Release, the Info Button feature will be re-evaluated for future implementation. Provision of similar information is scheduled in 2021 with the EIM Portal implementation.*
#16	CAISO Internal	EIM Entities require "Resource Congestion" and "Shift Factor" market UIs. These screens already exist for the RTMO and CISO BAA, they just need to be shown to the EIM entities as well. They will only be allowed to see data within their BAA.
#17	CAISO Internal	**RECENTLY DEPLOYED IN PRODUCTION** This request includes changes to the "ETSR Lock" UI and the "ETSR Detail" UI to improve functionality/visibility for the RTMO. As more EIM entities onboard it becomes more important for us to quickly identify when ETSRs get locked and the reason. This associates to CIDI Case #00215416 (See ID#12). The "ETSR Detail" screen needs to be enhanced to get rid of the RTD/RTPD filter and make RTD and RTPD two individual UIs (like other UIs in the software). Request ability to compare data for the two market runs side by side. We also need the ETSR total Effect Limits box moved to the top of the UI.

ID#	CIDI Case Number	Request Summary
#18	CAISO Internal	Add resource-level meter data interval flag to the GRDT template, and MasterFile Data Exchange Report/API. This internal parameter shall be provided within the GRDT (Generator Resource Data Template) so that the Scheduling Coordinator may validate the metering data interval for resources provided in its SQMD plan and stored in MasterFile. By adding the filed to the GRDT, the SC can get the information from the downloaded GRDT and no longer requires MCI manual intervention. *ISO Note: This feature will be supported for both EIM BAA and ISO BAA participants.*
#21	CAISO Internal	**Intentionally left blank**
#22	CAISO Internal	**Intentionally left blank**
#23	CAISO Internal	**Intentionally left blank**
#24	CAISO Internal	**RECENTLY DEPLOYED IN PRODUCTION** Enhancement will allow non-participating owners to access BAA common bill determinant files in the MRI-S system, while maintaining privacy of non-common bill determinants.
#25	CAISO Internal	**RECENTLY DEPLOYED IN PRODUCTION** EIM BAA support of the pumped hydro storage resource model, and is inclusive of both base schedules and resource sufficiency evaluation functions.
#26	CAISO Internal	When BAA cutovers are performed during EIM Go Live events, automation of reporting display filter population with the new BAAs will allow the user the ability to query the onboarding BAAs as soon as the market results data is available to view. Currently, the data is only available to the user when no filtering is performed (entire dataset). Ensure more-seamless cutovers during onboarding of new EIM BAAs, on the basis of EIM BAA activation dates defined in MasterFile.

2 Intellectual Property Ownership

Intellectual Property covers a broad array of information and materials, including written works, computer programs, software, business manuals, processes, symbols, logos and other work products. Determining ownership of Intellectual Property is very important in preserving the rights of the California ISO, and helps to avoid Intellectual Property infringement issues. In considering the business requirements or service requirements to be performed, the business owner of the project must determine Intellectual Property Ownership.

2.1 Checklist

The ISO retains intellectual property ownership of the following:

- Related Business Practice Manuals
- All rights reserved for works included within this BRS document

3 Acronym and Terms Definitions

Term	Description/Definitions
A2A	Application-to-Application (internal API)
ABC	Available Balance Capacity. After the implementation of the Energy Imbalance Market (EIM), the ISO observed instances in which the power balance limit had to be relaxed because of insufficient economic bids which resulted in prices being set at the power balance constraint relaxation parameters. However, since the EIM entity maintains balancing authority responsibilities, the EIM entity had available resources to meet its load; but the market optimization was not able to recognize that this available capacity that is manually dispatched to maintain system balance within the balancing authority area. If the market optimization could recognize this capacity and include it in the economic dispatch, prices would be set based upon the last economic energy bid instead of the relaxation parameter. In March 2015, the ISO implemented its `available balancing capacity` design which allows the market to recognize the additional resources that the EIM entity uses to meet its balancing authority responsibilities. The design ensures that this capacity is only included in the bid stack in the event that the balancing authority area`s individual power balance constraint is being violated because of insufficient economic bids from participating resources within its balancing authority area. When the available balancing capacity is deployed, these resources are included in the bid stack, which allows the Locational Marginal Price (LMP) within the balancing authority area to be set by the marginal economic bid and not the power balance constraint relaxation parameter.
AIM	Access and Identity Management Security certificate database used to provide registered points of contacts (POCs - also known as User Access Administrators - UAAs) with the ability to view application-level access for all of their organization`s users as well as any users from other organizations who have access to their resources (endorsed users). *Also Access Identification Management.*
ALFS	Automated Load Forecast System. A system used to calculate short-term Demand Forecasts for ISO Balancing Authority Area operations. ALFS utilizes a neural-network methodology that uses forecasted weather and conditions such as type of day to determine the ISO Forecast of ISO Demand.
API	Application Program Interface

Term	Description/Definitions
AS	Ancillary Services 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.
B2B	Business-to-Business (API between ISO and EIM or ISO BAA participants)
BAA	Balancing Authority Area Balancing Authority Area - Balancing authority (electric): The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.
BAAOP	Balancing Authority Area Operations Portal Interface provided for EIM entities for the following purposes: * UI to the market operations * Management of dispatches BAAOP sends the following information to the EIM Entity: * Load forecast bias * Dispatch instruction approve/decline * Dynamic limits: interties * Intertie changes
BD	Bill Determinant Bill Determinants are the results of a settlement calculation that produces a customer`s consumption of a product for a defined period of time. Each Bill Determinant Definition provides a detailed description of the billable market product.
BRS	Business Requirement Specification

Term	Description/Definitions
BSAP	Base Schedule Aggregation Portal BSAP is a modified SIBR application for Energy Imbalance Market (EIM) entities. BSAP will receive hourly Base Schedules from all resources within the EIM balancing authority area and interchange transactions five hours prior to the operating hour, in order to provide an input for all Real-Time processes including the longer-term Short-Term Unit Commitment (STUC) as well as Real-Time Unit Commitment (RTUC) and Real-Time Dispatch (RTD). These hourly Base Schedules will balance against the load forecast and serve as the baseline for settling imbalance energy in the EIM. The combination of load forecasts, Base Schedules, and the bid range from Participating Resources will become the hourly Resource Plan for the EIM balancing authority. The ISO has based the EIM on the Real-Time Market design, which was developed in part to comply with FERC Order No. 764, and consists of a 15-minute market and a 5- minute dispatch. Each of these market runs will produce schedules and locational marginal prices for resources.
BSC	Base Schedule Scheduling Coordinator
CAISO	California Independent System Operator
CIDI	Customer Inquiry, Dispute and Information system
CISO	See CAISO
CMRI	CAISO Market Results Interface
DAM	Day Ahead Market The day-ahead market is made up of three market processes that run sequentially. First, the ISO runs a market power mitigation (MPM) test. Bids that fail the test are revised to predetermined limits. Then the integrated forward market (IFM) establishes the generation needed to meet forecast demand. And last, the residual unit commitment (RUC) process designates additional power plants that will be needed for the next day and must be ready to generate electricity. Market prices set are based on bids. A major component of the market is the full network model (FNM), which analyzes the active transmission and generation resources to find the least cost energy to serve demand. The model produces prices that show the cost of producing and delivering energy from individual nodes, or locations on the grid where transmission lines and generation interconnect
DEC	Decrement. Indicates the active power output of a resource is being decreased.
DOT	Dispatch Operating Target. Identifies where the unit is expected to be at the end of the dispatch time interval.
ED	Exceptional Dispatch (also referred to as Manual Dispatch) Exceptional dispatches are requests for energy from System Operators for reliability purposes, regardless of cost. Exceptional Dispatches allow the EIM and ISO operators to draw power from sources not cleared by market software in order to maintain grid reliability during emergencies, so they are likely not the most economic resources, but they are deemed necessary for the reliability of the system. EDs are entered manually by the ISO Operator into the Day-Ahead or Real Time Market optimization software so that they are accounted for and included in the communication of Day-Ahead Schedules and Dispatch Instructions to Scheduling Coordinators.

Term	Description/Definitions
EIF	EIM Incremental Flow
EIM	Energy Imbalance Market An Energy Imbalance Market (EIM) manages real-time imbalances on the grid economically, reliably, and automatically. Deviations in supply and demand occur in real time resulting in a mismatch, or imbalance, between available electricity versus what is needed by consumers. Balancing Authorities (BAs) have traditionally tried to manage these imbalances by relying on manual dispatches and extra power reserves. An EIM solves these imbalances in real-time with more precision through an automated five-minute energy dispatch service. EIM`s automation and economic dispatch lower costs for participants and become even more valuable as additional renewable resources connect to the grid.
EMS	Energy Management System The ISO`s telemetry-based system for managing reliable operations of the ISO-controlled grid. The EMS system receives information every four seconds regarding the system load and generator operating levels. EMS also provides Automatic Generation Control (AGC) sending operating set points for units on regulation. An energy management system (EMS) is a system of computer-aided tools used by operators of electric utility grids to monitor, control, and optimize the performance of the generation and/or transmission system. The monitor and control functions are known as SCADA.
ETF	EIM Total Flow
ETSR	Energy Transfer System Resource
GRDT	Generator Resource Data Template
HVDC	High Voltage Direct Control
ICCP	Inter-Control Center Communications Protocol The Inter-Control Center Communications Protocol (ICCP or IEC 60870-6/TASE.2)[1] is being specified by utility organizations throughout the world to provide data exchange over wide area networks (WANs) between utility control centers, utilities, power pools, regional control centers, and Non-Utility Generators
IFM	Integrated Forward Market (see Day-Ahead Market)
IE	Interval-Ending, convention (e.g. 15-minute IE 0:30 would be the time period 0:15 to 0:30)
IIE	Instructed Imbalance Energy
INC	Increment. Indicates the active power output of a resource is being increased.
ISL	Interchange Scheduling Limit
ITC	Intertie Transmission Constraint
LMP	Locational Marginal Price
ISO	Independent System Operator

Term	Description/Definitions
MF	MasterFile The Generator Resource Data Template is one of several Excel spreadsheets, designed to capture data specific to a particular unit type, such as Wind, Biomass, Hydro, Solar, etc. The spreadsheet includes fields for dozens of data elements that describe the resource, including SCIDs, resource type, ramp rate, heat rate, startup requirements, forbidden operating regions, etc. - much of the data that is required for the ISO`s Master File database. As part of the new resource implementation (NRI) process, the new generator operator must submit an initial Generator Resource Data Template for preliminary modeling to the ISO. The Generator Resource Data Template and the Intertie Resource Data Template are used to submit requests to add or change specific operating parameters that reside within Master File.
MRI-S	Market Results Interface - Settlements
MSG	Multi-Stage Generation Multistage Generators: between their minimum and maximum operating levels, there are output levels at which the units cannot be dispatched. Multi-Stage Generation Resources have between 1 and 10 operating configurations (or operating regions) that have distinct operating parameters. It requires time and money to move from one configuration operating range to another configuration operating range, and they can be operated only in one configuration within any given dispatch interval. During transition from one configuration to another, if the configurations do not overlap, then there is a gap between them where they cannot be dispatched. For these forbidden regions, the transition profile for external Dispatch Operating Targets (DOTs) remains in the `From Configuration` until the end of transition, while internal imbalance calculations assume ramping.
MW	Mega-Watt
NA	Network Applications
NSI	Net Schedule Interchange. Net Scheduled Interchange is the sum of all Interchange Schedules across a given path or between Balancing Authorities for a given period or instant in time (imports minus exports).
OASIS	Open Access Same Time Information System
OOS	Out-of-Sequence (See Exceptional Dispatch)
PDR	Proxy Demand Resource
PSH	Pumped Storage Hydro
ROC	Rate-of-Change
RTBS	Real-Time Balance Schedule. Application and process internal to ISO that performs resource sufficiency tests for the EIM.
RTD	Real-Time Dispatch The Security Constrained Economic Dispatch (SCED) and Security Constrained Unit Commitment (SCUC) software used by the CAISO to determine which Ancillary Service and Imbalance Energy resources to Dispatch and to calculate LMPs. The Real-Time Dispatch Process (RTD) is the general term for one of three specific dispatches: • Real-Time Economic Dispatch (RTED) that is executed every 5 minutes, • Real-Time Contingency Dispatch (RTCD) that is executed for a 10-minute interval on demand, • Real-Time Manual Dispatch (RTMD) that is executed on demand in manual mode.

Term	Description/Definitions
RTM	Real-Time Market The real-time market is a spot market in which utilities can buy power to meet the last few increments of demand not covered in their day ahead schedules. It is also the market that secures energy reserves, held ready and available for ISO use if needed, and the energy needed to regulate transmission line stability. The market opens at 1:00 p.m. prior to the trading day (during the Day-Ahead) and closes 75 minutes before the start of the trading hour (in the Real-Time). The results are published about 45 minutes prior to the start of the trading hour.
RTMO	Real-Time Market Operator (ISO BAA Operator)
RTPD	Real-Time Pre-Dispatch An application of the Real Time Market that runs every 15 minutes and commits Fast and Medium-Start Units using the Security Constrained Unit Commitment (SCUC) to adjust Day-Ahead Schedules and Hour-Ahead Scheduling Process (HASP) Intertie Schedules.
RTSI	EIM Real Time Schedule Interchange. Schedule representation of tags sent to market for dispatch.
RTUC	Real-Time Unit Commitment
SC	Scheduling Coordinator
SCADA	Supervisory Control and Data Acquisition
SE	State Estimator A computer software program that provides the ISO with a near Real-Time assessment of system conditions (i.e., the `state` of current conditions) within the ISO Balancing Authority Area, including portions of the ISO Balancing Authority Area where Real-Time information is unavailable.
SFTP	Secured File Transfer Protocol
SIBR	Scheduling Infrastructure and Business Rules
SQMD	Settlement Quality Meter Data Meter Data gathered, edited, validated, and stored in a settlement-ready format, for Settlement and auditing purposes.
STUC	Short-Term Unit Commitment The unit commitment procedure run at approximately T-52.5 minutes for a time horizon of approximately five (5) hours. The STUC determines whether some Medium Start Units need to be started early enough to meet the demand within the STUC time horizon using the CAISO Demand Forecast. The STUC produces a unit commitment solution for every 15-minute interval within the STUC time horizon and issues binding start-up instructions only as necessary.

Term	Description/Definitions
SUPP	Supplemental Energy The difference between the bid-in capacity in the Day Ahead market and the forecasted demand (made up of Residual Unit Commitment and Resource Adequacy). When the Day Ahead demand forecasted volume is greater than the volume that clears the market, the ISO procures additional capacity from resources which are then required to submit an energy bid into the Real Time Market to ensure that there is enough supply available for the Real Time Market to dispatch. The energy between the cleared forecasted capacity bids and the forecasted demand is called Supplemental Energy. Supplemental Energy is made up of Residual Unit Commitment (RUC) procurement and Resource Adequacy (RA) capacity.
SVG	Scalable Vector Graphics At the ISO, SVG files are referred to in relation to PI ProcessBook displays (one-line diagrams). Scalable Vector Graphics (SVG) is an XML-based vector image format for two-dimensional graphics with support for interactivity and animation.
TG	Tie Generator (Inter-tie Generator)
TMSG	(Inter-)Tie Multi-Stage Generator
TNGR	Tie Non-Generator Resource
TSR	Transmission Service Reservation: A service request from the Transmission Customer to the Transmission Service Provider to move energy from a Point of Receipt to a Point of Delivery.
UI	User-Interface
UIE	Uninstructed Imbalance Energy
VER	Variable Energy Resource A Variable Energy Resource is a device for the production of electricity that is characterized by an energy source that: * Is renewable; * Cannot be stored by the facility owner or operator; * Has variability that is beyond the control of the facility owner or operator. *For example: wind; solar thermal and photovoltaic; and hydrokinetic generating facilities.*
XSD	XML Schema Definition

4 Details of Business Need/Problem

4.1 Description

Energy Imbalance Market Enhancements 2020, is to collectively address important issues identified by EIM market participants through Customer Inquiry, Dispute and Information system (CIDI) requests to improve the visibility, functions and features in Energy Imbalance Market (EIM).

Business Opportunity/Problem Statement:	
What:	Project scope addresses user display enhancements, new reports for added market transparency, and out-of-warranty defects associated with the Energy Imbalance Market (EIM). ***Key Notes:*** • Scope addresses CIDI tickets addressing issues submitted by multiple EIM participants; additionally, seven enhancements proposed internally by ISO System Operations and agreed upon to be performed with EIM participants. • Through analysis with the project team, it was determined two (2) CIDI tickets were already address and are in production (*#00215446 and # 00215370*); • One (1) deliverable request was determined to require a significant technology upgrade that was not feasible within the enhancements scope (scope ID # 10). • One scope item will be delivered in a follow-up project (ED Enhancements) that will support both EIM and ISO BAA participant MSG resources with a new configuration transition manual dispatch instruction type (see # *00215478)*. • Scope item #18 was added which will provide resource meter interval length for those resources included in an SQMD Plan. This will apply for both EIM and ISO BAA resources.
When:	Fall Release 2020
Why do we have this opportunity/problem:	As the ISO receives more feedback from the growing number of BAAs participating in the Energy Imbalance Market, there is an opportunity each year to implement value-added requests to enhance the market transparency and functionality.
Who does this opportunity impact:	*EIM Participants (All Scope Items in Section 1.1);* *ISO Market Participants (Scope Item #18 only);*

5 Business Impacts

5.1 Business Practice Manual (BPM)

BPM	Description of Impact(s)
Energy Imbalance Market (EIM)	- EIM Operator allowed to override activation of up to 15 contingencies from own BAA - New BSAP reporting of base deviation from manual dispatches
Market Instruments	- Additional CMRI reports, APIs - Added GRDT Meter Interval Length resource parameter
Market Operations	- Real-Time Market impacts from EIM Pumped Storage Hydro (PSH) feature.

5.2 Other

Impact:	Description: (optional)
Market Simulation	Yes
Market Participant Impact	Yes EIM Entities: BAAOP, BSAP, CMRI, RTBS updates Both EIM and ISO BAA Participants: GRDT update
External Training	Yes
Policy Initiative	No

6 Business Requirements

The sections below describe the Business processes and the associated business requirements involved in the project. These may represent high-level functional, non-functional, reporting, and/or infrastructure requirements. These business requirements directly relate to the high-level scope items determined for the project.

6.1 Business Process: Manage Energy Imbalance Markets

6.1.1 Business Requirements: BAAOP Enhancements

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
EIM20-BRQ-001	00215444 (Item #1)	From the BAAOP system SVG One-Line displays (located by navigating to EIM > NA > Output Displays > SVG One-Lines > RTD), the following display controls will be fixed for the RTD schema where: • "Trade Date" and "Time Interval" drop downs display filter controls to default to single available interval • Data Horizon display filter control should default to "Interval", instead of "Full"	Existing Functionality *(Patch)*	- BAAOP
EIM20-BRQ-006	00215444 (Item #1)	Within system SVG One-Line displays (located by navigating to EIM > NA > Output Displays > SVG One-Lines > RTD, RTPD): - The ellipses […] located in the upper left-hand corner of all SVG displays shall be removed or configured so it may be non-visible to the user	Existing Functionality *(Patch)*	- BAAOP
EIM20-BRQ-008	00215444 (Item #1)	Within system SVG One-Line displays (located by navigating to EIM > NA > Output Displays > SVG One-Lines > RTD, RTPD): - The "XX" values displayed next to circuit-breakers in the SVG one-lines shall be removed or configured so they may be non-visible to the user	Existing Functionality *(Patch)*	- BAAOP
EIM20-BRQ-010	00215444 (Item #1)	Within system SVG One-Line displays (located by navigating to EIM > NA > Output Displays > SVG One-Lines > RTD, RTPD):	Existing Functionality *(Patch)*	- BAAOP

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		Generator-related MW output shall consistently be displayed alongside the generator symbol		
EIM20-BRQ-015	00215447 (Item #2)	*RTD Dispatch Control* display shall provide the following features within its *Dispatch Instruction Review* UI component: - Addition of Remaining Ramp Capacity (both Up and Down directions) columns in display, such that the following are provided for each resource associated with the viewing EIM Entity: *Remaining Ramp Up Capacity* = Minimum[5-min Ramp Rate, (Upper Economic Limit – Current Dispatch MW)] *Remaining Ramp Down Capacity* = Minimum [5-min Ramp Rate, (Current Dispatch MW - Lower Economic Limit)] - Each Remaining Ramp Capacity column shall have its sum total of remaining ramp capacity (up, down) for all resources provided in a separate row below the table results	Core	- BAAOP
EIM20-BRQ-018	00215447 (Item #2)	*RTPD Dispatch Control* display shall provide the following features within its *Dispatch Instruction Review* UI component: - Addition of Remaining Ramp Capacity (both Up and Down directions) columns in display, such that the following are provided for each resource associated with the viewing EIM Entity: *Remaining Ramp Up Capacity* = Minimum[15-min Ramp Rate, (Upper Economic Limit – Current Dispatch MW)]	Core	- BAAOP

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		Remaining Ramp Down Capacity = Minimum[15-min Ramp Rate, (Current Dispatch MW - Lower Economic Limit)] - Each Remaining Ramp Capacity column shall have its sum total of remaining ramp capacity (up, down) for all resources provided in a separate row below the table results		
EIM20-BRQ-020	00215447 (Item #2)	BAAOP RTD, RTPD Dispatch Control user displays shall allow provide the Remaining Ramping Capacity in the following manner: - Display will show remaining ramping capability for MSGs at the plant level, but only apply the calculation to the current configuration (not reflecting any projected transitions) - Calculated ramping capacity would include limitations such as outage derates/rerates, exceptional dispatches, etc. - Each EIM Entity user shall view remaining up, down ramping capacity data associated only with its own BAA - ISO RTMO user shall access and view remaining up, down ramping capacity associated with any or all selected BAAs	Core	- BAAOP
EIM20-BRQ-025	CAISO Internal – (Item #9)	For each active BAA, the Bid Range Capacity Test result display shall continue to present each operating hour's upward and downward capacity requirements in accordance with: - the formula as discussed in BRQ-150 - continue displaying the most-insufficient 15-min interval's value for the trade hour	Existing Functionality	- BAAOP

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
EIM20-BRQ-040	CAISO-Internal (Item #11)	System shall allow EIM Operator the ability to override contingency activation/deactivation from its own BAA contingency list within the Network Analysis Contingency Editor display. Activation overrides shall apply to STUC, RTPD, and RTD market runs.	Core	- BAAOP
EIM20-BRQ-042	CAISO-Internal (Item #11)	From the Contingency Editor display, system shall allow the EIM Operator to activate a maximum of 15 contingencies associated with their own BAA (inclusive of existing EMS activations). If the EIM Operator attempts to activate a count beyond the maximum allowed limit, the display shall provide the user with the following message: *"Attempted activation count has exceeded the 15 contingency maximum limit. If needed, please deactivate contingencies to allow for other activations."*	Core	- BAAOP
EIM20-BRQ-045	CAISO-Internal (Item #11)	System shall allow EIM Operator the ability to override activation/deactivation from its own BAA contingency list within the Network Analysis Contingency Editor display. Activation overrides shall apply to STUC, RTPD, and RTD market runs for EIM Operator with a single contingency list. EIM Operator must select ALL Markets or none options. Activation overrides shall apply to ISO BAA for STUC, RTPD, and RTD independently per the RTMO's configuration with separate lists per each market run type.	Core	- BAAOP
EIM20-BRQ-050	00215416 (Item #12)	System displays shall provide EIM Operator user with visibility of ESTR locks and reasons associated with their own BAA as well as their adjacent BAAs.	Core	- BAAOP
EIM20-BRQ-060	CAISO Internal (Item #12)	System shall provide a separate RTD and RTPD "ETSR Details" display for EIM and ISO Operator users to view. EIM user shall only view ETSRs associated with own BAA.	Core	- BAAOP

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		Both RTPD and RTD Dispatch Control displays shall show all types of ETSRs (i.e. DYN, STATIC and BASE) and provide the following additional columns: - Delta (MW): DOT change between current interval (current market run) and the previous interval (previous run); sums all ETSR types (Dynamic, Static, and Base) - Threshold Delta (MW): DOT change between current interval (current market run) and the previous interval (previous run); sums the dynamic ETSR applied to Threshold Limit (if applicable, NULL otherwise)		
EIM20-BRQ-070	CAISO Internal (Item #13)	System shall provide a separate RTD and RTPD "ETSR Detail" display for EIM and ISO Operator users to view.	Core	- BAAOP
EIM20-BRQ-080	00215450 (Item #14)	System shall additionally display Supplemental DOT to VER resources within its RTD/RTPD Dispatch Control display, wherein the Supplemental DOT is defined as the Dispatch Operating Target (DOT) for a VER resource minus the VER Forecast for the binding dispatch interval. EIM Operator user shall only view the RTD/RTPD supplemental DOT values for VER resources within their own BAA. ISO Operator user shall view the RTD/RTPD supplemental DOT values for VER resources values for all EIM BAAs.	Core	- BAAOP
EIM20-BRQ-090	CAISO Internal (Item #16)	System shall provide EIM Operator user ability to view the following congestion information by resource for their associated BAA(s): - BAA - Interval End - Resource ID - Congestion LMP	Core	- BAAOP

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		- Resource Status (e.g. Online) - Constraint Type (EIM Transfer, HVDC, Inter-tie, Nodal Group, Flowgate, ETF, EIF, and Rate-of-Change) - Constraint Name - NA Case (only applicable for Flowgate constraint) - Shadow Price - Constraint Coefficient (if applicable) - Shift Factor - Congestion LMP component		
EIM20-BRQ-100	CAISO Internal (Item #16)	System shall provide EIM Operator user ability to view the following Shift Factor display information for their associated BAA(s): - Interval Start Time, End Time - Network Element Name - BAA - Resource ID, Type - NA Case ID - Resource Shift Factor	Core	- BAAOP

6.1.2 Business Requirements: Real-Time Base Schedule (RTBS) Enhancements

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
EIM20-BRQ-150	CAISO Internal (Item #9)	For each active BAA, system shall revise the reported *upward and downward capacity requirement* amounts for all performed Bid Range Capacity Tests to match the amounts used Bid Range Capacity Test evaluation, such that: - *Upward Capacity Requirement* = 15-minute Demand Forecast + Net Schedule Interchange (NSI) + Additional Upward Capacity (as provided by histogram) – Generation - *Downward Capacity Requirement* = Generation – 15-minute Demand Forecast – Net Schedule Interchange + Additional Downward Capacity (as provided by histogram) - System shall independently provide the user display and web service views with the capacity requirement amount in each direction for only the trade hour's 15-minute interval with the greatest insufficiency determined; - that is to say the values used for the OVER test (e.g. downward capacity requirement) and the UNDER test (e.g. upward capacity requirement) may result from different intervals within the same operating hour	Core	- Internal ISO System

6.1.3 Business Requirements: Base Schedule Aggregation Portal (BSAP) Enhancements

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
EIM20-BRQ-205	00215453 (Item #4)	System shall immediately process and update its existing Resource Bal Viewer and BAA Bal Viewer displays (located in the Base Schedule sub-menu), and include the following new fields which shall report the most restrictive manual dispatch for each instruction type of a given operating hour (given the validation provided in EIM20-BRQ-206 and logic scheme provided in EIM20-BRQ-210): - Max Goto - Min Goto - Fixed Goto Additionally, both Resource- and BAA-level Bal Viewer displays shall report the available base schedule and include manual dispatch impacts to reported base deviations (in addition to the outage impacts already reported) for each resource/BAA, wherein: - BAA-level display shall report the aggregate available base schedules and base deviations of all resources within the same BAA - (New) Available Base Schedule display column shall identify the Base Schedule +/- Base Schedule Deviation	Core	- BSAP
EIM20-BRQ-206	00215453 (Item #4)	System must receive manual dispatches at least 40 minutes prior to the start of the instruction's operating hour (i.e. T-40), and the dispatch instruction must span at least 30-minutes within the trade hour to be processed in the Resource Bal Viewer and BAA Bal Viewer displays.	Core	- BSAP
EIM20-BRQ-207	00215453 (Item #4)	For each EIM Entity SC, system shall display the following additional information in the Resource Bal Viewer user-interface for their associated resources: - Base Schedule MW amount	Core	- BSAP

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		- Base Schedule Deviation (includes deviations due to outages and manual dispatch instructions) - Available Base Schedule (base schedule +/- base deviation) - Most restrictive Min Goto, Max Goto, Fixed Goto value (based on the logic provided in EIM20-BRQ-210), if applicable ISO RTMO user shall have ability to view resource deviation information for all EIM Entity SCs and BAAs.		
EIM20-BRQ-210	00215453 (Item #4)	For each EIM BAA resource, system shall calculate the base deviation due to manual dispatch instructions in the following manner: *Fixed Goto* Instruction = fixedGotoMW - base schedule *Max Goto* Instruction = min (maxGotoMW - base schedule, 0) *Min Goto* Instruction = max (minGotoMW - base schedule, 0) Such that: - Deviation from overlapping manual dispatch instructions will apply the most restrictive instruction which provides the greatest absolute deviation, with the most restrictive Fixed Goto instruction overriding any Max or Min Goto instructions (even if more restrictive) - Only manual dispatch instructions received prior to T-40, and span a minimum of 30 minutes within the trade hour will be considered - Goto Fixed MW instructions (if overlapping) shall override any Goto Max MW or Goto Min MW	Core	- BSAP

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		instructions to determine the base deviation due to manual dispatch - Base deviations will additionally continue to consider Pmax and Pmin outage derates, as is currently performed Review Appendix G for example base deviation calculations.		
EIM20-BRQ-215	00215453 (Item #4)	System's BAA Balance Viewer UI display shall display the following additional information to the EIM Entity SC for its associated BAA: - Aggregate Base Schedule (aggregate MW algebraic sum of base schedules for resources within BAA) - Aggregate Base Deviation (aggregate MW algebraic sum of manual dispatch deviation by BAA, includes impacts from both manual dispatch instructions and outage Pmax/Pmin derates) - Aggregate Available Base Schedule (Aggregate Base Schedule +/- Aggregate Base Deviation) - Aggregate Min Goto, Max Goto, Fixed Goto (aggregate MW algebraic sum of instruction type for resources within BAA, based on the logic provided in EIM20-BRQ-210) ISO RTMO user shall have ability to view resource deviation information for all EIM Entity SCs and BAAs.	Core	- BSAP

6.2 Business Process: Market Results Reporting

6.2.1 Business Requirements: CMRI Enhancements

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
EIM20-BRQ-360	00215371 (Item #5)	For each 15-minute (RTPD) and 5-minute (RTD) market run, system shall report the *Available Balance Capacity (ABC) Up and Down Dispatches for the Fifteen Minute Market (FMM) and Real-Time Dispatch (RTD). Reports by Resource for each BAA.* EIM Entity (including EIM Non-Transmission entities) users may only view those resources associated with their own BAA(s). ISO operator users may view resources from all BAAs, as selected from a drop-down BAA-filter.	Core	- CMRI (UI)
EIM20-BRQ-370	00215371 (Item #5)	For 15-minute (RTPD) and 5-minute (RTD) market runs, system shall broadcast the *Available Balance Capacity (ABC) Up and Down Dispatches* through the *Fifteen Minute Market (FMM) and Real-Time Dispatch (RTD) Schedule Reports* by resource for each BAA via an API. EIM Entity (including EIM Non-Transmission entities) users may only retrieve those resources associated with their own BAA.	Core	- CMRI (API)
EIM20-BRQ-385	00215371 (Item #5)	For 15-minute (RTPD) and 5-minute (RTD) market runs, system shall report the *MW Infeasibility Report by BAA.* EIM Entity (including EIM Non-Transmission entities) users may only view those resources associated with their own BAA. ISO operator users may view resources from all BAAs, as selected from a drop-down BAA-filter.	Core	- CMRI
EIM20-BRQ-390	00215371 (Item #5)	For 15-minute (RTPD) and 5-minute (RTD) market runs, system shall broadcast the *MW Infeasibility Report by BAA via an API.*	Core	- CMRI

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		EIM Entity (including EIM Non-Transmission entities) users may only retrieve those resources associated with their own BAA.		
EIM20-BRQ-405	00215436 (Item #6)	After each RTPD, and RTD market run completion, system shall report the *EIM Entity Load Conforming* by BAA, providing the following information for binding and advisory intervals*:* - Market Type *(*'RTM' only*)* - Execution Type ('RTPD", 'RTD') - Interval Period - BAA (non-ISO BAA only, *as defined in MasterFile*) - Market Run Period (relevant for Advisory information; there are N intervals per market run) - Forecasted Load (MW) (this always exists for every binding or advisory interval) - Load Conforming MW Amount (positive for incremental, negative for decremental) - Load Conforming Reason (optional), as follows: ▪ Automatic Time Error Correction ▪ Disturbance Response ▪ Generation Deviation ▪ Load Forecast Deviation ▪ Other – Described Event ▪ Reliability Based Control ▪ Schedule Interchange Variation ▪ Stranded Generation ▪ Stranded Load - *Total Forecast = forecast + bias, when bias is 0/null TotalForecast=Forecast (Market will provide this value).*	Core	- CMRI

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		EIM Entity (including EIM Non-Transmission entities) users may only view their own BAA's load conformance. ISO RTMO users may view all - System shall make binding data available to users per existing CMRI's data retention policy - System shall make advisory data available to users per a rolling 7-day period - The report is expected to publish results for every market run, yet in the case of a market run failure or inability of the market to provide data, the ISO is not obligated to fill in missing intervals. There are no post-market corrections applied on this report. - The report is expected to start publishing information based on an activation date of the project.		
EIM20-BRQ-410	00215436 (Item #6)	For each RTPD and RTD market run, system shall broadcast the *EIM Entity Load Conforming Report* by BAA *via an API.* EIM Entity users may only retrieve those resources associated with their own BAA.	Core	- CMRI
EIM20-BRQ-411	CAISO Internal (Item #9)	For each trade hour, system shall receive payloads with the T-75, T-55, and T-40 (minutes prior to Trade Hour T) Bid Range Capacity Test *upward and downward capacity requirements* and immediately publish to the existing Bid Range Capacity Test Results report. There should be no change to the web eservices or schema. Only the underlying data will change.	Existing Functionality	- CMRI
EIM20-BRQ-415	CAISO Internal (Item #9)	System shall broadcast through its API the upward and downward capacity requirements for each performed Bid Range Capacity Test.	Existing Functionality	- CMRI (API)

6.2.2 Business Requirements: OASIS Enhancements

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
EIM20-BRQ-500	CAISO Internal (Item #26)	System shall make all reports (that have existing filter for BAA ID), automatically filterable by all BAA IDS that exist in each report, regardless of whether trade dates of the report data are in future or in past. **Examples:** • If BAA ID exists in report data (past or future) BUT not in a specified report's query filter, the missing BAA ID shall be added as a query filter option. **Notes:** • The following OASIS reports will be impacted: o System Demand->: ▪ Advisory CAISO Demand Forecast ▪ Sufficiency Evaluation Demand Forecast o Energy ->: ▪ Market Power Mitigations Status ▪ Net EIM Transfer Limits ▪ EIM Transfer ▪ EIM BAA Dynamic NSI ▪ EIM BAA Base NSI ▪ EIM transfer Limits By Tie ▪ EIM transfer By Tie ▪ Flexible Ramp Aggregate Awards	Core	- OASIS

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
		▪ Flexible Ramp Requirements ▪ Flexible Ramp Surplus Demand Curves ▪ EIM BAA Hourly Base NSI ▪ EIM BAA Hourly Base Loss ▪ Uncertainty Movement By Category ▪ Flexible Ramp Requirements Inputs ▪ BAA Market Events ▪ BAA and Tie Definition ▪ Scheduling Point Definition ▪ Flexible Ramping Constraint Results • Assumption: Whenever BAA ID is listed in an OASIS report, it will be listed in MF. • The BAA ID shall be added to the report filter as soon as the data for that BAA ID exists for that report.		

6.3 Business Process: Manage Master File

6.3.1 Business Requirements:

ID#	CIDI Case #	Business Feature	Req Type	Potential Application(s) Impacted
EIM20-BRQ-600	CAISO Internal (Item #18)	Scheduling Coordinators may view the resource-level Meter Interval Length data attribute from the MasterFile GRDT report, which shall define whether the meter data received for the resource is measured in 5, 15, or 60 minute intervals, for associated resources through the Generator Resource Data Template (GRDT).	Core	- MasterFile (GRDT File)
EIM20-BRQ-605	CAISO Internal (Item #18)	Scheduling Coordinators may retrieve the resource-level Meter Interval Length data attribute, which shall define whether the meter data received for the resource is measured in 5, 15, or 60 minute intervals, for associated resources through the Generator Resource Data Template (GRDT) API.	Core	- MasterFile (GRDT API)

6.4 Business Process: Market Simulation

This section shall provide a basis for the development of the Market/Business Simulation Scenarios. These requirements will provide guidance on the market participant impacts, inputs into the Scenarios, endpoints to the Scenarios and reasons for potential Scenarios. The guidance on market participant impacts shall be gathered from the requirements that impact rules, interfaces, applications/reports, new system processes, new/modified data models and new user roles. The source and sink systems shall be determined through the development of the system context diagram and the web service requirements.

ID#	CIDI Case #	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario
EIM20-MSIM-001	• 00215444 (Item #1) • 00215447 (Item #2) • CAISO Internal – (Item #9) • CAISO-Internal (Item #11) • CAISO Internal (Item #13) • 00215450 (Item #14) • CAISO Internal (Item #16)	**BAAOP Display Enhancements** The following BAAOP display enhancements shall be evaluated in the Market Simulation environment by the EIM Participants: - SVG One-Lines Display Patch - RTPD/RTD Remaining Ramp Capacity - Bid Range Capacity Up/Down Req. Update - EIM Operator Contingency Activation Override - Adjacent BAA ETSR Lock Display - RTPD, RTD Static and Base ETSR Transfer - Supplemental DOT to VER Resources column in RTPD, RTD Dispatch Control Display - Resource Congestion, Shift Factor Data Normal EIM and IFM/RTM market operations shall be performed during the Market Simulation. Additionally, each BAA shall have a few contingencies activated which will allow for EIM Operator deactivation override. VER Forecasts shall also be provided in the DA and RT markets.	*RTM*	*BAAOP*	*2. Interface changes*
EIM20-MSIM-002	00215453 (Item #4)	**BSAP Review of Base Schedule Deviation from Manual Dispatch.**	RTM	BAAOP	2. Interface changes

ID#	CIDI Case #	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario
		In the RTM, BAA resources shall be exceptionally dispatched with the following scenarios: - Resource MinGoto instruction is above resource base schedule - Resource MaxGoto instruction is below resource base schedule - Resource FixedGoto instruction is above/below base schedule Each of these scenarios will result in a displayed manual dispatch impact to base schedule deviation in BSAP at both the resource and BAA level.			
EIM20-MSIM-003	00215371 (Item #5)	**Available Balance Capacity (ABC) Dispatch Up/Down Reported in CMRI.** EIM Entity will review an ABC dispatches for its associated resource(s) which will be received in a new CMRI FMM and RTD ABC Dispatch report display and API.	RTM	CMRI	*2. Interface changes* *3. New Report*
EIM20-MSIM-004	00215371 (Item #5)	**MW Infeasibility Reported in CMRI.** EIM Operator will review Infeasible MW amounts used to meet the power balance infeasibility in either the upward or downward regulation requirement.	RTM	CMRI	*2. Interface changes* *3. New Report*
EIM20-MSIM-005	00215436 (Item #6)	**Load Conforming Reported in CMRI.** EIM Operator will review load conforming amounts and (optionally provided) reasons for its own BAA(s) load forecasts for the RTPD, and RTD markets in both a report display and API.	RTM	CMRI	*2. Interface changes* *3. New Report*
EIM20-MSIM-006	CAISO Internal (Item #18)	**Resource Meter Interval Length Reported in MasterFile Data Exchange.** Both EIM and ISO Market participants shall have the ability to view their BAA resources' meter	MF	MF API	*2. Interface changes* *3. New Report*

ID#	CIDI Case #	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario
		interval length via the MasferFile Data Exchange report and API.			

Appendix A – [Intentionally Left Blank]

Appendix B – Non-Implemented CIDI Tickets

ID#	CIDI Case Number	Category	Request Summary
16*	00215459	BAAOP	Fix ETSR Effective limit calculations on ETSR Details Display. Detail: In ETSR Details Display, bottom table "ETSR Totals": Remove Eff. Limit (Incorrect due to directionality). Add Effective Import Limit. Add Effective Export Limit. Apply any Import/Export limits due to Flex/Capacity failures and ETSR locks. Move total table to top of display. *See other ETSR Effective Limit request for additional limit comments. *Note: Delivered as 2019 OP enhancement*
17*	00215469	BAAOP	BAAOP ETSR Detail Page CAISO should focus on creating common themes and layouts for the displays. The ETSR Detail portion of BAAOP should contain 2 separate pages, one for RTD, and one for RTPD, just like all the other sections of BAAOP *Note: Delivered as 2019 OP enhancement*
18	00215460	BAAOP	Improve ETSR Effective limit usability on ETSR Details Display. Detail: In ETSR Details Display, modify the results to be based around the SUPP DOT and remaining Import/Export SUPP limits. *OR create a new display with this purpose *Note: in 2 EIM entity priority list, ISO is willing to discuss the requirement in future*
19	00215422	General Inquiries	CAISO should provide comprehensive ETSR training, including configuration, applications, controls, tools, e-Tags, and settlements on a quarterly (or at least annual) basis. *Note: Training issue*
20	00215418	Scheduling/ Tagging	CAISO should adjust the energy profile in all ETSR e-Tags to reflect market results, NAESB modified the e-Tag specification to allow Market Operators to perform the function described above. EIM would see significant savings in its vendor contract if the CAISO were to perform this function. *Note: in 2 EIM entity priority list, ISO is willing to entertain this idea with other EIMs in future.*

ID#	CIDI Case Number	Category	Request Summary
21	00215438	Application Access	AIM for group access: Add support of defined Groups or Roles in which users can be members of an inherit access rights
22	00215331	BAAOP	Add read-only functionality to BAAOP via user selection upon application launch
23	00215347	BAAOP	In Transmission Constraint Manager, add equipment, Station and Voltage on the UI display for operator to identify the equipment they are viewing. In addition, allow entities to see all constraints, not just constraints for that entity.
24	00215461	BAAOP	Add Resource Type column and filter for Resource Flex Ramping. Detail: In BAAOP > System > Base Schedule Test Results > Resource Flex Ramping: add column for Resource Type with filter.
25	00215449	BSAP	Add ability for Post T-55 ETSR Imbalance Corrections. A new process is needed that re-evaluates BSAP schedule submissions and resolves how entities can submit up-to-date interchange information for ETSRs without infringing on adjacent BAAs tariffs. Problem: EIM Entities with a shared ETSR do not have the ability to modify ETSR schedules without effecting both BAA's (and only the submitting entity can perform this action)
26	00215454	BSAP	Include Base Schedule deviations in BSAP "Base-DF" calculation. Detail: Modify the BSAP "Base-DF" calculation to be [Aggregate Base Schedules]+[Base Schedule Deviation]-[Demand Forecast]. Note: in 1 EIM entity priority list. Insufficient for implementation threshold.
27	00215475	BSAP	Get rid of the right click to submit a base schedule either make the save automatically submit (can't see a reason for someone saving a base schedule they don't want submitted), or add a button on the top to submit the schedule
28	00215351	CIDI	Estimated Adjusted Amount on the CIDI Cases portal when searching for SDS cases. We would also like the ability to download a csv or Excel summary of the cases from this portal. To clarify, We would like to see the following field, "Estimated Adjusted Amount" in the fields summarized on that screen. (Pictured in the attachment) Currently, the summary screen only includes the following fields: ITEM NUMBER CASE NUMBER SCID

ID#	CIDI Case Number	Category	Request Summary
			STATUS DISPUTE DETERMINATION TRADE DATE CHARGE CODE STATEMENT DISPUTED DISPUTE AMOUNT DATE/TIME OPENED CONTACT NAME ADJUSTMENT PUBLICATION DATE
29	00215224	CMRI	Currently data in CMRI Real-Time Dispatch Advisory Schedules and RTUC Dispatch Advisory Schedules can only be retained for 7 days after the Trade Date. We would like to request the enhancement for the above data to be retained up to one month from the Trade Date so Settlement Analysts can perform validation on the T+12 settlement statement.
30	00215456	Outage Management (OMS)	Add "CAISO Notes" to OMS entries, leave "External Notes" field for EIM entity
31	00215439	Application Access	AIM: Add support of future effective dates for user rights
32	00215420	BAAOP	During FNM update. Within BAAOP, at the RTMO's initiation, create an application that will systematically ramp out each EIM Entity's Net ETSR ITC limits to zero over several intervals;
33	00215421	BAAOP	Provide each EIM entity with a time-stamped log of operator entries into BAAOP for each trade day, flat file available for 30 days.
34	00215437	BAAOP	Provide each EIM entity with a time-stamped log of operator entries into BAAOP for each trade day
35	00215440	BAAOP	Add Unit Commitment Override (UCO) to BAAOP Manual Dispatch display. New Instruction type
36	00215443	BAAOP	Add SE status/value, Telemetry status/value and delta/out-of-position column for NA displays to compare network model (SE)
37	00215452	BAAOP	Add Supplemental DOT to VER resources to Dispatch Control displays In BAAOP RTD/RTPD Dispatch Control,
38	00215471	BAAOP	BAAOP - Situational Awareness. Operators have requested additional methods for the system to provide them with situational awareness of issues. Such as being able to bring critical items to the top and/or highlighting items when they approach/reach thresholds. Additionally, it would be beneficial to have some alerts generated from any part of the system display on one page - Such as if a balancing test or flex test fails have that information displayed on the RTD dashboard.

ID#	CIDI Case Number	Category	Request Summary
39	00215481	BAAOP	Essentially all the operational data in BAAOP should be made available to entities as fast as possible through some sort of webservice
40	00215466	BSAP	Add separate Real-time/Day-Ahead rights for BSAP :Detail: With RC West, PacifiCorp believes that we need separate Day-Ahead and Real-Time access rights for BSAP
41	00215473	BSAP	The Balancing Test Results, Flex test results, etc. from BAAOP should be feedback into and displayed in BSAP. Enhancement Request: BSAP As CAISO's Balancing Tool, BSAP should provide users with all the necessary information, accurately the official test results that are pushed to BAAOP should also be pushed to BSAP
42	00215474	BSAP	BSAP should allow for users to modify a base schedule, not have to create a new one to make a change check 2019 BRQ1270
43	00215462	CIDI	Add "Complete/Close Request" or "Mark as Resolved" button to CIDI requests. ? Detail: In CIDI tickets add a way for users to mark tickets for completion.
44	00215463	CIDI	Add "Priority" or some requested time for response field to CIDI requests. ? Detail: In CIDI tickets add a way for users to set a priority for response.
45	00215403	CMRI	A CMRI report that has the flexible ramping sufficiency test results for the PRSC to be able to pull. A CMRI report that reports on the infeasibilities by market, hour, and interval for the PRSC.
46	00215435	CMRI	Add Internal DOT data to CMRI and/or ADS payloads.
47	00215445	CMRI	Add visibility of other entity submitted ETSR limits in CMRI.
48	00215343	General Inquiries	Increased ability to establish unit parameters/limitations within the market: 1. Description: model: o Shutdown profiles o Testing parameters outside normal GRDT Pmin and Pmax o AGC ranges within the GRDT range o Group constraints to prevent several units from being started/stopped at the same time o MSG modelling for Tie Gen o Calibration time and required loading levels
49	00215344	General Inquiries	the software should be able to display timestamp data based on a selected time zone
50	00215441	General Inquiries	Add ability to select Time Zone (or use Local Time Zone)
51	00215345	General Inquiries	APS is requesting this data be made available in CMRI for entities to use after-the-fact.

ID#	CIDI Case Number	Category	Request Summary
			o Load Bias o Infeasibilities o Internal DOTs o Other
52	00215346	General Inquiries	Request manual dispatch perform commitment overrides, assign MSG configurations, or dispatch outside GRDT ranges during testing. Request The Manual Dispatch values providing in BSAP.
53	00215348	General Inquiries	Validating data using related data point prior to responding. If, for example, the market gets indication that a large unit has tripped offline, it should be able to validate using switchyard flow whether or not its primary indication is accurate
54	00215410	General Inquiries	Request for the market to be forward-looking 12-18 hours We have MSG units that have a min-down time of 9 hours
55	00215411	General Inquiries	Economic starts for base scheduled quick-start units. Tech note how EIMPR and EIM NPR works. base-scheduled units as must-run/self-scheduled unit for NPR.
56	00215412	General Inquiries	Add a resource emergency limit range in bids. Many units have a short term (4 hours or less) operating area above normal max and min. Adding an emergency limit range allows the market to see the available MW accessible only during a *declared emergency*
57	00215413	General Inquiries	Allow hourly commit status for generators: Economic, Must-Run, Emergency, and Outage.
58	00215419	General Inquiries	In all CAISO applications, users should be presented with the information used in the market run, especially limit data.
59	00215477	General Inquiries	We will never be able to open SIBR and BAAOP in IE at the same time, and we will have to adjust settings to be able to switch between the two.
60	00215479	General Inquiries	Improved State Estimator and data validation. CAISO should put some data validation in place before assuming a unit is offline based on an invalid switch position or put an MSG in a different configuration because the resource drifts 2 MWs above the PMax of its current config.
61	00215448	Outage Management (OMS)	Add ability to Share Display Views to WebOMS Allowing users to save a shared view would ensure all users have optimal settings in WebOMS
62	00215455	Outage Management (OMS)	Add Voltage Level filter for Equipment Reference Data in OMS

ID#	CIDI Case Number	Category	Request Summary
63	00215458	Outage Management (OMS)	Add "External Documents/Attachments" for OMS entries This functionally is needed to support documents that are needed for RC Outage submissions.
64	00215498	Scheduling/ Tagging	Tag Validation to include rejecting changes that are made within the optimization period. CAISO should enforce some additional tagging requirements for EIM participants' tag changes, other than curtailments, made with less than 22.5 minutes should be rejected due to causing market optimization issues.
65	00215499	Scheduling/ Tagging	Duplicate 00215498 and 00215499
66	00215428	Settlements	Develop a solution to have test or start up energy NOT get treated as UIE
67	00215414	SIBR	Revise bidding framework to accept Hourly Minimum Load Cost values for each hour of the day.
68	00215415	SIBR	Allow hourly limits to be represented in Generator Bids: can Bid range provide the same function?
69	00215464	SIBR	allow for removal of more than 24 bid entries at once
70	215859	General Inquiries	Configuration of the dispatch to be delivered into the Entity EMS system or Entity PI system. 2. Alarms could be built on the Entity side to inform operators when the configuration of the dispatch is different than the configuration of resource.

Appendix C – [Intentionally Left Blank]

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Appendix E – CMRI Report Mockups

Appendix E.1 – Resource Available Balance Capacity Up/Down Dispatch Report

(Reference ID: Item #5)

Fifteen-Minute Market (FMM) Available Balance Capacity (ABC) Dispatch

Trade Date	BAA	EIM Entity SC	Resource ID	Configuration	Product	Schedule Type	Hour-Ending	Interval IE:15	Interval IE:30	Interval IE:45	Interval IE:00
2/25/2020	BAA1	SCID_1	Resource A	ResA_2x1	Energy	ABC Up	2	20	20	20	20
2/25/2020	BAA1	SCID_1	Resource A	ResA_3x2	Energy	ABC Up	3	22	24	26	28
2/25/2020	BAA1	SCID_1	Resource B		Energy	ABC Up	2	12			
2/25/2020	BAA1	SCID_1	Resource B		Energy	ABC Down	3		10	12	10
2/25/2020	BAA2	SCID_4	Resource C		Energy	ABC Up	2	20	20	20	20
2/25/2020	BAA2	SCID_4	Resource C		Energy	ABC Down	3	22	24	26	28
2/25/2020	BAA2	SCID_5	Resource D	ResD_3x2	Energy	ABC Up	2				20
2/25/2020	BAA2	SCID_5	Resource D	ResD_2x1	Energy	ABC Up	3	22	24	26	28

Real-Time Dispatch (RTD) Available Balance Capacity (ABC) Dispatch

Trade Date	BAA	EIM Entity SC	Resource ID	Configuration	Product	Schedule Type	Hour-Ending	Interval IE:05	Interval IE:10	…	Interval IE:00
2/25/2020	BAA1	SCID_1	Resource A	ResA_2x1	Energy	ABC Up	2	20	20	…	20
2/25/2020	BAA1	SCID_1	Resource A	ResA_3x2	Energy	ABC Up	3	22	24	…	28
2/25/2020	BAA1	SCID_1	Resource B		Energy	ABC Up	2	12		…	
2/25/2020	BAA1	SCID_1	Resource B		Energy	ABC Down	3		10	…	10
2/25/2020	BAA2	SCID_4	Resource C		Energy	ABC Up	2	20	20	…	20
2/25/2020	BAA2	SCID_4	Resource C		Energy	ABC Down	3	22	24	…	28
2/25/2020	BAA2	SCID_5	Resource D	ResD_3x2	Energy	ABC Up	2			…	20
2/25/2020	BAA2	SCID_5	Resource D	ResD_2x1	Energy	ABC Up	3	22	24	…	28

Where

- ABC Up and ABC Down are non-negative values
- No values are included in payload for intervals where ABC Dispatch does not exist

Appendix E.2 – BAA MW Infeasibility Report

(Reference ID: Item #5)

Fifteen-Minute Market (FMM) MW Infeasibility

Trade Date	EIM Entity	Balancing Authority Area	Hour-Ending	Interval IE:15	Interval IE:30	Interval IE:45	Interval IE:00
2/26/2020	EIM Entity 1	BAA1	2		12.53		
2/26/2020	EIM Entity 2	BAA2	2	-10.23	-8.84	-8.84	-11.56
2/26/2020	EIM Entity 3	BAA3	2	-2.1			
2/26/2020	EIM Entity 4	BAA4	2				15.25
2/26/2020	EIM Entity 5	BAA5	2		32.35	25	14.8

Real-Time Dispatch (RTD) MW Infeasibility

Trade Date	EIM Entity	Balancing Authority Area	Hour-Ending	Interval IE:05	Interval IE:10	...	Interval IE:00
2/26/2020	EIM Entity 1	BAA1	2		10.1	...	
2/26/2020	EIM Entity 2	BAA2	2	-9.82	-9.29	...	-9.54
2/26/2020	EIM Entity 3	BAA3	2	-2.1		...	
2/26/2020	EIM Entity 4	BAA4	2			...	15.28
2/26/2020	EIM Entity 5	BAA5	2		32.34	...	14.82

Where,

- Positive values represent upward infeasibility
- Negative values represent downward infeasibility
- No values are included in payload for intervals where infeasibility condition does not exist

Appendix E.3 – EIM Entity RTUC, and RTD Load Conforming Report

(Reference ID: Item #6)

Binding dataset										
Execution Type	Market Start	Market End	Interval Start	Interval End	EIM Entity	BAA	Forecast	Load Conforming	Total Forecast	Load Conforming Reason
RTD	7/22/2020 12:00AM	7/22/2020 12:05AM	7/22/2020 12:00AM	7/22/2020 12:05AM	Entityxxx	BAA1	99.99	88.88	99.99	Load Forecast Deviation
Advisory dataset										
Execution Type	Market Start	Market End	Interval Start	Interval End	EIM Entity	BAA	Forecast	Load Conforming	Total Forecast	Load Conforming Reason
RTD	7/22/2020 12:00AM	7/22/2020 12:05AM	7/22/2020 12:05AM	7/22/2020 12:10AM	Entityxxx	BAA1	99.99	88.88	99.99	Stranded Generation
RTD	7/22/2020 12:00AM	7/22/2020 12:05AM	7/22/2020 12:10AM	7/22/2020 12:15AM	Entityxxx	BAA1	99.99	88.88	99.99	Stranded Generation
RTD	7/22/2020 12:00AM	7/22/2020 12:05AM	7/22/2020 12:15AM	7/22/2020 12:20AM	Entityxxx	BAA1	99.99	88.88	99.99	Stranded Generation
…										

Binding dataset

Execution Type	Market Start	Market End	Interval Start	Interval End	EIM Entity	BAA	Forecast	Load Conforming	Total Forecast	Load Conforming Reason
RTUC	7/22/2020 12:00AM	7/22/2020 12:15AM	7/22/2020 12:00AM	7/22/2020 12:15AM	Entityxxx	BAA1	99.99	88.88	99.99	Load Forecast Deviation

Advisory dataset

Execution Type	Market Start	Market End	Interval Start	Interval End	EIM Entity	BAA	Forecast	Load Conforming	Total Forecast	Load Conforming Reason
RTUC	7/22/2020 12:00AM	7/22/2020 12:15AM	7/22/2020 12:00AM	7/22/2020 12:15AM	Entityxxx	BAA1	99.99	88.88	99.99	Stranded Generation
RTUC	7/22/2020 12:00AM	7/22/2020 12:15AM	7/22/2020 12:15AM	7/22/2020 12:30AM	Entityxxx	BAA1	99.99	88.88	99.99	Stranded Generation
RTUC	7/22/2020 12:00AM	7/22/2020 12:15AM	7/22/2020 12:30AM	7/22/2020 12:45AM	Entityxxx	BAA1	99.99	88.88	99.99	Stranded Generation

Appendix F – [Intentionally Left Blank]

Appendix G – BSAP Base Deviation Examples

(Reference ID: Item #4)

For each BAA resource, *base deviation due to manual dispatch instruction will be determined from the most restrictive instruction providing the* greatest absolute deviation, wherein:

- Resource base deviation due to manual instruction will be as follows:

  Fixed Goto Instruction = fixedGotoMW - base schedule

  Max Goto Instruction = min (maxGotoMW - base schedule, 0)

  Min Goto Instruction = max (minGotoMW - base schedule, 0)

- Only manual dispatch instructions received prior to T-40, and span more than 30 minutes within the trade hour will be considered
- *Positive deviation* identifies when base schedule is above its deviated schedule (e.g. Fixed Goto 110 MW instruction for 100 MW base schedule has +10 MW deviation),
- *Negative deviation* identifies when base schedule is below its deviated schedule (e.g. Fixed Goto 90 MW instruction for 100 MW base schedule has -10 MW deviation)
- Base deviations will continue to include impacts due to outage derates, as is currently performed

Scenario	Base Schedule	Goto Max (Duration)	Goto Fixed (Duration)	Goto Min (Duration)	Base Deviation	Available Base Schedule
1	100	80 (10 min)	85 (50 min)	Null	**-15**	**85**
2	100	80 (30 min)	85 (30 min)	Null	**-20**	**80**
3	100	80 (20 min)	85 (20 min)	90 (30 min)	**0**	**100**
4	100	Null	115 (30 min)	120 (30 min)	**+20**	**120**
5	100	Null	130 (10 min)	110 (30 min)	**+10**	**110**
6	100	Null	115 (25 min)	Null	**0**	**100**
7	100	80 (20 min)	85 (20 min)	90 (30 min)	**0**	**100**
8	100	140 (25 min)	Null	70 (5 min)	**0**	**100**
9	100	140 (60 min)	70 (30 min)	50 (60 min)	**-30**	**70**
10	100	140 (60 min)	Null	120 (60 min)	**+20**	**120**
11	100	80 (60 min)	Null	70 (60 min)	**-20**	**80**

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Appendix J – [Intentionally Left Blank]

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