California ISO

Business Requirements Specification

Energy Storage and Distributed Energy Resources Phase 3 (ESDER 3)

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Revision History

Date	Version	Description
02/01/2019	1.0	Initial document release
02/22/2019	1.1	Updates to Terms: • Bid Options - Now Bid Dispatchable • Hourly Option – Now 60-Minute Option Section 6.1 Revised: • BRQ001 • BRQ071 • BRQ075 Section 6.2 Revised: • BRQ135 • BRQ160 Deleted: • BRQ154 • BRQ175 • BRQ180 Section 6.3 Revised: • BRQ270 Added Section 6.5

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Date	Version	Description

3/19/2019	1.2	Updated BRS to reflect revised implementation plans for ESDER 3 Project:
		
		Section 4:
		
		• Updated project change statement to indicate the implementation time frames for each major element
		• Inserted Fall 2019 for ESDER 3A Scopes:
		  ○ Bid Dispatchable Option
		  ○ Remove Single LSE Requirement and Default Load Adjustment (DLA)
		  ○ Customer Load Baseline Submittal
		• Inserted Fall 2020 for ESDER 3B Scopes:
		  ○ Load Shift Product
		  ○ Behind-the-Meter (BTM) Electric Vehicle Storage Equipment (EVSE)
		
		Section 5:
		
		• Added Column to indicate implementation period (2019-3A or 2020-3B)
		• Updated BPM impacts to align with implementation period
		
		Section 6:
		
		• Subsection Titles - Added indication of implementation period (2019-3A or 2020-3B)
		• Added subsecftion 6.5 – Manage Customer Load Baseline Submittals
		• Changed text to RED for scopes to be implemented in 2020

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Date	Version	Description
6/19/2019	1.3	Updated following Sections: Section 5.1 Market Operations BPM – Added Impact and Description for Phase 3A Section 6.6 • Corrected Implementation Phase from 3A to 3B for the following: ○ ESDER3-MKTSIM - 050 ○ ESDER3-MKTSIM - 055 ○ ESDER3-MKTSIM - 060 ○ ESDER3-MKTSIM – 065 • Added the following ID#s ○ ESDER3-MKTSIM - 075 ○ ESDER3-MKTSIM - 080
7/10/2019	1.3.1	Updates based on feedback from Market Partcipants No scope change is involved Section 5.6 updated for reflect scope identified in BRQ CLB- BRQ001 - CLB- BRQ007 as a Market Simulation Impact

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Date	Version	Description
7/17/2019	1.4	Made the following changes to align BRQs for PDR-LSRs with the applicable Section of the BRS. No Scope change is involved. Section 6.3 • Deleted BRQ250 (Moved to Section 6.2) • Revised BRQ255 to delete reference to BRQ250 Section 6.2 • Added BRQ250 • Added BRQ255A

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Date	Version	Description
2/13/2020	1.5	Changes made to existing BRQs and added new BRQS to provide additional clarification for selecting PDR-LSR and EVSE baseline methods, as well as added naming convention for PDR-LSR. Changes detailed below: BRQ110 – Clarification for selecting PDR-LSR baseline methods, and changed BTM to ES BRQ112 – Cleaned up to state that only the curtailment resource ID will be available in DRRS to associate to a registration that selects one of the PDR-LSR baseline methods. Added implementation note that MF will maintain two resource IDs, but DRRS will maintain just the curtailment resource ID BRQ140 – Removed LSR Control Group from the list of new baseline methods and added new MGO based methods BRQ141 – Added requirement to explicitly state the baseline methods that are applicable for a registration that has at least one location with ES BRQ142 – Added requirement to explicitly state the baseline methods that are applicable for a registration that has at least one location with EVSE BRQ143 – Added requirement to explicitly state the baseline methods that are applicable for a registration that has location(s) with both ES and EVSE BRQ144 – Added requirement to explicitly state the baseline methods that are applicable for a registration that has location(s) with neither ES nor EVSE BRQ150 – Changed BTM to ES BRQ154 – Included the naming convention for PDR-LSR Resources BRQ300 – Modified to refer to BRQs 142, 143, 144 instead of BRQ 301, which has been deleted BRQ301 – Removed as it is replaced with BRQs 142-144 BRQ302 – Added requirement to be able to identify locations associated with an EVSE BRQ303 - Added requirement to state the existing requirement for DRPs to submit meter data based on the matrix provided in Appendix A Added Appendix A Included three new requirements under a new section, Section 6.6, to capture DRRS enhancement requests that have been received from Market Participants.
03/09/2020	1.6	Split the details under Appendix A as two separate Appendices Added Appendix C for easy reference for location to baseline method matrix
9/10/2020	1.7	Changes made to Appendix A, update the data requirement for PDR_LSR CON resource ID under LOAD Measurement type from TEE > 0 to TEE <0.

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1 Introduction

1.1 Purpose

The energy storage and distributed energy resource (ESDER) initiative aims to identify and mitigate barriers that hinder effective market participation of storage and distributed energy resources. The presence of renewables and storage continues to increase and evolve, and therefore so does the integration of these resources into the CAISO markets. The multi-phase ESDER initiative allows these resources to participate more efficiently, thus allowing for more robust market solutions while reducing carbon emissions.

1.2 References

All references represent external requirements documents or stakeholder requests developed and submitted by the Business Units.

Information for this initiative can be found on the following CAISO web page at:

http://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorage_DistributedEnergyResources.aspx

Information for this initiative also can be found under the fall 2019 Release on the following CAISO web page at:

http://www.caiso.com/informed/Pages/ReleasePlanning/Default.aspx

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2.2 Checklist

Intellectual Property created per this BRS will be owned by the CAISO in accordance with existing contract provisions with the software developer.

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Acronym Definition

Acronym	Definition
ADS	Automated Dispatch System
BCR	Bid Cost Recovery
BTM	Behind The Meter
CMRI	Customer Market Results Interface
DLA	Default Load Adjustment
DLAP	Default Load Aggregation Point
DRP	Demand Response Provider
DRRS	Demand Response Registration System
ED	Exceptional Dispatch
EVSE	Electric Vehicle Supply Equipment
FMM	Fifteen Minute Market
LMP	Locational Marginal Pricing
LSE	Load Serving Entity
MGO	Metered Generator Output (Methodology)
NBT	Net Benefits Test
NQC	Net Qualifying Capacity
PDR	Proxy Demand Resource
PDR-LSR	Proxy Demand Resource-Load Shift Resource
RDRR	Reliability Demand Response Resource
RDT	Resource Design Template
SIBR	Scheduling Interface and Business Rules System

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Details of Business Need/Problem

The focus of the California Independent System Operator's (CAISO) energy storage and distributed energy resources (ESDER) initiative is to lower barriers and enhance the abilities for energy storage and distribution-connected resources to participate in the CAISO markets. The growing number and diversity of these resources are beginning to represent an increasingly important part of the future grid.

The ESDER initiative is an omnibus initiative with annual phases covering several related but distinct topics. This is the third phase of the overall initiative.
This ESDER 3 project involves the following key changes. Implementation time frames for changes are noted below.

Fall 2019 ESDER 3A

- **Demand Response Dispatchable Bidding Options:**
  - Currently, Demand Response (DR) resources are limited to a 5-minute bid option
  - This project will introduce new dispatchable bid options of 60-Minutes and 15-minutes

- **Removal of Single LSE requirement for DR registrations and default load adjustment (DLA)**:
  - Currently, a DR registration requires that all service accounts/locations be with the same LSE
  - This project will remove the requirement for a single LSE
  - Removal of the single LSE requirement combined with new bid criteria will eliminate the need for the DLA

- **Submittal of Customer Load Baseline Data**
  - Customer Load Baselines are required to be calculated in conjunction with the various Performance Evaluation Methodologies for PDRs and RDRRs
  - Per Tariff requirements, the calculated Customer Load Baselines are required to be submitted to the CAISO along with the underlying load/consumption data associated with the Customer Load Baseline
  - This project provides the requirements and capabilities to submit Customer Load Baseline data

Fall 2020 ESDER 3B

- **Load Shift Product**:
  - A load shift product for behind the meter (BTM) storage devices is being introduced
  - This product will follow the PDR participation model and operate under existing PDR policy provisions
  - These resources can bid and be dispatched for both load consumption or load curtailment
  - Each registered resource will be assigned two (2) unique Resource IDs
  - Specific performance methodologies will be assigned to these resource types

- **Behind-the-meter (BTM) Electric Vehicle Supply Equipment (EVSE)**:
  - This project will enable EVSEs sub-metering and MGO-like performance method for EVSE market participation independent of, or in combination with, its host customer
  - Specific performance methodologies will be assigned to these resource types to address residential versus non-residential installations

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Business Process Impacts

5.1 Business Practice Manual (BPM)

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BPM	Description of Impact(s)	3A 2019	3B 2020
Managing Full Network Model	**N/A**	**N/A**	**N/A**
Congestion Revenue Rights	**N/A**	**N/A**	**N/A**
Market Instruments	**Yes** - Update PDR bid requirements – new SIBR rule, and new bidding options	**X**	
	Yes – Update to address load consumption		**X**
Outage Management	**Yes -** Update to incorporate the PDR-LSR outage management protocols		**X**
Reliability Requirement	**Yes** - Address RA and bidding requirements for PDR-LSR		**X**
Market Operations	**Yes** - Update market functionality to include PDR-LSR, EVSE		**X**
	Yes - Update market functionality to address new bid dispatchable options for PDRs	**X**	
Compliance Monitoring	**N/A**	**N/A**	**N/A**
Metering	**Yes** - Updates to Performance Methodologies and PDR Registrations		**X**
Scheduling Coordinator Certification & Termination	**N/A**	**N/A**	**N/A**
Rules of Conduct Administration	**N/A**	**N/A**	**N/A**
BPM Change Management	**N/A**	**N/A**	**N/A**
Definitions & Acronyms	**Yes** - Add PDR-LSR, EVSE		**X**

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BPM	Description of Impact(s)	3A 2019	3B 2020
Settlements & Billing	**Yes** - Updates to Charge Code(s)	**X**	
Credit Management	**N/A**	**N/A**	**N/A**
Candidate CRR Holder	**N/A**	**N/A**	**N/A**
Transmission Planning Process	**N/A**	**N/A**	**N/A**
Direct Telemetry	**N/A**	**N/A**	**N/A**
Distributed Generation for Deliverability	**N/A**	**N/A**	**N/A**
Energy Imbalance Market (EIM)	**N/A**	**N/A**	**N/A**
Generator Interconnection Procedure (GIP)	**N/A**	**N/A**	**N/A**
Generator Interconnection and Deliverability Allocation Procedures	**N/A**	**N/A**	**N/A**
Generator Management	**N/A**	**N/A**	**N/A**

5.2 Other

Impact:	Description: (optional)	3A 2019	3B 2020
Market Simulation	**Yes**	**X**	**X**
Market Participant Impact	**Yes**	**X**	**X**
External Training	**Yes** - Update Demand Response User Guide to reflect changes	**X**	**X**
Policy Initiative	**Yes**	**X**	**X**

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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.

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6.1 Business Process: Manage Demand Response Bidding – Fall 2019 – 3A

Proxy Demand Resources (PDRs) currently participate in CAISO markets. However, some PDRs are constrained from participating in market optimization due to their individual operating characteristics.

New bidding options enabling PDRs to be dispatched for time periods that are supported by their individual operating characteristics will be available to provide opportunities to participate in the CAISO markets.

PDRs will need to identify their specific Bid Option selection when the resources are registered in the Master File. Bid Options can be changed for a given PDR per existing change processes associated with Master File registrations.

Bids will be optimized for dispatch in the market per the current effective Bid Option selected in the Master File.

6.1.1 Business Requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ001	**Bid Dispatchable Option Type** System to have ability to allow a Proxy Demand Resource (PDR) to register a **Bid Dispatchable** Option Type. **Bid Dispatchable** Options to include: • 60-Minute • 15-Minute • 5-Minute	Core	Master File
ESDER3-BRQ002	**Bid Dispatchable Option Type – RDT** RDT to be updated to include requirement to identify **Bid Dispatchable** Option Type for PDRs	Core	Master File

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ005	**Bid Dispatchable Option Type Effective Period** System to require Proxy Demand Resource ID to have a single effective **Bid Dispatchable** Option Type registered with a Start Date and End Date	Core	Master File
ESDER3-BRQ006	**Bid Dispatchable Option Type - Startup** 60-Minute - For PDR resources selecting the 60-Minute **Bid Dispatchable** option, RTM shall assume a value of 52.5 minutes (similar to hourly ties), for purposes of making commitment decisions 15-Minute –For PDR resources selecting the 15-minute **Bid Dispatchable** option, RTM shall assume a value of 22.5 minutes (similar to 15-minute ties), for purposes of making commitment decisions.	Core	Market Systems
ESDER3-BRQ010	**Bid Dispatchable Option Type - Market Use** For PDR Bids submitted in the Real-Time Market, system to use the effective **Bid Dispatchable** Option Type from the Master File for market optimization runs	Core	Market Systems
ESDER3-BRQ011	**60-Minute Bid Constraint** For resources selecting the 60-Minute **Bid Dispatchable** option, during the HASP run, system shall enforce a constraint that the resource's schedule for each of the advisory 15-minute interval of the HASP hour (i.e., interval 4-7) is equal but otherwise optimal.	Core	Market Systems
ESDER3-BRQ011C	**Ramping for 60-Minute Dispatches** PDR Resources dispatched based on a 60-Minute **Bid Dispatchable** option to be treated like 60-Minute intertie resources with a 20-minute ramp across hours	Core	Market Systems

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ011D	**Ramping for 15-Minute Dispatches** PDR Resources dispatched based on a 15-minute **Bid Dispatchable** option to be treated like a 15-min intertie resources with a 20-minute ramp across hours and a 10-minute ramp across 15-minute intervals	Core	Market Systems
ESDER3-BRQ012	**Hourly Schedule Broadcasts** System will make available to the downstream applications binding PDR Hourly schedule 52.5 minutes before scheduled flow of energy Refer to BRQ040 for access to these dispatches	Existing	Market Systems
ESDER3-BRQ014	**Expected Energy 15-Minute and 60-Minute Dispatch** System shall calculate total expected energy using block energy accounting for PDRs selecting the 60-minute or 15-minute **Bid Dispatchable** options, similar to static intertie resources and make it available to Settlements	Core	Market Systems
ESDER3-BRQ020	**PDR 15-Minute Dispatch** System will make available to the downstream applications binding 15-minute dispatches for PDRs Refer to BRQ041 for access to these dispatches	Existing	Market Systems
ESDER3-BRQ040	**RTUC Hourly Advisory Report** System to have the capability to receive and report on Hourly, Energy Schedules and A/S awards (MW & price) for PDRs Data to be available for seven (7) days	Existing	CMRI

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ041	**FMM Energy Schedules/Awards - RTPD Report** System to have the capability to receive and report on 15-minute Energy Schedules and A/S awards (MW & price) for PDRs	Existing	CMRI
ESDER3-BRQ043	**Expected Energy Report** System to have the capability to receive and report Expected Energy for PDRs having 5-minute, 15-minute and 60-minute dispatches	Existing	CMRI
ESDER3-BRQ065	**Bid Cost Recovery – 60-Minute Bids** Settlements to exclude Bid Cost Recovery (BCR) for PDR Bids having an effective Bid Dispatchable Option type of 60-Minute	Existing	Settlements
ESDER3-BRQ070	**Bid Cost Recovery – 15-Minute Bids** Settlements to include Bid Cost Recovery (BCR) for PDR Bids having an effective Bid Dispatchable Option of 15-minutes	Existing	Settlements
ESDER3-BRQ071	**60-Minute Settlements** The 60-Minute PDRs will be treated like hourly intertie resources with a block 15-minute energy settlement with four equal 15-minute instructed imbalance energy at the corresponding FMM LMP	Existing	Settlements
ESDER3-BRQ072	**15-Minute Settlements** The 15-minute PDRs will be treated like 15-minute intertie resources with a block 15-minute energy settlement at the corresponding FMM LMP	Existing	Settlements
ESDER3-BRQ075	**Bid Verification - SIBR** System to not allow the hourly pre dispatch Option to be changed in SIBR for PDRs.	Core	SIBR

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6.2 Business Process: Manage Load Shift Product (PDR-LSR) – Fall 2020 – 3B

The CAISO is adding a load shift product for behind the meter (BTM) storage devices under the PDR participation model. The load shift product will fall under existing PDR policy provisions, but will develop certain functionalities allowing the resource to bid and be dispatched for both load consumption (charging, negative generation) and load curtailment (discharging, generation) from a BTM storage resource.

The initial product will allow a PDR to access day-ahead and real-time energy markets for both load curtailment and load consumption capabilities through the use of two separate resource IDs.

These products will be represented as PDR-LSRs. PDR-LSRs can provide both load curtailment and load consumption through use of two (2) discrete resource IDs registered in the Master File..

Current mapping of unique PDR Resource IDs in Master File to associated Registration IDs in DRRS will persist.

Business Requirements

6.2.1

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ100	**PDR-LSR Registration - DRRS** System to have capability to enable a Registration ID for PDR-LSR resource by selecting Performance Methodologies for LSRs as identified in BRQ140	Core	DRRS

ESDER3-BRQ101	**PDR-LSR Pmin & Pmax Models**
	
	System to enforce business rules for PDR-LSR Resources per the following limits:
	
	• PDR-LSR Curtailment Model
	  ○ Pmin = zero (0)
	  ○ Pmax > zero (0)
	
	• PDR-LSR Consumption Model
	  ○ Pmin < zero (0)
	  ○ Pmax of zero (0)
		Core	Master File

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ110	**PDR-LSR Registration** System to have capability to validate a Registration ID that selects one of the PDR-LSR baseline methods based on the following: • Registration must include at least 1 Service Account with a Energy storage (ES) device	Core	DRRS
ESDER3-BRQ112	**PDR-LSR Registration and Resource IDs** A PDR-LSR curtailment resource ID can only be selected and associated to a registration if that registrion has selected a PDR-LSR baseline method. • Implementation Notes: • Master File will maintain two resource IDs for the same registration, but DRRS will have just the PDR-LSR curtailment resource ID	Core	DRRS
ESDER3-BRQ130	**PDR-LSR Registration- MF** System to add capability to create Registrations for two (2) new PDR types: • PDR-LSR Curtailment • PDR-LSR Consumption	Core	Master File
ESDER3-BRQ131	**PDR-LSR Initial Registration- SCID** Initial registration for related PDR-LSR Resource IDs, i.e., PDR-LSR Curtailment and PDR-LSR Consumption for the same physical entity, to confirm both Resource IDs have the same SC.	Business Process	Master File

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ132	**PDR-LSR Resource ID Updates - SCID** System to require that registration updates for related PDR-LSR Resource IDs, i.e., PDR-LSR Curtailment and PDR-LSR Consumption for the same physical entity, be made by the same SC.	Core	Master File
ESDER3-BRQ135	Bid Dispatchable **Option & Period Consistent** For PDR-LSR Curtailment and PDR-LSR-Consumption Resource, system to require: • Bid Dispatchable Option Type to be the same • Start Date and End Date to be the same • GDFs to be the same	Core	Master File
ESDER3-BRQ140	**PDR-LSR Performance Methodologies** System to add new performance methodologies for PDR-LSR registrations and registrations that include behind the meter energy storage location(s): • PDR-LSR- • PDR-LSR+Day Matching 5/10 • PDR-LSR+Day Matching 10/10 • PDR-LSR+Weather matching • PDR-LSR+Day Matching Combined • MGO + Day Matching 5/10 • MGO + Day Matching 10/10 • MGO + Day Matching Combined • MGO+Weather Matching NOTE: Existing MGO 10/10 (CLB) may be removed as a baseline option with addition of new MGO baselines listed in this requirement.	Core	DRRS

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ141	Registration that has a location with “Energy Storage” (ES) as an attribute can select any one of the following baseline methods: PDR-LSR PDR-LSR+Day Matching 5/10 PDR-LSR + Day Matching 10/10 PDR-LSR + Weather Matching PDR-LSR + Day Matching Combined MGO MGO + Day Matching 5/10 MGO + Day Matching 10/10 MGO + Day Matching Combined MGO+Weather Matching All other Existing Baseline Methods not identified in above list.	Core	DRRS
ESDER3-BRQ142	Registration that has a location with “EVSE” as an attribute can select any one of the following baseline methods: EVSE res EVSE res + Day Matching 5/10 EVSE res + Day Matching 10/10 EVSE res + Day Matching Combined EVSE res + Weather Matching EVSE non-res EVSE non-res + Day Matching 10/10 EVSE non-res + Weather Matching EVSE non-res + Day Matching Combined Existing Baseline Methods excluding existing MGO baselines, MGO and MGO 10/10 (with CLB)	Core	DRRS

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ143	Registration that has location(s) with both “ES” and “EVSE” as an attribute can select any one of the following baseline methods: PDR-LSR PDR-LSR+ Day Matching 5/10 PDR-LSR + Day Matching 10/10 PDR-LSR + Weather Matching PDR-LSR + Day Matching Combined MGO +Day Matching 5/10 MGO + Day Matching 10/10 MGO + Day Matching Combined MGO+Weather Matching EVSE res EVSE res + Day Matching 5/10 EVSE res + Day Matching 10/10 EVSE res + Day Matching Combined EVSE res + Weather Matching EVSE non-res EVSE non-res + Day Matching 10/10 EVSE non-res + Weather Matching EVSE non-res + Day Matching Combined Existing Baseline Methods not identified in above list.	Core	DRRS
ESDER3-BRQ144	Registrations that have locations with neither ES nor EVSE can select from only the following: Existing Baseline Methods excluding existing MGO baselines, MGO and MGO 10/10 (CLB)	Core	DRRS

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ150	**Energy Storage Device in Service Account** System to add capability to indicate if a Service Account has a behind the meter energy storage device Implementation Notes: • Service Accounts for which a energy storage device exists must be terminated and reregistered to identify energy storage device	Core	DRRS
ESDER3-BRQ154	**PDR-LSR Naming Convention** New naming convention for PDR-LSR resource types to be developed. Implementation Note: PDR-LSR NGR (consumption) shall have 'CON' in the Resource ID, PDR-LSR non-NGR (curtailment) shall have 'CUR' in the Resource ID, and the rest of the characters shall be the same. The naming convention shall be as follows: See table below	Core	DRRS

	Curtailment ID	Consumption ID
Pre-defined Resource	ABCD_x_PDRPCURxxx	ABCD_x_PDRPCONxxx
Custom Resource	ABCD_x_PDRCCURxxx	ABCD_x_PDRCCURxxx

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SDER3-BRQ160	**PDR-LSR RDT Process** The following business rules to be enforced for the new resource types noted in BRQ 130: • PDR-LSR-Consumption ○ Bid Dispatchable *must be either:* ▪ *5 min* ▪ *15 min* ○ *Worst Operational Ramp rate must meet or exceed the following :* ▪ *5 min* Bid Dispatchable *option: ramp rate > = (Pmax-Pmin)/5* ▪ *15 min* Bid Dispatchable *option: ramp rate > = (Pmax-Pmin)/15* ○ *No Ancillary Services are permitted* • PDR-LSR-Curtailment ○ Bid Dispatchable *Options can be one of the following:* ▪ *5 min* ▪ *15 min* ○ *Worst Operational Ramp rate must meet or exceed the following:* ▪ *5 min* Bid Dispatchable *option: ramp rate > = (Pmax-Pmin)/5* ▪ *15 min* Bid Dispatchable *option: ramp rate > = (Pmax-Pmin)/15* ○ *Ancillary Services are permitted:* ▪ *Spin* ▪ *Non-Spin* • Pmin to Pmax ramp rates (5-min or 15-min) to be: ○ *verified as being achievable* ○ *validated during RDT process*	Core	Master File

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ197	**NQC Rejection for PDR-LSR Consumption** System shall not allow a PDR-LSR Consumption Resource ID to be submitted for request of NQC.	Core	CIRA
ESDER3-BRQ250	**PDR-LSR-Consumption Price Criteria** System to verify all PDR-LSR-Consumption bids submitted in **DA and RT Market** meet the following criteria: • Equal to or greater than current Bid Floor price and Less than $0.00	Core	SIBR
ESDER3-BRQ255A	**Bid Rejections** If Bids identified in BRQ250 do not meet the applicable bid criteria noted in the respective BRQ, system shall: • Reject the bid and provide indication of rejection on system's User Interface • Provide an Error Message appropriate for the rejection • Allow rejected bids to be corrected and resubmitted	Core	SIBR

6.3 Business Process: Manage Demand Resource Aggregations – Fall 2019 – 3A

The CAISO currently requires DR resource aggregations consist of locations under a single LSE, represented by one demand response provider (DRP), and within a single sub-LAP.

This requirement for a DR resource aggregation consist of locations under a single LSE will be removed. DR resource registrations will be allowed to include locations (service accounts) from multiple LSEs. However, these accounts will still need to be within the same sub-Lap.

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In addition, PDR bids will be required to be at or above the current net benefits test NBT price. Bids not meeting this criteria will be rejected. There will be the opportunity to resubmit the bids.

Given that all accepted PDR bids will be at or above the NBT price, there will not be a need for the CAISO to make default load adjustment (DLAs). Thus, the DLA function will be removed and LSEs' metered load will not be subject to adjustments due to the NBT criteria.

Business Requirements

6.1

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ200	**Service Accounts - LSEs** System to allow registrations of PDRs and RDRRs to include Service Accounts from multiple LSEs Implementation Note: • Implementation Plan to manage existing PDR and RDRR registrations should be considered	Core	DRRS
ESDER3-BRQ210	**Service Accounts – Sub-laps** System to require Service Accounts used in a PDR or RDDR registration to be in the same sub-lap	Existing	DRRS
ESDER3-BRQ220	**Service Accounts - DLAP** For PDR registrations, DLAP data will not be required: Implementation Note: • Implementation Plan to manage existing PDR and RDRR registrations should be considered	Core	DRRS

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ230	**Eliminate DLAP Mapping** DLAP mapping for PDRs and RDRRs is not required in the Master File **Implementation Note:** A transition plan for DLAP mapping truncation must be developed. Items to include: • Existing DLAP mapping to be retained for historical data purposes • New resource IDs will not need any DLAP mapping	Core	Master File
ESDER3-BRQ240	**NBT Price Threshold – DA Market** System to verify all RDRR, PDR and PDR-LSR-Curtailment bids submitted in **DA Market** are at or above monthly NBT price thresholds	Core	SIBR
ESDER3-BRQ245	**NBT Price Threshold – RT Market** System to verify all PDR and PDR-LSR-Curtailment bids submitted in **RT Market** are at or above monthly NBT price thresholds	Core	SIBR
ESDER3-BRQ255	**Bid Rejections** If Bids identified in BRQ240 and BRQ245 do not meet the applicable bid criteria noted in the respective BRQ, system shall: • Reject the bid and provide indication of rejection on system's User Interface • Provide an Error Message appropriate for the rejection • Allow rejected bids to be corrected and resubmitted	Core	SIBR

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ270	**Remove DLA** System to deactivate current capability that triggers default load adjustment (DLA) function when a PDR delivers energy and the RT LMP is less than the NBT price threshold	Core	Settlement

6.4 Business Process: Manage Electric Vehicle Supply Equipment (EVSE) – Fall 2020 – 3B

EVSEs with sub-metering will be able to participate independent of, or in combination with, its host customer load.

New performance methodologies for residential and non-residential installations have been added.

6.4.1 Business Requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ300	**EVSE Registration - DRRS** System to have capability to enable a Registration ID for EVSE resource by selecting Performance Methodologies for EVSEs as identified in BRQs 142, 143, and 144	Core	DRRS

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ESDER3-BRQ302	**EVSE Device in Service Account** System to enable indication that a Service Account has a EVSE device associated to it. Registrations can be associated to EVSE related baseline methods only if there is one location that has the EVSE device. Implementation Notes: • Service Accounts for which a EVSE device exists must be terminated and reregistered to identify the EVSE device	Core	DRRS
ESDER3-BRQ303	External DRPs shall submit meter data for a resource that is associated to a registration with one of the EVSE or PDR-LSR baseline methods using the matrix provided in Appendix A. Note: This matrix is also available as Appendix B of the Business Practice Manual for Demand Response.	Existing	MRI-S

6.5 Business Process: Manage Customer Load Baseline Submittals – Fall 2019 – 3A

6.5.1 Customer Load Baselines are required to be calculated in conjunction with the various Performance Evaluation Methodologies for PDRs and RDRRs. Per Tariff requirements, the calculated Customer Load Baselines are required to be submitted to the CAISO along with the underlying load/consumption data associated with the Customer Load Baseline.

Business Requirements

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
CLB-BRQ001	MRI-S shall receive an additional measurement type of BASE to collect the resource/registration calculated Customer Load Baseline data for monitoring purposes only	Core	MRI-S, External DRP
CLB-BRQ002	Customer Load Baseline data submitted as measurement type of BASE shall be at hourly granularity	Core	MRI-S, External DRP
CLB-BRQ003	Customer Load Baseline data shall be submitted as measurement type of BASE for the following baseline methods: 1. Control Group 2. Day Matching 5/10 (Residential Only) 3. Day Matching 10/10 4. Day Matching Combined 5. Weather Matching	N/A	External DRP
CLB-BRQ004	For registration using Meter Generation Output with 10 in 10 method, the DRP shall submit two sets of data: • Customer Load Baseline data submitted as measurement type of BASE will be for the 10 in 10 element • MGO Customer Load Baseline data submitted as measurement type of TMNT will represent the generation device metered values used in the baseline calculation.	N/A	External DRP
CLB-BRQ005	Customer Load Baseline data submitted as measurement type of BASE shall be submitted only for those hours bids are submitted for trade dates when the resource/registration is being actively bid into the markets.	N/A	External DRP

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
CLB-BRQ006	Customer Load Baseline data submitted as measurement type of BASE shall be submitted beginning with the resource/registration effective start date and dates going forward until its effective end date.	N/A	External DRP
CLB-BRQ007	Data with measurement type of CBL, TMNT (load) and BASE (calculated) that are used for monitoring purposes shall be retained in MRI-S online for a minimum of 24 months and offline (archived) for a minimum of an additional 60 months	Core	MRI-S

6.6 DRRS Enhancements – Fall 2020 – 3B

Following table captures a few enhancements requests that have been received from market participants to retrieve incremental data from DRRS as well as add additional elements to the web services to provide the same functionality in the API as the UI.

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
DRRS-HPQC-BRQ001	HPQC 62584 Provide a functionality in DRRS to request for and view and/or return incremental data based on the record modification date	Core	DRRS, External DRP, External UDC, External LSE

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
DRRS-HPQC-BRQ002	HPQC 44701 & 61439 Provide a functionality in DRRS to programmatically retrieve the following location data attributes that is currently displayed on the UI: • LSE Comments • LSE Reviewer • LSE Reviewer Contact Info • UDC Comments • UDC Reviewer • UDC Reviewer Contact Info • Incumbent DRP Comments • Incumbent DRP • Incumbent DRP Contact Info • Prospective DRP Comments • Prospective DRP • Prospective DRP Contact Info	Core	DRRS, External DRP, External UDC, External LSE
DRRS-HPQC-BRQ003	HPQC 63444 Provide a functionality in DRRS to programmatically retrieve the locations that are currently involved in a defense process. This is equivalent to the existing function on the UI to retrieve locations with “Defense Active” = ‘Y’	Core	DRRS, External DRP

6.7 Business Process: Market Simulation – ESDER 3

The following Identifiers are used as a guide to indicate the reason for Potential Structured or Unstructured Scenarios.

1. ***Rule Impacts****: Generalized changes in market rules, bidding rules, settlements rules, market design changes, or other business rules.*
2. ***Interface changes****: Changes that impact templates (e.g. the Resource Adequacy (RA) supply plan), user interface (UI), and application programming interface (API) (e.g. retrievals of new shadow settlement data).*
3. ***New application/report****: Changes that cause addition/modification of market software or reports, especially when market data input is required by the market participant.*

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4. ***New system process***: *Modification of data flow in systems, especially if the new process requires the market participant to demonstrate proficiency prior to production.*
5. ***New/Modified model data***: *Addition or substantial modification of model data as a market solution provided by the ISO (e.g. BANC split into SMUD and non-EIM BAAs, PowerEx Overlapping Resource Aggregation).*
6. ***New user role***: *The addition or modification of access permissions for a user role applied to specific business units within an EIM entity or market participant organization (e.g. Load Serving Entity (LSE) as a Local Regulatory Authority (LRA) role). Structured Scenarios would be beneficial for market participants taking on a new function or process within their organization.*

Business Requirements

6.7.1

ID#	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario	3A 2019	3B 2020
ESDER3-MKTSIM-000	Day-Ahead Bids for PDRs to reflect new 60-Minute, 15-minute or 5-minute **Bid Dispatchable** options to be used for market optimization and dispatches. DA Awards are 60-Minute.	SIBR (Day Ahead Bids)	Settlements CMRI	1. Rule Impacts 5. New/modified model data	X	
ESDER3-MKTSIM-005	Real-time Bids for PDRs to reflect new **Bid Dispatchable** options of 15-minutes or 60-Minute to be used for market optimization and dispatches.	SIBR (Real Time Bids)	Settlements CMRI	1. Rule Impacts 5. New/modified model data	X	
ESDER3-MKTSIM-010	Registration of PDRs to indicate **Bid Dispatchable** option of 60-Minute, 15-minute or 5-minute for defined period	Master File	N/A	1. Rule Impacts 2. Interface changes 5. New/modified model data	X	

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ID#	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario	3A 2019	3B 2020
ESDER3-MKTSIM-015	Registration of Service Accounts to include indication of inclusion of a Behind-the-Meter (BTM) storage device	DRRS	N/A	1. Rule Impacts 2. Interface changes 5. New/modified model data		X
ESDER3-MKTSIM-020	Registration of Service Accounts to include indication of inclusion of an Electric Vehicle Supply Equipment (EVSE)	DRRS	N/A	1. Rule Impacts 2. Interface changes 5. New/modified model data		X
ESDER3-MKTSIM-025	Registration of new PDR-LSR Resource Types: • PDR-LSR Curtailment • PDR-LSR Consumption	DRRS	N/A	1. Rule Impacts 2. Interface changes 5. New/modified model data		X
ESDER3-MKTSIM-030	Submittal of SQMD per Resource ID/Registration ID	MRI-S	Settlements	1. Rule Impacts 2. Interface changes 5. New/modified model data		X
ESDER3-MKTSIM-035	Bid cost recovery for 15-Minute PDR bids	N/A	Settlements	5. New/modified model data	X	

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ID#	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario	3A 2019	3B 2020
ESDER3-MKTSIM-040	Day-Ahead Bids for PDRs to meet the new NBT Price Threshold criteria	SIBR	Settlements	1. Rule Impacts	X	
ESDER3-MKTSIM-045	Real-Time Bids for PDRs to meet the new NBT Price Threshold criteria	SIBR	Settlements	1. Rule Impacts	X	
ESDER3-MKTSIM-050	Day-Ahead Bids for PDR-LSR-Consumption Resource IDs to meet the new Bid Price criteria	SIBR	Settlements	1. Rule Impacts		X
ESDER3-MKTSIM-055	Real-Time Bids for PDR-LSR-Consumption Resource IDs to meet the new Bid Price criteria	SIBR	Settlements	1. Rule Impacts		X
ESDER3-MKTSIM-060	Day-Ahead Bids for PDR-LSR-Curtailment to meet the new NBT Price Threshold criteria	SIBR	Settlements	1. Rule Impacts		X
ESDER3-MKTSIM-065	Real-Time Bids for PDR-LSR-Curtailment to meet the new NBT Price Threshold criteria	SIBR	Settlements	1. Rule Impacts		X
ESDER3-MKTSIM-070	Day-Ahead Bids for RDRR Resource IDs to meet the new NBT Price Threshold criteria	SIBR	Settlements	1. Rule Impacts	X	
ESDER3-MKTSIM-075	Registration of PDRs and RDRRs can be from multiple LSEs but must be within the same sublap	DRRS	N/A	1. Rule Impacts 2. Interface changes	X	
ESDER3-MKTSIM-080	Registration of PDRs and RDRRs will not require DLAP data	DRRS	N/A	1. Rule Impacts 2. Interface changes	X	

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ID#	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario	3A 2019	3B 2020
ESDER3-MKTSIM-085	Customer Load Baselines are required to be submitted to the CAISO along with the underlying load/consumption data associated with the Customer Load Baseline in Settlements		MRI-S	1. Rule Impacts 2. Interface changes	X	

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Appendices

7.1 Appendix A - Baseline/Performance Evaluation Methodology MRI-S Data Submittal Requirements for Demand Response Resources

7

Baseline Methods and Measurement Type mapping:

Measurement Type	Data Granularity	Baseline Method	Comments
LOAD	5 minute	• Control Group • Day Matching 5/10 (Residential Only) • Day Matching 10/10 • Day Matching Combined • Weather Matching • Meter Generation Output[1] • Meter Generation Output with Customer Load Baseline[2] • PDR-LSR (CUR only) • PDR-LSR (CUR) with Customer Load Baseline[3] • EVSE-Res	**AS Resource only** This is the actual load for intervals the resource receives an Ancillary Service award. Both LOAD and MBMA data sets are required for no pay calculations, even though the LOAD data includes the same values submitted in the MBMA data set.[6] For PDR-LSR, and PDR with Customer Load Baseline, data is

[1] "MGO" is a performance evaluation methodology that can be used by a generation device located behind the revenue meter, to represent the load reduction attributed only to the output of that generation device excluding its typical use. Referred to as "generation offset only".

[2] "MGO with Customer Load Baseline" formerly known as "Meter Generation Output with 10-in-10" under this performance methodology option, the demand response performance is a result of combining the demand response energy measurement (DREM) from pure load reduction calculated utilizing a customer load baseline of Day Matching 10 in 10, Day Matching 5 in 10 (residential customers only), Day Matching Combined, weather matching combined with the DREM from load reduction attributed to generation offset (MGO). Referred to as "load and generation"

[3] PDR-LSR with Customer Load Baseline (CLB) includes Day Matching 5-in-10, Day Matching 10-in-10, Weather Matching, and Day Matching combined.

[6] For a Proxy Demand Resource or Reliability Demand Response Resource using behind-the-meter generation to offset demand utilizing one of the MGO performance methodology options, meter data submitted for LOAD and MBMA represents metered load for the service account (customer) not of the sub-metered behind-the-meter generator.

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		• EVSE-Res with Customer Load Baseline[4] • EVSE-Non-Res • EVSE-Non-Res with Customer Load Baseline[5]	submitted for the PDR-LSR curtailment (CUR) ID only. For EVSE it would be the load at the EVSE. For EVSE with CLB submit load at the facility level.
LOAD	5 minute	• PDR-LSR(CON)	PDR-LSR Consumptions (CON) ID submit "LOAD" only. This represents the energy consumption or reduction when dispatched. Data required for intervals where TEE<0.
GEN	5 minute	• Control Group • Day Matching 5/10 (Residential Only) • Day Matching 10/10 • Day Matching Combined • Weather Matching • Meter Generation Output • Meter Generation Output with Customer Load Baseline • PDR-LSR (CUR and CON) • PDR-LSR (CUR) with Customer Load Baseline[3] • EVSE-Res • EVSE-Res with Customer Load Baseline[4] • EVSE-Non-Res • EVSE-Non-Res with Customer Load Baseline[5]	Demand Response Energy Measurement (DREM) or performance data of the resource in response to an award or dispatch. Data required for intervals where TEE>0.
MBMA	5 minute	• Control Group	**AS Resource Only**

[4] EVSE residential with Customer Load Baseline (CLB) includes Day Matching 5-in-10, Day Matching 10-in-10, Weather Matching, and Day Matching combined

[5] EVSE non-residential with Customer Load Baseline (CLB) includes Day Matching 10-in-10, Weather Matching, and Day Matching Combined.

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		• Day Matching 5/10 (Residential Only) • Day Matching 10/10 • Day Matching Combined • Weather Matching • Meter Generation Output • Meter Generation Output with Customer Load Baseline[2] • PDR-LSR (CUR only) • PDR-LSR (CUR) with Customer Load Baseline[3] • EVSE-Res • EVSE-Res with Customer Load Baseline[4] • EVSE-Non-Res • EVSE-Non-Res with Customer Load Baseline[5]	This is the actual load data for the interval preceding, during, and following the trading intervals for which they were awarded ancillary services.[7] For PDR-LSR and PDR-LSR with Customer Load Baseline, data is submitted for the PDR-LSR curtailment ID only. For EVSE it would be the load at the EVSE. For EVSE with CLB submit load at the facility level.
CBL	Hourly	• Control Group • Day Matching 5/10 (Residential Only) • Day Matching 10/10 • Day Matching Combined • Weather Matching • Meter Generation Output with 10 in 10 (Customer Load Baseline)[2] • PDR-LSR (CUR) with Customer Load Baseline[3] EVSE-Res with Customer Load Baseline[4] • EVSE-Non-Res with Customer Load Baseline[5]	For **monitoring** only. Underlying load data used in the customer load baseline calculation for all baseline methods. 90 days of historical data prior to the day of the event is required. PDR-LSR with CLB Curtailment ID only This is applicable for the “MGO and EVSE res and non-res with CLB”[8] only. It represents the net load data used to develop the customer load baseline of the facility only. 90 days

[7] California Independent System Operator Corporation Tariff Section 4.13.4

[8] “MGO with CLB” provides for the use of Day Matching 10 in 10, Day Matching 5 in 10 (residential customers only), Day Matching Combined,and weather matching performance evaluation methods in the calculation of the DREM portion attributed to customer load response only.

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			of historic data prior to the day of the event is required PDR-LSR with CLB submit resource IDs PDR-LSR curtailment
TMNT	Hourly	• Control Group • Meter Generation Output[9] • Meter Generation Output with 10 in 10 (Customer Load Baseline)[2] • PDR-LSR (CUR and CON) • PDR-LSR (CUR) with Customer Load Baseline[3] • EVSE-Res • EVSE-Res with Customer Load Baseline[4] • EVSE-Non-Res • EVSE-Non-Res with Customer Load Baseline[5]	For **monitoring** Only Submit for trade date where TEE > 0. 90 days of historic data prior to the day of the event is required. For the Control Group baseline method, data represents the actual load data for those locations in the treatment group. For the MGO and MGO 10 in 10 baseline methods, TMNT data represents the generation device metered values. For PDR-LSR submit both resource IDs, the consumption and curtailment IDs. For PDR-LSR with CLB, submit only the curtailment only ID. For all EVSEs, this represents the load at the EVSE.

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BASE	Hourly	• Control Group • Day Matching 5/10 (Residential Only) • Day Matching 10/10 • Day Matching Combined • Weather Matching • Meter Generation Output with Customer Load Baseline[2] • PDR-LSR (CUR) with Customer Load Baseline[3] • EVSE-Res with Customer Load Baseline[4] • EVSE-Non-Res with Customer Load Baseline[5]	For **monitoring** Only Calculated customer load baseline (CLB) values used to derive DREM. For the MGO with CLB, EVSE res with CLB, EVSE non-res with CLB, and PDR-LSR (CUR) with Customer Load Baseline, BASE data represents the customer load baseline used to calculate the DREM attributed to the pure load reduction only. BASE data is submitted for trade dates when the resource/registration is being actively bid into the market for the hours in which it is bid.

7.2 Appendix B- MRI-S Data Submittal Requirements for Demand Response Resources

	AS Resource Only						
Baseline Method	**LOAD**	**MBMA**	**LOAD**	**GEN**	**CBL**	**TMNT**	**BASE**
Control Group	X	X		X	X	X	X
Day Matching 5/10	X	X		X	X		X
Day Matching 10/10	X	X		X	X		X
Day Matching Combined	X	X		X	X		X
Weather Matching	X	X		X	X		X

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MGO	X	X		X		X	
MGO with Day Matching 5/10	X	X		X	X	X	X
MGO with Day Matching 10/10	X	X		X	X	X	X
MGO with Day Matching Combined	X	X		X	X	X	X
MGO with Weather Matching	X	X		X	X	X	X
PDR-LSR (Curtailment)	X	X		X		X	
PDR-LSR (Consumption)			X	X		X	
PDR-LSR (Curtailment only) with Day Matching 5/10	X	X		X	X	X	X
PDR-LSR (Curtailment only) with Day Matching 10/10	X	X		X	X	X	X
PDR-LSR (Curtailment only) with Day Matching Combined	X	X		X	X	X	X
PDR-LSR (Curtailment only) with Weather Matching	X	X		X	X	X	X
EVSE res	X	X		X			
EVSE res with Day Matching 5/10	X	X		X	X	X	X
EVSE res with Day Matching 10/10	X	X		X	X	X	X
EVSE res with Day Matching Combined	X	X		X	X	X	X
EVSE res with Weather Matching	X	X		X	X	X	X
EVSE non-res	X	X		X			
EVSE non-res with Day Matching 10/10	X	X		X	X	X	X
EVSE non-res with Day Matching Combined	X	X		X	X	X	X
EVSE non-res with Weather Matching	X	X		X	X	X	X

7.3 Appendix C- Location Type – Baseline Method Refernce Matrix

Location Device Type	Baseline Methods for Registration
Energy Storage (ES)	PDR-LSR PDR-LSR+Day Matching 5/10 PDR-LSR+Day Matching 10/10 PDR-LSR+Weather Matching PDR-LSR+Day Matching Combined MGO+Day Matching 5/10 MGO+Day Matching 10/10

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	MGO+Day Matching Combined MGO+Weather Matching Weather Matching Meter Generation Output Day Matching Combined Day Matching 10/10 Day Matching 5/10 (Residential Only) Control Group
Electric Vehicle Supply Equipment (EVSE)	EVSE res EVSE res+Day Matching 5/10 EVSE res+Day Matching 10/10 EVSE res+Day Matching Combined EVSE res+Weather Matching EVSE non-res EVSE non-res+Day Matching 10/10 EVSE non-res+Weather Matching EVSE non-res+Day Matching Combined Weather Matching Day Matching Combined Day Matching 10/10 Day Matching 5/10 (Residential Only) Control Group
Neither ES Nor EVSE	Weather Matching Day Matching Combined Day Matching 10/10 Day Matching 5/10 (Residential Only)

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	Control Group
Both ES and EVSE	PDR-LSR PDR-LSR+Day Matching 5/10 PDR-LSR+Day Matching 10/10 PDR-LSR+Weather Matching PDR-LSR+Day Matching Combined MGO+Day Matching 5/10 MGO+Day Matching 10/10 MGO+Day Matching Combined MGO+Weather Matching EVSE res EVSE res+Day Matching 5/10 EVSE res+Day Matching 10/10 EVSE res+Day Matching Combined EVSE res+Weather Matching EVSE non-res EVSE non-res+Day Matching 10/10 EVSE non-res+Weather Matching EVSE non-res+Day Matching Combined Weather Matching Meter Generation Output Day Matching Combined Day Matching 10/10 Day Matching 5/10 (Residential Only) Control Group

Note: Baseline methods highlighted in green are new with ESDER 3B and those highlighted in yellow are existing methods

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