California ISO

Business Requirements Specification

Price Formation Enhancement-Rules for Bidding Above the Soft Offer Cap

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Revision History

Date	Version	Description
6/20/2024	1.0	BRS 1.0 Document Release.
9/30/2024	1.2	Update MIBP Shaping Factor *formula (*PFECAP-BRQ-151*)*

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1 Introduction

1.1 Purpose

This initiative will make modifications to the rules for bidding above the soft offer cap for resources; especially allow resources with intra-day opportunity costs to reflect those costs in their energy bids.

Go-live time: August 1, 2024

Problem:

FERC Order No. 831 requires

- Bids above soft cap $1,000/MWh must be cost-verified by the ISO and be capped at $2,000/MWh
  - Currently, ISO calculates DEB that are capped at the soft cap $1000
  - Resources use the reference level change request (RLCR) process to update the energy costs above $1000.
  - RLCR process is not designed for storage and does not include opportunity cost, therefore Energy Storage resource bids are capped at $1000
- Market participants have requested the ISO consider and prioritize policy enhancements for summer 2024 that would allow resources with intra-day opportunity costs to reflect those costs in their energy bids

Scope

1. Revise the cap on all Default Energy Bids (DEB) from $1,000/MWh to $2,000/MWh (“Uncap the DEB”) for both DA and RT. Generating resource energy bids are capped by max ($1000, DEB, adjusted DEB) for both DA and RT.
   - Calculate ‘Uncap the DEB” for all DEB types that are calculated in internal system except the resource with “Storage DEB Option”, which is calculated in the market
     - Replace the $1000 cap to $2000 in DEB calculation
     - Replace the $1000 cap to $2000 for negotiated DEB (NDEB) in internal system
   - Cap the generating resource bids in SIBR to max ($1000, DEB from internal system, adjusted DEB through RLCR)

2. For energy storage resource registered as an LESR using a proxy value, ISO will cap their bids at max ($1000, DEB from internal system if available, 4th highest Maximum Import Bid Price (MIBP), highest cost-verified bid)
   - For the energy storage resources (NGR-LESR):
     - Set Daily NGR MIBP to 4th Highest Maximum Import Bid Price for the Trading Day (set from DAM MIBP and then updated when new DAM or RTM MIBP is received.)

3. **Scope**:
4. Modify MIBP shaping factor formula based on the high-priced day SMEC only
    - If they have a DEB available to SIBR (from internal system) ISO will calculate their bid cap as max ($1000, DEB, 4th highest MIBP, highest cost verified bid) in RTM.
    - If they do not have a DEB available to SIBR (from internal system) ISO will calculate their bid cap as max ($1000, 4th highest MIBP, highest cost verified bid) in RTM.
    - Replace the $1000 cap to $2000 for Storage DEB calculation in market.
    - For NGR all types, cap the bids to max ($1000, DEB from internal system if available) in DAM.
    - For NGR not registered as NGR-LESR, cap the bids to max ($1000, DEB from internal system if available) in RTM.
    - The rules apply to corresponding tie resource in ISO and WEIM.

Implementation after August 1, 2024

Scope:

Modify MIBP shaping factor formula based on the high-priced day SMEC only.

1.2 References

Policy Initiatives

California ISO - Price formation enhancements (caiso.com)

Release Planning

Release planning | California ISO (caiso.com)

1.3 Acronym Definition

Acronym	Definition
AS	Ancillary Services
BAA	Balancing Authority Area
BPM	Business Process Manual
BRS	Business Requirement Specifications
CAISO	California Independent System Operator
DAM	Day-Ahead Market
DEB	Default Energy Bid
DMM	Department of Market Monitoring
ECIC	Energy Costs and Index Calculator (an internal system)
H	Hour
IFM	Integrated Forward Market
ICE	InterContinental Exchange
ISO	California Independent System Operator
LMP	Locational Marginal Price
MF	Master File
MIBP	Maximum Import Bid Price(MIBP)
N/A	Not Applicable
NDEB	Negotiated Default Energy Bid
NGR	Non Generation Resource
NGR-DDR	Non Generation Resource – Dispatch-able Demand Resource

Acronym	Definition
NGR-LESR	Non Generation Resource – Limited Energy Storage Resource
NGR-GNRC	Non Generation Resource – Generic NGR
NGR-HYBD	Non Generation Resource – Hybrid Resource
NPM	Nodal Price Model
PCA	Price Correction Admin
POC	Point Of Contact
PSTD	Power Systems Technology Development
RA	Resource Adequacy
RLCR	Reference Level Change Request (RLCR)
RTM	Real-Time Market
SC	Scheduling Coordinator
SIBR	Scheduling Infrastructure and Business Rules
SMEC	System Marginal Energy Cost Component
STUC	Short-Term Unit Commitment
SUT	Start Up Time
T	Time/Trading Hour
TBD	To Be Determined
TD	Trade Day/Date
TH	Trading Hour

2 Details of Business Need/Problem

2.1 Description

Business Opportunity/Problem Statement:	
What:	**Go-live on August 1, 2024** • Revise the cap on all Default Energy Bids from $1,000/MWh to $2,000/MWh ("Uncap the DEB"). This would allow hydro and other resources to bid up to a value that reflects the opportunity costs above $1,000/MWh as defined by their DEB • Modify the bid cap for energy storage resources to provide comparable bidding flexibility using a proxy value as max ($1000, DEB, 4th highest MIBP, highest cost verified bid) in the real-time market only
Why do we have this opportunity/problem:	FERC Order No. 831 requires • Bids above soft cap $1,000/MWh must be cost-verified by the ISO and be capped at $2,000/MWh • Current ISO mechanisms may not optimally account for opportunity costs • Market participants have requested the ISO consider and prioritize policy enhancements for summer 2024 that would allow resources with intra-day opportunity costs to reflect those costs in their energy bids

3 Project Information

3.1 Business Practice Manuals (BPM)

BPM	Description of Impact(s)
Market Instruments	

BPM	Description of Impact(s)
	Reference Level Change Requests (update references to bidding above soft cap) Financial Information (update references to bidding above soft cap) Financial Information (update references to bidding above soft cap) Discuss DEB cap logic changing to $2000 Update references to bidding above soft cap, clarify new definition of cost-verified bid Update MIBP hourly Energy Price Shaping Factor formula

3.2 Other

Impact	Description (optional)		
Market Participant Impact	Scheduling Coordinator (SC) in ISO and WEIM	**Yes**	SC NGR LESR and others could now bid above $1000
External Bid Publication	No change		

4 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.

Hyperlink to the Tariff Document Grouping: Filings | California ISO (caiso.com)

may-31-2024-tariff-amendment-price-formation-enhancements-er24-2168.pdf (caiso.com)

4.1 Business Process: < Manage Default Energy Bids >

4.1.1 Business Requirements

- Replace the $1000/MWh cap on Default Energy Bids (DEBs) with a value of $2000 in internal system
- Replace the $1000/MWh cap on Negotiated Default Energy Bids (NDEBs) Calculation with a value of $2000
- Modify the MIBP Energy Price Hourly Shaping Factor

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-110	**Continue current definition for NGR in MF** • No change for NGR resource GRDT submission	Information	MF
PFECAP-BRQ-130	**Replace the $1000/MWh cap to $2000 on Default Energy Bids (DEBs)** • Change the DEB Max Cap from current soft cap $1000 to the cap ceiling $2000 • Parameter effective date will be set August 1, 2024	Core Parameter change	Internal System

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-140	**Continue current DEB calculation with new DEB Max Cap** • Apply the $2000 cap in the DEB calculation for all the resources, including hydro and others, for all the DEB ranking options including negotiated DEB (NDEB)	Existing	Internal System
PFECAP-BRQ-150	**Continue current MIBP calculation** • MIBP = (Electric Hub Price * Hourly Energy Price Shaping Factor) * 1.1 Where: Electric Hub Price = max(Mid-C, PV DA bilateral price) Hourly Energy Price Shaping Factor based on SMEC • Hourly MIBP is calculated for all the hours of trading day prior to DAM • Re-calculated for all the hours of the trading day prior to the first hour of RTM. The MIBP value is a static 24 hour curve, no intra-day changes. Note: MIBP is for the whole market, not by BAA. The hourly shaping factor is not impacted by this project.	Existing	Internal System

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-151 (phase 2 implement after August 1,2024)	**Modify MIBP Energy Price Hourly Shaping Factor** $Hourly\ Shaping\ Factor_i = \frac{Hourly\ DA\ SMEC_{high-priced,i}}{Average\ DA\ SMEC_{high-priced,TOU}}$ i: hour i $high-priced$: the most recent day from the trading date in which any hour of DA SMEC exceeded $200/MWh TOU:Time of use On-peak or Off-peak $DA\ SMEC$: DAM System Marginal Energy Cost $Hourly\ DA\ SMEC_{high-prices,i}$: Hour i DAM SMEC of high-priced day $Average\ DA\ SMEC_{high-prices,TOU}$: Average DA SMEC of high-priced day of the on-peak hour or off-peak hour Note: The new formula for shaping factor is based on the high-priced day SMEC only, a change from current one that using the SMEC of trade hour in trading day.	Core	Internal System
PFECAP-BRQ-160	**Continue to skip the DEB calculation for the resource with "storage" DEB option** System will not calculate the DEB for the LESR resources with the "Storage" DEB option ranked as 1, as it does currently	Existing	Internal System

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-170	**Continue to accept NDEB from DMM** • DMM's application system is performing NDEB calculation for the given trade date, sends values to internal system; • NDEBs go through the DEB MAX CAP check as well. With DEB Max CAP change to $2000, the system will allow the NDEB up to $2000	Existing	Internal System
PFECAP-BRQ-180	**Revise the $1000/MWh cap on Negotiated Default Energy Bids (NDEBs) Calculation to $2000** • Revise $1000 cap to $2000 cap for all the NDEB calculations for all type of resources. Ensure the NDEB capped by $2000	Core	Internal System, DMM application

4.2 Business Process: < Manage Bid Submission (SIBR)>

Bid Cap rule updates for NGR:

- Build a function turn on the new bid cap rules using effective date
- Cap the DAM/RTM energy bid for the non-NGR resource-specific generating resources at max($1000, DEB, Adjusted DEB from RLCR)
- Set Daily NGR MIBP to 4th highest MIBP for the trading day with latest MIBP
- Identify hourly highest cost verified bid for each trading hour in RTM
- Cap the energy bids for NGR-LESR at max ($1000, DEB, 4th highest MIBP, highest cost verified bid) for TH in RTM
- Cap the energy bids for all NGR at max ($1000, DEB) for TH in TD in DAM
- Cap the energy bid for NGR that not registered as LESR at max ($1000, DEB) in RTM

4.2.1 Business Requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-200	**Build a function for the new bid cap rules activate through setting the effective date** System shall build a function for the new SIBR rules to be activated through the effective date	Core	SIBR
PFECAP-BRQ-210	**Receive the resource data from Master File as existing** Receive Master File defined resource NGR characteristics as currently received today • RES_TYPE: Generating unit (GEN),Tie Generator (TG) ; LOAD • NGR: Y; N/Null • REM: N; Y • Fuel_TYPE: o LESR – Limited Energy Storage Resource; o DDR – Dispatchable Demand Response, o HYBD – Hybrid Resource, o GNRC- Generic NGR	Existing	SIBR
PFECAP-BRQ-212	**Receive the resource data from the internal system** • Receive the DEB from internal system for DAM and RTM • Receive DAM Hourly MIBP for trading day from internal system prior to close of DAM • Receive the RTM latest Hourly MIBP for trading day from internal system before close of the first hour of RTM in trading day • Receive Reasonableness Threshold from internal system for DAM and RTM	Existing	SIBR

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted

PFECAP-BRQ-220	**Cap the DAM energy bid for the non-NGR resource-specific generating resources at max($1000, DEB, Adj DEB)**
	
	• For the generating resource that are not NGR, if energy bids exceed the soft bid cap ($1000), cap generating resource energy bids to the Max($1000, the resource DEB from internal system , the resource Adjusted DEB from the RLCR) in DAM
	  ○ Non-NGR resource-specific generating resources, hydro and other generating resources included, are the generating resource that **NOT** registered as NGR
	  ○ Apply to internal (G) and intertie generating (TG) resources
	  ○ DEB from internal system can be above $1000
	
	Example1:
	Res1 internal system calculated uncapped DEB =$1100, Adjusted DEB from RLCR=$1150
	if bids $1200/MWh>$1000, bids capped at $1150 in DAM
		Existing	SIBR

PFECAP-BRQ-222	**Cap the RTM energy bid for the non-NGR resource-specific generating resources at max($1000, DEB, Adj DEB)**
	
	• If the generating resource that are not NGR, the energy bids exceed the soft bid cap ($1000), Cap generating resource energy bids to the Max($1000, the resource DEB from internal system , the resource Adjusted DEB from the RLCR) in RTM
	  ○ Apply to ISO and WEIM resources
	  ○ Apply to internal (G) and intertie generating (TG) resources
	• Resource energy bid plus GHG bid shall not exceed the bid ceiling $2000. If the energy bid plus GHG bid exceed the bid ceiling, the energy bid and GHG bid become invalid.
	
	Example:
	Scenario 1: Res1 internal system calculated uncapped DEB =$1100, Adjusted DEB from RLCR=$1150
	if bids $1200/MWh>$1000, bids capped at $1150, GHG bid $30, Energy bid plus GHG bid $1150+$30 =$1180 <$ 2000 bid ceiling, bids are valid
	
	Scenario 2: Res1 internal system calculated uncapped DEB =$1100, Adjusted DEB from RLCR=$1990
	if bids $1990/MWh>$1000, bids capped at $1990, GHG bid $30, Energy bid plus GHG bid $1990+$30 =$2010 >$ 2000 bid ceiling, the bids for $1990/MWh and GHG bid $30 are invalid, SC need re-submit
	
	More examples at Appendix A
		Existing	SIBR

PFECAP-BRQ-226	**Set Daily NGR MIBP to 4th highest MIBP for the trading day with latest MIBP**	Core	SIBR

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
	• Set **Daily NGR MIBP to** the 4th highest MIBP for the trading day from the Hourly MIBP curve sent from internal system • Store the 4th highest MIBP for the trading day		
PFECAP-BRQ-232	**Identify hourly highest cost verified bid for the TH in RTM** • Identify the hourly highest cost verified bid in RTM of all the resources for the market footprint (WEIM BAAs and CAISO BAA) for the trading hour (TH) • Follow the existing process, with a check every 5 minutes start 45 min before market close in SIBR based on submitted bids prior to and at market close	Existing	SIBR

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-234	**Cap the DAM energy bids for NGR at max ($1000, DEB) for TH in TD** For resource registered as NGR, include all the NGR types, if the DAM energy bid is above soft offer, cap the hourly energy bid as max ($1000, the resource DEB from internal system) for the trading hour (TH) in the trading day (TD) Note: This DAM bid cap rule applies to all non-REM NGR: NGR-LESR, NGR-DDR, NGR-HYBD, NGR-NGRC NGR will not have the capability to submit an Adjusted DEB in SIBR.	Core	SIBR

PFECAP-BRQ-236	**Cap RTM the energy bids for non-REM NGR-LESR at max ($1000, DEB, 4th highest MIBP, highest cost verified bid) for TH**
	
	For NGR resource registered as Limited Energy Storage Resource (NGR –LESR), if the RTM energy bid is above soft offer cap for the trading hour,
	
	• If the NGR-LESR has a DEB available to SIBR (from internal system), cap the hourly energy bid as max ($1000, the resource DEB, 4th highest MIBP, highest cost verified bid).
	• If the NGR-LESR does not have a DEB available to SIBR (from internal system), cap the hourly energy bid as max ($1000, 4th highest MIBP, highest cost verified bid).
	  ○ 4th highest MIBP*: fourth-highest calculated hourly value of the Maximum Import Bid Price for that Trading Day in the applicable CAISO Market Process; and*
	  ○ highest cost verified bid*: the highest-priced Energy Bid from a resource subject to a Default Energy Bid that the CAISO has accepted for the applicable Trading Hour, excluding without limitation Virtual Bids, Export Bids, Demand Bids, and Bids for Non-Resource-Specific System Resources*
	• Resource the energy bid plus GHG bid in RTM shall be capped by the bid ceiling $2000, if energy bid plus GHG bid >bid ceiling $2000, both energy bid and GHG bid are invalid. SC will need re-submit the bids.
	
	Note:
		Core	SIBR

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
	Rules apply to Non-REM NGR registered LESR in MF Examples at Appendix A		
PFECAP-BRQ-240	**Cap the RTM energy bids for the NGR not register as LESR at max ($1000, DEB) for TH** • For resource registered as NGR that not LESR (resource that register as NGR-DDR, NGR-HYBD and NGR–GNRC), if the resource RTM energy bid is above soft offer cap, cap the hourly energy bid as max ($1000, the resource DEB) for the trading hour. • Resource the energy bid plus GHG bid in RTM shall be capped by the bid ceiling $2000, if energy bid plus GHG bid >bid ceiling $2000, both energy bid and GHG bid are invalid. **Note:** NGR will not have the capability to submit an Adjusted DEB in SIBR. The RTM SIBR bid cap apply to NGR types, except NGR-LESR.	Core	SIBR
PFECAP-BRQ-249	**Hard cap bid ceiling ($2000) applies to all the resources energy bid, energy bid plus GHG bid**	Existing	SIBR
PFECAP-BRQ-250	**Keep NPM resource energy bids at soft offer cap in DAM** No change for cap rule the NPM energy bids, Cap NPM resource energy bids at soft offer cap in DAM	Existing	SIBR

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-260	**Keep the current processes for system resources** • No Change bid cap rule for Non-Resource-Specific System Resources that are Resource Adequacy(RA) (i.e. RA imports) ▪ No Change bid cap rule for Non-Resource-Specific System Resources that are not RA (i.e. imports and exports) Virtual Resources, Exports, Demand Resources (i.e. Non-Participating Load) ▪ No Change bid cap rule for Reliability Demand Response Resources (RDRRs)	Existing	SIBR

4.3 Business Process: <Manage the Market (IFM, RTM)>

For the Storage DEB calculation, Change the Storage DEB bid CAP limit from $1000 to $2000

4.3.1 Business Requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-300	**For the Storage DEB calculation, Change the Storage DEB CAP limit from $1000 to $2000 for DAM and RTM**	*Existing* *Parameter change*	IFM/RTM

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
PFECAP-BRQ-310	**Market power Mitigation using DEB calculated with $2000 CAP** Note: MPM mitigation applies to the bids higher than DEB No changes to existing MPM logic, the only difference is that now the market may receive DEBs from internal system up to $2000 or market calculated DEB for NGR-LESR will be capped at $2000	*Existing*	IFM/RTM
PFECAP-BRQ-320	**Trigger penalty prices set using existing logic** No change to existing logic: Based on the clean bids from SIBR and the MIBP from internal system, Market has the logic to set the scaling flag for the penalty prices *for $1000 soft bid cap or $2000 cap if applicable.*	*Existing*	IFM/RTM

4.4 Business Process: <Manage the Market (MQS, PCA, Settlement, CMRI, OASIS)-N/A>

No impact

4.4.1 Business Requirements

ID#	Business Feature	Requirement Type	Business Unit(s) Affected	Potential Application(s) Impacted
N/A				

4.5 Business Process: <Market/Business 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. The *Reason for the Potential Scenario* column will be to offer guidance regarding what potential scenarios, and their context, may be needed for this project. This section applies to all policy development projects, market enhancements, technology enhancements, operation enhancements, Energy Imbalance Market (EIM) implementations, and Reliability Coordination (RC) service implementations. If the project team has deemed that no structured testing is needed, an end-to-end test case must be specified.

In the Reason for Potential Scenario column, select one or more of the following reasons:

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.
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 or export provided by the ISO.
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). Scenarios are beneficial for market participants taking on a new function or process within their organization.

4.5.1 Business Requirements

ID#	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario
PFECAP-Sim-BRQ-500	Allow SC to submit the bids for NGR that higher than soft cap ($1000)	*SIBR*	*SIBR*	*1. Rule Impacts*

ID#	Guidance on Market Participant Impacts	Source System	Sink System	Reason for Potential Scenario
PFECAP-Sim-BRQ-501	Allow SC to submit the bids for NGR-LESR that higher than soft cap ($1000) in RTM	*SIBR*	*SIBR*	*1. Rule Impacts*

Appendix A: Examples

A1. Examples for LESR bid cap in DAM:

Bid in value	DEB	Soft Cap ($1000)	Daily NGR MIBP	Highest Cost Verified	GHG Bid	Energy Ceiling ($2000)	Capped Value	Notes Variables include (soft cap, DEB, MIBP (4th highest) and Cost verified.)
1200	39		899	599	$0		1000	Capped at Soft Cap, sets new cost verified bid.
1200	39		899	1000	$0		1000	Capped at highest cost verified value.
1001	1200		899	1000	$0		1001	Uses bid in value which sets the new cost verified bid to 1001.
1500	1200		999	1001	$25		1200	Capped at the DEB for 1200, which sets new cost verified to 1200.
1500	1200		1300	1400	$25		1400	Capped at highest cost based bid, cost based bid stays at 1400.
1500	1200		1450	1400	$25		1450	Capped at MIBP, new cost based bid is now 1450.

1250	1250		1425	1450	$25		1250	Uses bid in value since submitted bid is not above the DEB, cost based not changed.
1300	1250		1425	1450	$25		1300	Uses bid in value since it is below the higher of (variables)
1435	1250		1425	1450	$25		1435	Uses bid in value since it is below the higher of (variables)
1999	1250		2000	1998	$25		Invalid	Due to Energy bid+ GHG bid >2000
2000	1250		2000	1899	$25		Invalid	Due to Energy bid+ GHG bid >2000