California Independent System Operator Corporation

March 20, 2020

The Honorable Kimberly D. Bose
Secretary
Federal Regulatory Energy Commission
888 First Street, NE
Washington, DC 20426

Re: California Independent System Operator Corporation
Response to Deficiency Letter
Motion to Amend

Docket No. ER20-732-___

Dear Secretary Bose:

The California Independent System Operator ("CAISO") provides the following responses to the Deficiency Letter issued in this docket on February 28, 2020.

The CAISO respectfully requests that the Commission approve the tariff revisions submitted in the CAISO's original filing effective March 3, 2020, as requested in the CAISO's January 2, 2020 transmittal letter. The CAISO's annual interconnection request window is April 1 to April 15.[1] Granting the CAISO's original effective date will allow interconnection customers to make the elections discussed in the CAISO's transmittal letter in their initial interconnection requests.[2] All parties have had the full 60-day notice period as required under the Federal Power Act. As such, no party will be prejudiced by maintaining the CAISO's original requested effective date. The Commission has granted the originally requested effective date in similar circumstances.[3]

Turning to the specific questions in the Deficiency Letter, the CAISO responds as follows.

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[1] Section 3.3.1 of Appendix DD to the CAISO tariff.

[2] If the Commission approves the CAISO's proposal in whole or in part, the CAISO will already have the information in the interconnection requests and be able to use it. If the Commission rejects the CAISO's proposal, the CAISO can simply ignore the information, as the rest of the interconnection request would be unaffected.

[3] *See, e.g.*, *California Independent System Operator Corp.*, 168 FERC ¶ 61,003 (2019) (granting the originally requested effective date after response to a deficiency letter).

1. *Proposed tariff section 30.5.6.1 (Off-Peak Deliverability Status for Non-Generator Resource Bids) states that self-schedules for non-generator resources can be submitted only when the non-generator resource has Off-Peak Deliverability Status. CAISO further states that CAISO will only allow generators with Off-Peak Deliverability Status to self-schedule in CAISO's markets.*

    a. *Please explain how CAISO's proposal in the instant submittal would affect the ability to self-schedule and associated curtailment priority for resources whose owners/operators are not interconnection customers and do not have the opportunity to elect a deliverability status under the Generation Interconnection Deliverability Allocation Procedures.*

The CAISO's proposal would not affect the existing bidding rights, self-scheduling rights, or curtailment priorities for scheduling coordinators representing resources that are not interconnection customers. Bidding and scheduling rights are set forth in Section 30 of the CAISO tariff. The CAISO discusses the associated curtailment priorities in response to question 1(b).

    b. *Please compare the self-scheduling opportunities available to and curtailment priority for all categories of supply and demand in CAISO's current markets (including imports/exports, non-generator-specific supply, and non-resource adequacy resources) to the opportunities that would be available under CAISO's proposed framework.*

Curtailment Priority

Where the CAISO's security-constrained market optimization cannot dispatch all supply bids due to congestion, the CAISO first curtails effective economic bids based on bid price. "Curtailment priority" only affects the very small minority of cases where there are insufficient effective economic bids to curtail, and the CAISO must curtail non-priced supply and demand offers. In these cases, the CAISO's market optimization applies market parameter values to each type of non-priced offer. The CAISO's market parameter values for non-priced quantities are explained in Section 6.6.5 of the CAISO's Business Practice Manual for Market Operations, consistent with Sections 27.4.3, 31.4, and 34.12 of the CAISO tariff.[4] The CAISO has included the market parameter values as Attachment A to this response. The CAISO notes that these market parameter values will not change as a result of the CAISO's proposal. The CAISO has not proposed to create a new curtailment priority or modify existing priorities.

[4] https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Market%20Operations. *See also California Independent System Operator Corp.*, 126 FERC ¶ 61,147 (2009).

Self-Scheduling Rights

Supply and demand resources generally can self-schedule in the CAISO markets. The CAISO is aware of two exceptions. First, demand response resources must economically bid.[5] Second, Flexible Resource Adequacy Resources have must-offer obligations that require them to economically bid based on the amount of Flexible Resource Adequacy they provide.[6]

Under the CAISO's proposal, interconnection customers will only be Economic Only and prohibited from self-scheduling if they site their projects in an area where they face transmission constraints that impair their deliverability, and then elect not to finance the network upgrades that would relieve those constraints. As the CAISO and commenters in this proceeding explained, this gives developers additional flexibility in designing and marketing their projects because they will be able to make trade-offs between interconnection costs and the energy markets. The CAISO's proposal makes no other changes to resources' self-scheduling rights.

c. *Please also describe the effects of CAISO's proposal on future market participants that are not interconnection customers, such as external resources selling into CAISO, new resources connected through wholesale distribution access tariffs, or possibly new loads, and have not yet joined CAISO's markets.*

The CAISO's proposal is narrowly tailored to a specific issue in the CAISO balancing authority area. To ensure that resources that finance network upgrades to relieve local transmission constraints receive the benefit of their bargain, the CAISO's proposal would only prohibit resources from self-scheduling where the CAISO's interconnection studies have determined that the resource faces local transmission constraints, and the interconnection customer does not want to finance the network

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[5] *Compare* Section 30.5 and Section 30.6 of the CAISO tariff. Proxy Demand Resources may self-schedule energy in the real-time market up to their day-ahead schedule.

[6] *See* Section 40.9.3 of the CAISO tariff ("The CAISO shall determine the extent to which each Flexible RA Resource made that capacity available in each Availability Assessment Hour of the day by comparing (A) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids in the Day-Ahead Market and the Real-Time Market on a given day; and (B) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource had a performance obligation to submit Economic Bids in the CAISO Markets under the must-offer requirements applicable under Section 40.10.6 on a given day. . . . For resources with a start-up time less than 90 minutes, the CAISO will use the resource's MWs of capacity from zero to the EFC value to assess the availability of the designated Flexible RA Capacity; provided that the Scheduling Coordinator for the resource does not submit Self-Schedules for the capacity from zero to PMin or for any portion of the capacity under the must-offer obligation for Energy. . . . For resources with a start-up time greater than 90 minutes, the CAISO will use the MWs of capacity between the resource's PMin and EFC value in the availability assessment and validate whether the Scheduling Coordinator for the resource submitted Economic Bids for all MWs designated on the Resource Flexible RA Capacity Plan").

upgrades that relieve those constraints. Any supply or demand resource that does not meet those criteria—including resources the CAISO does not study for interconnection purposes—will be unaffected, and can continue to self-schedule. External resources, distributed resources, and load resources are not affected by the CAISO's proposal. Such resources are not similarly situated to CAISO interconnection customers.

2. *Pursuant to CAISO's proposal, a Location Constrained Resource Interconnection Generator (LCRIG) whose fuel source occurs substantially off-peak will receive Off-Peak Delivery Status based on the off-peak deliverability assessment, regardless of their on-peak deliverability status. Please explain whether a LCRIG could forgo on-peak deliverability status, obtain Off-Peak Deliverability Status, and have curtailment priority over a similarly situated LCRIG that only financed on-peak upgrades (e.g., Full or Partial Capacity Deliverability) and, therefore, would not have Off-Peak Deliverability Status.*

This question implies that Off-Peak Deliverability Status alone provides curtailment priority. This is not the case. Off-Peak Deliverability Status would only provide a generator with the *ability* to self-schedule. If that generator economically bids—which it would be more incentivized to do under the CAISO's proposal—it would be dispatched and curtailed based on its bid price and the CAISO's security-constrained economic dispatch. If it self-schedules, it would have priority over effective economic bids.[7] But the CAISO's proposal reduces current incentives to self-schedule instead of economically bid. Self-scheduling resources already have a curtailment priority over economic bids today. Because all generators currently can self-schedule, generators facing frequent transmission constraints are incentivized to always self-schedule to avoid the curtailment that would result if they economically bid against a generator self-scheduling behind the same constraint. In other words, in a situation where two generators can self-schedule behind a constraint, they both *have to* self-schedule to avoid disparate curtailment. The CAISO's proposal removes this problem by only allowing the resources that financed the necessary deliverability upgrades to self-schedule. OPDS generators would *not* have to self-schedule against Economic Only generators because they know that the Economic Only generator *cannot* self-schedule in the first place.

The Commission has approved the CAISO's interconnection studies recognizing that LCRIGs with off-peak energy sources generally require different network upgrades to relieve local transmission constraints during peak hours than during off-peak hours.[8] Other resources, on the other hand, would require the same network upgrades to relieve local transmission constraints. As such, an LCRIG with an off-peak energy

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7 *See* the CAISO's response to question 1(b), above.

8 *California Independent System Operator Corp.*, 124 FERC ¶ 61,292 at P 108 (2008).

source could forego on-peak deliverability status, and elect to have Off-Peak Deliverability Status. The resource would have Energy Only status, meaning that it would be ineligible to provide resource adequacy, and Off-Peak Deliverability Status, allowing it to self-schedule. Alternatively, an LCRIG could elect only to finance the network upgrades necessary to relieve its on-peak transmission constraints.[9] It would be eligible to provide resource adequacy but could not self-schedule. These results would be based entirely on the owners' own elections in the interconnection process. The CAISO's proposal merely provides developers the flexibility to make these elections because currently there is no mechanism that allows them to address local transmission constraints during off-peak hours (when curtailment is most likely for these resources) in the interconnection process.

None of these deliverability statuses in themselves convey any dispatch, scheduling, or curtailment priority. The CAISO would schedule and curtail the resources, if necessary, based on the bid price. However, if the OPDS/Energy Only generator self-scheduled its energy, it would be curtailed after the CAISO has curtailed effective economic bids sufficient to relieve the congestion.

3. *CAISO states that in its current market, self-scheduled resources have curtailment priority over economic bids. CAISO also states that generators facing frequent transmission constraints are incentivized to self-schedule in order to avoid the curtailment that would result had they bid economically against a self-scheduled resource behind the same constraint.*

   Considering that generators may or may not have financed the network upgrades related to the specific interval(s) in which a constraint appears, and considering that generators with deliverability status may already receive additional revenue opportunities independent of their output or curtailment in the energy market, please explain why CAISO believes it is necessary to offer curtailment priority as an incentive to induce developers to finance any off-peak upgrades that may be identified in the deliverability assessment.

Generators that receive a curtailment priority would be expected to receive additional revenue opportunities because they have Off-Peak Deliverability Status and the corresponding ability to access a curtailment priority. They will have a lower risk of curtailment than generators in constrained areas that elected not to address their constraints. There is no reason to expect that Economic Only generators facing off-peak constraints would receive additional revenue opportunities. It is necessary to offer the ability to self-schedule with Off-Peak Deliverability Status because without it, Economic Only generators behind the

[9] The other two options: relieve all constraints (FCDS and OPDS), or relieve no constraints (Energy Only and Economic Only).

same constraints would receive the exact same benefit from network upgrades funded by OPDS generators as the OPDS generators. Moreover, as the CAISO explained in its transmittal letter, subsequent Economic Only generators could erode the benefits of the off-peak upgrades for the generator that financed them.[10] These outcomes would not be equitable.

The CAISO notes that its intent is not to "induce developers" to finance any particular upgrade. Developers, ratepayers, and utilities all benefit from less congestion and curtailment during any interval, on-peak or off-peak. The CAISO's proposal to offer different options to address local congestion—either by allowing interconnection customers to address congestion or by incentivizing developers to site projects in unconstrained areas—resulted from the requests of stakeholders during a robust stakeholder process.

4. *In its transmittal letter and in the proposed tariff language pertaining to the off-peak deliverability assessment, CAISO uses the term "excessive curtailment." Please explain what standards or parameters CAISO will use to determine whether curtailments without the identified network upgrades would be considered "excessive." In addition, what consideration, if any, will CAISO give to the cost of the network upgrades relative to the value of the avoided curtailments and how will CAISO convey this information to its stakeholders?*

The Off-Peak Deliverability Assessment Methodology included as Attachment F to the CAISO's transmittal letter describes the parameters the CAISO will use to determine whether curtailments without the identified network upgrades would be considered excessive. Just like the On-Peak Deliverability Assessment Methodology, the CAISO has included tariff provisions requiring that the CAISO maintain this methodology on the CAISO website.[11] The instant tariff revisions, in fact, resulted from a public stakeholder process to review the inputs and assumptions used in the On-Peak Deliverability Assessment Methodology.

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[10] CAISO Transmittal Letter at 27-29 ("For example, a developer could construct a new 10 MW generator with Off-Peak Deliverability Status. The off-peak network upgrades it finances would deliver its 10 MW to load without excessive curtailment due to transmission constraints. However, if a 200 MW generator sites adjacent to the 10 MW generator, and the 200 MW generator does not want to finance additional off-peak network upgrades, the 10 MW generator could lose its ability to deliver energy off-peak. Under current rules, if both generators submit self-schedules—supply bids without a $/MWh price—they will be curtailed on a *pro rata* basis based upon their output. If the generators each submit self-schedules at their PMax, and the transmission line that connects them to load could only support 50 MW off-peak, the 200 MW generator would be curtailed to produce 47.6 MW. The 10 MW generator would be curtailed to produce 2.4 MW even though it financed off-peak network upgrades specifically to avoid this constraint. This is unfair").

[11] Proposed "Off-Peak Deliverability Assessment," Appendix A to the CAISO tariff.

The CAISO developed the study methodology and dispatch assumptions during the stakeholder process. To determine what constitutes "excessive curtailment," the CAISO considers the amount of the curtailment as a percentage of the annual energy production.[12] Currently, approximately three percent of the relevant generation is curtailed due to transmission constraints or system oversupply. For purposes of the off-peak deliverability assessment, the curtailment of ten percent will be considered excessive. The off-peak deliverability assessment identifies local transmission bottlenecks that would cause excessive curtailment, but the study assumptions focus on system conditions when system-wide oversupply is unlikely.

Each interconnection customer's Phase I and Phase II study reports will contain the following information regarding off-peak constraints and any identified off-peak network upgrades to relieve those constraints: [13]

- Explanation of the constraints causing curtailment during off-peak hours;
- Estimated percentage of MW capacity curtailment for the generating facility due to transmission constraints;
- Estimated net present value of curtailed energy;[14]
- Total costs of identified upgrades to relieve the constraints, and allocated share of those costs for the interconnection customer (for Local Off-Peak Network Upgrades only);[15]
- Estimated cost-to-benefit ratio of the upgrades relative to expected level of curtailment.

Consistent with the CAISO's approach for on-peak deliverability constraints and upgrades, interconnection customers will only be responsible for their Local Off-Peak Network Upgrades. As the CAISO explained in its transmittal letter, Area Off-Peak Network Upgrades designed to address identified Area Off-Peak Constraints will be examined in the economic study portion of the CAISO's Transmission Planning Process. The Transmission Planning Process will examine detailed production cost simulation data, identify a preferred solution, and identify an Approved Project Sponsor if the upgrade's construction is approved. Interconnection customers are not assigned any costs related to Area Off-Peak Network Upgrades.

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[12] *I.e.*, those resources whose energy cannot be stored by the facility owner or operator; with variability beyond the control of the facility owner or operator.

[13] Sections 6.7 and 8.7 of Appendix DD to the CAISO tariff.

[14] Based on the expected generation dispatch levels described in the CAISO's Off-Peak Deliverability Assessment methodology.

[15] In fact, the CAISO provides these results on a detailed basis, including the interconnection customer's Current Cost Responsibility, Maximum Cost Responsibility, and Maximum Cost Exposure.

Each interconnection customer's interconnection studies also will explain all assumptions and results, and the interconnection customer can discuss those assumptions and results in their Phase I and Phase II study results meetings.

5. *CAISO states that its one-time deliverability allocation proposal (section III.D) is dependent on the Commission's acceptance of the off-peak deliverability proposal described in section III.A of its transmittal letter (Off-Peak Deliverability Status). Please explain whether the proposals described in sections III.B (Curtailment Priorities) and III.C (Transition to Off-Peak Deliverability Status) are severable from each other and/or other proposals in the filing or whether the entirety of CAISO's filing should be considered as one package. To the extent that one or more parts of CAISO's proposal are severable, please indicate the relevant tariff provisions.*

The CAISO is amending its filing to remove the one-time Transmission Plan ("TP") Deliverability allocation tariff revisions described in section III.D of the CAISO's transmittal letter.[16] The CAISO conducts its interconnection studies based on deadlines provided in the CAISO tariff. Because of its firm study deadlines, the CAISO required approval by the requested effective date to be able to implement the one-time TP Deliverability allocation tariff provisions. As such, the CAISO has provided TP Deliverability allocation results to interconnection customers based on current tariff provisions.[17]

The CAISO requests that the Commission approve the remainder of the CAISO's proposals. These proposals are severable; however some elements are contingent on the approval of others, as explained below. The proposal described in section III.A of the CAISO's transmittal letter is a distinct, severable proposal.[18] This proposal would allow interconnection customers to finance off-peak network upgrades through the interconnection process, and signal to potential off-takers that they have mitigated local transmission constraints during off-peak hours. Although the CAISO believes the Commission should approve all of its remaining proposals as just and reasonable, it is possible for the Commission to approve this proposal alone.[19] Its justness and

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[16] Section III.D of the CAISO's transmittal letter; proposed Section 9.1 of Appendix DD to the CAISO tariff.

[17] Section 8.9.2 of Appendix DD to the CAISO tariff.

[18] Described in Section III.A of the CAISO's transmittal letter.

[19] If the Commission were to approve this proposal without the proposal in section III.B, it would approve all of the CAISO's proposed tariff revisions except Proposed Sections 30.5.2.2.1 and 30.5.6.1, and the last paragraph of Proposed Section 6.3.2.3 ("Interconnection Customers that achieved their Commercial Operation Date before March 3, 2020 will have Off-Peak Deliverability Status pursuant to Sections 30.5.2.2.1 and 30.5.6.1 of the CAISO Tariff"). It would also be prudent for the Commission to request the CAISO to submit a compliance filing amending the proposed name and definition of

reasonableness is not dependent on the Commission's approval of any other proposed tariff revision.

The proposal described in section III.B of the CAISO's transmittal letter also is a distinct, severable proposal as well, but contingent on the approval of the proposal in section III.A. As described at length in this proceeding, this proposal helps ensure that interconnection customers that finance Off-Peak Network Upgrades continue to receive their benefits through the ability to self-schedule. Where an interconnection customer sites its project in an area where it faces transmission constraints that impair its deliverability, and then elects not to finance the network upgrades that would relieve those constraints, it would be "Economic Only," and prevented from self-scheduling. The CAISO believes this proposal is equitable, avoids free-riding, and addresses later interconnection customers' ability to erode the benefits of network upgrades. Additionally, this proposal helps avoid situations where interconnection customers are incentivized to self-schedule regularly to avoid disparate curtailment, as described in response to question two, above.

The proposal described in section III.C of the CAISO's transmittal letter, describing the transition to Off-Peak Deliverability Status, is contingent upon the Commission's approval of Off-Peak Deliverability Status, as described in section III.A of the CAISO's transmittal letter, but could be approved without III.B with minor modifications to the CAISO tariff on compliance that would not materially change the substance of the CAISO's proposal.[20]

"Economic Only" to reflect that it no longer relates to self-scheduling rights. For example, references to Economic Only could be changed to "Off-Peak Energy Only," and the definition could be "Status for a Generating Facility indicating its expected Energy to the CAISO Controlled Grid during modeled off-peak Load conditions will be subject to curtailment due to transmission constraints." Likewise, the proposed definition of "Off-Peak Deliverability Status" should be amended to strike the last clause: "and that allows its Scheduling Coordinator to submit Self-Schedules consistent with the CAISO Tariff."

[20] Specifically, without the self-scheduling proposal, the Commission could approve Section 6.3.2.3, describing the transitions process, with the exception of the last paragraph ("Interconnection Customers that achieved their Commercial Operation Date before March 3, 2020 will have Off-Peak Deliverability Status pursuant to Sections 30.5.2.2.1 and 30.5.6.1 of the CAISO Tariff"). Because existing generating facilities' rights would be unaffected, and because their off-peak deliverability was never addressed in the interconnection studies, Off-Peak Deliverability Status would be inapplicable.

Contents of Filing

Besides this transmittal letter, this filing includes these attachments:

Attachment A	Section 6.6.5 of the CAISO's Business Practice Manual for Market Operations;
Attachment B	Clean CAISO tariff sheets incorporating this tariff amendment;
Attachment C	Red-lined document showing the revisions in this tariff amendment

Respectfully submitted,

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Attachment A – Market Parameter Values from Business Practice Manual for Market Operations

Response to Deficiency Letter in Docket No. ER20-732-000

California Independent System Operator Corporation

March 20, 2020

6.6.5 Adjustment of Non-Priced Quantities in IFM

This section is based on CAISO Tariff Section 31.4, Uneconomic Adjustments in the IFM.

All Self-Schedules are respected by SCUC to the maximum extent possible and are protected from curtailment in the Congestion Management process to the extent that there are Economic Bids that can relieve Congestion. If all Effective Economic Bids in the IFM are exhausted, resource Self-Schedules between the resource's Minimum Load and the first Energy level of the first Energy Bid point is subject to adjustments based on the scheduling priorities listed in Section 6.6.5.3.

Through this process, imports and exports may be reduced to zero, Demand Schedules may be reduced to zero, and Price Taker Demand (LAP Load) may be reduced. However, prior to reducing Load the following process is used to ensure that LAP Load is not reduced unnecessarily.

Market Parameter Values

This section provides the specific value settings for a set of ISO market parameters that are used for adjusting non-priced quantities in the market optimizations.

The parameter values are organized into three sections by market process: the Integrated Forward Market (IFM), the Residual Unit Commitment (RUC), and the Real Time Market (RTM). The parameters in these tables are also known in the jargon of mathematical optimization as "penalty factors," which are associated with constraints on the optimization and which govern the conditions under which constraints may be relaxed and the setting of market prices when any constraints are relaxed. Importantly, the magnitude of the penalty factor values in the tables for each market reflect the hierarchical priority order in which the associated constraint may be relaxed in that market by the market software.

Integrated Forward Market (IFM) Parameter Values

Penalty Price Description	Scheduling Run Value[1]	Pricing Run Value	Comment
Market energy balance	6500	1000	Market energy balance is the requirement that total supply equal the sum of total demand plus losses for the entire system. In the IFM energy balance reflects the clearing of bid-in supply and demand; in the MPM component of the DAM it reflects the scheduling of bid-in supply against the ISO demand forecast.
Transmission constraints: Intertie scheduling	5000	1000	Intertie scheduling constraints limit the total amount of energy and ancillary service capacity that can be scheduled at each scheduling point.
Legacy Reliability Must-Run (LRMR) pre-dispatch curtailment (supply)	-6000	-150	The ISO considers transmission constraints when determining LRMR scheduling requirements. After the ISO has determined the LRMR scheduling requirements, the market optimization ensures that the designated capacity is scheduled in the market.
Pseudo-tie layoff energy	-4000	-150	Pseudo-tie layoff energy is scheduled under contractual arrangements with the Balancing Authority in whose area a pseudo-tie generator is located.
Transmission constraints: branch, corridor, nomogram (base case and contingency analysis)	5000	1000	In the scheduling run, the market optimization enforces transmission constraints up to a point where the cost of enforcement (the “shadow price” of the constraint) reaches the parameter value, at which point the constraint is relaxed.
Transmission Ownership Right (TOR) self schedule	5900, -5900	1000, -150	A TOR Self-Schedule will be honored in the market scheduling in preference to enforcing transmission constraints.
Existing Transmission Contract (ETC) self schedule	5100 to 5900, -5100 to -5900	1000, -150	An ETC Self-Schedule will be honored in the market scheduling in preference to enforcing transmission constraints. The typical value is set at $5500, but different values from $5100 to $5900 are possible if the instructions to the ISO establish differential priorities among ETC rights. For some ETC rights the ISO may use values below the stated scheduling run range if that is required for consistency

[1] Penalty values are negatively valued for supply reduction and positively valued for demand reduction.

Penalty Price Description	Scheduling Run Value[1]	Pricing Run Value	Comment
			with the instructions provided to the ISO by the PTO.
Converted Right (CVR) self schedule	5500, -5500	1000, -150	A CVR Self-Schedule is assigned the same priority as the typical value for ETC Self-Schedules.
Ancillary Service Region Regulation-up and Regulation-down Minimum Requirements	2500	250	In the event of bid insufficiency, AS minimum requirements will be met in preference to serving generic Self-Scheduled demand, but not at the cost of overloading transmission into AS regions.
Ancillary Service Region Spin Minimum Requirements	2250	250	Spinning reserve minimum requirement is enforced with priority lower than regulation up minimum requirement in scheduling run.
Ancillary Service Region Non-Spin Minimum Requirements	2000	250	Non-spin reserve minimum requirement is enforced with priority lower than spin minimum requirement in scheduling run.
Ancillary Service Region Maximum Limit on Upward Services	1500	250	In the event of multiple AS regional requirements having bid insufficiency, it is undesirable to have multiple constraints produce AS prices equaling multiples of the AS bid cap. An alternative way to enforce sub-regional AS requirements is to enforce a maximum AS requirement on other AS regions, thereby reducing the AS prices in the other regions without causing excessive AS prices in the sub-region with bid insufficiency.
Self-scheduled CAISO demand and self-scheduled exports using identified non-RA supply resource	1800	1000	Pursuant to section 31.4, the uneconomic bid price for self-scheduled demand in the scheduling run exceeds the uneconomic bid price for self-scheduled supply and self-scheduled exports not using identified non-RA supply resources.
Self-scheduled exports not using identified non-RA supply resource	1150	1000	The scheduling parameter for self-scheduled exports not using identified non-RA capacity is set below the parameter for generic self-schedules for demand.
Regulatory Must-Run and Must Take supply curtailment	-1350	-150	Regulatory must-run and must-take supply receive priority over generic self-schedules for supply resources.
Price-taker supply bids	-400	-150	Generic self-schedules for supply receive higher priority than Economic Bids at the bid floor.

Penalty Price Description	Scheduling Run Value[1]	Pricing Run Value	Comment
Conditionally qualified Regulation Up or Down self-provision	-405	NA	Conversion of AS self-schedules to Energy pursuant to section 31.3.1.3 received higher priority to maintaining the availability of regulation, over spinning and non-spinning reserve.
Conditionally qualified Spin self-provision	-400	NA	Conversion of AS self-schedules to Energy pursuant to section 31.3.1.3 receives higher priority to maintaining the availability of spinning reserve, over non-spinning reserve.
Conditionally qualified Non-Spin self-provision	-395	NA	This penalty price for conversion of self-provided non-spinning reserves balances the maintenance of AS self-schedules with ensuring that the conversion to energy occurs before transmission constraints are relaxed.
Conditionally unqualified Reg Up or Down self-provision	-195	NA	In instances where AS self-provision is not qualified pursuant to the MRTU tariff, the capacity can still be considered as an AS bid, along with regular AS bids. The price used for considering unqualified AS self-provision is lower than the AS bid cap, to allow it to be considered as an Economic Bid.
Conditionally unqualified Spin self-provision	-170	NA	Same as above.
Conditionally unqualified Non-Spin self-provision	-155	NA	Same as above.

Residual Unit Commitment (RUC) Parameter Values

Penalty Price Description	Scheduling Run Value	Pricing Run Value	Comment
Transmission constraints: Intertie scheduling	2000	250	The Intertie scheduling constraint retains higher relative priority than other RUC constraints.
Market energy balance - under procurement	1600	0	The RUC procurement may be less than the Demand forecast if the CAISO has committed all available generation and accepted intertie bids up to the intertie capacity.
Transmission constraints: branch, corridor, nomogram (base case and contingency analysis)	1250	250	These constraints affect the final dispatch in the Real-Time Market, when conditions may differ from Day-Ahead.

Penalty Price Description	Scheduling Run Value	Pricing Run Value	Comment
Maximum energy limit in RUC schedule	1500	250	Limits the extent to which RUC can procure energy rather than unloaded capacity to meet the RUC target. For MRTU launch the limit will be set so that the total energy scheduled in the IFM and RUC will be no greater than 99% of the RUC target unless this limit is relaxed in the RUC scheduling run.
Limit on quick-start capacity scheduled in RUC	250	0	Limits the amount of quick-start capacity (resources that can be started up and on-line within 5 hours) that can be scheduled in RUC. For MRTU launch the limit will be set to 75%.
Day-Ahead energy schedules resulting from the IFM run	250	0	These values preserve schedules established in IFM in both the RUC scheduling run and pricing run.
Market energy balance -over procurement	200	0	Market energy balance when the RUC procurement may be more than the Demand forecast.

Real Time Market Parameters

Penalty Price Description	Scheduling Run Value	Pricing Run Value	Comment
Energy balance/Load curtailment and Self-Scheduled exports utilizing non-RA capacity	1450	1000	Scheduling run penalty price is set high to achieve high priority in serving forecast load and exports that utilize non-RA capacity. Energy bid cap as pricing run parameter reflects energy supply shortage.
Transmission constraints: Intertie scheduling	1500	1000	The highest among all constraints in scheduling run, penalty price reflects its priority over load serving. Energy bid cap as pricing run parameter reflects energy supply shortage.
Legacy Reliability Must-Run (LRMR) pre-dispatch curtailment (supply), and Exceptional Dispatch Supply	-6000	-150	LRMR scheduling requirement is protected with higher priority over enforcement of internal transmission constraint in scheduling run. Energy bid floor is used as the pricing run parameter for any type of energy self-schedule.
Pseudo-tie layoff energy	-1500	-150	Energy bid floor is used as the pricing run parameter for any type of energy self-schedule.

Penalty Price Description	Scheduling Run Value	Pricing Run Value	Comment
Transmission constraints: branch, corridor, nomogram (base case and contingency analysis)	1500	1000	Scheduling run penalty price will enforce internal transmission constraints up to a re-dispatch cost of $ of congestion relief in $1500 per MWh. Energy bid cap as pricing run parameter consistent with the value for energy balance relaxation under a global energy supply shortage.
Real Time TOR Supply Self Schedule	-5900	-150	In RTM, TOR self-schedule scheduling run penalty price is much higher in magnitude than generic self-schedule but lower than transmission constraint. Energy bid floor is used as the pricing run parameter as any type of energy self-schedule.
Real Time ETC Supply Self Schedule	-5100 to -5900	-150	In RTM the range of penalty prices for different ETCs supply self-schedules are much higher in magnitude than generic supply self-schedules but lower than TOR. Energy bid floor is the pricing parameter for all energy supply self-schedules.
Ancillary Service Region Reg-Up and Reg-Down Minimum Requirements	1450	250	Scheduling run penalty price is below the one for transmission constraint. Pricing run parameter is set to the AS market bid cap to reflect AS supply shortage.
Ancillary Service Region Spin Minimum Requirements	1400	250	Scheduling run penalty price is lower than the one for regulation-up minimum requirement. Pricing run parameter is set to the AS market bid cap to reflect AS supply shortage.
Ancillary Service Region Non-Spin Minimum Requirements	1350	250	Scheduling run penalty price is lower than the one for spin minimum requirement. Pricing parameter is set to the AS market bid cap to reflect AS supply shortage.
Ancillary Service Region Maximum Limit on Upward Services	1200	250	Scheduling run penalty price is lower than those for minimum requirements to avoid otherwise system-wide shortage by allowing sub-regional relaxation of the maximum requirement. AS market bid cap as pricing run to reflect the otherwise system-wide shortage.
Self-scheduled exports not using identified non-RA supply resource	1150	1000	Scheduling run penalty price reflects relatively low priority in protection as compared to other demand categories. Energy bid cap as pricing run parameter to reflect energy supply shortage.

Penalty Price Description	Scheduling Run Value	Pricing Run Value	Comment
Final IFM Supply Schedule	-750	-150	Scheduling run penalty price is much higher in magnitude than supply generic self-schedule but lower than ETCs. Energy bid floor is the pricing parameter for all energy supply self-schedules.
Regulatory Must-Run and Must Take supply curtailment	-1400	-150	Scheduling run penalty price reflects the higher priority of regulatory must-run and must-take supply received over generic self-schedules for supply resources. Energy bid floor is the pricing parameter for all energy supply self-schedules.
Price-taker supply bids	-400	-150	Energy bid floor is the pricing parameter for all energy supply self-schedules.
Qualified Load Following self-provision Up or Down	-8500	0	Scheduling run penalty price reflects the highest priority among all categories of AS self-provision. AS bid floor is used as the pricing parameter for any type of AS self-provision.
Day ahead conditionally qualified Reg Up or Down Award	-7750	0	Scheduling run penalty price is higher than the penalty price for energy balance constraint to reflect higher in priority over energy. AS bid floor is pricing parameter for any type of AS self-provision.
Day ahead conditionally qualified Spin Award	-7700	0	Scheduling run penalty price is lower than the one for Reg-up. AS bid floor is pricing parameter for any type of AS self-provision.
Day ahead conditionally qualified Non-spin Award	-7650	0	Scheduling run penalty price is lower than the one for Spin. AS bid floor is pricing parameter for any type of AS self-provision.
Conditionally qualified Reg Up or Down Real Time self-provision (RTUC only)	-405	0	Scheduling run penalty price allows the conversion of AS self-schedules to Energy to prevent LMP of local area from rising so high as to trigger transmission constraint relaxation. AS bid floor is pricing parameter for any type of AS self-provision.
Conditionally qualified Real Time Spin self-provision (RTUC only)	-400	0	Scheduling run penalty price is below the one for regulating-up. AS bid floor is pricing parameter for any type of AS self-provision.
Conditionally qualified Real Time Non-Spin self-provision (RTUC only)	-395	0	Scheduling run penalty price is below the one for spin. AS bid floor is pricing parameter for any type of AS self-provision.

Penalty Price Description	Scheduling Run Value	Pricing Run Value	Comment
Conditionally unqualified Reg Up or Down Real Time self-provision (RTUC only)	-195	0	In scheduling run, AS self-provision not qualified in pre-processing can still be considered as an AS bid with higher priority in the Energy/AS co-optimization along with regular AS bids. AS bid floor is pricing parameter for any type of AS self-provision.
Conditionally unqualified Spin Real Time self-provision (RTUC only)	-170	0	Same as above.
Conditionally unqualified Non-Spin Real Time self-provision (RTUC only)	-155	0	Same as above.
System power balance constraint	1100, -155	1000, -155	To reflect the role regulation plays in balancing the system for undersupply conditions when economic bids are exhausted, the ISO allows the system power balance constraint to relax by as much as the seasonal regulation requirement. For over-supply conditions, when economic bids are exhausted, the ISO allows the system power balance constraint to relax to about 10% of the seasonal regulation requirement. The prices are selected to allow for coordinated dispatch of bids that may exist at or near the bid cap, or at or near the bid floor.
Power Balance constraint for individual. EIM areas	1100, -750	1000, -150	Subject to the FERC order granting waiver of tariff sections 27.4.3.2.and 27.4.3.4, and consistent with Section 10.1.6 of the BPM for Energy Imbalance Market, which implement the price discovery mechanism overriding the pricing parameters and yielding the last economic signal under constraint relaxation. The scheduling run parameter is set to -750 for the individual EIM areas to coordinate the relaxation of the EIM power balance constraint during over-generation conditions relative to congestion on non-EIM constraints.
EIM Upward Available Balancing Capacity Range	1200 through 1050	Bid in Prices Range for EIM Participating resource and DEB for EIM	The Penalty Price Range used for the Available Capacity Range prices to maintain the economic merit order reflected in the energy bid prices of the allocated energy bid portions

Penalty Price Description	Scheduling Run Value	Pricing Run Value	Comment
		Non-Participating	
EIM Downward Available Balancing Capacity	-250 through -350	Bid in Prices Range for EIM Participating resource and DEB for EIM Non-Participating	The Penalty Price Range used for the Available Capacity Range prices to maintain the economic merit order reflected in the energy bid prices of the allocated energy bid portions
EIM Transfer Constraint	1500	1000	Penalty price and pricing parameter consistent with the transmission constraint;
EIM Entitlement Rate of Change Constraint (RTD Only)	1500	0	Penalty price aligned with EIM transfer constraint is currently applicable to RTD 5 minute rate of change.
Administrative Flexible Ramp Down Price Floor	-152	-152	Downward Demand Curve Price Cap
Administrative Flexible Ramp Up Price Ceiling	247	247	Upward Demand Curve Price Cap

Attachment B - Clean Tariff

Response to Deficiency Letter in Docket No. ER20-732-000

California Independent System Operator Corporation

March 20, 2020

Appendix DD

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Section 9 Additional Deliverability Assessment Options

9.1 [Intentionally Omitted]

9.2 [Intentionally Omitted]

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Attachment C – Marked Tariff

Response to Deficiency Letter in Docket No. ER20-732-000

California Independent System Operator Corporation

March 20, 2020

NOTE: As the CAISO is amending its original filing to remove all proposed changes to Appendix DD Section 9.1, that section will remain unchanged from its currently effective content; hence no marked deletions are shown below.

Appendix DD

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Section 9 Additional Deliverability Assessment Options

9.1 [Intentionally Omitted]

9.2 [Intentionally Omitted]

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