156 FERC ¶ 61,226
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Norman C. Bay, Chairman;
Cheryl A. LaFleur, and Colette D. Honorable.

California Independent System Operator Corporation ER16-2023-000

ORDER ON TARIFF REVISIONS

(Issued September 26, 2016)

1. On June 24, 2016, the California Independent System Operator Corporation (CAISO) filed tariff revisions to replace its existing flexible ramping constraint with a new flexible ramping product. In this order, we accept CAISO's proposed tariff revisions, effective October 1, 2016, as requested.

I. Background

2. CAISO states that in the past several years, it has implemented several enhancements to its real-time market to help effectively manage the integration of variable energy resources. CAISO explains that resources with flexible ramping capability have become increasingly necessary for balancing the system because of the number of variable energy resources participating in CAISO's market. CAISO describes ramping capability as a resource's ability to move from one energy output to a higher (upward ramp) or lower (downward ramp) energy output. Flexible ramping capability is a resource's ability to rapidly change its output to respond to a change in forecasted net load.[1] CAISO states that as California progresses toward implementing a 50 percent renewable portfolio, variable energy resources and behind-the-meter generation will play an increasing role in CAISO's real-time market, thus creating a need for flexible ramping capability and the accurate settlement of such capability.[2]

[1] Forecasted net load is the difference between total system demand and the demand met by non-dispatchable resources. CAISO Filing at 4.

[2] *Id.* at 2-5.

3. CAISO states that in 2011, it implemented the flexible ramping constraint as an interim measure that would operate in the 15-minute real-time unit commitment process to ensure the commitment of sufficient upward ramping capability of dispatchable resources.[3] CAISO explains that the flexible ramping constraint works by reserving unloaded ramping capability from dispatchable resources that it has not designated to provide regulation or contingency reserves, and whose upward ramping capability is not committed to meet forecasted net load needs in the real-time unit commitment process. This capability is then available for five-minute dispatch instruction and, if dispatched above minimum load, is able to set real-time locational marginal prices. However, CAISO states that the flexible ramping constraint only partially addresses system ramping needs because it operates only in the 15-minute real-time unit commitment process and only addresses upward ramping needs.[4] CAISO states that the flexible ramping constraint was intended to address issues arising from the lack of flexible ramping capability while it developed a new, market-based flexible ramping product. CAISO explains that the instant proposal was developed over a five-year stakeholder process.

4. CAISO states that its current market design relies on a multi-interval optimization in the unit commitment and dispatch process that can look ahead several intervals to meet forecasted load needs, including the ramping capability necessary to meet imbalance energy requirements in successive intervals. The current optimization process accomplishes this by correctly positioning resources to meet forecasted system conditions in subsequent market runs. However, CAISO states that its experience has shown that it cannot rely exclusively on this multi-interval optimization process to meet net load needs because of uncertainty in forecasts. CAISO explains that the current optimization process does not include a margin of error between the forecasted ramping need and the actual ramping need, which can result in the commitment and dispatch of an amount of energy that is higher or lower than the actual need. CAISO states that when the amount

[3] *Cal. Indep. Sys. Operator Corp.* 137 FERC ¶ 61,191 (2011); *see also Cal. Indep. Sys. Operator Corp.* 140 FERC ¶ 61,042 (2012).

[4] CAISO Filing at 9-10.

of energy committed and dispatched cannot meet demand, a power balance violation[5] is triggered, which it states can lead to undesirable outcomes.[6]

5. CAISO states that neither reliance on regulation services, nor the procurement of additional spinning reserves is a sufficient solution to the need for additional flexible ramping capability. CAISO explains that procuring additional regulation services ahead of time could be problematic because it would reduce the quantity of resources available for real-time dispatch as imbalance energy and potentially lead to more power balance constraint violations and trigger penalty prices that are not related to actual operational issues. CAISO also states that procuring additional spinning reserves would be overly expensive because the price of spinning reserves already includes the cost of not providing energy. Further, CAISO notes that there is no downward contingency reserve product and, therefore, spinning reserves could not address the need for downward ramping capability.[7] In addition, CAISO states that reliance on the multi-interval optimization process raises issues about the compensation of resources providing flexible ramping capability by increasing uplift payments to units that are held out of economic merit order or failing to compensate a resource for the flexible ramping capability provided.[8]

[5] CAISO defines power balance violations as a situation in which "there is no feasible system wide [real-time dispatch] schedule to maintain supply and demand power balance." *Id*., Attachment D at 2.

[6] Specifically, CAISO states that a power balance violation can mean that: (1) the system must rely on regulation services to resolve the issue in real-time after the imbalance has caused a frequency deviation or area control error; (2) CAISO may have to rely on regulation energy from other balancing authority areas, which may affect CAISO's ability to meet operational performance criteria; and (3) administrative penalty prices rather than economic bids may determine real-time energy prices. *Id.* at 7.

[7] *Id.* at 7-8.

[8] *Id.* at 8.

II. Flexible Ramping Product Proposal

6. CAISO states that the proposed flexible ramping product[9] is a significant enhancement to the flexible ramping constraint[10] because it will ensure that sufficient upward and downward ramping capability is available and efficiently dispatched in all of its real-time market processes and Energy Imbalance Market (EIM), rather than only the 15-minute real-time unit commitment process.[11] The flexible ramping product will procure and compensate resources for providing ramping capability for both the forecasted movement of net load and uncertainty in the forecasted net load, which is the amount of flexible ramping capability needed to cover the potential error in the real-time dispatch forecasted net load. Further, the flexible ramping product will compensate for ramping capability and calculate the value of ramping distinct from the imbalance energy price.[12] Thus, CAISO asserts that the flexible ramping product will improve its management of ramping capability to meet changes in system conditions.[13]

7. CAISO states that it will continue to use its current multi-interval optimization to ensure that ramping capability is available to meet forecasted movement.[14] To address uncertainty in the forecasted net load, CAISO will procure ramping capability in both the upward and downward directions based on a probability distribution of forecasted net load that it will develop based on historical forecasted net load errors and other appropriate data. However, CAISO states that it will only issue uncertainty awards to the extent that procuring this ramping capability is economic.[15] To make this determination,

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[9] *Id.* at 31, Attachment A, Proposed Tariff § 11.5.9 adds the flexible ramping product to the list of real-time market settlements and specifies that the CAISO will settle it according to section 11.25.

[10] CAISO proposes to replace tariff sections 11.25 and section 27.10 of its current tariff detailing the flexible ramping constraint with the proposed flexible ramping product tariff provisions described below. *Id*. at 31-32.

[11] *Id.*, Attachment A, Proposed Tariff §§ 29.44, 34.4, 34.5, and 44.1.

[12] *Id.* at 31, Attachment A, Proposed Tariff § 11.8.4.2.

[13] *Id.* at 2-4, 12.

[14] *Id.*, Attachment C (Tretheway Testimony) at 15.

[15] CAISO adds that it will limit eligibility for uncertainty awards to dispatchable resources that have bids in the real-time market. *Id.* at 18.

CAISO will use the probability distributions and the power balance constraint relaxation parameters to develop a demand curve that will ensure that CAISO procures flexible ramping capability only up to the expected cost of incurring a power balance constraint violation. Further, CAISO states that it will place limits on the demand curve to preserve the priority of ancillary service necessary to meet reliability criteria over flexible ramping capability. CAISO states that it will describe in detail how it will calculate the probability distribution functions and develop the demand curve in the business practice manuals to allow CAISO the flexibility to refine the methodology over time as it gains experience with the flexible ramping product.[16]

8. CAISO proposes to set separate uncertainty requirements and issue separate uncertainty awards for each individual balancing authority area as well as for the EIM area as a whole.[17] CAISO states that including more granular (i.e., sub-balancing authority area) locational procurement requirements would require significant enhancements that would unnecessarily delay implementing the proposal. Thus, CAISO proposes to proceed without the more granular procurement at this time, but emphasizes that it intends to draw upon actual market experience to refine the determination of ramping needs.[18]

9. CAISO states that there will be no separate bids for uncertainty awards and, instead, it proposes to economically dispatch energy and determine uncertainty awards contemporaneously through the real-time market using the energy bids submitted by suppliers.[19] CAISO explains that it considered an option utilizing separate flexible ramping product bids in the real-time market during the stakeholder process, but rejected this approach because the only costs of providing flexible ramping capability are opportunity costs associated with not selling energy or ancillary services in the CAISO real-time markets. CAISO highlights that these opportunity costs will be fully captured in its co-optimization and pricing models for the real-time markets. CAISO also notes that the Market Surveillance Committee found that separate bids for the flexible ramping

[16] *Id.* at 14-15; *see also* Attachment A, Proposed Tariff §§ 44.2.4.2.

[17] *Id.* at 14; *see also* Attachment A, Proposed Tariff § 44.2.4.1.

[18] *Id.* at 18-20.

[19] *Id.* at 16; *see also* Attachment A, Proposed Tariff §§ 34.9, and 27.4.1.

product would create inefficiencies and indicated that there is no evidence supporting the need for additional compensation.[20]

10. CAISO states that it will pay and charge resources a flexible ramping price equal to the shadow price of the uncertainty requirement for the applicable constraint, which equals the marginal cost of procuring the flexible ramping product.[21] CAISO states that this method of compensation makes the resource whole, which not only provides just compensation, but also reduces the need for real-time bid cost recovery. CAISO states that it has designed the allocation of the costs of uncertainty awards to scheduling coordinators to reflect their contribution to errors in the forecasted net load.[22] Specifically, CAISO proposes to allocate the costs on a pro rata basis between load, generation, and imports/exports based upon the observed forecast error of each category relative to the other two categories. CAISO states that this allocation follows the principles of cost causation as it assigns responsibility as closely as possible to each category's contribution to uncertainty. Further, CAISO proposes to do a first allocation of the cost of the uncertainty awards on a daily basis, which is necessary because it needs to compensate resources for providing flexible ramping capability daily in order to include the compensation in bid cost recovery. CAISO then proposes to reallocate the costs at the end of the month by separating out costs between peak and non-peak hours and for upward and downward ramping. CAISO states that this reallocation will reflect the fact that solar facilities do not contribute to uncertainty during evening hours.[23]

11. CAISO states that it will settle forecasted movement awards, which is the ramping capability reserved through the multi-interval optimization process, at the ramping price it determines for uncertainty awards.[24] CAISO states that, in the 15-minute market, it will determine the forecasted movement as the difference between the resource's non-binding 15-minute schedule in the first advisory interval and its 15-minute schedule in the binding interval. CAISO will then settle the 15-minute forecasted movement at the upward and downward 15-minute market price. In the real-time dispatch, CAISO states

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[20] *Id.* at 16-17 (citing CAISO Filing, Attachment J, Opinion on Flexible Ramping Product by Members of Market Surveillance Committee at 10-11).

[21] *Id.* at 21-22; *see also* Attachment A, Proposed Tariff § 11.25.2.

[22] *Id.* at 31; *see also* Attachment A, Proposed Tariff §§ 16.6.3 and 17.3.3.

[23] *Id.* at 22-25.

[24] *Id.* at 26-27; *see also* Attachment A, Proposed Tariff §§ 11.25.1, 11.25.1.2, 11.25.1.3, 11.25.2, and 11.25.2.2.

that it will determine the forecasted movement as the difference between the non-binding dispatch instruction for the first advisory interval and the dispatch instruction for the binding interval. CAISO states it will compensate each resource and intertie schedule for movement in the direction of total system movement and charge for movement opposite to the direction of total system movement in each market at the same price that is calculated for the uncertainty requirement. CAISO states that this is the same way imbalance energy is settled and asserts that it is consistent with cost causation principles because the costs are charged to supply, interties, or load that add to the total system movement, while the supply, interties, or load that provide ramping to meet the total system movement are paid.[25]

12. CAISO states that the flexible ramping product creates the potential for double payment if CAISO were to compensate a resource for flexible ramping product and then subsequently compensate the same resource for uninstructed imbalance energy. Thus, CAISO proposes measures to prevent such double payment by rescinding any portion of a flexible ramping payment that overlaps with an uninstructed imbalance energy payment for the same settlement interval.[26]

13. CAISO notes that it currently applies an hourly resource sufficiency evaluation in the EIM to assess the adequacy of upward ramping capability both system-wide and in an EIM balancing authority area. CAISO states that, with implementation of the flexible ramping product, it will also perform a symmetrical test for downward ramping capability to determine EIM transfer limits.[27] CAISO also proposes other tariff revisions related to implementing the flexible ramping product in the EIM, such as how it will settle and allocate payments and charges, calculate hourly capacity requirements, and manage a resource's failure to meet the downward sufficiency test described above.[28]

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[25] *Id.*

[26] *Id.* at 27-28; *see also* Attachment A at 11, Proposed Tariff § 11.25.2.3. CAISO states that for each settlement interval in which a resource receives a flexible ramping product payment, CAISO will determine if the resource was double paid by comparing uninstructed imbalance energy to the award. If the resource has an uninstructed imbalance energy deviation or an operational adjustment that overlaps the flexible ramping product forecast movement and uncertainty awarded capacity, CAISO will rescind any excessive payments.

[27] *Id.* at 30; *see also* Attachment A, Proposed Tariff § 29.34(m).

[28] *Id.* at 30, 32; *see also* Attachment A, Proposed Tariff §§ 29.11, 29.34(I)(4), and 29.34(n).

14. CAISO proposes other tariff revisions to implement the flexible ramping product, such as changes to its general dispatch principles and instructions,[29] and new or revised definitions in Appendix A of its tariff.[30]

15. Finally CAISO requests that the Commission issue an order accepting its proposed tariff revisions by September 22, 2016, in advance of its requested October 1, 2016 effective date.[31]

III. Notice and Responsive Pleadings

16. Notice of CAISO's filing was published in the *Federal Register*, 81 Fed. Reg. 43,595 (2016), with interventions and protests due on or before July 15, 2016. Timely motions to intervene were filed by the Electric Power Supply Association (EPSA); Puget Sound Energy, Inc.; PacifiCorp; NV Energy, Inc.; Arizona Public Service Company; NRG Power Marketing LLC and GenOn Energy Management, LLC; Calpine Corporation; the City of Santa Clara, California; Modesto Irrigation District; Bonneville Power Administration; Portland General Electric Company; Northern California Power Agency; and California Department of Water Resources State Water Project. The Public Utilities Commission of the State of California (CPUC) submitted an out-of-time motion to intervene.

17. Timely motions to intervene and comments or protests were filed by the Cities of Azusa, Banning, Colton, Pasadena, and Riverside, California (Six Cities); Pacific Gas and Electric Company (PG&E); Powerex Corp. (Powerex); the California Energy Storage Alliance (CESA); Southern California Edison Company (SoCal Edison); and the Western Power Trading Forum, EPSA, and Independent Energy Producers Association (collectively, Joint Commenters). On August 1, 2016, CAISO filed an answer. On August 24, 2016, the Environmental Defense Fund (EDF) filed a motion to intervene out-of-time and comments in support of CAISO's proposal.

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[29] *Id.* at 32; *see also* Attachment A, Proposed Tariff §§ 34.7, 34.8, and 34.13.2.

[30] These definitions include: Peak Flexible Ramp Hours, Flexible Ramp Up Price, Flexible Ramp Down Price, Off Peak Flexible Ramp Hours, Forecasted Movement, Uncertainty Award, Uncertainty Requirement, and Supply. *Id.*, Attachment A, Appendix A.

[31] *Id.* at 33.

A. Comments and Protests

18. Commenters generally support the flexible ramping product and CAISO's proposal to procure and compensate resources for providing ramping capability to meet forecasted and unexpected changes in the net load.[32] Several commenters state that CAISO's proposal represents an important step toward ensuring that CAISO maintains the flexibility necessary to respond to the challenges of integrating renewable resources. While supportive of CAISO's proposal in concept, PG&E requests that the Commission direct CAISO to submit a report on the performance of the flexible ramping product six months after its implementation to evaluate the effectiveness of the design parameters, impacts on the total cost of dispatch, and reductions in the number of ramp shortages.[33]

19. Six Cities state that during CAISO's stakeholder process, it urged CAISO to conduct detailed simulations based on historical market data before implementing its proposal. Six Cities assert that the complexities of the proposed flexible ramping product may lead to unintended consequences and unnecessary cost increases that are not present under the current flexible ramping constraint.[34] Six Cities add that CAISO should not be permitted to implement a significantly more complex process until it conducts the necessary simulations, analyzes the results, and makes these analyses available to market participants prior to implementing the product. Therefore, Six Cities request that the Commission require successful completion of the CAISO's market simulations prior to the tariff provisions becoming effective.[35]

20. SoCal Edison states that CAISO's proposal does not consider location-specific needs for flexible ramping capability, which may result in CAISO procuring ramping products that end up stranded due to congestion. Therefore, SoCal Edison requests that the Commission direct CAISO to track the need for locational constraints in the procurement of flexible ramping as it gains experience with the product.[36] In addition, SoCal Edison cautions that there is insufficient information available to determine the

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[32] PG&E Comments at 3, SoCal Edison Comments at 2, Powerex Comments at 6, and CESA Comments at 3.

[33] PG&E Comments at 3.

[34] Six Cities Comments at 2.

[35] *Id*. at 2 (citing CAISO Filing at 3).

[36] SoCal Edison Comments at 3.

interaction between the flexible ramping product and convergence bidding due to modeling differences between the day-ahead and real-time markets. Thus, SoCal Edison states that although it does not object to CAISO's implementation of the proposal, it stresses the importance of closely monitoring market performance.[37]

21. CESA expresses concern that CAISO's current bid floor of -$150/MWh may insufficiently promote downward ramping or more frequent downward price spikes in some periods. CESA contends that these conditions can create "uplift" or "downlift" and may inappropriately force CAISO to depend on other balancing authorities or regulation capacity to balance its system. Therefore, CESA recommends that CAISO lower the bid floor to -$300/MWh, with the ability to consider further lowering the bid floor to -$1,000/MWh.[38]

22. Powerex supports CAISO's present proposal, but encourages CAISO to explore enhancements to the flexible ramping product, such as providing market participants with the option to offer ramping at a price and to extend the flexible ramping product into the day-ahead market.[39]

23. Joint Commenters object to CAISO's proposal to implement a flexible ramping product that is not biddable. Joint Commenters argue that the procurement of uncertainty awards is an ancillary service that should be compensated in the same manner as other bid-based ancillary services in the CAISO market. Joint Commenters contend that the flexible ramping product meets the definition of an ancillary service in the Commission's

[37] *Id.* at 2-3.

[38] CESA Comments at 5.

[39] Powerex Comments at 7.

glossary[40] and CAISO's tariff[41] because, according to these parties, CAISO has demonstrated that it cannot rely exclusively on the multi-interval market optimization to meet net load and because the flexible ramping product is necessary for reliable operation of the grid.[42]

24. Joint Commenters further assert that the flexible ramping product and other ancillary services, such as regulation or operating reserves, are substitutes for each other from a reliability perspective and should therefore be compensated in the same manner.[43] Moreover, Joint Commenters argue that the flexible ramping product is more valuable to grid reliability, as compared to non-contingent spinning reserves, because the flexible ramping product can be dispatched both upward and downward, and can preserve ramping capability throughout each real-time market run. Therefore, Joint Commenters contend that it would be unjust and unreasonable to compensate the flexible ramping product differently than other bid-based ancillary services in CAISO's market.[44]

25. Joint Commenters argue that the compensation methodology CAISO proposes for the flexible ramping product is deficient because: (1) it treats the service as if the capacity value of the service has no incremental value; (2) it fails to provide generators

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[40] The glossary, which is located in the Market Oversight tab of the Commission's website, defines ancillary services as "[t]hose services necessary to support the transmission of electric power from seller to purchaser, given the obligations of control areas and transmitting utilities within those control areas, to maintain reliable operations of the interconnected transmission system. Ancillary services supplied with generation include load following, reactive power-voltage regulation, system protective services, loss compensation service, system control, load dispatch services, and energy imbalance services." Joint Commenters Protest at 10 (citing http://www.ferc.gov/market-oversight/guide/glossary.asp).

[41] CAISO defines ancillary services as "Regulation, Spinning Reserve, Non-Spinning Reserve, Voltage Support and Black Start together with such other interconnected operation services as the CAISO may develop in cooperation with Market Participants to support the transmission of Energy from Generation resources to Loads while maintaining reliable operation of the CAISO Controlled Grid in accordance with WECC standards and Good Utility Practice." *Id.* (citing CAISO Tariff, Appendix A).

[42] Joint Commenters Protest at 10.

[43] *Id.* at 11.

[44] *Id.* at 13.

with the opportunity to opt out of providing the product or to express their preference between the provision of the product and other ancillary services; and (3) it fails to provide suppliers with the opportunity to express a pricing preference between its own resources. In addition, Joint Commenters assert that CAISO has failed to demonstrate the potential reliability risks or market inefficiencies by implementing a bid-based product.[45] Joint Commenters dispute the findings of CAISO's Market Surveillance Committee that implementing a biddable product would lead to inefficiencies, arguing that it has failed to support its conclusion that resources with a positive bid price may fail to clear the flexible ramping target. Thus, Joint Commenters argue that the Commission should disregard the Market Surveillance Committee's comments on this issue.[46]

26. Finally, Joint Commenters argue that CAISO has failed to support its proposal to procure the flexible ramping product only in the real-time market. Joint Commenters contend that the flexible ramping product should be treated similarly to other ancillary service products and procured in the day-ahead market because: (1) there are more resources available for commitment in the day-ahead market than in the real-time market; and (2) it would increase efficiency and lead to increased price and scheduling convergence between the day-ahead and real-time markets.[47]

27. Therefore, Joint Commenters request that the Commission direct CAISO to implement the flexible ramping product such that suppliers can submit bids for services. In the alternative, Joint Commenters request that the Commission require CAISO to submit a compliance filing within six months to replace the non-biddable flexible ramping product with a biddable product within 12 months of its implementation.[48]

B. CAISO Answer

28. In response to commenters, CAISO states that it intends to provide the information PG&E requests to market participants in its monthly performance reports and meetings, thus there is no need for CAISO to submit a report with the Commission.[49] CAISO also states that it will report on the need for locational constraints through those same reports.

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[45] *Id.* at 6-7.

[46] *Id.* at 15.

[47] *Id.* at 15-16.

[48] *Id.* at 16-17.

[49] CAISO Answer at 6.

Moreover, CAISO commits to working with stakeholders through its stakeholder initiative roadmap process if any market changes are needed.[50] Similarly, in response to CESA, CAISO states that it has already begun a stakeholder process to determine whether it should lower the bid floor, and that the Commission should allow CAISO and its stakeholders to finish that process before making any changes to the bid floor.[51] Finally, in response to Six Cities, CAISO contends that the Commission should not condition its acceptance of the instant filing on CAISO's completion of market simulations. CAISO explains that the successful completion of market simulations is a precondition to its implementation of all market enhancements, so conditional acceptance by the Commission is not necessary. CAISO states that market simulations for the flexible ramping product begin on August 16, 2016, and that any issues that would impede successful implementation will be resolved prior to implementation.[52]

29. CAISO disputes Joint Commenters' position that the flexible ramping product should be a biddable product arguing that the flexible ramping product is distinct from ancillary services. CAISO explains that ancillary services represent standby unloaded capacity available to meet deviations from assumed system demand levels in the same trading interval, whereas the flexible ramping product represents energy that is withheld from the real-time market. CAISO argues that while the flexible ramping product may meet the definition of an ancillary service, CAISO is not required to procure and dispatch it in the same manner as a capacity-based ancillary service.[53]

30. Next, CAISO contends that Joint Commenters misstate CAISO's position on the substitutability of regulation or operating reserves for the flexible ramping product, restating its argument that neither regulation, nor operating reserves are sufficient to address ramping needs. CAISO explains that regulation services are used to address deviations that arise *during* the trading interval. Thus, CAISO asserts that procuring additional regulation to address deviations that arise before the trading interval would mean the additional capacity reserved for regulation would not be available for dispatch and could lead to more power balance violations. CAISO further explains that spinning reserves are dispatched to respond to a contingency, whereas ramping capability is available independent of a contingency, adding that there is no downward ramping

[50] *Id.* at 6-7

[51] *Id.* at 5.

[52] *Id.* at 6-7.

[53] *Id.* at 9, 11.

product that could substitute for the flexible ramping product.[54] Moreover, CAISO states that even if the flexible ramping product is more valuable to the grid than non-contingent spinning reserves, it does not follow that the product must be bid-based.[55] Finally, CAISO contends that the distinction Joint Commenters attempt to make between bid-based and non-bid-based compensation is irrelevent because the opportunity cost paid for uncertainty awards is based on the market energy clearing price, just as ancillary services prices are determined by the ancillary services market. Thus, CAISO claims that market-based uncertainty award compensation is not less compensatory than the compensation for market-based ancillary services award merely because a flexible ramping product provider does not submit a separate bid for the product.[56]

31. CAISO also argues that Joint Commenters failed to provide any basis for rejecting the conclusions of the Market Surveillance Committee recommendation regarding bid-based compensation. CAISO recognizes that generators may wish to express a preference for the provision of ancillary services over the flexible ramping product, but notes that such a desire represents a preference and not a cost incurred by generators. CAISO also states that if its suppliers determine that they need additional compensation in relation to providing the flexible ramping product, that need may be expressed through energy bids.[57] CAISO maintains that a bid-based flexible ramping product could lead to unintended and inefficient outcomes. Specifically, CAISO defends the Market Surveillance Committee's observation that a bid-based product with a market clearing process would not guarantee that the resources will clear against the demand curve. In these situations, CAISO states that it would be required to either: (1) not count the ramping capability of these resources as available in clearing the market despite the fact that the resources would be available; or (2) count the capacity and not pay the resources. CAISO states that these situations could create market inefficiencies such as the market software committing additional generation despite having adequate ramping capability available, or may create incentives for resources to submit high offer prices that would distort the market clearing price.[58]

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[54] *Id.* at 11-12.

[55] CAISO states, for example, that voltage support is more valuable to grid reliability than non-contingent spinning reserves, but it has never been a bid-based product under CAISO's tariff. *Id.* at 12-13.

[56] *Id.* at 13.

[57] *Id.* at 15.

[58] *Id.* at 17-18.

32. Finally, CAISO avers that there is no need to procure the flexible ramping product in the day-ahead market. CAISO reiterates that the benefits of producing the flexible ramping product in the day-ahead market are not significant enough to overcome the potential inefficiencies caused by different settlement and dispatch periods between the day-ahead and real-time market, such as significant flexible ramping product re-procurement in the real-time market. While Joint Commenters have argued that there are mechanisms that could be employed to resolve such inefficiencies, CAISO contends that the potential existence of other mechanisms does not render the proposed flexible ramping product unjust or unreasonable.[59]

IV. Discussion

A. Procedural Matters

33. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2016), the timely, unopposed motions serve to make the entities that filed them parties to this proceeding.

34. Pursuant to Rule 214(d) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214(d) (2016), the Commission will grant the CPUC's and EDF's late-filed motions to intervene given the parties' interest in the proceeding, the early stage of the proceeding, and the absence of undue prejudice or delay.

35. Rule 213(a)(2), 18 C.F.R. § 385.213(a)(2) (2016), prohibits answers to protests and answers to answers unless otherwise ordered by the decisional authority. We accept CAISO's answer because it has provided information that assisted us in our decision-making process.

B. Substantive Matters

36. We find that CAISO's proposal to implement the flexible ramping product in the instant filing is just and reasonable and is an improvement over the existing flexible ramping constraint. We find that the flexible ramping product will enhance CAISO's ability to manage ramping capability to address changes in system conditions by extending CAISO's ability to procure ramping capability in both the upward and downward directions and to account for forecasted net load movement and forecast uncertainty in all processes of the real-time market. Thus, the flexible ramping product will ensure that CAISO has sufficient dispatchable ramping capability to meet net load changes in all market intervals. We also find that CAISO's proposal will ensure that

[59] *Id.* at 16.

flexible ramping capability is valued and compensated properly in CAISO's markets, as discussed below. Specifically, as discussed more fully below, we find that opportunity cost will provide a just and reasonable basis for compensation for flexible ramping product providers because it appropriately captures the costs associated with providing flexible ramping capability while avoiding the market inefficiencies that may be associated with a bid-based product given the other elements of CAISO's flexible ramping product design. For these reasons, we accept CAISO's proposed tariff revisions, effective October 1, 2016, as requested.[60]

37. We also find that CAISO has sufficiently addressed commenters' concerns, including requests for additional information on the flexible ramping product and further enhancements to it. CAISO states that it plans to include the data PG&E and SoCal Edison request, such as the effectiveness of the design parameters and need for locational constraints, in its regular monthly performance reports and in its monthly market performance meetings.[61] Consistent with CAISO's routine practice of sharing market performance information in its monthly reports, we expect CAISO to share with its stakeholders the information necessary to evaluate the performance of the flexible ramping product and to evaluate the potential for further refinements to the flexible ramping product. We find that providing this information through the already established forums will provide stakeholders with sufficient data and transparency. Thus, we will not require CAISO to file reports containing this information with the Commission, as requested by PG&E.

38. Further, we deny Six Cities' request that the Commission condition acceptance of CAISO's filing upon the successful completion of market simulations. As CAISO states, market participants may participate in its market simulations, and CAISO will not implement the flexible ramping product until it successfully completes and addresses issues identified in such simulations.[62] Based on these representations, which reflect CAISO's internal process requirements as documented in its Program Lifecycle

[60] The Commission expects that CAISO will include data related to ramping capability awards, settlements, and prices in its Order No. 760 data submissions (*Enhancement of Electricity Market Surveillance and Analysis through Ongoing Electronic Delivery of Data from Regional Transmission Organizations and Independent System Operators*, FERC Stats. & Regs. ¶ 31,330 (2012)).

[61] CAISO Answer at 6-7.

[62] *Id.*

Methodology manual,[63] we find this approach sufficient and that it is not necessary to condition our acceptance of CAISO's proposal on a market simulation requirement.

39. We find that CESA's request to direct CAISO to lower the bid floor is beyond the scope of this proceeding because CAISO has not proposed any revisions to the bid floor here. In any case, CAISO states that it is working with stakeholders to investigate lowering the bid floor, and that it will propose changes to the Commission following the stakeholder process if necessary.[64] We encourage CESA to work with CAISO and other stakeholders as part of the ongoing stakeholder process.

40. We are not persuaded by Joint Commenters' arguments that the flexible ramping product should be a biddable product. As a threshold matter, because we find CAISO's proposal to be just and reasonable, as discussed herein, we need not entertain alternative proposals.[65] Moreover, we find Joint Commenters' arguments regarding the alleged need for separate flexible ramping product bids to be unpersuasive. That the flexible ramping product may meet the definition of an ancillary service, or be similar to other ancillary services, such as spinning reserves or regulation, does not require that CAISO procure it in the same manner as those other products. Similarly, the value of the flexible ramping product to grid reliability does not necessitate that it be a bid-based product, so long as the compensation provided under CAISO's proposal is just and reasonable, which we find it to be, as discussed below. Finally, because the opportunity cost paid for

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[63] CAISO's Program Lifecycle Methodology, which defines the methodology for CAISO to develop and manage new market products and projects, specifically requires the successful completion of market simulations prior to implementing a new market design feature. CAISO, *Program Lifecycle Methodology*, § 2.2.7 (Mar. 2011),

http://www.caiso.com/Documents/CaliforniaISOProgramLifecycleMethodologyVersion1_7.pdf.

[64] CAISO Answer at 4-5.

[65] For a rate design proposal to be acceptable, it need be neither perfect nor even the most "desirable"; it need only be reasonable. *See New England Power Co.*, 52 FERC ¶ 61,090, at 61,336 (1990), *reh'g denied*, 54 FERC ¶ 61,055, *aff'd Town of Norwood v. FERC*, 962 F.2d 20 (D.C. Cir. 1992); *City of Bethany v. FERC*, 727 F.2d 1131, 1136 (D.C. Cir. 1984), *cert. denied*, 469 U.S. 917 (1984)(utility need establish that its proposed rate design is reasonable, not that it is superior to alternatives)*; OXY USA, Inc. v. FERC*, 64 F.3d 679, 692 (D.C. Cir. 1995) ("[T]he Commission may approve the methodology proposed in the settlement agreement if it is 'just and reasonable'; it need not be the only reasonable methodology or even the most accurate.").

uncertainty awards is based on the real-time energy price, we find that flexible ramping product compensation is market-based, as opposed to an administratively determined price, even though suppliers will not submit separate bids for it.

41. As to the compensation level, we find that opportunity costs are a just and reasonable measure of the costs incurred by suppliers who provide flexible ramping capability. Further, we find merit in the Market Surveillance Committee's findings regarding the potential market inefficiencies that could be introduced by a bid-based product, such as the potential for committing unnecessary additional ramp capacity because ramping bids did not clear against the flexible ramping target, or creating incentives for resources to submit high offer prices that could distort the clearing price. Further, CAISO's proposed compensation methodology calculates the value of ramping distinct from the imbalance energy price, which should result in better price signals because the market-clearing price for ramping will not simply be subsumed into the locational marginal price but will be reflected in the separate flexible ramping price. Finally, because the method of compensation proposed by CAISO pays resources for ramping services to address both forecasted movement of net load and the uncertainty of the forecasted net load requirement, resources should experience less revenue insufficiency and thus the proposal should reduce bid cost recovery payments. In addition, we find that these improvements incentivize market participants to make ramping capability available to the CAISO market on a long-term basis, provide greater transparency to the cost of serving the ramping needs within CAISO, and provide an opportunity for market participants to recover their costs. In these ways, the proposal aligns with and furthers the Commission's price formation goals.[66] Thus, we find that CAISO's proposal does not need separate ramping bids to provide just and reasonable compensation for flexible ramping capability.

42. Finally, we find that the inefficiencies of implementing the flexible ramping product in the day-ahead market, such as the potential of having to procure significant amounts of additional flexible ramping capability in the real-time market, outweigh the benefits of this suggested market feature. Further, because we find that the flexible ramping product for the real-time market is just and reasonable as proposed, we find no need to require CAISO to develop and implement a day-ahead product at this time. However, we encourage CAISO to continue to work with its stakeholders to explore any further refinements as CAISO gains experience with the product and evaluates the product's performance over time.

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[66] *See Settlement Intervals and Shortage Pricing in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 825, 81 Fed. Reg. 42,882 (June 30, 2015), FERC Stats. & Regs. ¶ 31,384, at PP 53-54 (2015).

The Commission orders:

CAISO's proposed tariff revisions are hereby accepted, effective October 1, 2016, as discussed in the body of this order.

By the Commission. Commissioner Clark is not participating.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

Document Content(s)