166 FERC ¶ 61,138
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Neil Chatterjee, Chairman;
Cheryl A. LaFleur, Richard Glick,
and Bernard L. McNamee.

California Independent System Operator Corporation Docket No. ER19-538-000

ORDER ON TARIFF REVISIONS

(Issued February 21, 2019)

1. On December 12, 2018, the California Independent System Operator Corporation (CAISO) filed, pursuant to section 205 of the Federal Power Act (FPA),[1] revisions to its tariff regarding practices for conformance of load forecasts in the balancing authority areas that participate in the CAISO markets. Specifically, these revisions would enhance CAISO's tariff by describing: (1) the load conforming practice in the real-time market; (2) a similar practice in the residual unit commitment (RUC) process of the day-ahead market; and (3) a load conformance limiter tool. In this order, we accept CAISO's proposed tariff revisions, effective February 27, 2019, as requested.

I. Background

2. CAISO administers both day-ahead and real-time wholesale electricity markets. Although the day-ahead market only includes the CAISO balancing authority area, the real-time market extends to balancing authority areas participating in the western Energy Imbalance Market (EIM), which includes CAISO and, currently, seven EIM entities. Both of these interrelated markets ensure electricity supply is sufficient to satisfy demand in the region while maintaining the reliability of the transmission system. The markets produce optimal schedules and dispatches, and produce locational marginal prices used for financial settlement.[2]

3. The CAISO tariff sets forth the rules for submitting bids and self-schedules for energy and ancillary services in the CAISO markets. As part of the day-ahead market, CAISO clears the integrated forward market based on market participant supply and

[1] 16 U.S.C. § 824d (2012).

[2] CAISO Filing at 2.

demand bids, as opposed to CAISO's load forecast. The integrated forward market produces unit commitment and financially binding day-ahead energy schedules. Subsequently, CAISO conducts the RUC process as part of the day-ahead market, which consists of a unit commitment process based on CAISO's load forecast for its balancing authority area. This process ensures CAISO has committed sufficient resources in the day-ahead timeframe to meet its demand forecast. The RUC process uses RUC availability bids and resource's start-up and minimum load costs that clear against CAISO's demand forecast.[3]

4. In the real-time market, which includes the EIM, CAISO clears supply bids against its load forecast and export bids, and does not accept real-time load demand bids. CAISO system operators may also issue exceptional dispatch instructions to resources outside of the market's economic dispatch construct. Similarly, EIM entity system operators retain operational control and may manually dispatch resources within their respective balancing authority areas.[4]

5. Prior to executing the applicable market runs, CAISO produces a "CAISO Forecast of CAISO Demand" for its balancing authority area, and this load forecast is used in clearing the real-time market. For their respective balancing authority areas, EIM entities may use a forecast produced by CAISO or they may produce their own forecast for use in the CAISO market. These forecasts are automated.[5]

A. Conformance of Load Forecasts in Real-Time Market

6. System operators in the CAISO and EIM balancing authority areas are responsible for continually maintaining a balance of supply and demand to maintain system reliability and compliance with North American Electric Reliability Corporation (NERC) Reliability Standard BAL-001-2 Real Power Balancing Control Performance, which applies to all balancing authorities. This balance is maintained primarily through CAISO's market systems. However, CAISO explains that although it strives to produce an accurate load forecast, at times, the automated load forecast used in clearing supply bids against forecasted load and exports for CAISO's real-time market does not match actual system conditions due to issues such as load forecast error, variable energy resources deviating significantly from forecasts, and unpredictable events like outages or weather changes. When CAISO and EIM balancing authority area operators observe that the load forecast input into the market is not consistent with actual system conditions,

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

[4] *Id.* at 3.

[5] *Id.*

they may manually adjust the load forecast before the market runs to align with system conditions through a practice known as "load conformance." The alternative to load conformance is for system operators to use a manual or exceptional dispatch after the market has produced a solution.[6]

7. CAISO states that the process of conforming the load forecast ensures the market system will produce a more feasible solution and reduce the need for manual dispatches after the market clears. According to CAISO, conforming the load forecast enables the system operator to increase or decrease demand evenly across the system as modeled in the market based on distribution factors, and allows the market optimization to achieve a least cost dispatch that minimizes congestion.[7]

8. CAISO explains that the DMM's Q2 Report on Market Issues and Performances provides data on CAISO's and EIM entity balancing authority areas' conformances in the real-time market for April through June 2018. According to the data, CAISO conformed its load forecast in 53 percent of 15-minute market intervals and 73 percent of five-minute real-time dispatch intervals. Overall, conformances averaged approximately one to two percent of the total load in the CAISO balancing authority area. The data also indicate that EIM balancing authority areas conformed their respective load forecasts in the 15-minute market at a frequency ranging among EIM balancing authority areas from zero percent to 88 percent of the intervals, and from 27 to 74 percent of intervals in the five-minute market. CAISO states that overall, conformances generally averaged approximately one to four percent of an EIM entity's total load.[8] According to CAISO, the majority of conformances are for load and resource deviations.[9]

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[6] *Id.* at 4-5.

[7] *Id.* at 5. CAISO states that it collects relevant data regarding the frequency and magnitude of load conformance, the reason for the conformance, as well as any alternatives considered. CAISO's Department of Market Monitoring (DMM) reviews and evaluates this information and includes it in its public Quarterly Report of Market Issues and Performance. *Id.* at 7.

[8] *Id*. at 7 (citing CAISO Department of Market Monitoring, *Q2 2018 Report on Market Issues and Performance* (Aug. 2018), http://www.caiso.com/Documents/2018SecondQuarterReportonMarketIssuesandPerformance.pdf).

[9] *Id.* at 8.

9. While the CAISO tariff provides CAISO, and in some cases the EIM entity, authority to develop the load forecast, the practice of load conformance is not described in the tariff.

B. Load Conformance Limiter

10. According to CAISO, the balancing authority area operators' load conformance adjustments are often "coarse" in nature because they represent operators' imprecise approximation of what they perceive to be the system need at the time based on best estimates and judgement. CAISO states that operators also make coarse adjustments over multiple intervals to reach their targeted outcome, because it is not possible for operators to incrementally move the system to the precise load conformance target, either up or down, in each five- and 15-minute interval while simultaneously ensuring the load conformance does not exceed the available ramping capability in that interval.[10]

11. As a result of this coarseness, in 2012, CAISO adopted the use of a "load conformance limiter," which is an automated functionality that ensures the system operator-initiated conformance to load forecasts do not exceed the actual ramping capability available in a given interval of the real-time market. According to CAISO, the limiter assumes that if the system operator had been aware of the available ramping capability, the system operator would have refined the conformances to rely only on the amount of ramping capability necessary to meet the actual system conditions over a period. CAISO explains that the limiter is intended to ensure that the coarse adjustments do not cause a power balance constraint violation[11] in a given interval in which the coarse adjustment exceeds the ramping capability, but the supply is not needed in that interval.[12]

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[10] CAISO Filing at 8-10.

[11] If there are insufficient supply bids to clear forecasted demand, the market software relaxes the power balance constraint, setting the system marginal energy cost component of the market clearing price at the power balance relaxation penalty price of $1,000/MWh. *Id.* at 9.

[12] For example, an operator may conform the load forecast by 500 MW to correct for an observed system balance deviation to maintain compliance with NERC reliability standard BAL-001-2. The operator has 30 minutes to correct for the deviation under the NERC standard and makes the full 500 MW load conformance all at once because it is the most efficient way to make the correction (as opposed to trying to determine incremental ramp needed interval by interval). The market will then attempt to procure 500 MW in the next market run, even though the full 500 MW is not needed immediately for dispatch in the next five minute interval to address the reliability issue the operator is intending to resolve. CAISO explains that if 500 MW of ramping capacity is not available in that corresponding interval, the market solution would be infeasible and

Under CAISO's current practice, if the size of a load conformance is greater than the power balance infeasibility, the practical impact of the limiter triggering is that the market clearing price is set at the price of the last available economic bid rather than the $1,000/MWh power balance relaxation penalty parameter.[13] CAISO has observed shortcomings with its current limiter that it seeks to mitigate through the proposed enhanced limiter in this filing.[14] The load conformance limiter is not currently described in the CAISO tariff.

C. RUC Net Short Process

12. CAISO conducts the RUC process for the CAISO balancing authority area as part of the day-ahead market after it completes the integrated forward market. CAISO explains that it produces an hourly CAISO Forecast of CAISO Demand for the next day at the start of the day and uses that forecast for the RUC process. The RUC clears availability bids against the next day's hourly CAISO Forecast of CAISO Demand less the energy scheduled in the integrated forward market, and accounting for other factors, such as load forecast error, and estimated incremental real-time market bids including those from variable energy resources.[15]

13. The CAISO tariff specifies that CAISO may consider factors such as load forecast error and expected performance in considering the forecast and RUC procurement target. However, CAISO explains that its tariff does not specify how system operators will conform the forecast to incorporate such information. CAISO states that its operators may conform the hourly forecast when there is reason to believe that the forecast will not result in RUC committing sufficient capacity to meet system needs. In doing so, the system operator will employ what is referred to as the "RUC net short" process, which modifies the CAISO demand forecast to ensure sufficient capacity is procured to address anticipated real-time conditions. CAISO explains that, similar to the real-time load forecast conformance, operators consider current information on system conditions and

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trigger the power balance constraint when the operator did not intend to indicate an increase in the load forecast for that interval. *Id.* at 10.

[13] *Id.* at 8-10.

[14] *Id.* at 10-13.

[15] *Id.* at 13.

requirements to determine whether to deploy the RUC net short process and the magnitude of the conformance they make to the forecast to be used in the RUC.[16]

II. Filing

14. In the instant filing, CAISO proposes to describe in new CAISO tariff section 27.12.1 the load conforming practices that both CAISO and EIM operators currently perform for their respective balancing authority areas in the real-time market. CAISO also proposes new tariff section 27.12.2 describing the load conformance limiter functionality that CAISO applies only in the real-time market, and to enhance the logic of the limiter to improve the accuracy of when the limiter is triggered.[17] Finally, CAISO proposes new tariff section 31.5.3.1.1 to add detail regarding its practice of conforming the load forecast used in the "RUC net short" process to address imbalances in the day-ahead market. Each of these proposals is discussed in greater detail below. CAISO requests that the Commission accept the proposed tariff revisions effective February 27, 2019.

III. Notice and Responsive Pleadings

15. Notice of CAISO's filing was published in the *Federal Register*, 83 Fed. Reg. 64,820 (2018), with interventions and protests due on or before January 2, 2019. Timely motions to intervene were filed by PacifiCorp, Southern California Edison Company, Pacific Gas and Electric Company, the City of Santa Clara, California, and the Modesto Irrigation District. Timely motions to intervene and comments were filed by Nevada Power Company and Sierra Pacific Power Company (collectively, NV Energy), the Cities of Anaheim, Azusa, Banning, Colton, Pasadena, and Riverside, California (collectively, Six Cities), NRG Power Marketing LLC (NRG), Powerex Corp. (Powerex), and DMM.[18] On January 17, 2019, CAISO and Six Cities filed answers to protests. On January 23, 2019, NRG filed an answer to CAISO's answer.

[16] *Id.* at 13-14.

[17] As noted above, while the CAISO tariff provides CAISO, and in some cases the EIM entity, authority to develop the load forecast, neither the practice of load conformance nor the load conformance limiter are described in the tariff. *Id.* at 15.

[18] DMM submitted a corrected version of its comments on January 9, 2019.

IV. Discussion

A. Procedural Matters

16. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2018), the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.

17. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.213(a)(2) (2018), prohibits an answer to a protest unless otherwise ordered by the decisional authority. We will accept CAISO's, Six Cities', and NRG's answers because they have provided information that assisted us in our decision-making process.

B. Substantive Matters

18. CAISO proposes to revise its tariff to describe the load conforming practice in the real-time market and a similar practice in the RUC process of the day-ahead market, and to describe the functionality of its load conformance limiter tool. As discussed below, we accept CAISO's proposed tariff revisions, effective February 27, 2019, as requested.

1. Conformance of Load Forecasts in Real-Time Market

a. CAISO Proposal

19. CAISO proposes to describe in new tariff section 27.12.1 the load conforming practices that both CAISO and EIM operators currently perform for their respective balancing authority areas in the real-time market. The proposed revisions clarify that operators may conform the load forecast and identify the types of factors that system operators may consider when they have determined there is a need to conform the load forecast. Specifically, the proposed revisions provide that operators will consider factors such as variable energy resource deviations, weather changes, and Area Control Error adjustments. In addition, the proposed revisions provide that both CAISO and EIM operators will log all load conformances. CAISO emphasizes that load conformance is necessary to system operations because it is often the only tool operators can use quickly to ensure the market systems produce a reliable dispatch solution. CAISO asserts that these tariff changes will provide greater transparency for market participants into the manual actions operators must take to ensure the system is balanced and in compliance with NERC requirements.[19]

[19] CAISO Filing at 15-16.

b. Comments

20. Generally, commenters agree with CAISO that system operators should have the ability to manually adjust load forecasts in the real-time market to maintain reliability. Six Cities and NV Energy state that they support clarification of CAISO's tariff to specify CAISO's and EIM entities' authority to conform load forecasts in the real-time market through adjustments to the load forecast.[20] NV Energy asserts that the ability of CAISO and EIM entities to conform load is a vital tool to maintain reliable operations. According to NV Energy, while the EIM entity can issue a manual dispatch where necessary, it would be highly problematic if CAISO's model was trying to move generators in the opposite direction due to an inaccurate load forecast.[21] NV Energy states that, while every effort must be made to ensure the accuracy of CAISO's forecasts, the generator master file inputs, and the up-to-date conditions of the transmission system to ensure the optimization achieves an efficient dispatch, there will nonetheless be inaccuracies that must be accounted for through load conformance.[22]

21. NRG and Powerex agree that operators' use of load conformance is necessary to ensure the market solution reflects the most up-to-date information on grid conditions. However, Powerex contends that CAISO's ultimate goal should be to develop automated tools that ensure real-time grid conditions are accurately reflected in market processes to minimize the need for operator interventions like load conformance.[23] In addition, Powerex asserts that frequent and persistent load conformance may be masking systematic and material underlying market design and/or operational shortcomings that may be impairing the efficient operation of CAISO's real-time markets. Powerex notes that load conformances fall into predictable patterns, such as CAISO's large upward adjustments during the morning and evening hours when the need for ramping capability is greatest.[24] Powerex encourages CAISO to hold a stakeholder process focused on evaluating the underlying causes driving the frequent use of load conformances and

[20] Six Cities Comments at 1; NV Energy Comments at 1.

[21] *Id.* at 3-5.

[22] *Id.* at 6.

[23] Powerex Comments at 5.

[24] *Id.* at 6.

recommending improvements to reduce the magnitude and frequency of the conformances.[25]

c. Answers

22. In its answer, CAISO asserts that no commenters object to the description of load conformance practices in the real-time market and the RUC process that CAISO proposes to include in the tariff.[26] In response to Powerex's, DMM's, and NRG's comments, CAISO states that it identified in its filing market design enhancements and other measures to reduce the need for load conformance, and is also now considering additional changes not identified in the filing to reduce this need. CAISO asks that the Commission not prejudge the outcome of this effort or CAISO's stakeholder processes. CAISO states that it will be open with its stakeholders as it works to further develop these enhancements.[27] CAISO also notes that, although it believes the Commission should accept all three sets of tariff provisions, the three sets are distinct and severable from each other. Accordingly, CAISO asserts that the Commission should consider each set of tariff provisions on their individual merit.[28]

23. Six Cities states that load conformance is a practice commonly used by balancing authority area operators to help maintain system balance in response to changing system conditions. Six Cities notes that load conformance adjustments do not merely correct for errors in load forecasts or sudden changes in system load; they are also used to respond to a variety of changes in system conditions relating to resource deviations, transmission outages, or other events that affect not just system load but also the interval-to-interval balance between system load and system resources.[29]

d. Commission Determination

24. We accept CAISO's proposed tariff section 27.12.1, which describes the load conformance practices performed by CAISO and EIM entity operators for their respective balancing authority areas. We find that operators in the CAISO and EIM entity balancing authority areas should have the ability to manually adjust load forecasts in the real-time market when necessary to maintain system reliability and keep the system

[25] *Id.* at 9.

[26] CAISO Answer at 3.

[27] *Id.* at 4-6.

[28] *Id.* at 2 n.3.

[29] Six Cities Answer at 4.

in balance. We agree with CAISO's assessment that in many situations where operators are observing rapid changes to system conditions, internalizing the needed changes in commitment and dispatch to the market is preferable to manual dispatches after the market solution is produced. Through load conformance, system operators are able to quickly address reliability concerns, reducing manual dispatches and associated uplift payments. We also find that CAISO's proposed tariff provisions provide beneficial transparency to stakeholders regarding CAISO's load conformance practices.

2. Establishing Load Conformance Limiter in Tariff

a. CAISO Proposal

25. CAISO proposes to add new tariff section 27.12.2, describing the load conformance limiter functionality that CAISO applies in the real-time market, and to enhance the logic of the limiter to improve the accuracy of when the limiter is triggered. As explained above, the limiter is an automated functionality that ensures the system operator-initiated conformance to load forecasts do not exceed the actual ramping capability available in a given interval of the real-time market. CAISO explains that the intent of the limiter is to enable the market to solve without relaxing the power balance constraint when an operator did not intend to indicate an actual increase in load forecast for that interval.[30]

26. Previously, the limiter was triggered based on the amount of load conformance in a given interval. Now, CAISO proposes to trigger the limiter only in response to certain load conformance adjustments.[31] Specifically, the proposed limiter will consider the magnitude of the load conformance change between the current and previous market interval as compared to the amount of power balance constraint infeasibility in a given interval. In addition, the limiter will identify whether a power balance constraint infeasibility in the current interval resulted from a load conformance change in a previous interval, or whether it resulted from a power balance infeasibility in a previous interval and not due to a load conformance change. In the latter case, the enhanced logic will not trigger the limiter. CAISO asserts that the enhanced logic of the limiter should more effectively prevent load conformance practices from triggering shortage pricing where there is likely no shortage, but allow shortage pricing to trigger where potential shortage conditions exist.[32]

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[30] CAISO Filing at 10.

[31] *Id.* at 16.

[32] While CAISO and commenters use the terms "shortage" and "scarcity" to refer to a shortage of energy in a real-time market interval, this order uses the term "shortage"

27. CAISO recognizes the load conformance limiter is needed in large part because of the limitations system operators have in conforming the load forecast precisely during the operating period. CAISO explains that over the past several years, it has worked to improve the tools available to operators and provide better situational awareness and the ability to conform load in a more targeted, precise, and timely manner. CAISO asserts that it will continue pursuing market design changes and other measures to improve the quality of load conformance or reduce the need for the manual imbalance conformance performed by operators. Once CAISO implements these improvements, it expects the load forecast conformances will be less coarse in nature and it will diminish the need for the conformance limiter. Therefore, CAISO explains that it is pursuing a number of improvements[33] and intends to disable the conformance limiter feature in the real-time market in approximately two years.[34]

28. CAISO asserts that the tariff revisions do not change its compliance with Order No. 825,[35] which required regional transmission organizations (RTOs) and independent system operators (ISOs) to trigger shortage pricing for any interval in which a shortage of energy or operating reserves is indicated. CAISO contends that, as required by Order No. 825, its market systems immediately trigger shortage pricing for any interval in which there is a shortage of energy or operating reserves. CAISO states that it recognizes that changes made to the load forecast can increase or decrease demands on the system and thus impact prices. CAISO asserts that a faulty load forecast conformance can cause false shortages or prevent prices from reflecting scarce conditions. According to CAISO, the limiter can reduce the occurrences of faulty load forecast conformance. CAISO asserts that both the conformance and the limiter are necessary to ensure the market recognizes actual system conditions accurately and produces a reliable and feasible set of dispatches and commitments. CAISO states that once the inputs are included in the

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consistent with Order No. 825. *See Settlement Intervals and Shortage Pricing in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 825, 155 FERC ¶ 61,267 (2016).

[33] These include improving real-time forecasting of renewable resources, implementation of a 15-minute day-ahead market, improvements in the flexible ramping product, development of an automated conformance tool, and development of a tool that approximates ramping capacity available for each CAISO market run. CAISO Filing at 22.

[34] *Id.* at 21, 23.

[35] Order No. 825, 155 FERC ¶ 61,267 at P 162.

market clearing process, CAISO does not prevent shortage pricing from being triggered.[36]

b. Comments

29. Six Cities and NV Energy support CAISO's proposal to enhance the functionality of the load conformance limiter mechanism. According to Six Cities, the proposed enhancements to the limiter functionality will improve the accuracy of the limiter. Six Cities note the market design enhancements that CAISO plans to consider and perhaps implement over the next two years, and support further consideration and development of these enhancements. However, Six Cities note that many of these enhancements are in the conceptual development stage, and it remains to be seen whether the enhancements will actually be implemented and, if they are, whether they will function as expected and make the limiter unnecessary. Accordingly, Six Cities state that the limiter should remain in place until there is a demonstration, based on empirical data, that the conformance limiter is no longer needed to prevent artificial price spikes.[37] NV Energy states that it particularly supports CAISO's proposal to conduct a stakeholder process in approximately two years to review whether disabling the load conformance limiter is just and reasonable.[38]

30. DMM supports CAISO's proposed enhancements to the limiter as an improvement over CAISO's current approach. DMM states that CAISO's proposed enhancements will significantly reduce the intervals in which the limiter is triggered, and that the proposed limiter is likely to reduce the frequency in which the limiter is triggered when the power balance constraint is relaxed due to excessive manual adjustments rather than by actual shortages of ramping capacity.[39] DMM also notes that under current market conditions, the load conformance limiter will not have a significant impact on average prices in CAISO with or without the proposed changes. DMM explains that this is because in most intervals when the limiter is triggered, the highest priced bids dispatched are currently at or near the $1,000/MWh bid cap, so that the resulting price would often be very similar with or without the limiter. In contrast, DMM states that the proposed changes to the limiter may have a significant impact on prices in two EIM balancing areas. Specifically, if the limiter had been in place during 2018, DMM asserts that average prices in the Arizona Public Service area would have increased by almost

[36] CAISO Filing at 19-20.

[37] Six Cities Comments at 1-3.

[38] NV Energy Comments at 6-7.

[39] DMM Revised Comments at 2-3.

$4/MWh (11 percent) in the 15-minute market and $5/MWh (14 percent) in the five-minute market. In the NV Energy area, average prices would have increased by around $2/MWh (six percent) in the 15-minute market and almost $3/MWh (eight percent) in the five-minute market. DMM states that the impact on prices in other EIM areas would have been minimal.[40]

31. DMM also notes that the proposed changes to the limiter could have a significant impact on prices when CAISO raises the penalty prices for supply insufficiencies and the energy bid cap applied to qualifying resources to $2,000/MWh pursuant to Order No. 831.[41] DMM states that, to mitigate this potential price impact, it had recommended that CAISO seek to reduce the need for operators to conform load in the real-time market, particularly in the very predictable ramping pattern in which adjustments have been made in recent years.[42] DMM also notes that the average load adjustment in the hour-ahead and 15-minute markets decreased by about 70 MW in 2018.[43]

32. NRG and Powerex both claim that the limiter runs counter to the Commission's price formation objectives by preventing shortages from triggering shortage pricing where an operator adjustment exposes a supply shortage in the market.[44] First, according to NRG, the limiter violates Order No. 825, which requires that (1) "… each regional transmission organization and independent system operator trigger shortage pricing for any interval in which a shortage of energy or operating reserves is indicated during the pricing of resources for that interval" and (2) that shortage pricing be triggered during a shortage "…regardless of the duration or cause of [the] shortage."[45] NRG asserts that the limiter acts contrary to these requirements, because the operator's *ex ante* conformance actions are taken during the time that price formation takes place (e.g., in advance of the relevant interval).[46] Further, NRG contends, Order No. 825 mandates that shortage

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[40] *Id.* at 3.

[41] *Offer Caps in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Order No. 831, 157 FERC ¶ 61,115, at P 77 (2016).

[42] DMM Revised Comments at 4, 12.

[43] *Id.* at 12.

[44] NRG Comments at 5; Powerex Comments at 10.

[45] NRG notes that CAISO did not include the limiter in its Order No. 825 compliance filing.

[46] NRG Comments at 6.

pricing apply to any shortage regardless of the cause or duration of the shortage. While CAISO asserts that its markets trigger shortage pricing where there are inadequate supplies of energy and ancillary services to clear forecasted demand, NRG reiterates that the limiter suppresses shortage pricing when the shortage is caused by an operator forecast adjustment that overrides the automated load forecast.[47]

33. Similarly, Powerex argues that if an operator adjustment makes the load forecast more accurate, and exposes shortages in the market in doing so, there is no justification for the limiter to prevent the application of shortage pricing. Powerex explains that the limiter enables an operator to exhaust all available supply, while limiting it just enough to prevent it from exceeding the available resources offered in the market even if the forecast adjustment resulted in a more accurate forecast of system needs. Regardless of whether the shortage is exposed through automated load forecasts or operator adjustments, Powerex and NRG assert that Commission policy requires shortage pricing to be applied.[48] NRG further asserts that it is irrelevant that CAISO operators do not know how much ramping capability is available, because the operator is conforming the load forecast to reflect what he or she believes is necessary to achieve reliable operations.[49] Moreover, NRG claims that CAISO's argument that the limiter mimics what the operator would do if he or she was aware of available ramping capability contradicts CAISO's assertion that the operator does not consider whether their actions affect prices. Further, NRG argues that that the need to apply conformances over multiple intervals does not justify the price-suppressing effects of the limiter. Likewise, Powerex argues there is no basis to conclude that the limiter is needed to prevent conformances from undermining efficient dispatch or pricing.[50]

34. In support of the argument that the limiter suppresses prices, NRG references CAISO's Market Surveillance Committee's report which found that the limiter reduced real-time power prices by approximately $5/MWh during a three month period in 2016.[51] NRG explains that this price suppression improperly blunts price signals regarding the value of real-time response capability that would promote the deployment of resources to

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[47] *Id.* at 7.

[48] Powerex Comments at 11; NRG Comments at 15.

[49] For example, NRG contends, an operator adjustment of 500 MW when only 300 MW of ramping capability is available does not make the 500 MW adjustment wrong or in need of correction by the limiter.

[50] Powerex Comments at 12.

[51] NRG Comments at 2.

address real-time ramping challenges.[52] Likewise, Powerex contends that the limiter mutes the short and long-term price signals for the deployment of resources needed to maintain reliability. According to Powerex, artificially suppressing prices during periods where flexible capacity is most needed reduces the incentive for flexible resources to be available to meet CAISO's operational needs.[53]

35. NRG states that the neither the fact that the limiter has been in effect since 2012 without tariff authority nor the fact that CAISO has purportedly improved the limiter render the limiter just and reasonable. Further, NRG contends that neither the promise of a future stakeholder process to disable the limiter nor CAISO's stated intention to disable the limiter support a finding that the limiter is just and reasonable. NRG thus requests that the Commission immediately order CAISO to disable the limiter, allowing the power balance constraint penalty to be triggered by operator actions warranted by real-time conditions.[54]

36. Powerex states that it is not opposed to CAISO modifying its tariff to include the limiter, but asks the Commission to accept CAISO's proposal on the condition that (1) CAISO eliminate the limiter in no more than two years; and (2) CAISO submit reports showing its progress toward eliminating the limiter and information on how frequently the limiter is applied and how it affects market prices.[55]

c. Answers

37. In response to protests, CAISO asserts that the load conformance limiter automatically performs the necessary function of ensuring that system operator-initiated load forecast conformances that enter the market optimization do not exceed the actual market ramping capability and are consistent with actual system needs. According to CAISO, the limiter is necessary because it is not possible for operators to perfectly estimate and be perfectly aware of the available ramping capability of the system when inputting the conformance. CAISO explains that operators are limited in their ability to ramp in their conformances across multiple market intervals.[56]

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[52] *Id.* at 8.

[53] Powerex Comments at 13.

[54] NRG Comments at 5.

[55] Powerex Comments at 14.

[56] CAISO Answer at 6.

38. CAISO and Six Cities both assert that NRG ignores the fact that not all system operator-initiated conformances in fact convey shortage conditions, explaining that some load conformance occurs during intervals with no shortages because of the limitations system operators face when implementing a load conformance.[57] CAISO contends that there is no basis for allowing shortage pricing when in fact there are no shortages, and no Commission order requires such an outcome because it would be unjust and unreasonable.[58] CAISO also argues that the limiter is not configured to suppress prices, pointing out that the limiter may limit load conformance in either the positive or negative direction, which may result in higher or lower prices than anticipated. It also explains that CAISO and stakeholders have concluded that CAISO should focus efforts on improving the accuracy of the inputs that go into the market, so CAISO proposes to deactivate the limiter in two years. However, CAISO asserts that the two years are necessary to develop and implement the necessary tools and market enhancements to ensure that market inputs are accurate and tailored to system needs.[59]

39. CAISO also refutes NRG's assertion that the load conformance limiter violates Order No. 825. CAISO explains that, under either its current market design or the proposal to modify the limiter in this filing, once the market systems observe a shortage of energy or ancillary services in a particular interval, the market systems trigger shortage pricing. According to CAISO, the limiter targets whether the manual potentially coarse load conformance is in all cases necessary to maintain system reliability in that interval. CAISO contends that there is nothing in Order No. 825 that requires the trigger of shortage pricing when a system operator implements a load conformance but no shortage exists based on the actual conditions at the time. Moreover, CAISO asserts that it is not just and reasonable to require that a load forecast conformance that does not actually represent a shortage on the system trigger shortage pricing. On the other hand, CAISO argues, it is just and reasonable to ensure that load conformances that affect the market outcome are limited to those that are actually necessary to manage the system reliably.[60]

40. CAISO agrees with intervenors that it is necessary to decrease the degree to which system operators must rely on load forecast conformances in order to achieve a reliable market dispatch, and it has already committed to improve the information and tools its operators use. CAISO states that there is no need for periodic reports to the Commission on CAISO's progress on eliminating the limiter because CAISO is already conducting an

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[57] *Id.* at 7; Six Cities Answer at 5-6.

[58] CAISO Answer at 7.

[59] *Id.* at 7-9.

[60] *Id.* at 9-10.

open and transparent stakeholder process. CAISO states that it and DMM will also continue to report on the nature of load conformances and the degree to which operators trigger the use of the load conformance limiter.[61]

41. According to CAISO, there is no evidence that the load conformance limiter has had the effect of suppressing price signals and adversely affecting the CAISO market. CAISO contends that DMM's data suggest the load conformance limiter does not have a significant effect on prices. According to CAISO, there is no reason to believe that the existing high priced bids will disappear soon. Therefore, CAISO explains, even if the load conformance limiter were to act to remove the effect of a load conformance when there actually was a shortage, the market is likely to yield a strong price signal because of the continuous presence of resources with bids at or near the bid caps. CAISO also states that the proposed load conformance limiter is likely to trigger much less frequently than the load conformance limiter as currently configured.[62] Six Cities contend that if the administrative penalty price is increased to $2,000/MWh as required by Order No. 831, it will be even more critical that (1) the load conformance limiter remain available to minimize circumstances where excessive load conformance adjustments cause implementation of penalty pricing when resource shortages do not actually exist, and (2) the limiter be applied as accurately as possible so as to allow the application of penalty pricing when resource shortages exist in fact. According to Six Cities, continued application of the limiter as modified in this filing strikes the appropriate balance between the potential adverse consequences of either over-applying or under-applying penalty pricing.[63]

42. Finally, CAISO and Six Cities both contend that CAISO has not violated the FPA by using the existing load conformance limiter without Commission authorization.[64] CAISO contends that it has authority to formulate the CAISO Forecast of CAISO Demand under the CAISO tariff, because the tariff simply states that this forecast is the forecast CAISO produces. Similarly, they argue, EIM entities also may formulate their own load forecasts. CAISO asserts that the load forecast conformance and the limitations posed on conformances by the limiter are all part of CAISO and EIM entities' efforts to run the market with a load forecast that best represents system conditions and needs while avoiding the potential for coarse manual actions from inaccurately influencing system conditions. CAISO states that it has openly discussed both load conformances and the

[61] *Id.* at 11.

[62] *Id.* at 11-14.

[63] Six Cities Answer at 9.

[64] CAISO Answer at 15; Six Cities Answer at 7.

existence of the limiter with market participants and the Commission, and when it identified necessary changes through its stakeholder process, it submitted the instant filing to propose those revisions.[65]

43. In response to CAISO's answer, NRG asserts that CAISO's statement that the limiter ensures that system operator-initiated load conformances that enter the market optimization do not exceed actual market ramping capability and "are consistent with actual system needs" is misleading.[66] According to NRG, operators make the load conformance prior to the operating interval because they believe the adjustment is required to better reflect system conditions and ensure reliable operations. However, given that system needs are forecast and not actually known at the time of the limiter's conformance-correcting actions, NRG claims that CAISO's assertion that the limiter ensures that load conformances are consistent with actual system needs does not make sense.[67] Next, NRG asserts that it did not claim that load conformances in and of themselves demonstrate shortages; rather, NRG asserts that when a conformance does create a shortage, shortage pricing should result. NRG also claims that CAISO's assertion that the limiter does not violate Order No. 825 ignores the plain language of that order.[68] Finally, NRG claims that CAISO seems to imply that because market participants will continue to submit high-priced bids, this is a dependable surrogate for shortage pricing. NRG contends that proper shortage pricing should not depend on the likelihood that high bid prices will somehow ensure it.[69]

d. Commission Determination

44. We accept CAISO's proposed tariff section 27.12.2, which describes the proposed load conformance limiter functionality. We find that the proposed limiter will act to limit the application of shortage pricing during intervals where CAISO's market run indicates a shortage resulting from load conformance where actual supply is not needed. We find that use of the limiter is acceptable in this circumstance, because it will ensure that a coarse load conformance does not exceed the actual market ramping capability during an interval where the supply is not needed. Without the limiter, the power balance constraint would be relaxed during intervals where the supply is not needed,

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[65] CAISO Answer at 15-16.

[66] NRG Answer at 2 (quoting CAISO Answer at 6).

[67] *Id.* at 3.

[68] *Id.* at 5.

[69] *Id.* at 6.

inappropriately applying shortage pricing of up to $1,000/MWh. We therefore find that the proposed limiter is a reasonable mechanism to ensure that shortage pricing is not triggered when there is no actual shortage condition on the system.

45. We also find arguments that the proposed limiter violates Order No. 825 unavailing. Order No. 825 requires RTOs and ISOs to trigger shortage pricing for any interval in which a shortage of energy or operating reserves is indicated during the pricing of resources for that interval.[70] Order No. 825 did not specifically address the scenario at issue here, where the coarse nature of load conformance may inaccurately indicate a shortage. In this scenario, CAISO's limiter would apply where a shortage does not actually exist. We find that Order No. 825 does not require shortage pricing in such a scenario. The proposed limiter is intended to detect intervals in which a shortage would be indicated due to an imprecise load conformance, but, in which supply is not actually needed. Because the limiter should not apply during intervals where an actual shortage of supply exists, and thus shortage pricing would trigger, we find that CAISO's proposal is not in violation of Order No. 825.

46. NRG claims that the limiter is unnecessary to correct conformances, because the conformances are made to better reflect system conditions and ensure reliable operations. We disagree that the proposed limiter here is unnecessary to correct conformances and find that the limiter is a reasonable mechanism to utilize, given that operators cannot fine tune their conformances to the precise amount of adjustment needed interval to interval. If additional supply is not actually needed for a given interval, it would not make sense for an operator to intentionally signal to the market that the full quantity of additional supply is needed—regardless of pricing impacts. NRG also contends that the limiter suppresses the pricing impact of an action taken by a CAISO operator to maintain reliability by deeming that the amount of supply available to CAISO is sufficient to address actual system need, when the actual system need is not known when the limiter acts. We also find this concern unavailing as the limiter seeks to limit the operator's conformance to the available ramping capability in instances where the full conformance is not needed immediately. In other words, the limiter ensures that the conformance is consistent with actual system needs and does not send a signal that there is a supply shortage in a given interval where shortage conditions do not exist. On the other hand, when a power balance infeasibility observed in the current interval is greater than the change in load conformance between the current and prior interval, the limiter will not apply, thus allowing the triggering of shortage pricing.

47. While we accept CAISO's proposal to use the load conformance limiter, we understand commenters' assertions that CAISO should reduce its reliance on load conformances, and by association the use of the limiter. We note that CAISO has committed to undertaking several initiatives to reduce the need for such conformances

[70] Order No. 825, 155 FERC ¶ 61,276 at P 162.

and has stated its intention to disable the limiter in two years after making the necessary market design and process improvements. We will not require CAISO to report on its progress toward eliminating the limiter, as CAISO and the DMM already report on load conformance actions and the frequency with which the limiter is applied, pursuant to another Commission order.[71] Finally, while we decline to adopt Powerex's request that we accept CAISO's proposal subject to the condition that the limiter must be disabled in two years, we expect that CAISO will follow through on its commitment to adopt improvements that will reduce operators' reliance on load conformances. We expect that such improvements would ultimately allow for the elimination of the limiter at the appropriate time.

3. RUC Net Short Process

a. CAISO Proposal

48. CAISO also proposes tariff revisions to add detail regarding its practice of conforming the load forecast used in the RUC process for the day-ahead market. CAISO explains that the process its system operators follow to determine whether they must conform the CAISO Forecast of CAISO Demand so the RUC procures additional capacity needed to meet real-time system conditions is very similar to the load conformance process in the real-time market, described above. After the integrated forward market runs, the operator may employ the RUC net short process to conform the load forecast to procure additional capacity to better reflect anticipated system conditions. CAISO asserts that it has the authority to set the CAISO Forecast of CAISO Demand as it deems appropriate and therefore already has the authority to conform it as necessary.[72] CAISO proposes to revise the tariff to add a new section 31.5.3.1.1 clarifying that it may conform the load forecast used in the RUC process to reflect the kind of conditions CAISO system operators consider in conforming the forecast.[73] The proposed tariff provides that operators could consider, among other things, fires that threaten transmission lines or corridors, load forecast error, and generator outages that will result in a different supply availability than was bid into the day-ahead market.

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[71] *See California Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,305, at P 129 (2015). While the Commission's previous directives pertained to load conformance specifically in the EIM entities' balancing authority areas, DMM also analyzes conformances and associated impacts in the CAISO balancing authority area in its public quarterly reports.

[72] CAISO Filing at 20.

[73] *Id.* at 20-21.

b. Comments

49. Six Cities support CAISO's proposal to specify in the tariff its authority to conform load forecasts in the day-ahead market through the RUC net short process.[74]

c. Commission Determination

50. We accept CAISO's proposed tariff section 31.5.3.1.1, which clarifies that CAISO may conform the load forecast used in the RUC process and describes the kind of conditions CAISO system operators may consider in conforming the load forecast. We find that it is reasonable for CAISO operators to conform the load forecast used in the RUC process to ensure the RUC process commits sufficient capacity to meet system needs. While the existing tariff already provides CAISO discretion to adjust the load forecast to account for load forecast error, among other things, the proposed provisions will provide greater specificity regarding when operators may conform the load forecast used in the RUC process.

The Commission orders:

CAISO's tariff revisions are hereby accepted, as discussed in the body of this order.

By the Commission.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

[74] Six Cities Comments at 1.