143 FERC ¶ 61,110
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Jon Wellinghoff, Chairman;
Philip D. Moeller, John R. Norris,
Cheryl A. LaFleur, and Tony Clark.

California Independent System Operator Corporation Docket No. ER13-1060-000

ORDER ON TARIFF REVISIONS

(Issued May 9, 2013)

1. On March 8, 2013, the California Independent System Operator Corporation (CAISO) filed revisions to its open access transmission tariff (Tariff). CAISO proposes to reduce the net redispatch cost that would trigger the transmission constraint relaxation parameter[1] in the scheduling run process in CAISO's real-time market from $5,000 per megawatt-hour (MWh) to $1,500 per MWh. According to CAISO, this change is necessary to arrive at a more efficient market solution that reliably relieves congestion at a reasonable cost. In this order, the Commission accepts CAISO's proposed tariff revisions, effective May 10, 2013, as requested.

I. Background

2. CAISO operates day-ahead and real-time integrated markets for energy, ancillary services and residual unit commitment. CAISO's markets are designed to balance energy supply and demand and to procure ancillary services, all while subject to certain constraints (transmission line limits, generator ramp rates, system energy balance, etc.). The market design relies primarily on economic supply and demand bids to set applicable dispatch levels and market prices. However, relying exclusively on economic bids may lead to ineffective dispatch results and very high real-time congestion offset costs in the presence of real-time congestion.[2] As a result, CAISO has adopted a number of operating

[1] As discussed in greater detail below, the transmission relaxation parameter represents the congestion cost above which CAISO's market software will begin to relax an internal transmission constraint (or increase transfer capability) in order to avoid ineffective but costly market solutions. CAISO March 8, 2013 Filing at 1, 6.

[2] In order to relieve real-time constraints that were not accurately forecasted in the day-ahead market, CAISO must redispatch generation. The congestion offset cost is the

parameters that limit these undesirable outcomes by not enforcing certain transmission constraints when congestion costs of such constraints exceed the relevant relaxation parameter.[3] In particular, when the cost of redispatch of economic bids to relieve an internal transmission constraint (i.e., the congestion cost of the constraint) exceeds the transmission relaxation parameter, currently set at $5000/MWh, CAISO's market software will allow that transmission constraint to be relaxed, reflecting a cost equal to the transmission relaxation parameter, rather than strictly enforcing the constraint and relying exclusively on increasingly more expensive economic dispatches.

3. CAISO's real-time market execution includes two optimization runs: a scheduling run and a pricing run. The scheduling run attempts to find an optimal dispatch solution using economic bids within established parameters, but will relax constraints (as described above) and adjust self-schedules if necessary to ensure optimal solutions. After the scheduling run, CAISO conducts a pricing run that modifies constraint limits based on information from the scheduling run and establishes prices based on the submitted economic bids, taking the transmission constraint relaxation parameter into account.

II. CAISO's Filing

4. The instant filing seeks to revise only the real-time scheduling run transmission constraint relaxation parameter. No changes to the day-ahead parameters or the real-time pricing run parameters are proposed.

5. CAISO proposes to reduce the real-time transmission relaxation parameter from $5,000/MWh to $1,500/MWh, in order to mitigate extremely high congestion offset costs resulting from the existing mechanism. According to CAISO, dramatic increases in real-time congestion offset costs occurred in CAISO's real-time market in the summer and fall of 2012.[4] In order to relieve real-time constraints that were not accurately forecasted

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difference between CAISO's real-time congestion payments to generators following redispatch and the corresponding real-time congestion charges to load and exports.

[3] *See generally Cal. Indep. Sys. Operator Corp.*, 126 FERC ¶ 61,147 (2009) (February 2009 Order) (accepting CAISO's tariff revisions adopting for the first time transmission constraint relaxation parameters to replace the prior tariff provisions that required exhaustion of all economic bids before relaxing a transmission constraint).

[4] CAISO March 8, 2013 Filing at 1. CAISO states that congestion offset costs traditionally averaged approximately $5 million per month, and never exceeded $10 million. However, in July 2012, it increased to $25 million, and peaked at approximately $55 million in August 2012. Figure 1 in CAISO's transmittal letter shows a period of increased congestion offset costs, relative to historical averages, spanning from July 2012 to November 2012. While subsequent months have remained more

in the day-ahead market, CAISO must redispatch generation. As stated earlier, the congestion offset cost is the difference between CAISO's real-time congestion payments to generators following redispatch and the corresponding real-time congestion charges to load and exports. CAISO explains that a number of factors may have caused these differences between the day-ahead and real-time market forecasts, including changes in system operational conditions, for example, lack of coordinated outages or wildfires that occur throughout California.[5] Congestion offset costs become excessive because, when congestion is caused by differences between the day-ahead market and the real-time market, energy supply cost increases upon redispatch even if energy demand has remained constant.[6]

6. In response to increased congestion offset costs, CAISO evaluated the impact of lowering the transmission constraint relaxation parameter used in the scheduling run in the real-time market through a number of sensitivity analyses. CAISO performed these sensitivity analyses to evaluate the ability of the market to produce market solutions that sufficiently address congestion in real-time.[7] CAISO studied 97 real-time market intervals (out of a possible 2,400), covering 74 of the 91 most binding transmission constraints that occurred between January 2012 and December 2012.[8] CAISO indicates that the sensitivity analyses "confirmed that the $5,000 parameter did not provide a market solution that was more effective at relieving the transmission constraints than if the parameter had been set at a lower level."[9] CAISO determined that the $1,500/MWh transmission constraint relaxation parameter provided similar amounts of congestion relief in the market model as the $5,000/MWh parameter, and resulted in as much as a 36 percent reduction in real-time congestion offset costs.[10]

7. The sensitivity analyses showed that when the transmission constraint relaxation parameter was reduced from $5,000/MWh to $1,500/MWh, constraint relaxation generally resulted in increased flows in the market model on a constrained transmission

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tempered than those observed in July and August of 2012, CAISO states that those costs were still much higher than historical costs.

[5] CAISO March 8, 2013 Filing Attachment C – Exh. ISO-1, Testimony of Mark A. Rothleder at 28-29 (Rothleder Testimony).

[6] CAISO March 8, 2013 Filing at 8.

[7] *Id*. at 13.

[8] Rothleder Testimony at 46-47.

[9] *Id.* at 47-48.

[10] CAISO March 8, 2013 Filing at 14; Rothleder Testimony at 53-55.

line of only up to five percent, and the bulk of the intervals studied ranged from zero percent to three percent.[11] However, there were ten outlier intervals in which market model flows on a transmission constraint increased from six percent to as much as approximately 37 percent.[12] CAISO explains that these ten outliers were due to a number of factors,[13] and asserts that these ten outlier intervals do not suggest that the higher parameter setting yielded greater congestion relief. Rather, CAISO states, the greater congestion relief was achieved through out-of-market solutions that would have occurred regardless of the parameter setting.[14]

III. Notice and Responsive Pleadings

8. Notice of CAISO's filing was published in the *Federal Register*, 78 Fed. Reg. 16,262 (2013), with interventions or protests due on or before March 29, 2013. Timely motions to intervene were filed by Powerex Corp.; the City of Santa Clara, California and the M-S-R Public Power Agency; the Modesto Irrigation District; J.P. Morgan Ventures Energy Corporation; and the NRG Companies. The Cities of Anaheim, Azusa, Banning, Colton, Pasadena and Riverside, California (Six Cities), the California Municipal Utilities Association (CMUA), the Northern California Power Agency (NCPA), the California Department of Water Resources State Water Project, and Southern California Edison Company (SoCal Edison) filed timely motions to intervene and comments.

9. The Western Power Trading Forum (WPTF) filed a timely motion to intervene and protest. CAISO filed a motion for leave to answer and answer.

IV. Discussion

A. Procedural Matters

10. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 385.214 (2012), the timely, unopposed motions to intervene serve to make the entities that filed them parties to this proceeding.

11. Rule 213(a)(2) of the Commission's Rules of Practice and Procedure, 18 C.F.R. § 213(a)(2) (2012), prohibits an answer to a protest unless otherwise ordered by the decisional authority. We will accept CAISO's answer because it provided information that assisted us in our decision-making process.

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[11] Rothleder Testimony at 48.

[12] *See id.* at 48-51.

[13] *Id.* at 51.

[14] *See* CAISO March 8, 2013 Filing at 14.

B. Substantive Matters

1. Comments

12. All of the substantive comments, save WPTF's, support CAISO's proposal to reduce its real-time transmission constraint relaxation parameter from $5,000/MWh to $1,500/MWh, and ask that the Commission accept the instant filing. Generally, the comments from these load-serving entities agree that while there is considerable debate as to the causes of increased real-time congestion offset costs, lowering the transmission constraint relaxation parameter is an effective measure to help dampen sharp increases of such costs. A number of the comments point out that, as the entities being charged these uplift costs, continuing to pay generators for redispatch, when redispatch is largely ineffective, is unreasonable. While some comments acknowledge that there are legitimate reasons for congestion offset costs, the comments largely agree that reducing the real-time transmission constraint relaxation parameter from $5,000/MWh to $1,500/MWh will reduce unnecessary costs associated with transmission congestion redispatch. The comments highlight a 36 percent reduction in congestion offset cost under the $1,500/MWh transmission constraint relaxation parameter with only marginally less congestion relief when compared with the $5,000/MWh parameter. The comments therefore urge the Commission to accept the $1,500/MWh parameter as a just and reasonable measure to curb exorbitant and unnecessary congestion offset costs.

13. Despite broadly supporting CAISO's filing, the comments agree, to a large extent, that the proposed $1,500/MWh transmission constraint relaxation parameter is merely a stop-gap measure, and not a long-term solution for increased congestion offset costs. Rather, many of the parties state that assessing other long-term measures is necessary in addition to adopting a lower real-time transmission constraint relaxation parameter.[15] Specifically, some comments point to convergence bidding as a major factor frustrating CAISO's management of the real-time market as it relates to transmission constraints and

[15] *See, e.g.*, Six Cities March 29, 2013 Comments at 4 ("The Six Cities therefore appreciate the CAISO's commitment to evaluate the viability of additional measures that may have the effect of mitigating [real-time congestion offset] costs."); NCPA March 29, 2013 Comments at 5 ("NCPA acknowledges that CAISO is making efforts to address the underlying issues of real-time congestion. And more work is certainly needed. NCPA supports CAISO's longer-term efforts to improve real-time congestion management, but those efforts do not reduce the need for this short-term solution."); SoCal Edison March 29, 2013 Comments at 8 ("According to the CAISO, real-time markets *prices* are 'unjustifiable,' 'unnecessary,' and 'no longer reasonable.' SoCal Edison agrees. Addressing the parameter price is a necessary immediate fix. However, this fix alone is not *sufficient* to address the extreme *costs* resulting from the real-time market.").

congestion.[16] SoCal Edison provides an analysis as to how convergence bidding inappropriately affects the real-time market and contributes to congestion offset uplift costs.[17] SoCal Edison goes so far as to urge the Commission to order CAISO to address the problems identified with convergence bidding in this proceeding.[18]

2. WPTF's Protest

14. In its protest, WPTF makes four principal arguments in opposing CAISO's plan to revise the real-time transmission constraint relaxation parameter. First, WPTF states that CAISO has conceded that congestion events on its grid are due, in part, to specific operational situations, such as resource outages, wildfires, and the need to coordinate reliability measures with neighboring balancing authority areas.[19] WPTF implies that reducing the transmission constraint relaxation parameter in the real-time market should only be driven by concerns with market power, or suspicion of illegitimate bidding behavior, neither of which, WPTF asserts, CAISO has suggested.[20] WPTF argues that CAISO's rationale for moving further away from market-based solutions for congestion management, which WPTF argues will increase out-of-market solutions (i.e., exceptional dispatch), is solely to reduce CAISO's redispatch costs, not to resolve core operational challenges.

15. Second, WPTF asserts that CAISO's optimization software implements a package of related parameters for utilizing economic bids in redispatching resources to resolve transmission constraints that the Commission deemed just and reasonable in a prior order.[21] WPTF contends that the transmission constraint relaxation parameter provides a check, in addition to the two percent minimum effectiveness threshold and the bid cap,[22]

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[16] *See*, *e.g.*, Six Cities March 29, 2013 Comments at 4; CMUA March 29, 2013 Comments at 4; SoCal Edison March 29, 2013 Comments at 9.

[17] *See* SoCal Edison March 29, 2013 Comments at 10-14.

[18] *See id.* at 15 ("Specifically, the Commission should Order the CAISO to conduct an expedited stakeholder process on this issue and reply with a proposed solution within 3 months.").

[19] WPTF March 29, 2013 Protest at 4-5.

[20] *Id.* at 5.

[21] *Id.* at 4, 5 (citing February 2009 Order, 126 FERC ¶ 61,147).

[22] The bid cap limits the most that a participant may bid into the market to be paid for redispatch. CAISO's bid cap is currently set at $1,000/MWh. Effectiveness of economic bids to reach a feasible solution involves considerations of the extent to which a given flow of energy from a resource will relieve a constraint, i.e. if dispatching

to limit the total costs that the market solution will incur to resolve a constraint. WPTF claims that reducing the transmission constraint relaxation parameter would preempt the energy bid cap for highly effective resources, thus forcing CAISO to employ exceptional dispatch where a market solution would still be effective in relieving a transmission constraint.[23] WPTF argues that reducing the transmission constraint relaxation parameter counters the policy of resolving constraints through market solutions, as it will deny market-based compensation to generation resources and demand response participants that otherwise could have resolved system needs, and will stifle LMP pricing signals.[24] Furthermore, WPTF claims that CAISO has failed to "advance a compelling rationale for why it is just and reasonable to alter the package of parameters it has previously relied upon to further lean upon administrative solutions for transmission constraints."[25]

16. Next, WPTF asserts that CAISO's proposal is inconsistent with other independent system operators' (ISO) best practices.[26] WPTF states that CAISO's revised real-time transmission constraint relaxation parameter does not comport with other ISOs' relaxation prices.[27] WPTF contends that using voltage-differentiated transmission constraint relaxation prices to better reflect the true cost of constraints in the bulk electric system "appears to be a best practice."[28] Alternatively, WPTF argues that when an ISO uses a single value, rather than voltage-differentiated prices, the best practice "appears to be a relatively high value."[29] Because CAISO proposes not only a single transmission constraint relaxation price, but also a price that is "low," WPTF suggests the revised transmission constraint relaxation parameter should be found unjust and unreasonable.

17. Finally, WPTF contends that CAISO's proposal is too narrowly focused, as it addresses only congestion offset costs without addressing the core causes of congestion

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10 megawatt-hours from a resource reduces flow on a constraint by one megawatt-hour, the resource is 10 percent effective. CAISO utilizes a minimum bid effectiveness of 2 percent. CAISO March 8, 2013 Filing at 5.

[23] WPTF March 29, 2013 Protest at 6.

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

[25] *Id.* at 7.

[26] *Id.*

[27] *Id.* (citing CAISO March 8, 2013 Filing Attachment E, Constraint Relaxation Board Presentation at slide 6).

[28] *Id.* at 8.

[29] *Id.*

in the real-time market. According to WPTF, the core causes of congestion are: (1) CAISO's failure to manage congestion in the day-ahead market, (2) the lack of available resources in real-time when congestion occurs, (3) increased real-time prices institutionalizing differences between day-ahead and real-time prices, and (4) market participants arbitraging differences between day-ahead and real-time prices.[30] WPTF states that these factors drive up congestion offset costs. While WPTF acknowledges and supports the actions that CAISO has taken to address systemic causes of congestion, WPTF contends that lowering the transmission constraint relaxation parameter to $1,500/MWh not only fails to resolve a core cause of congestion, but also exacerbates price differences between the day-ahead and real-time markets.[31] Additionally, WPTF argues that CAISO should use available tools to address constraints in the day-ahead market, rather than wait until the real-time market to address constraints, when such tools are more limited or unavailable.

3. CAISO's Answer

18. In response to WPTF's claims, CAISO argues that it does not need to prove that the $5,000/MWh transmission constraint relaxation parameter is no longer just and reasonable, but only that the $1,500/MWh transmission constraint relaxation parameter is just and reasonable. CAISO acknowledges that the lower parameter reduces overall redispatch costs, but rejects this as a basis for denying the proposal, because the lower parameter renders market dispatch more efficient and prevents unjustifiable profits from being paid to redispatched resources.

19. Additionally, CAISO contends that WPTF's example purporting to demonstrate that a lower parameter undermines the bid cap is overly simplified and fails to consider that relieving congestion often involves redispatching more than one resource. Moreover, CAISO contends that exceptional dispatch does not occur immediately after failure to resolve a constraint below the parameter, but that other options are considered first.

20. CAISO also argues that "best practices" is not synonymous with "just and reasonable," and that WPTF fails to present sufficient evidence to support its assertion that voltage-differentiated values or a high single parameter value constitutes "best practices." Finally, CAISO reiterates that it is currently evaluating the root causes of congestion in the real-time market, and that lowering the transmission constraint relaxation parameter is a just and reasonable solution to rising congestion offset costs in the interim.

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[30] *Id.* at 9.

[31] *Id.*

21. With respect to comments submitted by SoCal Edison, CAISO argues that the Commission should accept its filing unconditionally, as it is just and reasonable. CAISO contends that being forced to devise a solution that addresses other root causes of congestion – primarily, convergence bidding – is outside the scope of the proceeding. Nonetheless, CAISO maintains that it is continually evaluating ways to enhance its markets and procedures in order to reduce congestion costs.

4. Commission Determination

22. In the February 2009 Order, the Commission determined that CAISO's proposed $5,000/MWh scheduling run transmission constraint relaxation parameter was just and reasonable, with the understanding that the $5,000/MWh was a flexible parameter and could be revised.[32] When CAISO initially proposed the $5,000/MWh scheduling run transmission constraint relaxation parameter, its then-current tariff contained no parameter, but rather, mandated that all economic bids be exhausted before utilizing other options to relieve system congestion.[33] The exhaustion of all economic bids proved unworkable, and as such, the Commission accepted CAISO's proposed $5,000/MWh scheduling run transmission constraint relaxation parameter, as it struck the necessary balance between ensuring maximum utilization of economic bids and prudent operation of the grid.[34] While CAISO maintained, and the Commission found, that the $5,000/MWh transmission constraint relaxation parameter struck this balance at the time it was proposed, CAISO noted that "it would need to continue to monitor the performance of the constraint and to make additional adjustments as necessary."[35] CAISO indicates that since the original $5,000/MWh parameter was accepted, novel and unexpected market and operational conditions necessitate revising the parameter to $1,500/MWh. As a result, CAISO maintains that the $5,000/MWh parameter no longer strikes the expected balance of allowing economic bids to be optimally dispatched while avoiding unreasonably high real-time congestion cost.

23. The Commission agrees with CAISO that it is just and reasonable to lower the scheduling run transmission constraint relaxation parameter to $1,500/MWh at this time.

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[32] February 2009 Order, 126 FERC ¶ 61,147 at P 82 (". . . CAISO has committed to continually evaluate the parameters in the future, both before and after the MRTU 'go-live' date. We expect the CAISO to follow through on its commitment.").

[33] *Id.* P 3.

[34] *Id.* P 43.

[35] CAISO March 8, 2013 Filing at 7 (citing CAISO, Filing, Docket No. ER09-240-000 at 9 and Exh. ISO-1, Testimony of Dr. Lorenzo Kristov at 20-22 (filed November 24, 2008)).

The Commission finds that approving the revised $1,500/MWh transmission constraint relaxation parameter in the real-time scheduling run will not only address the increased frequency of real-time congestion constraints but also permit CAISO to forego continuously accepting redispatch costs up to the $5,000/MWh transmission constraint relaxation parameter that are not effective at relieving congestion on a constrained transmission line. We agree with CAISO that the $5,000/MWh transmission relaxation parameter is simply driving up congestion costs unnecessarily, which the lower transmission constraint relaxation parameter can ameliorate.

24. Additionally, the Commission finds that lowering the scheduling run transmission constraint relaxation parameter from $5,000/MWh to $1,500/MWh will not have an impact on the reliability of the grid. We believe this because CAISO is required to operate in compliance with the NERC reliability standards independently from the congestion relief pricing. CAISO, as a Transmission Operator, should operate the system consistent with these standards and take all actions necessary to keep or put back its system within the operating limits when necessary. In addition, CAISO's operational margin in real-time is normally set three to five percent below the actual physical limit of the transmission system to avoid having flows on transmission lines near the actual operating limit.

25. Through its sensitivity analyses, CAISO found that the lower transmission constraint relaxation parameter was nearly as effective at relieving congestion as the current $5,000/MWh parameter. Specifically, Mr. Rothleder's testimony points out that, aside from ten outlier intervals, discussed below, the $1,500/MWh transmission constraint relaxation parameter typically resulted in zero percent to three percent less congestion relief than the $5,000/MWh transmission constraint relaxation parameter, and no more than a five percent increase.[36] CAISO indicates that these increases in market model flows are within the operating margins used by CAISO in the real-time market.[37] The Commission finds that out-of-market solutions (i.e., exceptional dispatch) will not necessarily be more likely in order to maintain reliability of the grid given the minimal amounts of congestion relief found under the $1,500/MWh transmission constraint relaxation parameter when compared with the $5,000/MWh transmission constraint relaxation parameter.

26. With respect to the ten outlier intervals specified in Mr. Rothleder's testimony, the Commission agrees that these outliers do not pose reliability concerns. It appears these constraints would have been resolved through out-of-market solutions regardless of the level of the transmission constraint relaxation parameter. Thus, the results from the $1,500/MWh transmission constraint relaxation parameter do not appear to meaningfully

[36] Rothleder Testimony at 48.

[37] CAISO March 8, 2013 Filing at 14; Rothleder Testimony at 57.

differ from those achieved by the $5,000/MWh parameter and will not negatively affect reliability.

27. The scheduling run transmission relaxation parameter represents a limit on the willingness of CAISO to pay for redispatch costs resulting from congestion on its grid, which are then charged to load and exports.[38] As CAISO notes in the instant filing, it has consistently found through its sensitivity analyses that the $1,500/MWh transmission constraint relaxation parameter was nearly as effective at congestion relief when compared to the $5,000/MWh transmission constraint relaxation parameter, yet provided significant savings to market participants. Accordingly, the Commission finds the $1,500/MWh transmission constraint relaxation parameter, which yields similar congestion relief but at much lower costs, is a just and reasonable measure for addressing real-time congestion uplift costs at this time.

28. However, the revised $1,500/MWh transmission constraint relaxation parameter merely assists in ensuring that real-time congestion offset costs do not reach excessive levels, and does not resolve the root causes of congestion that drive up such costs, such as convergence bidding, unanticipated loop flow in real-time, or lack of outage coordination. CAISO has indicated that it is already evaluating means to address the other drivers of increased real-time congestion offset costs and that it will continue to do so.[39] The Commission encourages CAISO to pursue its evaluation vigorously and to propose solutions to the observed difficulties promptly when they become evident.

The Commission orders:

CAISO's proposed tariff revisions are hereby accepted, as discussed in the body of this order, effective May 10, 2013, as requested.

By the Commission.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

[38] *See* February 19, 2009 Order, 126 FERC ¶ 61,147 at P 45.

[39] CAISO March 8, 2013 Filing at 18.