

160 FERC ¶ 61,035
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Neil Chatterjee, Chairman;
Cheryl A. LaFleur, and Robert F. Powelson.

California Independent System Operator Corporation Docket No. ER17-490-000

ORDER ACCEPTING TARIFF REVISIONS

(Issued August 29, 2017)

1. On December 5, 2016, the California Independent System Operator Corporation (CAISO) filed proposed tariff revisions to modify technical requirements associated with automatic voltage regulation. On March 2, 2017, pursuant to the authority delegated to the Director, Division of Electric Power Regulation – West, Office of Energy Market Regulation, in the Commission’s February 3, 2017 Order Delegating Further Authority to Staff in Absence of Quorum,¹ CAISO’s proposed tariff revisions were accepted for filing, suspended for a nominal period, to become effective March 6, 2017, as requested, subject to refund and further Commission order.²

2. In this order, we accept CAISO’s proposed revisions, effective March 6, 2017, as requested.

I. Background

3. In Order No. 827,³ the Commission revised the *pro forma* Large Generator Interconnection Agreement and *pro forma* Small Generator Interconnection Agreement

¹ *Agency Operations in the Absence of a Quorum*, 158 FERC ¶ 61,135 (2017).

² *Cal. Indep. Sys. Operator Corp.*, Docket No. ER17-490-000 (March 2, 2017) (delegated letter order).

³ *Reactive Power Requirements for Non-Synchronous Generation*, Order No. 827, 81 Fed. Reg. 40,793 (June 23, 2016), FERC Stats. & Regs. ¶ 31,385 (cross-referenced

to require all newly interconnecting non-synchronous⁴ generators that have not yet executed a Facilities Study Agreement as of the effective date of the Final Rule to provide dynamic reactive power, “within the range of 0.95 leading to 0.95 lagging at the high-side of the generator substation,” as a condition of interconnection.⁵ The Commission stated that it would allow transmission providers to “propose additional technical requirements, to the extent they believe those are necessary, in a separate filing pursuant to section 205 of the [Federal Power Act].”⁶ CAISO states that it views the instant filing as proposing additional technical requirements not addressed in Order No. 827 that are necessary to ensure that resources providing dynamic reactive power support to the CAISO-controlled grid can automatically control voltage.⁷

II. CAISO Filing

4. CAISO proposes several revisions to section 8.4.1.3 of its tariff, which addresses the provision of reactive power by generators. CAISO proposes to require all generators providing reactive power to be under the control of automatic voltage regulators at all times and to operate in voltage control mode.⁸ CAISO states that these requirements align with North American Electric Reliability Corporation (NERC) Reliability Standard VAR-002-4 and Western Electricity Coordinating Council (WECC) Reliability Standard VAR-002-WECC-2, which require, with limited exceptions, that

at 155 FERC ¶ 61,277), *order on clarification and reh’g*, 157 FERC ¶ 61,003 (2016) (Order No. 827).

⁴ “Non-synchronous generators are ‘connected to the bulk power system through power electronics, but do not produce power at system frequency (60 Hz)’ . . . [and] ‘do not operate in the same way as traditional generators and respond differently to network disturbances.’” *Id.* P 10 n.24 (quoting *PJM Interconnection, L.L.C.*, 151 FERC ¶ 61,097, at P 1 n.3 (2015)). CAISO uses the term “asynchronous” to refer to non-synchronous generators. *See* CAISO Transmittal at 3 n.3.

⁵ Order No. 827, FERC Stats. & Regs. ¶ 31,385 at P 1.

⁶ *Id.* P 70.

⁷ CAISO Transmittal at 2-3.

⁸ Section 8.4.1.3 currently requires that the generator be under the control of automatic voltage regulators during the time it is providing voltage support. *See* CAISO, eTariff, Operating Characteristics Required To Provide AS (Ancillary Services), § 8.4.1.3.

generators connected to the bulk electric system have automatic voltage regulation in service and operate in automatic voltage control mode.⁹

5. CAISO also proposes to require that a generator's automatic voltage regulator remain in voltage control mode and automatically control the net reactive power to regulate the scheduled voltage as assigned by the participating transmission owner. CAISO states that the purpose of this proposed language is to make clear that resources need only control voltage within the design of their facilities.¹⁰ CAISO further proposes to prohibit a generating unit from disabling voltage regulation controls while the unit is operating, unless it has CAISO's permission. CAISO states that this is consistent with existing tariff language applicable to non-synchronous generators that prohibits a resource owner from disabling power factor equipment while its generating facility is in operation.

6. Finally, CAISO proposes to apply the provisions of section 8.4.1.3 of its tariff to all resources required by Order No. 827 to provide reactive power capability.¹¹ CAISO states that Order No. 827 requires that all newly interconnecting non-synchronous generators provide dynamic reactive power, which requires a resource to respond automatically to voltage fluctuations. CAISO explains that an automatic voltage regulator normally controls dynamic power flow from a resource and that, as a result, these resources will need to install automatic voltage regulators.¹² CAISO states that although existing non-synchronous generators may have reactive power capability requirements set forth in their interconnection agreements, CAISO's proposed tariff revisions ensure that all newly interconnecting non-synchronous generators install and operate automatic voltage regulators in a manner similar to other resources.¹³

7. CAISO states that it is not proposing any additional mechanism to compensate generators for providing reactive power or for the additional costs to install and operate automatic voltage control.¹⁴ CAISO asserts that it considered this possibility in its stakeholder process, but decided against a separate payment for reactive power

⁹ CAISO Transmittal at 3-4.

¹⁰ *Id.* at 4.

¹¹ *Id.* at 5.

¹² *Id.*

¹³ *Id.*

¹⁴ *Id.* at 6.

capability. CAISO states that it views the ability to provide reactive power as part of a generator's fixed costs, which are recovered through power purchase agreements.¹⁵ CAISO notes that NERC has advocated that the Commission consider the provision of reactive power to be part of good utility practice and that CAISO's proposed tariff revisions follow this approach. CAISO further states that the Commission has not required payment for reactive power and did not change its approach in Order No. 827.¹⁶

III. Notice and Responsive Pleadings

8. Notice of CAISO's filing was published in the *Federal Register*, 81 Fed. Reg. 89,924 (2017), with interventions and comments due on or before January 27, 2017. Pacific Gas and Electric Company; Southern California Edison Company; the cities of Anaheim, Azusa, Banning, Colton, Pasadena, and Riverside, California (collectively, Six Cities); Northern California Power Agency; and City of Santa Clara, California, timely filed motions to intervene. EDF Renewable Energy (EDF) filed a timely motion to intervene and protest. On January 11, 2017, CAISO and Six Cities filed answers in response to EDF's protest.

A. EDF Protest

9. EDF argues that CAISO's proposal goes beyond the requirements of Order No. 827, which did not require automatic voltage control equipment, and as such, CAISO has the burden to show that this additional requirement is just and reasonable and not unduly discriminatory.¹⁷ EDF states that CAISO has not shown that there is a deficiency in the provision of reactive power or that automatic voltage control is required for non-synchronous generators to provide dynamic reactive power as required by Order No. 827.¹⁸ EDF further states that there is no reliability standard that requires non-synchronous generators to be under automatic voltage control.¹⁹ EDF posits that the NERC and WECC reliability standards cited by CAISO deal with synchronous generators and thus states that the Commission should not give weight to CAISO's suggestion that its proposal is based on the standards.

¹⁵ *Id.*

¹⁶ *Id.* at 7 (citing Order No. 827, FERC Stats. & Regs. ¶ 31,385 at P 52).

¹⁷ EDF Protest at 2.

¹⁸ *Id.* at 3.

¹⁹ *Id.* at 4.

10. EDF argues that CAISO has not shown that automatic voltage control is needed or required for non-synchronous generators, and it is therefore unjust and unreasonable for CAISO to require non-synchronous generators to use automatic voltage control without compensating them for the cost of doing so.²⁰ EDF states that, unlike synchronous generators, there is a significant cost for non-synchronous generators to provide reactive power. EDF argues that power purchase agreement contract revenues will not increase to compensate non-synchronous generators for the additional cost of providing automatic voltage control. EDF states that power purchase agreements are procured in a competitive environment where the contracts are based on MWs of active power provided, and so the reactive power provided will be irrelevant to the price.²¹

11. EDF states that the Commission should not accept CAISO's proposal because it has not provided a separate cost recovery mechanism for non-synchronous generators.²² EDF also states that CAISO's filing is premature because the Commission is investigating reactive power compensation issues in Docket No. AD16-17-000, and specifically, states EDF, requiring transmission providers to provide compensation for reactive power capability.²³ EDF states that the proceeding in that docket has recognized that, unlike other regional transmission organizations (RTOs) and independent system operators (ISOs), CAISO provides no compensation for reactive power capability. EDF argues that CAISO's proposal brings it further out of sync with other RTOs and ISOs.²⁴ EDF states that it would be reasonable for the Commission to reject CAISO's filing, without prejudice, until the Commission resolves the reactive capability compensation issues in Docket No. AD16-17-000 and CAISO thereafter provides evidence to demonstrate a need for its proposal.²⁵

²⁰ *Id.* at 6.

²¹ *Id.* at 7.

²² *Id.* at 7-8.

²³ *Id.* at 7 (citing Order No. 827, FERC Stats. & Regs. ¶ 31,385 at P 52).

²⁴ *Id.* Specifically, EDF explains that both PJM Interconnection, L.L.C. and Midcontinent Independent System Operator, Inc. provide compensation for reactive power capability.

²⁵ *Id.* at 8.

B. CAISO and Six Cities Answers

12. CAISO states that in order to provide dynamic reactive power, as required by Order No. 827, resources within CAISO must have automatic voltage control.²⁶ CAISO explains that resources providing dynamic reactive power must absorb or inject reactive power automatically within the resources' power factor range in order to maintain voltage schedules. Therefore, CAISO argues that non-synchronous generators support scheduled transmission voltages by operating a resource with automatic voltage regulation. CAISO notes that this capability must occur continuously because actual voltage at a given substation fluctuates as the loading on transmission equipment and demand on the system changes. CAISO notes that, currently, non-synchronous generators providing dynamic reactive power based on a determination of need for dynamic reactive power in their system impact studies must operate with automatic voltage control systems.²⁷

13. CAISO argues that NERC Reliability Standard VAR-002-4, which applies to generator operation in the maintenance of voltage schedules and requires automatic voltage regulation, applies to non-synchronous generators.²⁸ CAISO states that the standard does not distinguish between synchronous and non-synchronous generators. CAISO states that the only reason that non-synchronous generators were previously exempt from these standards was the Commission's determination that these resources were incapable of providing reactive power. CAISO argues that Order No. 827 makes this exemption moot.²⁹

14. CAISO states that its proposal treats all resources providing reactive power comparably. CAISO states that it does not compensate synchronous generators for installing automatic voltage regulator systems. CAISO also states that it does not compensate non-synchronous generators currently required to provide reactive power for installing automatic voltage regulator systems. Accordingly, CAISO states that the Commission should not condition acceptance of its proposed tariff revisions on the

²⁶ CAISO Answer at 2-3.

²⁷ *Id.* at 3 (citing CAISO, eTariff, Large Generator Interconnection Agreement for GIDAP (Generator Interconnection and Delivery Allocation Procedures), Appendix EE).

²⁸ *Id.* at 5-6.

²⁹ *Id.* at 6.

provision of compensation to non-synchronous generators subject to the requirements of Order No. 827, as doing so would create an undue preference.³⁰

15. Six Cities argues that there has been no evidence presented that CAISO's proposal would result in any significant increase in costs to the resource developer. Six Cities also states that the costs to implement automatic voltage regulation would be *de minimis*. Six Cities notes that no information on the specific magnitude of costs has been provided, but that during the stakeholder process, CAISO concluded that additional costs would be *de minimis* after outreach with manufacturers.³¹ Six Cities also argues that, as the requirements will apply prospectively, resource developers will have the ability to cover additional capital costs through capacity payments in power purchase agreements.

IV. Discussion

A. Procedural Matters

16. Pursuant to Rule 214 of the Commission's Rules of Practice and Procedure,³² 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 Procedure³³ prohibits an answer to a protest or an answer unless otherwise ordered by the decisional authority. We will accept CAISO's and Six Cities' answers because they have provided information that assisted us in our decision-making process.

B. Substantive Matters

18. We accept CAISO's proposal to modify section 8.4.1.3 of its tariff to require all generators providing reactive power, including newly interconnecting non-synchronous generators, to be under the control of automatic voltage regulators at all times and to operate in voltage control mode. In CAISO's balancing authority area, synchronous generators and non-synchronous generators that are required to provide dynamic reactive power pursuant to system impact studies have done so through the use of automatic

³⁰ *Id.* at 8.

³¹ Six Cities Answer at 3 (citing CAISO's August 13, 2015 Straw Proposal at 24).

³² 18 C.F.R. § 385.214 (2017).

³³ *Id.* § 385.213(a)(2).

voltage regulator systems.³⁴ With all newly interconnecting non-synchronous generators now required to provide reactive power pursuant to Order No. 827, CAISO seeks to require those generators to provide reactive power on a similar basis as synchronous and non-synchronous generators on its system that currently provide reactive power. This is not unreasonable.

19. EDF contends that a separate cost recovery mechanism is necessary to render CAISO's proposal just and reasonable. We disagree. As set forth in Order Nos. 2003 and 2003-A, if a transmission provider pays its own or affiliated generators for providing reactive power capability inside the standard power factor range, it must also pay the interconnection customer.³⁵ CAISO's proposal does not violate this requirement in Order Nos. 2003 and 2003-A. In CAISO, there is no compensation for any generators for providing reactive power capability inside the standard power factor range. CAISO does not propose to alter the standard power factor range inside which generators must provide reactive power, and CAISO requires automatic voltage control for synchronous and non-synchronous generators that it currently requires to provide reactive power inside the standard power factor range. Therefore, a separate payment for the provision of reactive power capability inside the standard power factor range is not required, and we see no reason to require a separate cost recovery mechanism for reactive power capability based on the record here. Accordingly, we are not persuaded by EDF's contention that there must be a separate cost recovery mechanism added to CAISO's proposal here to make the proposal just and reasonable.

20. EDF argues that CAISO has not shown that this requirement is needed or required for system reliability, and that CAISO has not shown any deficiency in the provision of reactive power. CAISO is not required to demonstrate that this technical requirement is necessary to ensure system reliability; it is required to show that its proposal is just and reasonable. As noted above, we find that CAISO's proposal is just and reasonable.

21. We are not persuaded to reject CAISO's proposal here as premature until the resolution of Docket No. AD16-17-000, as EDF also suggests. CAISO is not proposing

³⁴ See CAISO Transmittal at 3 (citing CAISO, eTariff, Appendix EE). See also CAISO, eTariff, Operating Characteristics Required To Provide Ancillary Services, § 8.4.1.3.

³⁵ See *Standardization of Generator Interconnection Agreements and Procedures*, Order No. 2003, FERC Stats. & Regs. ¶ 31,146, at P 546 (2003), *order on reh'g*, Order No. 2003-A, FERC Stats. & Regs. ¶ 31,160, at P 416, *order on reh'g*, Order No. 2003-B, FERC Stats. & Regs. ¶ 31,171 (2004), *order on reh'g*, Order No. 2003-C, FERC Stats. & Regs. ¶ 31,190 (2005), *aff'd sub nom. Nat'l Ass'n of Regulatory Util. Comm'rs v. FERC*, 475 F.3d 1277 (D.C. Cir. 2007), *cert. denied*, 552 U.S. 1230 (2008).

to revise its tariff to address reactive power compensation here, and we find that EDF's request is outside the scope of this proceeding.

22. Finally, we find CAISO's remaining proposed tariff revisions to section 8.4.1.3, which were unprotested, to be just and reasonable, as they align with CAISO's current tariff requirements and applicable reliability standards. Accordingly, we accept CAISO's proposed tariff revisions, effective March 6, 2017, as requested.

The Commission orders:

CAISO's proposed tariff revisions are hereby accepted, effective March 6, 2017, as requested, as discussed in the body of this order.

By the Commission.

(S E A L)

Kimberly D. Bose,
Secretary.