

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

**Reactive Power Capability Compensation ) Docket No. RM22-2-000**

**COMMENTS OF THE  
CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**

The California Independent System Operator Corporation (CAISO) submits these comments in response to the Federal Energy Regulatory Commission’s Notice of Inquiry (NOI) in the above-captioned docket.<sup>1</sup>

**I. BACKGROUND**

On November 18, 2021, the Commission issued the NOI seeking comments on reactive power capability compensation and market design. It has been approximately 20 years since the Commission recommended that resources with actual cost data and support documentation use the method employed in *American Electric Power Service Corporation* to establish a rate for providing reactive power.<sup>2</sup> The NOI notes that since establishing the *AEP* methodology as the default reactive power compensation methodology, “the electric markets and the generation resource mix have undergone significant change.”<sup>3</sup> Because of those changes, the Commission seeks comment “on various issues that have arisen regarding reactive power capability compensation and

---

<sup>1</sup> *Reactive Power Capability Compensation*, 177 FERC ¶ 61,118 (2021) (NOI).

<sup>2</sup> *Am. Elec. Power Serv. Corp.*, Opinion No. 440, 88 FERC ¶ 61,141 (1999) (Opinion No. 440).

<sup>3</sup> NOI at P 2.

market design.”<sup>4</sup>

The majority of the questions in the NOI relate to the *AEP* methodology. As the NOI recognizes, some regions, including the CAISO, generally do not compensate resources for providing reactive power. The Commission asks how resources in such regions “recover the costs of their investment in reactive power capability.”<sup>5</sup> The NOI also poses several questions regarding reactive power for distribution-connected resources.<sup>6</sup> Because the CAISO tariff does not adopt the *AEP* methodology, the CAISO limits its comments here to addressing its general approach to securing needed reactive power and voltage support and the responsibility that distribution-connected resources hold in that regard.

## **II. COMMENTS**

### **A. CAISO’s General Approach to Reactive Power**

CAISO tariff section 8.2.3.3 is the CAISO’s primary tariff provision addressing reactive power. Generators must “maintain the CAISO specified voltage schedule if required under their Generator Interconnection Agreement, while operating within the power factor range specified in their interconnection agreements.” The CAISO’s pro forma interconnection agreements set standardized reactive power ranges based on the type of generator (*i.e.*, synchronous vs. asynchronous) and, consistent with Commission Order 827,<sup>7</sup> the vintage of generator. For generators that do not operate under a

---

<sup>4</sup> NOI at P 3.

<sup>5</sup> NOI at P 32.

<sup>6</sup> NOI at P 36.

<sup>7</sup> *Reactive Power Requirements for Non-Synchronous Generation*, 155 FERC ¶ 61,277 (2016).

CAISO interconnection agreement, section 8.2.3.3 imposes default reactive power requirements. Resources subject to the default rule must provide reactive power “within a band of 0.90 lag (producing VARs) and 0.95 lead (absorbing VARs) power factors.” Regardless of the specific reactive power range applicable to a generator, the resource “shall receive no compensation for operating within these specified ranges.”<sup>8</sup> CAISO tariff section 8.3.8 also requires generators to provide reactive power outside these ranges upon CAISO direction.<sup>9</sup> When a generator responds to such a request, the CAISO, per tariff section 11.10.1.4, compensates the generator based on the opportunity cost of the foregone sales of real power. Notably, these requirements apply to participating generators irrespective of their type of interconnection (*i.e.*, transmission-connected vs. distribution-connected resources).

## **B. Generator Recovery of Reactive Power Costs**

The rationale for the CAISO’s existing approach to reactive power compensation is that the reactive power ranges called for in each interconnection agreement represent a reasonable range of what a generator is expected to provide the CAISO without additional compensation in accordance with good utility practice and as a condition of being part of the CAISO markets and CAISO grid.<sup>10</sup> The CAISO expects that the costs of providing reactive power within that range should be recovered the same as any

---

<sup>8</sup> CAISO Tariff, section 8.2.3.3.

<sup>9</sup> CAISO Tariff, section 8.3.8 (“Any Participating Generator who is producing Energy shall, upon the CAISO’s specific request, provide reactive energy output outside the Participating Generator’s Voltage Support obligation defined in Section 8.2.3.3.”).

<sup>10</sup> *Cal. Indep. Sys. Operator Corp.*, Transmittal Letter, at 6 & 7, FERC Docket No. ER17-490 (Dec. 5, 2016) (“resources generally recover the fixed costs of their plant as part of financing their project and cover the costs of financing through power purchase agreements” and the “CAISO continues to believe that providing reactive power constitutes good utility practice.”)

other general cost of operating the facility (e.g., market revenue, power purchase agreement, resource adequacy contract, etc.). Once the CAISO calls on a generator to provide reactive power outside of the defined range, however, the generator may receive additional compensation if it must reduce its MW output in order to comply with such an instruction. In this circumstance, the generator is eligible to recover its opportunity cost. In 2017, the Commission considered the CAISO's approach and found "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."<sup>11</sup>

### **C. Unique Issues for Distribution-Connected Resources**

The NOI asks: "For a distribution-connected resource, is reactive power dispatchable by direction of the transmission provider?"<sup>12</sup> For the CAISO, the answer to this question is "yes," but with some qualifications. Distribution-connected resources participating in the CAISO market do not execute an interconnection agreement with the CAISO, so they are subject to the default reactive power requirements in tariff section 8.2.3.3. This means that distribution-connected resources have a tariff requirement to comply with CAISO dispatches for reactive power.

The topic is complicated by the CAISO's interaction with the distribution system

---

<sup>11</sup> *Cal. Indep. Sys. Operator Corp.*, 160 FERC ¶ 61,035, P 19 (2017). In a recent order, the Commission affirmed this approach when it was proposed by a different transmission provider. *Pub. Serv. Co. of N.M.*, 178 FERC ¶ 61,088, P 29 (2022) ("Consistent with Commission precedent, a transmission provider may decide to eliminate compensation for having the capability of providing reactive service within the standard power factor range.").

<sup>12</sup> NOI at P 36.

operator and obligations distribution-connected resources hold under the distribution utilities' wholesale distribution access tariffs and interconnection agreements. In general, the distribution utility issues reactive power schedules to distribution-connected resources as part of its overall management of voltage stability on its distribution system. When the CAISO experiences voltage stability issues at the interconnection between the transmission and distribution system, it may issue an instruction to a distribution-connected resource to adjust its reactive power output under the authority of tariff section 8.2.3.3. In those cases, the CAISO can direct a resource to provide more reactive support. But whether the CAISO sees the desired impact on its transmission system still depends on what further actions the distribution system operator takes, and the CAISO depends on the distribution system operator not inadvertently giving contrary instructions.

Because of these complications, the CAISO more typically will remain in close coordination with the distribution utility in communicating the needed voltage levels at a particular interface between the transmission and distribution systems. The CAISO then defers to the distribution operator's judgment as to what further actions should be taken, including adjusting voltage schedules for distribution-connected resources, to maintain the needed voltage levels at that interface.

#### **D. CAISO Evaluation of Status Quo on Reactive Power**

Aside from voltage stability issues experienced in response to the unexpected retirement of the San Onofre Nuclear Generating Station in 2013, the CAISO has not experienced major issues of concern with reactive power. The CAISO has seen no evidence to this point that resources cannot comply with reactive power dispatch

instructions because they have insufficient funds for the equipment to meet the reactive power dispatch. Similarly, the collaborative process with distribution utilities for managing voltage support with distribution-connected resources has generally worked well. To the extent changes are needed, the CAISO can consider those changes through its normal stakeholder processes, so any further actions the Commission may take in response to the NOI should not be addressed to the CAISO.

### III. CONCLUSION

The CAISO's existing approach to securing reactive power and compensating resources for such provision is just and reasonable. The Commission should defer any future changes in this area to the CAISO's existing stakeholder processes.

Respectfully submitted,

**By: /s/ David S. Zlotlow**

Roger E. Collanton  
General Counsel  
Anthony Ivancovich  
Deputy General Counsel  
Andrew Ulmer  
Assistant General Counsel  
David S. Zlotlow  
Senior Counsel  
California Independent System  
Operator Corporation  
250 Outcropping Way  
Folsom, CA 95630  
Tel: (916) 351-4400  
Fax: (916) 608-7222  
[dzlotlow@caiso.com](mailto:dzlotlow@caiso.com)

February 22, 2022

## CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service lists in the above-referenced proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California, this 22<sup>nd</sup> day of February 2022.

*/s/ Anna Pascuzzo*  
Anna Pascuzzo