

21 February 2017

Practice Groups:

Energy

*Public Policy and
Law*

CAISO Urges Flexibility and Coordination to Advance Distributed Energy Resource Aggregations at FERC

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Introduction

As previously covered by [K&L Gates' Global Power Law and Policy blog](#), on November 17, 2016, the Federal Energy Regulatory Commission ("FERC") issued a Notice of Proposed Rulemaking ("NOPR") to remove barriers so that electric storage resources and distributed energy resource aggregations can better participate in the capacity, energy, and ancillary services markets operated by regional transmission organizations ("RTOs") and independent system operators ("ISOs"). This alert will focus on the response to those proposals submitted by the California Independent System Operator ("CAISO"), particularly as they relate to distributed energy resource aggregations.

FERC defines distributed energy resource aggregators as entities that aggregate one or more distributed energy resources, such as electric storage resources, distributed generation, thermal storage, and electric vehicles (collectively, "DERs"), and offer those resources into wholesale markets. The NOPR called for comments on what types of market rules should be established to provide DERs with more certainty and to remove barriers to entry.

The CAISO is one of the largest ISOs in the nation, responsible for managing about 80 percent of California's electricity flow. Having recently received FERC approval of its own DER aggregation participation model, CAISO has a head start on incorporating DER aggregations into its energy and ancillary services markets.¹ In fact, in a statement issued concurrently with the NOPR, Acting FERC Chairman Cheryl LaFleur specifically identified CAISO's DER aggregation rules as a model to study and evaluate any lessons learned from CAISO's implementation of those rules.

CAISO submitted its comments on FERC's proposal on February 13, 2017. With its recent experience in developing a DER program, CAISO's comments offer insights that may guide FERC as it works toward a final rule.² Overall, CAISO's comments strongly support incorporating DER aggregations into the nation's energy and ancillary services markets, so long as each RTO/ISO is given the flexibility to develop participation models that reflect regional and regulatory preferences in generation, transmission, and distribution assets. CAISO also predicts that the roles and responsibilities of transmission and distribution

¹ Letter from California Independent System Operator to Hon. Kim D. Bose, Secretary, FERC, dated Mar. 4, 2016 (hereinafter "[CAISO Transmittal Letter](#)") at 1. On November 30, 2016, CAISO submitted an informational report to FERC summarizing its early implementation efforts.

² Other RTOs/ISOs, like PJM, have also developed aggregation rules. In the case of PJM, most of the aggregation has come through demand response resources. *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, FERC Docket No. RM16-23; AD16-20 (Comments of PJM Interconnection LLC filed Feb. 13, 2017) (hereinafter "[PJM Comments](#)") at 19-20.

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operators will experience significant change in the coming years, and that FERC, electric grid operators, and market participants can best encourage innovation and resiliency by avoiding any overly-prescriptive models that stifle DER participation.³

CAISO's New DER Aggregation Model

In 2016, CAISO adopted tariff provisions that created a new market participant category called a distributed energy resource provider ("DER Provider"). Under CAISO's definition, a DER Provider is a market participant that aggregates one or more small distribution-connected energy resources totaling at least 0.5 MW.⁴ The aggregated resource may be either in front or behind a customer meter. Proxy demand resources, reliability demand response resources, and individual generating units over 1 MW or units with existing Participating Generator Agreements are ineligible for such aggregations, as they already participate in the CAISO markets under other provisions of CAISO's tariff.⁵ Resources currently participating in retail net energy metering programs are similarly unable to also participate in DER aggregation.⁶

CAISO's DER aggregation program recognizes the challenges in incorporating small distribution-connected resources into a market run by the transmission-level operator. DERs interconnecting at the distribution level are subject to the interconnection requirements and operational limitations of local distribution utilities. Because the transmission and distribution systems have inherently different structures, characteristics, and functions, communication to coordinate real-time operations remains limited between CAISO and the distribution-level utility.⁷ CAISO recognized that its DER aggregation model contained good "first steps," but identified a need for closer coordination at the "transmission-distribution interface," where power has historically flowed only one-way.⁸

To address these (and other) issues, FERC required CAISO to submit an informational report that analyzed certain issues within the first six months of implementation.⁹ Filed on November 30, 2016, CAISO's informational report stated that four entities had already executed agreements with CAISO to become DER Providers. CAISO explained that the DER Providers are working with resource owners, municipalities, and community choice aggregators to aggregate a mix of smart grid technology, renewables and small-scale storage, including converting storage and electric vehicle resources from demand response to energy resources.¹⁰ CAISO also noted that coordination between DER Providers and local distribution utilities was taking longer than expected, and that no DER Provider had yet entered CAISO's New Resource Implementation review.¹¹

³ *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*, FERC Docket No. RM16-23; AD16-20 (Comments of the California Independent System Operator filed Feb. 13, 2017) (hereinafter "[CAISO Comments](#)") at 54.

⁴ [CAISO Tariff at § 4.17](#); CAISO Transmittal Letter at 5.

⁵ See *Cal. Indep. Sys. Operator Corp.*, 155 FERC ¶ 61,229 at ¶ 5.

⁶ See *Cal. Indep. Sys. Operator Corp.*, 155 FERC ¶ 61,229 at ¶ 6.

⁷ See *Cal. Indep. Sys. Operator Corp.*, 155 FERC ¶ 61,229 at ¶ 43-45; *California Independent System Operator Corp.*, FERC Docket No. ER16-1085 (Informational Report of the California Independent System Operator Corporation filed Nov. 30, 2016) (hereinafter "[CAISO Informational Report](#)") at 11-12.

⁸ See *Cal. Indep. Sys. Operator Corp.*, 155 FERC ¶ 61,229 at ¶ 38, 39; CAISO Informational Report at 11.

⁹ See *Cal. Indep. Sys. Operator Corp.*, 155 FERC ¶ 61,229 at ¶ 45.

¹⁰ CAISO Informational Report at 4-6.

¹¹ CAISO Informational Report at 8-9.

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CAISO's Comments on FERC's Proposal

FERC's NOPR proposed that each RTO/ISO establish market rules related to eight aspects of DER market participation. Due to CAISO's recent experience with a similar participation model, it was well positioned to provide meaningful responses. Below is a summary of FERC's proposals, with CAISO's responses and comments to each. As expected, CAISO generally supports FERC's proposed reforms for enabling distributed energy resource providers to aggregate and participate in wholesale power markets.¹²

- **Eligibility to participate through a DER aggregator:** FERC proposed rules that would limit participation of DERs through an aggregator if the DER is receiving compensation for the same service through another program, such as a net metering or demand response program. FERC also sought comment on whether there should be a minimum or maximum capacity requirement to participation in DER aggregations.

As explained above, CAISO's DER aggregation model also excludes certain demand response and net metering programs. CAISO strongly agrees that individual RTOs/ISOs be allowed to dictate the minimum and maximum size of resources that can participate in wholesale markets.¹³ Within CAISO, aggregated resources must meet the minimum 0.5 MW threshold to participate, and each aggregation that includes energy resources located at different pricing nodes must be no larger than 20 MW.¹⁴ CAISO describes these thresholds as "initial limits" while it obtains experience with how DER aggregations can best support grid reliability and market efficiency.¹⁵

- **Locational requirements:** FERC proposed that RTO/ISOs adopt locational requirements that permit DER aggregation across an area as geographically broad as technically feasible and proposed giving RTO/ISOs flexibility in making determinations as to the appropriate locational requirement. FERC also sought comments on the impact on dispatch, pricing, and settlement within RTO/ISOs if DER aggregations are not limited to the same pricing node or behind the same point of interconnection.

CAISO notes that under its DER model each aggregation must be located in a sub-load aggregation point to mitigate any congestion risks that could occur if aggregated resources were dispatched on both sides of a transmission constraint.¹⁶ Using metering information, CAISO uses a weighted locational marginal price to settle an aggregated resource's response across multiple pricing nodes.¹⁷ According to CAISO, because the topology of each RTO/ISO transmission system is different, FERC should not adopt universal locational requirements for all RTOs/ISOs.

¹² CAISO Comments at 1.

¹³ CAISO Comments at 24-25.

¹⁴ CAISO Comments at 25-26.

¹⁵ CAISO Comments at 25-26. In other comments submitted on the NOPR, entities advocated for minimum capacity requirements that were lower than CAISO's 0.5 MW threshold. See e.g., [Tesla, Inc. and SolarCity Corporation Comments](#) at 17 (advocating for a 0.1 MW minimum size requirement).

¹⁶ CAISO Comments at 27.

¹⁷ CAISO Comments at 29.

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Instead, each RTO/ISO should have the flexibility to justify any locational requirement as part of compliance with any final rule.¹⁸

- **Distribution factors and bidding parameters:** In addition to proposing rules that would require DER aggregators to provide distribution factors to the RTO/ISO when they register and when they submit bids and offers, FERC also sought comments on other bidding parameters that may be necessary to capture the physical and operational characteristics of DER aggregations.

CAISO agrees that RTOs/ISOs must have sufficient information about aggregated resources to model them appropriately and issue feasible dispatch instructions.¹⁹ Under the CAISO tariff, DER bids must include components like ramp rate, minimum and maximum operating limits, energy limits, and contingency flags. CAISO also requires each bid to include Generation Distribution Factors (“GDFs”) (or be subject to the default GDFs) to provide a reasonable expectation of power flows arising from the injection of electricity at multiple nodes.²⁰

- **Information and data requirements:** FERC proposed that DER aggregators provide certain information related to the physical parameters to the RTO/ISOs and maintain aggregate settlement data for the DER aggregation.

CAISO generally agrees that DER Providers should keep accurate operational and locational information regarding their individual resources, but urges caution on whether FERC should require DER aggregators to submit the same data as required by other market participants. For instance, CAISO’s program relieves DER Providers of submitting meteorological data for each individual resource, although it may revisit that determination as the program matures and it is shown that the burden of collecting data for each individual resource is outweighed by its usefulness.²¹ Under CAISO’s tariff, DER Providers must retain meter data for each individual resource for three years.²²

- **Modifications to the list of resources in a DER aggregation:** FERC proposed that each RTO/ISO revise its tariff to permit DER aggregators to modify the list of resources within its aggregation without re-registering all other resources if the modification will not result in any safety or reliability concern. FERC also recognized the need to have the relevant distribution utility review the list of resources included in an aggregation before those resources participate in the organized wholesale market.

CAISO strongly agrees with FERC’s approach. CAISO’s comments also reiterate the value of giving each local distribution utility the chance to assess and periodically review whether a DER can respond to dispatch instructions without overwhelming or compromising the distribution system, or interfering with resources that are already participating in demand response programs.²³

¹⁸ CAISO Comments at 28.

¹⁹ CAISO Comments at 30.

²⁰ CAISO Comments at 31.

²¹ CAISO Comments at 33.

²² CAISO Comments at 34.

²³ CAISO Comments at 35-36.

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- **Metering and telemetry system requirements:** FERC proposed a flexible requirement for each RTO/ISO to identify necessary metering and telemetry requirements for DER aggregations that would not impose unnecessarily burdensome costs on DER aggregators and the individual DERs. FERC recognized the requirements may vary based on the types of resources within the DER aggregation.

CAISO's model requires DEP Providers to follow the same metering and telemetry requirements as other resources participating in the CAISO market. CAISO cautions against any additional FERC standards, given that such uniform requirements may pose barriers to entry for many DERs that are already subject to various state and local utility metering standards.²⁴ According to CAISO, each RTO/ISO should retain the flexibility to impose telemetry requirements that are comparable to other resources participating in its respective market.²⁵

- **Coordination between the RTO/ISO, DER aggregator, and the distribution utility:** FERC proposed rules to require ongoing coordination among the RTO/ISO, DER aggregator, and distribution utility, but sought comment on the level of detail necessary in RTO/ISO tariffs to establish a framework for ongoing coordination and appropriate lines of communication.

In CAISO's experience, coordination between the DER Provider and local utility is crucial to ensuring that DER aggregations are successfully incorporated into wholesale markets. While the local distribution utility's interconnection process may have evaluated each individual resource in a DER aggregation under normal grid conditions, there is less certainty on whether a series of distributed resources, acting in concert, could pose operational risks.²⁶ CAISO also suggests that to the extent congestion or reliability problems arise on the distribution-level, there should be a formal mechanism for the RTO/ISO, DER Provider, and local distribution utility to develop solutions to those problems.²⁷

CAISO also recommends closer communication on short-term and developing system conditions between DER Providers and distribution utilities. Specifically, CAISO recommends that there be a process for a distribution utility to notify a DER Provider of changes that could affect its ability to respond at maximum capacity.²⁸ While CAISO may be able to detect abnormalities on the transmission system, there is no way presently for CAISO to effectively monitor how irregularities on the distribution system will impact the output of DER aggregations.²⁹ As more resources become distribution-connected, CAISO anticipates that such irregularities will become tougher to predict, *especially* if a significant number of resources are *not* participating in the wholesale markets, and thus are invisible to CAISO.³⁰

²⁴ CAISO Comments at 38-39.

²⁵ CAISO Comments at 38-39.

²⁶ CAISO Comments at 40.

²⁷ CAISO Comments at 41.

²⁸ CAISO Comments at 43.

²⁹ CAISO Comments at 43-44.

³⁰ CAISO Comments at 45-46.

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CAISO also believes that different types of Distribution System Operators will evolve to operate “transactive energy” markets and/or manage two-way power flows at the distribution level. CAISO contends that given the changing roles of distribution utilities and transmission operators, the regulatory environment will continue to adaptively manage DER aggregations.³¹

- **Market participation agreements:** FERC proposed to require each RTO/ISO to establish a market participation agreement for DER aggregators that would define the roles and responsibilities of the DER aggregator, but not restrict the business models for DER aggregators.

In response, CAISO urges FERC to allow each RTO/ISO work with its participants to develop market participation agreements tailored to each RTO/ISO, and that FERC should also consider whether a “[FERC]-jurisdictional agreement should also apply between a utility distribution company and a distributed energy resource aggregation,” similar to a Wholesale Distribution Tariff.³²

Conclusion

Given its recent experience, CAISO is ahead of the curve when it comes to incorporating DER aggregations into wholesale markets. Its comments on the FERC NOPR express the view that each RTO/ISO should retain significant authority to account for regional differences in market participants and regulatory requirements. In all cases, CAISO predicts that closer coordination with the distribution level utility will be needed to ensure DER aggregations can advance the cause of a cleaner, more resilient power system. Achieving the close coordination that CAISO predicts is necessary to ensure the successful aggregation and operation of DERs on a large scale raises significant questions about the evolving role of distribution utilities and RTO/ISOs, as well as the increasingly blurry line between FERC’s jurisdiction over wholesale market activity and RTO/ISOs, on one hand, and the states’ jurisdiction over retail sales and distribution utilities, on the other hand.

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³¹ CAISO Comments at 47-50.

³² CAISO Comments at 51.

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