UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Reform of Generator Interconnection Procedures and Agreements	))	Docket No. RM17-8-000

COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

The California Independent System Operator Corporation (CAISO) submits these comments on the Commission's notice of proposed rulemaking (NOPR) to "improve certainty, promote more informed interconnection, and enhance interconnection processes."[1] Because the vast majority of the Commission's proposed enhancements are modeled on the CAISO's existing generator interconnection procedures, the CAISO generally supports the NOPR. Based on the CAISO's experience with these procedures, the CAISO recommends certain enhancements to the proposed reforms. These clarifications may help the Commission achieve the goal of an enhanced interconnection process.

I. Background

A. Interconnection Reform

Since Order No. 2003, the CAISO has implemented a number of systematic enhancements to its generator interconnection procedures.

[1] *Reform of Generator Interconnection Procedures and Agreements*, 157 FERC ¶ 61,212 at P 1 (2016) (NOPR).

California's renewable portfolio standard,[2] energy storage procurement mandate,[3] and the associated changes in the generation development marketplace have made it increasingly important over the past several years for the CAISO to identify ways to administer its generation interconnection queue more efficiently.[4] The CAISO's overriding goal has been to tailor its procedures to promote state energy policies, while ensuring that they remain grounded in principles of cost-causation, fairness, and non-discrimination. Because generation development in California has rapidly evolved, the CAISO has had to continually review and enhance its generator interconnection procedures with stakeholders.[5] The CAISO overhauled the generator interconnection process in 2008 to establish (i) a cluster study process and (ii) requirements for project viability and developer commitment as soon as interconnection customers have an estimate of the costs of their projects. The CAISO studies projects in clusters and requires an initial posting of at-risk financial security for network upgrades following the phase I study results, a second posting following the phase II study

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2 *See* California P.U.C., "California Renewables Portfolio Standard," *available at* http://www.cpuc.ca.gov/PUC/energy/Renewables/.

3 The California Public Utilities Commission ("CPUC") directed California investor-owned utilities to procure 1,325 MW of energy storage (excluding pumped hydro storage) by 2020. *See, e.g.,* CPUC/CAISO Issue Paper on Joint Workshop on Multiple-Use Applications and Station Power for Energy Storage, *available at* http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M159/K876/159876453.PDF.

4 There were over 260 projects in the interconnection queue as of September 21, 2015. *See* http://www.caiso.com/planning/Pages/GeneratorInterconnection/Default.aspx (CAISO website page listing projects in the queue).

5 The generator interconnection process and related provisions are set forth primarily in section 25 of the CAISO tariff. The interconnection procedures and *pro forma* generator interconnection agreements ("GIAs") are contained in appendices S through FF

results, and a third posting at the commencement of construction activities.[6]

In 2012, the CAISO implemented a second major reform[7]—the generator interconnection and deliverability allocation procedures, or "GIDAP"—to integrate the transmission planning and generator interconnection processes.[8] Under the GIDAP, interconnection customers that propose to locate their projects in areas with planned transmission upgrades will have lower costs. Interconnection customers with proposed locations for their projects not supported by the transmission planning process will incur higher costs and will not be eligible to receive reimbursement for network upgrade costs that exceed the cost cap of $60,000 per MW of generating capacity.[9] The Commission approved the GIDAP, finding that it: (1) provides incentives for generation developers to choose interconnection points consistent with public policy-driven transmission development, and limit ratepayer responsibility for inefficient or underutilized upgrades; (2) produces more realistic study result and cost estimates, thereby improving chances that viable projects will achieve commercial operation; (3) provides greater certainty for generation developers that the needed delivery upgrades will be granted permits by relevant state siting authorities; and

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6 *See California Independent System Operator Corp.*, 124 FERC ¶ 61,292 (2008).

7 In 2010, the CAISO conducted another stakeholder process to harmonize the CAISO's LGIP with its SGIP by establishing integrated cluster study processes for small and large generators. The CAISO also revised its interconnection procedures to expedite study processes for independent or otherwise adroit generators by implementing new independent study and fast track processes. *California Independent System Operator Corp.*, 133 FERC ¶ 61,223 (2010).

8 *California Independent System Operator Corp.*, 140 FERC ¶ 61,070 (2012).

9 Section 14.3.2.1 of Appendix DD to the CAISO tariff.

(4) provides greater transparency into the transmission development process.[10]

In April 2013, the CAISO launched its first Interconnection Process Enhancement ("IPE") initiative.[11] The IPE initiative represented the next step in stakeholder processes that the CAISO has conducted over the past several years to meet its commitment to improve interconnection procedures. The 2013 IPE initiative resulted in several tariff amendments in 2013 and 2014.[12] The CAISO re-launched the IPE initiative in 2015, which resulted in 11 more enhancements, including certain enhancements proposed in the NOPR, namely, the affected system outreach process and allowable modifications between initial studies.[13]

B. Energy Storage

The CAISO also has implemented several enhancements to enable electric storage resources to participate in the CAISO markets. The CAISO first developed the framework for the "non-generator resource" model in 2010 in response to the directives of Order Nos. 719 and 890 to facilitate the provision of ancillary services by non-generator resources.[14] In 2011, the CAISO created the non-generator resource model and detailed the procedures for non-generator

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[10] *California Independent System Operator Corp.*, 140 FERC ¶ 61,070 at P 8.

[11] Further background information on the IPE initiative is provided in the CAISO's September 30, 2013 tariff amendment filing in Docket No. ER13-2484 to implement the first set of tariff revisions to come from that initiative.

[12] *California Independent System Operator Corp.*, 149 FERC ¶ 61,231 (2014); 148 FERC ¶ 61,077 (2014); 145 FERC ¶ 61,172 (2013).

[13] *California Independent System Operator Corp.*, 154 FERC ¶ 61,169 (2016); 153 FERC ¶ 61,242 (2015).

[14] *California Independent System Operator Corp.*, 132 FERC ¶ 61,211 (2010).

resource market participation, including the use of regulation energy management functionality.[15] In 2013, the CAISO conducted an energy storage interconnection initiative to examine potential issues with energy storage resources' interconnecting to the CAISO controlled grid.[16] Stakeholders agreed that the CAISO's existing interconnection procedures adequately processed electric storage resources such that tariff reform was unnecessary.[17] Stakeholders also agreed with the CAISO's proposal to study and model electric storage resources' charging function as "negative generation" in lieu of conducting traditional firm load studies, which was identified as a best practice in the NOPR.[18]

C. AWEA Petition and Technical Conference

As the NOPR states, this rulemaking proceeding began with the American Wind Energy Association's petition for a rulemaking to revise generator

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15 *California Independent System Operator Corp.*, 137 FERC ¶ 61,165 (2011). Scheduling coordinators for non-generator resources may request to certify resources that use regulation energy management to provide regulation service consistent with the continuous energy requirements. Regulation energy management is "a market feature for resources located within the CAISO Balancing Authority Area that require Energy from the Real-Time Market to offer their full capacity as Regulation." Resources that choose to use regulation energy management must sign a participating generator agreement or a participating load agreement. The resources that choose to use regulation energy management must also define their ramp rate for operating as generation and load and allow CAISO to control their operating set point. *See* CAISO tariff Appendix A; CAISO tariff section 8.4.1.2. This load is not considered firm load and is therefore treated as wholesale.

16 http://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorageInterconnection.aspx.

17 http://www.caiso.com/Documents/DraftFinalProposal_EnergyStorageInterconnection.pdf.

18 *Id.*; NOPR at P 229.

interconnection rules and procedures (AWEA Petition).[19] The AWEA Petition, commenters, and technical conference participants highlighted the success of the CAISO's interconnection reforms, and noted that the CAISO's interconnection procedures could serve as best practices for other utilities.[20] The CAISO and representatives from its participating transmission owners participated at the 2016 Technical Conference discussed in the NOPR.[21]

D. The Continuing Need for Regional Flexibility

The CAISO has undertaken many stakeholder initiatives for interconnection enhancements because the Commission has afforded the CAISO regional flexibility over its procedures. The CAISO echoes the ISO/RTO Council's recommendation for continued regional flexibility, both in complying with the NOPR and in the future.[22] ISOs and RTOs differ greatly from one another: different transmission owners, different state regulatory partners, different electrical characteristics, and different mechanisms and mandates for procurement of new resources. Only if the Commission continues to provide each ISO/RTO with the regional flexibility provided in the past will the CAISO and other ISO/RTOs be able to continue to innovate new ways to effectively and efficiently interconnect resources to their systems.

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[19] American Wind Energy Association, Petition for Rulemaking to Revise Generator Interconnection Rules and Procedures, Docket No. RM15-21-000 (filed June 19, 2015) ("AWEA Petition").

[20] *See, e.g.,* AWEA Petition at pp. 24, 30, 48; NextEra Comments on AWEA Petition at pp. 6, 9; NRG Comments on AWEA Petition at pp. 3-5.

[21] *See* Speaker Materials of Stephen Rutty (CAISO); Speaker Material of David Gabbard (PG&E) in Docket No. RM15-21 (May 13, 2016).

[22] ISO/RTO Council Comments on AWEA Petition at pp. 1-2.

II. Proposed Reforms

A. Improving Certainty for Interconnection Customers

1. Scheduled Periodic Restudies

The NOPR proposes to require transmission providers that conduct cluster studies to conduct restudies on a scheduled, periodic basis (*e.g.*, annually or quarterly). The CAISO supports this proposal, and takes this opportunity to comment on its experience with an annual restudy, which the CAISO calls the "annual reassessment." First, the CAISO suggests that the Commission only require that transmission providers provide a publication date or end-date for the periodic restudy in their respective tariffs (rather than both the beginning of the restudy and the end/publication). By only requiring a fixed publication date, the transmission providers will have the flexibility to begin their restudy processes earlier if they face more interconnections or complexities in a year, or if their experience leads them to believe that they need more time to complete these restudies. The firm publication date will still provide interconnection customers with certainty, but an open start date to run the studies will give transmission providers much needed flexibility.

Second, the CAISO cautions that a periodic restudy works effectively in the CAISO because the CAISO uses a cluster study approach with firm cost caps, and transmission owners finance network upgrade costs beyond these cost caps. Only with these mechanisms in place is it reasonable for interconnection customers to wait for an annual restudy to find out how their projects may have been affected by project withdrawals over the course of the prior year: with the

transmission owners picking up any costs above the cost cap, withdrawals can decrease or increase interconnection customers' network upgrade costs depending upon whether the upgrade is still needed for other interconnection customers. Costs decrease when sufficient interconnection customers withdraw such that a network upgrade is no longer needed, and increase when the network upgrade is still needed but withdrawals lead to fewer interconnection customers that need the upgrade (and therefore must incur a higher percentage of the costs).

In other ISO/RTOs this may not be the case. As ISO-NE and others pointed out in response to the AWEA Petition, an interconnection customer must wait for a periodic restudy to find out that its project costs have increased dramatically. The CAISO therefore cautions the Commission that it should consider its various proposals in concert because cost caps and the definition of contingent facilities have a significant impact on the efficacy of periodic restudies.

Third, the CAISO notes that for this proposal and throughout the NOPR, the Commission recommends that the *pro forma* LGIP mandate publication on *OASIS*. The CAISO respectfully requests that the Commission not mandate using OASIS for this information where a general reference to the website should suffice. OASIS is the primary tool for scheduling coordinators, the market, and operations to access information regarding daily system conditions and operations. Interconnection customers, transmission developers, and planning engineers often use different programs and interfaces that can provide them with the specific and more planning-related information and tools they need. In

addition, ISO/RTOs and utilities differ in whether their OASIS is public, requires a login, or requires a non-disclosure agreement, and their OASIS requirements may differ from their requirements for their planning sites. For example, the CAISO does not require a non-disclosure agreement to use its OASIS, but it requires a non-disclosure agreement for its planning portal because that portal contains sensitive customer information and critical infrastructure information. The CAISO agrees with the proposal that each transmission provider should publish the restudy dates; however, doing so under its normal market notice procedures (which include publication on the website and direct emails to all subscribers) would serve the Commission's purposes better than strict OASIS requirements.

2. The Interconnection Customer's Option to Build

The NOPR proposes to modify the *pro forma* LGIP to remove the condition that self-build options only be available where the transmission owner cannot meet the interconnection customer's schedule. The CAISO already allows this and thus supports the Commission's proposal. The CAISO, however, cautions that the Commission should not make self-build options universal and absolute. Without rules to ensure cost-efficiency, interconnection customers' self-building their own network upgrades can create issues for the transmission owner, grid reliability, and ratepayers. In addition, later queued projects may rely on network upgrades being built by an interconnection customer. These other customers can be adversely affected if the customer withdraws from the queue or delays construction.

First, the CAISO agrees with the NOPR that requiring transmission owner consent regarding design and construction details is critical. Because the transmission owner ultimately will assume ownership of these network upgrades and must operate and maintain them, and because future interconnection customers may interconnect to the facilities, the facilities must follow the transmission owner's existing interconnection, engineering, and construction standards. Interconnection customers should not be able to build whatever they want in the name of cost, speed, or preference, without regard to good utility practice. Stand-alone network upgrades must meet the engineering and reliability standards of the rest of the grid.

Second, the CAISO recommends that the Commission require that stand-alone network upgrade costs be capped for reimbursement under their interconnection studies. The CAISO's experience shows that interconnection customers often elect to self-build stand-alone network upgrades when they believe that they can construct them much more quickly than the transmission owner. But this speed often comes at a price beyond what those network upgrades normally would have cost. This premium should not flow to ratepayers, and instead should be assumed by the interconnection customer without cash, transmission credit, or congestion revenue right reimbursement. Approval to self-build stand-alone network upgrades should not include a ratepayer-funded blank check to construct upgrades at any cost.

3. Self-funding by the Transmission Owner

The NOPR proposes to require agreement between a transmission owner or provider and interconnection customer before the transmission owner or provider may elect to initially fund network upgrades.[23] The CAISO supports this proposal.

4. RTO/ISO Dispute Resolution

The NOPR says that "Commenters have not raised dispute resolution procedures outside of RTO/ISO regions as an issue, so the Commission has not proposed changes to non-RTO/ISO dispute resolution procedures in this Proposed Rule. However, as discussed below, the Commission invites comments regarding the adequacy of dispute resolution processes outside of RTO/ISO regions."[24] Some commenters on the AWEA Petition believe that the ISO/RTO could resolve disputes between transmission owners and interconnection customers.[25] Others, however, pointed out this would likely result in the interconnection customer "losing" the dispute.[26]

Because the CAISO and its transmission owners generally make all planning and interconnection decisions in conjunction, the CAISO agrees there would be little point in having the CAISO mediate or arbitrate disputes with the interconnection customer and transmission owner. Because the CAISO and its transmission owners do not always initially agree on issues—but strive to present

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23 NOPR at P 64.

24 NOPR at P 78.

25 NOPR at PP 80-81.

26 NOPR at P 81.

a united front to provide clarity to the interconnection customer—CAISO staff and transmission owners' staff already expend enormous amounts of energy to resolve issues *before* they communicate to the interconnection customer. Generally, neither the CAISO nor the transmission owner unilaterally decide issues in the interconnection process. If issues can be resolved neutrally, the CAISO tariff already provides alternative dispute resolution, negotiation, and mediation, including a dispute committee dedicated specifically to generator interconnection issues.[27]

5. Capping Costs for Network Upgrades

The NOPR and the AWEA Petition both cite the CAISO's use of cost caps for network upgrade costs as a potential model for a best practice.[28] Commenters on the AWEA Petition rightly pointed out, however, that the CAISO's use of cost caps is premised on an allocation system where transmission owners (and thus ratepayers) ultimately reimburse interconnection customers for network upgrades.[29] Because the Commission recognizes that the ISO/RTOs have developed different rules for cost responsibility, implementing cost caps may be difficult.[30] The NOPR thus "appreciates insights into balancing the benefits of increasing cost certainty to interconnection customers against the

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27 *See* Section 13 of the CAISO tariff; Section 15.5 of Appendix DD to the CAISO tariff.

28 NOPR at P 88 *et seq.*

29 NOPR at P 92 ("MISO asserts that . . . any cost overruns are ultimately shifted to load, which will eventually benefit from any generation resulting from the interconnection").

30 NOPR at P 94.

potential drawbacks of shifting costs to other parties, particularly load."[31]

The CAISO supports the use of cost caps for network upgrades in the interconnection process. While they come with some risk, discussed below, the CAISO, its stakeholders, and especially the generation community in California have found cost caps to be beneficial. Cost caps allow generators to have clear demarcations for their financial responsibilities going forward, which mitigates risk and financial uncertainty where generators submit proposals to provide capacity and later seek financing for construction. The CAISO also has had success re-evaluating projects' estimated costs with the CAISO's annual reassessment process.[32] The reassessment provides a true-up between an interconnection customer's Phase I and Phase II interconnection studies to reflect recent developments in the immediately preceding queue cluster.

Commenters are correct to wonder whether the certainty cost caps can provide may come at a price. Issues frequently arise where financiers and load serving entity procurement processes choose not to distinguish between cost estimates and cost caps. This makes sense: even where an interconnection customer's cost estimate is low (and thus marketable), a higher cost cap indicates that the project bears risk (making it less marketable). This issue arises sometimes under the CAISO's interconnection procedures. To provide a usable, true cost cap, the CAISO and the transmission owner must include the costs of

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31 NOPR at P 95.

32 *See* Section 7.4.3 of Appendix DD; *California Independent System Operator Corp.*, 140 FERC ¶ 61,070 (establishing the reassessment process); 148 FERC ¶ 61,077 (2014) (enhancing the reassessment to evaluate the effects of generators' downsizing).

all of the network upgrades for which the interconnection customer may be responsible. Where an interconnection customer may be responsible for financing a large network upgrade—like a new substation or substantial reconductoring—the cost cap is high, even where it is unlikely this one interconnection customer must finance the entire upgrade (*e.g.*, if higher-queued interconnection customers or other interconnection customers in its cluster bear or share the costs). This cost cap may make it more difficult for that interconnection customer to market its project for a power purchase agreement. However, weighed against the uncertainty presented by the absence of any real cost cap, CAISO stakeholders have preferred to have cost caps.

Commenters correctly note that the CAISO's system may be more difficult outside of regions where ratepayers ultimately pay for generator interconnection-driven network upgrades.[33] In the CAISO, the interconnection customer only provides the initial financing for its network upgrades. Upon reaching commercial operation, those costs are reimbursed by the transmission owner and included in that transmission owner's transmission revenue requirement paid by ratepayers. Where actual costs exceed the cost caps provided in the interconnection studies,[34] the transmission owner assumes the cost, but it would have assumed the cost anyway. The only question is whether the transmission owner's assumption of the cost occurs before commercial operation (for costs above the

[33] For reliability network upgrades, costs to load are capped at $60,000 pew MW of generating capacity to balance the costs of the upgrade with the benefits the generator presents.

[34] Not to be confused with the $60,000/MW cost cap. Costs above this cost cap must be financed on a merchant basis by the generator. The transmission owner and ratepayers do not bear costs above this cap.

cost cap), or after commercial operation (for costs below the cost cap). In a system where the interconnection customer bears the ultimate costs for the network upgrades it triggers, the question the Commission must answer is Who pays for costs above the cost cap? The Commission cannot examine whether to require cost caps in a vacuum. Cost caps may shift costs to ratepayers in regions where ratepayers do not pay for generator interconnection driven network upgrades, namely, the majority of RTOs.

The CAISO agrees with other commenters that cost caps should never include the costs of interconnection facilities. Interconnection facilities are not part of the bulk electric system or the ISO/RTO grid, and by definition, they do not benefit ratepayers such that ratepayers should bear their costs. As such, only the interconnection customer should be solely responsible for their costs. If an interconnection customer elects to rely on the transmission owner to construct interconnection facilities for it, the interconnection customer should bear the risk of that election.

B. Promoting More Informed Interconnection

1. Identification and Definition of Contingent Facilities

The NOPR proposes to revise the *pro forma* LGIP to require transmission providers to detail the method they use to determine contingent facilities, namely, those unbuilt interconnection facilities and network upgrades upon which the interconnection customer's costs, timing, and study findings are dependent (and if not built, could cause a need for restudies or a reassessment of costs or

timing).[35] The NOPR also suggests that interconnection agreements list these contingent facilities.[36] Finally, the NOPR seeks comment on whether estimates of the costs and timing of higher-queued contingent facilities are helpful to the interconnection customer and can be provided to the interconnection customer without disclosing commercially sensitive information.[37]

Because of the CAISO's firm cost cap system, the CAISO lists contingent facilities in the interconnection customer's study reports. This information is critical because the study results depend upon the pre-cursor projects' construction. In other cases, interconnection customers must know of the potential for pre-cursor project delays to delay their projects. Such delays often require power purchase agreements to be re-negotiated, which can be problematic for all involved.

2. Transparency regarding Study Models and Assumptions

The NOPR proposes to require transmission providers make available all assumptions regarding the underlying network model used for interconnection studies, including before interconnection requests are submitted (so potential interconnection customers can prepare optimal requests).[38] The NOPR says this information should be available on transmission providers' OASIS sites.[39]

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35 NOPR at P 97.

36 NOPR at P 102.

37 NOPR at P 108.

38 NOPR at P 118.

39 NOPR at P 119.

For the reasons described in the NOPR, the CAISO already makes its network model and study assumptions available on the CAISO's website. As the Commission notes, this allows interconnection customers to submit informed interconnection requests. As such, the CAISO supports the Commission's proposal. However, as described in Section II.A.1, above, the CAISO respectfully requests that the Commission not mandate using *OASIS* in all cases and simply refer generally to the entity's website. The CAISO agrees with the proposal to make the network model and study assumptions available; however, doing so pursuant to existing sites, portals, and market notice procedures (which generally include publication on the website and direct emails to all subscribers) would serve the Commission's purposes better than strict OASIS requirements. It would also save ratepayers from the cost of the CAISO having to move its existing transmission planning sites into OASIS (with no incremental benefit).

3. Congestion and Curtailment Information

The NOPR proposes to require transmission providers to post congestion and curtailment information, and seeks comment regarding the location of such posting and the level of granularity of the data.[40] The NOPR states that this information "can be particularly important for interconnection customers that are considering Energy Resource Interconnection Service ("ERIS"), as the interconnection customer may interconnect to the transmission system and be eligible to deliver its output using the existing firm or non-firm capacity of that

[40] NOPR at P 122.

transmission system on an 'as available' basis."[41] The NOPR notes that "[c]urrently, transmission providers are not required to provide consistent and transparent congestion information to interconnection customers. The level of disaggregation and availability of this data varies per transmission provider. Additionally, how and where this data is posted may be inconsistent from transmission provider to transmission provider."[42]

Specifically, the NOPR proposes to require transmission providers to post on OASIS information on congestion data representing:

i. Total hours of curtailment on all interfaces;

ii. Total hours of Transmission Provider-ordered generation curtailment and transmission service curtailment due to congestion on that facility or interface;

iii. the cause of the congestion (e.g., a contingency or an outage); and

iv. total megawatt hours of curtailment due to lack of transmission for that month.[43]

The NOPR proposes that these data be posted on a monthly basis and maintained for a minimum of three years.[44]

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41 *Id*. "Energy Resource Interconnection Service shall mean an Interconnection Service that allows the Interconnection Customer to connect its Generating Facility to the Transmission Provider's Transmission System to be eligible to deliver the Generating Facility's electric output using the existing firm or nonfirm capacity of the Transmission Provider's Transmission System on an as available basis. Energy Resource Interconnection Service in and of itself does not convey transmission service. *See* Standard Large Generator Interconnection Procedures, Section 1, Definitions." Order No. 2003, FERC Stats. & Regs. ¶ 31,146 at PP 752–753.

42 NOPR at P 123.

43 NOPR at P 130.

44 *Id*.

The CAISO supports the Commission's efforts to provide more transparency (and thus more predictability) for interconnection customers, but it is concerned that the Commission's efforts here will only create the illusion of transparency and predictability. Transmission providers do not plan curtailments: Economic curtailments are the result of economic bidding and market optimization, and other curtailments—effected through exceptional dispatch—protect the grid from events that are difficult or impossible to predict, such as outages, overloads due to oversupply, and contingency events.

It is a fiction that potential interconnection customers do not already have access to these data. Transmission providers like the CAISO publish exceptional dispatch reports, congestion data, and LMP data so that potential interconnection customers can understand where there is available capacity. Moreover, every interconnection customer in the CAISO receives a "Net Qualifying Capacity," which measures the resource's ability to deliver its output to the grid during peak conditions so that it can provide Resource Adequacy. Interconnection customers seeking "Full Capacity Deliverability Status" are studied differently than "energy only" interconnection customers because they may need additional upgrades to ensure deliverability. As such, the CAISO already provides interconnection customers with as much information *as can be predicted*. But interconnection customers cannot, and should not, be protected from curtailment to protect the grid. Nor should they be protected from market optimization based on economic bidding.

As such, the CAISO questions what the effect of packaging these data for interconnection customers will be, particularly in cases where there was little curtailment before a new generator interconnects, but increased curtailment after. Moreover, the CAISO already posts on its OASIS the congestion prices at each node. If the Commission requires that curtailment data be aggregated and packaged specifically for interconnection customers, it should clarify that these data cannot be the basis for a future complaint regarding that generator's curtailment.

4. Definition of "Generating Facility" in the Pro Forma LGIP and LGIA

The NOPR proposes to include energy storage resources within the functional definition of "Generating Facility" in the *pro forma* LGIP and LGIA:

> Generating Facility shall mean Interconnection Customer's device for the production and/or storage for later injection of electricity identified in the Interconnection Request, but shall not include the interconnection customer's Interconnection Facilities.[45]

The CAISO supports this proposal. The CAISO already has clarified that energy storage resources can participate as generators to provide supply and ancillary services into the CAISO markets. Although the CAISO studies the reliability impacts of a storage resource's charging, it does not require the storage resource to be studied as firm load. Storage facilities that require firm load treatment can apply to the local distribution company.

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[45] NOPR at P 138.

The CAISO described these efforts in the Commission's proposed rulemaking on energy storage participation and distributed energy resources.[46] The CAISO also conducted a stakeholder initiative in 2014 to examine whether any additional enhancements were necessary for the interconnection process to accommodate energy storage resources. The CAISO and stakeholders concluded that no additional enhancements were necessary for the interconnection process to accommodate energy storage resources at that time.[47] The CAISO has processed hundreds of interconnection requests for electric storage resources, and many have come online.

5. Interconnection Study Deadlines

To track late study results from transmission providers using the "reasonable efforts" standard, the NOPR proposes to require that all transmission providers post summary statistics related to processing interconnection studies on their OASIS sites on a quarterly basis for one year. The Commission further proposes that a transmission provider that has more than 25% of any study type exceeding study deadlines for interconnection requests for two consecutive quarters must file additional informational reports with the Commission.[48]

The CAISO opposes this proposal *as applied to the CAISO* and other transmission providers with firm study deadlines. The CAISO and its

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[46] *See Electric Storage Participation in Markets Operated by Regional Transmission Systems and Independent System Operators*, Docket Nos. RM16-23 and AD16-20; Comments of the California Independent System Operator Corp. (February 13, 2017).

[47] http://www.caiso.com/Documents/DraftFinalProposal_EnergyStorageInterconnection.pdf.

[48] NOPR at P 148.

transmission owners do not rely on the reasonable efforts standard to repeatedly allow for additional time. The CAISO interconnection procedures and transmission planning process are coordinated such that one process informs the other. This necessitates completing the interconnection studies on a timely basis. As such, the CAISO and its transmission owners complete studies on a timely basis. Additionally, the CAISO already publishes extremely detailed schedules of its study process for each queue cluster on its interconnection public website.[49] The CAISO therefore should not be subjected to reporting requirements intended to curb late studies. The CAISO requests that the Commission clarify that this proposal is limited to those transmission providers and owners that do not have firm study deadlines in their tariffs.

The CAISO again objects to the Commission's direct reference to *OASIS* in the NOPR for the reasons explained in Section II.B.2, above. Using existing public websites, portals, and reports should satisfy any publication requirement, and would save ratepayers from the expense of the transmission providers' being required to move data onto OASIS. In addition, it would allow the critical assets to remain confidential subject to existing processes for access.

6. Improving Coordination with Affected Systems

The NOPR noted that comments on the AWEA Petition indicated that "transmission providers may not provide sufficient information on the guidelines and timelines they will use to coordinate with affected systems during the

[49] https://www.caiso.com/planning/Pages/GeneratorInterconnection/Default.aspx.

interconnection process."[50] The Commission concluded that providing such guidelines could help interconnection customers to avoid late withdrawals due to unforeseen costly network upgrades on affected systems. Further, a clear set of procedures and timelines regarding the affected system's study of the proposed interconnection memorialized in a Commission-approved agreement regarding affected systems analysis could help to ameliorate delays experienced awaiting study results from affected systems.[51] The NOPR thus seeks comments on whether the Commission should prescribe guidelines for affected systems analyses and coordination or if it should impose study requirements and associated timelines on affected systems that are also public utility transmission providers.[52] The NOPR also seeks comment on whether to standardize the process for coordinating an affected system analysis and whether to develop a standard affected system study agreement. Finally, the NOPR seeks comments on proposals or additional steps that the Commission could take (*e.g.,* conducting a workshop or technical conference focused on improving issues that arise when affected systems are impacted by a proposed interconnection).

The CAISO appreciates the Commission's attention to this issue, which the CAISO raised in its joint comments with PJM, MISO, and NYISO on the AWEA Petition.[53] As the Commission is aware, the CAISO recently enhanced its

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50 NOPR at P 158.

51 *Id*.

52 NOPR at P 159.

53 Joint Comments of the CAISO, MISO, NYISO, and PJM Interconnection on the AWEA Petition, at pp. 7 *et seq.*

interconnection procedures for addressing affected system issues.[54] The CAISO's enhancements have been well received by interconnection customers, affected systems, and CAISO staff because they have reduced administrative burden and uncertainty for all parties. Below, the CAISO describes these recent enhancements.

Principally, the CAISO formalized the obligation that the CAISO—in lieu of interconnection customers—will notify potentially affected systems within 30 days of when interconnection customers post their initial interconnection financial security.[55] This simple change allows each potentially affected system to receive one list at one time of all proposed generator interconnections that may affect it, instead of having each interconnection customer contact it separately on an ad-hoc basis. The affected system is invited to the Phase II scoping meeting and results meetings for each project it identifies as affecting its system.

The CAISO also developed a list of limited circumstances that warrant later notification: Where (i) the CAISO failed to identify the affected system initially for any reason (*e.g.*, due to administrative error); (ii) the interconnection customer modifies its project such that an electric system operator becomes a potentially affected system; or (iii) the interconnection customer converts from a Wholesale Distribution Access Tariff to the CAISO tariff and the same affected

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[54] *California Independent System Operator Corp.*, 154 FERC ¶ 61,169 (2016); Section 3.7 *et seq.* of Appendix DD to the CAISO tariff.

[55] Initial interconnection financial security postings generally occur after the interconnection customers' Phase I study results meetings (approximately one year into the interconnection process). The CAISO intends to provide these notices in complete batches to each affected system (*i.e.*, in one email and letter containing all of the proposed interconnections that may affect their system) for administrative efficiency.

systems were not notified previously (or the conversion was due to a system change). In these limited circumstances—which have not occurred since the CAISO implemented these reforms last year—the CAISO would coordinate with the interconnection customer and the potentially affected system to develop an expedited timeline to determine whether the potentially affected system actually may have a reliability impact so as to warrant affected system studies. The CAISO would then notify the interconnection customer as soon as practical of the new identified affected systems.

Once the CAISO has notified the potentially affected systems, they have 60 days to determine whether each generator could present potential reliability issues that may warrant mitigation. For these generators, the affected system notifies the CAISO that it is an "identified affected system" that should continue to be involved in all study processes and that the CAISO should await affected system feedback before synchronizing the generator. If a potentially affected system does not respond, the CAISO assumes that it is not affected by the proposed interconnection. Because the affected system is not required to conduct any studies during this 60-day period or make any final determinations regarding the reliability impacts of the interconnection, the CAISO, stakeholders, and affected systems felt a 60-day notification period is reasonable. This straightforward notification period provides meaningful certainty for interconnection customers: They will know the affected systems with which they will need to coordinate studies and, perhaps more importantly, they know other affected systems cannot raise objections to their interconnection to the CAISO

later in the process (absent extenuating circumstances, as discussed below). Interconnection customers are thus exposed to fewer affected system risks and uncertainties.

Because affected systems inherently are not subject to the CAISO tariff, the CAISO also explained in the tariff how the CAISO will proceed if affected systems fail to identify themselves on a timely basis (rather than try to impose requirements on the affected systems themselves). If an electric system operator advises the CAISO that it is an affected system outside of the 60-day window, the CAISO does not delay the synchronization or commercial operation of the generator unless the electric system operator identifies and the CAISO confirms a reliability issue.

C. Enhancing Interconnection Processes

1. Requesting Interconnection Service Below Generating Facility Capacity

The NOPR proposes to allow interconnection customers to request a level of interconnection service for a generating facility that is lower than the generating facility's capacity.[56] For example, the owner of an electric storage resource with a generating facility capacity of 30 MW may choose to operate the facility in such a way that it only uses 25 MW of interconnection service. Under this proposal, the transmission provider would allow the interconnection customer to apply for the 25 MW it intends to use instead of the entire 30 MW of generating facility capacity. If a facility utilizes this option, it must establish in its

[56] NOPR at P 161.

interconnection agreement the appropriate hardware and/or software to prevent it from exceeding its interconnection service, consent to penalties if its output does exceed its interconnection service, and be subject to curtailment provisions.[57]

As the NOPR notes, the CAISO allows interconnection requests for less than nameplate capacity. The CAISO supports the proposal because this degree of flexibility can be a significant benefit to interconnection customers—especially newer resources that combine storage, conventional generation, high auxiliary load, and/or onsite demand-side management—and the transmission operator is unaffected so long as the interconnection request studies the correct capacity and, as the NOPR notes, that capacity is never exceeded. As several commenters noted, exceeding studied interconnection capacity can result in serious safety and reliability risks to the grid and the generator itself. Accordingly, tested and well-maintained protection schemes that enforce these limits and operate circuit breakers to disconnect the generator from the transmission system are far more critical than mere agreement in the GIA. The CAISO supports strict enforcement of interconnection capacity limits, including opening breakers as enforcement and, if needed, terminating GIAs.

2. Provisional Interconnection Service

The NOPR states that "in some cases, there is a certain amount of interconnection capacity that has already been studied at the point of interconnection. The Commission therefore proposes to adopt a provisional agreement process wherein new generating facilities could interconnect, possible

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57 *Id*.

under limited operation, using interconnection service pursuant to existing and regularly updated studies while they wait to complete the additional studies needed to satisfy their full interconnection request."[58]

The CAISO seeks clarification on this proposal. The CAISO does not understand what the Commission means in stating that "there is a certain amount of interconnection capacity that has already been studied." As explained in detail below on the concept of "surplus interconnection service," the CAISO does not study projects that are not in service or in queue. As such, the only interconnection capacity that the CAISO has already studied is either in use or is planned to be in use soon. To the extent this is what the Commission contemplates, the CAISO supports the proposal and notes that the CAISO's interconnection procedures already provide different avenues for interconnection customers to come online "provisionally":

- "Phased Generating Facilities" allows the interconnection customer to structure its construction and GIA milestones to achieve commercial operation in two or more successive phases.[59] For example, an interconnection customer may submit an interconnection request to construct 50 MW of photovoltaic solar. Once studies are complete, it could structure its GIA to reflect that 25 MW would be constructed and achieve commercial operation in

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58 NOPR at P 181.

59 *See* Section 11.4.1.2 of Appendix EE to the CAISO tariff.

commercial operation year one, 15 MW in year two, and the final 10 MW in year three.

- "Commercial Operation for Markets" allows a portion or all of a contemplated generating facility to be tested and synchronized to bid into the CAISO markets in advance of achieving its planned commercial operation date.[60] This allows generating facilities to begin participating in markets ahead of schedule without altering the negotiated and agreed-upon schedule for the transmission owner to reimburse the interconnection customer for financed network upgrades.
- "Energy-only interconnections" allow an interconnection customer to come online completely or in phases in situations where reliability network upgrades are completed before delivery network upgrades are completed. As such, the generating facility may begin participating in the CAISO markets while it awaits the delivery network upgrades that will allow it to provide Resource Adequacy Capacity.
- "Limited Operation Studies" allow interconnection customers to request that the CAISO and transmission owner determine extent to which a generating facility may come online prior to the completion of network upgrades or transmission owner

[60] *See* Section 7 of the Business Practice Manual for Generator Management, *available at* https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Generator%20Management.

interconnection facilities.[61] Interconnection customers may request a limited operations study within five months of their synchronization to determine if the system can operate reliably if these transmission facilities cannot be completed prior to the interconnection customer's requested commercial operation date.[62]

3. Utilization of Surplus Interconnection Service

The NOPR states that "a number of interconnection customers would like to co-locate new generating facilities with existing generating facilities [that] may not be fully utilizing an existing generating facility's interconnection service," for example, by adding electric storage to a variable energy resource.[63] The NOPR thus proposes to require transmission providers to provide "an expedited process for interconnection customers to utilize or transfer surplus interconnection service at existing generating facilities."[64] The NOPR further proposes "that this process give an existing generating facility owner or its affiliate priority to use the surplus interconnection service, but that the tariffs and *pro forma* LGIP also establish an open and transparent process for the sale of that surplus interconnection service if the owner and its affiliates elect not to use it, and elect to make it available to another party."[65] Specifically, the NOPR proposes

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61 Section 14.2.4 of Appendix DD to the CAISO tariff.

62 The reason for this timing is the relevance of the system topology and status of the generating units, both existing and the current projected synchronization date of other generating facilities.

63 NOPR at P 191.

64 *Id*.

65 *Id*.

> that the studies for surplus interconnection service shall consist of reactive power, short circuit/fault duty, and stability analyses, and that steady-state (thermal/voltage) analyses may be performed as necessary to ensure that all required reliability conditions are studied. The Commission proposes that if the surplus interconnection service was not studied under off-peak conditions, off-peak steady state analyses shall be performed to the required level necessary to demonstrate reliable operation of the surplus interconnection service. The Commission also proposes that if the original System Impact Study is not available for the surplus interconnection service, both off-peak and peak analysis may need to be performed for the existing generating facility associated with the request for surplus interconnection service.[66]

Finally, the NOPR seeks comment on

> whether the surplus interconnection service should survive the retirement of the existing generating facility. The Commission seeks comment on whether the interconnection agreement for surplus interconnection service should terminate upon the retirement of the existing generating facility, or whether there are circumstances under which the surplus interconnection service customer may operate its generating facility under terms of the surplus interconnection service agreement after the retirement of the existing generating facility.[67]

The CAISO questions the need for this proposal for two reasons. First, the CAISO seeks clarification on how the Commission would define "*surplus* interconnection capacity." To the CAISO, the only interconnection capacity that has already been studied is the interconnection capacity existing generators are using or interconnection customers in queue that have completed their Phase I and Phase II interconnection studies contemplate using. Anything previously studied and abandoned or partially built would have been based on network topology at the time and would be current. Thus, there is no additional

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66 NOPR at P 202.

67 NOPR at P 24.

interconnection capacity or "headroom." Moreover, Commission precedent is clear that interconnection capacity is not a property right, and that where an interconnection customer builds less capacity than it requested, it does not retain that capacity indefinitely.[68] Because interconnection capacity is not indefinitely retained, the CAISO removes it from its base case. Moreover, the concept of "interconnection capacity that has already been studied" could be based on the false premise that all interconnection capacity is the same—as if the megawatts at stake were the only factor studied. That is not the case. Interconnection studies are highly project specific because reliability depends on that specificity. 100 MW of natural gas will have a very different impact on the grid than 100 MW of wind, even when they are at the same interconnection point. Moreover, the CAISO conducts interconnection studies on a cluster basis, so the fact-specific problems described here are compounded by the number of interconnection requests. The fact that interconnection capacity at a point of interconnection was studied at some point does not mean that another project could quickly be plugged for the same capacity and operate reliably. Projects must be studied, and the Commission should ensure that it does not sacrifice reliability studies on the altar of convenience.

Second—if this proposal concerns the interconnection capacity that existing generators are using or interconnection customer in the queue that have completed their Phase I and Phase II interconnection studies contemplate

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[68] *See CalWind Resources Inc. v. California Independent System Operator Corp.*, 146 FERC ¶ 61,121 at PP 33 *et seq.* (2014).

using—the CAISO does not believe that any reform is necessary (or that transmission providers should be involved in this process). Generation developers already can—and do—take advantage of existing interconnection capacity where available. This almost always occurs when an existing generating facility retires or wishes to repower its facility. The CAISO allows interconnection customers to take advantage of existing interconnection capacity primarily in two ways (often together):

1. **Repowering:** The CAISO tariff allows existing generating units to modify their facilities as long as they do not (i) increase the total capability of the plant, or (ii) substantially change their electrical characteristics such that original reliability studies would be affected.[69] The CAISO refers to these modifications as "repowering" because they generally consist of developers' replacing and updating antiquated technology, often to the entire plant. Recently this process has been utilized to swap out existing conventional generation for energy storage. Critically, interconnection customers retain their ability to repower only for a three-year period from when they last produced energy.[70]

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[69] *See* Section 25.1.2 of the CAISO tariff; Section 12 of the BPM for Generator Management, *available at* https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Generator%20Management. These provisions also provide the detailed rules and study procedures the CAISO uses to ensure that electrical characteristics will remain unchanged such that reliability studies are unaffected.

[70] Interconnection customers may extend this period where they can demonstrate that they are actively in construction.

2. **Assignment:** Article 19 of both the *pro forma* LGIA and the CAISO's LGIA allow interconnection customers to assign their rights and obligations for interconnection service. An interconnection customer retiring its resource (that does not want to repower) may assign it to another developer that wishes to repower the existing generating units with the three-year retention period. In other words, the three-year limit to repower still applies to the assignee based on the original owner's last production.

Although the CAISO and transmission owner is intimately involved in the repowering process, the CAISO does not believe that a transmission provider-administered process should replace the assignment process. Generation developers in California already take advantage of these processes without the need for the bureaucracy the NOPR would create. Moreover, allowing some generators and their interconnection capacity to retire fully has real benefit. Transmission providers would be seriously challenged to ensure a reliable grid if every ancient interconnection study is grandfathered for decades because new developers can bypass the interconnection study process by building near a retiring generating facility and inheriting its study assumptions.

4. Material Modification and Incorporation of Advanced Technologies

The NOPR proposes to require that transmission providers develop: (1) a definition of permissible technological advancements pursuant to an interconnection request that the interconnection process can accommodate; and (2) an accompanying procedure that will be used to accommodate the

incorporation of technological advancements to interconnection requests for synchronous and non-synchronous generating facilities.[71]

The CAISO supports this proposal. The CAISO already provides as much flexibility as can be afforded to interconnection customers to make modifications during the study process and throughout the life cycles of their projects.[72] The CAISO recommends, however, that the Commission prohibit modifications that would extend an interconnection customer's commercial operation date, especially beyond the seven-year limit for interconnection customers to remain in queue. Such a rule would prevent customer-driven modifications and project deviations from being used as a means for speculative projects to remain in queue, hoarding potential capacity and points of interconnection and causing interconnection studies to become stale. While this may sound alarmist or cynical, the CAISO experiences numerous examples of such modification requests every month.

5. Modeling of Electric Storage Resources for Interconnection Studies

The NOPR proposes to require that transmission providers evaluate their methods for modeling electric storage resources for interconnection studies, identify whether their current modeling and study practices adequately and efficiently account for the operational characteristics of electric storage resources, and provide their responses to the Commission in comments to this

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[71] NOPR at P 212.

[72] *See* Section 6 of the BPM for Generator Management, *available at* https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Generator%20Management.

Proposed Rule regarding why and how their existing practices are or are not sufficient.[73] The NOPR notes that "CAISO's approach to modeling electric storage resources (or Non-Generator Resources) as 'negative generation' was identified as a best practice during the 2016 Technical Conference and in the post-technical conference comments,"[74] and that

> the negative-generation practice in CAISO may allow transmission providers to better account for the transitions of electric storage resources between generation and load and may better enable the use of existing generator interconnection procedures and agreements due to their treatment as negative generation instead of load. This approach to studying electric storage resources may also expedite their interconnection by allowing the transmission provider to study them as a single resource and perform one study (as opposed to separate studies for generation and load impacts). In addition, this approach may also help ensure the applicability of existing interconnection agreements and procedures to electric storage resources.[75]

The NOPR stipulates that transmission providers must submit compliance filings within 90 days of the effective date of the final rule in this proceeding to demonstrate its compliance.[76]

Although the CAISO supports the Commission's attention to this issue, the CAISO does not believe that it warrants a compliance filing or other reporting requirements unless the Commission finds that a transmission provider has not adequately addressed the issues the Commission has identified. As described above, the CAISO already conducted an energy storage interconnection

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[73] NOPR at P 229.

[74] NOPR at P 228.

[75] NOPR at P 229.

[76] NOPR at P 231.

stakeholder initiative to examine potential issues with energy storage resources' interconnecting to the CAISO controlled grid.[77] Stakeholders agreed that the CAISO's existing interconnection procedures adequately processed electric storage resources such that tariff reform was unnecessary.[78] Stakeholders also agreed with the CAISO's proposal to study and model and electric storage resources' charging function as "negative generation" in lieu of conducting traditional firm load studies, which was identified as a best practice in the NOPR.[79]

III. Further Recommended Reforms

The CAISO recognizes the need to nationalize many of the practices proposed in the NOPR. Unfortunately, the NOPR largely mirrors the expressed wishes of the generation development community while ignoring the counterbalancing requests of the ISO/RTOs and utilities who must perform the interconnection studies, manage hundreds of interconnection requests, and administrate the thousands of annual modifications, requests, suspensions, withdrawals, and tweaks that these generation developers submit to them. In essence, the NOPR fails to recognize that it is often the interconnection customers themselves who undermine certainty, informed interconnections, and an enhanced interconnection process. Without counterbalancing reforms

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77 http://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyStorageInterconnection.aspx.

78 http://www.caiso.com/Documents/DraftFinalProposal_EnergyStorageInterconnection.pdf.

79 *Id.*; NOPR at P 229.

affecting the generators themselves, the Commission will effect little progress through this NOPR.

The CAISO thus takes this opportunity to offer one additional suggested reform to enhance the interconnection process and meet the Commission's goals. The CAISO's experience in the 14 years since Order No. 2003 shows that the unilateral suspension rights under Article 5.16 of the *pro forma* LGIA have not been used to achieve the Commission's goal of permitting and construction flexibility. Instead, these rights have been used in the vast majority of cases to enable resources to linger in queue while the interconnection customer takes additional time to seek a power purchase agreement. Interconnection customers, transmission owners, and transmission providers can spend months negotiating construction milestones for all parties. These milestones are memorialized such that an interconnection customer can sign a GIA on a Monday, and then suspend for three years on Tuesday. More problematic—because interconnection customers can just keep tolling their suspensions until they hit the three-year limit—the transmission provider and the transmission owner cannot determine the impact that the suspension will have on this project, its construction milestones, *and the other interconnection requests in queue* until the suspension is over.

The CAISO agrees that prudent suspensions should be allowed; the CAISO's only concern is that suspensions can have ripple effects for the project and the rest of the projects in the queue that the transmission provider cannot evaluate until the suspension ends. The CAISO therefore suggests that the

Commission allow or require transmission providers to treat suspensions similar to other modifications and allow the transmission provider to evaluate the materiality of the suspension at the time the interconnection customer makes the request. To the extent the suspension would alter the project's milestones or have materially affect other interconnection customers, including holding capacity that requires later queued customers to pay for costly upgrades to interconnect, the interconnection customer should not be allowed to suspend its project unless it mitigates those effects.

Dated: April 13, 2017

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon all of the parties listed on the official service list for the captioned proceeding, 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 13th day of April, 2017.

/s/ Grace Clark
Grace Clark