

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Consider
Distributed Energy Resource Program
Cost-Effectiveness Issues, Data Access and
Use, and Equipment Performance Standards.

Rulemaking 22-11-013
(Filed November 17, 2022)

**COMMENTS OF THE
CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION ON
ORDER INSTITUTING RULEMAKING TO CONSIDER DISTRIBUTED ENERGY
RESOURCE PROGRAM COST-EFFECTIVENESS ISSUES, DATA USE AND ACCESS,
AND EQUIPMENT PERFORMANCE STANDARDS**

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I. Introduction

Pursuant to the California Public Utilities Commission’s (Commission) November 17, 2022 *Order Instituting Rulemaking to Consider Distributed Energy Resource Program Cost-Effectiveness Issues, Data Use and Access, and Equipment Performance Standards* (OIR), the California Independent System Operator Corporation (CAISO) submits comments on the proposed preliminary scope and schedule.

Load-modifying behavior and behind-the-meter (BTM) generation have significantly altered the CAISO’s load shape over the past few years. The CAISO must ensure the wholesale market is positioned appropriately to maintain reliability. This means the CAISO must be aware of changes that impact load response and BTM generation activity. Visibility into load drivers and the activity of BTM resources will improve the CAISO’s operational forecasts, real-time assessments, situational awareness, contingency planning, market design efforts, and uncertainty assessments. The CAISO strongly supports the Commission focusing on data use and access as a dedicated track in this proceeding. The Commission should ensure it collects data necessary to measure the impacts of BTM resources on customer demand and evaluate customer response to retail rates, and is able to share that data with the CAISO and other entities for operational and planning needs.

The CAISO’s comments are limited to Phase 1 Track 2 of the OIR (Expanding Data Use and Access).

II. Discussion

A. The CAISO Strongly Supports the Commission’s Focus on Data Use and Access as A Dedicated Track in This Proceeding.

Phase 1 Track 2 of this proceeding will “focus on improving the reporting, availability, privacy protections, and use of data, especially data from Smart Meters and other “smart” devices.”¹ The Commission’s goals for this track include developing public-facing data portals, expanding the scope of data available, and enhancing processes and tools for collecting, reporting, and accessing data. The CAISO strongly agrees with the Commission’s conclusion that “[a]dvanced methods of data science and analytics support complex analyses of large datasets to support electric grid planning, operations, procurement, and investment as well as DER integration onto the grid.”²

The CAISO supports the Commission’s focus on improvements to distributed energy resource (DER) data collection, reporting, and access in a dedicated track in this proceeding. Data enhancements will support grid planning and reliable grid operations. The CAISO has stressed the importance of BTM and demand-side data to support reliable operations in recent proceedings at the Commission and at the California Energy Commission (CEC).³ This data is critical to ensure the accuracy of the CAISO’s short-term load forecasts that are used in market processes to schedule and dispatch resources in the wholesale market. Data on BTM resources and the underlying drivers of DER behavior and load response to retail rates are critical to ensure accurate load forecasting and reliable grid planning.

B. Better Data Will Help the CAISO Operate the System Reliably Under a High Penetration of BTM DERs.

The CAISO relies on vast amounts of data to forecast demand accurately and serve load reliably. The CAISO’s ability to reliably balance supply and demand relies on accurate short term demand forecasting. The CAISO uses its short-term load forecasts to schedule and dispatch resources in the wholesale markets. The CAISO’s short-term load forecasts account for BTM

¹ OIR, p. 21.

² OIR, p. 12.

³ See CAISO Reply Comments on Preliminary Scope and Schedule, R.21.06-017, October 7, 2021; CAISO Opening Comments on OIR, R.22-07-005, August 15, 2021; *Distributed Energy Resources in the CAISO Market and Operational Awareness*, CEC Docket 22-OII-01, June 1, 2022, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=243408&DocumentContentId=77214>

generation and load-modifying behaviors that have altered the CAISO's load shape significantly over the last few years. The effects of BTM generation on the CAISO's short term forecasts will become increasingly impactful as DERs continue to proliferate. In the future, DERs will be more heterogeneous, bi-directional, and driven by varying use patterns and customer needs. Load also may become more flexible in response to evolving retail rates that better align with grid needs.

Improved collection, reporting, and access to data are critical to understand the underlying drivers of DER behavior and load response to forecast their impacts to overall demand. In addition to the CAISO, the CEC, distribution utilities, load serving entities (LSEs), and stakeholders all need data to ensure the integrity of their load forecasts. This includes data on the size and locations of BTM resources, their actual output, and data to understand and measure the underlying drivers of DER behavior and load response. The Commission's scope for this proceeding should include data requirements to support short and long-term demand forecasting.

C. The Commission Should Coordinate Data Issues Across Proceedings, Particularly the High DER Future Proceeding (R.21-06-017) and the Demand Flexibility Proceeding (R.22-07-005).

Related Commission proceedings (R.21-06-017 and R.22-07-005) did not expressly scope in data requirements to measure the activity of BTM resources or load responsiveness to retail rates. The OIR notes that, "work in this proceeding will be coordinated with work with other proceedings on existing or planned data projects."⁴ The CAISO strongly supports the Commission coordinating data requirements, reporting, and access across Commission proceedings and with the CEC.

In comments in the High DER Future proceeding, the CAISO recommended the Commission prioritize data sharing with state agencies and the CAISO to ensure data necessary for real-time operations is readily available.⁵ The OIR notes the Commission is working with the CEC on a data gathering project that is "focused on a wider range of energy data, including customer time-series, power flow, geospatial grid infrastructure; energy efficiency, and demand response, to support the High DER Future proceeding (R.21-06-017)."⁶ The CAISO supports

⁴ OIR, p. 15.

⁵ CAISO *Reply Comments on Preliminary Scope and Schedule*, R.21.06-017, October 7, 2021, p. 6

⁶ OIR, p. 16.

coordination of data collection, reporting, and access between this proceeding, the High DER Future proceeding, and with the CEC including its informational proceeding on *Distributed Energy Resources in California's Energy Future*.⁷

In the Demand Flexibility proceeding, the CAISO supported greater demand flexibility that aligns with grid conditions, but stressed the importance of understanding the underlying drivers of load response to rates.⁸ The OIR describes efforts under R.22-07-005 to develop a pricing portal to provide public access to electricity prices and coordination with the CEC's amendments to their Load Management Standards.⁹ The CAISO supports coordination on data collection with the Demand Flexibility proceeding and with the CEC's Load Management Standards. In addition to creating a public-facing pricing portal, the Commission should focus on data needs to evaluate load response to dynamic rates, including when customers do not respond to rates. Stakeholders and regulators must be able to evaluate how and why end users do not always respond to dynamic rates.

D. The CAISO Supports Several Items Discussed in the Order For Consideration in Phase 1 Track 2.

The Commission should enhance data requirements for a broad scope of customer devices in Phase 1 Track 2. The CAISO agrees with the Commission that “in addition to Smart Meters, there are many customer devices, such as battery storage, thermostats, solar inverters, grid-connected heat pump hot water heaters, and electric vehicle chargers that could provide data and help improve ratepayer programs and grid planning and operations.”¹⁰ BTM solar and electric vehicle (EV) charging already have significant impacts on CAISO demand forecasts. As BTM storage continues to grow, they will significantly alter load shapes. The Commission should evolve retail rates to align with grid needs, and it will be increasingly important for the CAISO, CEC, distribution utilities, and LSEs to be able to model projected DER activity and load response in load forecasts.

The CAISO supports the OIR's goal of creating uniform data reporting and access. Inconsistent data formatting and methods of transmitting data has made it difficult for the

⁷ CEC, *Order Instituting Informational Proceeding on Distributed Energy Resources in California's Energy Future*, Docket: 22-OII-01

⁸ CAISO *Opening Comments on OIR*, R.22-07-005, August 15, 2022, p. 4.

⁹ OIR, p. 17.

¹⁰ OIR, p. 11.

CAISO to consume and manage data streams from different parties. The CAISO strongly supports uniformity in data reporting and access which will facilitate better data sharing and minimize data discrepancies among parties. A common, centralized platform for data sharing is ideal.

The CAISO also supports the creation of a Data Working Group with CEC and California Air Resources Board (CARB) staff to focus on Track 2 issues. The Commission should include data requirements to support both short and long-term load forecasting activities in the scope of this working group. The CAISO, Commission, CEC, and CARB staff coordinate closely on long-term load forecasting activities. The CEC models several load modifiers for its long-term forecast adopted in the Integrated Energy Policy Report (IEPR).¹¹ The IEPR forecast, which the Commission and the CAISO use in critical procurement and planning processes, captures a wide range of load modifiers such as BTM solar, BTM storage, EVs, energy efficiency, and fuel substitution. Each load modifier is modeled separately to account for unique and independent drivers. For certain DERs such as EVs, the CEC's modeling also includes modeled response to time-of-use (TOU) rates. It is the CAISO's understanding that much of the IEPR forecast relies on *modeled* load modifier generation or charging profiles, rather than actual resource performance data. It is not clear whether modeled DER profiles accurately reflect actual performance. Additionally, the CAISO requires insight into various BTM load modifiers and data to measure load response to demand-side incentives in order to reconstitute actual system demand in coordination with the CEC. Enhanced data collection and data sharing among state agencies and the CAISO is critical to support short and long-term load demand forecasting, and the Commission should include data needs to support long and short-term demand forecasting within the Data Working Group scope. The Data Working Group should also coordinate on data analysis to measure customer use patterns, to ensure alignment across entities on inputs used in respective forecasting processes.

The CAISO recognizes that different use cases may require different levels of data granularity, and in the effort to provide improved access to data, the Commission must also

¹¹ See, e.g., CEC, *2021 Integrated Energy Policy Report, Volume IV - California Energy Demand Forecast*, available at: <https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2021-integratedenergy-policy-report>

consider requirements to protect customer information. The CAISO supports the inclusion of customer privacy issues in the scope of this proceeding.

E. The Commission Should Prioritize Data Enhancements for DERs and Programs That Impact Customer Demand.

1. BTM solar

Thus far, BTM solar has been the most impactful type of DER on CAISO's load forecast and operations. The CAISO uses commercially-available solar inverter data to train its forecasting models to recognize changed behavior in the underlying load so the wholesale market is positioned appropriately to maintain reliability. For example, when the forecast shows cloud coverage, the CAISO can pre-empt the reduction in solar generation by increasing wholesale market generation. As retail rates evolve and consumers adopt a greater variety of DERs, the Commission should evaluate the impacts of rates on BTM solar generation and other DERs. In the example above, a reduction in BTM solar generation due to cloud coverage may be indistinguishable from consumer response to dynamic rates that incentivize EV or battery charging in the middle of the day. It will be important for the CAISO and others to understand the magnitude of the impact of retail rates on BTM solar production.

In addition to solar inverter data, the CAISO also relies on locational data on BTM solar installed capacity as an input to its demand forecasts. The CAISO uses publicly available interconnection data to understand the size and location of BTM solar installed capacity. As noted in the OIR, "California Distributed Generation Statistics [DG Stats] is a website that hosts publicly-available data on behind-the-meter interconnections in utility service territories and data on customer generation and storage programs"¹² The CAISO appreciates the extensive data currently made publicly available on Distributed Generation Statistics (DG Stats). This platform has worked well to provide a centralized source for DER data for certain retail programs and tariffs, and can be leveraged as foundation for expanding data access for other resources and programs.

Although DG Stats is a good starting point for accessing DER data, data provided on DG stats can be enhanced further. First, the Commission should update data on DG Stats more frequently than quarterly, at least on a monthly basis. Second, the Commission should release

¹² OIR, p. 17.

more granular locational data on DG Stats, at minimum at the zip code level. Lastly, the Commission should seek to include data on programs and resources that investor-owned utilities (IOUs) do not have visibility into for a more complete picture of BTM capacity across the system (*i.e.*, resources outside of an IOU interconnection request or a utility rate change). The CAISO suggests that the Data Working Group focus on expanding data requirements and access to DER data outside of IOU programs.

2. EVs

The CAISO has observed that EV charging has increasingly impacted load shapes. EV charging and other controllable DERs are less predictable than BTM PV output and forecasting charging patterns will require an understanding of consumer usage patterns and response (or lack thereof) to retail rates. It is important that the Commission and others define data requirements ahead of the growing adoption of these technologies. Although DG Stats may be a good location for data on EV capacity, not all EVs are registered with utilities under EV rates, potentially resulting in gaps in data. Like for BTM solar, the Data Working Group should focus on expanding data requirements and access to EV capacity data outside of utility programs and outside of specific EV rates. This data should be publicly available with, at minimum, monthly updates down to the zip code level. Focus on EV data to date has been on light-duty vehicles, but as medium- and heavy-duty EV fleets grow the Commission should also plan for the data requirements for these vehicle classes.

The CAISO and stakeholders also must understand the underlying drivers of EV charging patterns. This requires data on actual charging and the potential drivers of charging patterns such as retail rate, location, and customer type. The Commission should develop expected energy patterns and true-ups of actual to expected energy consumption to assess the impact of different rate structures on EV charging. This information can also help inform enhancements to programs and rates to better align customer charging patterns response with grid needs.

3. Battery Storage

As BTM batteries proliferate, these resources will have an increasing impact on load shapes. Like EV data, the CAISO seeks data on BTM battery installed capacity and battery characteristics down to the zip code level to support CAISO forecasting and operations. To estimate the impacts of BTM storage operation on CAISO's short-term load forecasts, the

CAISO also seeks after-the-fact operational data for BTM storage resources and data to measure the potential drivers of charging and discharging behavior such as electric rate, location, and customer type. Like EVs, the Commission should develop expected energy patterns and true-ups of actual to expected energy consumption to assess the impact of different rate structures on BTM battery charging and discharging.

4. Time-Of-Use and Dynamic Rates

The Commission should collect, report, and provide access to data for stakeholders to assess the expected and actual impact of Time-Of-Use (TOU) and dynamic rates. As the CAISO noted in comments on the Demand Flexibility proceeding, access to underlying resource performance data will be critical to measuring both the success and limitations of retail rates and why customers do not always respond to dynamic rates.¹³ The Commission should evaluate the impacts of TOU and dynamic rates with locational granularity as customers may be more or less responsive to such rates depending on location. This data will be a critical input into CEC long-term demand forecasts and CAISO's short-term load forecasts.

III. Responses to Questions for Parties from Section 3.1.2.1 of the Ruling ((Track 2 Questions).

In the subsections below, the CAISO provides responses to selected questions from the Ruling. The relevant questions are reproduced prior to each CAISO response.

Question 1: Should the Commission create a Data Working Group consisting of Commission, CEC and CARB Staff, as well as utilities, and interested stakeholders? If so, what should be the scope and timeline for the working group?

As noted above, the CAISO supports the creation of a Data Working Group with CEC and CARB staff to focus on Track 2 issues. The Commission should include data requirements to support short and long-term load forecasting activities in the scope of this working group.

Question 2: Referring to the preliminary Track 2 schedule provided in section 4, do you suggest any changes? What workshops or other activities, if any, are needed to advance work in Track 2?

The CAISO recommends the Commission hold at least one workshop to discuss data needs to support short and long-term demand forecasting in Track 2.

¹³ CAISO Opening Comments on OIR, R.22-07-005, August 15, 2022, p. 4.

Question 3: How can the Commission, utilities, DER providers, and customers better use Smart Meter data? How can Smart Meter data help individual ratepayers, developers, and contractors determine which DER programs are likely to provide the most benefits?

As discussed above, the continued growth of DERs and evolution of retail rates make it critical for the CAISO to understand the impacts of DERs and retail rates on demand forecasts, in order to support reliable grid operations and grid planning. The Commission should use Smart Meter data and customer device data to understand customer demand patterns and measure the impact of retail rates on customer behaviors. The Commission should evaluate these impacts over time as DERs grow and retail rates change. The Commission also should make data and findings accessible to other stakeholders.

Question 7: Should smart devices, such as thermostats, solar and/or storage inverters, energy storage devices, grid-connected heat pump hot water heaters, and electric vehicle chargers, that are supported by ratepayer-funded incentive programs, be required to provide data for research purposes?

As discussed above, DERs, particularly BTM solar, EVs, and battery storage have had an increasing impact on demand forecasts. The latest CARB State Implementation Plan (SIP) will also result in significant load growth due to building electrification.¹⁴ The Commission should collect data on various customer devices, including but not limited to those listed above, in order to understand and measure how each contributes to customer demand patterns. Ultimately, this information is critical to support short and long-term demand forecasts and reliable grid operations and planning. The Commission should not limit data and findings for research purposes, and should look to share this type of data with other stakeholders. This data is critical for end users today to support ongoing grid operations and planning. As mentioned above, the CAISO suggests that the Data Working Group also focus on expanding data requirements and access to DER data outside of specific IOU programs

Question 8: How can existing data reporting and data collection processes be improved to make them more consistent across resources and more accessible by users?

As discussed above, DG Stats has worked well for data sharing, providing a centralized, consistent platform for the public to access data. The CAISO supports developing a centralized location for accessing data on DERs and customer programs including installed capacity,

¹⁴ 2022 State Strategy for the State Implementation Plan, California Air Resources Board, September 22, 2022: https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf

resource characteristics, program type and rate structure, and actual and expected consumption patterns down to the zip code level to support short and long term demand forecasting and operational needs.

Question 10: When the Commission contracts with third party consultants to provide analytic and program evaluation services, should the data collected by the contractors be always required to be shared with the Commission?

If receiving this data will help the Commission avoid duplicative work, then it seems reasonable for the Commission to require that third party consultants share data with the Commission. More broadly, however, if data collected by third parties is also useful for other party needs, then the Commission should consider sharing this data with other stakeholders to support their needs.

IV. Conclusion

The CAISO appreciates the opportunity to provide comments on the OIR and looks forward to working collaboratively with the Commission, Commission staff, and other parties on these important issues.

Respectfully submitted

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