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Stakeholder Comments of the CAISO

CEC Demand Response Qualifying Capacity Methodology Working Group

A. Introduction

The CAISO appreciates the opportunity to submit these comments to support discussion within the CEC's Demand Response (DR) Working Groups. These comments serve primarily to provide additional clarifications on the effective load carrying capability (ELCC) methodology and the CAISO's proposal for using ELCC to value DR qualifying capacity (QC). The CAISO provides responses here to numerous questions raised during the working group meetings and clarifications regarding ELCC. The CAISO hopes these responses clarify stakeholders' understanding of ELCC and enhance future discussion.

B. The CAISO provides background on Effective Load Carrying Capability (ELCC)

The resource adequacy program primarily ensures there are enough resources with contractual obligations to ensure the safe and reliable operation of the grid in real time providing sufficient resources to the CAISO when and where needed. The CAISO emphasizes that the California Public Utilities Commission (CPUC) has already approved and implemented ELCC as a reliability-based QC methodology for other resource adequacy variable-energy resources, as directed by the Public Utilities Code.[1] Wind and solar ELCC have been used for several years in the resource adequacy program and the CPUC calculates ELCC values for storage resources in the integrated resource planning (IRP) proceeding. The CPUC's use of ELCC recognizes it as an appropriate methodology to evaluate the contribution of intermittent and use-limited resources in meeting resource adequacy requirements and maintaining reliability.

C. The CAISO provides additional clarifications on ELCC

Input Flexibility:

The ELCC methodology is flexible with regard to the representation of a resource's availability that is input into the model. While actual performance is the preferred input, DR's limited dispatches in the CAISO market make the use of this input challenging. Additionally, actual performance is not available for expected new programs. Thus, a proxy method is likely necessary. These proxies could include historical bids, synthetic bids, and tested performance data used for contract capacity. In all of these cases, the inputs can be scaled based on future customer enrollment.

The CAISO has used historical bids as a proxy for availability as bids represent the available load curtailment potential of the resource as communicated to the CAISO in or close to real-time operations.[2] This is a liberal approach at valuing capabilities for three reasons. First, bids are not capped by existing capacity values. Therefore, DR resources can bid above their QC values if they have incremental load curtailment available to the market. Second, bids can be shaped (versus a flat QC value) to represent

[1] California Public Utilities Code Section 399.26(d).

[2] E3, *Demand Response ELCC*, June 24, 2021, available at: http://www.caiso.com/Documents/E3-CAISODemandResponseELCCStudyUpdate2021-Combined-.pdf

the maximum capability as reflected in the market. Third, actual performance may be lower than the bid so this methodology errors on the side of potential greater availability.

PG&E has proposed using "LIP profiles." This is an example of what the CAISO refers to as synthetic bids. These synthetic bids represent all 8760 hours and take into account relevant factors such as the weather, day type, etc. This representation is meant to capture expected performance across a range of conditions. This can also help capture data for DR programs that do not have historical bid data. If this approach is used, care would need to be taken to ensure these synthetic bids do not overstate the true capability of the DR resources given the incentive of DR providers who would develop these synthetic bids. The CAISO is interested in exploring this option further with the IOUs and any other DRPs.

Lastly, parties have suggested using contract capacity as a viable means of representing DR's capabilities. The CAISO has concerns that this approach does not have a basis in reliability. However, the CAISO could support the use of contract capacity, depending on the rigor and availability of test data used in developing the resource's capability, as an input to ELCC or an ELCC-like reliability evaluation.

Program Growth:

Parties have questioned if ELCC can reflect program growth or if it ignores program growth by only looking at past performance. The CAISO reiterates that program growth can be reflected in ELCC through scaling the inputs.

Nameplate and Output:

The CAISO noted some confusion about the outputs of ELCC and if a "nameplate" capacity is needed. The CAISO reiterates clarifications presented on slide 2 of E3's 9/15/21 presentation to the QC Methodology Working Group.[3] First, "nameplate" capacity of DR is both an unknowable value and an unnecessary input to calculate DR ELCC. The required input is the resource's availability in MW across varying time and weather conditions, as described above. Second, the output of ELCC is a MW value that represents a resource's MW equivalent of "perfect capacity." It is not a percentage and does not need to be compared directly with a "nameplate."

As background, in E3/CAISO's June 2021 ELCC study of IOU DR programs, the ELCC MW results were translated into percentage de-rates in order to show the extent to which LIP-informed NQC estimates overvalue the ELCC of DR. However, ELCC as a proposed QC methodology would not need to be translated into percentage de-rates but rather would use the MW outputs as QC values. Any necessary scaling for program enrollment changes could be applied to the inputs.

First-in vs. Last-in:

[3] TN # 239807 in CEC Docket 21-DR-01.

The CAISO noted some confusion about the meaning of "First-in" and "Last-in" ELCC values. The CAISO reiterates clarifications presented on slide 3 of E3's 9/15/21 presentation.[4] "First-in" and "Last-in" nomenclature are simply different measurement techniques and have nothing to do with the California loading order that preferences demand-side resources.

- "First-in" ELCC is the ELCC that results from adding a resource to a fictional portfolio of perfect resources (one with no solar, wind, storage, or even gas resources with forced outages).
- "Last-in" ELCC is the ELCC that results from adding a resource to the actual portfolio for a given year (with all expected solar, wind, storage, etc.). Last-in ELCC is the equivalent of "marginal" ELCC.

"First-in" and "Last-in" have nothing to do with the "order" in which resources are dispatched – in all cases, resources are dispatched optimally to provide maximum reliability given their capabilities. However, DR does dispatch at different times in "Last-in" compared to "First-in" because "Last-in" considers the interactive effects of renewables and storage resources and consequently the hours of importance are different (*i.e.*, in the evening instead of mid-day). "Last-in" ELCC reflects how DR is dispatched in the CAISO market today since it is dispatched in conjunction with all other resources.

"First-in" and "Last-in" measurements are each necessary because neither on their own can be used to characterize the aggregate portfolio ELCC of all resources working and interacting together. E3 provides more information as well as a potential framework for deriving a single value from "First-in" and "Last-in" values in their June 2021 report.[5]

Forecasting ELCC Values:

During working group meetings DR providers have expressed the need to be able to forecast their expected ELCC values. The materials already released by E3 in their report serve as indicative materials to help DR providers forecast their ELCC. There are two main variables at play in the determination of an ELCC value: 1) the hours the DR resource is available and 2) the limitations on calling the resource. For (1) the LOLP heat maps show the hours DR needs to be available.[6] For (2) the tables that show average ELCC reduction based on number of calls and duration per call show how DR use limitations can reduce ELCC.[7] Multiplying the resource's average MW availability during nonzero LOLP hours (1) by the factor from the table (2) likely provides a reasonable estimation of ELCC. The CAISO proposes the above method as solution that allows DR providers to forecast their expected ELCC values without requiring them to run the ELCC model themselves.

[4] TN # 239807 in CEC Docket 21-DR-01.
[5] E3, *Demand Response ELCC,* June, 24, 2021, pp. 28-35, available at: http://www.caiso.com/Documents/E3-CAISODemandResponseELCCStudyUpdate2021-Combined-.pdf.
[6] E3, *Demand Response ELCC,* "Time Window Availability Needs for DR in 2020 & 2030," June, 24, 2021, p. 46, available at: http://www.caiso.com/Documents/E3-CAISODemandResponseELCCStudyUpdate2021-Combined-.pdf.
[7] E3, *Demand Response ELCC,* "4) Allocate Resource Category ELCC to Individual Resource/Programs Using Heuristics," June, 24, 2021, p. 35, available at: http://www.caiso.com/Documents/E3-CAISODemandResponseELCCStudyUpdate2021-Combined-.pdf.

Parameters:

At the 9/20/2021 QC Methodologies Working Group meeting, Josh Bode asked if the ELCC methodology considers resource parameters such as start up, ramp rate, short/long start units in its calculation. The CAISO provides the following response.

In theory an ELCC model can be configured to consider those parameters. However, most models, including E3's RECAP model, do not consider those parameters because incorporating them into dispatch would result in an infeasible computing time. To incorporate those parameters, it would be necessary to significantly reduce the number of years simulated. E3 does not consider this a worthwhile tradeoff given that they have found empirically that those parameters do not represent barriers to reliably meeting load when incorporated into more detailed simulation models such as PLEXOS. Operational adjustments such as operating solar flexibly with upward and downward flexibility can solve almost all of the problems relating to these parameters so resource adequacy remains the primary challenge.

Availability Assessment Hours (AAH):

Working group participants have raised concerns with using LOLP hours that looking beyond the AAH will hurt the value of DR. The CAISO counters that the non-zero LOLP hours occur during the net peak period and coincide with the AAH, when DR programs currently operate. Conversely, this means that as there is no LOLP at 2:00AM on a Monday, for example, there is not a need for incremental capacity at that time and there is no "derating" or disincentive for DR that cannot operate at that time. Evaluating DR using LOLP can help guide when programs should be adjusted or changed to match changes in expected loss of load event hours.

As background, the AAH are determined annually by the ISO and published in the BPM.[8] AAH were first developed as a part of the ISO standard capacity product (SCP) and maintained as a part of the RA Availability Incentive Mechanism (RAAIM). AAH convey the hours of greatest need to maximize the effectiveness of the availability incentive structure. To develop the AAH, the CAISO uses CEC IEPR data to obtain hourly average load, by hour, by month, over a range of years, and then calculates the top 5% of load hours within each month using an hourly load distribution.

DR Baselines and QC Values:

In response to stakeholder questions the CAISO clarifies the following interactions between (1) how performance methodologies (baselines) interact with the Load Impact Protocols (LIP) today and (2) how performance methodologies interact with ELCC. As background, performance baselines are utilized in three areas of DR today: (1) settlements, (2) resource planning to establish a QC value, and (3) cost effectiveness. This discussion will focus on settlements and resource planning.

[8] Section 40.9 of the CAISO tariff.

1. **Settlements.** Performance baselines are used to compensate for the load reduction provided. Today, there are two types of baselines used to settle DR for the load reduction provided.
    a. Energy Settlements (CAISO energy payment settlement). The following baselines are approved in the CAISO tariff for energy settlements: 10-in-10, 5-in-10, combined 10-in-10/5-in-10, metering generator output, control group methodology, and weather matching.
    b. Capacity Settlements (CPUC capacity payment settlement). Capacity settlement occurs between a utility and program participants (third party providers or program participants), and the CAISO's understanding is that currently the CPUC has approved the 10-in-10 and 5-in-10 baseline.
2. **Resource planning (QC value).** Performance baselines can factor into the QC process depending on which methodology or availably inputs used.
    a. Under LIP: Today the load impact protocols have flexibility for a variety of ways to calculate performance and it gives guidance on what impacts should be estimated. The CPUC is not prescriptive on what baselines can be used in developing anticipated load impacts. However, the baseline selected directly impacts the QC value of the resource.
    b. Under ELCC: ELCC seeks to quantify the aggregate availability of DR based on factors such as time availability, # of calls, duration of calls, and enrollment. Quantifying this aggregate availability is an input into ELCC and could be based on a baseline methodology. Examples include:
        i. Actual performance: The MW of DR would be a function of the performance utilizing the settlement baselines.
        ii. Historic bids: The MW of DR would be a function of the bids. If the scheduling coordinator based their bids on how they performed under specific baselines, this would be reflected in their historic bids.
        iii. Synthetic bids: The MW of DR would be a function of the profiles developed. The profiles used in synthetic bids look at performance under a range of weather days and day types, which could involve a baseline.
        iv. Contract capacity utilizing test information: The MW of DR would be a function of the baseline used to assess performance in testing.
3. **Cost effectiveness:** While cost effectiveness looks at the benefits of DR (utilizing performance via a baseline) this is out of scope for this discussion on the link between settlement and resource planning.