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DSA Comments on CEC Draft Report Qualifying Capacity of Supply-Side DR

Please find our comments on the CEC's draft report titled "Qualifying Capacity of Supply-Side Demand Response Working Group Draft Report (CEC Docket 21-DR-01)." As part of our comments, we are attaching in-line edits to the report. For clarity, I restricted in-line edits to corrections for accuracy or added, but needed, context. The DSA perspective and comments are included as tracked comments.

Additional submitted attachment is included below.

Comments on CEC Draft Report
Qualifying Capacity of Supply-Side DR

Demand Side Analytics agrees with the main conclusions of the report which provides an interim option for qualifying capacity while the working group continues to work towards a long-term resolution. However, we found inaccuracies, gaps, and mischaracterizations in the report. As part of our comments, we are attaching in-line edits and comments both in MS Word (we converted the documented) and Adobe PDF format. For clarity, I restricted in-line edits to corrections for accuracy or added, but needed context. The DSA perspective and comments are included as tracked comments. Below, is a high level summary that separates feedback on accuracy, context, and DSA comments.

Accuracy

- **The description of the CAISO baseline adjustments needs to be edited for accuracy (p.6)**. The initial write up makes it seems like baseline methods using matched controls were the de-facto method in 2021 and are fully implemented. They are not, in 2021, CAISO with Recurve conducted an after the fact test with a sample of data. The method has potential but has not yet been adopted widely. Please see the in-line edits for accuracy.
- **Description of load impact protocols (Qualifying Capacity of Demand Response section).** I found several factual errors or omissions in the description of the load impact protocols. Please see the in-line edits for accuracy.
- **Findings Key Challenges description.** I request that the section be retitled accuracy of DR performance calculations. The second part of the paraph includes commentary, much of inaccurate or misleading. See the in-line edits for the sentences to delete.

Context

- **Resource adequacy section**. The section needs an broader introduction and should include a figure with the load duration curve and discussion around it. I included a load duration plot and some text. I respectfully request it be included as the report is incomplete without it.
- **ELCC Discussion in 2nd Qualifying Capacity of Demand Response section.** The description of ELCC was too concise and read as if the ELCC estimate provide an accurate estimate of perfect capacity. It needed a more complete description. The LOLP models used to estimate ELCC are designed for the portfolio of all resources, not for individual resources. The fact that the sum of the individual resource ELCC does <u>not</u> add up to the portfolio ELCC (it is internally inconsistent) and relies on after-the-fact calibration is extremely important. On the commentary side, it raises several questions: Why are we using obscure, proprietary, expensive, and complex that provides false precision for individual DR resources? If the magic behind the individual resource ELCC's is the after-the-fact calibration, aren't simpler, more transparent approaches, appropriate?

Comments

- **Table 2 and adjacent paragraphs.** The plot mischaracterizes demand response resource and implies they were not available for the August 2020 emergency conditions and did not perform. The fact that the resources were not in the supply plan is correct but the reason - CAISO requirements that resources in the plan be available every hour of the month – is omitted. In addition, it omits that fact that DR bid into the market (available) and delivered substantial demand reductions on August 14th and August 15th, 2020. The section entirely omits the results from the load impact evaluation, which are the best and most accurate estimate of the demand reduction delivered. I recommend removing the table and modifying the adjacent paragraphs. The main point – that DR needs to be better incorporated into planning – can be made without mischaracterizing the availability or performance of DR programs.

- **Working Group Process Section Write up**. The description of the process is fine, but the description of the party positions and comments is very incomplete and skewed. I recommend the CEC entirely delete the summary of the positions from various parties in this report and include a more complete and more accurate account in the final report (versus in the report for interim solutions). It does not reflect all the proposals that were submitted, nor all the positions voiced, nor all the comments submitted.

- **Working Group Process overall.** Having attended the working groups, the process has been unsatisfactory. Most of the discussions have been conceptual with little actual testing of methods or comparing of how they work in practice. Based on my observation, most of the members have limited technical or applied expertise with the load impact protocols or with development or use of LOLP models used to calculate ELCC. The attendees have mainly been regulatory staff, experienced at navigating hearing and submitting written comments. Much of the initial discussion was in clarifying misunderstandings about the load impact protocols (including by CEC staff), how effective load carrying capacity is calculated, what can be produced based on historical DR performance. The lack of common technical expertise has severely limited meaningful discussion about what methods and tools work, or how to modify them to deliver accurate estimates of the contribution of DR to resource adequacy.

- **Recommend that the CLECA proposal be included as on option rather than relegated to an appendix.** No other proposal received as wide or as fast of support from the whole range of stakeholders – DR providers, utilities, advocacy groups (CLECA, DRMEC), and evaluators – yet it is relegated to an appendix.

Best regards,

Digitally signed by Josh L. Bode
Date: 2022.02.04 15:39:50 -08'00'

Josh Bode
Partner, Demand Side Analytics

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CALIFORNIA ENERGY COMMISSION

California Energy Commission

COMMISSION REPORT

Qualifying Capacity of Supply-Side Demand Response Working Group Draft Report

Gavin Newsom, Governor
January 2022 | CEC-200-2022-001-CMD

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DISCLAIMER

ABSTRACT

This report provides the California Energy Commission's (CEC) interim findings and recommendations from the CEC's working group on supply-side demand response to the CPUC, as requested by the CPUC in Decision 21-06-029.

Demand response is the practice of providing customers with incentives to reduce or shift electricity use from peak demand periods. For purposes of this report, there are two primary categories of demand response: supply-side demand response and load-modifying demand response. Supply-side demand response resources are integrated into wholesale energy markets of the California ISO. Load-modifying demand response is typically driven by time-variant rates and any associated load reduction is counted in reduced peak demand forecast. Only supply-side demand response, and not load-modifying demand response, is the subject of this report.

Demand response provides California with various benefits, including providing greater reliability to the grid and helping prevent rotating outages. Improving the counting conventions for the qualifying capacity of supply-side demand response, which are values based on what the resource can produce during periods of peak electricity demand, may help demand response ensure reliability in California.

The report scope focuses primarily on recommended changes to the counting conventions for the qualifying capacity of supply-side demand response in the interim, specifically changes that can be implemented in 2022 to support resource adequacy for 2023. However, this report also includes findings and recommendations regarding permanent changes to the counting conventions for the qualifying capacity of supply-side demand response for 2024 and beyond.

Keywords: Supply-side demand response, resource adequacy, qualifying capacity, reliability

Please use the following citation for this report:

Flynn, Tom and Lyon, Erik. 2022. *Qualifying Capacity of Supply-Side Demand Response Working Group Report*. California Energy Commission. Publication Number: CEC-200-2022-001-CMD

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EXECUTIVE SUMMARY

This report provides the California Energy Commission's (CEC) interim findings and recommendations from the CEC working group on supply-side demand response to the California Public Utilities Commission (CPUC), as requested in CPUC Decision 21-06-029.

Demand response provides California with benefits that include providing greater reliability to the grid and helping prevent outages. However, in recent years the California ISO, CPUC, demand response providers and other stakeholders have identified issues with the methods and process used to calculate and assign qualifying capacity for demand response resources. These issues include the need to improve the counting conventions for the qualifying capacity of supply-side demand response to help demand response ensure reliability. The working group considered changes to the counting conventions for the qualifying capacity of supply-side demand response resources to better allow energy planners to rely on demand response resources.

These issues are intertwined with California's resource adequacy framework, which is a program administered by the CPUC and the California Independent System Operator (ISO) to ensure that sufficient resource capacity is secured to support safe and reliable operation of the electricity grid.[1] Supply-side demand response operates within the resource adequacy program and is subject to the rules of that framework for calculating qualifying capacity, which are values based on what the resource can produce during peak electricity demand periods. In the case of a demand response resource, this is the amount of load reduction it can produce rather than an amount of generation as with a power plant. The working group considered changes to the counting conventions for the qualifying capacity of supply-side demand response resources.

For purposes of this report, there are two primary categories of demand response: supply-side demand response and load-modifying demand response. Of these two, only supply-side demand response is the focus of this report. Supply-side demand response resources are integrated into wholesale energy markets and can be called on to reduce demand when needed for economic or reliability reasons. In contrast, load-modifying demand response is typically driven by time-variant rates and any associated load reduction is counted in reduced peak demand forecast. Load-modifying demand response is not the subject of this report.

The report scope focuses primarily on recommended changes to California counting conventions for the qualifying capacity of supply-side demand response in the interim, specifically changes that can be implemented in 2022 to support resource adequacy for 2023. However, this report also includes findings and recommendations regarding a path forward to permanently changes the counting conventions for the qualifying capacity of supply-side demand response for 2024 and beyond.

1 See https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/resource-adequacy-homepage.

CHAPTER 1: Introduction

Purpose and Scope

This report provides interim findings and recommendations from the California Energy Commission (CEC) stakeholder working group[2] on qualifying capacity of supply-side demand response to the California Public Utilities Commission (CPUC), as requested by the CPUC in Decision 21-06-029. While a permanent solution was originally intended to be devised for resource adequacy year 2023, incompatibilities between the CEC working group's timeline and that of related proceedings and processes precluded a permanent solution in this time frame, as discussed later in the report.[3] Therefore, the report scope focuses primarily on recommendations for qualifying capacity methods for the interim (resource adequacy year 2023). However, this report also includes findings and recommendations regarding a path forward to develop a permanent qualifying capacity method for resource adequacy year 2024 and beyond.

Importance of Demand Response

Demand response is increasingly important for utilities and wholesale market operators to balance electricity supply and demand, especially under critical grid conditions. Demand response can alleviate the stress on the electricity grid, reduce operational costs and greenhouse gas emissions, and play a critical role in ensuring grid reliability and price stability.

Customers of all types, from residential to commercial and industrial, can participate in demand response by reducing their electricity usage or shifting it to other times in the day. Although demand response is conventionally viewed as customers *decreasing* electricity usage, demand response can also help balance electricity supply and demand by *shifting* electricity usage to times when the grid has plentiful electricity generation from renewable resources like solar and wind.

Demand response increasingly holds the potential to provide California with economic and environmental benefits, including:

- Providing greater reliability to the grid and helping prevent rotating outages.
- Avoiding the purchase of high-priced energy.
- Avoiding the consumption of fossil fuels, which result in air quality issues and contribute to climate change.
- Aligning electric demand with renewable energy generation.
- Avoiding the over procurement of generation resources.
- Avoiding the construction of new generation and transmission infrastructure.

2 Please refer to Chapter 3 for more information on the stakeholder working group process.
3 Throughout this report, the term "resource adequacy year" is used to distinguish the year of compliance from the year in which specific planning actions and processes take place. For example, for resource adequacy year 2023, most compliance activities take place in 2022.

Taxonomy of Demand Response

Demand response programs in California are largely directed by the CPUC and administered by California's three regulated investor-owned utilities: Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric.[4] Independent commercial entities known as "third-party demand response providers" or "aggregators" also provide demand response services to investor-owned utilities and community choice aggregator customers.

Although there are many possible approaches to classifying demand response, one taxonomy divides demand response into two primary categories: dispatchable demand response and nondispatchable demand response.[5] For this report, dispatchable demand response is referred to as supply-side demand response and nondispatchable as load-modifying demand response. CPUC decisions in 2014 and 2015 split CPUC-jurisdictional demand response programs into supply-side demand response and load-modifying demand response. Supply-side demand response resources are designed to reduce demand when dispatched by the California ISO and are considered analogous to other "supply-side" generation resources like power plants. Only supply-side demand response, and not load-modifying demand response, is the subject of this report.

There are two types of California ISO-participating supply-side demand response resources: economic demand response, which bids into the market under normal operating conditions and is formally called a proxy demand resource, and emergency demand response, which is called upon only during supply-shortage conditions and is formally called a reliability demand response resource. Both types are dispatchable and counted for resource adequacy. Supply-side demand response resources are compensated for capacity by the load-serving entity and are compensated for energy by the California ISO if dispatched.

Economic demand response exists for investor-owned utility and CPUC jurisdictional third-party demand response providers.[6] Economic demand response is made up of various investor-owned utility demand response programs including air-conditioning cycling (typically operated as direct utility control of a customer air-conditioning system), capacity bidding program (typically operated as an aggregation of customer load reductions to respond to events), investor-owned utility local capacity requirement contracts, demand response auction mechanism (aggregated demand response bid directly into the California ISO market), and load-serving entity demand response resource adequacy contracts.

Demand response is unique among supply-side resources in the associated treatment as a resource adequacy resource. While some supply-side demand response resources are shown on supply plans, another larger portion is not and are instead treated through a process

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4 Demand response programs directed or administered by other local regulatory authorities, such as those operated by municipally owned utilities, are not the subject of this report.

5 Guernsey, Matt, Margo Everett, Bill Goetzler, Theo Kassuga, Nicole Reed Fry, and Rois Langner. May 11, 2021. *Incentive Mechanisms for Leveraging Demand Flexibility as a Grid Asset – An Implementation Guide for Utilities and Policymakers*. Prepared for National Renewable Energy Laboratory (NREL) by Guidehouse, Inc. May 11, 2021, https://www.energy.gov/sites/default/files/2021-06/GEB_Implementation_Guide_May_2021.pdf.

6 Electricity customers in California have the choice to participate in demand response programs provided by independent commercial entities, called "third-party demand response providers" or "aggregators." Third-party demand response providers include OhmConnect, Sunrun, Leapfrog Power, and CPower, among others.

known as “crediting.” Under crediting, California ISO can count investor-owned utility demand response resources as a reduction in the amount of resource adequacy capacity required — that is, they are “credited” against the total demand instead of “shown” as resources to meet that demand. Investor-owned utility demand response program resources are credited, while the non-investor-owned utility demand response resources are shown as a contribution to resource adequacy requirements to the California ISO.

Reliability demand response resources consist of exclusively investor-owned utility demand response programs, including the base interruptible program and the agricultural pumping interruptible program, both of which work directly with large customers to call on load reductions in emergencies. These reliability demand response resources can be triggered by the California ISO after at least a warning is declared. These programs are managed by the investor-owned utilities and are credited by the CPUC against the resource adequacy obligations of CPUC jurisdictional load-serving entities.

Load-modifying demand response is any program for demand flexibility not classified as supply-side demand response (that is, nondispatchable). Load-modifying demand response is typically driven by time-variant rates. Any associated load reduction is counted in reduced peak demand forecast. End-use customers are typically compensated via bill savings. Load-modifying demand response is not a subject of this report.

In terms of relative size, the amount of supply-side demand response far exceeds the amount of load-modifying demand response. The current CPUC jurisdictional demand response portfolio (as of 2021) consists of about 1,500 MW of supply-side demand response versus 85 MW of load-modifying demand response. A breakdown of this portfolio is provided in Table 1.

Table 1: August 2021 Demand Response Portfolio

<table>
<tr><th>Supply-Side Demand Response (~ 1500 Aug MWs)</th><th>Load-Modifying Demand Response</th></tr>
<tr><td>

Investor-owned utility managed demand response:

Emergency (804 Aug MW)
Base Interruptible Program
Agricultural Pumping Interruptible Program
Economic (393 Aug MW)
Capacity Bidding Program
AC Cycling
Local Capacity Requirement Contracts

3rd Party managed demand response:

Demand Response Auction Mechanism (206 Aug MW)
Community Choice Aggregator resource adequacy contracts (120 Aug MW)

</td><td>

Investor-owned utility managed demand response: (85 Aug MW)
Permanent Load Shifting*
Time of Use*
Critical Peak Pricing
Real Time Pricing

* Load impact incorporated in reduced peak demand forecast
</td></tr>
</table>

Source: California Public Utilities Commission

Demand Response and Reliability

Supply-side demand response can help utilities and California ISO balance electricity supply and demand to maintain grid reliability, especially under critical grid conditions. Supply-side demand response is considered part of the supply stack (along with resources including solar, wind, energy storage, and natural gas-fired generation, among others) and is counted on to maintain reliability. As was noted in the Final Root Cause Analysis[7] of the August 14–15, 2020 (Root Cause Analysis) rotating outages, a significant portion of emergency demand response programs (that is, reliability demand response resources) provided load reductions when emergencies were called. Like other supply-side resources that support reliability, demand response resources operate within the resource adequacy framework and are subject to the accompanying rules for calculating qualifying capacity, described in the subsequent sections on resource adequacy and the qualifying capacity of demand response. However, the analysis conducted in the Root Cause Analysis pointed to questions about whether current qualifying capacity methods accurately capture the contribution of demand response to reliability. Some stakeholders raised arguments that demand response was undercounted, while others argued that it was overcounted.

In response to the Root Cause Analysis, the CEC, California ISO, and CPUC took the following actions to begin to address the issue of supply side demand response and reliability:

- ☐ Demand response roundtable: The CEC, with CPUC and California ISO, hosted two roundtable discussions with demand response providers in the state. The roundtables were designed to understand the concerns providers have with conclusions in the Root Cause Analysis and how demand response programs are structured and obtain input on potential improvements. The demand response working group discussed in this report ultimately took up this effort.
- California ISO demand response program adjustments: Starting in the summer 2021, the California ISO ~~implemented baseline adjustments~~ tested baseline methods ~~through comparison group method changes~~that relied on matched control groups and ~~changes to the~~ adjustment factors, ~~used in the baseline calculations~~ as permitted under the California ISO tariff. This process allowed a more accurate assessment of demand response load reduction during extreme events. The two baseline improvement tracks instituted for the summer included 1) exploring the use of comparison/control group method and 2) establishing a process and criteria for approved use of load adjustment factors outside of the min/max caps for summer 2021. The method has the potential for improving the accuracy of settlements for weather sensitive resources, if it is widely adopted. The approach relies on smart meter data for non-participants and, as a results, concerns about privacy of data and the ability of third parties to replicate the baselines need to be addressed.
- ☐ CPUC resource adequacy proceeding (Rulemaking 19-11-009): This proceeding considered several specific demand response-related issue areas identified in the Root Cause Analysis Report, including the issue of a better method for determining the qualifying capacity of demand response and the related issue of distribution and transmission loss factors associated with the current qualifying capacity approach.

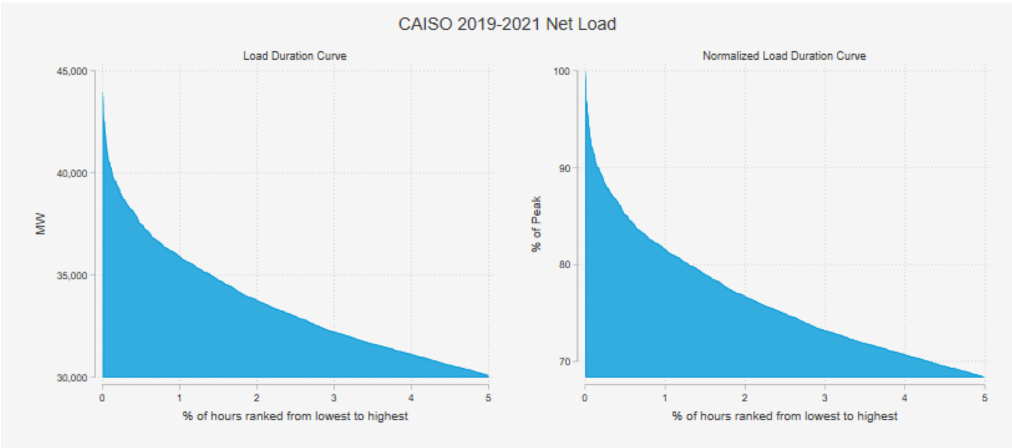
Commented [JB1]: Edited for accuracy. The initial draft made it seem like it is the de facto method, when 2021 was an after the fact test with sample data.

7 Final Root Cause Analysis Mid-August 2020 Extreme Heat Wave. Prepared by the California ISO, CPUC, and CEC. January 13, 2021, http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf.

Resource Adequacy

A vital role of the electric grid planning ensuring that electricity supply remains reliable and is able to meet demand. Electric power differs from most products in that demand and supply must be balanced nearly instantaneously; failure to do so can lead to cascading outages. Historically, the electric grid has been sized to meet the aggregate demand of end users when it is forecasted to be at its highest—peak demand. Electric loads remain highly weather sensitive and peak demands and the risk of outages has been concentrated a relatively small number of hours. The introduction of large amount of large scale solar and wind have shifted planning needs so that sufficient dispatchable resources are available to meet net load – system load minus large scale solar and wind. It also has altered when, where, how often, and for how long resources are needed. Overall, the risk of resources shortages occurs is driven by high net loads, unexpected generator or transmission outages, lack of import availability, sudden un-forecasted changes in solar and wind generation, and errors in short term planning and operations due to the challenge of forecasting electric loads.

The below plots show the CAISO hourly net loads for 2019-2021, with a focus on the top 5% of hours. The risk of resources shortage is typically highest peak net loads are highest. Overall, peak loads are highly concentrated on a limited number of hours. Even though, extreme loads are uncommon, the electric grid requires that enough resources be built and available to meet peak net loads – a term commonly referred to as resource adequacy. Demand response resource often, but not always, target reducing peak demand when they are highest. The key concept is that reducing peak demand, when needed, reduces the need to purchase peaker power plants (or batteries) which are only needed to meet resource needs for a limited number of hours.



To ensure load-serving entities and California ISO have the capacity to meet their reliability requirements, the CPUC and California ISO jointly administer the resource adequacy program.

Commented [JB2]: This section needs an introduction and should include a figure with the load duration curve and discussion around it. DSA provided plots of load durations curves, load heat maps, and top load days during the working group meetings and the CEC has them available for use.

California's resource adequacy program was implemented in 2006 and designed to ensure that load-serving entities secure sufficient resource capacity when and where needed to support safe and reliable operation of the California ISO grid.[8] The California ISO and local regulatory authorities establish system, local, and flexible capacity requirements for load-serving entities, and the load-serving entities in turn procure resource adequacy capacity through bilateral capacity contracts or their ownership or control of resources.

The CPUC sets and enforces the resource adequacy rules for its jurisdictional load-serving entities which include the investor-owned utilities, community choice aggregators, and electric service providers. Collectively, these jurisdictional entities represent 90 percent of the load within the California ISO service territory. Each October, CPUC-jurisdictional load-serving entities must submit filings to the CPUC's Energy Division demonstrating they have procured 90 percent of their system resource adequacy obligations for the five summer months (May–September) of the following year. Following this year-ahead filing, load-serving entities must demonstrate procurement of 100 percent of their system resource adequacy requirements on a month-ahead basis.

The scheduling coordinators for load-serving entities and the entities that supply resource adequacy capacity provide the California ISO with resource adequacy plans to demonstrate on an annual and monthly basis that they meet their resource adequacy requirements and they are prepared to accept the California ISO tariff obligations of providing resource adequacy capacity.

The California ISO validates the resource adequacy plans to verify that load-serving entities have met their resource adequacy capacity. The California ISO notifies load-serving entities and suppliers of any deficiencies or inconsistencies. California ISO can exercise its capacity procurement mechanism authority to backstop for any resource adequacy showing deficiencies and allocate the procurement costs to deficient load-serving entities.

Demand response is unique among supply-side resources. While some supply-side demand response resources are shown on supply plans, another larger portion is not and is instead treated through a process known as "crediting." Under crediting, California ISO can count investor-owned utility implemented demand response resources as a reduction in the amount of resource adequacy capacity required — that is, they are "credited" against the total demand instead of "shown" as resources to meet that demand.

A credit is essentially an adjustment the local regulatory authority (e.g., the CPUC) has made to a load-serving entity's resource adequacy obligation, which can be neutral or decrease the obligation. Credits generally represent demand response programs and other programs that reduce load at peak times. The largest credited amount from a local regulatory authority is from the CPUC (for example, 1,482 MW for August 2020), which reflects the various supply-

8 Following the California Electricity Crisis in 2000–2001, the Legislature enacted Assembly Bill (AB) 380 (Núñez, Chapter 367, Statutes of 2005), which required the CPUC, in consultation with the California ISO, to establish resource adequacy requirements for CPUC jurisdictional load-serving entities.

side demand response programs from the investor-owned utilities, including the emergency-triggered reliability demand response resources. Of this total credit, 1,472 MW reflects investor-owned utility emergency and economic demand response programs. Another 10 MW of credited demand response is attributed to non-investor-owned utility proxy demand resources. The non-investor-owned utility entities are CPUC jurisdictional third-party demand response providers.

For several years the California ISO has accommodated this practice whereby local regulatory authorities (such as the CPUC) provide proposed demand response to the California ISO for crediting before the resource adequacy showings process. The California ISO counts a local regulatory authority's credits when determining if a load-serving entity under that local regulatory authority's jurisdiction met its respective resource adequacy obligations. Crucially, these credited resource adequacy resources are not shown on supply plans and thus are not subject to the California ISO's tariff, which means they are not subject to the must-offer obligation (obligation to bid into the California ISO markets) and are not subject to the resource adequacy availability incentive mechanism.[9] In December 2020, the California ISO sought to end this practice and require demand response resources to be shown on supply plans to provide greater assurance that these resources would be available to support reliability.

In contrast to demand response programs that are credited with contributions to reducing demand, the demand response capacity that is explicitly included on the supply plans of CPUC jurisdictional entities is much smaller. **Table 2** shows the total credited and shown demand response capacity for August 2020 for CPUC jurisdictional entities. In August 2020, demand response programs on supply plans contributed resource adequacy capacity totaling 243 MW.

Table 2: August 2020 Credited and Shown Supply-Side Demand Response Resource Adequacy Capacity for CPUC Jurisdictional Entities

Demand Response Type	Implementer	Credited (MW)	Shown (MW)
Emergency (reliability demand response resources)	IOU	1,115	0
Economic (proxy demand resources)	IOU	358	0
Economic (proxy demand resources)	Non-IOU	10	243
Total		1,482	243

Source: *Final Root Cause Analysis Mid-August 2020 Extreme Heat Wave.* January 13, 2021.

Commented [JB3]: Recommend deleting. The plot mischaracterizes demand response resource and implies it was not available for the August 2020 emergency conditions. It is correct that those resource were in the supply plan because of CAISO requirements that resources in the plan be available every hour of the month. However, DR resources were bid in the market (available) and delivered substantial demand reductions. If it is to be included please fix the mischaracterization.

There are differing perspectives on how the load reduction capability of supply-side demand response should be planned and counted. While the accounting system to measure the value

9 Through the RAAIM, the California ISO assesses nonavailability charges and provides availability incentive payments to resource adequacy resources based on whether the performance of these resources falls below or above, respectively, defined performance thresholds.

of demand response has never been perfect, in part because it is hard to account for customers' actual behavior compared to their expected behavior, the extreme heat events in 2020 focused greater attention on the challenges with counting on and accounting for supply-side demand response. This renewed focus on the capacity value of demand response resulted in actions taken by the California ISO discussed in the following sections.

Qualifying Capacity of Demand Response

Commented [JB4]: Recommend editing section title. There are two sections titled "Qualifying Capacity of Demand Response" with different content (confusing).

To determine the capacity of each resource eligible to be counted toward meeting the CPUC's resource adequacy requirement, the CPUC develops qualifying capacity values based on what the resource can produce during peak electricity demand periods. The CPUC-adopted qualifying capacity counting conventions vary by resource type. For demand response, the qualifying capacity values are set based on historical performance using the load impact protocols, or LIP.

The load impact protocols were adopted by the CPUC in D.08-04-0501 in 2008 and prescribe a set of guidelines for estimating the impact on load resulting from demand response activities. These guidelines established a consistent method for measuring and reporting actual historical performance of demand response resources~~ and for forecasting anticipated future performance~~. They include protocols for estimating the magnitude of demand reductions available by month and hour under normal (1-in-2) and extreme (1-in-10) system peaking conditions based on historical performance data.[1] The protocols themselves did not specify how load impacts should be applied for resource adequacy, did not require annual reporting for all entities, nor did they detail the process for qualifying capacity. They were defined to produce inputs into the planning process. The CPUC defines how to use the results, the frequency of reporting, and the process for using load impacts to determine qualifying capacity.

~~Demand response providers calculate resource capacity based on the expected load reduction capabilities of demand response resources under typical expected peak grid needs.~~ To convert historical performance into demand reduction capability under as standard set of conditions, ~~In essence, the load impact protocols~~ demand response providers use historical load impact data to generate a model to estimate the load reduction capability of a demand response resource under varying conditions. The ex-ante~~is~~ model might account for ambient temperature, day of the week, hour of the day, and month of the year, depending on the nature of the resources. ~~To generate a qualifying capacity value, this~~ The model is then applied to a set of conditions expected to reflect the peak grid need. These planning assumptions include the ~~median peak~~ hourly temperatures expected for each monthly system ~~on a weekday~~peak day over the 4-9 pm hours, when~~ with the highest~~ net demand is highest. Demand response resources made of aggregations of small customers, such as residential "smart thermostat" programs, may be modeled as a demand reduction per customer, and the total capacity value is adjusted by the expected future participation.

Commented [JB5]: Edited for accuracy.

Finally, the CPUC Energy Division staff determines the capacity value that gets adopted as the

[1] Based on of the protocol authors, Josh Bode, the structure was designed to align so it could be cross-multiplied against a loss-of-load probability (LOLP) heat map, which is typically produced by hour of day and month.

qualifying capacity for a given resource~~ is provided by CPUC Energy Division staff~~. CPUC staff reviews load impact protocol reports with estimated capacity values and makes a "reasonableness determination" for each resource. For capacity values found unreasonable, CPUC staff may change assumptions regarding the expected load impacts or participation based on professional judgment. The resulting value is adopted as the qualifying capacity and represents the maximum capacity a demand response resource can provide in a resource adequacy capacity contract. The CPUC staff does not currently adjust the capacity based on the characteristics of DR resources such as coincidence (by hour) with loss-of-load probability, dispatch duration or hours of availability.

Commented [JB6]: Edits to make it clear that it is CPUC staff, not the LIP, that defines capacity. And, also to make it clear that adjustments (or lack thereof) for DR characteristics and limited use is in the CPUCs domain.

CHAPTER 2: Context of Supply-Side Demand Response Qualifying Capacity Issues

The CPUC's Decision 21-06-029 requested the CEC establish a stakeholder working group process to address several interrelated issues regarding the qualifying capacity of supply-side demand response resources. To fully understand this request, a few pieces of additional context are required. This section summarizes each of these, starting with the California ISO proposed revision request 1280.

California ISO Proposed Revision Request 1280

On August 27, 2020, the California ISO submitted proposed revision request 1280 through its business practice manual change management process proposing revisions to its business practice manual for reliability requirements[10]. These revisions were intended to ensure that only capacity subject to the California ISO's resource adequacy tariff requirements count toward meeting the resource adequacy obligations of load-serving entities. That is, all supply-side demand response that counts toward a load-serving entity's resource adequacy requirements must appear on supply plans and be subject to the California ISO's tariff, including must-offer obligations.

Proposed revision request 1280 would have effectively ended the California ISO's accommodation of the crediting practice. Under this crediting practice, the CPUC provides load-serving entities with credits that reduce their resource adequacy obligations with demand response or similar resources that do not meet the normal California ISO tariff requirements and are not subject to the tariff's resource adequacy provisions. The proposed revisions would reject any credits that lower a resource adequacy requirement without the resource being shown on a California ISO supply plan and are not subject to the must-offer obligation. Implementation of proposed revision request 1280 would mean that demand response credits allocated to load-serving entities by the CPUC would no longer be accepted by California ISO.

Several stakeholders objected to proposed revision request 1280 during the California ISO business practice manual change management process and appealed proposed revision request 1280. On December 9, 2020, the California ISO Executive Appeals Committee issued a decision placing proposed revision request 1280 on hold to provide time for the California ISO and the CPUC to work collaboratively to resolve resource adequacy issues associated with supply-side demand response.

CPUC Rulemaking 19-11-009

In November 2019, the CPUC opened Rulemaking 19-11-009 to oversee the resource adequacy program, consider changes and refinements to the program, and establish forward resource adequacy procurement obligations applicable to CPUC-jurisdictional load-serving

10 The California ISO business practice manual for reliability requirements may be found here: https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Reliability%20Requirements

entities beginning with the 2021 resource adequacy compliance year. This proceeding included the decision requesting the CEC convene a supply-side demand response qualifying capacity stakeholder process and began a process to restructure the resource adequacy program more broadly.

Decision 21-06-029

Decision 21-06-029 was issued in Rulemaking 19-11-009 on June 25, 2021, and is relevant to the subject of this report because it considered two topic areas associated with supply-side demand response: 1) reporting demand response resources on supply plans and 2) determining qualifying capacity of demand response resources. The latter topic area included the request for the CEC to launch a stakeholder working group process to develop recommendations on determining the qualifying capacity of demand response.

Demand Response on Supply Plans

In the Rulemaking 19-11-009 proceeding, the California ISO proposed to discontinue credits and require all resources counting as resource adequacy capacity to be shown on a California ISO supply plan based on the same arguments made in proposed revision request 1280 (discussed previously). The California ISO stated that unlike other resource adequacy resources, credited demand response resources are not shown on supply plans and not subject to California ISO tariff provisions, such as a must-offer obligation. The California ISO stated that these resources do not allow the California ISO to meet reliability needs and, if they fail to perform, are not subject to resource adequacy availability incentive mechanism charges.

CPUC Energy Division stated that it views demand response as a variable resource that should be treated as such in California ISO's system. In particular, they assert that demand response should be allowed to bid in different capacity amounts on different days and hours depending on operating conditions that affect load impact magnitude without exposure to resource adequacy availability incentive mechanism penalties. Energy Division proposed that investor-owned utilities be directed to move their demand response portfolios onto supply plans once the California ISO allows demand response to participate in its markets as a variable resource exempt from the resource adequacy availability incentive mechanism and demand response is permitted to bid variably. California ISO argued that adoption of an effective load carrying capability, or ELCC, method for demand response was a prerequisite for demand response to be exempt from the resource adequacy availability incentive mechanism.

In its decision, the CPUC was persuaded by parties' assertions that demand response is a variable resource with behavioral and weather-dependent characteristics and that demand response should be treated as such in California ISO's market. The CPUC stated that demand response should be permitted to bid different energy amounts associated with capacity on different days and hours, depending on the operating conditions that affect the magnitude of load expected on a given day and hour.

Further, the CPUC did not agree with the California ISO that the resource adequacy availability incentive mechanism should apply to demand response resources. The CPUC found it unreasonable that demand response resources could be penalized through the resource adequacy availability incentive mechanism for bidding below the associated qualifying capacity value due to the conditions on a given day. The CPUC declined to adopt an effective load carrying capability based qualifying capacity method in the decision because of the lack of consensus from parties providing comments.

The CPUC concluded that once it confirms that California ISO permits demand response resources to bid variably in its markets and implements a Federal Energy Regulatory Commission-approved resource adequacy availability incentive mechanism exemption for demand response resources, each IOU will be directed to move its demand response portfolios onto California ISO supply plans.

Qualifying Capacity of Demand Response

In its filings in Rulemaking 19-11-009, the California ISO proposed that an effective load carrying capability method be used to determine the qualifying capacity of supply-side demand response, rather than a load impact protocols -based approach, because the California ISO believes that the load impact protocols based approach overvalues the contribution of supply-side demand response to reliability. In support of its proposal, the California ISO cited an effective load carrying capability study prepared by Energy + Environmental Economics (E3) that analyzed 2019 bid data submitted by PG&E and SCE, subsequently updated with 2020 bid data, and found that the load impact protocols method valued demand response capacity contributions 19 to 23 percent more than the effective load carrying capability method.

ELCC is derived directly from the loss-of-load probability modeling that system planners have long utilized to determine the Planning Reserve Margin ("PRM") that is necessary to ensure reliable electric service and calculate the risk of resource shortages. The concept is to add resources until the acceptable level of loss-of-load-probability is reached, while accounting for their availability and characteristics (e.g., forced outage rate). ELCC is can be thought of as the equivalent quantity of "perfect capacity." For example, a power plant with 100 MW of nameplate capacity and a 5% forced outage rates would have 95 MW of ELCC (assuming no other characteristics affect performance). ELCC is typically estimated at the portfolio level because of interactive effects between resources (e.g., solar and batteries complement each other). It has also been extended so it is applied to individual resources such as solar, wind, and battery storage. While, the approach is technology agnostic, the results are highly sensitive the inputs, assumptions (such as modeling of correlated risk), and how the characteristics of individual resources are modeled.

The effective load carrying capability framework ~~determines~~ attempts to determine the equivalent quantity of "perfect capacity" (a hypothetical resource that can change output instantaneously and face no outages) that a variable or energy-limited resource provides over a year. The effective load carrying capability model inputs the capability profiles of demand response resources across all hours of the year, then runs electric reliability simulations over many years with varying weather conditions. However, the ELCC values for individual resources do not add up to the portfolio ELCC for all resources. Thus, as a final step the individual resource values are calibrated or adjusted so they are equal to the portfolio ELCC. The qualifying capacity of a resource is the estimated capacity amount the resource contributes without increasing the probability of a forced outage. The California ISO has commented that the proliferation of intermittent and use-limited resources has required

Commented [JB7]: Section needs more background on ELCC

Commented [JB8]: I think is important to note that the individual resource ELCC's are really approximations. The individual pieces do not add up to the portfolio without calibration. Thus, a key question is whether such a complex modeling is needed if we end up with false precision and calibration factor. A simpler, more transparent approach may work better, as long as it calibrated back to the portfolio ELCC.

capacity counting methodologies to evolve to better capture the reliability contribution of certain resources, and that the CPUC updated its resource adequacy capacity valuation methodologies for wind and solar to use an effective load carrying capability approach.

The California ISO effective load carrying capability proposal used aggregated demand response bids programs to generate the annual capability profile. Bids are a logical source of inputs for demand response availability because these bids form the basis for the California ISO to meet load in the operational space. Bids represent what the California ISO considers available for dispatch in energy markets even in cases where actual availability deviates from the bid; the California ISO can rely only on the amount bid. However, other parties identified problems with using bid data as inputs to an effective load carrying capability model, which led PG&E and SCE to develop an alternative effective load carrying capability, or ELCC, proposal.

PG&E and SCE's proposal, termed "load impact protocols-informed effective load carrying capability," or "LIP-informed ELCC," in this report[11], shares the reasoning behind effective load carrying capability; the significant difference is the use of modeled load impacts from the load

11 Originally called "load impact protocols plus effective load carrying capability," or "LIP + ELCC."

impact protocols to generate the annual capability profile instead of bids. SCE submitted that such a method would sufficiently address the California ISO's concerns with the load impact protocols to enable it to revise its tariff to treat demand response as a variable resource. If the CPUC were to adopt this approach, PG&E recommended an exemption to the resource adequacy availability incentive mechanism, or RAAIM, for demand response on supply plans for 2022.

In the proceeding, some parties favored continued reliance on the load impact protocols-based approach, while others suggested that an effective load carrying capability approach be considered. The CPUC found that:

- ☐ Implementing a new interim effective load carrying capability approach for 2022 involved uncertainties and unanswered questions that must be addressed.
- ☐ The proposed method represents an abrupt change from the longstanding use of the load impact protocols.
- California ISO, SCE, and PG&E did not address how qualifying capacity for third-party and SDG&E demand response resources (those not included in the California ISO's original analysis) would be determined.

The CPUC concluded that there was an insufficient basis to adopt an effective load carrying capability method and declined to adopt any form of effective load carrying capability qualifying capacity method.

Rather than adopting a new qualifying capacity method for demand response in its decision, the CPUC instead opted to ask the CEC to launch a stakeholder working group process in the *2021 Integrated Energy Policy Report (IEPR)* and make "recommendations for a comprehensive and [measurement and verification] strategy, including a new capacity counting method for demand response addressing *ex post* and *ex ante* load impacts for implementation as early as practicable. (35)" Specifically, the CPUC requested the CEC "make actionable recommendations" on the following issues:

1. Whether the California ISO's effective load carrying capability proposal is reasonable and appropriate to determine demand response qualifying capacity and what modifications, if any, should be considered.
2. "Whether the load impact protocols-informed effective load carrying capability proposal is reasonable and appropriate to determine demand response qualifying capacity and/or what modifications, if any, should be considered.
3. Whether other proposals that may be presented in the CEC's stakeholder process are reasonable and appropriate to determine demand response qualifying capacity.
4. Whether and to what extent alignment of demand response measurement and verification methods in the operational space for California ISO market settlement purposes with methods to determine resource adequacy qualifying capacity in the planning space should be achieved, and if so, how.
5. Whether, and if so what, enhancements to intracycle adjustments to demand response qualifying capacity during the resource adequacy compliance year, as adopted in D.20-06-031, are feasible and appropriate to account for variability in the demand response resource in the month-ahead and operational space.

6. Whether implementation of any elements of demand response qualifying capacity method modifications that might be adopted by the commission should be phased in over time.
7. Whether, and if so how, any changes to demand response adders should be reflected in demand response qualifying capacity methodology." (35–36).

In its decision, the CPUC requested the CEC to submit its recommendations for implementation in the 2023 resource adequacy year to the CPUC no later than March 18, 2022. The CPUC also requested, to the extent possible, that the CEC's recommendations include specific qualifying capacity values for consideration.

Decision 21-07-014

Decision 21-07-014, issued July 16, 2021, establishes a process and timeline for restructuring other aspects of the resource adequacy program within the CPUC proceeding. The decision adopts PG&E's "slice-of-day" proposal framework, with which the CEC's long-term demand response qualifying capacity method recommendations for resource adequacy year 2024 and beyond will need to be compatible.

PG&E's "slice-of-day" framework seeks to meet load in all hours of the day, not just during peak-demand hours. The proposal also seeks to ensure there is sufficient energy on the system to charge energy storage resources. The proposed framework would establish resource adequacy requirements for multiple slices of the day composed of one or more consecutive hours and across seasons composed of one or more months. The framework would establish a counting method to reflect the ability of a resource to produce energy during each respective slice.

The CPUC found that PG&E's slice-of-day proposal best addresses the concerns with the current resource adequacy framework and is best positioned to be implemented in 2023 for the 2024 compliance year. The decision directed parties to collaborate to develop a final restructuring proposal based on PG&E's slice-of-day proposal over at least five workshops through 2021 to early 2022 and develop a workshop report to be submitted into the resource adequacy proceeding in February 2022. The CPUC will consider the final proposed framework and intends to issue a decision in the third quarter of 2022 with details for implementation in 2023 for the 2024 resource adequacy compliance year.

CPUC Rulemaking 21-10-002

On October 11, 2021, the CPUC opened this proceeding to continue to address forward procurement obligations applicable to load-serving entities beginning with the 2023 resource adequacy year and consider broader structural reforms and refinements to the resource adequacy program. This rulemaking is intended to address the 2023 and 2024 resource adequacy years, as well as the local resource adequacy procurement obligations for the 2023–2026 compliance years. This rulemaking will also consider reforms and refinements to the resource adequacy program, including consideration of broader structural reforms. This proceeding is the successor to Rulemaking 19-11-009, which addressed these topics over the past two years. This proceeding is divided into an implementation track and a reform track. The implementation track is subdivided into phases 1, 2, and 3.

Assigned Commissioner's Scoping Memo and Ruling

On December 2, 2021, the assigned commissioner in this proceeding issued a scoping memo and ruling. As noted, this proceeding is divided into an implementation track (with phases 1, 2, and 3) and a reform track. The reform track encompasses consideration of a final proposed framework based on PG&E's "slice-of-day" proposal and the associated workshop report to be submitted into the resource adequacy proceeding in February 2022.

The issues within the scope of implementation track phase 2 includes qualifying capacity counting conventions — specifically, consideration of qualifying capacity proposals from the CEC's demand response working group report, as directed in Decision 21-06-029. The scoping memo and ruling established a schedule for implementation track phase 2.

The scoping memo and ruling notes that numerous parties commented that the CPUC should evaluate certain proposals in parallel or in a specific order — more specifically, that reform track proposals should be considered alongside or before certain implementation track proposals that may be affected, such as counting methods. The scoping memo and ruling recognize the benefit in aligning consideration of the reform track proposals and the CEC's working group report on the demand response qualifying capacity counting method, as directed in Decision 21-06-029. The scoping memo and ruling reiterates that Decision 21-06-029 directed a CEC working group report to be submitted into the resource adequacy proceeding by March 18, 2022. However, for the CPUC to consider the CEC's working group report in parallel with reform track proposals, the scoping memo and ruling requests that the CEC submit its report into the resource adequacy proceeding in February 2022 rather than March 2022. It is in response to this request that the CEC has accelerated the production of its working group report to enable its submittal to the CPUC in February.

CHAPTER 3:
CEC Stakeholder Process

In response to the June 2021 CPUC request in Decision 21-06-029, the CEC launched a stakeholder working group process in the *2021 IEPR* to make actionable recommendations on issues associated with the qualifying capacity of supply-side demand response. The request embedded in the decision called for "recommendations to the [CPUC] no later than March 18, 2022 as appropriate for implementation in the 2023 [resource adequacy] compliance year or thereafter" (78). The following summarizes the stakeholder process established by the CEC to respond to this request.

Staff Workshop Held on July 19, 2021

To launch the stakeholder working group process, the CEC held a staff workshop focused on qualifying capacity of supply-side demand response on July 19, 2021. The workshop was subsequently incorporated into the IEPR docket. This workshop served to publicly kick-off the stakeholder working group process requested by the CPUC. At this workshop CEC staff provided background on the CPUC's request and the CEC's plan to satisfy the request. CEC staff led a stakeholder discussion regarding the formation of one or more working groups and a workplan and schedule to satisfy the CPUC's request. CEC staff also announced the creation of a new CEC docket (Docket 21-DR-01) to compile meeting information and documents associated with the working group process.

Working Group Process

Immediately following the July 19 workshop, CEC staff formed two stakeholder working groups. One working group, called the "QC Methodology Working Group," was established to identify and define an array of methods for counting the qualifying capacity of supply-side demand response resources. The second working group, called the "Principles Working Group," sought to identify a set of principles that a qualifying capacity method should meet. Participation in both working groups was open to all interested stakeholders. The CEC publicly noticed the creation of an online form that let stakeholders indicate which working group they wanted to participate in and whether they would be interested in serving as a stakeholder lead of either working group. The response was positive, with most stakeholders opting to participate in both working groups.[12] Two stakeholders volunteered and were selected as stakeholder leads for the two working groups.[13]

Commented [JB9]: Having attended the working groups. It is important to note that most of the discussions have been conceptual with little actual testing of methods or comparing of how they work in practice.

Most of the members lack the technical or applied expertise with the load impact protocols or with LOLP models, but are instead in the regulatory department. As a result, much of the initial discussion was in clarifying misunderstandings about the load impact protocols (including by CEC staff), how effective load carrying capacity is calculated, what can be produced based on historical DR performance etc.

Commented [JB10]: The description of the process is fine, but the description of the party positions and comments is very **incomplete and skewed**. It does NOT reflect all the proposals that were submitted, nor all the positions voiced, nor all the comments submitted. I recommend the CEC either entirely delete the summary of the positions from various parties in this report, and includes more complete and more accurate account in the final report (versus in the report for interim solutions).

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12 Stakeholder organizations represented include Sunrun, California ISO, Enel X North America, Recurve, Olivine, OhmConnect, CPUC Energy Division, CPUC Public Advocates Office, Hy Power Salton Sea, SCD Energy Solutions, Grounded Analytics, Southern California Edison, Pacific Gas and Electric, Barkovich & Yap, Inc. for the California Large Energy Consumers Association (CLECA), California Efficiency + Demand Management Council (CEDMC), CPower, SDG&E, Middle River Power, Leap, CalCCA, Powerflex, NRG Curtailment Solutions, Jay Luboff Consulting, Demand Side Analytics, Opinion Dynamics, California Energy Storage Alliance, Verdant Associates, Enchanted Rock, and EnergyHub.

13 Stefanie Wayland of Grounded Analytics volunteered and was selected as the stakeholder lead of the QC Methodology Working Group. Luke Tougas, a consultant on behalf of CEDMC, volunteered and was selected as the stakeholder lead of the Principles Working Group.

These two working groups began meeting August 2, 2021. Due to the limited amount of time available to respond to the CPUC request by March 2022, it was determined that the working groups would need to meet frequently. Thus, a working group meeting was held every Monday morning for two hours, with each working group meeting on alternate Mondays. Between August and October, each working group met five times. This frequency of working group sessions was successful and produced within just a few months an array of potential supply-side demand response capacity counting methods and a set of principles to evaluate the options. Based on this progress, CEC staff combined the two working groups in October 2021 into one working group to move to the next phase of effort. The new combined working group was named the "Supply-Side Demand Response Qualifying Capacity Working Group."

In October 2021, stakeholders communicated to CEC staff that due to timelines of other processes and proceedings, completing a permanent solution for resource adequacy year 2023 was infeasible. The qualifying capacity compliance schedule for resource adequacy year 2023 had already begun and the resource adequacy reform workshop process could significantly change the requirements of a demand response qualifying capacity method for resource adequacy year 2024. Accordingly, stakeholders noted any method adopted would likely be too late for implementation in resource adequacy year 2023 and incompatible for resource adequacy year 2024. In response, CEC staff suggested quickly developing interim recommendations (for resource adequacy year 2023 only) that could be adopted with minimal changes and moving the report deadline sooner.

To that end, in October 2021 the working group turned its focus to identifying interim options for the 2023 resource adequacy year. Over time, the working group coalesced on two interim proposals: load impact protocols informed effective load carrying capability, or LIP-informed ELCC, (originally termed load impact protocols plus effective load carrying capability, or LIP + ELCC) and an incentive-based approach modeled on other U.S. independent system operators or regional transmission operators such as PJM[14] and the New York ISO. The incentive-based "PJM/NYISO" approach was proposed by the California Energy + Demand Management Council (CEDMC). From that point forward the working group continued to discuss and focus on these two proposals for resource adequacy year 2023. The working group met through January 10, 2022, the final working group meeting held before publishing this report for public comment.

IEPR Workshop Held on December 3, 2021

On December 3, 2021, an IEPR workshop was held on supply-side demand response and reliability. This IEPR workshop provided an opportunity to inform the IEPR record on the progress made in the CEC-led stakeholder working group process. This included reporting on the work completed, namely the types of methods proposed for counting the capacity of supply-side demand response resources and a set of principles for evaluating the proposed methodologies. The workshop included presentations on interim proposal options under development that could be implemented in 2022 for the 2023 resource adequacy year. Stakeholders expressed support for focusing the remainder of

14 PJM is a regional transmission organization that coordinates the movement of wholesale electricity through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.

the stakeholder working group process on developing options that could be implemented in 2022 for the 2023 resource adequacy year.

Following the December 3 IEPR workshop, written comments were received from the California ISO, CEDMC, CLECA, PG&E, and SoCalGas, which are summarized below.

California ISO

The California ISO states in its comments that capacity valuation is a critical piece of the resource adequacy program. Moreover, to operate the grid reliably, California ISO must be able to rely on the capacity shown by load-serving entities and suppliers in annual and monthly resource adequacy plans, including demand response resources. California ISO points out that the resource adequacy program was designed to meet the peak load of each month plus a planning reserve margin; however, the proliferation of intermittent and use-limited resources has required capacity-counting methodologies to evolve to better capture the reliability contribution of certain resources.

To support this assertion, the California ISO cites several examples, including that the CPUC updated its resource adequacy capacity valuation methods for wind and solar to use an effective load carrying capability approach. California ISO also cites as an example that the CPUC's integrated resource planning process applies effective load carrying capability to four-hour duration storage resources. As another example, California ISO states that effective load carrying capability has gained traction across the United States, and several ISOs, regional transmission organizations, and utilities already use, or are considering a transition to, effective load carrying capability for renewable energy and energy limited resources. California ISO notes that the counting method for demand response has not evolved to reflect these changing grid realities in California. The California ISO advocates for improvements in calculating demand response qualifying capacity in the resource adequacy program.

California ISO proposes that the load impact protocols informed effective load carrying capacity approach, or LIP-Informed ELCC, could be an option for both investor-owned utility and non-investor-owned utility third party demand response providers for resource adequacy year 2023. California ISO believes that using the LIP-informed ELCC approach for resource adequacy year 2023 would allow parties to understand better its potential for long-term use and provide insights into potential refinements. The California ISO is hopeful that the LIP-informed ELCC method can be used to establish demand response qualifying capacity for the 2023 resource adequacy year and then be refined to inform program design in time for the investor-owned utility 2023–2027 program applications.

The California ISO does not support methods that measure resource capability without accounting for the contribution of demand response to reliability. Specifically, they do not support methods that do not account for the variable output, use limited, or availability limited nature or combination of demand response and the associated interactive effects with other use-limited resources. Based on this position, California ISO does not support the current load impact protocols based qualifying capacity method, nor does it support the CEDMC's interim proposal for the 2023 resource adequacy year.

California Efficiency + Demand Management Council

The California Efficiency + Demand Management Council (CEDMC), in written comments submitted to the CEC following the December 3, 2021, IEPR workshop on supply-side demand response and reliability, cited several concerns with the load impact protocols from a third-party demand response provider perspective. CEDMC asserts that since the CPUC directed third-party demand response providers to use the load impact protocols to determine their qualifying capacity values,[15] the load impact protocols are problematic for demand response providers for several reasons, creating barriers to third-party demand response participation in California. CEDMC cited four reasons to support this assertion:

1. The accuracy of the load impact protocols is questionable for more dynamic portfolios. Unlike investor-owned utility programs, demand response provider portfolios can significantly change from one year to the next because demand response providers have a financial interest in sizing their portfolios to meet market commitments and take advantage of market opportunities. Because of the uncertainty inherent in executing contracts, portfolios may differ widely from year to year, both in size and customer composition. In addition, the extended time frame of the load impact protocols process leads to performance data being used from up to two years prior to the resource adequacy delivery year.
2. The load impact protocols process lacks transparency and is very time-consuming. The load impact protocols entail a four-month process beginning in December with a final report due April 1 of each year. There is a two-year lag between the data used for load impact protocols analysis and qualifying capacity determination, and the resource adequacy delivery year. For example, the load impact protocol process that kicked off in December 2021 will use data from the 2021 resource adequacy year to derive qualifying capacity values for the 2023 resource adequacy delivery year. Following submission of the final load impact protocols report on April 1, it is then assessed by CPUC Energy Division over the following 3–5 months to determine the qualifying capacity values of these demand response resources.
3. The load impact protocols process is costly with no guarantee of cost recovery for third parties. The load impact protocols process requires extensive analysis and reporting, which requires the use of specialized consultants, which is very costly, even for comparatively small portfolios. Investor-owned utilities can recover these costs through their demand response program budgets, but demand response providers do not have that luxury. Therefore, this represents a significant investment that some demand response providers choose not to make without a reasonable expectation that they will recover these costs.
4. The requirement that consultants be used to perform the load impact protocols analysis acts as a bottleneck. There are a limited number of consultants able to perform the load impact protocols analysis, and, due to the intensive nature of this work, many consultants are limited in the number of investor-owned utilities and demand response providers they can take on. This limitation leads to many investor-owned utilities and

15 CPUC Decision 19-06-026 directed demand response providers to use the load impact protocols to determine qualifying capacity values beginning with the 2020 resource adequacy year.

demand response providers chasing a finite number of consultants, which can lead to demand response providers being frozen out of the load impact protocols process and, therefore, unable to sell their capacity.

Commented [JB11]: These assertions are subjective and disputed by other parties, including DSA.

CEDMC asserts that the CEC's overriding goal in its working group process should be to develop a demand response qualifying capacity method that works well for third-party demand response providers and investor-owned utilities while ensuring that demand response programs and resources are delivering value commensurate with their qualifying capacity values.

CEDMC believes that for third-party demand response to grow, a new approach is needed that will accurately reflect the capabilities of each demand response provider and investor-owned utility, be transparent in how a demand response portfolio qualifying capacity value is determined, incur a reasonable cost, and require little time to implement. CEDMC states that, at the very least, the CEC and stakeholders should ensure that the adopted approach is not *more cumbersome* than the existing process. CEDMC believes that future demand response growth will occur primarily through third parties, so a more streamlined demand response qualifying capacity method is needed that better suits the more dynamic nature of third-party demand response portfolios.

CEDMC believes that a new method should meet the following six principles: (1) reflect actual investor-owned utility and demand response provider capabilities based on the most current information possible, (2) minimize the time required to receive a qualifying capacity value from CPUC Energy Division, (3) be as transparent as possible, (4) minimize the cost to demand response providers, (5) avoid or minimize the need for outside consultants, and (6) reduce CPUC Energy Division workload to determine demand response qualifying capacity values.

CEDMC has proposed two methods for consideration: the "PJM/NYISO" incentive-based approach and the "streamlined load impact protocols," or "Streamlined LIPs," method. The PJM/NYISO method is CEDMC's preferred method in both the interim and long term because it addresses almost all of CEDMC's six principles listed above. CEDMC states that the Streamlined LIPs method also addresses its six principles but believes it would require time and resources to develop as a long-term approach and thus is less suitable as an interim method. CEDMC's proposed PJM/NYISO method is discussed in more detail in a later section of this report. CEDMC supports allowing several new methods to be tested as interim measures for the 2023 resource adequacy year. CEDMC states that cultivating a competition of ideas in this area is preferable to approval of a method with no track record.

California Large Energy Consumers Association

In its written comments, the California Large Energy Consumers Association (CLECA)[16] is opposed to the California ISO position that providing an exemption to the resource adequacy availability incentive mechanism and allowing variable bids for demand response are only possible under an effective load carrying capability approach, including load impact protocols informed effective load carrying capability, or LIP-informed ELCC. CLECA argues that this LIP-informed ELCC method has not been fully developed and its results have not been vetted for

16 CLECA is an organization of large electricity customers located in California who all participate in the base interruptible program.

reasonableness. CLECA believes effective load carrying capability modeling is complex and doubts that the LIP-informed ELCC modeling can be performed in time to have the results vetted and be usable for resource adequacy year 2023. CLECA points out that the resource adequacy timeline requires that resource adequacy showings by load-serving entities be made in October 2022 based on whatever resource adequacy value is assigned to resources under the adopted resource adequacy counting method at that point.

CLECA does not believe that the LIP-informed ELCC option is consistent with the slice-of-day method being developed for the resource adequacy year 2024.

Pacific Gas and Electric

PG&E states in its written comments that the idea of increasing the level of load-modifying demand response as compared to supply-side demand response is worth greater exploration. PG&E explains that this is in the context of not only the challenges both investor-owned utility and third-party demand response providers experience with supply-side demand response administration (that is, qualifying capacity measurement, supply plans, and dispatch), but also from the push for broader load flexibility. PG&E also believes that with the introduction of the nonmarket integrated pilot called the Emergency Load Reduction Program, it is clear that out-of-market resources can meaningfully support the grid.

PG&E believes that while market integration could be appropriate in certain cases such as economic demand response, it may be less appropriate in other cases such as emergency demand response and rate-based programs. Regarding the demand response auction mechanism, pilot, PG&E does not believe it is clear that demand response auction mechanism is the appropriate structure for procuring reliable resource adequacy from third-party demand response providers. For resource adequacy year 2023, PG&E supports a phased approach with optionality. As such, PG&E believes the current load impact protocols or the load impact protocols informed effective load carrying capability method (LIP-informed ELCC) as an alternative option should be considered for 2023. PG&E believes that the LIP-informed ELCC option combines the benefits of the current load impact protocols with the enhancements of an effective load carrying capability framework advocated by the California ISO.

PG&E views the two valuation options proposed by CEDMC as inadequate and not implementable for resource adequacy year 2023. PG&E believes that proposals that trade off a more rigorous forecasting method with after-the-fact penalty structures are concerning, particularly as many of these penalty provisions have long feedback loops and lead to inconsistent counting of resources. PG&E argues that it is poor resource planning to remove upfront oversight because it would be too late to replace the resources if a large quantity of capacity was not available.

PG&E also comments that while it is not opposed to streamlining the load impact protocols, any modification would require thorough discussion and that the CPUC decision on load impact protocols modification would not be available in time for the year-ahead resource adequacy allocation for 2023. That is, PG&E believes that CEDMC's streamlined load impact protocols method is not a viable option for resource adequacy year 2023 but may be possible for resource adequacy year 2024 and beyond.

Lastly, PG&E believes that it may be difficult to reach full “consensus” among all stakeholders, as desired by the CPUC. PG&E notes that qualifying capacity counting methods have been considered in the resource adequacy proceeding since early 2020 and parties remain conflicted, despite a robust working group process. PG&E concludes that the CPUC may ultimately need to decide on a preferred option, based on input and data from the CEC and California ISO, to move forward with improved methods and avoid a “stalemate.” To provide sufficient lead time for the 2023 resource adequacy process, such guidance from the CPUC should occur no later than the first quarter of 2022.

SoCalGas

SoCalGas comments that during the August 2020 blackouts, California ISO relied on demand response programs to curtail load more frequently and at higher levels than in nearly two decades. SoCalGas believes that from a system planning perspective, demand response bidding into resource adequacy should be discounted to ensure that California does not run short on capacity that could result in additional stresses to the electric system. SoCalGas suggests that the CEC, CPUC, and California ISO investigate how to ensure that higher percentages of enrolled demand response capacity materialize during the times of greatest need. SoCalGas believes data it provided in its comments suggest that there is limited assurance that demand response can be accounted for in long-term planning because it can fluctuate significantly from year to year. As such, SoCalGas recommends that the “reliance capacity” be discounted to account for uncertainty in demand response.

CHAPTER 4: Findings

This section summarizes the findings made by CEC staff based on the working group process. These findings fall into the following categories:

1. Key Challenges for Qualifying Capacity Methods and Resource Adequacy Process of Demand Response Resources
2. Process and Timeline
3. Interim Proposal for Qualifying Capacity Methods in Resource Adequacy Year 2023

These findings are reviewed in additional detail in the following subsections.

Key Challenges for Qualifying Capacity Methods and Resource Adequacy Process of Demand Response Resources

CEC staff has identified five broad challenges to enabling a robust market for demand response capacity in California. These include:

1. **Crediting of investor-owned utility demand response resources:** California ISO has argued that the practice of crediting investor-owned utility demand response resources limits California ISO's ability to manage these resources to ensure reliability. These resources are not subject to the California ISO's tariff provisions, including the must-offer obligation and resource adequacy availability incentive mechanism in place to ensure resources contribute capacity when needed. While CEC staff recognizes that the current qualifying capacity counting method and incentive mechanism are not appropriate for all resource adequacy resources (see qualifying capacity method and incentive mechanisms below), CEC staff finds the argument credible that supply-side demand response resources should be considered part of the supply stack, rather than as a reduction in demand, and treated accordingly.
2. **Qualifying capacity methodology:** The core request of the CPUC request that resulted in the CEC working group process was to develop "a new capacity counting methodology for [demand response]" (35). The decision also states that the *status quo* "~~[load impact protocols]~~ approach is also a reliability-based [qualifying capacity] methodology," but acknowledges others may "be proven to be more accurate … in valuing a resource's contribution to system reliability" (38). CEC staff agrees that the load impact protocols based approach is fundamentally intended to measure a contribution to reliability but finds that a more precise methodology is needed. As such, one primary goal of the working group is to develop a qualifying capacity method that better reflects the contributions of resources to reliability.
3. **Incentive mechanisms:** The California ISO resource adequacy availability incentive mechanism is a penalty structure in place to ensure supply-side resources are available during the hours when the grid is most likely to need them. However, investor-owned utility demand response resources that are credited instead of shown on resource adequacy supply plans, as well as resources under 1 MW of capacity, are not subject to this provision of the California ISO tariff, leaving the majority of California's demand

Commented [JB12]: Please refrain from labeling the current approach as the load impact protocols. As noted earlier, the load impact protocols produce results that track historical performance and are inputs for planning. The CPUC defined the process and how to use the data to estimate qualifying capacity. Most of complaints and concerns are about the process and requirement that are not part of the load impact protocols.

response capacity with no performance incentive. On the other hand, the resource adequacy availability incentive mechanism was developed for traditional dispatchable, constant-output resources such as natural gas power plants. CPUC Energy Division staff has suggested "California ISO find an alternate mechanism to hold [demand response] bidders accountable" for performance (28–29). Similarly, the California ISO's Department of Market Monitoring recommended "developing a performance penalty or incentive structure for resource adequacy [demand response] resources."[17] CEC staff finds these recommendations persuasive and finds the current incentive structure inappropriate and insufficient for providing the certainty in demand response capacity needed to contribute to grid reliability.

4. **Accurate Demand Reduction Performance Calculations~~Settlements~~:** A key motivator for California ISO's proposed revision request 1280 was the performance of investor-owned utility demand response resources during California's rotating outages of August 14 and 15, 2020. California ISO ~~found~~ concluded that investor-owned utility resources both bid less than their qualifying capacity in aggregate and the measured performance using CAISO baselines was even lower and characterized this behavior as "underperformance." However, the approved settlement baseline methods used to estimate load impacts at that time did not include appropriate methods for weather-sensitive demand response resources, such as air-conditioning cycling programs. ~~CEC staff finds that without accurate baseline methods, it cannot be known whether these demand response resources underperformed relative to the associated operational (energy) or planning (capacity) commitments. However, accurate measurement of actual load impacts is a foundational requirement for valuing a contribution to reliability, so CEC staff finds accurate settlement baselines requisite to any capacity counting method. CEC staff notes that the California ISO has since adopted a "control group" (more precisely called a "comparison group") baseline method for such resources. The new baseline has the potential to address the settlement challenge sufficiently, but it must be successfully implemented to do so.~~

Commented [JB13]: Please delete. The CEC staff is entirely ignoring the evaluations that document the demand reductions delivered. The LIPs provide the most accurate assessment of demand reductions. Most of the evaluations rely on matched control groups and AMI data and are estimated using difference in differences regression methods. The methods also undergo extensive out-of-sample testing and validation and are documented.

5. **Process:** Stakeholders have communicated to staff that the load impact protocols and qualifying capacity assignment process are unreasonably expensive, onerous, opaque, and inflexible. Completion of the load impact protocols typically requires an evaluation consultant to complete many load impact protocols reporting requirements, many of which are not strictly necessary for calculating the qualifying capacity value, adding expense. The load impact protocols process for a given resource adequacy year begins more than one year in advance with the submittal of load impact protocols evaluation plans with data from the previous year, rendering the input data out of date relative to actual compliance year. The actual assignment of qualifying capacity is finalized by CPUC Energy Division staff, who reviews and amends qualifying capacity based on professional judgment, but no published guidelines exist for how such amendments are made. Finally, because of the annual cycle for calculating and approving qualifying capacity values, there is little opportunity to change qualifying capacity values based on factors such as enrollment. These interrelated issues suggest that the qualifying

17 California ISO Department of Market Monitoring. *Demand Response Issues and Performance.* February 25, 2021. http://www.CaliforniaISO.com/Documents/ReportonDemandResponseIssuesandPerformance-

Feb252021.pdf. Page 30.

capacity process could be preventing new demand response resources from being deployed and qualified, so California is not able to benefit from such potential new resources. CEC staff finds that there is significant room for improvement in the cost, ease, transparency, and flexibility in the demand response qualifying capacity process, allowing new resources to come on-line flexibly as needed.

Addressing any subset of these issues can significantly improve the market for demand response capacity and the role it plays in California's electric reliability, GHG emissions reductions, and cost management. However, to make the most of supply-side demand response in California, CEC staff finds that all five barriers must be addressed holistically.

Process and Timeline

Although the initial focus of the effort was the development of a March 2022 recommendation for a permanent replacement qualifying capacity method that could be implemented as early as resource adequacy year 2023, in mid-October 2021 CEC staff and working group members determined that devising a permanent solution would not be feasible on the original schedule.

First, the schedule called for a report with recommendations for a permanent method by March 2022, allowing the CPUC to reach a decision on these recommendations by June 2022. Load impact protocols evaluation plans were already due by the end of 2021 and draft load impact protocols reports are due to the CPUC by mid-March 2022. Stakeholders communicated that demand response providers would have to either incur significant expense to complete the unnecessary load impact protocols process or risk not completing the process only to find it required for resource adequacy year 2023 if the CPUC did not adopt the recommendations.

Second, stakeholders communicated that the CEC working group needed to make an informed recommendation consistent with the outcome of CPUC's working group for restructuring the resource adequacy program under a "slice-of-day" framework (from D.21-07-014). Given that the report is expected in February 2022 (and the CPUC is expected to decide whether to adopt in the third quarter of 2022), the CEC working group does not have all the information required to make a recommendation on qualifying capacity counting method at this time that would be aligned with a slice-of-day approach.

Finally, given the five challenges identified in the CEC working group (see previous subsection), CEC staff concluded that submittal of recommendations by March 2022 for a permanent replacement qualifying capacity method does not allow sufficient time for a well-thought-out comprehensive solution for the long term. More time is needed to develop a new approach that meets near- and longer-term program objectives.

Together, these factors suggested that working toward a permanent solution beginning in resource adequacy year 2023 is not possible. However, CEC staff found that some of the proposals can address subsets of the previously identified challenges in ways that can materially contribute to California's electric system reliability in 2023. Even so, the amount of time to adopt interim methodologies is limited, and there is unavoidable risk with attempting to implement a new methodology by resource adequacy year 2023. CEC found that given the timeline of the load impact protocols process for resource adequacy year 2023, it is reasonable to allow all demand response providers to qualify their capacity using the *status quo* load impact protocols process. Additional time and effort will be required to develop a permanent approach for resource adequacy year 2024 and beyond.

The authors of this report note that CEC staff has served in a collaborative or advisory role with CPUC staff in all previous resource adequacy proceedings. Starting several years ago, CPUC decisions have designated CEC as collaborative staff (that is, acting in an advisory capacity). The authors note that CEC staff can continue in these capacities to help promote the implementation of interim solutions.

In summary, one or more interim solutions are needed for resource adequacy year 2023 to address key challenges to procurement of demand response capacity and allow time for a more comprehensive determination of a long-term solution for 2024 and beyond. CEC staff may support the effort to implement the interim qualifying capacity process.

Interim Proposal for Qualifying Capacity Methods in Resource Adequacy Year 2023

While it is infeasible to adopt a permanent qualifying capacity method for resource adequacy year 2023, CEC staff finds that PG&E's load impact protocols informed effective load carrying capability proposal or "LIP-informed ELCC" and CEDMC's "PJM/NYISO" each materially address a subset of the challenges to optimizing the role of demand response in capacity procurement and have been vetted extensively with the working group members. CEC staff finds that, for the same reasons there is insufficient time to select a permanent solution, there is insufficient time to make any significant changes to interim methodologies. Similarly, there was insufficient time to consider CLECA's January interim qualifying capacity proposal (see appendix). CEC staff cautions that these interim options for the 2023 resource adequacy year should not set any precedent relative to long-term consideration of methods for the 2024 resource adequacy year; the interim options should not be construed to be stronger permanent qualifying capacity methodologies simply because they were recommended in the interim. The two interim proposals that did receive working group consideration and the key challenges they address are summarized in Table 3.

Table 3: Summary of Interim Proposals and Key Challenges Addressed

	Crediting	Qualifying Capacity Method	Incentive Mechanisms	~~Settlements~~Accuracy of DR performance calculations	Process
LIP-Informed ELCC	X	X			
PJM/NYISO			X		X

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Source: CEC Analysis

Load Impact Protocols-Informed Effective Load Carrying Capability

The California ISO initially proposed an effective load carrying capability method for counting demand response capacity. The California ISO believes an enhanced counting method for demand response should meet three principles: (1) it should represent accepted industry-leading practices recognizing demand response resources' limited and variable output nature;

(2) it should assess demand response resources' contribution to reliability across the year or seasons; and (3) it should assess demand response resources' interactive effects with other resources as incremental amounts of energy and use-limited resources begin to add less and less incremental capacity value to the system.

The California ISO believes that the effective load carrying capability method best meets these principles and supports effective load carrying capability as the preferred resource adequacy counting method for demand response resources with limited availability or output. California ISO believes that effective load carrying capability best captures demand response resource reliability contributions and interactive effects with other resources on the system.

However, California ISO's initial proposal used bid data to characterize the hourly capacity availability of demand response over the course of a year. CEC found that bid data were not a reliable measurement of availability because of the issues with baseline methods for weather-sensitive resources. As such, the original bid-informed effective load carrying capability was ruled out as an interim method candidate.

PG&E and SCE initially proposed a variation of effective load carrying capability called the load impact protocols informed effective load carrying capability. The "LIP-informed ELCC" proposal (originally termed "LIP + ELCC") is identical to the bid-informed effective load carrying capability in principle. The main difference is that the inputs to the effective load carrying capability model are the outputs from the load impact protocols (that is, the load impact protocols profile).

Since ruling out the bid-informed effective load carrying capability, California ISO supports this approach as the preferred counting method for demand response resources for resource adequacy year 2023. California ISO notes that this approach meets the California ISO's principles to support an exemption from the resource adequacy availability incentive mechanism. The California ISO has developed a process guide to facilitate the CPUC Energy Division staff's modeling of demand response effective load carrying capability.[18] The California ISO believes that this effort will leverage the CPUC's existing modeling tool SERVM, which it currently uses to develop effective load carrying capability values for the resource adequacy program and in its integrated resource planning proceeding.

CEC staff finds that an effective load carrying capability-based approach meets the principles stated by California ISO and adopting this method should better reflect the contribution of demand response to reliability. Because California ISO has indicated it would support an exemption to the resource adequacy availability incentive mechanism under an effective load carrying capability-based approach, adopting this method would also address the issue of crediting investor-owned utility demand response resources. However, the LIP-informed ELCC approach does not provide any performance incentives and adds to the process by requiring the step of developing a load impact protocols profile for input into the effective load carrying capability model. CEC staff acknowledges the technical and timing risk related to implementing the effective load carrying capability modeling in the amount of time available and that a

18 *DR ELCC Guide: Using LIP-Informed Profiles to Calculate DR ELCC in SERVM*, prepared by Energy + Environmental Economics for the California ISO, January 19, 2021. This guide can be found in CEC Docket 21-DR-01 at: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-DR-01

contingency plan, in the event that LIP-informed ELCC results cannot be produced in the time permitted, would help reduce this risk.

Incentive-Based "PJM/NYISO" Approach

CEDMC proposed an incentive-based approach modeled in part on those of other U.S. independent system operators such as PJM and NYISO.[19] Under an incentive-based approach, demand response providers estimate the capability of their resources and claim a corresponding capacity value. Unlike other proposals and the *status quo*, which require significant upfront oversight in estimating future capacity, the incentive-based approach employs incentive mechanisms — namely financial penalties for underperformance — to ensure compliance. Because the penalty mechanism provides an incentive to forecast accurately, demand response providers may use any proprietary analytical tools they choose to determine their qualifying capacity values.

However, the incentive-based approach proposed by CEDMC essentially adopts the same counting method for *ex post* evaluation as the load impact protocols process uses for *ex ante* qualifying capacity valuation. As noted, CEC staff finds the capacity counting method to be a rough approximation for contribution to reliability and improving the method to be a central component of the request from the CPUC.

Finally, the proposed incentive schedule may not be sufficient to ensure the desired level of performance for demand response resources. The proposed schedule is based on the demand response auction mechanism, which itself has seen underperformance over the course of the pilot program. The experience with the demand response auction mechanism suggests stronger penalties may be needed to ensure demand response providers are able to meet capacity commitments.

CEC staff nonetheless recognizes that California may be in danger of a capacity shortfall in the near term, and energy system planners have called for more capacity in the coming years.[20] While possibly imperfect, CEC staff views the incentive-based approach that could allow more demand response capacity to materialize in a relatively short time frame.

Optionality

CEC staff has found that given the status of the load impact protocols and qualifying capacity process for resource adequacy year 2023, it is not reasonable to require demand response providers to adopt one of the proposed new methods. This finding implies demand response providers must have the option between the *status quo* load impact protocols process and the proposed interim methods for resource adequacy year 2023. While the two interim proposals each address an acute problem for investor-owned utility or third-party demand response providers (crediting and barriers to participation, respectively), CEC staff finds that neutral

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19 A CEDMC provided document entitled, *California Efficiency + Demand Management Council Interim DR Qualifying Capacity Methodology* Proposal, describes their proposal and can be found in the CEC Docket 21-DR-01 at: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=21-DR-01.

20 Gill, Liz, Mark Kootstra, Elizabeth Huber, Brett Fooks, and Chris McLean. 2021. *Midterm Reliability Analysis*. California Energy Commission. Publication Number: CEC-200-2021-009.

market rules should allow both types of demand response providers to select from either of the interim methodologies and the *status quo*.

Optionality provides an opportunity to test new methods without committing to the results of a new method. The investor-owned utilities that participated with the California ISO and E3 in the prior study of bid-informed effective load carrying capability have the benefit of some experience with the effective load carrying capability method. The third-party demand response providers did not participate in that prior study and thus did not get this benefit. The availability of the LIP-informed ELCC method for resource adequacy year 2023 provides the third-party demand response providers with an opportunity to gain some experience with the effective load carrying capability method, if desired, while providing the investor-owned utilities with additional ELCC experience. Moreover, the expected exemption to the resource adequacy availability incentive mechanism provided by the LIP-informed ELCC method allows previously credited investor-owned utility demand response resources to be shown on supply plans without being subject that penalty. Subject to the adoption of this compliance pathway, CEC staff finds the California ISO's proposal to require all resource adequacy capacity to be subject to the California ISO's resource adequacy tariff provisions (that is, shown on supply plans) to be reasonable. Therefore, demand response capacity qualified through the load impact protocols process can also be required to be subject to the resource adequacy tariff provisions (including the must-offer obligation and the resource adequacy availability incentive mechanism).

CHAPTER 5: Recommendations

CEC staff recommends that the working group effort to develop options and address the issues regarding supply-side demand response qualifying capacity should be split into two tracks:

1. **Interim track:** Focus on developing options for resource adequacy year 2023 that address key challenges to deploying and relying upon supply-side demand response capacity in ways that materially contribute to California's near-term electric reliability.
2. **Long-term track:** Consider the complete list of issues in the CPUC request and identified during the working group process and focus on developing a comprehensive, thoroughly vetted, and permanent solution for resource adequacy year 2024 and thereafter that aligns with potential structural reforms to the resource adequacy framework (particularly the forthcoming slice-of-day approach).

Specific recommendations for each track follow.

Interim Track

For resource adequacy year 2023 only, CEC staff make the following recommendations to the CPUC:

3. **Adopt the load impact protocols informed effective load carrying capability method (LIP-informed ELCC) proposed by PG&E and California ISO.** The LIP-informed ELCC method more accurately accounts for a contribution to reliability than the *status quo*. This method will allow the California ISO to grant an exemption to the resource adequacy availability incentive mechanism for investor-owned utility demand response resources and for the CPUC to direct investor-owned utilities to move their demand response resources onto supply plans.
4. **Adopt the incentive-based approach proposed by CEDMC.** The "PJM/NYISO" incentive-based approach allows third-party demand response providers to bring new resources online quickly and allows them to update capacity values more frequently to reflect the most recent information about the demand response resources. The incentive-based penalty approach is more appropriate for demand response resources than the resource adequacy availability incentive mechanism.
5. **Allow optionality between LIP-informed ELCC, the incentive-based approach, and the LIP-based *status quo* for both third-party and investor-owned utility demand response providers.** There is insufficient time to require demand response providers to adopt a new method for resource adequacy year 2023, so the *status quo* should remain an option. For market neutrality, the additional interim methodologies should be available to all demand response providers, both investor-owned utility and third-party. Optionality should enable a demand response provider to participate in testing new methods without committing to the results of the new method. For consistency with the resource adequacy process, require demand response providers to commit to a methodology by July 1, 2022.
6. **Request that the California ISO grant an exemption to the resource adequacy availability incentive mechanism for LIP-informed ELCC.** The LIP-informed ELCC

meets the California ISO's requirements to file for a tariff amendment with the Federal Energy Regulatory Commission to grant an exemption to the resource adequacy availability incentive mechanism for demand response resources that choose to use it. The California ISO should file its tariff amendment and grant exemptions accordingly.

7. **Direct investor-owned utilities to move their demand response portfolios onto supply plans.** Because the LIP-informed ELCC method satisfies the requirements above, the investor-owned utilities may now move their resources onto supply plans without exposure to the resource adequacy availability incentive mechanism. However, in the event the CPUC finds that LIP-informed ELCC values cannot be satisfactorily determined in time to meet resource adequacy process milestones, the CPUC should retain the prerogative until August 1, 2022, to grant credits for investor-owned utility demand response resources in 2023. In this circumstance, the CPUC may allow resources previously committed to using LIP-informed ELCC to be reverted to the *status quo* and provide credits for IOU programs.
8. **Consider LIP-informed ELCC and incentive-based approach as non-precedent setting recommendations.** Recommendation of these methods in the interim should not be construed as tacit support or endorsement for these methods in the long term; all interim methods should be on the table as candidates for consideration as a long-term solution. Both methods proposed for the interim improve aspects of the market for demand response capacity, but neither is perfect and neither has had sufficient opportunity to be amended through the working group. Furthermore, the two interim methods vary greatly in their approach, and the CEC does not recommend maintaining such differing approaches in the long-term. Finally, the forthcoming decision regarding slice-of-day should inform the long-term method.
9. **Leverage CEC staff to support qualifying capacity counting for resource adequacy year 2023.** CEC staff should continue to serve in a collaborative or advisory role with CPUC staff in the resource adequacy proceeding to help facilitate the deployment and implementation of the recommended interim solutions.

Long-term: Resource Adequacy Year 2024 and thereafter

For resource adequacy year 2024 and thereafter, CEC staff recommend the following:

10. **Extend the CEC supply-side demand response working group beyond February 2022.** Allow the CEC-led working group process to continue into the third quarter of 2022 to develop recommendations for resource adequacy year 2024 and thereafter. Request the CEC produce a final report by the fourth quarter of 2022.
11. **Expand the scope of the supply-side demand response working group to address the five challenges identified in the CEC working group process.** The CPUC request for the CEC focused on the qualifying capacity method (which was tied closely to the practice of crediting investor-owned utility demand response resources). However, the CEC working group process revealed other interrelated challenges facing demand response participation in capacity procurement. CEC staff believe that crediting, the qualifying capacity method, incentive mechanisms, settlements, and process must be addressed holistically to develop a robust market for demand response capacity. CEC staff note that the issue with settlements may have been addressed

through the control group baseline method but recommend the working group monitor its implementation and make sure the new method is working as anticipated.

12. **Continue collaboration with CEC staff on qualifying capacity counting implementation in the long term.** CEC staff should continue to serve in a collaborative or advisory role with CPUC staff in the resource adequacy proceeding to help facilitate the deployment and implementation of the recommended long-term solution.

APPENDIX A: Acronyms and Abbreviations

Acronym	Term
API	Agricultural Pumping Interruptible Program
BIP	Baseline Interruptible Program
BPM	Business Practice Manual
CBP	Capacity Bidding Program
CCA	Community Choice Aggregator
CEDMC	California Energy + Demand Management Council
CLECA	California Large Energy Consumers Association
CPM	Capacity Procurement Mechanism
DR	Demand Response
DRAM	Demand Response Auction Mechanism
ELCC	Effective Load Carrying Capability
EUE	Expected Unserved Energy
HE	Hour(s) Ending
IEPR	Integrated Energy Policy Report
IOU	Investor-Owned Utility
ISO	Independent System Operator
LIP	Load Impact Protocols
LOLE	Loss of Load Expectation
LOLP	Loss of Load Probability
LRA	Local Regulatory Authority
LSE	Load Serving Entity
PDR	Proxy Demand Resource
PRR	Proposed Revision Request
QC	Qualifying Capacity
RA	Resource Adequacy
RAAIM	Resource Adequacy Availability Incentive Mechanism
RDRR	Reliability Demand Response Resource

APPENDIX B: January 2022 Proposal from CLECA

At the January 10, 2022, working group meeting (the final working group meeting held prior to publishing this report) a third interim approach was proposed by CLECA. Although this proposal came into the working group process with insufficient time to publicly vet and critique, the CEC wanted to document the CLECA proposal in this report. To help, CLECA provided a written description of their proposal on January 11 and a revised version on January 17, and that is provided verbatim here in this appendix report. The approach will be vetted in the working group as part of a longer-term solution.

[The following material was provided by CLECA.]

The current load impact protocols (LIP) estimate the ex-ante load reduction for demand response (DR) on an hourly basis for a five-hour event from 4-9 pm (HE17-21). The load reduction is based upon both a 1 in 2 and 1 in 10 peak load assumption. For Resource Adequacy, the qualifying capacity is the simple average of the load reduction for the five hours to calculate a single monthly value utilizing the 1 in 2 peak load assumption.[21] The shortcoming of this approach is that the hourly load reduction value in terms of reliability from 4-9 pm is not identical. For example, a load reduction during 6-8 pm would be used more often to maintain reliability than a reduction from 4-6 pm. If a DR program does not have a constant load reduction over time, such as A/C cycling, then the simple average does not consider value differences across hours.

The results from system reliability modeling can be utilized to develop hourly weights that can be used to determine the weighted average of load reduction for an assumed demand response event. This offers the following benefits:

- ☐ The hourly load reduction is matched to its value to affect grid reliability as measured from the reliability model
- ☐ The proposal does not require time-intensive and costly modeling of the reliability impacts of individual DR programs
- ☐ It is a simple additional step to the current process using the load impact protocols
- ☐ It captures interactive or saturation impacts because all resources and weather scenarios are imbedded in the reliability results

Loss of Load Probability and Loss of Load Expectation

The CEC[22] and CPUC[23] have performed reliability modeling to determine if the current resource portfolio or a future resource plan will achieve the desired reliability metric of no more than 1 day in 10 years of not being able to serve load.[24] The reliability model will run multiple scenarios for load (based upon historical weather patterns) and resource availability. The resources included are all existing resources and, in the case of a forecast, will include adjustments for anticipated new resources or retirements. The reliability model will also include various scenarios for unit forced outages. An output of the reliability model is unexpected served energy (EUE) for each scenario. Most of the scenarios will have no unserved energy because the expected capacity on the system is greater than the expected peak load. The number of scenarios that have unserved energy compared to the total number of runs yields the loss of load probability (LOLP). For each scenario that has unserved energy, this can occur in different hours or months. When all the scenarios are combined, an hourly LOLP results which shows the distribution across time and months. These LOLP hours tend to occur during the periods of hottest weather. For the CAISO system, the hottest weather occurs most frequently in August and September.

For the use in developing weights in the proposal, the LOLP is converted to a relative expectation (loss of load expectation or LOLE) by dividing the hourly probably by the annual sum of the hourly values. The resulting hourly LOLE for the entire year will sum to 100%. The hourly LOLE results can be used as weights applied to the average of the hourly load impacts from the LIP.

In July 2021, the CAISO and its consultant E3 performed a reliability analysis in support of its effective load carrying capability study (ELCC) proposal which produced LOLE for 2020 as shown below.[25] The results show that expected loss of load only occurs in August and September and during the hours of 4-10 pm (HE17-22). Because hot weather events can occur in June and July, the Summer monthly hourly results should be combined into a summer hourly LOLE, as shown in the grand total line, to be used as weights.

Loss of Load Expectation for 2020 (Hour Ending)

Sum of LOLE: Colur												
Month	**HE13**	**HE14**	**HE15**	**HE16**	**HE17**	**HE18**	**HE19**	**HE20**	**HE21**	**HE22**	**HE23**	**Grand Total**
1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.7%	0.0%	0.0%	0.0%	3.3%
9	0.0%	0.0%	0.0%	0.0%	1.4%	25.2%	39.5%	21.8%	7.5%	1.4%	0.0%	96.7%
10	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
11	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
12	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Grand Total	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.4%**	**25.2%**	**42.1%**	**22.5%**	**7.5%**	**1.4%**	**0.0%**	**100.0%**

The LIP Informed by LOLE (LIP+LOLE) Proposal

The LIP estimate hourly load reductions for a DR event from 4 – 9 pm, which is consistent with the current CAISO availability assessment hours, i.e., the hours when it wants resources to be available for its expected greatest need.[26] Per the CPUC Maximum Cumulative Capacity (MCC) Buckets, DR programs must be available for 4 continuous hours, 4 – 9 pm, Monday-Saturday, and May – September.[27] However, many DR programs are available for six hours and are not restricted to the 4 – 9 pm window and not limited to May-September. Depending on the distribution of the LOLE, the assumed DR call window in the LIP should be adjusted to match the system need and program parameters. Failure to make this adjustment would improperly penalize a DR program when it is available to be called for a longer period than what is assumed in the current LIP call window. For example, the BIP program is available for a 6-hour call, but the LIP assume only a 5-hour call from 4-9 pm.

The table below compares the results of using a simple average to the use of LOLE as a weighted average for Southern California's Base Interruptible Program[28] and its commercial Summer Discount Plan (SDP) for A/C cycling. Because BIP customers have a relatively flat load shape and the program is available for all six hours of the LOLE, the results of the simple average of HE17-21 and weighted average of HW17-22 (highlighted in yellow) are the same. Note, the load impact results for BIP were adjusted to show a 6-hour call.

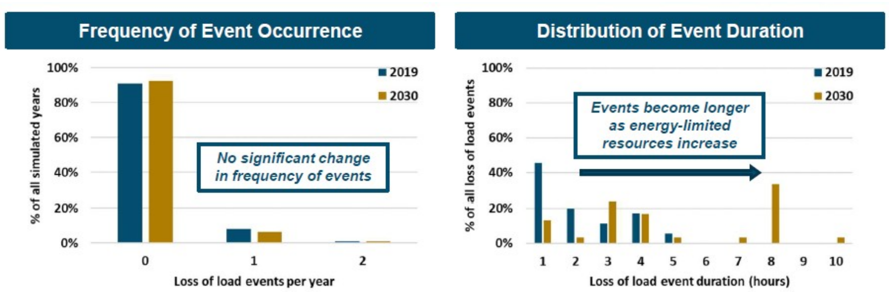
The SDP has a load reduction that is the highest in the first hour and then declines as commercial load falls off due to customer fatigue and/or commercial business hours. In this case, the hourly load impacts make different contributions toward reliability across time. The use of hourly LOLE as weights will be a better measurement of the value of load reduction over the reliability event. In this case, the qualifying capacity is 19 MW instead of 20 MW. However, since SDP is available for a 6-hour call, in this example a positive value should exist for HE22, so the weighted average should be slightly higher.

		SCE-BIP		SCE-SDP-Commerical	
		Load Impact		Load Impact	
HE	LOLE	MW		MW	
16	0.0%	0		0	
17	1.4%	494		28.95	
18	25.2%	498		23.72	
19	42.1%	494		18.78	
20	22.5%	495		14.90	
21	7.5%	497		12.61	
22	1.4%	506		-2.81	
23	0.0%	164		-1.21	
	100.0%				
		LIP Avg of HE17-21	LIP weighted by LOLE HE17-22	LIP-Avg HE17-21	LIP weighted by LOLE HE17-21
		496	496	19.79	18.58
	SCE ExAnte LIP for PY2020 with 2021				
	Impacts for September call, 1 in 2 weather year				
	BIP HE22 adjusted to show full load reduction for 6 hour event				
	NOTE:Since SDP can be called for 6 hours, hourly values needs revision.				

Ideally, the LIP call window would be aligned with the hours of LOLE, i.e. a 6-hour DR program to match the 6 hours of LOLE. If the call hours (HE 17-21 or 4-9pm) from the LIP cannot be adjusted to align with the hourly LOLE distribution (in the example above HE 17-22), then the conversion from the LOLPs to the LOLE used for weights would be adjusted. This would be accomplished by removing the LOLP for HE22, summing the LOLP hours for HE17-21, so that the LOLE for HE 17-21 now sums to 100%. This would avoid unfairly weighting an hour of LOLE to have zero load reduction for HE22 when in fact it could provide some load reduction. To be clear, this would only occur if the 4-9pm LIP call cannot be adjusted for a longer duration capability of a DR. If there was a DR program that was only available for four hours, then the hours of LOLE should not be reduced to a 4-hour duration.

In the case when the DR program is available for less than the duration of the LOLE hours, it should be allowed to optimize its value. That is because it is consistent with a reliability model's dispatch of a 4-hour program to minimize expected unserved energy during a scenario if the outage lasts longer than 4 hours. Using the LOLE data above, a 4-hour program would be able to avoid 97% of the LOLE events. In a prior version of the CAISO DR ELCC study (for 2019) almost all the shortfall scenarios were 4 hours or less and roughly 5 percent of the scenarios had a 5-hour duration. Thus, the proposal appears consistent with what would result if the 4-hour DR program was estimated using an ELCC approach.

Finally, the CAISO DR ELCC study showed that for 2019, there were at most 2 loss of load events per year. Since DR programs must be available 24 hours a month, a 4-hour program could be called 6 times a month. The frequency limits of DR programs would not be a binding constraint in performing a more complex ELCC analysis. Therefore, the frequency of calls is not needed in the LIP+LOLE approach.



The Source of the LOLE Study

Both the CEC and CPUC have performed reliability studies, so either organization could provide the hourly LOLE results. The CEC Mid-Term Reliability Report published on September 30, 2021, included reliability analysis for 2022. Figure 9 of the Report included a distribution of when the unexpected unserved energy occurred, i.e., from HE 17 to HE 21. This data could be used for the 2023 RA compliance year. An alternative is that the CPUC could run reliability analyses to be used for DR. Finally, because this is an interim approach, the CAISO LOLE results from its July 2021 study (as shown above) could be utilized as the results appear consistent with the results from the CEC that HE17-21 is the period of greatest concern.

2022 Timeline

February – CEC issues Report to CPUC

March – Comments on CEC report to CPUC

April 1 – DR Providers submit LIP results to CPUC

April – CPUC issues order for use of LIP + LOLE, and provides the LOLE to be used by all parties

May – Parties submit LIP + LOLE results

June/July – Commission PD and Final decision for RA QC for DR