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Witnesses:	Brad Heavner

PREPARED DIRECT TESTIMONY THE
CALIFORNIA SOLAR & STORAGE ASSOCIATION

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Establish Policies, Processes, and Rules to Ensure Reliable Electric Service in California in the Event of an Extreme Weather Event in 2021.	Rulemaking 20-11-003 (Filed November 19, 2020)

PREPARED DIRECT TESTIMONY OF THE CALIFORNIA SOLAR & STORAGE ASSOCIATION

This testimony is presented on behalf of the California Solar & Storage Association (CALSSA). CALSSA represents more than 600 businesses that provide services and products for solar energy and energy storage in California, including contractors, engineers, manufacturers, distributors, and financiers. Brad Heavner is the Policy Director at the California Solar & Storage Association. His business address is 1107 9th St. #820, Sacramento, CA 95814. His experience and qualifications are described in the attached Statement of Qualifications, which is attached to this testimony.

I. BACKGROUND

On July 30, 2021, Governor Gavin Newsom issued a proclamation directing the state agencies to take action to increase energy supply and reduce demand for summer 2022 and 2023.[1] In response to that proclamation, the California Public Utilities Commission (the Commission) issued its Assigned Commissioner's Amended Scoping Memo and Ruling for Phase 2, initiating Phase 2 of this proceeding. In Phase 2, the Commission seeks to increase peak and net peak supply resources, and reduce peak and net peak demand, in 2022 and 2023. On August 16, 2021, Administrative Law Judge (ALJ) Brian Stevens issued a ruling with an Energy Division Staff Concept Paper (Staff Concept Paper) that consisted of a number of policy concepts for parties to consider when submitting Phase 2 proposals.

[1] See https://www.gov.ca.gov/wp-content/uploads/2021/07/Energy-Emergency-Proc-7-30-21.pdf (Proclamation of a State of Emergency).

II. INTRODUCTION

As Californians increasingly adopt behind-the-meter (BTM) battery energy storage systems, the state is developing a growing resource that can be dispatched to provide valuable energy and capacity during grid emergencies. Virtual power plants (VPPs) are one of the most promising vehicles for fully realizing the value of these BTM resources for our state's grid needs. A VPP is a collection of distributed energy resources (DERs) located at customer sites that an aggregator can remotely control and dispatch as a single unit in response to grid needs.

CALSSA's member companies are actively engaged in developing VPPs, but have experienced varying degrees of success in doing so depending on the policy frameworks of the jurisdictions in which they are active. Virtual power plants consisting of rooftop solar and battery storage are becoming increasingly common in other parts of the United States and the world,[2] but they are not yet widespread in California because the state has not developed policies and programs that would allow residential battery customers to enroll their batteries in a VPP and that would allow customers and aggregators to be compensated for the energy and capacity they provide during critical times. For example, while the Commission's Demand Response Auction Mechanism (DRAM) and CAISO's Proxy Demand Resource (PDR) tariff compensate for energy and capacity from DER aggregations, neither of those programs recognizes energy dispatched to the grid from behind the meter, significantly reducing the value to battery owners and aggregators of participating in these programs.

The Emergency Load Reduction Program (ELRP) represents a unique opportunity to develop program elements that can meet urgent needs while piloting those elements for possible inclusion in a broader program. ELRP seeks to address some of the issues that have impeded VPP development in California to date—particularly an inability to be compensated for exported energy to the grid from BTM batteries—and is a step in the right direction. Notably, ELRP already allows compensation for energy exported to the grid, unlike existing demand response programs.

However, participation in this ELRP option has been poor as a result of limitations in program design. The primary issues impeding the ELRP program are difficulties in customer

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[2] *Financial Times*, "Extreme weather fuels rise of 'Virtual Power Plants,'" by Henry Sanderson, July 13, 2021, *available at* https://www.ft.com/content/4e350d50-d4cb-4447-bc2a-debfdec702f8 (last visited on Aug. 31, 2021).

enrollment and in estimating customer benefits, or even being assured that the program will result in compensable dispatches. Because of these problems, ELRP as it is currently structured is unlikely to foster much participation from battery storage customers or aggregators seeking to enroll those customers in a VPP—currently the focus of ELRP Group A.4—particularly if enrollment is a burdensome process that excludes participation in other programs, without a clear way to estimate any potential financial gain.

In the Staff Concept Paper, staff recommends an Electric Vehicle/Vehicle to Grid Integration (EV/VGI) Aggregation Pilot with a number of features that are different from other segments of the ELRP pilot, including minimum dispatch of 30 hours per season, and ability to measure and settle incremental load reduction (ILR) at the EV supply equipment (EVSE) sub-meter. As a general matter, CALSSA questions the rationale for applying different rules to EV batteries than to stationary storage, as the two resources employ fundamentally the same technology and stationary storage is more well prepared to deliver strong performance in the short term. CALSSA's view is that the best way to develop EV/VGI resources is to first develop programs that facilitate virtual power plants for stationary storage—which already has the necessary hardware, software, and interconnection agreements for grid dispatch—and then allow EVs to participate in those programs as EV manufacturers start to develop cars with bi-directional inverters.

In this testimony, CALSSA suggests a number of program improvements to address the obstacles to VPPs for stationary storage. CALSSA's proposal focuses on policy changes to ELRP that offer the best opportunity to bring VPPs online to reduce net peak demand for summer 2022 and 2023. One of the most effective steps the Commission can take to reduce net peak demand in this short time frame is to establish programs that promote the aggregation and dispatch of behind-the-meter solar-paired batteries to the maximum extent possible during the most critical hours of grid need. Thus, CALSSA's proposal focuses on making it easier for distributed energy resource (DER) aggregators to play a role they are uniquely situated to play, facilitating and increasing customer dispatch of batteries to provide greater grid benefit than can be achieved through customer actions alone.

III. CALSSA PROPOSAL

Pursuant to the Guidance to Parties for Proposals to Reduce Demand or Increase Supply, CALSSA's proposal proposes modifications to the existing ELRP program to reduce demand or increase supply at net peak.

1.a General Program Design

In order to set the aggregator-driven portion of ELRP aside with distinct program elements and evaluation, CALSSA proposes to create Group C to replace Group A.4. The triggers, compensation, and eligibility for this group will be unique enough that it will avoid confusion if it is designated as a separate Group C rather than a subset of Group A. Group C will have five main tenets.

- Everyone is eligible, with no dual participation limitations.
- It is easy to opt in.
- Events are more frequent, with a target of 50 hours per year.
- Participation is voluntary for the individual customers, but aggregators are held to a performance standard.
- The aggregator can present data for settlement at the battery inverter rather than the meter, if the utility validates their data submittal format.

One drawback of the ELRP approach is that Commission staff, the utilities, and parties spend a significant amount of time, work, and effort to develop a program that is likely to be dispatched very infrequently. For example, in both 2016 and 2018, CAISO called *zero* AWE events, and in 2017 and 2019 CAISO called only one such event in each year.[3] The year 2020 had more events, but there is no certainty that will be the norm.

To engage robust participation from customers that have technological capabilities for strong performance and aggregators to manage their resources, there has to be enough opportunity for customer value to attract aggregators to participate. Because the existing ELRP participation rules exclude customers from participating in other demand response (DR) programs—such as market-integrated programs like DRAM and load-modifying programs like critical peak pricing (CPP)—ELRP runs the risk of reducing demand response as a resource to

[3] CAISO Summary of Restricted Maintenance Operations, Alert, Warning, Emergency, and Flex Alert Notices Issued from 1998 to Present, Aug. 16, 2021, http://www.caiso.com/Documents/AWE-Grid-History-Report-1998-Present.pdf.

meet California's climate goals. It seems a waste to build the infrastructure and enroll thousands of customers into a program that is almost never dispatched and that prohibits enrolled customers from participating in other programs that have actual performance obligations.

Creating a Group C, in which customers could opt in and be subject to greater frequency of dispatch events with different triggers from the primary ELRP program, would rectify this problem. While automatically enrolling all residential customers in ELRP, as proposed in the Staff Concept Paper, would reduce an upfront barrier to customer enrollment, such a step would not in itself ensure maximum participation in the program, for a few reasons. First, many customers who are automatically enrolled in the program likely will not be aware they are enrolled, since they will not have taken any steps to opt in, and no marketing effort successfully reaches all customers. Second, automatic enrollment would remove any opportunity for third-party aggregators to participate and earn revenue. Without third-party aggregators, there will be no entity with a financial incentive to educate customers about the program and to facilitate maximum customer dispatch through smart devices. This is particularly critical for BTM batteries. The operating modes of most customer batteries are pre-programmed, so customers should be given the same opportunity as non-battery customers have to make behavioral changes to reduce consumption and receive compensation, while allowing their aggregator to perform remote dispatch actively. This will increase the contribution customers with BTM batteries can make toward grid reliability compared with automatic enrollment alone.

1.a.i. Program Trigger

In the Staff Concept Paper, staff recommends adding CAISO Flex Alerts as a trigger for ELRP dispatch, in addition to AWE events. CALSSA agrees with that recommendation for customer participation in ELRP, but does not believe Flex Alerts should be a trigger for aggregator participation.

One problem with using ELRP as a basis for VPPs is that there is no guarantee the resource will be dispatched in any given year, and thus customers and aggregators have no way to estimate potential earnings. This is particularly important for aggregators that would need to expend capital to build and manage the software/hardware platforms for VPP and recruit customers. In addition, it is inefficient and a waste of resources to create a new program, educate and enroll customers, and then only dispatch that program a handful of times per year at most.

For this reason, CALSSA also proposes that Group C VPPs be subject to a dispatch trigger designed to dispatch the resource for 50 hours each year.

To accomplish this, the program should include a price trigger for aggregator participation. Each utility should determine a threshold price by January 31 of each year. The threshold price is based on the CAISO day-ahead Locational Marginal Prices (LMP) from the previous three years. For each of those past three years, the utility determines the lowest price among the 50 highest priced hours—i.e., the price that would have triggered 50 hours of events in that year. Those three values from the three years are averaged into a trigger price for the following year.

CALSSA analyzed data from 2020 and determined that the 50th-highest-priced hour had the following prices.

PG&E: $255/MWh
SCE: $290/MWh
SDG&E: $289/MWh

When the day-ahead LMP is higher than the threshold price in any hour, the utility calls an event for those hours the following day.

1.a.ii. Demonstration that the program will deliver benefits during net peak

Tying the event trigger to CAISO day ahead hourly prices will ensure that events happen during net peak when energy supplies are forecast to be tight.

Additionally, CALSSA proposes that dispatch windows be tailored to take full advantage of the BTM storage resource. One way this resource differs from traditional load reduction is that the limited energy content of the batteries necessitates a narrower dispatch window compared with load reduction. Thus, whereas for traditional load-reducing DR resources, a grid operator should make the dispatch window wide enough to ensure that the customer avoids consuming energy during any hour that might create a reliability risk, for battery-based VPP resources, the optimal dispatch window would be targeted to maximize the value of that limited energy by dispatching as much of it as possible during the critical hour. For this reason, the CPUC should work with CAISO to develop narrower dispatch windows of 1–3 hours around the most critical reliability period for battery-based VPPs, and establish a method for communicating this information to VPP aggregators. This approach can accommodate 1–3 hour dispatch windows

that are staggered to meet grid needs across a longer period if the CPUC and CAISO determine that is warranted.

The ELRP Program should be evaluated in Fall 2022 to measure the success of Group C and quantify benefits.

1.a.iii. Program performance requirements

Group C contains two options for aggregators: an energy-only option and a capacity option. In either case, the aggregator commits to delivering some minimum amount of capacity, and the aggregators' payment is reduced if they do not deliver that capacity.

From the perspective of the individual customer, however, participation in events is completely voluntary. The customer is paid $1/kWh for dispatching energy during events, just as in the existing ELRP program, and there is no penalty for failing to dispatch. Thus, for Group C, it is incumbent upon the VPP aggregator to ensure enough customers are dispatched in sufficient amounts to meet the aggregator's commitment. Since energy-limited devices like batteries are dispatched separately and are not related to customer load reduction, we recommend that the aggregator's performance be measured and settled at the battery inverter, rather than at the utility meter. This will facilitate policies that incentivize battery aggregators to dispatch the limited energy in batteries during the most critical windows rather than over the duration of the dispatch event.

Similar to the recommendation in the Staff Concept Paper for VGI to Group A.4 VPPs, Group C should include the ability to measure performance and settle at the sub-meter. Because an aggregator of residential batteries does not have control over a residential customer's general energy consumption, it makes little sense to measure the performance of battery-based, aggregator-managed VPPs at the utility meter—although the individual customers should still be incented to reduce demand in general. For this reason, we recommend that aggregators be allowed to opt for having their compensation be measured and settled at the battery inverter. Customer performance could be measured at the utility meter to be consistent with other residential customers and to incent general load reduction during ELRP events. Measuring the customer's performance at the utility meter allows the customer to be compensated for battery dispatch (which is captured by the utility meter), as well as for general non-battery load reduction. However, the aggregator choosing settlement at the battery inverter would be measured and paid only for battery performance.

CAISO similarly adopted the MGO methodology for energy storage systems before it did so for EVSE, and energy storage systems participating directly into the CAISO markets have been able to leverage this methodology for several years. Allowing energy storage systems to be separately metered and participate as a single site or an aggregation of storage systems, similar to staff's EV/VGI Aggregation Pilot proposal, would allow a greater variety of participation options for DER technologies and sites.

1.a.iv. Compensation Structure

CALSSA recommends additional payment structures and incentives for aggregators who manage devices and facilitate load reduction on behalf of residential customers. There are two ways these aggregator payments could be structured: The first is as a capacity payment, which would be a fixed $/kW payment made to the aggregator each month with a commitment from the aggregator that the promised level of capacity will be provided when an event is called; the second option is an energy payment paid directly to the aggregator for energy provided during each ELRP event, in addition to and separate from the energy payment made to the customer.

Because ELRP is a pilot program, CALSSA proposes to establish both payment methods and allow aggregators to pick one or the other. Thus, aggregators should have a choice of either:

1. <u>Capacity Payment</u>: This would be a monthly payment for capacity paid directly to the aggregator. The aggregator would be responsible for ensuring that the capacity it committed to providing is dispatched during an event. CALSSA recommends setting the capacity payment equal to the net Cost of New Entry (CONE) for utility-scale 4-hour battery storage used in the most recent iteration of the Avoided Cost Calculator or Integrated Resource Planning production cost model. CALSSA recommends using net CONE (rather than Resource Adequacy prices) because VPP resources established by this program will be new resources, and thus should be valued as such.
2. <u>Energy Payment</u>:
    a. During AWE events, compensation is an additional incentive of $1/kWh paid directly to aggregators who enroll customers in VPPs and dispatch those customers during ELRP events. This payment would be in addition to the $1/kWh payment made to customers, for a total payment of $2/kWh. Similar to Staff's recommendation in the Concept Paper to increase the ELRP payment to $2/kWh for Group A.1. non-residential customers and Group A.2 BIP aggregators, this

higher payment for Group C VPP customers would come with a commitment to providing a certain minimum level of performance. We recommend that aggregators' $1/kWh payment be adjusted commensurate with performance around a band of 50% to 200%, similar to the method used for Group 1.A customers, but that the individual customer portion of the payment not be subject to a performance adjustment. Thus, if only half of an aggregator's customers deliver energy during an ELRP event, the aggregator's payment would be adjusted to account for that under-performance, but the individual customers who delivered energy would not be impacted.

b. During dispatch events triggered by prices as described in section III.1.a.1 that are not AWE events, the aggregator will be paid the LMP at the day-ahead hourly level. Although paying real-time five-minute prices would more accurately follow market prices, this pilot must be streamlined to be effective, and five-minute increments would be too difficult to manage at this stage.

Paying aggregators an energy or capacity payment in addition to the customer payment would compensate aggregators for doing the work of actively operating fleet performance, signing up new customers, and managing customer expectations, as well as the underlying work to create platforms with which to dispatch customers and continually improve upon operational capabilities. In addition, aggregators would likely have a strong incentive to pass a portion of that payment on to customers in order to increase customers' motivation to enroll with a particular aggregator. Even without resource adequacy and the associated requirements, the Commission can have confidence in program performance because aggregators will have the incentive to show results and assemble bigger fleets for the following year.

Customers with dual enrollment will be compensated only under ELRP for performance during ELRP events. If a customer is also enrolled in a DR program and that program has an event that is not also an ELRP event, the customer can be compensated under the DR program for those event hours. If a customer is also enrolled in critical peak pricing, CPP rates will be applied to net exports during non-ELRP event hours, as well as applying to net consumption at all times.

1.a.v. Program eligibility and enrollment

In the Staff Concept Paper, staff recommends automatically enrolling all residential customers into ELRP if they are not already enrolled in a competing demand response program. CALSSA supports this recommendation for Groups A and B, as it would address the cumbersome enrollment process, which is currently a barrier to customer participation. For Group C, customers should be able to opt in through a registration process managed by the aggregator. That process can be reviewed by Energy Division and is subject to audit.

Currently, VPP aggregators' desire to create an easy, "one-click" enrollment process is stymied by the fact that an aggregator has no way of knowing in advance if an individual residential customer is eligible to participate in ELRP. This is likely to result in aggregators offering to enroll customers, only to find out later that a significant portion of the enrolled customers are disqualified, causing frustration and unnecessary friction.

One way to solve this problem would be to automatically enroll all residential customers in ELRP and eliminate the rules preventing them from dual-enrolling in other DR programs. CALSSA agrees that it does not make sense to "double pay" customers for the same DR event through two different programs. However, there is a much easier way to solve this problem than disallowing dual enrollment: Simply allow ELRP to take priority for payment over any other DR program a customer is also enrolled in whenever there is overlap between two different programs in terms of the service provided and for which a customer might be compensated.

Aggregators will have a deadline of June 1 each year to register their fleets in the program. Every customer participating in the fleet will have opted into the aggregation by that time. Each aggregator will manage their entire fleet for that program year and be evaluated on the fleet as a whole.

The Commission can choose to put a cap on enrollment for the 2022 program year for purposes of cost containment. From CALSSA's perspective, historic deployment of customer batteries is a natural cap. California IOUs have interconnected approximately 360 MW of customer-sited batteries to date, and are adding approximately 19 MW per month.[4] If 150 MW of storage capacity were to participate for 50 hours in 2022 at a compensation rate of $300 per MWh, total compensation would be $2.25 million for the year. If an additional 150 MW were

[4] Data analysis based on California Distributed Generation Statistics, available at californiadgstats.ca.gov. Approximately 42% of customer battery capacity is at commercial customer sites and 58% is at residential sites.

added each year through 2025 with the same participation rate and compensation rate, the total budget for battery aggregations under the expanded event trigger would be $22.5 million. Presuming that there would be some participation from demand management providers, the total cost of aggregator payments in Group C would be higher than that, but the total cost should still be manageable. If the Commission creates a cap, it should be revisited each year. If there is no cap, the Commission can simply make clear that there is no guarantee the budget will be increased if it is depleted before the end of the pilot term.

1.a.vi. Measurement and Verification

CALSSA proposes that measurement of performance for the customer portion of Group C payment be done at the utility meter, and measurement of performance for the aggregator portion of the Group C payment be done at the battery inverter. This will better enable aggregators to set targets, ensure they hit their targets, and demonstrate performance to program administrators.

1.b. Program Administration

CALSSA does not propose any changes to program administration for the ELRP program, with utilities continuing to administer the program.

1.c. Program Marketing, Outreach, and Education

With the proposed Group C, aggregators will use their own funds for marketing and outreach. That is one of the main benefits of the proposal. Utilities have had difficulty marketing customer energy programs, and performance in Flex Alerts has been disappointing. CALSSA's proposal fixes those shortcomings. The funding provided to aggregators will obviate the need to spend money on less effective marketing, as aggregators would have a direct financial incentive to enroll customers.

CALSSA makes one recommendation for informing program participants about Public Safety Power Shutoff (PSPS) events. This is perhaps more of an implementation issue than marketing, but we include the recommendation in this section.

In Rulemaking (R.) 18-12-005, the Commission has established processes for utilities to proactively de-energize power lines in order to avoid sparking wildfires during certain high-risk times, a process known as PSPS events. To the extent that PSPS events coincide with ELRP events, customers with BTM batteries who participate in ELRP may be wary of discharging their batteries to help the grid, since doing so could leave them without backup power in the event of

an outage. Currently, customers and aggregators can receive notification of impending PSPS events, but only for wide geographic areas, thus creating uncertainty for battery customers as to whether they can discharge their battery for an ELRP event without risking having insufficient backup power. If utilities could provide API access to all customer locations subject to PSPS events, battery customers in ELRP Groups A.3 and A.4 would have more confidence that they can fully discharge a battery for ELRP without sacrificing backup power for resiliency.

1.d. Program Budget

CALSSA anticipates that a higher budget may be needed to cover the additional compensation for aggregators and for Group C participants, but participation levels are not certain enough to propose a budget modification at this time. Given the infrequency with which ELRP events have been called to date, it appears the original budget caps may have been much higher than needed to cover costs under the existing program. As a starting point, CALSSA recommends taking the program funds under the cap for customer compensation that were not used in 2021, and adding one quarter of those funds to each year remaining in the program. If there are no events called for the remainder of 2021, this would result in the following annual budget caps for customer compensation.[5]

- PG&E: $35.75 million
- SCE: $42.25 million
- SDG&E: $18.5 million

CALSSA does not recommend any changes to the utilities' administrative budgets.

1.e. Implementation Timeline

CALSSA recommends the following implementation timeline:

- November 2021: Commission Decision voted out
- December 2021: Utilities file Advice Letters incorporating new program elements into existing ELRP structure
- March 2022: Energy Division approves Advice Letters
- April 2022: Residential customers are automatically enrolled in ELRP
- May 2022: Aggregators begin enrolling customers in Group A.4
- June 2022: Program launch with test event

[5] Budget numbers from D.21-03-056, Attachment 1, p. 16.

1.f. Program Duration

CALSSA does not propose to change the program duration or the 2025 end point at this time.

1.g. Estimated Megawatt Contribution

Since the proposed program is a new program for California, it is challenging to estimate the capacity contribution prior to gaining real-world experience. However, the interconnection database shows approximately 366 MW of BTM residential batteries deployed in California. This is likely an underestimate considering internal record-keeping of leading storage providers.

CALSSA recommends that Group C be open to both commercial and residential customers, but we expect it will be dominated by residential customers because commercial customers have other revenue opportunities for deployment of energy storage.

1.h. Potential Interaction with Other Existing Programs

CALSSA proposes to eliminate the dual participation rules and allow all residential customers to enroll in ELRP, regardless of whether or not they are enrolled in another DR program.

1.i. Prior Similar Program Experience

CALSSA is not aware of any similar program in California or elsewhere.

1.j Program Funding and Cost Recovery Mechanisms

CALSSA does not propose to change the ELRP funding or cost recovery mechanisms.

1.k. Potential Risks of Proposal

The greatest risk CALSSA sees is the potential that a customer's first experience with a VPP through the ELRP may be a negative one, making them less likely to participate in other VPP programs in the future. This could be the case if (for example): the enrollment process is confusing or overly burdensome; the customer does not see benefits of enrollment due to lack of events or low payment; compensation was not what the customer was expecting; it is unclear to the customer how performance for events was determined and settled.

This concludes CALSSA's testimony.

Attachment 1

STATEMENT OF QUALIFICATIONS OF BRAD HEAVNER

Brad Heavner has been employed as the Policy Director at the California Solar & Storage Association since November 2013. His business address is 1107 9th St. #820, Sacramento, CA 95404.

CALSSA is a statewide trade association representing more than 600 member companies that are active in providing solar energy and energy storage in California. Mr. Heavner oversees the association's work at the Commission.

Prior to work at CALSSA, Mr. Heavner worked for 16 years in a variety of roles advocating clean energy, environmental protection, and consumer rights. This includes six years with the Frontier Group, a think tank focused on consumer and environmental issues and affiliated with the Public Interest Network, three years as state director of the Maryland Public Interest Research Group, five years as state director of Environment Maryland, and two years with the Climate Center.

Mr. Heavner sponsored testimony in the consolidated residential default time-of-use proceeding (A.17-12-011), PG&E 2020 General Rate Case (A.19-11-019), and Net Energy Metering Successor Tariff (R.20-08-020). In addition, he has led CALSSA's intervention in 18 proceedings at the CPUC, including eight General Rate Cases or Rate Design Windows. This includes acting as the lead party representative in the following rate proceedings:

- Residential Rates Order Instituting Rulemaking, R.12-06-013
- SCE 2013 Rate Design Window, A.13-12-015
- PG&E 2014 General Rate Case, A.13-04-012
- SDG&E 2015 Rate Design Window, A.14-01-027
- SCE 2015 General Rate Case, A.14-06-014
- SDG&E 2016 General Rate Case, A.15-04-012
- SCE 2016 Rate Design Window, A.16-09-003
- PG&E 2017 General Rate Case, 16-06-013
- SCE 2018 General Rate Case, A.17-06-030

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VERIFICATION OF FACTS IN PREPARED DIRECT TESTIMONY OF THE CALIFORNIA SOLAR & STORAGE ASSOCIATION

The Prepared Direct Testimony of the California Solar & Storage Association (Testimony), filed September 1, 2021, was prepared under my supervision. The facts contained in the Testimony are true and correct to the best of my knowledge, except as to matters that are stated on information and belief, and as to those matters, I believe them to be true. Any opinions expressed in the Testimony reflect my best professional judgment.

I understand this declaration is made under penalty of perjury.

/s/ *Brad Heavner*

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