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DIRECT TESTIMONY OF

NICHOLAS J. PAPPAS
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MAHAYLA SLACKERELLI AND
SAMANTHA WEAVER

ON BEHALF OF

CALIORNIA COMMUNITY CHOICE ASSOCIATION

CALCCA
ADVANCING LOCAL ENERGY CHOICE

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
R.20-11-003

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Table of Contents

CHAPTER 1. WITNESS NICHOLAS J. PAPPAS 1

I. INTRODUCTION 1

II. REVIEW OF NEEDS ASSESSMENT ANALYSES AND FINDINGS 4

A. Resource Assumptions 7

1. Fossil Resources 9

2. Hydroelectric Resources 11

3. Solar and Wind Resources 11

4. Import Resources 13

5. Demand Response 15

6. Battery Storage 16

B. Demand Assumptions 16

C. Results and Analysis 18

D. Conclusion 21

III. ASSIGNMENT OF PROCUREMENT RESPONSIBILITY 22

CHAPTER 2. WITNESSES MICHAEL HYAMS, MATTHEW LANGER, MAHAYLA SLACKERELLI AND SAMANTHA WEAVER 23

I. DEMAND-SIDE SOLUTIONS 23

A. CleanPowerSF – Michael Hyams 24

1. Question 6: Program Design, Benefits, and Barriers 24

2. Question 7: Communications Strategy 27

B. Clean Power Alliance- Matthew Langer 28

1. Question 6: Program Design, Benefits, and Barriers 28

2. Question 7: Communications Strategy 29

C. Redwood Coast Energy Authority- Mahayla Slackerelli 29

1. Question 6: Program Design, Benefits, and Barriers 30

2. Question 7: Communications Strategy 32

D. Expanding Electric Vehicle (EV) Participation in DR Programs- Samantha Weaver 32

Appendix A
Appendix B
Attachment A
Attachment B
Attachment C
Attachment D
Attachment E

CHAPTER 1. WITNESS – NICHOLAS J. PAPPAS

I. INTRODUCTION

In response to the Commission's recent *Order Instituting Rulemaking Emergency Reliability,*[1] many diverse stakeholders representing a wide range of interests and businesses submitted thoughtful and thought-provoking comments. The California Community Choice Association (CalCCA) joins with these stakeholders and the California Public Utilities Commission (Commission) to work together to address the risk of reliability events occurring on the immediate planning horizon, with a particular focus on Summer 2021.

Chapter 1 of this Testimony has been prepared on behalf of CalCCA by or under the supervision of Nicholas J. Pappas, Director of Strategic Initiatives and Outreach. Mr. Pappas' qualifications are set forth in Attachment A. This Chapter addresses energy supply concerns in Summer 2021, and CalCCA's support for consideration of the various supply- and demand-side policy options, such as incremental supply-side procurement, expansion of demand response procurement, critical peak pricing, and other demand-side solutions on an emergency basis. CalCCA believes that these solutions should be considered on their merits – the likelihood that they will succeed in reducing reliability risk, the potential for their successful execution, their expected cost to ratepayers, the fair allocation of those costs, and other factors. Further, the solutions must be appropriately tailored in magnitude to the problem at hand: the Commission should ensure the cumulative expected impact from Commission-authorized supply and demand solutions should be roughly equivalent to the net need for Summer 2021 for customers served by Commission-jurisdictional Load Serving Entities (LSEs).

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[1] R.20-11-003, November 19, 2020.

To support this "right-sizing" of Commission-authorized procurement, this testimony addresses the likely quantity of need for Summer 2021, focusing on interpretation of the analyses submitted into the record by the California Independent System Operator Corporation (CAISO)[2] and Southern California Edison (SCE).[3] The CAISO analysis replicates and updates the 2019 "stack analysis" performed by the Commission's Energy Division (ED).[4] SCE presents a stochastic Loss of Load Expectation (LOLE) study adapted from its 2019-2020 Integrated Resource Plan.[5] CalCCA offers observations and interpretations from these analyses based on their different inputs and methodological approaches.

Following these analyses and comments from other stakeholders, the Commission issued *Assigned Commissioner's Ruling Directing the State's Three Large Electric Investor - Owned Utilities to Seek Contracts for Additional Power Capacity to Be Available by The Summer of 2021 or 2022* on December 28, 2020 (December Ruling) and, subsequently, issued the proposed *Decision Directing Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company to Seek Contracts for Additional Power Capacity for Summer 2021 Reliability* on January 8, 2021 (January PD). Under more forgiving conditions, a rigorous LOLE analysis would be the prudent approach. CalCCA acknowledges, however, that the compressed timeline leading into Summer 2021 virtually forecloses any significant additional analysis at this time. Regardless, the Commission must determine the scale of the reliability

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2 Comments of the California Independent System Operator Corporation on Order Instituting Rulemaking Emergency Reliability, November 30, 2020.

3 Southern California Edison Company's (U-338) Comments on 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, November 30, 2020.

4 *Assigned Commissioner and Administrative Law Judge's Ruling Initiating Procurement Track and Seeking Comment on Potential Reliability Issues*, R.16-02-007, June 20, 2019, at 12.

5 Integrated Resource Plan of Southern California Edison Company (U 338-E), R.20-05-003, September 1, 2020.

need, and it is worthwhile to examine the key variables and inputs upon which this determination will hinge. This testimony reviews these input assumptions and methodologies through a review of the analyses already submitted into the record, recommending that the Commission hold a workshop to reconcile major differences between the submitted analyses to better understand the resource need before approving significant ratepayer expenditures for emergency procurement. However, recognizing the need for urgent action and the Commission's proposed direction to the IOUs to return with proposed contracts by February 15, 2021, CalCCA recommends that authorized supply- and demand- solutions should not, cumulatively, exceed 1,073 MW, without further analysis. CalCCA also urges the Commission to make clear that responsibility for procuring additional resources under the December Ruling rests solely with the three IOUs.

Chapter 2 of this testimony, prepared by Michael Hyams, Matthew Langer, Mahayla Slackerelli, and Samantha Weaver, presents the response of various CCAs to certain questions posed in the December 18, 2020 Administrative Law Judge's ruling introducing a Staff Report and seeking certain information from parties (December 18 Ruling).[6] This section discusses the experiences of community choice program aggregators (CCAs) who have developed and implemented some form of "critical peak pricing", which may be useful in reducing load during constrained summer periods. The discussion identifies both the benefits of the programs and barriers encountered by the CCAs in implementing these programs. This Chapter also includes a discussion of recommendations for expanding electric vehicle participation in Demand Response (DR) programs and provides examples of existing CCA programs and pilots.

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[6] *Administrative Law Judge's Ruling Introducing a Staff Report and Questions to the Record and Seeking Responses from Parties in Opening and Reply Testimonies*, December 18, 2020, Attachment 1 at 4.

II. REVIEW OF NEEDS ASSESSMENT ANALYSES AND FINDINGS

The existing record, notwithstanding any additional analysis delivered in this round of opening testimony, comprises two analyses: one from the CAISO and one from SCE.[7] The CAISO and SCE analyses each represent valuable and significant contributions into the record and, while conceptually similar in their intent, take structurally distinct methodological approaches, use different input sources and, accordingly, differ significantly in their results. Given the focus within the CAISO analysis on September Hour Ending (HE) 20 (7:00 p.m. to- 8:00 p.m. Pacific Standard Time), the hour which perhaps most acutely reflects net peak concerns, CalCCA's review of the analyses is also focused on September HE 20 and refers to values within that period unless otherwise stated. CalCCA concludes that, despite the value of both submissions, it is critical that the Commission move forward to reconcile the differences in assumptions and methodologies between the analyses prior to determining the level of need for emergency procurement in Summer 2021. Specifically, CalCCA strongly urges the use of an LOLE study consistent with SCE's approach, but notes below several areas where resource assumptions differ significantly with CAISO assumptions and may not accurately capture real world values, particularly assumptions for fossil resources, demand response, and other renewables (e.g. geothermal, biomass, biogas, etc).

CAISO's analysis reconstructs and updates the stack analysis exercise developed by ED staff in 2019 with key modifications. At a high level, CAISO's analysis estimates the available RA capacity in all hours of Summer Months (May-October), with specific focus on results for

[7] CalCCA wishes to acknowledge the transparency and spirit of collaboration of both the CAISO and SCE teams, and appreciates the time and effort taken to provide data and answer questions in the course of developing this testimony. While CalCCA has taken efforts to ensure the accuracy of the discussion below, the compressed time frame of this testimony has foreclosed the opportunity to review these results with the authors and some errors in interpretation may exist. CalCCA submits this testimony in the spirit of identifying areas for continued discussion and refinement of the analytical record.

Hour Ending (HE) 20 (7:00 p.m. to-8:00 p.m. Pacific Standard Time). CAISO modifies the stack by reducing the Qualifying Capacity (QC) of solar resources to zero beginning in HE 20, including planned resources, and including a range of estimates for import RA. CAISO compares the stack against both the current RA requirement, which includes a 15% Planning Reserve Margin (PRM), and a 20% PRM, which CAISO indicates is necessary to reflect latest available data on load forecast uncertainty and forced outage rates.

Assuming all available CAISO resources and an average level of import RA are shown by LSEs in 2021, CAISO's analysis finds a 1,073 megawatt (MW) shortfall in HE 20 for September 2021 based on the current 15% PRM. Utilizing a 20% PRM, as CAISO recommends, results in shortfalls from July through September ranging from 452 MW (August) to 3,316 MW (September). As a deterministic analysis, CAISO's needs assessment indicates the quantity of resources that would be necessary to avoid reliability events under specific, conservative conditions based on specific risk thresholds, represented respectively by the 15% and 20% PRM values. Said differently, CAISO's analysis does not provide an assessment of the probability or level of risk associated with achieving, for example, slightly less or slightly more than the prescribed PRM, but instead indicates whether the tested resource stack exceeds a pre-defined needs value. This approach, while less rigorous than other industry standard resource planning and reliability methods, was prominent in the 2019 IRP Procurement Track, and represents a more accessible work product for policymaker and stakeholder discussion – two factors which almost certainly contributed to CAISO's selection of this methodology for this urgent proceeding.

SCE's analysis, in contrast, tests a broad range of grid conditions, simulating 500 scenarios through its PLEXOS production cost modeling software. SCE's analysis uses resource data from SCE's Integrated Resource Plan (IRP), which reflects data from the 2019-2020 IRP Baseline Resource List[8] as well as expected new resources ordered in D.19-11-019, modeled as 1,650 MW of storage resources delivered in July and August 2021. SCE uses a stochastic LOLE study which varies load, fossil outages, and variable renewable resource production along defined probability distributions. SCE's input range includes the load, fossil outage rates, and variable renewable resource production values observed during the August and September heat storm events, as well as values both above and below observed values. Fixed values, including hydropower and imports, use IRP values with some modifications to better align with Summer 2020 observed conditions. SCE generated 500 scenarios using the stochastic variables described above and tested them through a PLEXOS production cost model of the CAISO system to determine the frequency and magnitude of unserved load events, defined as any hour during which available supply fell below the operating reserve margin.

SCE's analysis found that some scenarios – primarily scenarios with high fossil outages and low renewable input – included loss of load events during net peak hours (HE17-HE20) during July, August, and September. Still, in aggregate, SCE found that the LOLE did not exceed the industry standard reliability metric of 0.1 days per year, which would be equivalent to one day of lost load per ten years. However, SCE's finding of an LOLE of 0.09 suggests that the CAISO system only scarcely exceeds the 0.1 standard, and subtle modifications to the study's inputs could easily result in an LOLE conclusion which fails the 0.1 industry standard, as SCE observes in its comments.[9]

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[8] https://www.cpuc.ca.gov/General.aspx?id=6442461894.

[9] Southern California Edison Company's (U-338) Comments on 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, November 30, 2020, at 17.

In contrast to CAISO's analysis, which tests sufficiency under inclement weather and forced outage conditions, SCE's stochastic approach tests a broad range of conditions, including both "blue sky" and severe weather conditions. SCE's results should be interpreted as the likelihood of reliability events given the probability of underlying inputs – extreme load and lower-than-expected supply. Consequently, the LOLE determination hinges significantly on an accurate and precise probability distribution of the stochastic inputs, as well as correctly calibrated fixed inputs. SCE's probability distribution utilizes weather data designed to incorporate the covariance of high load and renewable output which should, in theory, link the probabilities of high load and low renewables both associated with extreme temperatures.

While these analyses are each useful and informative on their own, they are difficult to compare in equal terms given the conceptual differences noted above as well as the input differences discussed below. Moving forward, it would be worthwhile for the Commission to hold a workshop to align the assumptions of each analysis for better comparison and incorporate the best practices from each analysis; for example, applying SCE's stochastic approach to a resource list and set of stochastic inputs aligned between CAISO and SCE assumptions. The discussion below compares the assumptions and methods of the two studies, focusing on HE20 in September 2021 and provides recommendations to resolve differences in assumptions between the studies.

A. Resource Assumptions

While similar in intent, the two analyses have significant discrepancies in their baseline and planned resource assumptions, and only SCE varies resource availability across multiple scenarios. CAISO's baseline list is built from the 2021 NQC List with modifications and additional information from the Master Control Area Generating Capability List, the Announced

Resource Retirement and Mothball List, and CAISO interconnection queue for upcoming resources.[10] Solar resources are presumed to have zero effective capacity beginning in HE20. CAISO's analysis assumes 44,597 MW of available resources, which, with the average 5,921 MW of import RA capacity, results in 50,518 MW of resources being available to CAISO for dispatch at HE20 in September 2021.

SCE's resource list was developed from the IRP Baseline Generator Unit List for the 2019-2020 IRP cycle, modified to include new resources required by D.19-11-016 as well as other known modifications. SCE's analysis assumes a median of 48,857 MW of resources are available, including 5,480MW of imports, though this value is varied considerably through its stochastic analysis.

Table 1 below compares the resource assumptions across the two analyses, focusing on the most extreme values in SCE's analysis, assessed as the 99th percentile of reliability impact (highest values for load and resource outages, lowest values for renewable output).

Comparison of SCE and CAISO Resource Input Assumptions				
Fixed Resource Values				
Resource	**CAISO**	**SCE**	**SCE - CAISO**	**Notes**
Nuclear	2,280	2,277	-3	Negligible.
Hydro	6,588	5,100	-1,488	CAISO: NQC List, Incl Revised Hydro QC per D.20-06-031; SCE: IRP SERVM September capmax values
Other RPS	1,779	2,253	474	Reason for discrepancy not clear at this time.
Demand Response	1,453	2,195	742	Reason for discrepancy not clear at this time.
Battery Storage	2,468	2,552	84	Likely due to SCE assumption that all D.19-11-019 compliance through battery storage.
Imports	5,921	5,480	-441	Available imports uncertain until LSE month-ahead filings; both assumptions likely reasonable; CAISO average listed here.
Stochastic Resource Values (September, HE20, 99th Percentile of SCE Simulations)				

10 Comments of the California Independent System Operator Corporation on Order Instituting Rulemaking Emergency Reliability, November 30, 2020, Attachment A, at 4-5.

Resource	CAISO	SCE (99th Percentile)	SCE - CAISO	Notes
Fossil	29,134	26,685	-2,449	CAISO uses full NQC and addresses outages in the PRM; SCE varies fossil resources with median production of 28,711 MW.
Solar	0	0	0	Note: Stochastic variable but all September, HE 20 values are zero.
Wind	895	0	-895	CAISO uses September ELCC for wind; SCE varies wind based on weather, with median wind production of 290MW in September, HE 20. 36% of scenarios have 0 wind in this hour.
Total Resources (September, HE20, 99th Percentile of SCE Simulations)				
Resource Totals (SCE 99th Percentile)	50,451	46,542	-3,909	Note that SCE's totals reflect expected high outage rates; CAISO's totals do not reflect outages which are instead addressed through the PRM.

Table 1: Overview of SCE and CAISO Assumptions

Overall, while CAISO has more resources in its resource stack than SCE's most extreme values, CAISO's resource stack does not reflect resource outages – these are instead reflected in CAISO's PRM. However, using CAISO's 10% outage rate from its proposed 20% PRM implies a resource total of 45,405 MW, which is approximately 1,136 MW lower than SCE's 99th percentile values. A discussion of specific differences and reasonableness of these assumptions is below.

1. Fossil Resources

CalCCA finds the fossil resource assumptions to be generally reasonable and consistent across the SCE and CAISO analyses, but highlights several retired resources which CalCCA understands SCE includes as a holdover from the IRP dataset. However, SCE and CAISO's treatment of forced outages, which represent a key factor in reliability risk, are pursued in very different manners.

CAISO's baseline list includes 29,134 MW, while SCE's includes 29,724 MW. CalCCA believes this difference is due primarily to SCE's inclusion of several resources which retired since the development of the IRP baseline list, representing 584 MW[11], included in greater detail in Appendix A. Reconciling this list would reduce the difference to approximately 6 MW, which likely reflects minor differences in resource values between the source documents.

Resource	Analysis	Total Capacity (MW)	Capacity With Outages (MW)	Notes
Fossil	CAISO	29,134	26,512	CAISO 9% forced outage rate in 15% PRM implies 91% availability
			26,221	CAISO 10% forced outage rate in 20% PRM implies 90% availability
	SCE	29,724	28,710	Median Fossil Outage: 1,014 MW
			27,736	90th Percentile Fossil Outage: 1,988 MW
			27,384	95th Percentile Fossil Outage: 2,340 MW
			26,685	99th Percentile Fossil Outage: 3,039 MW

Table 2: SCE and CAISO Fossil Resource Assumptions with Utilized and Implied Outage Rates

SCE approaches forced outages as a stochastic variable, testing 15,000 forced outage values across its 600 weather scenarios, while CAISO addresses forced outage rates in its PRM. To compare the implied fossil rate, CalCCA reduces CAISO's fossil list to 91% and 90%, respectively, to reflect the 9% and 10% forced outage rates assumed in CAISO's 15% and 20% PRM values. SCE's 99th percentile values (26,685 MW), which reflect the extreme weather captured in CAISO's conservative assumptions, are comparable to CAISO's implied 15% PRM fossil resource value (26,512 MW) and slightly above CAISO's implied 20% PRM fossil resource value (26,221 MW). Addressing the retired resource issue above would likely align SCE's values with CAISO's.

[11] Retired resources on SCE's resource list include the following Resource IDs: INLDEM_5_UNIT 1, 358 MW; CHINO_6_SMPPAP, 23 MW; COLGA1_6_SHELLW, 53 MW; MIDSET_1_UNIT 1 53 MW; SARGNT_2_UNIT, 57 MW; ANAHM_7_CT, 41 MW; GOLETA_6_GAVOTA, 0 MW; SBERDO_2_QF, 0.25 MW; STAUFF_1_UNIT, 0.1 MW.

2. Hydroelectric Resources

Both SCE and CAISO use reasonable assumptions for hydroelectric resources in light of water year variability and associated impacts on late summer hydroelectric production. CAISO utilizes the NQC list values for hydroelectric resources, totaling 6,588 MW. Some, if not most, of these resources likely utilize the revised hydro counting methodology adopted in D.20-06-031 which optionally allowed hydroelectric operators to reduce the NQC of their hydroelectric resources to an exceedance-based methodology. This methodology was noted, at the time of its adoption, to be a conservative methodology, and the Decision allowed generators to raise the NQC values of their facility through the year as more information became available. SCE utilizes monthly hydroelectric values from the IRP's SERVM database, totaling 5,100 MW for September.

3. Solar and Wind Resources

CalCCA finds the analyses' assumptions for solar and wind resources to be reasonable and generally consistent in magnitude, despite differences in approach. Variable renewable resources represent a significant source of uncertainty in any future-looking reliability assessment, and SCE and CAISO each approach this challenge differently.

Neither analysis includes any solar production in HE 20 in September, a reasonable assumption corroborated by CalCCA's review of historical renewable production below.

For wind, CAISO utilizes the September ELCC values, totaling 895 MW, while SCE incorporates wind as a stochastic variable, with a median value of 290 MW. However, it is worth noting that 36% of SCE's wind values during September, HE 20 reflect zero wind production.

Resource	Analysis	Full Capacity (MW)	Capacity With Outages (MW)	Notes
Wind	CAISO	895	814	CAISO 9% forced outage rate in 15% PRM implies lower effective fossil capacity by 9%
			806	CAISO 10% forced outage rate in 20% PRM implies lower effective fossil capacity by 10%
	SCE	6816	290	Median Wind Production
			0	36th Percentile (36% of simulations had no wind production in September, HE 20)

Table 3: Wind Production for SCE and CAISO Analyses in September, HE 20

SCE's approach to wind reflects a conservatism that may undervalue wind's contributions relative to historical performance. CalCCA reviewed historical variable renewable output from 2015 through October 2020 using 5-minute interval data from the CAISO OASIS server, represented in the graphic below. Note that CalCCA's analysis reflects energy production values over a period during which installed wind capacity grew from approximately 4.8GW to 6.3GW.[12]

Figure 1 below shows historical September solar and wind production represented with quartile box-and-whisker plots. Each box-and-whisker plot reflects the top 25% of observations (upper vertical line), median 50% of observations (box), median (horizontal line in box), and bottom 25% of observations (lower vertical line), as well as outliers (dots). CAISO's resource value assumptions are overlaid with a dashed line. A full monthly review from May through October is provided in Appendix B.

[12] Installed capacity based on Commercial Online Date from CAISO NQC List.

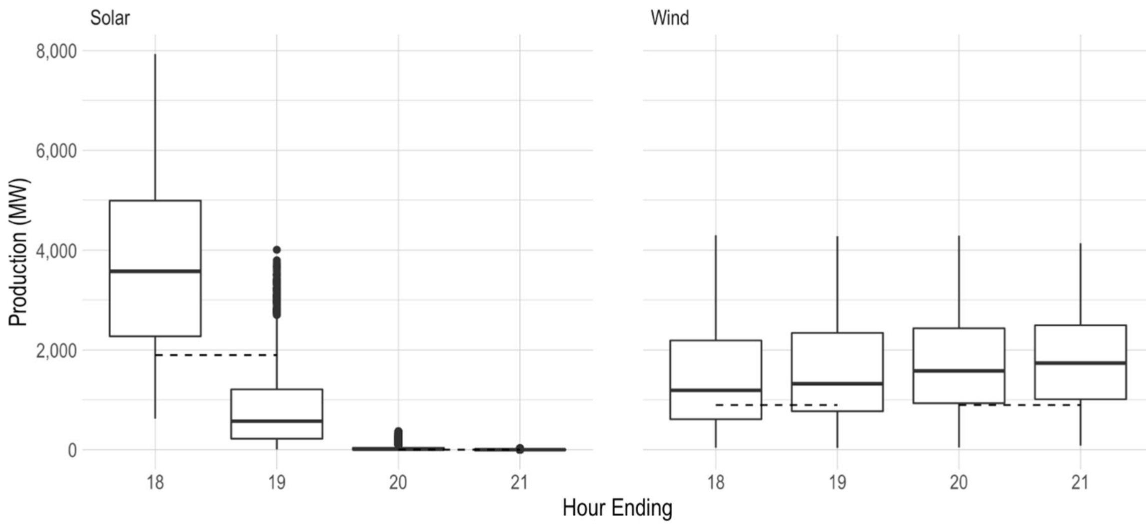

Figure 1: Solar and Wind Production in September
Hours Ending 18-21, 2015-2020 Historical Data

While wind has significant variability, and includes many values approaching zero, less than 25% of observations from 2015 through 2020 have produced below wind's QC value in HE 20, and its median production exceeds 1.5GW. It is unclear why SCE's distribution has such low values for wind production, but may reflect a conservative weather dataset within the IRP.

4. Import Resources

Import resource availability is likely the most significant source of uncertainty among RA resources for several reasons. First, unlike all other resources, available import resources cannot be simply tabulated based on an existing list or resource set. Second, it is not reasonable to assume that the same import resources will be shown by the same LSEs from year to year, and import resources may be more likely to be shown on Month Ahead filings relative to other resources. Third, changes to import resource eligibility taking effect in 2021 may result in significant changes in the quantity of firm import RA shown by LSEs in the coming year.

Finally, resource trends across the Western Interconnection may reduce the physical supply California's historical trading partners are willing to offer as firm capacity.

CAISO's analysis includes the Maximum Import Capability (MIC), which reflects the total physical transmission capacity into CAISO (10,805MW), as well as the monthly minimum, average, and maximum values of shown import RA over the prior six compliance years (2015-2020). SCE utilizes the IRP import constraint of 5,480 MW, based on historical levels of resource adequacy import contracting for LSEs. Recognizing the significant uncertainty regarding available RA imports, CalCCA instead focused its analysis on reviewing historical energy imports into the CAISO.

In general, CalCCA's analysis suggests that import resources have been dispatched in quantities consistent with the CAISO's three sensitivity values (minimum, maximum, and average). However, in contrast to must-take solar and wind resources, this simplified analysis of energy flows is complicated by the role of economic dispatch for import resources. Specifically, viewing historical energy production alone may obscure a deeper bench of available resources which were not called for economic dispatch during most hours. Understanding the extent of available import resources would require access to non-public bidding data that is not available to CalCCA.

As an alternate approach, CalCCA reviewed import behavior during the August and September heat wave as a proxy, assuming all available import resources were dispatched[13] and imported into CAISO. For context, the Preliminary Root Cause Analysis indicates that 2,600 MW to 3,400 MW of imports were bid into the CAISO day-ahead market above the August RA

[13] CalCCA utilized import energy values downloaded from CAISO's Today's Outlook tool.

requirement on August 14; however, a weather outage on the California Oregon Intertie reduced transmission capacity by approximately 650 MW.[14]

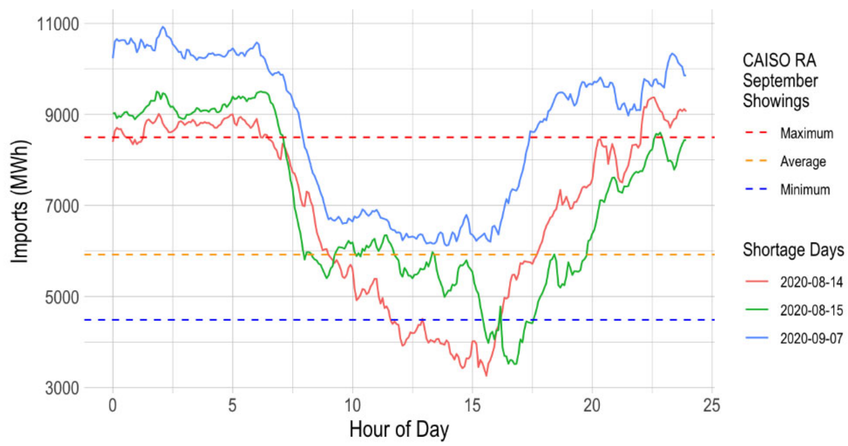

Figure 2: CAISO Net Imports During August and September Heat Storm Events

CalCCA's review of net imports during the August and September heat storm events suggests that it is reasonable to assume available imports may meet or exceed both CAISO and SCE's import values of 5,921 and 5,480 MW, respectively, given behavior observed during the August and September heat waves. However, a better understanding of future import availability in light of planned retirements throughout the Western Interconnection would be valuable for near-term planning.

5. Demand Response

The Demand Response values vary significantly between SCE and CAISO's analyses and, at this time, CalCCA does not have sufficient information to recommend a preferred assumption. CAISO sums Proxy Demand Response values from the NQC list (228 MW) and

[14] Preliminary Root Cause Analysis at 8-9. http://www.caiso.com/Documents/Preliminary-Root-Cause-Analysis-Rotating-Outages-August-2020.pdf.

2020 CPUC-credited investor-owned utility demand response without PRM (1,225 MW) for a total of 1,453 MW. SCE relies on the IRP baseline of 2,195 MW. The baseline DR assumptions in the IRP include existing IOU DR programs and interruptible pumping load. The peak load impact for each utility's programs is based on the April 1, 2018 Demand Response Load Impact Report. An additional 443 MW of interruptible pumping load is included as baseline DR capacity, which may be reflected in the SCE analysis but not the CAISO analysis. At this time, CalCCA does not have sufficient information to recommend a preferred assumption for demand response.

6. Battery Storage

At this time, the vast majority of battery storage in both analyses is still under development. While SCE's approach was justified given its limited visibility into planned resources, CalCCA recommends using CAISO's values given CAISO's unique access to interconnection queue data. Specifically, CAISO uses confidential data from its interconnection queue, indicating an additional 2,111 MW of storage, as well as 22 MW of wind (nameplate), and 320 MW of solar (nameplate) will be developed by September 2021. SCE assumes 1,650MW of new storage resources by September 1 pursuant to D.19-11-016, as well as 4,000MW of new solar resources.

This results in a cumulative battery storage value of 2,468MW for CAISO and 2,552MW for SCE in September 2021. SCE's analysis assumes that all LSEs will fulfill their D.19-11-019 obligations with battery storage, which likely drives the difference between the analyses.

B. Demand Assumptions

CAISO and SCE's analyses take very different approaches to managed load, and, generally speaking, CAISO's analysis appears to take a more conservative approach. Given the use of both analyses of the Independent Energy Policy Report (IEPR) 1-in-2 Mid-Baseline Mid-

AAEE ("Mid-Mid") managed net load forecasts, it is unclear at this time why the values for September HE 20 are so significantly divergent. This discrepancy (alongside structural differences in approach) likely plays a major role in the differing results of the two analyses and should be reconciled.

Demand and Reserve Margin (September, HE20, 99th Percentile Values)				
Resource	**CAISO**	**SCE (99th Percentile)**	**SCE - CAISO**	**Notes**
Managed Load	44,861	42,805	-2,056	SCE varies demand based on weather with a median rate of 36,012 MW for September, HE 20.

Table 4: SCE and CAISO Fossil Resource Assumptions with Utilized and Implied Outage Rates

CAISO's analysis utilizes the IEPR 1-in-2 Mid-Mid forecast of 44,861 MW in September HE 20; however, its 20% PRM analysis is intended to reflect a 1-in-5 forecast, which is associated with a 4% increase in HE 20 load to 46,655 MW.

SCE's analysis incorporates managed load as a stochastic variable ranging from 30,034 MW to 43,483 MW, and indicates the same IEPR 1-in-2 Mid-Mid dataset. While this range may initially appear broad, it is worth noting that SCE's analysis reflects values across the entire month of September, which has significant weather variability and includes many days of moderate temperatures and low cooling loads in addition to high cooling load days. To meaningfully compare analyses, it is more prudent to review SCE's extreme weather values. The top percentile of SCE's load in September, HE 20 ranges from 42,805 MW to 43,483 MW. SCE's values are also sourced from the IEPR forecast, with modifications to increase peak demand by 782 MW in August. Due to the compressed timeline, CalCCA has been unable to confirm why there is such a divergence between load values for September, HE 20 and notes that it is possible this may be resolved through improved understanding of the two analyses.

While there are outstanding questions regarding load in HE 20, CalCCA notes that SCE's narrative of its methodology indicates that the gross peak in 45% of its weather scenarios exceeded the IEPR 1-in-5 forecast, with 5% of its weather scenarios exceeding the 1-in-20 forecast. This suggests that, in the aggregate, SCE's analysis did significantly stress test the system with high demand values, despite the need for further discussion resolve questions regarding its assumptions for September net peak.

C. Results and Analysis

Consistent with their overarching methodological differences, CAISO and SCE diverge in their method for testing sufficiency and their corresponding results. In CAISO's analysis, sufficiency is achieved when the quantity of resources exceeds demand plus a PRM of 15% or 20%. In SCE's analysis, sufficiency is achieved as long as available resources exceed demand plus the CAISO operating reserve margin of 6%, with the remainder of the PRM "uncertainty" built into the stochastic variation of demand, fossil outages, and renewable production. This approach more accurately captures complex dynamics in which small changes in assumptions can result in substantial changes in the assessment of sufficiency.

Summary Results (September, HE 20, 99th Percentile for SCE Draws)				
Resource	**CAISO**	**SCE (99th Percentile)**	**SCE - CAISO**	**Notes**
Resource Totals	50,518	46,542	-3,909	Note: SCE's resource stack internalizes forced outages.
Managed Load with 15% PRM (CAISO), 6% Reserve (SCE)	51,590	45,373	-6,217	CAISO demand augmented by 15% PRM; SCE demand augmented by 6% operating reserve margin.
Managed Load with 20% PRM (CAISO), 6% Reserve (SCE)	53,833	45,373	-8,460	CAISO demand augmented by 20% PRM; SCE demand augmented by 6% operating reserve margin.
Resource Buffer with 15% PRM (CAISO), 6% Reserve (SCE)	-1,072	1,169	2,308	CAISO demand augmented by 15% PRM; SCE demand augmented by 6% operating reserve margin.
Resource Buffer with 20% PRM (CAISO), 6% Reserve (SCE)	-3,315	1,169	4,551	CAISO demand augmented by 20% PRM; SCE demand augmented by 6% operating reserve margin.

Note: Values are presented here for discussion and verification purposes only. Due to structural differences in methodology, it is not appropriate to directly compare CAISO and SCE results. Specifically, SCE's resource stack reflects significant reductions from expected forced outages, while CAISO's resource stack does not. Inversely, CAISO's demand is augmented to reflect expected forced outages, while SCE's is not.

Table 5: Summary Results of CAISO and SCE Resource, Load Inputs

Table 5 summarizes data from the above sections on resource inputs and demand, though CalCCA notes that these summaries at not reasonably compared given structural differences in approach. For example, CAISO's analyses assume more resources are available given that forced outages are accounted for in the PRM rather than the resource stack. Similarly, SCE's "sufficiency" value is considerably lower given that the need for a PRM is transitioned into its accounting of resources.

CAISO's analysis, while binary in its assessment of "sufficiency," provides easily accessible and interpretable conclusions regarding the magnitude of potential shortages and the quantity of need moving into Summer 2021. While CAISO's conclusions using average imports and a 15% PRM may be a reasonable starting place for discussion of a needs assessment, it would be regrettable not to further develop CAISO's study into a more rigorous, stochastic analysis before utilizing its conclusions for procurement decisions.

Similarly, CAISO's recommended use of the 20% PRM bears further analysis before being used for resource investment decisions. CalCCA agrees with CAISO that the Commission should review the PRM as part of its overarching review of the RA program in R.19-11-009. Modifying the PRM to 20% – with a corresponding resource procurement impact of approximately 500 MW per percentage point – should be done only after a thorough analytical record has been developed to support such a determination.

Moreover, the PRM should be calibrated carefully using stochastic reliability analysis, similar to that done by SCE, to determine a PRM threshold which ensures reliability meets a standard acceptable to policymakers. CAISO's approach sums the approximate "buffer" for load uncertainty and resource outages with the operating reserve margin, while not altogether unreasonable in concept, approaches the problem from the wrong direction. Instead, the Commission should determine a desired reliability standard (e.g. less than 0.1 LOLE), test the existing resource fleet against the desired reliability standard using a well-calibrated, stochastic reliability modeling tool, and, iteratively, reduce or add resources until the desired LOLE standard is achieved, thereby determining an appropriate PRM. While this PRM is highly dependent on resource mix and may change over time, integrating this process with the IRP can reduce the uncertainty and frequency with which the PRM must be recalibrated.

SCE's LOLE analysis is methodologically consistent with the approach described above to determine a PRM. However, as noted by SCE, LOLE results can be susceptible to modest shifts in their input assumptions when constraints are present. For instance, the difference in demand response resource assumptions between CAISO and SCE – 742 MW – could have a major impact on the resulting LOLE value if a significant portion of the "sufficient" simulations were sufficient by 742 MW or fewer, as would the differences in baseline assumptions regarding fossil resources and load. Without further data regarding the distribution of the "sufficient" runs, it is unclear whether these modifications – or others – would move the resulting LOLE from 0.09 to a less desirable value, emphasizing the importance of vetting input assumptions and thoroughly reviewing results. Regardless, SCE's finding of 0.09 LOLE is encouraging and utilizing SCE's methodology with consensus inputs would improve precision for the needs determination.

D. Conclusion

Both CAISO and SCE should be lauded for their strong contributions into the record, as well as their novel consideration of emerging issues such as renewable variability and the growing risk of extreme weather. CalCCA supports the continued development of analytical tools for assessing reliability as California transitions away from conventional reliability resources.

In general, both CAISO and SCE make reasonable assumptions for resources and load, and use appropriate methodologies for considering resource sufficiency. CAISO's simpler methodological approach makes its analysis more accessible to policymakers and stakeholders, and it is reasonable to use CAISO's 15% PRM analysis as a starting point for "least-regrets" action by the Commission. Specifically, the Commission should endeavor to move forward in refining the analysis of need for Summer 2021 now, in anticipation of supply- and demand-side resources being brought forth by IOUs for Commission approval on February 15, as proposed in the January PD, to ensure the resources fit the need. Failing a more precise value becoming available, the Commission should consider CAISO's 1,073 MW result a ceiling for resource procurement for Summer 2021. Moving forward, this analytical approach – despite its precedent in D.19-11-016 – should not be considered rigorous enough on which to base significant procurement decisions. SCE's methodology is more appropriate for any procurement activity.

CalCCA encourages the Commission to hold a workshop to resolve outstanding discrepancies between the CAISO and SCE input assumptions, such as the differences in fossil, demand response, renewables, and managed load. Input differences, which collectively far exceed the expected scale of the need, should be reconciled and analyses revised prior to the approval of significant emergency procurement on the schedule indicated in the January PD.

III. ASSIGNMENT OF PROCUREMENT RESPONSIBILITY

In addition to considering the amount of a proposed change to the PRM, CalCCA reviewed how such a procurement obligation would be applied. CalCCA agrees with the Commission's framing of the procurement ordered by the December Ruling as a specific IOU-level requirement rather than a modification to individual LSE RA showings through a modified PRM for compliance year 2021. CalCCA urges the Commission to maintain the procurement obligation centrally with the IOUs, despite allocating costs across all customers. This obligation should not be subject to delegation or otherwise pushed down into individual LSE RA obligations this year. Specifically, this procurement should be considered incremental to individual LSE RA procurement and neither the compliance obligation nor the resource attributes should be allocated to LSEs, including IOU bundled portfolios, for the purposes of RA program accounting. Similarly, to ensure incrementality, this procurement should be tailored to minimize central procurement of resources which would otherwise be shown in LSE RA showings.

CAISO proposed in its comments an increase in the PRM that would flow through to individual LSEs.[15] However, the Commission can achieve the same reliability benefits via an IOU-procurement approach that does not modify the PRM requirements for individual LSEs, and, consequently, avoids significant disruption to on-going LSE efforts to procure RA for 2021. Indeed, setting the appropriate PRM levels for the RA program, and translating the dual peak and post-peak requirements to individual LSEs will take additional time the Commission cannot afford if it intends to implement its changes in time to address Summer 2021 reliability.

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15 Comments of the California Independent System Operator Corporation on Order Instituting Rulemaking Emergency Reliability, November 30, 2020, at 2.

In addition, it would be disadvantageous to increase individual LSE obligations at the same time IOUs are directed to procure capacity through CAM under the December Ruling. Unsure of the exact amount of their CAM allocation of RA, LSEs will be unable to manage their portfolios efficiently. It will be difficult, if not impossible, for LSEs to accurately anticipate an LSE's CAM share of system RA in time for the LSE to act reasonably and responsibly to balance its portfolio. Perverse incentives could be created, as an LSE may decide to remain short until the allocation of the unknown centrally procured capacity occurs.

Thus, the IOUs' procurement obligation under the December Ruling should be clarified to remain an IOU-level requirement that may not be delegated to individual LSEs for this compliance year. However, for future years, if the Commission revises the PRM early enough to avoid significant disruption of LSE RA procurement, such as adopting a revised PRM for 2022, it would then be reasonable for resources procured under this order (as well as corresponding RA obligation) to be allocated to LSEs in the traditional manner utilized through the Cost Allocation Mechanism.

CHAPTER 2. WITNESSES MICHAEL HYAMS, MATTHEW LANGER, MAHAYLA SLACKERELLI AND SAMANTHA WEAVER

I. DEMAND-SIDE SOLUTIONS

The Administrative Law Judge's December 18, 2020 ruling,[16] included "Final Staff Proposals and Guidance to Parties" posing several questions to stakeholders regarding Critical Peak Pricing (CPP) marketing, design, and expansion to Non-IOU LSEs. Among these questions, Staff Question 6 seeks information regarding CPP-like programs implemented by

[16] *Administrative Law Judge's Ruling Introducing a Staff Report and Questions to the Record and Seeking Responses from Parties in Opening and Reply Testimonies*, December 18, 2020, Attachment 1, at 4.

Community Choice Aggregators. Staff Question 7 seeks responding CCAs' experience regarding communication strategies to support the programs. In addition, the Final Staff Proposals and Guidance to Parties seeks information regarding electric vehicle (EV) programs. Witnesses from each of CleanPowerSF, Clean Power Alliance (CPA), Peninsula Clean Energy Authority (PCEA), and Redwood Coast Energy Authority (RCEA) provided information in response to these questions.

A. CleanPowerSF – Michael Hyams

This portion of testimony is provided by Michael Hyams, Director, CleanPowerSF, on behalf of CalCCA Mr. Hyams' qualifications are set forth in Attachment B.

1. Question 6: Program Design, Benefits, and Barriers

CleanPowerSF has implemented its Peak Day Pricing (PDP) Pilot program for two seasons (May to October 2019 and July to October 2020). This voluntary program incentivizes large commercial customers to reduce their electricity consumption between 4-8 p.m. on event days. The program is in the family of Critical Peak Pricing initiatives in that it uses customer price signals on a small number of days determined by grid and market conditions. Rather than being structured as a tariff with charges and credits on monthly customer bills, CleanPowerSF's PDP program offers one end-of-season incentive (bill credit). The incentive represents the net customer benefit of program credits and peak-day charges, calculated in parallel accounts, while the customer pays their monthly bill based on their normal tariff. Enrolled customers receive notices by text and email one day ahead of called PDP event days. The program mirrors PG&E's called event days, which are typically the hottest days of the summer in Northern California. Customer feedback surveys were conducted following the 2019 season but have not yet been conducted for the 2020 season. These interviews have informed CleanPowerSF's program design

– as has the previous experience of other CCAs, RCEA and East Bay Community Energy (EBCE).

CleanPowerSF offered bill protection for both of its PDP seasons. Based on customer feedback in 2019, customers view bill protection as a critical aspect of the program. Across the board, participants noted that without bill protection, they would not have participated in the program, as they would not be comfortable with the risk of additional charges.

Following the 2019 season, customers reported a very positive experience with the PDP program and were motivated to participate because they saw the program as aligned with their company's sustainability goals. Participation in the program bolstered customers' positive impression of CleanPowerSF as a whole. Additional benefits to non-IOU LSEs include:

- The voluntary enrollment PDP model (compared to a tariff approach) offers incentives and increased awareness for large customers to respond to peak days, while not requiring re-tooling of billing software, or extensive rate design. This approach of parallel price signals with separate program accounting may be a more achievable strategy for CCAs to be responsive to the grid constraints in the near-term.
- This PDP program approach offers CCA customers parity with the opportunity for credits for load responsiveness that IOUs offer through standard tariffs (which have PDP built-in).
- CleanPowerSF's PDP provides an avenue for customers and the CCA to be in alignment with the state's broader public purposes, including reliability and affordability.

- The flexibility of this PDP program approach allowed CleanPowerSF to be nimbler in shifting to a more useful PDP peak than a billing-based approach. Shifting the event day window to 4-8 p.m. from PG&E's 2-6 p.m. window was received very positively; commercial customers felt that this time period was much easier to respond to than the middle of the day.

Importantly, other potential benefits are still to be determined, especially the effectiveness of the program in impacting the LSE's peak day demand, and the program's cost-effectiveness as a resource. CleanPowerSF's PDP pilots to date have been modest in scale and focused on testing operational readiness. A scaled-up program would be needed to evaluate cost-effectiveness.

While the program has yielded clear benefits, CleanPowerSF has also encountered barriers in the implementation process.

- Data Quality: CleanPowerSF has found that a thorough quality assurance process is necessary if depending on PG&E's ShareMyData interval data to perform incentive calculations. During both of CleanPowerSF's program seasons, issues pertaining to data quality and availability from interval data pulled via ShareMyData arose.
- Limited Discretionary Load: While customers preferred the 4-8 p.m. PDP period, most reported that their energy use typically drops after 6 p.m. as operations shut down, so in effect they only managed discretionary load from 4 p.m. to 6 p.m. Of note, many customers indicated that they felt that they have limited discretionary load and that further reductions would be difficult to achieve without sacrificing occupant comfort or critical operations. This was particularly true among

customers who had previously made energy efficiency upgrades. Targeting the program to larger commercial and industrial customers may be appropriate since early results indicate that a few large customers provided most of the load shift/ curtailment.

CleanPowerSF is still evaluating the value of technical assistance and feedback offered for the first time in the 2020 program season. Of the several newly enrolled large customers who were offered modest technical support, none took advantage of the technical support. CleanPowerSF's experience may suggest that offering technical support is not a necessary component to CPP programs targeted at large commercial customers. That said, 2020 experience may not be representative; in a COVID-tinged season, minimizing contacts, or simply managing staff bandwidth, could have contributed to opting out of tech assistance. Also, the program is still evaluating how worthwhile are the event-day feedback reports, offered for the first time in the 2020 season. Data permissions, secure communication methods, and data quality all presented some level of challenge. End of season analysis is underway to determine if this investment was valuable.

2. Question 7: Communications Strategy

CleanPowerSF has found that a robust communications strategy is necessary to educate and recruit large commercial customers to participate in its PDP Pilot program. When recruiting participants for PDP, it is essential to connect directly with the actors at the organization that will lead the energy reduction efforts and that are authorized to make decisions related to the account; typically, this is the building management team. CleanPowerSF has found that high-touch outreach, such as one-on-one conversations, throughout the enrollment process is essential. CleanPowerSF has also observed that sustainability-type contacts are beneficial to connect with as they serve as advocates of the program and assist with obtaining internal buy-in for the organization to participate in the program.

B. Clean Power Alliance- Matthew Langer

This portion of testimony is provided by Matthew Langer, Chief Operating Officer, Clean Power Alliance (CPA), on behalf of CalCCA. Mr. Langer's qualifications are set forth in Attachment C.

1. Question 6: Program Design, Benefits, and Barriers

In 2019, CPA began its Peak Management Pricing (PMP) pilot program. PMP is a demand response program, similar in design to the CPP programs offered by large electric IOUs, that encourages commercial and municipal customers to voluntarily power down appliances, electronics, air conditioning, or other equipment during peak heat days. Participating customers receive bill credits during the summer months of the program (June - September) in exchange for being charged a premium for energy consumed during peak hours (4:00 - 9:00 p.m.) on "PMP Event Days". PMP Event Days are often the hottest days of the year with high energy consumption and only occur on non-holiday weekdays, with a maximum of 12 event days per year. Participants are notified via email or text up to 24 hours in advance of an event. Every customer that elected to participate in PMP also enrolled in CPA's Bill Protection program. Bill Protection customers receive a bill credit at the end of their first calendar year on PMP if they paid more than they would have otherwise paid on their regular rate.

CPA is cautiously optimistic that programs such as PMP can provide load management benefits when scaled properly but customer enrollment into PMP has been challenging. CPA's PMP requires commercial customers to opt-in to the program. CPA has performed limited mass marketing and engaged individual customers but has received little response to these outreach efforts. Enrollment in the first year of the PMP pilot program was small and declined in the second year of the PMP pilot, when customers were asked to re-enroll. Many potential customers conveyed that they are unable to control their loads during events due to operational considerations as a reason for not enrolling in the program, even when Bill Protection was offered to protect customers from downside risk.

CPA has identified some potential solutions that could enhance enrollment and the load management benefits offered by CPP-like programs. First, enhanced customer outreach through key accounts representatives emphasizing the potential benefits of the program in individual conversations could yield higher enrollment. Second, non-IOU LSEs must ensure they have reliable and updated contact information for their commercial customers in order to provide notice of demand response events. Finally, non-IOU LSEs might benefit from training on CPP rate-design to enhance the cost-effectiveness of their CPP-like programs. Workshops hosted by the CPUC that include large IOUs and CCAs with effective CPP programs could benefit rate-design and program design for other LSEs looking to create or enhance their own programs.

2. Question 7: Communications Strategy

Limited data from CPA's two pilot years have shown that some customers either don't have the capability to manage loads during events or don't understand the PMP program well enough to respond. Additionally, CPA has seen low engagement levels from commercial customers through traditional mass market techniques such as direct mail. Direct, customized, and targeted outreach and tools to educate commercial customers of the availability and benefits of these programs would enhance engagement with an opt-in program model.

C. Redwood Coast Energy Authority- Mahayla Slackerelli

This portion of testimony is provided by Mahayla Slackerelli, Account Services Manager, Redwood Coast Energy Authority (RCEA), on behalf of CAlCCA. Ms.Slackerelli' s qualifications are set forth in <u>Attachment D</u>.

1. Question 6: Program Design, Benefits, and Barriers

RCEA has provided a Peak Day Pricing Alternative (PDPA) program to customers for four seasons, each summer since the launch of the CCA in 2017. The program was designed to emulate the PG&E PDP program, allowing customers that realize cost savings from the IOU program to continue to receive those benefits after switching to RCEA's service.

RCEA's PDPA has historically mirrored PG&E's PDP program in structure. Under the program design that was used up to and including the 2020 season, commercial customers who were previously in the IOU PDP program were offered participation in the RCEA program on a voluntary basis. During the PDP season of May 1 through October 31, RCEA sent out emails and text messages to customers that signed up for the program the day before each event day as called by PG&E, prompting the customers to reduce or shift electric load during the 2:00 pm to 6:00 pm window. At the end of the season, RCEA analyzed whether the customer would have done better on the IOU PDP program. If the customer would have realized financial benefit from PG&E's PDP, RCEA provided them with a bill credit for the difference, making the customer whole. In this way, the program may have incentivized some load shifting or conservation, but without programmatic consequences for ignoring the alert and maintaining business as usual.

While the previous seasons' PDPA incentivized customers to shift load on event days, the goal of the program was to retain customer participation in the CCA. Given this, RCEA did not evaluate the impacts of the program on reducing its peak demand. In 2020, RCEA staff decided to restructure the program for the 2021 season with a new goal of reducing demand on days with the highest wholesale energy costs, thereby decreasing costs for RCEA and reducing load on the grid when it is critically needed. The August 2020 heat events affirmed RCEA's determination to improve the program and shift more load. The 2021 PDPA program is currently under development but will still be largely structured like PG&E's PDP. Beginning this year, it will include credits for load shifting and charges for failing to comply, and will align the peak event hours better with the actual evening summer peaks on the grid. Customers who elect to be in the program will see those credits and charges on their monthly bills rather than a true-up at the end of the season. This is the first year that RCEA will have access to billing quality usage data with enough regularity to implement monthly credits. Although peak events will now be scheduled independently of PG&E's peak days, RCEA plans to maintain the practice used by PG&E of committing to a specific limited number of peak events per season in order to limit the program's impact on customers.

RCEA is planning on pairing the 2021 PDPA with rebates for demand response controls and offering consultation on load management to select customers with the most opportunity for reducing demand during critical hours. This year will be a pilot season for those additional services with the intention of expanding them in following years pending successful deployment. RCEA has also launched a Behind-the-Meter Distributed Resource Adequacy (BTM DRA) program, which is expected to work in tandem with the PDPA program to curtail load during critical grid reliability events. Although the exact operational date and volume of capacity to be installed under the BTM DRA program are still being determined, RCEA expects to bring 1-5 MW of BTM RA online as a Proxy Demand Resource within the next few years.

RCEA is also contributing to grid reliability starting in summer 2021 through procurement of demand response via a resource adequacy contract with Leapfrog Power, Inc. (Leap). The contract will ensure RCEA's compliance with its procurement obligation for incremental capacity under the CPUC's D.19-11-016. The demand response aggregation will provide 5.5 MW of net qualifying capacity for a 10-year term, with delivery set to begin June 1,

2021. Leap's portfolio includes customer loads throughout CAISO, including some within RCEA's own service area.

2. Question 7: Communications Strategy

RCEA's PDPA communication strategy has been focused on providing program information to eligible customers and alerts for event days. RCEA has been a trusted energy advisor to Humboldt County since before the launch of the CCA program. Continuing in that role, RCEA is planning to help commercial customers respond to incentives from the restructured PDPA in 2021. This would mean providing broad messaging on program opportunities and working directly with facility managers to identify loads suitable for demand response. In previous seasons, where RCEA's program goal was to limit customer opt-outs, marketing effort was minimal. For the 2021 season with its more diverse and ambitious program goals, RCEA plans to increase marketing effort in order to maximize program participation.

D. Expanding Electric Vehicle (EV) Participation in DR Programs- Samantha Weaver

This portion of testimony is provided by Samantha Weaver, Principal Regulatory Analyst, East Bay Community Energy (EBCE), on behalf of CalCCA. Ms. Weaver's qualifications are set forth in Attachment E.

CalCCA supports leveraging the flexibility and potential of EV loads and encourages the Commissions to pursue strategies that maximize the use of vehicle-grid integration (VGI) to support Summer 2021 reliability, but only to the extent actions are feasible in the short-term. In response to the questions in Attachment 1 related to expanding EV participation in DR programs, CalCCA notes that the Final Report of the California Joint Agencies Vehicle-Grid Integration Working GroupVGI Working Group) is the result of collaboration between 85 organizations for over more than a year and provides distinct, actionable recommendations, including actions the

Commission could undertake to advance VGI in the short-term.[17] The Working Group recommendations that address programs, rates and incentives[18] include:

- Create an "EV fleet" commercial rate that allows commercial and industrial customers to switch from a monthly demand charge to a more dynamic rate structure;
- Enable customers to elect BTM load balancing option to avoid primary or secondary upgrades, either if residential R15/16 exemption goes away, or as an option for non-residential customers;
- Consider coordinated utility and CCA incentives for EVs, solar PV, inverters, battery storage, capacity, and EV charging infrastructure to support resilience efforts in communities impacted by PSPS events;
- Allow V1G and V2G to qualify for SGIP to level the playing field with incentives for other DERs, but V1G would get less incentive compared to V2G based on permanent load shift logic;
- Incentive(s) for construction projects with coincident grid interconnection and EV infrastructure upgrade;
- Enable customers, via Rules 15/16 or any new EV tariff, to employ load management technologies to avoid distribution upgrades, and focus capacity assessments on the Point of Common Coupling; and
- Create incentives for charging infrastructure for new public parking lot construction projects.

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[17] D.20-12-029, Appendix A, Final Report of the California Joint Agencies Vehicle-Grid Integration Working Group, June 30, 2020. Available at: https://gridworks.org/wp-content/uploads/2020/07/VGI-Working-Group-Final-Report-6.30.20.pdf.

[18] *Id.* at 10.

CalCCA recommends this list be prioritized based on actions that are feasible to implement in the near-term. Specifically, to further incentivize demand-managed EV charging, CalCCA supports the VGI Working Group's and Marin Clean Energy (MCE), EBCE, and PCEA (Joint CCAs) recommendation to expand SGIP eligibility to include vehicle-to-grid use cases. To best achieve this CCAs have suggested that the Commission create a new budget category under SGIP to provide incentives for demand-managed EV charging, V2G and vehicle-to-building compatible EV supply equipment systems.[19,]

Finally, several CCAs have already developed or deployed managed charging pilots and DR programs for EVs. These existing programs include[20]:

- CPA: "Power Response" program which enables EV DR for commercial customers;
- Silicon Valley Clean Energy: "GridShift" EV Charging pilot collaborated with a software company on a mobile application that allows EV drivers to charge with the lowest cost clean energy available by automatically linking to the customer's EV rate and CAISO grid emissions. The pilot is ongoing with a target participation of 200 residential households, and is leveraging EV telematics data to optimize carbon emission reductions and customer cost savings;
- Sonoma Clean Power (SCP): "GridSavvy" community program includes more than 2,900 smart devices, including 800 Level 2 EV charging stations. SCP dispatched this "virtual power plant" fleet in August and September to coincide with CAISO flex alerts;

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[19] *Id*. at 10, 38; *See* R. 20-05-012, Opening Comments of the Joint CCAs in Response to Scoping Memo Questions, September 16, 2020, at 13.

[20] For more examples, see VGI Working Group "Stock Take" for CCAs (developed June 2020), available at: https://gridworks.org/materials-produced-by-the-vgi-working-group-2/. *See also* Joint CCAs Opening Comments on Section 10 of the Transportation Electrification Framework, Appendix A: "CCA Transportation Electrification Initiatives: Examples of Existing Programs".

- Pioneer Clean Energy (PCE): " FlexCharging Pilot” is a vehicle telematics-based software for residential EV charging. PCE is currently evaluating the effectiveness of various forms of customer incentives to shift more charging off peak.

CCAs look forward to working with the Commission on actions that bolster their existing efforts and create new opportunities to maximize the use of VGI to support Summer 2021 reliability.

Appendix A

Fossil Resource Alignment Between SCE and CAISO Analyses

CalCCA reviewed the thermal resource lists used by SCE and CAISO. While most resources were aligned, CalCCA identified 9 resources in SCE's dataset which were not identified in CAISO's dataset. Of these, 8 are listed as retired in CAISO's latest Announced Retirement and Mothball List.[21] These retired resources total 583.96 MW and are listed below. One additional resource within SCE's dataset was not identified in CAISO's dataset or the Announced Retirement and Mothball List, totaling .01 MW.

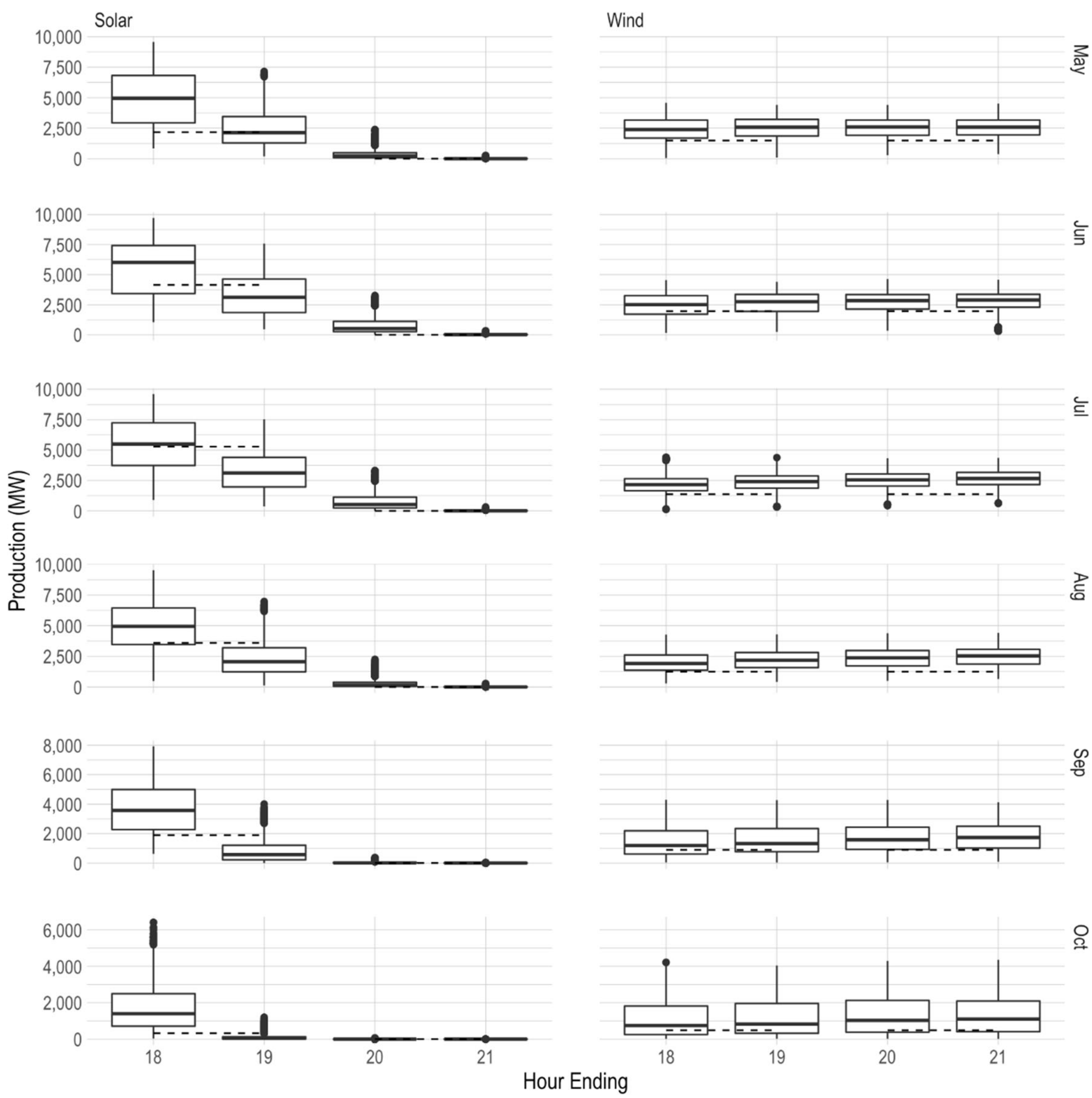
Resource Name	**Type**	**Status**	**Offline Date**	**NQC (MW)**
INLDEM_5_UNIT 1	CCGT1	Retired	1/15/2020	357.39
CHINO_6_SMPPAP	Peaker1	Retired	9/6/2019	22.78
COLGA1_6_SHELLW	CHP	Retired	12/31/2016	52.9
MIDSET_1_UNIT 1	CHP	Retired	12/31/2016	52.9
SARGNT_2_UNIT	CHP	Retired	12/31/2016	57.1
ANAHM_7_CT	Peaker1	Retired	6/30/2020	40.64
GOLETA_6_GAVOTA	CHP	Retired	11/2/2019	0
SBERDO_2_QF	CHP	Retired	6/30/2020	0.25
STAUFF_1_UNIT	CHP	Unknown		0.01
Total Retired				583.96
Total Unknown				0.01

[21] December 18, 2020 Announced Retirement and Mothball List http://www.caiso.com/Documents/AnnouncedRetirementAndMothballList.xlsx

Appendix B

Historical Renewable Resource Output

Appendix B compares historic evening solar and wind resource output from May through October in Hours Ending 18-21 against NQC values utilized in the CAISO analysis. Data reflects 5-minute interval data from the CAISO OASIS server from 2015 through 2020.



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COLGA1_6_SHELLW	CHP	Retired	12/31/2016	52.9
MIDSET_1_UNIT 1	CHP	Retired	12/31/2016	52.9
SARGNT_2_UNIT	CHP	Retired	12/31/2016	57.1
ANAHM_7_CT	Peaker1	Retired	6/30/2020	40.64
GOLETA_6_GAVOTA	CHP	Retired	11/2/2019	0
SBERDO_2_QF	CHP	Retired	6/30/2020	0.25
STAUFF_1_UNIT	CHP	Unknown		0.01
Total Retired				583.96
Total Unknown				0.01

[21] December 18, 2020 Announced Retirement and Mothball List http://www.caiso.com/Documents/AnnouncedRetirementAndMothballList.xlsx

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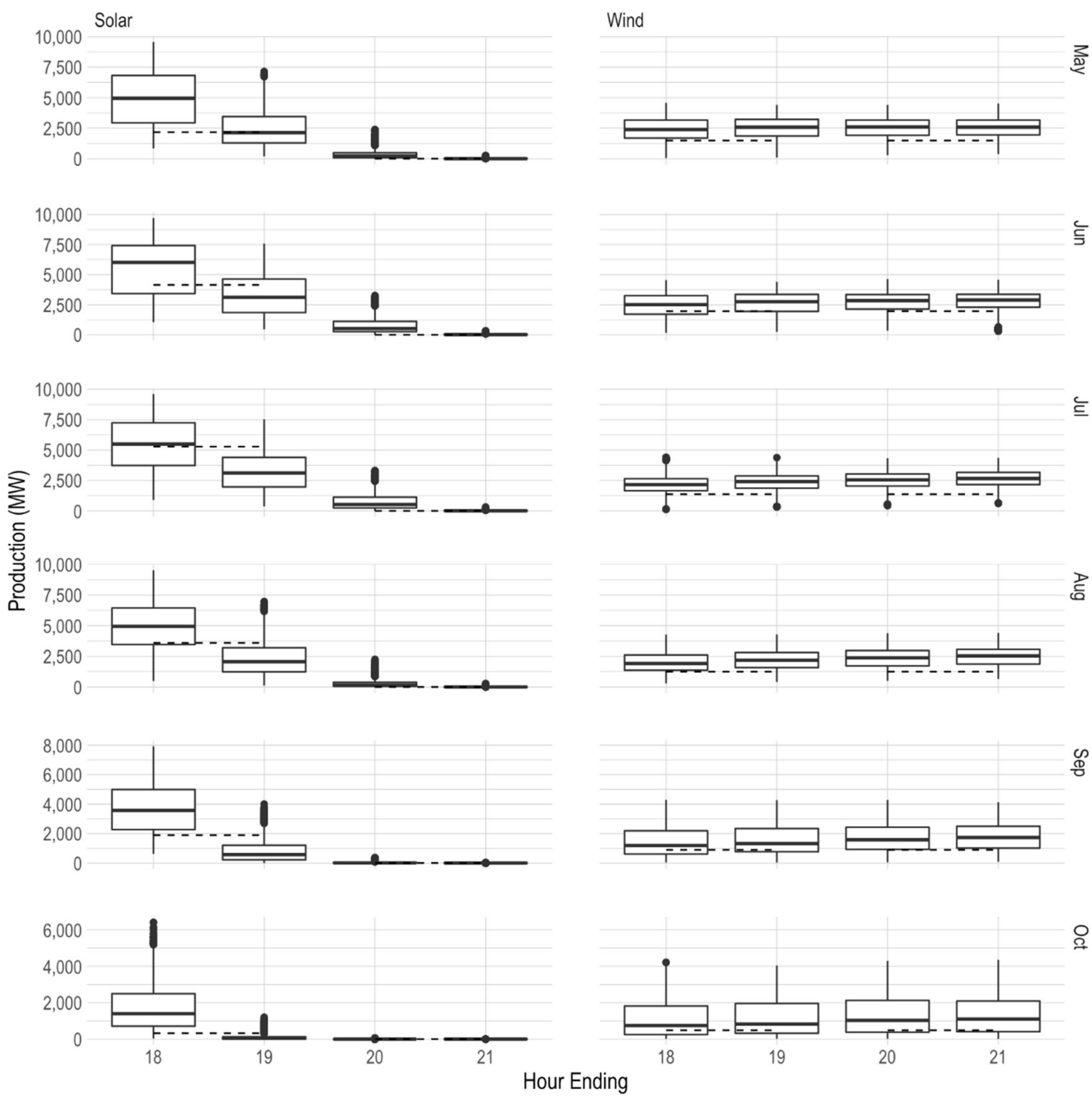

Attachment A

Nick Pappas

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SUMMARY

Clean energy industry leader with 10+ years of experience developing and shaping California policy in the legislative and regulatory arenas. Mission-driven; focused on the development and implementation of robust, functional, and lasting solutions to the global climate crisis.

EXPERIENCE

California Community Choice Association (CalCCA) **Sacramento, CA / San Francisco, CA**

Director of Strategic Initiatives and Outreach 1/2019 - Present

- Support the institutional development of CalCCA as an emerging trade association, with particular emphasis on building CalCCA's regulatory, legislative, and market analysis programs.
- CalCCA lead for procurement policy issues (Integrated Resource Planning, Resource Adequacy), responsible for policy analysis, internal position development and consensus building, drafting of regulatory filings, policymaker advocacy, and stakeholder outreach.
- Chair CalCCA's Procurement Working Group (35+ weekly participants), responsible for leading discussion and building consensus on complex, novel, and challenging policy issues.
- Manage CalCCA's data team responsible for collecting CCA data and developing meaningful analysis for internal discussion, peer benchmarking, continuous improvement, and incorporation of quantitative results into policy advocacy and communications.
- Lead CalCCA's efforts to identify and address mid- to long-term market and policy issues facing CalCCA members, educate internal partners, and manage efforts to design procurement and policy solutions to address long-term industry challenges.
- Support on-going member education through development of webinars, roundtable discussions, and conference panels on key issues impacting CalCCA members.

UC Davis Energy Graduate Group (UCD) **Davis, CA**

MS Student, Energy Systems & Graduate Student Researcher 9/2016 - 1/2019

- Augmented public policy career with interdisciplinary deep dive into "hard skills" – theory, methods, data analysis, and other aspects of economics, policy, and engineering research related to energy, transportation, and climate.
- Conducted research on electric sector reliability policies, climate policy design, and clean transit under faculty advisors from Economics (Prof. James Bushnell) and Civil and Environmental Engineering (Prof. Alissa Kendall).

Energy and Environmental Economics (E3) **San Francisco, CA**

Summer Associate (Internship) 6/2018 - 9/2018

- Led client project assessing policy strategy options for utilities confronting customer choice market transition; presented final deliverables to client senior executive and team.
- Contributed data visualization, financial modeling, and consumer research for joint utility project examining economic and environmental benefits of building electrification in California.
- Presented twice for "E3 Lunch Talk" series, discussing research on retail choice in US electric markets and utility regulatory and legislative policy structure in California, respectively.

Southern California Edison (SCE) **Sacramento, CA**

Senior Legislative Advocate | Legislative Advocate 12/2012 - 5/2016

- Managed SCE engagement on dozens of bills and budget proposals, including major legislation on renewable resource development, rate design, demand-side management, transmission and distribution reliability, distributed generation programs, and other key areas.
- Developed internal consensus on bill positions, drafted position letters, provided oral testimony in committees and advocacy meetings, and negotiated amendments to improve outcomes for SCE customers, operations, and shareholders.
- Developed and presented SCE's annual legislative education program designed to improve technical understanding of the electric industry among policymakers and increase awareness of emerging trends related to resource procurement, customer choice, and grid investment.
- Engaged policymakers and stakeholders with an earnest interest in developing viable, cost-effective, market-based solutions to their policy concerns, developing lasting relationships and mutual trust with legislative and agency staff, industry, and non-profit advocacy organizations.

California State Assembly, Office of Assemblymember Nathan Fletcher **Sacramento, CA**

Legislative Director | Jesse M. Unruh Assembly Fellow 10/2010 - 12/2012

- Developed an insider's view of energy politics as the advisor to a key member of the Assembly Committee on Utilities and Commerce during the formative years of California's clean energy policies (e.g. cap and trade implementation, 33% Renewables Portfolio Standard, net metering).
- Met with hundreds of community and policy advocates on issues ranging from healthcare funding and auto insurance requirements to industrial cogeneration and community solar.
- Managed the legislative agenda and bill analysis for thousands of committee and floor votes.

SKILLS AND ATTRIBUTES

- **Legislative and Regulatory Advocacy:** Seasoned, respected energy policy expert with years of experience testifying in legislative committees, drafting regulatory filings, and negotiating the finer points of legal and technical detail with stakeholders and policymakers.
- **Energy and Climate Subject Matter Expert:** Deeply versed in the science, engineering, economics, and policy frameworks governing the energy sector; capable of succinct translation of technically and legally complex issues for executive and political audiences (and vice versa).
- **Leadership:** History of success leading large and divergent groups to consensus on complex issues, incorporating and resolving competing viewpoints on path to unified team vision.
- **Market Analysis and Data:** Trained in energy economics and modeling; familiar with core regulatory modeling processes and tools, relevant state and federal datasets, and essential methods of industry and academic analysis of wholesale electric systems.
- **Writing and Communications:** Skilled communicator and editor across all modern written and visual formats, from didactic presentations and position papers to simple meeting agendas.
- **Programming:** Trained in R (intermediate/advanced), Excel (intermediate), Python (beginner).

EDUCATION

M.S. Energy Systems – University of California, Davis 2016-2018

Jesse M. Unruh Assembly Fellowship – Sacramento State University 2010-2011

B.A. Economics; Minors Writing, Latin American Studies – University of California, Davis 2006-2010

Attachment B

Michael A. Hyams

Director, CleanPowerSF

525 Golden Gate Avenue, San Francisco. CA. 94102 mhyams@sfwater.org

PROFESSIONAL EXPERIENCE

City and County of San Francisco Public Utilities Commission (SFPUC)
Director, CleanPowerSF (Community Choice Aggregation Program) Dec 2015-Present
Lead team responsible for planning, development, implementation and operation of CleanPowerSF, San Francisco's Community Choice Aggregation Program, with an annual budget in excess of $200 million per year. Responsible for developing business and operating plans, power portfolio management, complementary customer programs, hiring and managing staff, developing schedule and identifying all resources required to support CleanPowerSF implementation and operation.

City and County of San Francisco Public Utilities Commission (SFPUC)
Interim Director, Policy and Administration Group and Community Choice Aggregation Program March 2015-Nov 2015
Oversee the work of the Power Enterprise's Policy and Administration Group, including planning, monitoring, evaluating and coordinating the work of its various subdivisions including Regulatory and Legislative Affairs and direct the development of a Community Choice Aggregation Program for San Francisco.

City and County of San Francisco Public Utilities Commission
Acting Manager, Regulatory and Legislative Affairs May 2013-March 2015
Manage team responsible for ensuring compliance with electric utility regulations; monitoring, evaluating and planning for regulatory and/or legislative changes affecting the Department; and representing the policy and business interests of the SFPUC and its customers and residential and commercial energy ratepayers of San Francisco in Local, State and Federal regulatory and legislative forums.

City and County of San Francisco Public Utilities Commission
Utility Specialist Feb 2012-May 2013
Provided regulatory/legislative support to the SFPUC's Power Enterprise; monitored and intervened in state regulatory and legislative proceedings; supervised consultants work on transmission cost containment and California ISO stakeholder processes; and supported Power Enterprise's long-term planning efforts.

Port Authority of New York and New Jersey (PANYNJ)
Senior Energy Analyst July 2010-Jan 2012
Provided strategic planning, analytical, technical and research support for the PANYNJ Energy Program, including budgeting and demand forecasting of agency energy use and cost; managed team of consultants developing guaranteed energy savings projects with approx. $20 million in proposed upgrades at three Port properties; monitored and intervened in energy regulatory and policy proceedings; analyzed energy data for project assessment and development.

Columbia University Center for Energy, Marine Transportation and Public Policy
Research Associate and Acting Director, Urban Energy Program July 2009-July 2010
Responsible for on-going program design, research and other program activities; served as lead author and project manager of a multi-institution research team in the preparation of a white paper and policy roadmap for distributed energy "micro-grids" for New York.

National Photovoltaic Construction Partnership (NPCP)
Researcher Jan 2008-Sept 2008
Assisted NPCP Director in developing a proposal for a Renewable Energy Extension Service for New York State; conducted a range of energy research projects in support of NPCP's solar energy development business, including market and regulatory changes.

City and County of San Francisco Public Utilities Commission
Utility/Regulatory Analyst Dec 2003-Sept 2007
Provided regulatory support to the SFPUC's Power Enterprise; monitored and intervened in state regulatory proceedings; project managed long-term planning efforts; analyzed energy data; collaborated with stakeholders to design new load-serving programs.

EDUCATION

Columbia University, School of International and Public Affairs New York City, NY
Master of Public Administration, International Energy Management & Policy May 2009

University of Oregon Eugene, Oregon
Bachelor of Arts, *Magna Cum Laude* December 2000

Attachment C
Matthew H. Langer

EXPERIENCE

Clean Power Alliance of Southern California
Chief Operating Officer May 2018 –Present
Responsible for key operational business areas at the largest CCA in California, including energy procurement, regulatory affairs, customer programs, key accounts, rate setting, non-energy procurement and strategic planning

Southern California Edison Rosemead, CA
Principal Advisor, Energy Procurement Strategy January 2018 –April 2018
Leading efforts to develop strategies for optimizing SCE's energy portfolio including energy, capacity, RECs, GHG and other products; working with stakeholders to devise a fair cost-allocation mechanism for entities pursuing Community Choice Aggregation (CCAs)

Principal Advisor, Distribution Special Projects January 2017 – January 2018
Led cross-functional effort to optimize SCE's $100 million street light business, including improving customer experience, implementing LED conversions, generating new revenue through smart cities applications, and developing a long-term strategy to achieve operational excellence; implemented various continuous improvement and Operational Excellence initiatives within Distribution

Edison Water Resources Los Angeles, CA
Vice President, Corporate Development January 2016 – January 2017
Edison International Rosemead, CA
Principal Advisor, Strategic Planning August 2015 – January 2016
Led Edison International's initial exploration of several opportunities in the water market, launched Edison Water Resources ("EWR") as a new venture within Edison International, built the water recycling business line for EWR from the ground up, began development of EWR's first water recycling projects, led M&A efforts, and ultimately recommended and managed Edison's exit from the water space

Southern California Edison Rosemead, CA
Principal Manager/Senior Manager, Energy Contracts Management January 2015 – August 2015
Managed a team responsible for all aspects of SCE's $3.7 billion portfolio of 500+ renewable, combined heat and power, qualifying facility, energy storage, conventional, gas, and resource adequacy contracts, as well as EEI, WSPP, ISDA and NAESB Master Agreements, focusing on gas fired tolling agreements and large hydro power contracts

Senior Manager, Contract Compliance & Technical Services November 2012 – December 2014
Managed a team of engineers and analysts responsible for contract compliance activities for SCE's entire contract portfolio, including contract origination, contract management, renewables portfolio standard compliance, regulatory support, site inspections, engineering consultation, resource on-boarding, CAISO markets, and database management

Contract Manager, Renewable & Alternative Power April 2010 – November 2012
Managed a complex portfolio of 40+ power purchase agreements with renewable and combined heat and power facilities totaling 2,600 MW, handling all aspects of contract administration including counterparty relationships, project onboarding, amendments, settlements, regulatory support, dispute management, and terminations

MBA Intern, Energy Efficiency June 2009 – April 2010
Analyzed operations and developed programs for the Energy Efficiency Partnerships group, making substantial, tangible contributions to more than 20 programs

EDUCATION
University of Southern California, Marshall School of Business Los Angeles, CA
Master of Business Administration, Certificate in Entrepreneurship May 2010

Tulane University, A. B. Freeman School of Business New Orleans, LA
Bachelor of Science in Management, Concentration in Finance May 2005

Attachment D

3605 Heindon Road
Arcata, CA, 95521
707-499-3261
mcs41@humboldt.edu

MAHAYLA SLACKERELLI

SKILLS & ABILITIES

- Entry Level North American Board of Certified Energy Professionals
- Cascadia Leadership Program Graduate
- Intermediate Spanish and Hungarian language
- Microsoft Office Suite
- PVWatts, SAM, Calpine CRM

EXPERIENCE

ACCOUNT SERVICES MANAGER, REDWOOD COAST ENERGY AUTHORITY

December 2017 - Present

- Lead account management for 62,000+ customers including billing and customer service
- Successfully implemented over 10 rate-setting cycles
- Manage net energy metering program including customer education and billing
- Developed, implemented, and manage a 6 MW Feed-in Tariff program
- Co-lead the Redwood Coast Airport Microgrid tariff development team
- Lead the Peak Day Pricing Alternative program including program design, coordinating outreach, analysis and billing

ENERGY SPECIALIST, REDWOOD COAST ENERGY AUTHORITY

August 2017 – December 2017

Analyzed data, supervised CivicSpark fellows, used the customer relationship manager to satisfy customer requests and retrieve data, liaised with student projects, represented RCEA to the public, assisted with regulatory filings and compiled meeting agendas

VICE CHAIR, ARCATA ENERGY COMMITTEE

October 2015 - Present

Review local initiatives and activities relating to energy and conservation such as transportation mode shift and county-wide climate planning and zero waste policies, communicate with the public and recommend policies to the City Council

EDUCATION

HUMBOLDT STATE UNIVERSITY – ARCATA, CA – MASTER OF SCIENCE – 2017

Energy, Technology and Policy

Thesis - Tax Equity Structures and Solar Development in Humboldt County

SARAH LAWRENCE COLLEGE – BRONXVILLE, NY – BACHELOR OF ARTS - 2009

Concentration – Economics

AWARDS

2017 Outstanding Student Research – Humboldt State University

Attachment E

SAMANTHA WEAVER

770 Francisco Street, San Francisco, CA • (313) 574-2640 • samantha.l.weaver@gmail.com

PROFESSIONAL EXPERIENCE

EAST BAY COMMUNITY ENERGY, Oakland, CA **September 2018–Present**

Principal Regulatory Analyst, Public Policy & Regulatory Affairs

Develop policy positions on behalf of EBCE and evaluate proposed policies at the CPUC, CAISO, and CEC.

- Develop analyses, written reports, and presentation materials to support EBCE's positions.
- Lead EBCE's engagement in regulatory proceedings involving distributed energy resources.

PACIFIC GAS AND ELECTRIC, San Francisco, CA **January 2015–September 2018**

Principal Case Manager, Regulatory Affairs, May 2018 – present

Regulatory case manager for the Distribution Resources Plan and Integrated Distributed Energy Resources proceedings.

- Manage compliance filings, case strategy, and development of advocacy positions.

Expert Clean Energy Policy Analyst, March 2017– present | Senior Analyst, March 2016–Feb 2017

Conduct technical and policy analysis to inform PG&E's renewable energy procurement strategy.

- Team lead for publishing PG&E's annual Renewables Portfolio Standard (RPS) Procurement Plan.

Senior Energy Policy and Planning Analyst, Energy Policy and Procurement, January 2015 – February 2016

Developed strategy and formulated policy positions related to capacity markets and distributed energy resources (DERs).

- Provide project management support for strategic initiatives focused on utility business models and DERs.

LAWRENCE BERKELEY NATIONAL LABORATORY, Berkeley, CA **January 2013–January 2015**

Senior Research Associate, Electricity Markets & Policy Group

Co-authored over ten publications and oversaw analysis of large datasets for annual renewable energy market reports.

- Played essential role in the data collection, analysis, and writing for a publication series on solar PV installed costs.
- Led data collection and analysis for a widely-cited study on the costs and benefits of RPS policies.

IHS EMERGING ENERGY RESEARCH, Cambridge, MA **May 2011–December 2012**

Senior Research Analyst, May 2012 – December 2012 | Intern May 2011 – May 2012

Published data-driven analysis in response to client questions as part of the IHS renewable energy advisory service.

- Maintained a strong understanding of the regulatory and technological landscape of the industry, with a focus on state RPS supply and demand, distributed generation, and energy storage.

DNV GL (previously DNV KEMA), Lowell, MA **June 2008– July 2010**

Data Analyst, Energy Assessments

Completed wind resource assessments and oversaw data processing to support feasibility studies for wind power projects.

- Served as the lead member of analysis team for the firm's second-largest client.

EDUCATION

Master of Arts in Urban and Environmental Policy and Planning, Tufts University, Medford, MA (2012)

- *Thesis*: Analyzed job creation potential of energy efficiency programs in Kentucky.

Bachelor of Arts in Political Science, concentration in Environmental Studies, Kalamazoo College, MI (2008)

- *Thesis with Honors*: Developed emissions inventory and carbon neutrality plan for Kalamazoo College.

SKILLS AND LEADERSHIP

Skills:

Proficiency in ArcGIS, MS Excel, Access, PowerPoint, IMPLAN; basic capabilities with R, SQL, Matlab

Leadership & Service:

Women's Network Leadership Program, Selected Participant, PG&E – San Francisco, CA June 2017-present
Board Member, Rockridge Community Planning Council – Oakland, CA, April 2014-April 2015
President Elect, Marketing and Events Director, Young Professionals in Energy – Boston, 2011-2012