Docket No. I.17-02-002

Exhibit No. CalCCA-01

Date December 12, 2022

Witness Andrew D. Mills, Ph.D.

PREPARED DIRECT TESTIMONY OF ANDREW D. MILLS, Ph.D. ON BEHALF OF THE CALIFORNIA COMMUNITY CHOICE ASSOCIATION IN ORDER INSTITUTING INVESTIGATION PURSUANT TO SENATE BILL 380 TO DETERMINE THE FEASIBILITY OF MINIMIZING OR ELIMINATING THE USE OF THE ALISO CANYON NATURAL GAS STORAGE FACILITY LOCATED IN THE COUNTY OF LOS ANGELES WHILE STILL MAINTAINING ENERGY AND ELECTRIC RELIABILITY FOR THE REGION

CALCCA
ADVANCING LOCAL ENERGY CHOICE

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I. INTRODUCTION AND SUMMARY OF TESTIMONY

In response to the California Public Utilities Commission's (Commission's) *Order Instituting Investigation Pursuant to Senate Bill 380 to Determine the Feasibility of Minimizing or Eliminating the Use of the Aliso Canyon Natural Gas Storage Facility Located in the County of Los Angeles While Still Maintaining Energy and Electric Reliability For The Region*,[1] I offer the following conclusions on behalf of CalCCA.

- The need for new generating resources and storage and their interaction with energy efficiency and building electrification are best evaluated in a comprehensive manner through the Integrated Resource Plan (IRP)
- The allocation of needs and obligations of entities to perform procurement is an output of the IRP process and is best addressed within the IRP
- Costs incurred in performing procurement in response to an IRP are best addressed within the IRP

II. THE COMMISSION SHOULD MAKE ELECTRIC PROCUREMENT AND PLANNING DECISIONS IN THE IRP, NOT THIS PROCEEDING

This OII has been instrumental in studying the gas system and the impacts on that system from further reduction in the reliance on Aliso Canyon. It is not, however, the appropriate venue to discuss how changes to the electric system can be used to compensate for that reduction. The complexities of actions in the electric system -- procurement of resources or energy efficiency, demand response, and electrification – are a central focus in other proceedings, with the IRP proceeding providing the most integrated examination. Moreover, many parties who have a direct stake in electric

[1] *Order Instituting Investigation Pursuant to Senate Bill 380 to Determine the Feasibility of Minimizing or Eliminating the Use of the Aliso Canyon Natural Gas Storage Facility Located in the County of Los Angeles While Still Maintaining Energy and Electric Reliability For The Region*, I.17-02-002 (Feb. 9, 2017) (OII).

system buildout may not be active in this proceeding, and making any critical electric system decision here would risk the loss of their informed perspectives.

The Commission should, instead, look to perform procurement planning in a coordinated manner. It already has the IRP process, which addresses all the concerns related to electrical generation, demand response, and energy efficiency in a single cohesive plan. The IRP considers reliability of electricity provision, the meeting of policy goals (including emissions and compliance requirements such as Renewable Portfolio Standards), and limitations on the use of once-through cooling plants, as well as assumptions about changes in load, including energy efficiency and building electrification. This process can also address needs to reduce electrical generation from gas-fired generation that is reliant on Aliso Canyon.

The IRP has an existing process to test electric system reliability: Historically, the Commission has taken the combined plans from the IOUs, CCAs, and ESPs, entered them into the Strategic Energy and Risk Valuation model (SERVM), and performed hourly commitment and dispatch simulations of the electric grid. SERVM can output the timing, duration and magnitude of any loss-of-load events by area for Pacific Gas and Electric Company, Southern California Edison Company (SCE), San Diego Gas & Electric, or out-of-California Independent System Operator Corporation (CAISO) balancing authorities on the West Coast. It can use these outputs to calculate whether or not a specific set of generation meets the "1 event in 10 years" reliability standard. Any determination about electric grid reliability should follow this existing process, which has undergone extensive vetting by stakeholders.

For example, the Commission could, as part of the IRP process, reduce the winter capacity of SERVM's gas-fired units to reflect reduced gas availability from Aliso Canyon, or increase load in the SCE area to reflect increased electrification. If the SERVM analysis finds that these changes lead to unacceptable loss of load, then the IRP process can evaluate candidate solutions to improve reliability.

In addition, the IRP proceeding requires participation by the investor-owned utilities (IOUs), community choice aggregators (CCAs), and energy service providers (ESPs). Not all of these parties have been involved in this investigation. In order to get the necessary input to reliably and cost effectively address the electric generation portfolio needs to reduce reliance on Aliso Canyon, the Commission would be far better served to move those needs and requirements to the IRP proceeding where they can be addressed in a comprehensive manner.

For these reasons, the Commission should conduct any need assessment associated with alleviating the reliance on Aliso Canyon, procurement obligation, procurement allocation, and cost recovery mechanism contemplation to the IRP.

III. RESPONSES TO QUESTIONS IN ATTACHMENT A – ALISO CANYON I.17-02-002: STAFF PROPOSAL FOR PORTFOLIO AND NEXT STEPS – SEPTEMBER 23, 2022

1. What are the quantities of a) electricity generation and storage, b) building electrification, c) electric energy efficiency and optionally, d) commercial, and industrial demand response that the utility proposes should combine to meet the target? At least 82 MMcfd of the target must be met by a combination of b) and c).

a. Why is this the appropriate mix?

The inclusion of not only generating resources but that of changes in energy demand through energy efficiency, demand response, and building electrification makes the need to use the IRP process to evaluate the need for generating and storage resources even

more critical. The IRP is designed to evaluate energy and load needs including these elements and determine the mix of resources necessary to address them. The IRP has the ability to look at those needs for the entirety of the system which can include Aliso Canyon related changes in energy and demand as a part of its process and optimize with other needs as well. The mix of resources if determined within this OII may be sufficient to meet the immediately identified needs on a stand-alone basis. However, it fails to consider how this mix combines with other quantities of these same portfolio elements to meet other system needs. In addition, the IRP can take inputs from the CAISO Transmission Planning Process (TPP) to evaluate not only generation and storage needs but also the expected transmission system topology that will enable additional procurement efficiency. Without understanding what procurement is already occurring through the IRP that will, in part, address Aliso Canyon needs, it is not possible to know whether any amount and mix of resources proposed in this OII is effective and efficient (*i.e.*, the least cost option) to addressing the total need of the grid.

b. Should the Commission specify in this proceeding how a) will be subdivided between generation and storage?

No. Determining the appropriate mix of energy storage and renewables is a complex analysis that depends on new resources that Southern California load-serving entities (LSEs) will build to meet their carbon and reliability goals (which is within the focus of IRP), as well as transmission availability (which is already addressed in the CAISO Transmission Planning Process (TPP)). Given that IRP and TPP already address these issues, the Commission should not make any determinations about need in this standalone proceeding.

2. Regarding electricity generation and storage:

a. How should the required quantity of generation or storage be allocated among LSEs? For example, should it be based on the "Winter 1-in-10 Peak Day Energy Requirements by Service Area from Phase 3 Study" results shown above?

There are several considerations in determining how to allocate procurement which include causation, equity, and expediency. In recent history, the Commission has allocated procurement obligations in the IRP with 3,300 megawatts (MW) in Decision (D.) 19-11-016[2] and an additional 11,500 MW in D.21-06-035[3]. These obligations were allocated to all LSEs based on their relative load shares. In contrast, central procurement by the IOUs was used to meet an urgent 2021 reliability need in D.21-02-028[4]. Other methods of need allocation are also a central focus in R.20-05-003[5], the IRP proceeding. Each proceeding addressed allocation differently in consideration of all procurement needs identified within the IRP.

Given the need to integrate procurement in a consolidated proceeding, the allocation of procurement obligations should be placed in the IRP and not in this OII.

b. What entities should be responsible for conducting the procurement?

Consistent with the response in question 2.a above, the IRP is most suitable for determining allocations as well as the entities responsible for procurement.

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[2] D.19-11-016, *Decision Requiring Electric System Reliability Procurement For 2021-2023*, Rulemaking (R.) 16-02-007 (Nov. 13, 2019); located at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M319/K825/319825388.PDF.

[3] D.21-06-035, *Decision Requiring Procurement to Address Mid-Term Reliability (2023-2026)*, R.20-05-003 (June 30, 2021); located at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M389/K603/389603637.PDF.

[4] D21-02-028, *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*, R.20-11-003 (Feb. 17, 2021); located at https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M366/K441/366441341.PDF.

[5] *Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.*, R.20-05-003 (May 7, 2022); located at https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:R2005003.

c. What new transmission into or within the LA Basin, if any, should be considered to support the additional generation and storage identified?

Any procurement obligation must consider the ability of the proposed resources to serve load reliably. The IRP must include information gained from the CAISO TPP and use it in a manner to address all resources portfolio needs. In the same manner, information from detailed studies of the gas-system impacts of Aliso Canyon can become input to the IRP process to address portfolio needs. In addition, if the Aliso Canyon need requires new transmission build, the CPUC should work with the CAISO to include those assumptions in the TPP which is then included in the IRP. This should be performed in a single consolidated proceeding rather than separately where there is a risk of differing assumptions and portfolios that could result in sub-optimal outcomes overall.

3. Regarding building electrification, energy efficiency, and gas demand response:

a. How should the required quantities be allocated among LSEs or other implementers?

As with question 2, the allocation of procurement obligations should be a matter for the IRP, in which entities serving electricity to customers can effectively plan for all grid needs. The IRP should be informed of any gas utility plans to reduce gas demand so that the three elements work together.

4. How much of each of the activities a), b), c) and d) as described in Question 1 should be implemented by the responding utility vs. other utilities vs. other entities such as CCAs or third party implementers, and how would any other entities be selected and funded?

The electricity needs of customers should generally be served by the entity responsible for serving the load of that customer. Occasions have occurred within the IRP in which procurement obligations have been placed upon a subset of entities (generally the IOUs). These have been limited circumstances and most recently in D.21-02-028

(which prioritized quick preparation for extreme weather in 2021) where timing played a critical role and procurement was necessary on very short notice. Integrating the needs for Aliso Canyon within the IRP will allow the Commission to determine the entities responsible for procurement in a clear and consistent manner with all parties present since the IOUs, CCAs, and ESPs are all parties to that proceeding. The IRP can also determine how funding for such procurement would occur.

5. For those activities conducted or funded through the responding utility, what programs and processes would implement these activities and how would they be funded?

To recover the costs of procuring generation, the IOUs use either 1) their bundled generation rates for procurement to serve their bundled customer load or 2) the Cost Allocation Mechanism for procurement made on behalf of all customers. The funding mechanism thus may depend upon how any obligations are obligated. For this reason, the question of IOU funding mechanism must follow the allocation of the obligation, which should be decided in the IRP.

IV. CONCLUSION

This concludes my opening testimony.

ATTACHMENT A
TO
PREPARED DIRECT TESTIMONY OF ANDREW D. MILLS, Ph.D.
ON BEHALF OF
THE CALIFORNIA COMMUNITY CHOICE ASSOCIATION
IN ORDER INSTITUTING INVESTIGATION PURSUANT TO SENATE BILL 380 TO DETERMINE THE FEASIBILITY OF MINIMIZING OR ELIMINATING THE USE OF THE ALISO CANYON NATURAL GAS STORAGE FACILITY LOCATED IN THE COUNTY OF LOS ANGELES WHILE STILL MAINTAINING ENERGY AND ELECTRIC RELIABILITY FOR THE REGION

QUALIFICATIONS OF ANDREW D. MILLS, Ph.D.

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Q1. Please state your name and business address.

A1. My name is Andrew D. Mills. My business address is One Concord Center, 2300 Clayton Road, Suite 1150, Concord, CA 94520.

Q2. Please state your qualifications to offer this testimony.

A2. I received a B.S. in Mechanical Engineering from the Illinois Institute of Technology. I received an M.S. and Ph.D. in Energy and Resources from the University of California, Berkeley. I joined the California Community Choice Association in December 2021 as an electricity system modeler. In that capacity I develop and maintain a PLEXOS electricity market model of the western U.S. electricity system. Prior to joining CalCCA, I conducted research on electricity markets and policy as a Staff Scientist at the Lawrence Berkeley National Laboratory. I was the lead author for several peer-reviewed journal articles and Department of Energy-sponsored reports on best-practices for integrated resource planning, power system modeling with high shares of variable renewables, and methods to improve reliability modeling of solar and storage resources. I was a contributing author to the Intergovernmental Panel on Climate Change's Special Report on Renewable Energy.

Q3. What testimony are you sponsoring in this proceeding?

A3. I am sponsoring the Testimony on Behalf of the California Community Choice Association.

Q4. Was this material prepared by you or under your supervision?

A4. Yes, it was.

Q5. Insofar as this material is factual in nature, do you believe it to be correct.

A5. Yes, it is correct.

Q6. Insofar as this material is in the nature of opinion or judgment, does it represent your best judgment?

A6. Yes, it does.

Q7. Do you adopt this testimony as your sworn testimony in this proceeding?

A7. Yes, I do.

Q8. Does this conclude your qualifications and prepared testimony?

A8. Yes, it does.

ATTACHMENT B
TO
PREPARED DIRECT TESTIMONY OF ANDREW D. MILLS, Ph.D.
ON BEHALF OF
THE CALIFORNIA COMMUNITY CHOICE ASSOCIATION
IN ORDER INSTITUTING INVESTIGATION PURSUANT TO SENATE BILL 380 TO DETERMINE THE FEASIBILITY OF MINIMIZING OR ELIMINATING THE USE OF THE ALISO CANYON NATURAL GAS STORAGE FACILITY LOCATED IN THE COUNTY OF LOS ANGELES WHILE STILL MAINTAINING ENERGY AND ELECTRIC RELIABILITY FOR THE REGION

ANDREW D. MILLS, Ph.D.
CURRICULUM VITAE

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California Community Choice Association
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EDUCATION

University of California at Berkeley. Ph.D. in Energy and Resources, August 2015. *Application of Power Systems Economics to Wind and Solar Power Integration.* Duncan Callaway (chair), Severin Borenstein, Shmuel Oren

University of California at Berkeley. M.S. in Energy and Resources, May 2006

Illinois Institute of Technology. B.S., Mechanical Engineering, May 2003

EXPERIENCE

CALIFORNIA COMMUNITY CHOICE ASSOCIATION, Concord, CA
Principal Electrical System Modeler, 2021 – present
- Develop and maintain an electricity market model of the western U.S. grid in PLEXOS
- Analyze the reliability, emissions, and affordability implications of procurement and policy decisions

LAWRENCE BERKELEY NATIONAL LABORATORY, Berkeley, CA
Staff Scientist, Electricity Markets and Policy Department, 2006 - 2021
- Led research on the integration of variable renewable energy into the electric power system and impacts on wholesale power markets
- Disseminated research findings to the broader public through LBNL reports, journal articles, and conference papers
- Provided expert renewable energy assistance to stakeholders including utilities, public utilities commissions, and regional transmission planning groups
- Supervised junior staff and graduate student research assistants

SONOMA STATE UNIVERSITY, Rohnert Park, CA
Lecturer: Electrical Energy Management, August 2007 – December 2007
- Taught upper-division undergraduate course on basics of electricity (DC and AC), energy efficiency, and electric motors

ALL CELL TECHNOLOGIES, LLC, Chicago, IL
Engineering Consultant, 2003 - 2004
- Conducted research on passive thermal management system for lithium-ion battery packs
- Fabricated and analyzed a graphite matrix to increase thermal conductivity of phase change materials

SELECTED HONORS AND AWARDS
- Contributing Author, Working Group III contribution to the IPCC Fifth Assessment Report, 2012
- Utility Variable-Generation Integration Group 2012 Annual Achievement Award, 2012
- Contributing Author, IPCC Special Report on Renewable Energy, 2009
- National Science Foundation Graduate Research Fellowship, 2004

SELECTED PUBLICATIONS

- Co-authored more than 90 publications including peer-review journal articles, Berkeley Lab reports, and magazine articles: https://orcid.org/0000-0002-9065-0458

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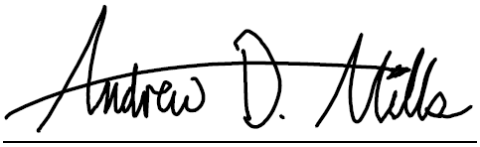
16. Mills, A.D., and R.H. Wiser. 2013. "Changes in the Economic Value of Photovoltaic Generation at High Penetration Levels: A Pilot Case Study of California." *IEEE Journal of Photovoltaics* 3 (4): 1394–1402. http://dx.doi.org/10.1109/JPHOTOV.2013.2263984

VERIFICATION OF ANDREW D. MILLS, Ph.D.

Under penalty of perjury under the laws of the State of California, I, Andrew D. Mills, Ph.D., certify that the PREPARED DIRECT TESTIMONY OF ANDREW D. MILLS, Ph.D. ON BEHALF OF THE CALIFORNIA COMMUNITY CHOICE ASSOCIATION IN ORDER INSTITUTING INVESTIGATION PURSUANT TO SENATE BILL 380 TO DETERMINE THE FEASIBILITY OF MINIMIZING OR ELIMINATING THE USE OF THE ALISO CANYON NATURAL GAS STORAGE FACILITY LOCATED IN THE COUNTY OF LOS ANGELES WHILE STILL MAINTAINING ENERGY AND ELECTRIC RELIABILITY FOR THE REGION, dated December 12, 2022, was prepared by me or under my supervision. To the extent my testimony states facts, those facts are true and correct to the best of my knowledge. To the extent my testimony contains opinions, those opinions are the product of my best professional judgment.

Executed this 8th day of March, 2024, at Oakland, California.

By: 

ANDREW D. MILLS, PH.D.
DIRECTOR OF DATA ANALYTICS
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