Company: San Diego Gas & Electric Company (U 902 M)
Proceeding: 2024 General Rate Case
Application: A.22-05-015/-016 (cons.)
Exhibit: SDG&E-215

REBUTTAL TESTIMONY

OF FERNANDO VALERO

(CLEAN ENERGY INNOVATIONS)

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

May 2023

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APPENDICES

REBUTTAL TESTIMONY OF FERNANDO VALERO (CLEAN ENERGY INNOVATIONS)

I. SUMMARY OF DIFFERENCES

TOTAL O&M - Constant 2021 ($000)			
	Base Year 2021	**Test Year 2024**	**Change**
SDG&E	**3,895**	**9, 985**[1]	**6,090**
CAL ADVOCATES[2]	**3,895**	**4,971**	**1,076**
TURN[3]	**3,895**	**9,985**	**6,090**
CEJA	**3,895**	**3,974**	**79**
UCAN	**3,895**	**9,610**	**5,715**

TOTAL CAPITAL - Constant 2021 ($000)					
	2022	**2023**	**2024**	**Total**	**Difference**
SDG&E	**23,024**	**24,974**	**26,333**	**74,331**	**-**
CAL ADVOCATES	**1,425**	**0**	**800**	**2,225**	**(72,106)**
TURN	**20,227**	**7,817**	**1,727**	**29,771**	**(44,560)**
UCAN[4][5]	**23,024**	**24,974**	**0**	**19,330**	**(26,333)**
CEJA	**23,024**	**24,974**	**25,178**	**73,176**	**(1,155)**

[1] As discussed in this rebuttal, SDG&E agrees the "other" classification within the SCP 2024 O&M budget should be reduced from $57,000 to $10,000, which represents a reduction of $47,000 to SDG&E's forecast. Due to rounding and the table value in ($000), the reduction of $47,000 is not seen.

[2] Cal Advocates does not challenge SDG&E's 2021 Base Year O&M costs, but their workpapers cut base labor 50% as discussed below in section III and section IV.

[3] TURN does not challenge SDG&E's 2021 Base Year O&M costs and SDG&E understands TURN to agree with SDG&E's TY 2024 O&M forecast. *See* Ex. TURN-06-C (Monsen) at 78 states "SDG&E's baseline is reasonable relative to the actual 2022 O&M for this exhibit."

[4] SDG&E assumes that UCAN's recommended cuts to capital is applicable to all 2024 capital costs based on the following statement in Ex. UCAN (Woychik) at 12: "Do the related capital expenditures for SDG&E's Clean Energy Innovation in 2024 of $26.33 million look to be just and reasonable?... UCAN recommends that the entire budget for clean energy innovation of $26.33 million be denied."

[5] SDG&E did not reduce 2022 or 2023 capital request as UCAN does not state whether 2022 or 2023 funds should be denied. See Ex. UCAN (Woychik) at 284-291.

II. INTRODUCTION

This rebuttal testimony regarding San Diego Gas & Electric Company's ("SDG&E's") request for Clean Energy Innovations ("CEI") addresses the following testimony from other parties:

- The Public Advocates Office of the California Public Utilities Commission ("Cal Advocates") as submitted by Ms. Monica Weaver (Exhibit CA-05) and as submitted by Mr. Amin Younes (Exhibit CA-09), both dated March 27, 2023.
- The Utility Reform Network ("TURN"), as submitted by Mr. William A. Monsen (Exhibit TURN-06), dated March 27, 2023.
- The California Environmental Justice Alliance ("CEJA"), as submitted by Mr. Matthew Vespa, Ms. Sara Gersen, Ms. Susan Saadat, and Ms. Rebecca Barker (Exhibit CEJA-01), dated March 27, 2023.
- The Utility Consumers' Action Network ("UCAN"), as submitted by Dr. Eric Charles Woychik (Exhibit UCAN), dated March 27, 2023.
- The Environmental Defense Fund ("EDF"), as submitted by Mr. Michael Colvin (Exhibit EDF-01), dated March 27, 2023.
- The Federal Executive Agencies ("FEA"), as submitted by Mr. Ralph Smith (Exhibit FEA-01), dated March 27, 2023.
- The Protect Our Communities Foundation ("PCF"), as submitted by Mr. Bill Powers (Exhibit PCF-01), dated March 27, 2023.
- The San Diego Community Power and Clean Energy Alliance (jointly referred to as the CCAs), as submitted by Mr. Anthony M. Georgis (Exhibit CCAs-Georgis), dated March 27, 2023.

As a preliminary matter, the absence of a response in this rebuttal testimony to any particular issue raised by any intervenor does not imply or constitute agreement by SDG&E with the proposal or contention made by such intervenor. The forecasts contained in SDG&E's direct testimony, performed at the project level, are based on sound estimates of its revenue requirements at the time of testimony preparation.

SDG&E's CEI supports the delivery and use of clean electricity throughout SDG&E's service territory. This includes the evaluation, testing and deployment of infrastructure and

technologies needed to achieve both SDG&E's and California's goal of decarbonization, resiliency, and operational flexibility, supporting customers' adoption of clean energy technologies, and re-establishing a Research, Development and Demonstration ("RD&D") program at SDG&E.[6]

CEI is on the forefront of SDG&E's effort to advance California's ambitious and necessary goal to counteract climate change by decarbonizing the state's electricity supply by 2045.[7] In the longer term, CEI's programs and projects presented in this GRC are a catalyst for that energy transition by evaluating, developing, and piloting emerging and diverse technologies to inform future investments, whether by the state, SDG&E or other Investor-Owned Utilities ("IOUs"), customers or third party providers. In the near-term, CEI's programs and projects bring resources online that capture excess renewable generation, such as solar photovoltaic ("PV"), for later use when needed, strengthen microgrids, and enhance local grid reliability, local grid resiliency and local power quality.

As stated in the California Air Resources Board's ("CARBs") 2022 Scoping Plan for Achieving Carbon Neutrality (November 16, 2022) ("CARB Scoping Plan"):

> "The major element of this unprecedented transformation is the aggressive reduction of fossil fuels wherever they are currently used in California, building on and accelerating carbon reduction programs that have been in place for a decade and a half…It means continuing to build out the solar arrays, wind turbine capacity, and other resources that provide clean, renewable energy to displace fossil-fuel fired electrical generation. It also means scaling up new options such as renewable hydrogen for hard-to-electrify end uses and biomethane where needed…Modeling indicates that natural and working lands will not, on their own, provide enough sequestration and storage to address the residual emissions. For that reason, it is necessary to research, develop, and deploy additional methods of capturing CO2 that include pulling it from the smokestacks of

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6 Ex. SDG&E-15-R (Valero) at 1.

7 *See* Senate Bill ("SB") 100, Sections 1(b) & 5, codified at Cal. Pub. Util. Code Section 454.53(a) (directing Commission to "plan for 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045"), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100; SB 1020 (2022), Section 4, codified at Pub. Util. Code Section 454.53(a) (directing this Commission to plan for "eligible renewable energy resources and zero-carbon resources [to] supply 90 percent of all retail sales of electricity to California end-use customers by December 31, 2035, 95 percent of all retail sales of electricity to California end-use customers by December 31, 2040, 100 percent of all retail sales of electricity to California end-use customers by December 31, 2045, and 100 percent of electricity procured to serve all state agencies by December 31, 2035"), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB1020. .

> facilities, or drawing it out of the atmosphere itself and then safely and permanently utilizing and storing it, as called for in recent legislation. Carbon removal also will be necessary to achieve net negative emissions to address historical GHGs already in the atmosphere…This is a plan that aims to shatter the carbon status quo and take action to achieve a vision of California with a cleaner, more sustainable environment and thriving economy for our children. This ambitious plan will serve as a model for other partners around the world as they consider how to make their transition. As we have so often in the past, California can continue to serve as a leader in innovation that has produced not only the fifth largest economy on the planet, but ultimately one of the most energy-efficient economies, with a track record of demonstrating the ability to decouple economic growth from carbon pollution."[8]

CARB correctly identified that California needs to "shatter the carbon status quo." As one of California's largest providers of electric service, SDG&E's CEI program and project funding requests are positioned to help meet the state's mandatory clean electricity goals by 2045, while helping provide reliable service to our customers.

SDG&E requests that the Commission approve its Clean Energy Innovations Test Year ("TY") 2024 forecast as submitted in my opening testimony with the exception of a $47,000 reduction in 2024 Operations and Maintenance ("O&M") where SDG&E agrees that the appropriate contingency is miscalculated.

SDG&E summarizes intervenors' recommendations regarding the Clean Energy Innovations forecast, with general and specific rebuttal in later sections.

A. CAL ADVOCATES

The following is a summary of Cal Advocates' positions on O&M expenses:[9]

- The Commission should reduce all incremental labor increases by a minimum of 50%.
- The Commission should deny cost recovery for the $1,300,000 Clean Energy project.
- The Commission should deny cost recovery for the $1,000,000 Customer End-Use project.
- The Commission should shift the $800,000 System Advancement hardware purchase from O&M to capital.

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[8] *See* CARB's 2022 Scoping Plan at p. 1-2: https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf.

[9] Ex. CA-09 (Younes) at 2.

- The Commission should reduce the O&M forecast for Sustainable Communities Program ("SCP") by $47,000.
- The following is a summary of Cal Advocates' positions on Capital expenditure:[10]
- Cost recovery for Advanced Energy Storage ("AES") should be denied.
- Cost recovery for AES 2.0 should be denied.
- Cost recovery for Non-Lithium-Ion Energy Storage Technology should be denied.
- Cost recovery for Borrego 3.0 Microgrid should be denied.
- Cost recovery for the SCP Removal should be denied.
- Cost recovery for the Mobile Battery Energy Storage Systems ("MBESS") should be denied.
- Cost recovery for the Hydrogen Build-Ready Infrastructure should be denied.
- Cost recovery for the Hydrogen Energy Storage System ("HESS") Expansion should be denied.
- Consistent with the recommendation in O&M expense above, $800,000 in capital should be added for System Advancement hardware purchase.

B. TURN

The following is a summary of TURN's positions on Capital expenditure: [11]

- The Commission should order SDG&E to remove the AES 2.0 and Non-Lithium-Ion projects from SDG&E's capital forecasts.

C. CEJA

The following is a summary of CEJA's position(s) on O&M expenses:[12]

- Deny the $1,011,000 requested for the Hydrogen Strategy and Implementation Department.

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[10] *Id.* at 3-4.

[11] Ex. TURN-06 (Monsen) at 3.

[12] Ex. CEJA-01 (Vespa, et al.) at 6.

- Deny the $5,000,000 requested for the Innovation Technology Development program. If the Commission approves this new program in any form, it should explicitly prohibit SDG&E from using ratepayer funds for carbon capture research.
- The following is a summary of CEJA's positions on Capital expenditure[13]:
- Deny the $1,155,000 requested for the Hydrogen Build Ready Infrastructure Program and prohibit SDG&E from using ratepayer funds for this program.

D. UCAN

The following is a summary of UCAN's position on CEI O&M: [14]

- Deny $375,000 for DER Engineering O&M.
- The following is a summary of UCAN's positions on capital expenditure: [15]
- Deny entire $26,330,000 for Clean Energy Innovation's budget in 2024.[16]
- Funding recovery for Advanced Energy Storage in 2023 unjust.[17] In favor of the $2.55M for Non-lithium-Ion Battery Storage.[18]
- Funding for Borrego 3.0 is unjust.[19]

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[13] Ex. CEJA-01 (Vespa, et al.) at 4.

[14] Ex. UCAN (Woychik) at 241-242.

[15] *Id.* at 12 and 284.

[16] Ex. UCAN (Woychik) at 284.

[17] Ex. UCAN (Woychik) at 284-85.

[18] Ex. UCAN (Woychik) at 285-286 states "Yes, this expenditure applies to technology that can be considered 'clean energy innovation,' goes beyond standard lithium-based energy storage batteries and may result in scaling up of additional non-lithium-ion battery storage technologies. Moreover, this proposed new battery storage technology seems less likely to crowd out significant use of CSOM battery storage and may allow newer CSOM battery storage capacity to become increasingly available, which optimistically appear to be related to the positions taken by SDG&E's witnesses Valero and Swetek."

[19] Ex. UCAN (Woychik) at 286-87; *but see* UCAN (Woychik) at 253 ("UCAN recommends that the Commission deny capital funding for the Borrego 3.0 upgrade described in WP 17246A $.10M in 2024.")

- Deny $1.15M for Hydrogen Build Ready Infrastructure in 2024.[20]
- Deny funding for Hydrogen Energy Storage System Expansion in 2024.[21]

E. FEA

FEA recommends the Hydrogen Build Ready Infrastructure program costs be tracked via a memorandum account.[22]

III. GENERAL REBUTTAL

I respond here to certain of intervenors' arguments that extend beyond an individual program or budget code.

A. Cal Advocates' Challenge to SDG&E's Additional Labor Costs

Cal Advocates recommends: "The Commission should reduce all incremental labor increases by a minimum of 50%."[23] Later, Cal Advocates reiterates this point and explains its rationale: "The Commission should reduce estimates of labor additions by 50% across the board. Cal Advocates' estimate has the same basis as, and no more uncertainty than, the estimates provided by SDG&E. Reducing additional labor in half reduces O&M and capital expenditures on labor as shown in Table 9-5."[24] In Table 9-5, Cal Advocates recommends a reduction of $1,866,125 to SDG&E O&M labor costs (identifying $1,428,625 of that amount as "Unique Adjustments") and a reduction of $2,540,250 to SDG&E 2022 to 2024 capital labor costs, to reflect this 50% "across the board" cut.[25] Cal Advocates provides its calculations in its "Workpapers for Ex. CA-09: Labor Line items."[26]

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[20] Ex. UCAN (Woychik) at 290 ("UCAN recommend that SDG&E's proposed capital spending for project 212680 of $1.15M in 2024 should be denied.")

[21] Ex. UCAN (Woychik) at 253 ("UCAN thus recommends that the Commission deny the hydrogen generation aspect of the Borrego 3 project."); id. at 291 ("UCAN recommend that SDG&E's proposed capital request for 2024 of $0.08 million be denied.") Although the Borrego 3.0 Microgrid (17246A) project is distinct from the Hydrogen Energy Storage System Expansion (212720), see Ex. SDG&E-15 at 22 and 29, SDG&E understands UCAN to be opposed to the latter project.

[22] Ex. FEA-01 (Smith) at 50.

[23] Ex. CA-09 (Younes) at 2 (emphasis added).

[24] *Id.* at 12 (emphasis added).

[25] Ex. CA-09 at 13 & n. 32. Footnote 32 explains that some of these recommended cuts are duplicative of cuts also recommended for other reasons, but that $1,428,625 are "Unique Adjustments," which reflects "reductions which are applied here and nowhere else."

[26] Ex. CA-09 (Younes) at 13 n. 31.

Cal Advocates' proposed reduction is without merit for three reasons: (1) Cal Advocates made an error in calculating "incremental labor costs" by including base year costs; (2) Cal Advocates presents no evidence supporting its assertion that SDG&E only needs half of its proposed O&M labor force (whether incremental or total); and (3) Cal Advocates presents no evidence supporting its assertion that SDG&E only needs half of its proposed capital projects labor force.

First, a review of the referenced "Workpapers for Ex. CA-09: Labor Line items." reveals that Cal Advocates calculated its proposed reduction by cutting 50% from all SDG&E labor costs, including base year Operations and Maintenance ("O&M") labor costs. See Appendix C, which is Cal Advocates' "Workpapers for Ex. CA-09: Labor Line items" in which Cal Advocates' cuts to base year labor costs are highlighted in red). Such costs are not "incremental labor" or "additional labor" (*i.e*., 2022-2024 labor requests), but rather the known cost of running the program(i.e., HSI, ACT and DER Engineering) in the base year (*i.e*., actual 2021 base year labor expenditures).[27] In many instances, this brought Cal Advocates' recommended O&M funding for the departments' O&M labor below the base year labor (*i.e*., what was spent on labor in 2021). This is inconsistent with Cal Advocates' proposal and appears to be a mistake, albeit significant.

Second, even if Cal Advocates' proposal were limited to <u>incremental</u> O&M labor, Cal Advocates has presented no facts that suggest SDG&E can complete the proposed work with only half of the proposed incremental labor (or only half the work force, if Cal Advocates truly meant to attack SDG&E's base year 2021 O&M costs). See Appendix C, which is Cal Advocates' "Workpapers for Ex. CA-09: Labor Line items" with Cal Advocates' 50% cut to incremental labor costs for O&M shown in red font. Cal Advocates claims that SDG&E did not adequately support its requests for incremental labor. To the contrary, my opening testimony explains the need for additions to the workforce, while Cal Advocates has not adequately supported their explanation for not funding incremental labor. The only specific incremental labor item Cal Advocates describes in any detail relates to the request for an additional 2.4 FTE

[27] Ex. SDG&E-15 WP at 11 says "The forecast method is base-year. This is appropriate because it accurately reflects the current state of the activities performed by the Advanced Clean Technology team."

in the Hydrogen Strategy and Implementation (HSI) Department.[28] I respond in depth to Cal Advocates' attack on these HSI labor additions in Section IV.A.1 of my rebuttal testimony.

Third, Cal Advocates presents no evidence to establish that SDG&E only needs half of its proposed capital projects labor force to implement the proposed capital projects. However, Cal Advocates does not discuss SDG&E's capital labor forecasts at all other than to propose their reduction.[29] See Appendix C, which is Cal Advocates' "Workpapers for Ex. CA-09: Labor Line items" with Cal Advocates' 50% cut to labor costs for Capital shown in red font. SDG&E adequately supported its capital labor forecasts by justifying and representing the estimated internal labor necessary to take on the capital request.

Cal Advocates' request for a 50% "across the board" cut to labor costs is inaccurate and should be denied by the Commission. As set forth here and in my rebuttal on specific programs, SDG&E fully supported its requests for additional labor.

B. Cal Advocates' Challenge to SDG&E's Energy Storage Projects

Noting that many of SDG&E's proposed projects are for energy storage, Cal Advocates contends that the Commission, in Decision ("D.") 19-11-016, established that "the Investor-Owned Utilities (IOUs) have a duty to procure only cost-effective resources."[30] According to Cal Advocates: "In the case of projects which serve no specific need, these projects can only represent least cost to ratepayers if they have a positive net benefit compared to, among other things, third-party ownership and no project."[31] Cal Advocates also states its opposition to "ratepayer funding of projects which the utility engages in voluntarily."[32]

SDG&E does not agree with Cal Advocates. First, D.19-11-016, which was intended to address the potential for electricity system resource adequacy shortages beginning in 2021 and set forth incremental capacity targets for load serving entities, does not apply to SDG&E's projects in this GRC proceeding. While Cal Advocates quotes a portion of the Commission's

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[28] Appendix B, SDG&E's response to Data Request PAO-SDGE-133-AMY question 4 which clarifies Cal Advocates mistaken claims that "SDG&E proposes three full-time equivalent (FTE) employees" for the HSI Department.

[29] Ex. CA-09 (Younes) at 10-13.

[30] *Id.* at 14.

[31] *Id.* at 15.

[32] *Id.*

Conclusion of Law in that Decision, the full Conclusion of Law states: "29. For purposes of the requirements of this decision, the IOUs should be authorized to consider third-party ownership and utility ownership of resources to be procured to satisfy the requirements of this order, but should be required to show that any utility-owned resources represent least cost to ratepayers, utilizing Appendix A, Section 2c, of D.19-06-032 as a starting point."[33] The SDG&E energy storage projects for which SDG&E seeks funding in my testimony are not proposed to meet the incremental capacity requirements of D.19-11-016, and its requirements therefore do not apply.

Moreover, as the Commission stated in that Decision, "to avoid any further confusion as reflected in the comments of some parties, our decision here is entirely about resources for system reliability, which means resources that qualify to meet system resource adequacy requirements. The June 20, 2019 Ruling was focused on concern about the potential for a system-level (not local or flexible) reliability shortfall by 2021."[34] SDG&E's energy storage projects proposed in my testimony are meant to address local areas with high levels of renewable penetration and are not meant to satisfy the system resource adequacy targets set forth in D.19-11-016 and as such do not fall into the confines of D.19-11-016.

The need for energy storage systems to manage rapidly increasing renewable penetration, such as solar PV, and to achieve our decarbonization goals is unequivocal. SDG&E reminds Cal Advocates that SDG&E's Advanced Energy Storage ("AES") programs are directly aligned with providing local reliability through the renewable energy transition, with precedence set through approval of AES 1.0 in SDG&E's Test Year ("TY") 2019 GRC.[35] The AES 2.0, HESS Expansion, Non-lithium Storage, and Mobile Battery Energy Storage systems proposed in this GRC represent practical solutions to, among other things, facilitate the utilization of abundant solar PV generation both in front of and behind the meter to reduce reliance on fossil fuel generation.

[33] D.19-11-016, Conclusion of Law 29 (emphasis added); *see also id*. at Ordering Paragraph 8.

[34] D.19-11-016 at 13.

[35] D.19-19-051.

According to the 2023 U.S. Department of Energy's Pathways to Commercial Liftoff Accelerate Clean Energy Technologies Reports,[36]

> "… cumulative investments must increase to approximately $300 billion across the hydrogen, nuclear, and long duration energy storage sectors, with continued acceleration until 2050 required to stay on track to realize long-term decarbonization targets."

The funding requested in the CEI chapter of SDG&E's GRC is consistent with the investments needed to decarbonize. My opening and rebuttal testimony on the individual projects demonstrates the need for the energy storage and their benefit to ratepayers. Cal Advocates' claim that SDG&E should not voluntarily propose programs to integrate renewable generation, improve reliability and evaluate methods to transition to a carbon-neutral energy future is addressed on a policy level in SDG&E's Sustainability Rebuttal, Ex. SDG&E-202 (de Llanos). From a program standpoint, by leveraging the modularity and scalability of energy storage, SDG&E is judiciously utilizing a stepwise approach to de-risk implementations. This approach benefits ratepayers from both a technology and cost perspective, including: 1) establishing how local systems in the territory can maintain resiliency with increased renewable energy generation and evolving grid requirements; 2) ensuring the knowledgebase exists to locally deploy the appropriate storage technology at the right scale to maximize utilization; 3) creating proof points that energy storage assets can reduce both utility and customer dependence on fossil-fuel generation, and enable increased renewable integration; and 4) implementing and testing modern, cybersecure distributed energy resource management systems which can facilitate optimal deployment of DERs and mitigate over-sizing of future energy storage projects.

C. UCAN's Promotion of Customer Side of the Meter Distributed Energy Resources

UCAN's witness, Dr. Woychik, promotes customer side of the meter ("CSOM") Distributed Energy Resources ("DER") (synonymous with behind-the-meter ("BTM") DER), particularly when combined with CSOM battery storage, as a significant part of the future electric grid. He generally argues that CSOM DERs should replace utility-owned storage and

[36] DOE Releases New Reports on Pathways to Commercial Liftoff to Accelerate Clean Energy Technologies, March 21, 2023, available at: https://www.energy.gov/articles/doe-releases-new-reports-pathways-commercial-liftoff-accelerate-clean-energy-technologies

that SDG&E has failed to take adequate steps to prepare for high CSOM DER penetration.[37] Although Dr. Woychik endorses SDG&E's non-lithium-ion pilot projects, he also "recommends that the entire budget for clean energy innovation of $26.33 million be denied."[38]

SDG&E agrees CSOM DERs are resources which can contribute to the electric grid, and that CSOM storage resources will play a role in the future. However, CSOM DERs, including those with storage, do not replace the need for in-front-of-the-meter ("IFOM") utility-owned storage and SDG&E's other investments now. SDG&E submits that the Commission should reject UCAN's suggestion that CSOM DERs somehow warrant disallowance of any of SDG&E's proposed TY 2024 expenditures for the following reasons.

First, Dr. Woychik does not present a feasible or coherent proposal for CSOM DERs to replace the need for IFOM utility-scale energy storage projects or other aspects of SDG&E's electric distribution system. In response to Dr. Woychik's claim that customer battery storage "is available if SDG&E would only encourage its customers to acquire this technology," SDG&E served a data request on UCAN asking Dr. Woychik to describe in the "greatest detail" he was able, the capacity, cost, funding, dispatchability, and reliability of such resources. No specific information was provided, though Dr. Woychik did imply that customers would pay for the battery storage, without predicting how many would do so.[39] Additionally, the Self-Generation Incentive Program ("SGIP") already funds 85% for energy storage technologies[40] from SDG&E's annual $22 million allocation of SGIP funding.[41] Furthermore, on a levelized cost of capacity and energy basis, Lazard's April 2023 update[42] indicates the cost of residential

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[37] *See* Ex. UCAN (Woychik), *passim*. SDG&E asked Dr. Woychik to explain how his recommended 30% cut to SDG&E's electric and gas distribution investments would "enable" CSOM DER, and was told "As my statement quoted above was a conclusion in summary of my 300+ pages of testimony in support, I will not replicate those pages here but refer to the document in chief." Appendix B (UCAN Response to SDG&E Data Request SCG-SDGE-UCAN-001, Q.7). Similarly, I will not attempt to summarize all of Dr. Woychik's claims.

[38] Ex. UCAN (Woychik) at 12 and 285.

[39] Appendix B, UCAN Response to SDG&E Data Request SCG-SDGE-UCAN-001, Q.4; *see also* Q5 & Q7.

[40] D.20-01-021 at 2.

[41] *Id.* at 12.

[42] *See* Lazard's Levelized Cost of Storage Analysis-Version 8.0, April 2023, p. 18-19, available at: https://www.lazard.com/research-insights/2023-levelized-cost-of-energyplus/.

solar PV plus storage is greater than 75% higher than full scale utility solar PV plus storage systems, so Dr. Woychik's statements regarding CSOM's value appear contrary to publicly available cost comparison information. In short, Dr. Woychik did not support his claim that SDG&E's investments in IFOM utility-owned storage could and should be replaced with CSOM DER.

Second, as discussed in SDG&E's Sustainability Rebuttal, Ex. SDG&E-202 (de Llanos), pursuant to its DER Action Plan 2.0, the Commission currently is considering how best to value and incorporate DERs into electric grid planning in a number of ongoing proceedings, including proceedings on the Order Instituting Rulemaking to Modernize the Electric Grid for a High Distributed Energy Resources Future, Rulemaking ("R.") 21-06-017, the Order Instituting Rulemaking to Advance Demand Flexibility Through Electric Rates (R.22-07-005), and the Order Instituting Rulemaking to Consider Distributed Energy Resource Program Cost-Effectiveness Issues, Data Use And Access, And Equipment Performance Standards, R.22-11-013. Most recently, the Commission considered the value of CSOM DERs in its Decision Revising Net Energy Metering Tariff and Subtariffs, D.22-12-056. In that proceeding, the Commission did not find that customer-owned DERs provide "more than individual benefits" or that "net energy metering installations will directly result in decreased utility-scale projects."[43]

At this point in time, Dr. Woychik's claims about CSOM DER and its replacement of utility investments are premature and uninformed.

Third, there are underlying fundamental challenges of incorporating CSOM DERs into the larger electric grid network. First, the outputs of CSOM DERs are not all visible to SDG&E's real-time operations. Second, CSOM DERs may vary in the type of metering, monitoring, and telemetry installed, which once again limits visibility to SDG&E, but also may limit potential communication of the CSOM asset and SDG&E. Third, CSOM DERs are not all used to export electricity to the grid in times of need, but instead are used to serve as a load-modifying asset for the customer only. Fourth, the uncertainty of the CSOM DER location being on a circuit that has a need. Finally, manufacturer limitations (e.g., local controller) that prohibit

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"The levelized cost of residential PV + storage on a capacity basis is $584-$735 $/kW-year versus utility PV + storage cost of $125-171 $/kW-year. The levelized cost of residential PV + storage on an energy basis is $392-$508 $/MWh versus utility PV + storage cost of $65-91 $/MWh."

[43] D.22-12-056, Findings of Fact 43 and 49.

the dispatch of CSOM DERs by an outside entity other than the customer or manufacturer limits the ability of SDG&E to utilize CSOM assets.

In sum, UCAN's assertion that "extensive battery storage can be provided by CSOM DERs" is not evidence that CSOM DERs with battery storage are available on the relevant circuits, what their capacity or state-of-charge ("SOC") may be, or that the customers owning any such CSOM DERs with battery storage are willing and able to guarantee to provide energy to the grid or a microgrid (e.g., the Borrego Springs Microgrid) when needed (rather than utilize battery stored energy themselves). As UCAN admits, "[c]ustomers acquiring distributed energy resources generally pay for CSOM storage,"[44] but it is speculative both how many customers will do so on the relevant electrical circuits and the price, if any, at which they might be willing to guarantee electricity supply to the electrical grid when needed. SDG&E notes that significant growth in NEM PV in Borrego Springs has not been accompanied by NEM storage.[45]

UCAN conjectures that "SDG&E seeks to control its distribution grid, reduce customer DERs, and ignore customer (inverter based) resiliency."[46] This viewpoint ignores the locational value of storage and how IFOM utility-scale storage enables the deployment and resiliency of CSOM DERs such as solar PV. For example, Borrego Springs 3.0 is demonstrating microgrid-based battery storage inverter resiliency to ensure that customer sited PV inverters do not trip during an outage. With customers utilizing solar PV inverters of different vintage, IFOM utility-scale storage assets mitigate a cascading collapse of customer-sited solar PV inverters.

Without adequate energy storage capabilities that are strategically serving the affected circuits, the CSOM DERs in it of themselves are not an all-encompassing solution to solve the complexities of safely and reliably operating the electric grid, both currently and in the future. Considering the incorporation challenges of CSOM DERs mentioned above, there is need for IFOM utility-scale energy storage to harness the CSOM solar PV during the hours when solar energy is plentiful, and then dispatch during the hours of peak need (e.g., when solar energy is no longer available). As seen in summer of 2020 and forward, there have been several heat events

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[44] Ex. UCAN (Woychik) at 285.

[45] SDG&E data re: adopted NEM and approved NEM applications for Borrego substation as of 4/26/23, for 2013-2023. NEM PV in Borrego Springs now represent 8.3 MW of generating capacity, with an additional 8.1 MW of approved customer NEM applications in the pipeline. With this additional 8.1 MW of NEM PV, only an additional 150 kW of storage has been requested and approved.

[46] Ex. UCAN (Woychik) at 4.

calling for "flex alerts" and "reduce your use" campaigns, and during days of extreme heat, State of Emergency Proclamations from the California Governor. These events demonstrate the need for an "all-of-the-above" approach, which includes IFOM utility-scale energy storage resources.

D. Various Intervenors' Opposition to Hydrogen-Related Projects

SDG&E must actively usher in the very challenging clean energy transition to 100% clean electricity by 2045 with a prudent and phased approach to new technology adoption and deployment. SDG&E's decarbonization strategy embraces diverse clean technologies to help meet this challenge, including hydrogen. Hydrogen has many unique properties that make it a necessary tool in our decarbonization toolkit, including that hydrogen is a dispatchable carbon-free fuel for reliable power generation, is a long duration energy storage medium, can be produced in a sustainable manager, and is scalable. Therefore, in order to learn how to deploy hydrogen safely and effectively, SDG&E has included hydrogen related capital and O&M requests in the GRC TY 2024 application.

There are several intervenors opposed to the inclusion of hydrogen-related technologies in our GRC TY 2024 application. Some opposition is based upon general skepticism concerning whether hydrogen truly can be a clean energy resource that reduces greenhouse gas ("GHG") emissions and other opposition is related to specific projects. There appears to be an overall misconception that adoption of clean hydrogen will slow down electrification efforts, when in fact hydrogen will serve as a key source of clean, reliable, dispatchable power to support electrification. Investing in hydrogen projects related to electric infrastructure today will allow SDG&E to prudently scale hydrogen to meet California's requirement of 100% clean energy by 2045. Here SDG&E addresses general opposition to its hydrogen-related funding requests.

Some intervenors appear to incorrectly perceive hydrogen as an alternative or competitor to electrification. For example, EDF states, "Whether hydrogen can be a cost-effective replacement for natural gas across the broader market and competitive with electrification remains to be seen."[47] Meanwhile PCF notes, "Electrification out-competes green hydrogen even in "hard-to-electrify" sectors."[48]

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[47] Ex. EDF-01 (Colvin) at 51.

[48] Ex. PCF-01 (Powers) at 23.

As an electric utility with a duty to serve customers with reliable, affordable, safe energy, SDG&E must be very clear on this point: Hydrogen is not an alternative to electrification nor a competitor to electrification, but rather will be a critical enabler of a reliable electrified system as the state transitions to 100% clean electricity. To buttress many of our hydrogen-related rebuttal testimony in project-specific responses, SDG&E here names examples of credible studies and policies supporting SDG&E's position that hydrogen will serve as part of California's generation portfolio in a 100% clean energy future, including:

- CARB 2022 Scoping Plan For Achieving Carbon Neutrality 49
- National Renewable Energy Laboratory ("NREL") and Los Angeles Department of Water ("LDWP"), LA100: The Los Angeles 100% Renewable Energy Study50
- SDG&E Path to Net Zero Study51
- United States Department of Energy ("DOE") National Clean Hydrogen Roadmap52
- California Energy Commission ("CEC"): Roadmap for the Deployment and Buildout of Renewable Hydrogen Production Plants in California53
- California Senate Bill ("SB") 1075: "The commission, State Air Resources Board, and Energy Commission shall consider green electrolytic hydrogen an eligible form of energy storage and shall consider

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[49] California Air Resources Board, *2022 Scoping Plan for Achieving Carbon Neutrality* (November 16, 2022), *available at:* https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf

[50] National Renewable Energy Laboratory *Final Report* (March 2021), *available at*: https://maps.nrel.gov/la100/la100-study/report

[51] *See* Ex. SDG&E-202 (de Llanos), Appendix C, San Diego Gas & Electric, *The Path to Net Zero: A Decarbonization Roadmap for California* (April 2022), *available at*: https://www.sdge.com/netzero

[52] U.S. Department of Energy *National Clean Hydrogen Strategy and Roadmap* (September 2022 Draft), *available at*: https://www.hydrogen.energy.gov/pdfs/clean-hydrogen-strategy-roadmap.pdf

[53] California Energy Commission *Roadmap for the Deployment and Buildout of Renewable Hydrogen Production Plants in California* (June 2020), *available at*: https://www.energy.ca.gov/publications/2020/roadmap-deployment-and-buildout-renewable-hydrogen-production-plants-california

other potential uses of green electrolytic hydrogen in their decarbonization strategies."[54]

- 2022 Inflation Reduction Act "(IRA") provides generous tax credits for clean hydrogen production to support a decarbonized economy.[55]
- CEC Natural Gas Research and Development Program: Annually established scope of projects that has increasingly focused on hydrogen technologies. The latest Budget Plan (Fiscal Year 2022-2023) includes a total of $13 million in funding for hydrogen related activities, including: (1) large-volume hydrogen storage projects for targeted use cases; (2) industrial clusters for clean hydrogen utilization; (3) funding to mitigate criteria air pollutants in hydrogen combustion; and (4) advanced hydrogen refueling for heavy transport refueling infrastructure solutions.[56]
- On April 7th, 2023, Governor Newsom's administration confirmed California's intention to leverage federal investment from the Infrastructure Investment and Jobs Act ("IIJA") through submission of a state-level proposal to establish an environmentally and economically sustainable and expanding renewable hydrogen hub ("ARCHES").[57]

The small-scale hydrogen projects included in GRC TY 2024 are reasonable, prudent, will be used and useful, and will also serve to allow SDG&E to learn a great deal about hydrogen as it readies itself for the transition to 100% clean electricity. Learning now, by using relatively small amounts of capital, will inform decarbonization and reliability efforts in a prudent and proactive way. SDG&E wants to avoid being in the position of LADWP, who is rushing to

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[54] California Senate Bill 1075, Section 4, codified at Cal. Pub. Util. Code Section 400.3. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB1075

[55] H.R. 5376 Inflation Reduction Act of 2022, Section 13204, *Credit for Production of Clean Hydrogen*.

[56] California Energy Commission, *Gas Research and Development Program Proposed Budget Plan for Fiscal Year 2022–23* (March 2022), *available at:* https://www.energy.ca.gov/sites/default/files/2022-03/CEC-500-2022-001.pdf.

[57] ARCHES, *California Submits Application to U.S. Department of Energy for Federal Funding to Become a National Hydrogen (H2) Hub*, (April 7, 2023, *available at*: https://archesh2.org/california-submits-application-to-u-s-department-of-energy-for-federal-funding-to-become-a-national-hydrogen-h2-hub/.

develop an $800 million "in-basin" hydrogen power plant at full scale by 2029 with no previous hydrogen operational experience[58]

While SDG&E does not endeavor to undertake the technical, operational, and cost risks that LADWP is facing by directly proceeding to mass scale deployment, SDG&E also cannot sit on the sidelines for the next ten to twenty plus years and then suddenly expect our employees, vendors, contractors, supply chains, and assets to be experienced and ready to meet the 2035, 2040 and 2045 deadlines of SB 100 and SB 1020,[59] while also meeting our requirement to serve safe, reliable, affordable energy. While ten to twenty years sounds like a long time, it only represents two to five General Rate Case cycles. Learning by doing today will allow SDG&E to gain hydrogen knowledge and experience in a variety of areas, including engineering, system design, codes and standards, controls, valves, piping, venting, safety requirements, hazards, material specifications, best practices, risk management, metering, performance data on gas turbine efficiency with blended gas, emissions data, cost data, developing asset operation and maintenance strategies, developing and publishing standard operating procedures, training staff, labor unions, and first responders, and developing asset management requirements and protocols.

Beyond the influence of hydrogen on the electric system, EDF, PCF, and UCAN express general concern about hydrogen's cost effectiveness as an alternative or complement to natural gas in the gas system. EDF states "Whether hydrogen can be a cost-effective replacement for natural gas across the broader market and competitive with electrification remains to be seen."[60] PCF compares today's cost of green hydrogen with the costs of today's natural gas prices and states, "Green hydrogen is prohibitively expensive."[61] EDF's testimony also expresses concern about the use of hydrogen gas if consumed by residential and commercial equipment as a replacement or complement to natural gas, and related oxides of nitrogen ("NO_x") emissions.[62]

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[58] Roth, Sammy. "L.A. is shutting down its largest gas plant — and replacing it with an unproven hydrogen project." Los Angeles Times Feb 8 2023. << https://www.latimes.com/business/story/2023-02-08/l-a-is-shutting-down-a-coastal-gas-plant-and-replacing-it-with-hydrogen>>.

[59] SB 100, Sections 1(b) & 5, codified at Cal. Pub. Util. Code Section 454.53(a), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100; SB 1020 (2022), Section 4, codified at Pub. Util. Code Section 454.53(a).

[60] Ex. EDF-01 (Colvin) at 51.

[61] Ex. PCF-01 (Powers) at 23.

[62] Ex. EDF-01 (Colvin) at 52.

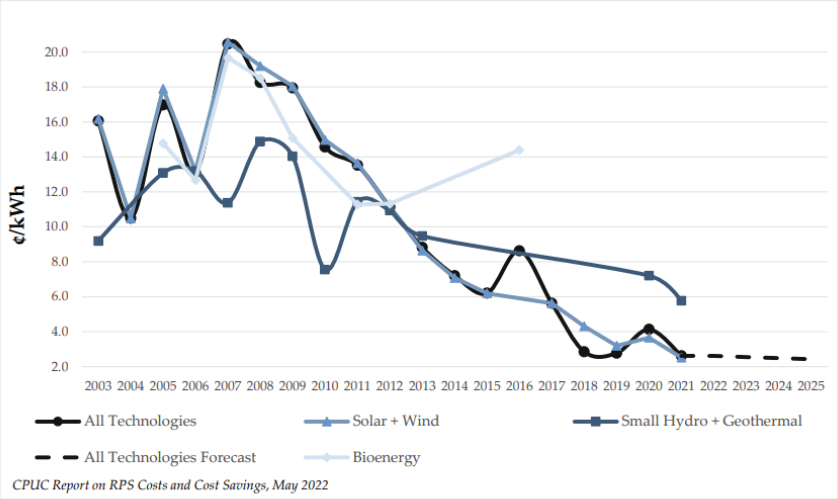
UCAN's testimony states, "Green hydrogen is very expensive…cannot be inserted into existing natural gas infrastructure, and will be far more costly than existing fuels."[63]

As an initial matter, these concerns are not relevant to the small-scale, pilot hydrogen projects for which SDG&E seeks funding in this GRC proceeding. Moreover, these intervenor statements represent generalized concern over two distinct issues that must be separately addressed. The first is the cost of hydrogen. The second is whether hydrogen can be a reasonable alternative to natural gas in the natural gas system.

Regarding cost, electrolytic hydrogen is more expensive *today* than natural gas. However, its delivered cost is expected to come down precipitously in the future as the technology is deployed and adopted. As seen in Figure FV-1 below, the costs of solar, batteries, and other clean energy technologies has fallen over time, and there is no reason to anticipate hydrogen will not follow this trend.[64]

Figure FV-1

Figure 7: Historical Trend of All Load Serving Entities' RPS Contract Costs by Technology and Year of Execution from 2003-2025 (Real Dollars)



Data Source: CPUC 2021 Annual Report on Costs and Cost Savings for the RPS Program (Padilla Report) [51]

One of the largest drivers of cost reduction of electrolytic hydrogen is the falling cost of electrolyzer systems. The recent U.S. Department of Energy Clean Hydrogen Pathways to

63 Ex. UCAN (Woychik) at 17.

64 CPUC, 2022 California Renewables Portfolio Standard Annual Report, Nov 2022, available at https://www.cpuc.ca.gov/-/media/cpuc-website/industries-and-topics/documents/energy/rps/2022-rps-annual-report-to-the-legislature.pdf.>

Commercial Liftoff Report[65] estimates a 60% cost decrease in electrolyzer system capex costs by 2030. The report summarizes that:

"The U.S. clean hydrogen market is poised for rapid growth, accelerated by Hydrogen Hub funding, multiple tax credits under the Inflation Reduction Act (IRA) including the hydrogen production tax credit (PTC), DOE's Hydrogen Shot, and decarbonization goals across the public and private sectors. Hydrogen can play a role in decarbonizing up to 25% of global energy-related CO_2 emissions, particularly in industrial/chemicals uses and heavy-duty transportation sectors. Achieving commercial liftoff will enable clean hydrogen to play a critical role in the Nation's decarbonization strategy."

The CEC's Integrated Energy Policy Report ("IEPR") acknowledges, "the strategy of hydrogen for decarbonization in California is still in the early development stages. Significant research is being done to drive down the costs to enable hydrogen to be cost-competitive."[66] In particular, procuring delivered clean hydrogen from a third party is expensive today and challenging to find, since as the CEC acknowledges, we are in "early" days. That is why SDG&E is being prudent in its requests and only proposing small pilot projects where it is generating electrolytic hydrogen on site instead of procuring it from the market.

Intervenors' second concern, whether hydrogen can be a cost-effective alternative to natural gas on the gas system is out of scope for the Capital and O&M requests and policy justifications in my chapter. SDG&E's requested funding for hydrogen projects in the TY 2024 GRC are solely focused on the use of onsite clean hydrogen production and its use to decarbonize the electric system and enable full, reliable electrification, including the electrification of transportation via the adoption of hydrogen fuel cell electric vehicles ("HFCEV").

EDF further confuses SDG&E's electric-related hydrogen capital requests with gas-related projects and "urges the Commission to apply the analysis in [General Order ("GO")] 177

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[65] *See* U.S. Department of Energy, Pathways to Commercial Liftoff: Clean Hydrogen, (March 2023), available at: https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Clean-H2-vPUB-0329-update.pdf.

[66] California Energy Commission. Adopted Final 2021 Integrated Energy Policy Report Volume I Building Decarbonization, at 158, available at: < https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2021-integrated-energy-policy-report> .

to inform future major hydrogen infrastructure and fuel investments."[67] Even so, EDF appears to concede that GO 177 does not apply to hydrogen projects. Further, in adopting GO 177 after thorough briefing on this issue in December 2022, the Commission stated: "We decline to specifically identify hydrogen gas infrastructure projects as covered by the GO at this time."[68]

General opposition from PCF, EDF, and UCAN appears to be based at least partly on skepticism toward hydrogen's ability to reduce global warming. PCF and EDF both reference the same study concerning the potential role of hydrogen as an indirect GHG, written by Illisa Ocko and Steven Hamburg, both of whom work for EDF.[69] The study makes dire assumptions on hydrogen leakage rates and finds that the "effectiveness of hydrogen as a decarbonization strategy, especially over timescales of several decades, remains unclear."[70]

However, studies written by independent academics, not EDF employees, find otherwise. For example, a recent study by Fabien Paulot, a Physical Scientist at the National Oceanic and Atmospheric Administration ("NOAA") Geophysical Fluid Dynamics Laboratory, and Didier Hauglustaine, Senior Researcher at the Université Paris-Saclay, found, "a green hydrogen economy is beneficial in terms of mitigated carbon dioxide emissions for all policy-relevant time-horizons and leakage rates."[71]

PCF goes farther and states, "Hydrogen is not clean. It will exacerbate climate change impacts and does not minimize pollutants and greenhouse gas emissions as required."[72] PCF does not provide any texts or sources defending this position. SDG&E contends it is scientific fact, not opinion, that hydrogen ("H_2") is a carbon free molecule and when it is split in the presence of air, via fuel cell or combustion, its only by-products are energy and water. PCF's unsubstantiated opinion runs counter to scientific fact and goes against the guidance of

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67 Ex. EDF-01 (Colvin) at 50-51.

68 D.22-12-021 at 39.

69 Ocko, I. B. and Hamburg, S. P.: Climate consequences of hydrogen emissions ("Climate consequences of hydrogen emissions") (July 20, 2022), Atmos. Chem. Phys., 22, p. 9350, https://doi.org/10.5194/acp-22-9349-2022.

70 *See* Ocko, I. B. and Hamburg, S. P.: Climate consequences of hydrogen emissions ("Climate consequences of hydrogen emissions") (July 20, 2022), Atmos. Chem. Phys., 22, p. 9350, https://doi.org/10.5194/acp-22-9349-2022.

71 *See* Hauglustaine, D., Paulot, F., Collins, W. *et al.* Climate benefit of a future hydrogen economy. *Commun Earth Environ* **3**, 295 (2022). https://doi.org/10.1038/s43247-022-00626-z

72 Ex. PCF-01 (Powers) at 26.

authorities such as the US DOE, the CARB, and major academic institutions such as Columbia University and University of California Irvine, and countless other scientific authorities, who all conclude that clean hydrogen exists, is feasible, and will be a necessary part of the carbon-free future.[73,74,75,76]

EDF further asserts that SDG&E's hydrogen projects "must be considered risky investments that only accrue to the benefit of shareholder with no clearly identified benefits [to] ratepayers."[77] SDG&E disagrees. The hydrogen projects included in SDG&E's TY 2024 GRC proceeding are practical, support system resilience, will indeed be used and useful, do fall into the bounds of activities within the regulated activities, utilize proven, commercialized technology, and will provide value to ratepayers. Further, there is precedent of the Commission approving newer technology investments within the GRC. For example, D.13-05-010 authorized $26 million in capital expenditures to fund SDG&E's energy storage projects in TY 2012 GRC. While batteries are commonly accepted today as a grid resource, in 2012 they were considered relatively new and unproven. Even so, the Commission recognized the potential value of batteries to support the electric system. SDG&E went on to become a leader in grid-connected battery deployment to help meet the needs of the grid. SDG&E urges the Commission to recognize the value of hydrogen projects in this GRC TY 2024 for similar reasons.

The capital requests for clean hydrogen projects in SDG&E's application include its use at the Palomar Energy Center, where it will be used to meet multiple use cases, including to replace existing gray hydrogen as a generator cooling gas; to fuel SDG&E HFCEV; and to blend up to 2% hydrogen by volume with natural gas into its turbines to support cleaner power generation. In the case of the Borrego Hydrogen Energy Storage System Expansion, citizens of Borrego Springs will benefit from having a cleaner microgrid during times when the

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[73] *See* Cho, Renee. Columbia University, Columbia Climate School. January 2021. "Why We Need Green Hydrogen." << https://news.climate.columbia.edu/2021/01/07/need-green-hydrogen/>>

[74] *See* US Department of Energy. "Hydrogen: A Clean, Flexible Energy Carrier."

[75] *See* CARB 2022 Scoping Plan.

[76] *See* University of California, Irvine, Advanced Power and Energy Program, *Roadmap for the Deployment and Buildout of Renewable Hydrogen Production Plants in California* (June 2020), *available at:* https://www.apep.uci.edu/PDF_White_Papers/Roadmap_Renewable_Hydrogen_Production-UCI_APEP-CEC.pdf.

[77] Ex. EDF-01 (Colvin) at 49-50.

community's power gets islanded; by expanding the capacity of the fuel cell at Borrego, the onsite diesel generators will be required less frequently and/or at lower power. The Hydrogen Build-Ready Infrastructure program will only be spent at customer sites who apply for the funding and have plans to make electrolytic hydrogen onsite, using an electrolyzer paired with a solar PV system that can provide at least 30% of the electrolyzer's nameplate capacity, to support their energy needs, whether for mobility or other purposes.

Because EDF generally opposes SDG&E's proposed hydrogen projects based on overall hydrogen policy concerns that the Commission is managing under proceedings separate from and outside of the scope of SDG&E's TY 2024 GRC proceeding, SDG&E asks the Commission to disregard EDF's testimony to not fund the hydrogen capital and O&M costs in SDG&E's TY 2024 GRC request. Because PCF generally opposes SDG&E's proposed hydrogen projects based on overall misunderstandings of the science behind hydrogen as a carbon-free fuel and the benefits it can provide in an electrified future, SDG&E asks the Commission to disregard PCF's testimony not to fund the hydrogen capital and O&M costs in SDG&E's GRC 2024 request.

I will address other intervenor concerns related to specific hydrogen projects in the relevant sections of my rebuttal.

In conclusion, hydrogen is a critical tool for supporting California's clean, electrified future and SDG&E only has about three to five GRC cycles to learn how to deal with this new fuel on its electric system. All of the hydrogen projects addressed in Ex. SDG&E-15-R are designed to be prudent, used and useful, reduce GHG emissions, and to expand SDG&E's understanding of how to manage and operate hydrogen assets in an appropriate way. SDG&E believes all projects should be funded as part of this GRC.

IV. REBUTTAL TO PARTIES' O&M PROPOSALS

A. Non-Shared Services O&M

NON-SHARED O&M – Constant 2021 ($000)			
	Base Year 2021	**Test Year 2024**	**Change**
SDG&E	**3,895**	**9,985**	**6,090**
CAL ADVOCATES	**3,895**	**4,971**	**1,076**
TURN	**3,895**	**9,985**	**6,090**
CEJA	**3,895**	**3,974**	**79**
UCAN	**3,895**	**9,610**	**5,715**

1. 1DD001 – Hydrogen Strategy and Implementation Department O&M

a. Cal Advocates

Cal Advocates takes issue with the Test Year O&M forecast for budget code 1DD1001 (Hydrogen Strategy and Implementation ("HSI") Department). First, as discussed above, Cal Advocates recommends reducing "estimates of labor additions by 50% across the board," including for the HSI Department.[78] Cal Advocates states that it cannot determine the basis for SDG&E's full time equivalent ("FTE") assessment and is concerned that SDG&E employed a qualitative assessment by Subject Matter Experts ("SME") to determine the size of the department needed, rather than a quantitative assessment. Second, Cal Advocates raises concerns about the descriptions of work for the proposed labor additions to the HSI Department.[79]

As an initial matter, Cal Advocates made an error in its calculation of "additional labor" as discussed in my General Rebuttal, Section A above. Cal Advocates proposes to cut $305,500 from the base forecast for this Department, as well as cutting 50% of the additional labor costs.[80]

Moreover, Cal Advocates provides no basis for its proposal to cut 50% of the funding for additional labor in this Department. SDG&E submits that a qualitative assessment is appropriate for a newer team without significant historical data on which to draw. Most of the work required for the HSI team is based on future projects informed by policies directing or supporting hydrogen adoption, as well as our perception of upcoming hydrogen regulatory activity, such as proceedings, reporting, or new applications, that will be required. There are ample state and federal laws and activities underway that lead SDG&E to believe that there will be an increased amount of regulatory and hydrogen activity in our territory over the period of the TY 2024 GRC, and for which we will need additional labor to support.

For example, the passage of California SB 1075 in September 2022 provides: "The commission, State Air Resources Board, and Energy Commission shall consider green electrolytic hydrogen an eligible form of energy storage and shall consider other potential uses of

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[78] Ex. CA-09 (Younes) at 11.

[79] Ex. CA-09 (Younes) at 10-12.

[80] *See* Appendix C (SDG&E highlighting of errors in Ex. CA-09 WP Labor Line Items, O&M tab).

green electrolytic hydrogen in their decarbonization strategies."[81] Further, the federal 2022 IRA provides generous tax credits for clean hydrogen production.[82] SDG&E believes these and other laws and regulations will lead to increased work for the HSI team in the coming years and justify the request for additional headcount.

Cal Advocates states that SDG&E workpapers do not provide a "scope of work from which an SME could develop a credible estimate of required labor."[83] In Data Request PAO-SDGE-080-AMY, Cal Advocates requested SDG&E provide "any and all scopes of work" associated with "each labor line item in SDG&E's expense workpapers and capital workpapers." SDG&E objected to that request as it was overly broad and vague, and directed Cal Advocates to my opening testimony and workpapers for "a description of the anticipated work and activities."[84] Cal Advocates now complains that SDG&E did not provide "scopes of work" for the HSI additional FTE line item but did not narrow its request to SDG&E to descriptions of such work.

Here, SDG&E reiterates the expected work for the requested 2.4 additional FTE's:[85]

- Business Analyst: The business analyst will support regulatory and policy efforts related to HFCEV transportation, including HFCEV adoption and fueling infrastructure requirements in SDG&E's territory to the extent that such needs require electric planning for grid connected electrolysis. The analyst will also serve as in-house expert on CARB programs such as Low Carbon Fuel Standard ("LCFS") for hydrogen, and develop expertise in

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81 Skinner, Nancy Bill Text - SB-1075 Hydrogen: green hydrogen: emissions of greenhouse gases. (ca.gov), Section 4, codified at 400.3.

82 H.R. 5376 Inflation Reduction Act Text - 117th Congress (2021-2022): Inflation Reduction Act of 2022 | Congress.gov | Library of Congress, Section 13204 codified at 45V.

83 Ex. CA-09 (Younes) at 12.

84 Appendix B, SDG&E's response to Data Request PAO-SDGE-080-AMY Q2b.

85 Appendix B, SDG&E response to Data Request PAO-SDGE-133-AMY, question 4 says:

"SDG&E's O&M workpaper states that 2024 will have 3.0 additional FTEs, but that is a typo and should not have been displayed. 2024 should be consistent with 2023 with the 2.4 FTE and labor costs of $294,000. SDG&E will update its O&M workpaper at the next available opportunity."

Pursuant to the April 20, 2023 E-Mail Ruling with Instructions for a Status Conference on May 26, 2023, and Information for the Evidentiary Hearings at 11, Exhibit SDG&E-15-WP will be corrected to reflect this change.

hydrogen project permitting, project cost development, and electrolyzer interconnection issues.

- The Project Manager: will support the growing number of hydrogen projects SDGE anticipates working on, some included in this application and at least one where SDG&E anticipates receiving federal dollars from the IIJA which allocated $9.5 billion in funding for hydrogen projects through 2028. For example, two candidate projects of hydrogen hub related initiatives involving SDG&E have been submitted to the US DOE. These are complex projects requiring specialized expertise with hydrogen equipment, generation, and construction as well as significant attention to program administration for handling federal grant funds. This role will help manage project development and ensure they are delivered on time and on-budget.
- The Business Development Manager: will lead solicitations for funding from federal and state grant opportunities for hydrogen infrastructure development from entities such as the US DOE and the CEC; develop and manage relationships and customer service with high potential hydrogen off-takers in our service territory from an electricity demand perspective including the Port, major universities, transit agencies, and fleet services companies located at the US/Mexico border; and assist in informing on SDGE's long term electrification strategy with regards to the role of hydrogen.

Because SDG&E utilized a legitimate, SME based methodology founded on credible descriptions of anticipated work developed for the labor additions under this group, SDG&E recommends Cal Advocate's request be denied and the Commission approve funding as presented by SDG&E in direct testimony.

b. CEJA

CEJA takes issue with the Test Year O&M forecast for budget code 1DD1001 (Hydrogen Strategy and Implementation Department O&M).

First, CEJA states SDG&E created the new department without seeking Commission authorization.[86] SDG&E's position is that it is not required to seek authorization each time it creates, eliminates, or combines departments, and that from time to time the company engages in team restructuring as any company does.

Second, CEJA states that SDG&E misled the Commission and the public regarding how it intends to spend ratepayer funds because my opening testimony lists four studies related to hydrogen under the HSI team O&M, but then in discovery SDG&E clarified that it is not seeking funds for those studies.[87] As stated in discovery to CEJA:

> To clarify, the costs associated with the referenced section of Mr. Valero's testimony are related to potential studies forecasted for 2022 and 2023, with no costs forecasted to extend into 2024 (*see* Ex. SDG&E-15-WP page 4-9). As shown on pages 4-9 of Ex. SDG&E-15-WP, SDG&E is requesting cost recovery for $100,000 in non-labor costs (for Sponsorship and other costs) associated with the Clean Energy Innovations cost center forecasted to occur in 2024. The forecasted dollars for 2022 and 2023 are included for awareness purposes and are not included in SDG&E's Test Year 2024 GRC revenue requirement forecast. SDG&E acknowledges that the narrative description in Mr. Valero's testimony at FV-6 to FV-8 is ambiguous regarding the amount to be included in the Test Year 2024 GRC revenue requirement forecast, and therefore, SDG&E will revise this testimony at the next available opportunity to remove any reference to SDG&E requesting non-labor funding for these four studies.[88]

As SDG&E informed CEJA, those studies were not performed in 2022 and are not planned for 2023.[89] Consistent with SDG&E's data request response quoted above, SDG&E confirms that it is not requesting non-labor costs in this GRC to conduct any of the studies referenced in page FV-6 through FV-8 of my direct testimony and that any language in my opening testimony requesting funding for these studies should be removed.[90] Because funds for the studies referenced in my opening testimony are not sought in this GRC proceeding, CEJA's

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86 Ex. CEJA-01 (Vespa et al.) at 45.

87 *Id.* at 45-46.

88 Appendix B SDG&E's response to Data Request CEJA-SEU-005, Q. 9) (emphasis added).

89 Appendix B, SDG&E's response to Data Request CEJA-SEU-015, Q.3.

90 Ex. SDGE-15-R at FV-6, lines 16-19. Pursuant to the April 20, 2023 E-Mail Ruling with instructions for a Status Conference on May 26, 2023, and Information for the Evidentiary Hearing at 11, Exhibit SDG&E 15-R will be corrected to reflect the change.

testimony at page 46, line 17 through page 50, line 9, is irrelevant to any issue in this proceeding.[91]

Third, SDG&E disagrees with CEJA's assertion that "Mr. Valero's testimony and workpapers did not provide sufficiently detailed information to determine whether SDG&E is requesting revenue for activities that will provide reasonable benefits to ratepayers."[92] SDG&E has met the burden of showing that the HSI Department will perform work that benefits customers by evaluating the potential of hydrogen to decarbonize California's energy grid while maintaining reliable and resilient electric service.

CEJA specifically attacks SDG&E's proposed $100,000 expenditure for "Sponsorships and other costs," relating to hydrogen, and SDG&E's plans to advance decarbonization through deployment of hydrogen.[93] In proposing a reduction of TY 2024 O&M funds by $100,000 for "Sponsorships and other costs,"[94] CEJA contends: "It is inappropriate for SDG&E to spend ratepayer funds on trade associations that appear regularly before the Commission."[95] In making this argument, CEJA omits important information. CEJA served two data requests on this line item, but its testimony only refers to one of the responses. In the first response, SDG&E named some organizations that may be funded.[96] In the second response, SDG&E stated:[97] "SDG&E clarifies that notwithstanding the description of 'Sponsorship and other costs,' SDG&E did not and will not use any O&M dollars to sponsor any third-party entities." SDG&E then further provided details as to what that budget request may fund: "The $100,000 budget may be allocated to support sponsorship of industry standards committees, consortia membership fees, industry events, conference travel and attendance, and technical advisory committees for the Hydrogen Strategy and Implementation Department. The budget will also fund the critical development of hydrogen safety training modules for internal employees, project partners, first responders, and visitors from the community to SDG&E hydrogen sites."

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91 Ex. CEJA-01 (Vespa et al.) at 46 lines 17 through p 50 line 9

92 *Id*. at 50.

93 *Id*. at 50-51.

94 *See* Ex. SDG&E-15-WP (Valero) at 7.

95 Ex. CEJA-01 (Vespa et al.) at 50.

96 Appendix B, SDG&E's response to Data Request CEJA-SEU-007, Q.21.

97 Appendix B, SDG&E's response to Data Request CEJA-SEU-018 Q 4a.

Therefore, CEJA's concern is unfounded, and the requested disallowance should be rejected.

SDG&E submits that Budget Code 1DD001 - Hydrogen Strategy and Implementation Department O&M should be fully funded for $1,011,000 in TY 2024.

c. TURN

TURN does not propose any changes to SDG&E's O&M funding request for Clean Energy Innovations. TURN finds "SDG&E's baseline is reasonable relative to the actual 2022 O&M for this exhibit."[98]

2. 1DD002 – Advanced Clean Technology Department

a. Cal Advocates

Cal Advocates does not identify any specific disagreement with SDG&E's Test Year O&M forecast for budget code 1DD1002 (Advanced Clean Technology ("ACT") Department). Instead, Cal Advocates relies on its assertion that "SDG&E's testimony provides only a high-level account of the labor to be done" to propose reducing SDG&E's O&M request for this budget code by $ 634,000.[99] Cal Advocates states that it cannot determine the basis for SDG&E's FTE assessment and therefore recommends the Commission reduce estimates of labor additions by 50 percent across the board.[100] Cal Advocates does not identify any specific basis for its challenge to the Advanced Clean Technology Department budget. Its request should be denied on that ground alone.

As an initial matter, Cal Advocates made an error in its calculation of "additional labor" as discussed in my General Rebuttal, Section A above. Cal Advocates proposes to cut $556,000 from the base forecast for this Department, as well as cutting 50% of the additional labor costs.[101] Cal Advocates' proposal would be below SDG&E's base year O&M spend of $1,112,000,[102] which is based on actual hours worked in 2021.

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98 Ex. TURN-06-C (Monsen) at 78.

99 Ex. CA-09 (Younes) at 2, Table 9-1.

100 *Id.* at 12.

101 *See* Appendix C (SDG&E highlighting of errors in Ex. CA-09 WP Labor Line Items, O&M tab).

102 Ex. SDG&E-15-R (Valero) at 11.

Moreover, Cal Advocates provides no basis for its proposal to cut 50% of the funding for additional labor (much less all labor) in this Department. As described in my opening testimony at FV-9 to FV-11, the ACT department undertakes a multitude of projects, initiatives, and regulatory proceedings which impacts current and future labor estimates. For instance, the ACT department investigates potential decarbonization projects as well as integration software necessary to integrate DERs and microgrids. On the regulatory front, the ACT department is the lead business unit for the Microgrid Order Instituting Rulemaking ("OIR") (Rulemaking ("R") 19-09-009) and the Electric Program Investment Charge ("EPIC") proceeding (R.19-10-005). Both aforementioned proceedings are ongoing and are working through active tracks with the Commission. The ACT department also supports the Wildfire Mitigation Plan ("WMP") filing, the Rule 21 proceeding (R.17-07-007), and the High DER proceeding (R.21-06-017).

My opening testimony at FV-10 to FV-11 explains the need for additional staff:

> Additional ACT department staff is required to properly engage in contract negotiations, procurement, development, and project management of these projects. Additional ACT department staffing is also needed to keep pace with the rapid development in grid technology, customer technology, and associated integration standards. This additional staff is also needed to develop and implement a research and development program to vet and test technologies before commercial deployment, as discussed further below in Section IV.
>
> The ACT department also needs an additional technology advisor to participate in and support activities associated with the increasing demand initiated by State regulatory and legislative activities, including but not limited to the Microgrid OIR and the High DER OIR proceedings.

Cal Advocates presents no evidence that such additional staff are not needed.

For these reasons, SDG&E believes Cal Advocates' recommendation should be denied and SDG&E's proposed funding be approved.

b. TURN

TURN does not propose any changes to SDG&E's O&M funding request for Clean Energy Innovations. TURN finds "SDG&E's baseline is reasonable relative to the actual 2022 O&M for this exhibit."[103]

[103] Ex. TURN-06-C (Monsen) at 78

3. 1DD003 Innovation Technology Development O&M

a. Cal Advocates

SDG&E's Test Year 2024 O&M forecast for budget code 1DD003 (Innovation Technology Development) includes five RD&D programs.[104] In addition to its erroneous general attack on SDG&E's labor costs (see General Rebuttal, Section A above), Cal Advocates proposes to cut funding to two RD&D programs and to re-allocate $800,000 in another to capital rather than O&M.[105]

As shown in its Table 9-06 and Ex. CA-09-WP Labor Line items O&M, Cal Advocates proposes to cut 50% of the funding for three staff positions.[106] This appears to be based on its claim that SDG&E's descriptions are too "high-level" and thus should be cut 50% across the board.[107] Cal Advocates does not further explain its reasons for the recommended cut in funding these three positions. SDG&E explained the need for these positions in my direct workpaper as "three additional FTEs to oversee, administer and manage the activities."[108] The work of this Department is described in my opening testimony at Ex. SDG&E-15R at FV-11 to FV-12.

As shown in Table 9-06, Cal Advocates also proposes to cut 50% of the funding for Business Unit Project Support.[109] Cal Advocates provides no support to justify this 50% cut aside from its broad claim that all labor descriptions are too "high level." As Cal Advocates provides no justification for the cut, and the internal business labor support is necessary to have a successful RD&D program and the work was described in my opening testimony and workpaper, SDG&E recommends that Cal Advocates' proposal be rejected.

With respect to the Customer End-Use, Electrification Transformation sub-program, Cal Advocates states that technology demonstrations like wireless power transfer and dynamic in-motion charging and emerging beachhead sectors should be developed by the electric vehicle ("EV") and EV charging industries.[110] Further claiming these advancements do not provide

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[104] Ex. SDG&E-15-R (Valero) at FV-11 to FV-14.

[105] Ex. CA-09 (Younes) at 20-21.

[106] *Id.* at 18.

[107] *Id.* at 10, 12, 18.

[108] Ex. SDG&E-15-R WP (Valero) at 17.

[109] Ex. CA-09 (Younes) at 18.

[110] *Id*. at 20.

benefit to ratepayers in general, but only to those who choose to procure EVs, Cal Advocates recommends that the Commission deny the $1.0M funding request.[111] While the EV charging industry should continue to develop technology demonstrations, SDG&E must also help guide customers through their electrification transformation with research and development of new technology, particularly in the transportation sector which is the largest GHG contributor in California.[112] Cal Advocates' logic that the Customer End-Use, Electrification Transformation sub-program only provides benefits to those who choose to procure EVs, and not ratepayers in general, is incorrect and shortsighted. New technologies such as bi-directional vehicle-to-grid ("V2G") or wireless power delivery benefit all ratepayers. These technologies can provide grid reliability and resiliency, enable more efficient use of renewable energy, and integrate with other distributed energy resources. Research from this sub-program complements SDG&E's EV Infrastructure Programs and can provide SDG&E unique insights into how customers can better integrate these technologies with the grid and thereby increase EV adoption in support of SB 676.[113]

Cal Advocates also opposes the Clean Energy, Carbon Sequestration sub-program. As described in my opening testimony: "This program and its sub-program will support the evaluation and study of new solutions for carbon sequestration and/or clean generation enhancements on a small scale to determine whether to adopt them commercially on a larger scale. Includes identifying types of sites that may be suitable for commercial adoption."[114] Cal Advocates states that SDG&E did not identify any specific quantitative or qualitative benefits for its Carbon Sequestration technology, and therefore recommends the Commission deny the $1.3M funding request.[115]

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[111] *Id.*

[112] *See* CARB Press Release 22-30, https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035.

[113] Senate Bill 676 (2019), Section 1, codified at Pub. Util. Code Section 740.16, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB676.

[114] Ex. SDG&E-15R (Valero) at FV-13.

[115] *Id.*

SDG&E disagrees with Cal Advocates. In its 2022 Scoping Plan, the CARB recognized the potential need for carbon capture and sequestration ("CCS") in the electric sector to meet California's climate change goals:

> In this Scoping Plan, CCS is included to address emissions from limited sectors, including electricity generation… to ensure anthropogenic emissions are reduced by at least 85 percent below 1990 levels in 2045, as directed in AB 1279. While the modeling outputs show CCS not being applied to the electricity sector until 2045, CCS could be implemented earlier on the electricity sector with a similar ramp up over time as that for refineries and cement plants. An earlier application of CCS in the electricity sector would yield additional reductions in years prior to 2045.[116]

SDG&E's Innovation Technology Development will play a small role, but essential role, in studying and evaluating new solutions for carbon sequestration or clean generation enhancements that could be implemented by SDG&E or its suppliers of electricity, which could use it in their gas-fired generation plants. As stated in CARB's 2022 Scoping Plan, CCS for electricity generation will play a part in California's transition to carbon neutrality by 2045 as required by SB 100 and California Assembly Bill ("AB") 1279 (2022).[117] California will need to utilize all available tools to reach these goals. For these reasons, SDG&E submits its proposal is just and reasonable and should be approved.

Cal Advocates also takes issue with the System Advancements, Planning Control & Power Optimization subprogram. Cal Advocates states that "a piece of distribution equipment" purchased under the System Advancement project, when placed in O&M, can be recovered in perpetuity because it will remain in the historical data upon which future years are often forecasted.[118] Therefore, Cal Advocates recommends that this piece of equipment be documented as a capital expenditure rather than O&M.

SDG&E disagrees with Cal Advocates. First, the referenced Electric System Equipment is not yet defined. As I explained in my direct testimony: "General areas of prospective activity are: Testing novel technologies for monitoring, control, visualization, and situational awareness

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[116] *See* 2022 CARB Scoping Plan (https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf), p. 86.

[117] SB 100 sets a goal of requiring renewable and zero-carbon energy resources to supply 100% of electric retail sales and state loads by 2045. AB 1279 (2022) states that California's policy is to "[a]chieve net zero greenhouse gas emissions as soon as possible, but no later than 2045, and to achieve and maintain net negative greenhouse gas emissions thereafter." CCS will be necessary to achieve "net negative" GHG emissions.

[118] Ex. CA-09 (Younes) at 21.

in distribution system operations. Examples include new power electronic equipment, sensors, monitoring devices, safety systems, data systems, and software visualization platforms. …"[119] At this point, it is uncertain if SDG&E will procure Electric System Equipment and, if it does, such equipment will be specific to the applied research SDG&E is doing in this sub-program, not a general capital request.

Second, Cal Advocates is mistaken in asserting: "SDG&E requests to expense a 'piece of distribution equipment' costing $800,000. By expensing rather than capitalizing this one-time cost, SDG&E proposes to recover it each year in perpetuity…"[120] As an initial matter, Cal Advocates has confused the "unit metric" of "piece of distribution equipment" to mean that SDG&E may purchase a single piece of equipment costing that amount.[121] Further, as with other RD&D programs, SDG&E might spend money on equipment necessary to complete a project, but that does not mean it will continue to procure that equipment in perpetuity as Cal Advocates asserts. Instead, SDG&E will complete an RD&D project, then look to launch something different, which may or may not include equipment purchases. For these reasons, SDG&E recommends that Cal Advocates' proposal to move the $800,000 Electric System Equipment forecast to capital expenditure be rejected.

For all the reasons stated above, SDG&E recommends that the entire Innovation Technology Development O&M request be approved as filed.

b. CEJA

CEJA takes issue with the Test Year O&M forecast for budget code 1DD003 (Innovation Technology Development O&M). CEJA states that the Commission should deny all funding for the Innovation Technology Development program because SDG&E has not met its burden to show that spending on this new program would be in the ratepayers' interest. While CEJA expresses a general concern about RD&D programs outside the Commission's EPIC program, CEJA specifically attacks only the Clean Energy program's proposed "evaluation and study of new solutions for carbon sequestration and/or clean generation enhancements on a small scale to

[119] Ex. SDG&E 15R (Valero) at 13.

[120] Ex. CA-09 (Younes) at 21.

[121] Ex. SDG&E-15-WP (Valero) at 22.

determine whether to adopt them commercially on a larger scale."[122] CEJA states that if the Commission approves this new program in any form, it should prohibit funding on research related to carbon capture and/or sequestration.[123]

SDG&E disagrees with CEJA's recommendations because significant technological developments need to take place in California before the state can meet its goals in SB 100, SB 1020 and AB 1279. An essential part of the carbon neutrality transition will be new and/or advanced technologies and methodologies of maintaining a reliable and resilient electric grid. SDG&E's Innovation Technology Development program may advance those goals by evaluating CCS use by SDG&E and/or its electricity suppliers. As recognized in the 2022 CARB Scoping Plan:

> Reaching our ambitious, deep decarbonization goals will require continued technological innovation. Investment in research, development, and deployment of clean technologies has never been more critical …
>
> This Scoping Plan unequivocally puts the marker down on the need for innovation to continue in non-combustion technologies, clean energy, CO_2 removal options, and alternatives for SLCPs [short-lived climate pollutant]. [124]

CEJA also contends that ratepayers should not fund CCS research, stating:

> Gas-fired power plants with carbon capture equipment cannot meet California's long-term energy needs because Senate Bill ("SB") 100 requires the state's electric utilities to completely transition to zero-carbon resources by 2045…. Accordingly, when the CEC, CPUC, and CARB collaborated on their Joint Agency Report on implementing SB 100, they did not model natural gas generation with carbon capture and sequestration as part of California's long-term resource mix.[125]

CEJA misses the point. CEJA itself quotes the Joint Agency Report in a footnote, which recognizes the interest in CCS, but found "[p]artially decarbonized resources (that is, with less than 100 percent of onsite carbon emissions captured and stored) did not meet the joint agencies' criteria for zero-emission technologies."[126] The Joint Agencies Report does not rule out the

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[122] Ex. SDG&E-15-R (Valero) at 13; Ex. CEJA-01 (Vespa et al.) at 53-55.

[123] Ex. CEJA-01 (Vespa et al.) at 55.

[124] *See* 2022 CARB Scoping Plan (https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf), p. 37, 38.

[125] Ex. CEJA-01 (Vespa et al.) at 53-54.

[126] *Id.* at 54 n. 235.

possibility that, in the future, generation plants with 100% onsite carbon capture and sequestration might meet SB 100's requirements. SDG&E is looking to evaluate all promising technologies to decarbonize its operations and its suppliers' operations. As recognized in CARB's 2022 Scoping Plan and in California SB 905,[127] CCS is one option to be explored.

California will need to utilize all available tools to reach its SB 100 goal. For these reasons, the Commission should approve SDG&E's request.

4. 1DD004 – Sustainable Communities O&M

a. Cal Advocates

Cal Advocates takes issue with the Test Year O&M forecast for budget code 1DD004 (Sustainable Communities Program or "SCP"). Cal Advocates states that SDG&E's methodology of calculating the escalating contingency factor is incorrect, claiming the estimates have an unreasonable growth acceleration.[128] Cal Advocates therefore proposes a reduction of $47,000 to the "other" category within SCP for a 2024 forecast of $10,000.[129]

SDG&E agrees with Cal Advocates recommendation that the escalating contingency factor was incorrect. As such, SDG&E agrees the "other" classification within the SCP 2024 O&M budget should be reduced from $57,000 to $10,000, which represents a reduction of $47,000 to SDG&E's 2024 forecast.

5. 1DD005 – Distributed Energy Resource Engineering Department O&M

a. Cal Advocates

Cal Advocates takes issue with the Test Year O&M forecast for budget code 1DD005 (Distributed Energy Resource Engineering Department O&M or "DER Engineering"). Cal Advocates recommends a reduction of funding by $342,000 in Table 9-1.[130] Cal Advocates states that it cannot determine the basis for SDG&E's FTE assessment and therefore recommends the Commission reduce estimates of labor additions by 50 percent across the

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[127] SB 905, Section 2 (2022), codified at Cal. Health & Saf. Code Section 39741.1(a), https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB905.

[128] Ex. CA-09 (Younes) at 24.

[129] *Id.* at 26.

[130] Ex. CA-09 (Younes) at 2.

board.[131] Cal Advocates does not identify any specific basis for its challenge to the DER Engineering Department budget. Its request should be denied on that ground alone.

As an initial matter, Cal Advocates made an error in its calculation of "additional labor" as discussed in my General Rebuttal, Section A above. Cal Advocates proposes to cut $123,000 from the base forecast for this Department, as well as cutting 50% of the additional labor costs.[132] Moreover, Cal Advocates provides no basis for its proposal to cut 50% of the funding for additional labor in this Department. My opening testimony at FV-16 explains the need for additional staff:

Additional engineering staff is needed to perform testing on new technologies, performing microgrid islanding studies, integration of microgrids into SDG&E's local area distribution controller (LADC), and performing other engineering studies related to the integration of DERs. Additional staff is also needed to support the increase in energy storage and clean technology capital projects, such as the Advanced Energy Storage program and the Mobile Battery Energy Storage Program.

Cal Advocates presents no evidence that such additional staff are not needed.

As described in my opening testimony at FV-15 to FV-16, the DER Engineering Department leverages technology in order to accelerate the future of the electric industry through the use of microgrids, energy storage, advanced control systems and proactive engineering, testing, and demonstration, which impacts current and future labor estimates. For instance, the DER Engineering Department is actively supporting planned and unplanned outages, including PSPS events, in order to support customer resiliency through microgrid operations at the Borrego Springs Microgrid, as well as deploying backup generators. Without adequate staffing, the Department cannot perform all of the work needed.

For these reasons, SDG&E recommends Cal Advocates' recommendation be denied and SDG&E's proposed funding be approved.

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[131] *Id.* at 12.

[132] *See* Appendix C (SDG&E highlighting of errors in Ex. CA-09 WP Labor Line Items, O&M tab).

b. TURN

TURN does not propose any changes to SDG&E's O&M funding request for Clean Energy Innovations. TURN finds "SDG&E's baseline is reasonable relative to the actual 2022 O&M for this exhibit."[133]

c. UCAN

UCAN takes issue with the Test Year O&M forecast for budget code 1DD005 (Distributed Energy Resource Engineering Department O&M or "DER Engineering"), recommending a reduction of funding by $375,000.[134] UCAN states that "the proposed additional grid O&M budget request for grid modernization and advanced interconnection and modeling ($1,300,502) is also outmoded, inconsistent with the Commission's priorities, and appears unjustified."[135] UCAN further states "Not only are these expenditures untimely and inconsistent and will face technology obsolescence, but they are improperly focused, leaving this set of O&M costs to support only projects that will be obsolete and thus stranded.[136]

As a threshold matter, UCAN's testimony and recommendation is discussing SDG&E's Grid Modernization Plan ("Grid Mod Plan"), which is required as part of the GRC proceeding pursuant to D.18-03-023 and can be found in Ex. SDG&E-12-R (Swetek), but it does not directly request costs.[137,138] A portion of SDG&E's DER Engineering Department O&M request, $375,000, is presented in SDG&E's Grid Mod Plan as the requested additional O&M will support grid modernization efforts by SDG&E but ultimately the O&M request can be found in Ex. SDG&E-15-R at FV-15 through FV-16.[139]

SDG&E disagrees with UCAN's proposal, which would cut additional labor (FTE) for two positions funded by the DER Engineering Department, as it lacks substantive justification.

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133 Ex. TURN-06-C (Monsen) at 78.

134 Ex. UCAN (Woychik), p. 241-242. UCAN cites to SDG&E's additional grid O&M request for $1,300,502, which includes $375,000 for this budget code (1DD005), as shown in Ex. SDG&E-12-R (Swetek), Appendix C p. 20 Table 2.

135 *Id.* at 241.

136 *Id.* at 241-142.

137 Ex. SDG&E-12-R (Swetek) at Appendix C.

138 Costs presented in the Grid Mod Plan can be found throughout many SDG&E witness chapters.

139 Ex. SDG&E-12-R (Swetek) at Appendix C, at 20 Table 2, workpaper 1DD005.

As described in my opening testimony at FV-15 to FV-16, the DER Engineering department leverages technology in order to accelerate the future of the electric industry through the use of microgrids, energy storage, advanced control systems and proactive engineering, testing, and demonstration, which impacts current and future labor estimates. The technologies the DER Engineering Department will support are not obsolete.

Moreover, my opening testimony at FV-16 explains the need for additional staff:

> Additional engineering staff is needed to perform testing on new technologies, performing microgrid islanding studies, integration of microgrids into SDG&E's local area distribution controller (LADC), and performing other engineering studies related to the integration of DERs. Additional staff is also needed to support the increase in energy storage and clean technology capital projects, such as the Advanced Energy Storage program and the Mobile Battery Energy Storage Program.

Additionally, SDG&E provides rebuttal to UCAN's assertion that its proposed LADC projects will be obsolete in Section IV below. For these reasons, SDG&E recommends UCAN's recommendation be denied, and SDG&E's proposed funding be approved.

V. REBUTTAL TO PARTIES' CAPITAL PROPOSALS

TOTAL CAPITAL - Constant 2021 ($000)					
	2022	**2023**	**2024**	**Total**	**Difference**
SDG&E	**23,024**	**24,974**	**26,333**	**74,331**	
CAL ADVOCATES	**1,425**	**0**	**800**	**2,225**	**(72,106)**
TURN	**20,227**	**7,817**	**1,727**	**29,771**	**(44,560)**
UCAN[140,141]	**23,324**	**24,974**	**0**	**19,330**	**(26,333)**
CEJA	**23,024**	**24,974**	**25,178**	**73,176**	**(1,115)**

A. 20278A Advanced Energy Storage

As stated in my opening testimony (Ex. SDG&E-15-R at FV-18): "The AES project continues the Company's strategic deployment of energy storage devices established in SDG&E's TY 2019 GRC, D.19-09-051, on distribution circuits with an abundance of solar

[140] SDG&E assumes that UCAN's recommended cuts to capital is applicable to all 2024 capital costs based on the following statement in Ex. UCAN (Woychik) at 12: "Do the related capital expenditures for SDG&E's Clean Energy Innovation in 2024 of $26.33 million look to be just and reasonable?... UCAN recommends that the entire budget for clean energy innovation of $26.33 million be denied."

[141] SDG&E did not reduce 2022 or 2023 capital request as UCAN does not state whether 2022 or 2023 funds should be denied. See Ex. UCAN (Woychik) at 284-291.

photovoltaic (PV) penetration to effectively manage the reliability of the grid. … For the current phase of AES, SDG&E is in the process of installing and integrating a 7.3 megawatt ("MW")/14.6 megawatt-hour (MWh) Battery Energy Storage System (BESS) and a 0.25 MW/4 MWh Hydrogen Energy Storage System (HESS) to leverage excess PV at the Borrego Spring Microgrid."

1. Cal Advocates

Cal Advocates takes issue with SDG&E's TY 2024 capital forecast for budget code 20278A (Advanced Energy Storage). Cal Advocates states "the AES project was not needed, proven by the fact that it was never built," and therefore recommends an adjustment of -$12,483,000 in 2022 and $1,314,000 in 2023, in addition to the Commission denying cost recovery for funds already spent.[142] Cal Advocates additionally makes the following claim: "SDG&E agrees with Cal Advocates' assertion that 'SDG&E spent the remaining $7,277,000 on something.'"[143]

As an initial matter, Cal Advocates has distorted SDG&E's discovery response by partially quoting only its question and not SDG&E's response, which states:

> Yes, the delayed start to building the advanced energy storage project resulted in SDG&E re-prioritizing the allocation of the authorized funds. The Commission recognizes that actual spending may differ from GRC authorized amounts: "The Commission has always acknowledged that utilities may need to reprioritize spending between GRCs." (D.20-01002 at p. 38.) SDG&E prudently and efficiently manages its costs over the GRC cycle and executes projects to the best of its ability. [144]

Cal Advocates also contends: "As of December 31, 2019, SDG&E had spent zero dollars on the project...,"[145] which is incorrect. As reported to Cal Advocates in discovery, SDG&E has spending recorded as far back as 2017 on AES.[146]

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[142] Ex. CA-09 (Younes) at 28-29.

[143] *Id.* at 28.

[144] Appendix B, SDG&E's Data Request response PAO-SDGE-062-AMY Question 7c.

[145] Ex. CA-09 (Younes) at 28.

[146] Appendix B, SDG&E's response to Data Request PAO-SDGE-025-AMY Question 9c; Appendix B, SDG&E's response to Data Request PAO-SDGE-080-AMY Question 1b and the corresponding table, found in Ex. CA-09 Workpapers at 57.

Cal Advocates' sole basis for asking the Commission to disallow SDG&E's proposed funding for the AES project is that it allegedly was "never built."[147] This is wrong. As stated above, spending on the two AES resources began as far back as 2017. As stated in my opening testimony (Ex. SDG&E-15R at FV-18), my capital workpapers (Ex. SDG&E-15-CWP at 4), and my supplemental workpapers (SDG&E-15-WP-S at 1-2), AES was under construction when this Application was filed and some of the resources could come online in 2023 in order to leverage excess photovoltaic ("solar PV") energy generation on the three circuits serving the Borrego Springs Microgrid. As stated in SDG&E's discovery response, the excess solar PV energy in Borrego Springs includes "two PV farms with the first being a 26 MW_{AC} PV installation, and the second being a 6.5MW_{AC} PV installation."[148] In addition, there is over 8 MW of BTM, non-curtailable rooftop solar PV deployed. In contrast however, the local peak load, which is picked up by the microgrid through all three interconnected circuits, is 14 MW.[149]

The generation circuit addition necessary to allow the BESS to connect to the Borrego Springs Microgrid has been completed, as contemplated by the Borrego Springs Microgrid 3.0 project discussed in Section V.D below. Additionally, the site grading work necessary to accommodate the BESS and the HESS have been completed in preparation for foundation and support structure construction. The BESS is on track to come online this year as the equipment is already received and is awaiting the necessary foundation construction for installation. Related to supply chain delays, the HESS project is anticipated to be commissioned in spring of 2024, but SDG&E is examining ways to accelerate.

The Borrego Springs Microgrid is sited at the end of a single, long transmission line. Given that the region is subject to extreme weather conditions including extreme heat, storms, high winds, and flooding, and transmission pole replacements due to damage and/or compliance maintenance, the microgrid is crucial to ensuring reliable power to the Borrego Springs Community. Table FV-1 presents a list of historic islanding operations of the Borrego Springs Microgrid from 2020 to present. Microgrid support duration for these planned outages ranged from 1.5 hours to over 60 hours.

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147 Ex. CA-09 (Younes) at 29.

148 Appendix B, SDG&E's response to Data Request PAO-SDGE-062-AMY Question 5.

149 Appendix B, SDG&E's response to Data Request PAO-SDGE-062-AMY Question 4.

Table FV-1
Borrego Spring Microgrid Islanding Operations 2020 to Present.
DG = Diesel Generators, BAT = Li-ion Battery

Date	Event Type	Support Duration (h)	Borrego Resources Utilized	Notes
Feb 5, 2020	**Planned Outage – Relay Calibration & Transmission Pole Maintenance**	5	• 3.6 MW DG • 1MW/3MWh BAT	
Oct 26, 2021	**Planned Outage – Transmission Pole Replacements**	12	• 3.6 MW DG • 1MW/3MWh BAT	Additional 2.2MW of additional portable, manually operated DG required for island operation.
Oct 27 2021	**Planned Outage – Transmission Pole Replacements**	12	• 3.6 MW DG • 1MW/3MWh BAT	Additional 2.2MW of additional portable, manually operated DG required for island operation.
Oct 28 2021	**Planned Outage – Transmission Pole Replacements**	12	• 3.6 MW DG • 1MW/3MWh BAT	Additional 2.2MW of additional portable, manually operated DG required for island operation.
Oct 24 2022	**Planned Outage - Accommodate switching to transfer Borrego load to IID from SDG&E**	1.9	• 3.6 MW DG • 1MW/3MWh BAT	
Oct 31 2022	**Planned Outage - Accommodate switching to transfer Borrego load from SDG&E to IID**	1.5	• 3.6 MW DG • 1MW/3MWh BAT	
Feb 9 – Feb 16, 2023	**Planned Outage – Compliance Transmission Maintenance**	61 total	• 3.6 MW DG • 1.5MW/4.5MWh BAT	Additional 6 x 220 kW portable, manually operated DG utilized as baseload support.
May 6, 2023 (pending)	**Planned Outage– Compliance Transmission Maintenance**	10 (estimated)	• 1.5MW/4.5MWh BAT	On-site 3.6 MW DG unavailable. 5 x 1250kW portable, manually operated DG required to support 10h microgrid operation.

SDG&E notes a few important microgrid islanding events at the Borrego Springs Microgrid:

- For the outages on October 26th through the 28th 2021, an additional 2.2 MW of portable diesel generators were required for island transitions before sunrise and sunset – the existing microgrid battery resources and stationary diesel generators were insufficient to take the microgrid into and out of island. Further, additional personnel needed to be on-site to

operate the generators for San Diego Air Pollution Control District ("SDAPCD") compliance purposes. **Additional energy storage will reduce emissions associated with the portable generators and can reduce labor expenses.**

- For the outages occurring from February 9th through February 16th, 2023, additional portable generators were again brought in to support baseload during island mode given a shortfall in the amount of energy storage. Without additional capacity, certain non-critical loads in the Borrego Springs community were shed.
- On May 6, 2023, a planned outage will be conducted. However, the on-site 3.6 MW diesel generators are off-line for repair. The existing 1.5 MW/4.5 MWh batteries will charge to maximum capacity utilizing PV during the day (with the large excess amount of PV being curtailed) and the existing energy storage will discharge in the evening. **Even with the existing battery storage, the operation will require the addition of five 1.25 MW generators to support 10 hours of operation. This again reiterates the importance of bringing AES, Borrego 3.0, and the HESS Expansion online in Borrego Springs to eliminate the need for both existing diesel generators in the microgrid yard and portable diesel generators.**

Regarding Cal Advocates' recommendation that funds already spent should be denied, SDG&E disagrees, and submits that such a recommendation is not justified. AES was authorized in the 2019 GRC Decision (D.19-09-051)[150] for capital funds from 2017 to 2019. It is inappropriate for Cal Advocates to recommend denial of funding previously approved by the Commission. SDG&E contends the only spending in scope of this TY 2024 GRC is the capital request from 2022 through 2024. As shown above, SDG&E's AES assets, the BESS and the HESS, are prudent additions to improve both the local reliability of the Borrego Springs community and the microgrid itself, while also better integrating excess PV generation, some of which cannot be curtailed. Additionally, as stated above, the assets are under-construction with

[150] D.19-09-051 at 293-294.

spending as far back as 2017 for this program and some of the resources could come online this year or early next year.

For all the reasons stated above, SDG&E recommends Cal Advocates' recommendation to cut funding for 2022, 2023 and prior spending should be denied and the AES project be funded as presented by SDG&E in direct testimony.

2. UCAN

UCAN takes issue with SDG&E's TY 2024 capital forecast for budget code 20278A (Advanced Energy Storage) claiming that standard lithium-ion battery storage is neither "advanced technology" nor innovative. UCAN states customer-side-of-the-meter (CSOM) DERs "can provide extensive battery storage."[151]

SDG&E disagrees with UCAN. First, SDG&E's AES BESS deployment will utilize lithium-ion storage technology, which is a proven, yet newer technology that provides clear benefits to the local distribution system.

Second, SDG&E has addressed UCAN's claim that CSOM DERs are available and able to replace SDG&E's proposed investments in its General Rebuttal, Section C above. In brief, UCAN's assertion that "extensive battery storage can be provided by CSOM DERs" is not evidence that CSOM DERs with battery storage are available on the relevant circuits, what their capacity may be, or that the customers owning any such CSOM DERs with battery storage are willing and able to guarantee and provide energy to the Borrego Springs Microgrid when needed (rather than utilize the battery stored energy themselves). As UCAN admits, "[c]ustomers acquiring distributed energy resources generally pay for CSOM storage,"[152] and it is speculative both how many customers will do so on the relevant electrical circuits and the price, if any, at which they might be willing to guarantee electric supply to the electrical grid when needed. SDG&E asked UCAN to state "the number of persons and entities in SDG&E's service territory that YOU contend will have installed such CSOM DER resources" by December 31, 2027, and what "UCAN contended would be the generation and storage capacity of such CSOM DER resources." UCAN did not provide any responsive information.[153]

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[151] Ex. UCAN (Woychik) at 285.

[152] Ex. UCAN (Woychik) at 285.

[153] Appendix B (UCAN's Response to Data Request SCG-SDGE-UCAN-001, Q. 5(a)-(c)).

UCAN also asserts that USOM storage "appears more expensive and will help induce significant rate increases."[154] UCAN however provides no evidence that, even assuming that CSOM DER resources with battery storage are available on the relevant electric circuits, that contracting with such CSOM DER resources to store excess energy and guarantee to provide it to the electric grid when needed would be less expensive than the BESS system being installed at the Borrego Springs Microgrid as part of AES. As previously stated, AES began construction in 2021 and the resources could come online in 2023/2024, leveraging excess PV energy generation in Borrego Springs. In doing so, the resources will better integrate the large amounts of PV generation from third-party sources and improve the reliability of the microgrid that serves the Borrego Springs community. For the reasons above, SDG&E recommends UCAN's recommendation be denied, and the AES project be funded as presented by SDG&E in direct testimony.

B. 212690 Advanced Energy Storage 2.0

As stated in my opening testimony: "This project is a continuation of the prior AES project (workpaper 20278A) and will consist of three energy storage systems each approximately 7 MW/14 MWh in size. As described above, SDG&E intends to identify additional circuits with high concentrations of DERs. SDG&E plans to build and place the Advanced Energy Storage 2.0 program in service by 2024.… This project continues to advance the company's strategic deployments of energy storage devices on distribution circuits with an abundance of PV penetration (which has grown significantly since SDG&E's first phase of this project) to effectively manage the reliability of the grid. Benefits include leveraging excess renewable energy to charge during the day when the circuit is experiencing lighter load levels, discharging during times of higher loading, and mitigating intermittency."[155]

1. Cal Advocates

Cal Advocates takes issue with SDG&E's TY capital forecast for budget code 212690 (Advanced Energy Storage 2.0), recommending that the Commission reduce SDG&E's request to zero. Cal Advocates states that "SDG&E has not established a need, a need date, project

[154] Ex. UCAN (Woychik) at 285.

[155] Ex. SDG&E-15-R (Valero) at 19 to 20.

benefits, or locations for project installation."[156] Cal Advocates contends that D.19-06-032 supports its recommendation. Cal Advocates also contends that "SDG&E has provided no evidence that utility ownership is the proper structure," and asserts that "if SDG&E would like rate recovery for AES 2.0, it should apply for recovery with an Application that meets the reasonableness standard required by D.19-06-032."[157]

SDG&E disagrees. First, Cal Advocates' assertion that "because SDG&E has not yet selected any locations, it cannot plausibly have an identified need for them," makes no sense. My opening testimony explains the need to deploy storage devices on "distribution circuits with an abundance of PV penetration" to manage reliability of the grid. Cal Advocates complains that SDG&E did not identify specific locations for the proposed storage devices, and quotes SDG&E's data request response: "At this time, SDG&E is exploring potential sites with high penetration of PV. SDG&E will conduct further analysis to identify areas on the distribution system that would benefit from the deployment of AES due to excess renewable generation on a circuit."[158] This should not be a surprise. SDG&E will continue to assess renewables penetration on circuits up until the time it decides where installing storage devices is most beneficial to renewables integration and grid reliability. The failure to identify specific circuits and locations now, when conditions on electrical circuits may change in the future, does not indicate (as Cal Advocates alleges) a lack of need.

The need for storage devices to manage renewables penetration is well-known and increasing. SDG&E's AES 2.0 is the second phase of AES 1.0, which was approved in SDG&E's Test Year ("TY") 2019 GRC (D.19-19-051). The strategic deployment of energy storage devices is needed to effectively manage the abundance of PV penetration on distribution circuits, which has significantly grown in SDG&E's service territory since the first phase of AES. SDG&E has seen a significant growth in non-curtailable solar (*i.e.*, net energy metering ("NEM")).[159] In the first quarter alone of 2023, SDG&E received 37,217 interconnection requests for NEM systems, whereas during the entire 2022 calendar year, SDG&E received a

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[156] Ex. CA-09 (Younes) at 31.

[157] *Id*.

[158] *Id*.

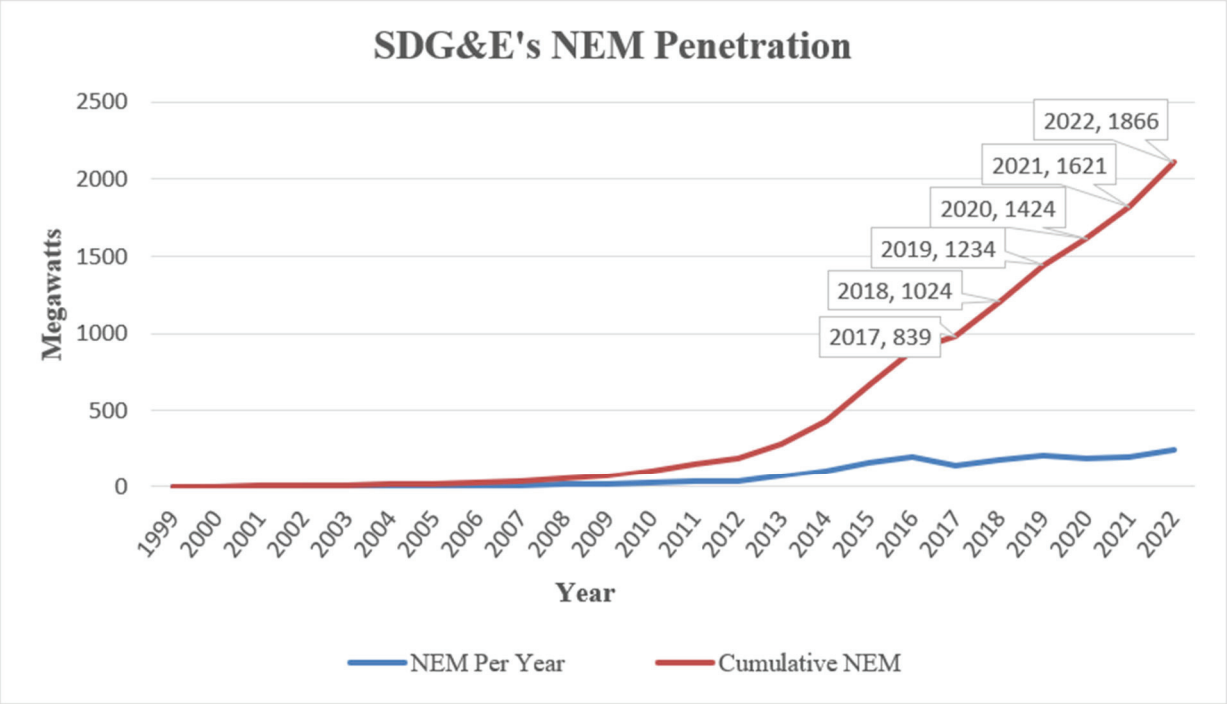
[159] As of March 31, 2023, SDG&E has 1,927 MW of NEM aggregated capacity authorized. The month of March 2023 represents 23.92 MW of residential NEM and 2.84 MW of non-residential NEM.

total of 39,274 interconnection requests. In 2019, when the Commission approved AES 1.0, SDG&E had 1,234 MW of BTM NEM online. By the end of 2022, that number grew to 1,866 MW, a 51% increase. This tremendous growth is the exact reason that further distribution-connected energy storage devices are needed, as SDG&E proposes through AES 2.0.

Figure FV-2 below shows the tremendous growth in BTM NEM in SDG&E's service territory from 1999 through the end of 2022.

Figure FV-2

[Non-Curtailable] BTM NEM[160]



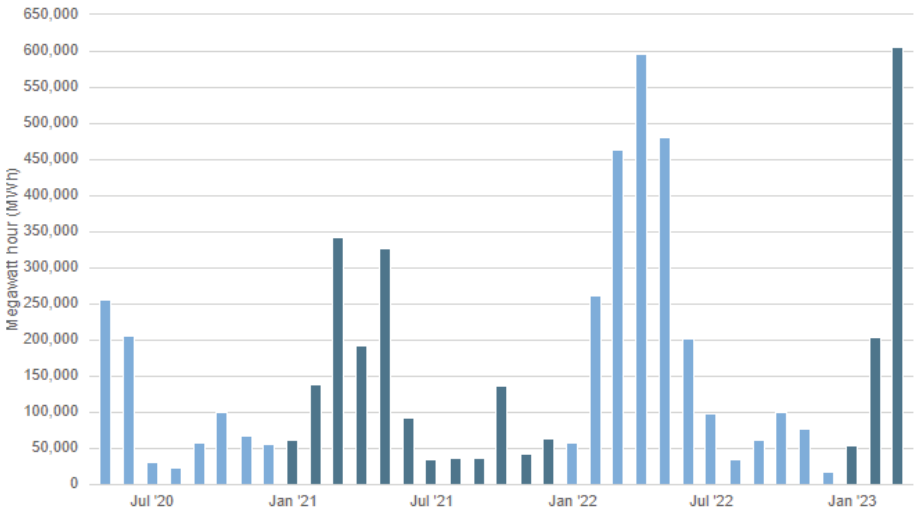
Additionally, non-curtailable generation, such as NEM can put a real strain on the local distribution system and lead to lower frequency and lower power quality. AES 2.0, however, is poised to collect that excess energy during times of high renewable output (*i.e.*, when the sun is shining in the middle of the day when load is already low compared to morning and evening peak) and discharge during times of grid need (*i.e.*, the net peak in the evening). Furthermore, as seen in Figure FV-3 below, the curtailment of wind and solar by the California Independent

[160] SDG&E's BTM NEM Penetration through December 31, 2022.

System Operator ("CAISO") has increased, especially in the first quarter of 2023 compared to the previous two years during the same quarter.

Figure FV-3

CAISO Oversupply Curtailment 2020-2023[161]



The CAISO "Managing Oversupply" website states: "The [CA]ISO is seeking solutions to avoid or reduce the amount of curtailment of renewable power to maximize the use of clean energy sources."[162] The CAISO website identifies storage as among the "promising concepts and technologies being explored to minimize oversupply and curtailment."[163]

As stated above, AES 2.0 will be one of multiple tools in the toolbox to manage oversupply. The need is clear from a local SDG&E service territory, as well as a CAISO-wide, perspective. The need for localized energy storage, as AES 2.0 is intended to supply, will become even more important as California continues to electrify and transition towards SB 100's goal of carbon neutrality for retail electric sales.

Second, SDG&E disagrees with Cal Advocates' suggestion that D.19-06-032 is grounds to deny SDG&E's funding request. In D.19-06-032, the Commission considered IOU proposals

[161] *See* CAISO, Managing Oversupply, available at http://www.caiso.com/informed/Pages/ManagingOversupply.aspx.

[162] *Id.*

[163] *Id.*

to comply with AB 2868 (2016),[164] which instructed the Commission to require the IOUs to file applications for a certain amount of distributed energy storage systems that prioritize public sector and low income customers.[165] Cal Advocates claims the Commission's reasoning for rejecting a Pacific Gas and Electric Company ("PG&E") program applies equally to SDG&E's AES 2.0 program.[166] SDG&E disagrees. First, the AB 2868 process applies specifically to procurement undertaken pursuant to that statutory provision;[167] the resources being contemplated here are not subject to AB 2868 or its related requirements as they are for different purposes. Second, while the Commission noted that PG&E's Application was missing specific site locations, it also noted missing costs, no projection of benefits, and a limitation to utility-owned projects, which the Commission found contrary to AB 2868's express provision.[168] Moreover, as the Commission described it: "PG&E is not proposing the procurement of specific projects at a specific cost, rather it is proposing a framework that would then allow it to conduct an [Request for Offer ("RFO")] and propose future utility owned projects through an Advice Letter process."[169] SDG&E's AES 2.0 program is not intended to meet the requirements of AB 2868, nor is SDG&E's AES 2.0 program structured like PG&E's program. SDG&E has provided evidence of the need, ratepayer benefit and cost of the AES 2.0 program. Therefore, the Commission's rejection of PG&E's program to comply with AB 2868 is not persuasive grounds for denying SDG&E's AES 2.0 program.

Finally, SDG&E disagrees with Cal Advocates' assertion that, "if SDG&E would like rate recovery for AES 2.0, it should apply for recovery with an Application that meets the

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[164] *See* D.19-06-032 at 2: "Assembly Bill (AB) 2868, signed into law on September 26, 2016, adds Sections 2838.2 and 2838.3 to the Public Utilities Code. It directs the Commission, in consultation with the California Air Resources Board and the Energy Commission, to direct the three Investor-Owned Utilities (IOU) to file applications for programs and investments to accelerate widespread deployment of distributed energy storage systems to achieve ratepayer benefits, reduce dependence on petroleum, meet air quality standards, and reduce emissions of greenhouse gases."

[165] *See* D.19-06-032 at 3: "The total capacity of the programs and investments in distributed energy storage systems approved by the Commission pursuant to AB 2868 is not to exceed 500 megawatts (MW), divided equally among [PG&E, SCE and SDG&E]."

[166] Ex. CA-09 (Younes) at 32.

[167] D.19-06-032, COLs 7, 12.

[168] D.19-06-032 at 31, 65.

[169] D.19-06-032 at 27.

reasonableness standard required by D.19-06-032," by which Cal Advocates means "the guidelines provided in Appendix A" thereto.[170] As an initial matter, the Commission made plain that D.19-06-032 applied to storage projects "pursuant to AB 2868,"[171] which AES 2.0 is not. Further, the direction provided in Appendix A of D.19-06-032 was intended to apply *solely* to the IOUs' implementation of AB 2868,[172] which again, encourages the accelerated deployment of distributed energy storage systems that prioritize public sector and low-income customers. Appendix A was not intended to apply more broadly. The Commission expressly states in D.19-06-032 that Appendix A "detail[s] how the IOUs should propose specific projects to be approved ***pursuant to AB 2868***."[173] Appendix A confirms this narrow focus, directing that applications for AB 2868 projects contain "[a]n explanation of how the procurement ***meets the mandates of AB 2868***, including . . . prioritization of those programs and investments that provide distributed energy storage systems to public sector and low-income customers . . . ."[174]

Moreover, AB 2868 expressly recognizes that the Commission may approve other storage projects in other proceedings,[175] such as this GRC proceeding. AES 2.0 deployments are envisioned firstly as distributed energy resources supporting the local distribution system by helping manage the rapid influx of renewable generation, in particular solar PV generation. While SDG&E will hold a RFO for the storage technology provider in AES 2.0 (*i.e.*, the Equipment Supply Agreement) and the construction and permitting (i.e., Balance of Plant),[176] which SDG&E does for any utility-owned storage asset and did in AES 1.0, with AES 2.0, SDG&E is not seeking to meet the statutory requirements of AB 2868.

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[170] Ex. CA-09 (Younes) at 32 and n. 113.

[171] *See, e.g.,* D.19-06-032, Conclusions of Law 9, 12-15 and Ordering Paragraphs 3, 7, 10-13.

[172] AB 2868, Stats. 2015-2016, Ch. 681 (Cal. 2016).

[173] D.19-06-032 at 32 (emphasis added).

[174] *Id*., Appendix A at 5 (emphasis added).

[175] AB 2868 (2016), Section 2, codified at Pub. Util. Code Section 2838.2(c)(3) ("The capacity authorized pursuant to paragraph (1) is in addition to any investments authorized pursuant to Section 2836."); Pub. Util. Code Section 2836(a)(4) ("Nothing in this section prohibits the commission's evaluation and approval of any application for funding or recovery of costs of any ongoing or new development, trialing, and testing of energy storage projects or technologies outside of the proceeding required by this chapter.").

[176] SDG&E notes there are two additional types of contracting for storage (*i.e.*, Engineering, Procurement and Construction or Balance of Plant) which could also be considered in SDG&E's RFO related to AES 2.0 deployments.

As shown above, SDG&E is striving to help local circuits, which are experiencing large penetrations of solar and wind, by absorbing excess renewable generation during times of high renewable output but low load.[177] SDG&E is currently evaluating curtailed renewable generation (*i.e.*, solar and wind) data, and corresponding reverse power flow data for local circuit(s) experiencing non-curtailable NEM penetration, on SDG&E's distribution system in order to identify possible candidate circuit sites for AES 2.0 deployment. For example, seasonal load data from the Crestwood Substation indicate reverse power flow on 308 of 365 days of the period analyzed from May 2022 through April 2023, reflective of a need for storage to alleviate curtailment from a local wind generation facility. In another example, during the same period, Circuit 520 experienced reverse power flow 159 of 365 days.

For all the reasons stated above, SDG&E submits that its AES 2.0 proposal will benefit ratepayers through grid reliability, is just and reasonable, and should be approved as filed.

2. TURN

TURN takes issue with SDG&E's TY 2024 capital forecast for budget code 212690 (Advanced Energy Storage 2.0), recommending that the Commission reduce SDG&E's request to zero.[178] TURN states the "proposals are so vague and unsupported that SDG&E has not met its burden of proof supporting the projects.[179] TURN also recommends that, if the Commission approves AES 2.0, that the Commission should order SDG&E to convert capex to a capital addition only after the project is assumed to be online. Lastly, TURN proposes that the Commission should establish what appears to be both a two-way balancing account treatment and a memorandum account treatment for the projects under this budget code.[180]

SDG&E disagrees with TURN's claim that the AES 2.0 project is vague and unsupported. As stated in my direct testimony:

> This project continues to advance the company's strategic deployments of energy storage devices on distribution circuits with an abundance of PV penetration (which has grown significantly since SDG&E's first phase of this project) to effectively manage the reliability of the grid. Benefits include leveraging excess

[177] As stated in Ex. SDG&E-15 CWP: "SDG&E intends to conduct a competitive solicitation process requesting proposals (RFP) to identify the optimal product and vendor for the specific locations."

[178] Ex. TURN-06C (Monsen) at 81.

[179] *Id.* at 57.

[180] *Id.* at 57, 82.

> renewable energy to charge during the day when the circuit is experiencing lighter load levels, discharging during times of higher loading, and mitigating intermittency.[181]

My opening testimony and Capital Workpapers provide information about the expected size, type and cost of the projects.[182]

As set forth in more detail in response to Cal Advocates, SDG&E has seen a significant growth in non-curtailable solar (*i.e.*, NEM)).[183] In the first quarter alone of 2023, SDG&E received 37,217 interconnection requests for NEM systems, whereas during the entire 2022 calendar year, SDG&E received a total of 39,274 interconnection requests. Non-curtailable generation can put a real strain on the local distribution system and lead to lower frequency and lower power quality. AES 2.0, however, is poised to collect that excess energy during times of high renewable output (*i.e.*, when the sun is shining in the middle of the day when load is already low compared to morning and evening peak) and discharge during times of grid need (*i.e.*, the net peak in the evening). As seen in Figure FV-3 above, the curtailment of wind and solar by the CAISO has increased since 2021. The CAISO "Managing Oversupply" website states: "The ISO is seeking solutions to avoid or reduce the amount of curtailment of renewable power to maximize the use of clean energy sources," and identifies storage as one "promising" option.[184]

As stated above, AES 2.0 is poised to be one of multiple tools to manage oversupply. SDG&E has supported its request and recommends TURN's proposed disallowance be denied.

In addition, TURN's proposal for a separate project accounting, including a memorandum account that appears to limit the cost recovery of project overruns, is unmerited, unnecessary, and inconsistent with the treatment of other capital projects in the GRC. SDG&E agrees with TURN that the AES 2.0 project should not have capex added to ratebase until the expected online date for the project. In responding to TURN's testimony, SDG&E discovered that it had inadvertently modeled AES 2.0 as a routine project when it instead should have been modeled similarly to the AES and Non-Lithium-Ion projects, which both have no capital

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[181] Ex. SDG&E-15-R (Valero) 20.

[182] Ex. SDG&E-15-R (Valero) at 19; Ex. SDG&E-15 CWP at 12.

[183] As of March 31, 2023, SDG&E has 1,927 MW of NEM aggregated capacity authorized. The month of March 2023 represents 23.92 MW of residential NEM and 2.84 MW of non-residential NEM.

[184] *Id.*

additions until their online dates. SDG&E will make this correction in the Results of Operation Model at the next available opportunity.[185]

C. 212710 Non-Lithium-Ion Energy Storage Technology

As explained in my opening testimony, the Non-Lithium-Ion Energy Storage Technology program "will seek commercially available solutions for energy storage technologies that avoid issues associated with lithium-ion technologies and can offer additional benefits. It also targets deployment of alternative technologies on a small scale to develop familiarity with the technology and the application situations in which larger-scale deployments are merited. … The energy storage systems deployed would be commercially available technology and will remain in use consistent with the useful life of the technology."[186]

1. Cal Advocates

Cal Advocates takes issue with SDG&E's TY capital forecast for budget code 212710 (Non-Lithium-Ion Energy Storage Technology), and recommends that the Commission reduce its funding to zero.[187] While admitting that "SDG&E's proposed project may not be within the purview of D.21-06-035," Cal Advocates argues that "SDG&E's proposal could count toward the long-duration storage ordered in D.21-06-035."[188] Cal Advocates then argues that the Commission therefore should order SDG&E to comply with the procedural requirements of D.21-06-035 (*i.e.*, an Application) because otherwise SDG&E might "over-procure" long term storage or that "[a]llowing SD&GE to circumvent those guardrails would further burden SDG&E's ratepayers by increasing their cost of service."[189] Cal Advocates additionally claims that, "[b]efore excluding lithium-ion technology, SDG&E should show that non-lithium-ion storage provides a net benefit to ratepayers relative to the lithium-ion storage."[190] Cal Advocates

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[185] Pursuant to the April 20, 2023 E-Mail Ruling with instructions for a Status Conference on May 26, 2023, and Information for the Evidentiary Hearing at 11, Exhibit SDG&E 15-CWP will be corrected to reflect the change.

[186] Ex. SDG&E-15-R (Valero) at FV-21 to FV-22.

[187] Ex. CA-09 (Younes) at 33.

[188] *Id.* at 34, 35 (emphasis added).

[189] *Id.* at 35.

[190] *Id.*

recommends that the Commission deny the funding in its entirety and instructs SDG&E to submit a separate application for this project.[191]

SDG&E disagrees with Cal Advocates that SDG&E's Non-Lithium-Ion Energy Storage Technology proposal should be consistent with and count towards SDG&E's D.21-06-035 long-duration energy storage obligation for 2026, and notes that here again, Cal Advocates is attempting to have requirements from discrete decisions have blanket applicability to this GRC. D.21-06-035 is clear that its requirement to file an application for utility-owned storage applies only to "procurement conducted as a result of [the] order" in the Decision.[192] The Commission also made plain that the procurement in D.21-06-035 was to address the mid-term reliability needs of the CAISO operating system.[193] As stated in my direct testimony, SDG&E is proposing to deploy non-lithium-ion alternatives on a small scale to develop familiarity with the technology and to inform future applications in larger-scale.[194] SDG&E is not intending for the three small scale deployments to participate in the CAISO market at least initially, as SDG&E wants to become familiar with the technologies and their capabilities. For that reason alone, the deployments would not meet the obligations specified in D.21-06-035,[195] as the assets would not meet CAISO net qualifying capacity ("NQC") requirements because they would not be bid into CAISO.[196]

Instead, SDG&E proposes to follow the multi-year demonstration process utilized by SDG&E's Miguel Vanadium Redox Flow ("Miguel VRF") BESS, which is distribution

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191 *Id.* at 35-36.

192 D.21-06-035, Ordering Paragraph 13 and at 93.

193 D.21-06-035 at 2 ("This decision addresses the mid-term reliability needs of the electricity system within the California Independent System Operator's (CAISO's) operating system by requiring at least 11,500 megawatts (MW) of additional net qualifying capacity (NQC) to be procured by all of the load-serving entities (LSEs) subject to the Commission's integrated resource planning (IRP) authority.")

194 Ex. SDG&E-15-R (Valero) at 21.

195 D.21-06-035 at 2.

196 *See* CAISO tariff (http://www.caiso.com/rules/Pages/Regulatory/Default.aspx), Section 40.4.3.1 states "Submit Bids into the CAISO Markets as required by this CAISO Tariff." Section 40 of CAISO's Federal Energy Regulatory Commission ("FERC") authorized tariff can be found at http://www.caiso.com/Documents/Section40-ResourceAdequacyDemonstration-for-SchedulingCoordinatorsintheCaliforniaISOBalancingAuthorityArea-asof-Feb11-2023.pdf

interconnected.[197,198] Over the multiple year demonstration, SDG&E will study the value streams related to voltage regulation, capacity firming, peak shaving, potential backup power, PV smoothing, and frequency regulation.[199] Noted in the 2023 U.S. DOE's LDES Pathways to Commercial Liftoff Report,[200] "Cost-effective long duration energy storage technologies are an option to enable high renewable pathways, lower the cost of grid expansions, improve grid resilience, reduce the need for new natural gas buildout, and diversifying domestic energy storage supply chains". Additionally, depending upon the technologies studied, there may be other aspects to study, like the microgrid capabilities of the Miguel VRF.[201]

For these reasons, D.21-06-035 is not applicable and should not be applied to SDG&E's proposed non-lithium-ion technology program. Cal Advocates' concern about "over-procurement" makes little sense for three small pilot projects that are connected to the distribution system. Requiring a separate application for this limited pilot program, rather than consideration in this GRC proceeding similar to consideration of the Miguel VRF in the 2019 GRC proceeding,[202] would be inefficient and time-consuming for both SDG&E and the Commission. Finally, the purpose of this pilot program is to study non-lithium-ion storage technologies. Therefore, Cal Advocates' suggestion that SDG&E should determine whether lithium-ion technology has greater benefit to ratepayers before SDG&E even begins the non-lithium-ion pilot program is illogical.

SDG&E therefore recommends Cal Advocates' proposal be denied, and SDG&E's proposed request be approved.

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197 The Vanadium Flow Battery Project (synonymous for the Miguel VRF) was funded by the 2019 GRC D.19-09-051 at 294.

198 Appendix B, SDG&E's Supplemental Data Request response to CCAS-SDGE-002 Question 02.22b.

199 This list is not meant to be exhaustive for the potential items for SDG&E to study.

200 U.S. Department of Energy, Pathways to Commercial Liftoff: Long Duration Energy Storage, (March 2023), available at: https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-LDES-vPUB-0329-update.pdf

201 *See* Multiple-Use Application Between Wholesale Market and Distribution Level Microgrid with Vanadium Flow Battery" at https://ieeexplore.ieee.org/document/9998043.

202 D.19-09-051 at 294.

2. TURN

TURN takes issue with SDG&E's TY capital forecast for budget code 212710 (Non-Lithium-Ion Energy Storage Technology), recommending that the Commission reduce SDG&E's request to zero.[203] As with SDG&E's AES 2.0 program, TURN states the "proposals are so vague and unsupported that SDG&E has not met its burden of proof supporting the projects."[204]

SDG&E disagrees with TURN. As stated in my opening testimony, Capital Workpapers, and rebuttal to Cal Advocates above, SDG&E proposes a multi-year demonstration of each technology studied to identify the value steams and study potential large-scale applications of the technology. SDG&E identified examples of technologies that may be deployed (new battery chemistries, as they emerge, and non-battery alternatives such as flywheels and gravity-based storage), explained that SDG&E would seek commercially available solutions, and provided a limited budget for feasibility and planning work, deployment and commissioning, and evaluation.[205] Evaluation of non-lithium-ion storage technologies avoids risks associated with over-dependence on lithium-ion and other existing battery technologies, may increase the diversity of storage resources available to the grid as encouraged by the Commission,[206] and is needed to advance SDG&E's and California's transition to the carbon neutrality required by SB 100 for retail electricity sales.[207]

SDG&E has adequately explained and supported this pilot project, and requests that the Commission approve its funding as set forth in my opening testimony.

3. UCAN

UCAN supports SDG&E's TY capital forecast for budget code 212710 (Non-Lithium-Ion Energy Storage Technology). UCAN states "this expenditure…goes beyond standard lithium-based energy storage batteries and may result in scaling up of additional non-lithium-ion battery storage technologies."[208] SDG&E agrees with UCAN, deploying non-lithium-ion energy

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[203] Ex. TURN-06C (Monsen) at 81.

[204] *Id.* at 7, 57.

[205] Ex. SDG&E-15-CWP (Valero) at 22.

[206] *See, e.g.*, D. 21-06-035 at 36.

[207] SB 100 sets a goal of requiring renewable and zero-carbon energy resources to supply 100% of electric retail sales and state loads by 2045; see also SB 1020 (2022).

[208] Ex. UCAN (Woychik) at 285-286.

storage technology on a small scale will advance the market for non-lithium-ion technologies and will further the goal of SB 32,[209] SB 100[210] and SB 1020 (2022).[211]

D. 17246A Borrego Springs 3.0 Microgrid

As stated in my opening testimony, the Borrego Springs 3.0 Microgrid project expands the existing microgrid by installing "a new circuit necessary to integrate additional DER as part of the microgrid."[212] The additional DERs, approved in SDG&E's 2019 GRC,[213] are under construction and expected to be online in 2023-2024, as set forth in the discussion regarding SDG&E's AES project above.[214] "The scope of Borrego 3.0 is to install a new distribution circuit to allow for additional capacity to support the installation of additional energy storage assets to increase the size of the microgrid supporting the community of Borrego Springs. The additional energy storage assets will not only support SDG&E's goal of transitioning this microgrid to being 100% renewable solution by reducing reliance on diesel generators, but will also help increase the amount of load the microgrid can carry for extended durations. A portion of this project is reimbursable by a grant from the Department of Energy studying various microgrid capabilities."[215] At this point, the new circuit contemplated by Borrego 3.0 has been constructed and is ready to interconnect the AES energy storage assets.

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[209] SB 32 ordered a reduction in economywide emissions of 40% below 1990 levels by 2030.

[210] SB 100 sets a goal of requiring renewable and zero-carbon energy resources to supply 100% of electric retail sales and state loads by 2045.

[211] Codified at Pub. Util. Code Section 454.53(a) ("It is the policy of the state that eligible renewable energy resources and zero-carbon resources supply 90 percent of all retail sales of electricity to California end-use customers by December 31, 2035, 95 percent of all retail sales of electricity to California end-use customers by December 31, 2040, 100 percent of all retail sales of electricity to California end-use customers by December 31, 2045, and 100 percent of electricity procured to serve all state agencies by December 31, 2035.").

[212] Ex. SDG&E-15-R (Valero) at 23.

[213] D.19-09-051 at 294.

[214] Ex. SDG&E-15-CWP (Valero) at 34.

[215] Ex. SDG&E-15-CWP (Valero) at 34.

1. Cal Advocates

Cal Advocates takes issue with SDG&E's TY capital forecast for budget code 17246A (Borrego 3.0).[216] Cal Advocates states SDG&E has not established a need for this project, stating that the "goal of achieving 100% renewable energy in the microgrid is laudable but unnecessary."[217] Therefore, Cal Advocates asserts the Commission "must reject funding" for the project.

SDG&E disagrees with Cal Advocates' recommendation. As an initial matter, the new circuit that is funded by this project is necessary to integrate the DERs approved by the Commission in SDG&E's 2019 GRC Decision,[218] which will capture excess PV energy generation and reduces utilization of fossil fuel generators during outages. These energy storage resources are under construction as described above in my discussion of AES, while the circuit is complete (*i.e.*, circuit 173).

Moreover, SDG&E's Borrego 3.0 project will contribute to many items related to the Borrego Springs Microgrid. Those items include SDG&E's cost-share associated with the DOE grant to directly validate that renewable DERs can provide the same microgrid resiliency and reliability as fossil fuel based DERs. Under SDG&E's DOE grant, DOE is also funding hardware-in-the-loop testing as well as modeling and simulation at the NREL to de-risk deployment of new renewable energy assets in the Borrego Springs Microgrid. The combined efforts will ensure a renewable energy microgrid can be operated safely and provide the necessary system stability during unplanned and planned outages (for example, black start of the microgrid and transition to island). NREL modeling and simulation are underway and are expected to wrap up before the end of 2023. Additionally, SDG&E notes that NREL is paid directly and exclusively by the DOE as a subcontractor on SDG&E's DOE award. As such, the only cost-share SDG&E is required to contribute to NREL's work is technical application oversight and review of their work as shown in my capital workpaper (Ex. SDG&E-15 CWP at 33-40.

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[216] SDG&E notes this project includes Collectible and Non-Collectible funding as laid out in Table FV-13 at FV-22 in my direct testimony (Ex. SDG&E-15-R). SDG&E's collectible (i.e., SDG&E's DOE funding) is removed from SDG&E's capital request so as not to overcharge ratepayers (i.e., the non-collectible value).

[217] Ex. CA-09 (Younes) at 38.

[218] D.19-09-051 at 293-294.

Finally, the DOE grant funds the development and implementation of SDG&E's initial phase of implementing a local area distribution controller ("LADC") (i.e., a microgrid controller) for existing energy storage assets (two batteries and one ultracapacitor system) of the Borrego Springs Microgrid, thereby reducing future IT development and programming time and investment of integrating additional AES assets into the LADC. The LADC enables streamlined operations and more efficient utilization of the renewable assets in the yard as well as better accommodating future growth of microgrid assets and functionality. Additionally, the LADC has been implemented at NREL in order to run simulations pursuant to the DOE grant. The integration of LADC at the Borrego Springs Microgrid, and into SDG&E's internal systems, for the existing energy storage assets is set to complete in the second half of 2023. Please see my direct testimony at FV-33 through FV-35 for a description of the LADC microgrid controller. Please also see my rebuttal testimony below, Section VI.E.1, for a further description of the LADC microgrid controller and how it supports SDG&E and the microgrid operation.

By allowing integration of additional energy storage to strengthen the microgrid, SDG&E's Borrego 3.0 project will lower GHG emissions, supporting SB 32's goal, and allow for carbon neutrality of the microgrid operation in the future, supporting SB 100's goal. Today, the Borrego Springs Microgrid utilizes diesel generators as the island master – the primary resource for black start, keeping the system stable when transitioning to island, and providing capacity. Energy storage development at Borrego, of which Borrego 3.0 is a key part, will demonstrate that battery-based resources can perform the same function and therefore fossil fuel generators can be decoupled from operations in the future. Not only will the direct reduction in fossil fuel consumption benefit the Borrego Springs community, but through Borrego Springs 3.0, SDG&E will be able to demonstrate improved reliability of customer-sited PV in outage conditions (mitigating the risk of legacy PV inverters tripping), better support the growth in customer-sited PV as a microgrid asset during outage, and more effectively utilize excess larger scale PV in overgeneration periods.

Further, the project more broadly de-risks utility energy storage adoption on the decarbonization pathway to serve resiliency and reliability applications, including services to rural/remote communities that are more likely to rely on diesel and gas generators during PSPS or outage conditions. This work, done in combination with the DOE and NREL, will inform the

whole microgrid industry in California and beyond, which is why DOE issued the grant to cover a portion of the costs.

For all these reasons, SDG&E has justified the Borrego 3.0 project and Cal Advocates request to deny the project should be denied.

2. UCAN

UCAN takes issue with SDG&E's TY capital forecast for budget code 17246A (Borrego 3.0). UCAN appears to argue that the ongoing construction of battery and hydrogen storage devices at the Borrego Springs Microgrid does not justify construction of the new circuit needed to integrate those assets into the microgrid.[219] Thereafter, UCAN contends "SDG&E did not provide enough information about the project to be justified," specifically claiming that the "Borrego Microgrid 3.0 project is outmoded, poorly justified, represents unnecessary capital cost and rate-based, and does not appear to reflect the need for increased power demand or reliability…and seems primarily aimed at integration of only USOM DERs."[220]

SDG&E disagrees with UCAN. First, SDG&E notes that the Commission approved the Borrego Springs Microgrid energy storage projects in D.19-09-051,[221] and it would be inefficient not to integrate those assets into the microgrid through the new circuit built under the Borrego Springs Microgrid 3.0 project. SDG&E notes the circuit work has been completed (i.e., circuit 173 has been added).

Second, the Borrego Springs Microgrid provides valuable service to SDG&E customers. The microgrid is in a rural and remote desert community, subject to temperature extremes, flooding, and other extreme weather. For instances of planned maintenance of the single, long transmission line running into the area, as well as when extreme weather events cause unplanned outages on the line, enhancing the power and capacity of microgrid through energy storage enables improved support of critical loads and will reduce reliance on both utility and customer usage of fossil-fuel based generators during outages. The functionality being brought to fruition in Borrego 3.0 will demonstrate that battery-inverter based resources can provide the same, if not better, capability as the current diesel generators, and will allow the microgrid to seamlessly

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[219] Ex. UCAN (Woychik) at 286-87.

[220] *Id*. at 288.

[221] D.19-09-051 at 294.

black start and island the community all based on clean technologies. This is the opposite of "outmoded."

Third, UCAN does not appear to understand how IFOM utility energy storage DERs support existing, and facilitate incorporation of additional, customer DERs. Should an outage occur in Borrego Springs, in the absence of adequate utility-sided microgrid energy storage for seamless transition to island operations, there is risk of customer-sided solar inverters tripping in underfrequency conditions, resulting in a loss of PV generation. If anything, Borrego 3.0 will ensure seamless operation of customer-sided PV while at the same time facilitating incremental customer additions. Further, integrating the AES BESS and HESS will enable the microgrid to increase the amount of clean generation captured from the 6.5 MW distribution-connected and 26 MW transmission-connected solar PV when grid paralleled.

UCAN's claim that there is no need for increased power demand or reliability through storage ignores local generation and load requirements, now and in the future. Borrego Springs presently has over 40 MW of solar PV generation at peak times during the day with relatively low loads and averages high peak loads in the 12 MW range in the late day when solar PV is not generating.

Since 2018, NEM PV in Borrego Springs has doubled, with 8.3 MW of generating capacity today. Further, there is an additional cumulative 8.1 MW of approved customer NEM applications in the queue. Along with this additional 8.1 MW of customer-sited generation capacity, only 150 kW of storage has been applied for in the queue, or less than 2%, of the additional generation.[222] Therefore, 1) increases in power and energy storage capacity at the Borrego Springs Microgrid can reduce daytime PV curtailment and capture that energy for when it is needed most in the late day; and 2) any increase in power and energy storage capacity at the Borrego Springs Microgrid can support microgrid loads for longer when it is necessary to island, thereby reducing reliance on fossil fuel-based generators by both SDG&E and the community.

SDG&E takes issue with the statement that the Borrego 3.0 project is unjustified because the microgrid "provides service to only 2,800 customers."[223] The Microgrid supports critical

[222] SDG&E data re: adopted NEM and approved NEM applications for Borrego substation as of 4/26/23, 2013-2023.

[223] Ex. UCAN (Woychik) at 287.

loads such as police and fire, health care facilities, cool zones, and schools, and also serves large agricultural customers with high evening peak demands related to water pumping.

UCAN also wrongly suggests that "the DOE grant seems likely to have applied to earlier phases of his project, such as when SDG&E applied DOE funding of $1.76M in 2017 and $.51M in 2018, but zero ($0) in 2019."[224] UCAN is mistaken—and made no effort to better understand during via discovery. While SDG&E has received DOE funding in the past for the Borrego Springs Microgrid project, that funding is separate from the grant for the work contemplated by Borrego Springs Microgrid 3.0.

Finally, UCAN makes the unsupported statement that "this same microgrid project has excessive O&M costs and should not be authorized by the Commission because the proposed expenditures associated with the microgrid are not just nor reasonable."[225] UCAN provides no background support to justify this claim. More importantly, SDG&E is not presenting any O&M costs associated with the Borrego Spring Microgrid in this TY GRC. Instead, O&M of the microgrid is managed by SDG&E's DER Engineering department (budget IDD005).

Given all these reasons above, SDG&E recommends that the Commission reject UCAN's objection and approve SDG&E's Borrego Springs Microgrid 3.0 project as filed in direct testimony.

E. 212660 Integrated Test Facility (ITF) Expansion

No parties submitted testimony opposing the ITF expansion. As such, the Commission should authorize the program as filed.

F. 20281A Sustainable Communities Removal

As explained in my opening testimony: "SDG&E expects to remove SDG&E-owned solar PV arrays and small batteries on customer sites throughout San Diego County through 2024. The identified customer sites, mainly municipal buildings, schools, non-profit and commercial buildings, are scheduled for a potential lease renewal in the corresponding years, however it is unlikely that the customers will renew the lease and instead will exercise their right to remove the PV arrays."[226]

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[224] *Id.* at 288.

[225] Ex. UCAN (Woychik) at 288.

[226] Ex. SDG&E-15-R (Valero) at 25.

1. Cal Advocates

Cal Advocates takes issue with SDG&E's TY capital forecast for budget code 20281A (Sustainable Communities Removal), and recommends the Commission reduce SDG&E's request by $1,113,417.[227] Noting that the PV arrays may still have useful life left, Cal Advocates suggests "SDG&E should pursue a different strategy, such as selling the used equipment to the site owners at a discounted rate."[228] If the Commission allows SDG&E to remove the equipment, Cal Advocates contends that "SDG&E's cost estimates are far too high."[229]

As a threshold matter, SDG&E notes that the lessor, not SDG&E, decides whether to terminate the lease. SDG&E's first goal is to seek the extension of a lease option, but that is not always feasible as it is the lessor's choice. Additionally, SDG&E did look into alternative proposals versus simply removing the assets from the owner's site, but as laid out below, alternative strategies like Cal Advocates proposes ("different strategy")[230] are not feasible whether it is due to fire code or negative impacts to the customer. Additionally, SDG&E notes that SDG&E's removal process and expenses include the recycling of the assets in order to properly dispose of parts and be good environmental stewards.

SDG&E disagrees with Cal Advocates that the removal costs are too high or that there is undepreciated value.[231] It's unreasonable for Cal Advocates to attempt to isolate and estimate an undepreciated value of the Sustainable Communities projects and use this as justification that the projects are "problematic,"[232] since these assets are part of a group depreciated account and under group depreciation, as further described in Exhibit SDG&E-36-R. As Sustainable Communities follows a group asset depreciation, it is inappropriate for Cal Advocates to assign undepreciated value to individual assets. As such, Cal Advocates' assertion of undepreciated value for the Sustainable Communities projects should be denied.

Additionally, SDG&E's removal cost estimates are based on an independent decommissioning study prepared by Sargent & Lundy, an engineering firm. The detailed study

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[227] Ex. CA-09 (Younes) at 47.

[228] *Id.* at 42.

[229] *Id.*.

[230] *Id.*.

[231] *Id.*

[232] *Id.*

can be found in Exhibit SDGE-36-WP-S – Volume 13. Cal Advocates challenges the removal costs as "inflated,"[233] Cal Advocates did not present any informed analysis of likely removal costs. As such, Cal Advocates' alternative recommendation for removal costs should be denied.

Further, Cal Advocates' recommendation to utilize a "different strategy"[234] is not feasible. Cal Advocates recommends two proposals: "selling the used equipment to the site owners at a discounted rate" and "[g]iving the equipment to customers free of charge."[235] Neither proposal is appropriate because 1) it would strand the assets on the site owners' roof and strap them with removal and recycling costs down the road; and 2) a sale or gift to such customers may require individual Section 851 filings,[236] which would result in more expense and delay. Additionally, if SDG&E removed these systems and attempted to deploy them on another customer's roof, Codes and Standards UL 1703 for fire classification would present issues, as "[w]here Class A or Class B roofing is required, the photovoltaic solar system (photovoltaic panels with the rack support system) shall have a Class A or Class B rating, respectively,"[237] which the SCP PV systems do not meet as they were installed prior to 2015. Lastly, while SCP resources are installed on customer's rooves, they are IFOM interconnected assets, with SDG&E being the interconnecting customer, not the site owner (i.e., lessor). For the site owner (i.e., formerly the lessor) to potentially re-interconnect the system to the grid, it would likely require them to submit a Rule 21 NEM interconnection application as the interconnection rights are owned by SDG&E, not the site lessor.

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[233] Ex. CA-09 (Younes) at 44.

[234] *Id.* at 42

[235] *Id*.

[236] Pub. Util. Code Section 851 ("A public utility … shall not sell, … or otherwise dispose of … any part of its ... property necessary or useful in the performance of its duties to the public … without first having either secured an order from the commission authorizing it to do so …."). While SDG&E believes a Commission decision authorizing this program would allow SDG&E to remove these assets from public service and then recycle them, SDG&E is less certain that the Commission would not require individual Section 851 filings to approve the sale or gift of working assets to individual customers.

[237] *See* UL 1703 fire classification requirements effective January 1, 2015: https://calssa.org/codes-standards#:~:text=UL%201703%20fire%20classification%20requirements%3A%20On%20November%2025%2C,a%20Class%20A%20or%20Class%20B%20rating%2C%20respectively.%22 .

"Effective January 1, 2015, rooftop mounted photovoltaic systems shall be tested, listed and identified with a fire classification in accordance with UL 1703."

Given all these reasons above, SDG&E recommends that the Commission reject Cal Advocates' request and approve SDG&E's SCP Removal project as filed in direct testimony.

G. 212610 Mobile Battery Energy Storage Program

As stated in my opening testimony: "This program will consist of purchasing three mobile battery systems for each of the years 2022, 2023, and 2024 for a total of nine mobile battery systems. … This cost supports the Company's goal of decarbonization by decreasing the reliance on backup diesel generation through the alternative use of clean energy batteries which are not limited by physical location. SDG&E can leverage these mobile battery energy storage systems (MBESS) to increase grid resiliency and operational flexibility for the Company's customers during public safety power shut-off events by deploying these systems to at-risk electric systems experiencing things like system maintenance outages and adverse weather conditions. The MBESS can also be used during outages related to planned maintenance work or construction activities, reducing the use of backup diesel generators which are typically used to provide power continuity to customers and support construction activities, respectively."[238]

1. Cal Advocates

Cal Advocates takes issue with SDG&E's TY capital forecast for budget code 212610 (Mobile Battery Energy Storage) and asks the Commission to reduce funding to zero. Cal Advocates states that SDG&E did not provide specific evidence that the MBESS are needed or benefit ratepayers. Cal Advocates states: "Cal Advocates does not oppose a transition from diesel generation to cleaner generation and/or storage. However, the benefits and costs must be carefully weighed to show that the benefit outweighs the cost, or pursuing the cleaner option is not just and reasonable."[239]

SDG&E disagrees with Cal Advocates as the MBESS will immediately support SDG&E's resiliency and reliability efforts, especially during Public Safety Power Shutoffs ("PSPS") events and other unplanned or planned outages. For example, in 2020 SDG&E deployed 195 diesel generators to mitigate customer impacts during planned outages and PSPS events, while in 2021 SDG&E deployed 168 diesel generators for planned outages, a PSPS event and one unplanned event.

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[238] Ex. SDG&E-15-R (Valero) at 26.

[239] Ex. CA-09 (Younes) at 48-49.

Using SDG&E's 275 kilowatt ("kW") generator deployment data for 2021 as a proxy for understanding GHG emissions from a "typical" diesel generator used to provide resiliency, there are quantifiable benefits.[240] Deploying a MBESS in place of a diesel generator results in the following benefits: 1) GHG emissions reductions; 2) reduction of criteria air pollutants (e.g., NO_x, carbon monoxide ("CO"), hydrocarbons, and diesel particulate matter) which affects ambient air quality; and 3) reduction of diesel fuel consumed. SDG&E's MBESS program will supplement the deployment of 2.69 (275 kW) diesel generators in 2022, 5.37 (275 kW) diesel generators in 2023, and 8.06 (275 kW) diesel generators in 2024. Using the Environmental Protection Agency ("EPA") standard emissions equivalence factors for diesel fuel[241] the MBESS deployments in lieu of a diesel generator equivalent would result in a reduction of 6.93 metric tons of CO_2 equivalent ($MTCO_2e$) in year 2022, 13.87 $MTCO_2e$ in 2023, and 20.80 $MTCO_2e$ in 2024. The reduction of criteria air pollutants will additionally play its part in contributing to bettering local ambient air quality, where ozone and particulate matter, are currently not in attainment with State standards.[242]

Notably, MBESS deployments can support the Clean Energy and Pollution Reduction Act of 2015 (SB 350) designated disadvantaged communities ("DACs").[243] Specifically, SDG&E has conducted studies at Santa Ysabel Reservation regarding food refrigeration and a community center offering health aid and dialysis. MBESS could be utilized to provide critical power support during outages in rural and remote Tribal areas. This is directly aligned with the Commission's 2022 Environmental & Social Justice ("ESJ") Action Plan goal[244] to increase climate resiliency in communities, ensuring that ESJ communities and considerations around their adaptive capacity is incorporated into relevant programs and activities.

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[240] Calculations for GHG and criteria pollutants were based on in-front-of-the-meter primary interconnection deployments. Behind-the-meter connection deployments utilize smaller generators (less than 50 horsepower) that are exempt from air quality permitting, and as such, exempt from operational hour logging.

[241] *See* https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf.

[242] *See* https://www.sdapcd.org/content/sdapcd/planning/attainment-status.html

[243] https://oehha.ca.gov/calenviroscreen/sb535

[244] California Public Utilities Commission Environmental & Social Justice Action Plan (V 2.0, April 7 , 2022, Goal 4, page 24 and 42. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/news-office/key-issues/esj/esj-action-plan-v2jw.pdf

Given all these reasons above, SDG&E recommends that the Commission reject Cal Advocates' request and approve SDG&E's Mobile Battery Energy Storage Program as filed in direct testimony.

H. 212680 Hydrogen Build Ready Infrastructure

As stated in my opening testimony: "To meet California's environmental goal and SDG&E's Sustainability Strategy, this project provides for the acceleration of electric system service infrastructure necessary to support customers' localized creation of hydrogen via electrolysis for the purpose of supporting clean, hydrogen-based transportation in SDG&E's service territory. This effort targets providing customers with an incentive by covering the interconnection costs incurred as it relates to the specific customer's installation of a hydrogen electrolyzer on SDG&E's electric grid. … SDG&E will target and prioritize these electrolyzer plus solar installations with a focus on serving public interest entities (e.g., public transit agencies, waste management agencies, port authorities or school districts)."[245]

1. Cal Advocates

Cal Advocates takes issue with capital forecast for budget code 212680 Hydrogen Build Ready Infrastructure. Cal Advocates contends that the Commission should deny all funding, stating it "entails a cross-subsidy because it covers costs related to up to five customers which would be spread across all customers."[246] Cal Advocates contends that ratepayer funding of this project would be "regressive, harmful to low-income Californians, unnecessary, and could stymie GHG reduction efforts by raising electricity rates."[247] Cal Advocates also objects to a two-way balancing account.

SDG&E disagrees with Cal Advocate's recommendation on the primary basis that the program will create environmental benefits for all customers by incentivizing, through subsidizing interconnection costs, San Diego customers interested in early adoption of locally produced hydrogen. Such customers will use the hydrogen generated onsite to displace polluting fossil fuel they would otherwise consume. Additionally, for customers interested in switching to hydrogen-powered vehicles, creating electrolytic hydrogen onsite can be more efficient because

[245] Ex. SDG&E-15-R (Valero) at 28.

[246] Ex. CA-09 (Younes) at 52.

[247] *Id.*

it removes the need to transport and store the hydrogen. Without a program like Hydrogen Build-Ready Infrastructure, customers committed to hydrogen fuel adoption might elect instead to have hydrogen delivered to their site via a diesel fueled truck, which would drive up emissions related to the transport and storage of hydrogen.

The environmental benefits of replacing diesel fueled vehicles with hydrogen fuel cell electric vehicles is significant. For example, SDG&E calculates that if the entire program budget was spent and supported 10 MW of electrolysis in SDG&E's territory, daily hydrogen production could be 4,248 kilograms ("kg"). If that hydrogen replaced diesel fuel for transportation, it would amount to 39 tons (US) of avoided CO_2/day, or 14,270 tons/year, as well as a reduction of 315 tons (US) of avoided NO_x.[248,249]

San Diego can help lead the state in hydrogen infrastructure development. SDG&E has identified candidate customers in the region who have interest in exploring on-site hydrogen generation for zero emission transportation needs, including medium and heavy duty ("MD/HD") on-road vehicles and for emission free maritime transportation. Customers across our region interested in developing onsite hydrogen generation include a transit district, a university, a Native American tribe, the Port of San Diego, and a large private trucking services company. Programs like Hydrogen Build-Ready Infrastructure, in combination with funding from the CEC or other entities, will encourage these potential early adopters to transition their MD/HD fleet to zero emission vehicles. For many use cases, battery electric MD/HD vehicles are not a reasonable substitute to diesel fueled vehicles due to the weight of the batteries and charging times these vehicles will require; in many cases, only hydrogen fuel cell electric vehicles are a practical alternative to diesel powered trucks. For zero emission maritime applications, hydrogen is one of the only solutions.

California policy supports incentivizing hydrogen fuel cell electric vehicles with onsite hydrogen generation for zero emission vehicle ("ZEV") fueling. For example, the 2022 CARB Scoping Plan envisions that by 2045, 22% of the total energy demand in the transportation fuel

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[248] US EPA Greenhouse Gases Equivalencies Calculator – Calculations and References (updated April 4, 2023) https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[249] Lambert, D.C.; Vojtisek-Lom, M.; Wilson, J.P., *Evaluation of on road emissions from transit buses during revenue service (figures 2 and 3),* 11th International Emission Inventory Conference (April 2002) https://www3.epa.gov/ttnchie1/conference/ei11/mobile/wilson.pdf

mix will come from hydrogen.[250] The California Climate Commitment, Governor Gavin Newsom's comprehensive plan to forge a comprehensive climate action plan, includes $10 billion for zero-emission vehicles, including hydrogen fuel cell electric vehicles, which will reduce emissions and protect public health in low-income communities.[251] Executive Order N-79-20 requires that 100% of MD/HD vehicles must be zero-emission by 2045 for all operations where feasible, and by 2035 for drayage trucks.[252] California's AB 8, adopted in 2013, provides the CEC with up to $20 million annually through the end of 2023 to co-fund the development of hydrogen fueling stations in California.[253] As of June 2021, the CEC has awarded $169.4 million toward publicly available hydrogen refueling infrastructure deployments, and $30.1 million on MD/HD hydrogen refueling infrastructure deployment.[254]

The Commission has also been supportive of programs that enable ZEV adoption. Cal Advocates claims the Hydrogen Build Ready Infrastructure program is a cross-subsidy to a few customers paid for by all ratepayers and by its nature should be disqualified for ratepayer funding.[255] However, the Commission has a precedent for authorizing programs that utilize ratepayer funds to support ZEV adoption. Specifically, in D.16-01-045, the Commission authorized a $45 million program for SDG&E to develop electric vehicle charging stations to be paid for by electric ratepayers.[256] The decision authorized and approved a $45 million start-up budget, plus cost recovery through future GRC proceedings for justified capital and O&M expenses.

D.16-01-045 adopted a set of Guiding Principles to direct that program, many of which apply to this request. These principles include: "(1) Must support the Governor's and

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[250] CARB 2022 Scoping Plan, p. 190, Figure 4-2 & n. 332.

[251] California Climate Commitment, summary available at: https://www.gov.ca.gov/wp-content/uploads/2022/06/California-Climate-Commitment-.pdf

[252] *See* California, Executive Order N-79-20 (September 23, 2020) available at https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf .

[253] Bill Text - AB-8 Alternative fuel and vehicle technologies: funding programs. (ca.gov) https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB8, codified at Health and Safety Code Section 43018.9.

[254] California Energy Commission Hydrogen Fact Sheet (June 2021).

[255] Ex. CA-09 (Younes) at 52.

[256] D.16-01-045 at 181.

California's state goals to … accelerate the adoption of 1.5 million ZEVs by 2025 [and] support clean air and climate change objectives"; (4) must provide EV "drivers the opportunity to maximize fuel cost savings relative to conventional transportation fuels"; (6) "must provide customer choice"; and (11) "must utilize rate design and load management practices to facilitate the integration of renewable energy resources, as well as deliver other grid benefits."[257] Given the history and the alignment of this program with the Guiding Principles set forth in D.16-01-045, SDG&E argues the Hydrogen Build Ready Infrastructure program is as beneficial to ratepayers as what was authorized previously and is appropriate to fund via this GRC proceeding.

Cal Advocates states there is no need for SDG&E to use a two-way balancing account for this project and that if it is funded, it should do so via a one-way balancing account.[258] SDG&E supports Cal Advocates' proposal for a one-way balancing account.

Additionally, SDG&E stands by its updated itemized cost estimate for the proposed program, in the amount of $2,024,000 relative to the forecast amount of $1,925,000 in its workpapers. SDG&E notes in DR PAO-SDGE-116-AMY that "the new total estimate for the Hydrogen Build Ready Infrastructure project is slightly higher than the amount reflected in the previous supplemental workpaper. SDG&E is still requesting a total capital cost of $1.925 million and will not be updating its forecast."[259] Finally, the capital dollars will only be spent if customers apply to the program and meet its requirements. Should no customers apply and qualify, no dollars will be spent.

For the foregoing reasons, SDG&E requests the Commission to approve the Hydrogen Build Ready Infrastructure request as presented.

2. CEJA

CEJA takes issue with the capital forecast for budget code 212680 Hydrogen Build Ready Infrastructure and requests that the project funding be denied. CEJA states that producing hydrogen through grid-connected electrolysis is "dangerously emissions intensive."[260] CEJA

[257] D.16-01-045, Attachment 2 at 3.

[258] Ex. CA-09 (Younes) at 52.

[259] Appendix B, SDG&E's response to Data Request PAO-SDGE-116-AMY, question 2.

[260] Ex. CEJA-01 (Vespa et al.) at 56 n. 56.

provided a value from a single page of an undated CARB document, which states that the carbon intensity value of compressed hydrogen produced in California by using California average grid electricity ("HYEG") is 164.46 gCO2e/MJ.[261] In response to a data request, CEJA provided context to SDG&E that "CARB approved the referenced Lookup Table in 2019."[262] SDG&E found that the same referenced value is also included in a CARB report from 2018.[263] In either case, the carbon intensity value of HYEG is lower today.

The reference year of the document is very important. As noted in CARB's *Low Carbon Fuel Standard Annual Updates to Lookup Table Pathways in 2021*, "Updates [to the tables] reflect changes in the carbon intensity of California grid electricity driven by rapidly increasing contributions from low-carbon sources in the California electricity mixes due to mandates driven by the Renewable Portfolio Standard ("RPS"), requirements related to integrated resource planning ("IRP"), the inclusion of Cap-and-Trade carbon pricing in dispatch models, and other structural or systemic changes."[264] Therefore, CARB acknowledges that as we move toward 2045, the average carbon intensity of the California grid decreases as it gets cleaner each year.

As stated in my opening testimony, a program requirement is that the customer's electrolyzer "must be paired with an onsite PV system that is anticipated to provide electricity to support at least 30% of the electrolyzer's nameplate capacity."[265] Therefore, SDG&E evaluated the carbon intensity of grid electrolysis in 2022 for a system using a minimum of 30% onsite solar and operating between the hours of 8 AM and 5 PM (37.5% capacity factor). SDG&E used the carbon intensities listed in CARB *Low Carbon Fuel Standard Annual Updates to Lookup*

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[261] Ex. CEJA-01 (Vespa et al.) at 56 n. 252.

[262] Appendix B, CEJA's response to Data Request SCG-SDGE-CEJA-003, question 1.

[263] CARB. "CA-GREET3.0 Lookup Table Pathways Technical Support Documentation". August 13, 2018. P35.

[264] CARB. "Low Carbon Fuel Standard Annual Updates to Lookup Table Pathways." March 15, 2021, p. 3 <https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/2021_elec_update.pdf>.

[265] Ex. SDG&E-15-R (Valero) at 28.

Table Pathways in 2022 data and CARB's then current input parameters for HYEG.[266,267] SDG&E found that, in that scenario, the carbon intensity of the produced hydrogen would be 43.430 gCO_2/MJ, 73.5% lower than 164.46 gCO2e/MJ that CEJA reported in its testimony.[268]

Additionally, CEJA states that "gasoline and diesel both have an average carbon intensity of about 100 gCO_2e/MJ" and implied this is the number to "beat." While SDG&E does not argue this point, it is worth establishing that on a per mile basis, hydrogen fuel cell buses use energy twice (2.0 x) more efficiently that gasoline or diesel-powered vehicles.[269,270] In other words, on an energy basis, a bus can go 60 miles on one unit of hydrogen fuel, and only 30 miles on an energy equivalent unit of diesel. Therefore, SDG&E recommends the Commission should consider comparing the carbon intensity not of transportation fuels themselves in gCO_2e/MJ, but of the carbon intensity of their end use, as in gCO_2e/mile.

CEJA states, "The Commission should not use ratepayer funds to subsidize the production of hydrogen from grid-average electricity, given the significant pollution impacts of increasing load on the electric grid to power hydrogen production."[271] SDG&E takes issue with this characterization of its proposed program. To be clear, SDG&E is not subsidizing the cost of hydrogen production via a tariff; the Hydrogen Build Ready Infrastructure program will only help reduce upfront interconnection costs for connecting new hydrogen production infrastructure to the grid. Significantly, as CEJA notes, SDG&E requires as part of its program requirements that participants meet at least 30% of the electricity capacity required with onsite solar. Doing so will incentivize electrolyzer operations during the day when the grid is cleanest and electricity is

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266 California Air Resources Board. "Low Carbon Fuel Standard Annual Updates to Lookup Table Pathways." Jan 24, 2022, p.3 <<https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/2022_elec_update.pdf>>.

267 California Air Resources Board. "CA-GREET3.0 Lookup Table Pathways Technical Support Documentation." Aug 13, 2018. Table F.1 p 35.

268 Ex. CEJA-01 (Vespa et al.) at 56.

269 Eudy, L.; Post, M., *Fuel Cell Buses in U.S. Transit Fleets: Current Status 2018*, National Renewable Energy Laboratory, NREL/TP-5400-72208 Table ES-1, (December 2018).

270 U.S. Department of Energy Alternative Fuels Data Center (Conserve Fuel) for Public Transportation, *see*: https://afdc.energy.gov/conserve/public_transportation.html.

271 Ex. CEJA-01 (Vespa et al) at 57.

lowest cost and ensure that only a maximum of 70% grid electricity is utilized during the hours of 8:00 AM -5:00 PM when the average carbon intensity of the grid is at its lowest.

CEJA's testimony makes significant unfounded assumptions as to how potential program participants may behave or operate their equipment and ignores critical economic factors and incentives that exist to ensure the produced hydrogen is low in carbon intensity. For example, the federal hydrogen Production Tax Credit ("PTC") allows producers a credit of up to $3/kg if the hydrogen that is produced results in a life cycle GHG emissions rate of not greater than 4 kg of CO2 per kg of hydrogen (equivalent of 28.2 gCO_2e/MJ, Higher Heating Value ("HHV")).[272] Therefore, participants have a strong incentive to limit their hydrogen production to daytime hours, to install additional solar, and/or to purchase Renewable Energy Certificate ("RECs") to offset emissions from grid electricity should they choose to use it.

In summary, SDG&E rejects CEJA's claim that grid-connected electrolysis is "dangerously emissions intensive." SDG&E developed this initiative with a strong understanding of the near- and longer-term trajectory of the carbon intensity of California's grid, and incorporated up-to-date technology, cost assumptions, and federal/state policy assessments in its proposed program. In contrast to CEJA's assessment, SDG&E judiciously projects future emissions intensity of grid connected electrolysis utilizing the most current data available. Given the rapid pace of decarbonization, use of older analysis can at best lead to inaccurate assessments and at worst support entrenched biases that will impede development of a technology neutral, diverse array of clean energy and transportation solutions for society.

3. UCAN

UCAN claims that the Hydrogen Build Ready Infrastructure costs are not just and reasonable. UCAN states that for SDG&E to execute the Hydrogen Build Ready Infrastructure program it will need to become involved in the "currently uneconomic and largely speculative market for hydrogen electrolyzers,"[273] and the projects require new infrastructure which "are far

[272] H.R. 5376 Inflation Reduction Act Text - 117th Congress (2021-2022): Inflation Reduction Act of 2022 | Congress.gov | Library of Congress, Section 13204 codified at 45V.

[273] Ex. UCAN (Woychik) at 289.

from commercially available."[274] UCAN additionally states that SDG&E has "no track record in developing or operating a hydrogen electrolyzer"[275]

UCAN is confused. Under this program, SDG&E will not be in the market for electrolyzers, nor will it be operating or providing ratepayer funding for electrolyzers. As stated in my opening testimony at FV-28, the Hydrogen Build-Ready Infrastructure simply provides "customers with an incentive by covering the interconnection costs incurred as it relates to the specific customer's installation of a hydrogen electrolyzer on SDG&E's electric grid." The customers, not SDG&E, will purchase and operate electrolyzers. If customers find it uneconomic to do so, they will not seek interconnection or funding under the Hydrogen Build-Ready Infrastructure program. Therefore, UCAN's concerns are unfounded.

4. FEA

FEA recommends that instead of a two-way balancing account, SDG&E track program costs via a memorandum account. FEA states, "As this [Hydrogen Build Ready Infrastructure] is a new program and it appears uncertain if and when the projects will arise, FEA recommends that these costs be tracked in a memorandum account so that they later can be reviewed for reasonableness."[276] SDG&E has conceded to change its request from a two-way balancing account to a one-way balancing account pursuant to our response to Cal Advocates above in Section V.H.1. SDG&E contends that a one-way balancing account, as proposed by Cal Advocates' and conceded by SDG&E herein, provides reasonableness review by the Commission. For this reason, SDG&E recommends Cal Advocates' proposal for a one-way balancing account for the Hydrogen Build Ready Infrastructure is appropriate and should be authorized by the Commission.

I. 212720 Hydrogen Energy Storage System Expansion

As stated in my opening testimony: "To support the Borrego Springs community's electric resiliency and environmental goals, SDG&E plans to expand the hydrogen portion of the Advanced Energy Storage System at the Borrego Springs Microgrid." The expansion includes increasing onsite hydrogen fuel cell capacity from 250 kW to 1,000 kW and doubling onsite

[274] Ex. UCAN (Woychik) at 290.

[275] Ex. UCAN (Woychik) at 289.

[276] Ex. FEA-01 (Smith) at 50.

hydrogen storage to support the increased fuel cell capacity and to guaranty at least eight hours of energy storage (1 MW/8 MWh). My direct testimony also notes, "This expansion is critical to support islanding operation of the microgrid…. Additional capacity of the hydrogen fuel cell will help reduce the reliance on the diesel generators to serve customer load in high demand scenarios." [277]

1. Cal Advocates

Cal Advocates takes issue with the capital forecast for BC 212720, Hydrogen Energy Storage System Expansion and states that the Commission should not approve recovery for any aspect of the HESS" Expansion project.[278] Cal Advocates claims it is not needed, contending it is a "glorified research project," and is concerned the project could "stymie GHG reduction efforts by raising electricity rates."[279]

SDG&E disagrees. SDG&E is proposing the HESS Expansion to support resilient, low-GHG microgrids in a remote area of our service territory that is prone to grid outages. As I noted in my original testimony, the expanded hydrogen energy storage system at Borrego will directly reduce the need for polluting onsite diesel generators and supports the Borrego Springs Community's electric resiliency and environmental goals.[280]

Cal Advocates asserts that SDGE did not provide adequate analysis for the HESS expansion to establish the reasonableness of its request. In response to a data request, SDG&E provided data such as the peak net load of the microgrid, and the requirement for 8 hours of energy storage duration, to justify its proposed system sizing.[281] The HESS expansion meets the criteria of SDG&E in the following ways: (1) the HESS expansion request supports absorbing some of the peak net load that would otherwise be met by diesel fuel in the incremental amount of 750 kW; (2) the HESS expansion is sized for eight hours of storage; (3) it meets SDG&E's footprint requirements for the available space at the microgrid; (4) it will allow SDG&E to operate the HESS alongside other DER assets such as batteries in islanded mode; (5) it could

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[277] Ex. SDG&E-15-R (Valero) at FV-29 to FV-30.

[278] Ex. CA-09 (Younes) at 62.

[279] *Id*. at 61

[280] Ex. SDGE-15-R (Valero) at 30.

[281] Appendix B, SDG&E Response to Data Request PubAdv-SDG&E-AMY-078, Q. 2b.

allow SDG&E to independently dispatch the HESS to the grid during daily operations (i.e., blue sky conditions), should it become a participating generator per the CAISO Tariff. [282]

Cal Advocates requested information on the technology alternatives SDG&E investigated.[283] SDG&E did not explore technology alternatives because it was considered more viable to incrementally expand the output capacity of the existing HESS via the addition of tanks and fuel cells as the electrolyzer is already sized for 1,000 kW[284] pursuant to the AES project. An alternative technology, to get to 8 hours of energy storage duration as proposed herein, like installing a new 750 kW/6,000 kWh system flow battery, could not leverage all the work being done as part of AES, and would be more challenging to deploy as compared to simply expanding the capacity of the HESS. Additionally, as stated above, there are significant learnings for the company in achieving a HESS system of total 1 MW.

Cal Advocates claims "that the HFC expansion does not increase the duration of operation for the HFC toward the 12-hour upper limit of observed outages …. Therefore, the HFC expansion is not needed."[285] This statement is not true; any level of power and capacity increase of the HESS system contributes towards extending the duration of operations towards a 100% renewable microgrid. During island operations, the HESS expansion enables increased dispatch flexibility to address the situation at hand. For example, SDG&E could operate the HESS to dispatch power at 500 kW, for 16 hours, 1 MW for 8 hours, or at any number of other combinations of power and duration, or it could serve a subset of critical microgrid loads for a longer period. The unique flexibility of the HESS is one of the things SDG&E hopes to further understand through the HESS expansion.

Cal Advocates claims that this project mainly serves the public interest and not the specific interest of SDG&E's electricity ratepayers.[286] SDG&E disagrees. The expanded HESS will be "used and useful" and will reduce harmful emissions associated with diesel generators. It will help SDG&E understand the benefits and value of hydrogen energy storage systems both for microgrids in island mode as well as "grid-connected" mode since the HESS will be large

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[282] CAISO. "ISO Basics." <<ResourceInterconnectionFAQs.pdf (caiso.com)>>.

[283] CA-09 (Younes) at 59.

[284] Ex. SDG&E-15 CWP at 82

[285] Ex. CA-09 (Younes) at 61.

[286] *Id.*

enough to be a CAISO participant. Lastly, it allows SDG&E to continue to learn how to manage distributed clean hydrogen resources as the company transitions to a 100% clean electricity system by 2045.

Lastly, Cal Advocates takes issue with the proposed atmospheric water generation ("AWG") system SDG&E included in its request for the expanded HESS. Cal Advocates states, "The AWG project appears useful, but there is no reason for ratepayers to foot the bill. SDG&E should not volunteer its ratepayers to 'relieve the water demand from the local water utility.'"[287] To clarify, the purpose of the AWG system is not to help out the local water utility. The purpose is to learn about alternative water supplies that can support clean electrolytic hydrogen production, which is very important in the drought-prone region of Borrego Springs since water is the feedstock for the electrolyzer process. As noted in my testimony,

> Electrolytic hydrogen requires water, which can create constraints and trade-offs in California during droughts and general water shortages. This system will pull water from the air to relieve the strain on aquafers and traditional water supplies. An atmospheric water generator generates converts ambient water vapor in the air into liquid, usable water using solar energy and desiccants.[288]

The AWG is a standalone system (not grid connected) that can help solve water shortage issues for hydrogen production. It is a relatively low-cost request at $175,000, representing less than 4% of the overall HESS Expansion project budget, but could provide significant learnings for SDG&E and the state of California.

For the foregoing reasons, SDG&E requests that the Commission approved the proposed funding as presented in my opening testimony for the Hydrogen Energy Storage System Expansion.

2. UCAN

UCAN takes issue with the capital forecast for BC 212720, Hydrogen Energy Storage System Expansion and recommends that "SDG&E's proposed capital request for 2024 of $0.08 million be denied."[289] UCAN contends that "Mr. Valero does not detail the full costs of this expansion, nor the need for increased fuel cell capacity. The source of the fuel to support the

[287] Ex. CA-09 (Younes) at 62.

[288] Ex. SDGE-15 CWP at 82.

[289] Ex. UCAN (Woychik) at 290-91.

proposed fuel cell (which must be assumed to be hydrogen) for generating electricity is not explained nor justified."[290]

To the contrary, the cost is set forth in my Capital Workpapers and my testimony pointed out that "[a]dditional capacity of the hydrogen fuel cell will help reduce the reliance on the diesel generators to serve customer load in high demand scenarios."[291] To clarify, the fuel source for the fuel cell is electrolytic hydrogen, generated by the onsite electrolyzer.

UCAN takes issue with the atmospheric water system, stating that the approach to water production is not justified in my testimony.[292] Please see response above to Cal Advocates in Section V.I.1.

For the foregoing reasons, SDG&E requests that the Commission approved the proposed funding as presented in my opening testimony for the Hydrogen Energy Storage System Expansion.

VI. REBUTTAL SUPPORT TO OTHER WITNESSES

A. Electric Generation – Daniel Baerman (Exhibit SDG&E-214) - 210390 - Palomar Hydrogen Systems

As noted in my opening testimony, I provide the business justification for this project, while the costs are sponsored by Mr. Baermann in Ex. SDG&E-14-CWP. "The Palomar Hydrogen Systems program is SDG&E's essential first pilot focused on demonstrating multiple use cases of electrolytically produced hydrogen to support decarbonizing natural gas-powered plant operations."[293] As stated through the course of discovery, the Palomar Energy Center is a 588-megawatt combined cycle power plant that SDG&E owns and operates in Escondido, CA. As part of the Palomar Hydrogen Systems project, solar panels will be installed to generate carbon-free electricity to help produce clean hydrogen on-site through electrolysis. This hydrogen will then be used in practical applications, including electric power generation, to replace gray hydrogen for generator cooling, and as a clean transportation fuel. More detail as to these specific applications is provided below:

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[290] Ex. UCAN (Woychik) at 290-91.

[291] Ex. SDG&E-15-R (Valero) at 30 n. 29.

[292] Ex. UCAN (Woychik) at 291.

[293] Ex. SDG&E-15-R (Valero) at 31-32.

- Electric Power Generation: on-site production of hydrogen will be blended via a blending skid into the natural gas feedstock fueling a natural gas combustion turbine. This will allow SDG&E to gain a deeper understanding of blended feedstocks, impacts on turbine operational performance, emissions reduction benefits, and facilitates the future use of blending clean hydrogen as a tool for emissions reductions.
- Generator Cooling: on-site production of hydrogen will also be used as a cooling gas for the electric generators. Hydrogen is currently used at the Palomar Energy Center as a cooling gas for the electric generators, however it is gray hydrogen purchased from industrial gas vendors and trucked to the facility via fossil fueled trucks. Assessment of operations and the value add of on-site hydrogen production will yield lessons learned that will benefit consumers of hydrogen who presently have hydrogen shipped to their facility, including SDG&E.
- Clean Transportation: on-site production of hydrogen will be used as a fuel to power hydrogen fuel cell vehicles as part of SDG&E's fleet. A hydrogen refueling station will be built at the Palomar Energy Center. SDG&E is adopting both electric and hydrogen FCEV fleet vehicles to reduce its carbon footprint. To facilitate SDG&E's adoption of hydrogen vehicles, the company will need reliable fueling dedicated to fleet vehicles in a location that meets operational requirements (See Ex. SDG&E-22, Direct Testimony of Arthur Alvarez, Fleet Services).[294] Currently, there are only two public hydrogen fueling stations in all of SDG&E service territory, and neither are convenient to Palomar Energy Center.

1. Cal Advocates

Cal Advocates takes issue with the capital forecast and policy justification for BC 210390, Palomar Hydrogen Systems. Cal Advocates recommends that the Commission reduce funding to zero "due to the lack of benefits the Palomar Hydrogen System project would have, such as a very low reduction of GHG emissions, intermittent use of 1% hydrogen blend, and the

[294] Appendix B, SDG&E Response to Data Request PAO-SDGE-029-MW5 question 2b.

fueling of only three hydrogen vehicles."[295] Cal Advocates also claims that the project does not meet "the Commission's guidelines and standards set in D.22-12-057."[296]

SDG&E disagrees with Cal Advocates' claims. Cal Advocates main argument is that "The pilot program is not a requirement from any other proceeding."[297] SDG&E concedes that this pilot is not specifically mandated by the Commission in any existing proceeding. However, as discussed in the Sustainability Rebuttal, Ex. SDG&E-202 (de Llanos), SDG&E seeks to advance compliance with the State-mandated goals to achieve decarbonization in the electrical sector and across the economy. These policies have led SDG&E to develop this cost-effective and prudent pilot and proactively begin to understand and incorporate the use of hydrogen at one of its generating assets.

In 2018, SB 100 established into law the requirement that renewable and zero-carbon energy resources supply 100 percent of electric retail sales to customers by 2045.[298] SB 1020 (2022) tightened that mandate by directing this Commission to plan for "eligible renewable energy resources and zero-carbon resources [to] supply 90 percent of all retail sales of electricity to California end-use customers by December 31, 2035, 95 percent of all retail sales of electricity to California end-use customers by December 31, 2040, 100 percent of all retail sales of electricity to California end-use customers by December 31, 2045, and 100 percent of electricity procured to serve all state agencies by December 31, 2035."[299]

SDG&E's Palomar Hydrogen Systems request is an important example of SDG&E taking a proactive approach to ensure it is ready to meet the requirements of SB 100 and SB 1020 while delivering safe and reliable service. Currently, natural gas fired generators support the state with firm, dispatchable electric power. In 2020, 30% of the state's total natural gas consumption went to electricity production.[300] Hydrogen blended with natural gas combustion could support the legally mandated transition to carbon-free electricity by 2045 by lowering CO_2

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[295] Ex. CA-05 (Weaver) at 32.

[296] *Id.*

[297] *Id.*

[298] SB 100, Sections 1(b) & 5, codified at Cal. Pub. Util. Code Section 454.53(a), https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100.

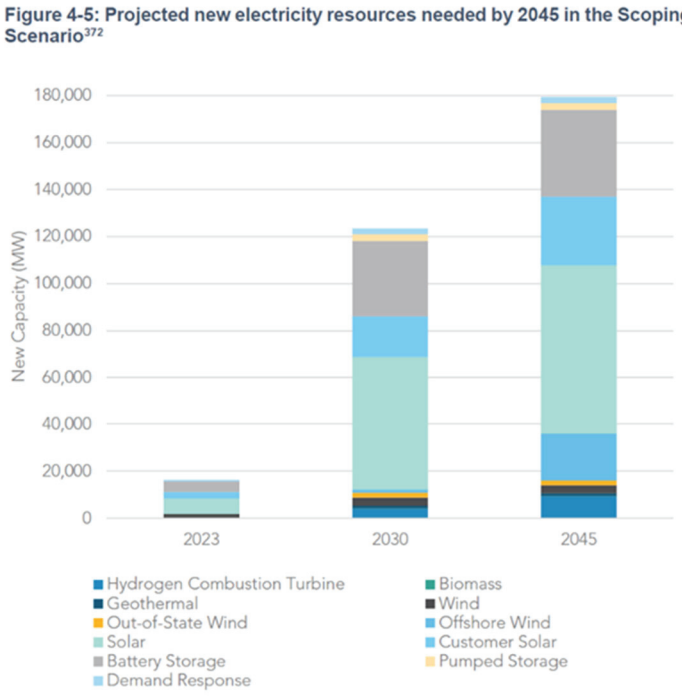
[299] SB 1020 (2022), Section 4, codified at Pub. Util. Code Section 454.53(a).

[300] U.S. Energy Information Administration, *Natural Gas Consumption by End Use, California, Annual, available at:* https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SCA_a.htm.

emissions from existing natural gas-powered generators over the next 20 years. Green hydrogen may be the clean fuel allowing zero-carbon, dispatchable generation in the future.

Power generation cannot be electrified; power generation from a carbon-free fuel like hydrogen will be an important and dispatchable enabler and source of electrification of buildings and transportation. In the 2022 CARB Scoping Plan, CARB projects that by 2045, California will require over 220 gigawatts ("GW") of new electricity resources to meet the growing electric demand. Of those new resources, CARB's plan estimates 9.325 GW of new hydrogen combustion turbine resources.[301] See Figure FV-4 below (CARB's Figure 4-5). The SDG&E Path to Net Zero study found that to cost-effectively support the grid with a one day in ten year loss of load requirement in the year 2045, California will need 20 GW of clean, firm dispatchable power generation to affordably complement all the intermittent renewable resources and battery energy storage that will make up the bulk of our generation portfolio.

Figure FV-4
CARB's Projected New Electricity Resources Needed in the Scoping Plan Scenario

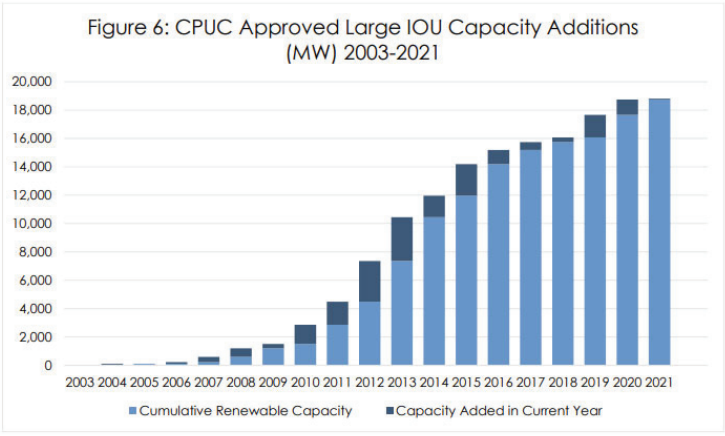


[301] California Air Resources Board. 2022 Scoping Plan for Achieving Carbon Neutrality. Nov 16 2022. AB 32 GHG Inventory Sectors Modeling Data Spreadsheet 2022-SP-Pathways-Data-E3_0.XLSX, tab "Electricity." Available at: https://ww2.arb.ca.gov/resources/documents/2022-scoping-plan-documents.

Unlike many existing electrochemical battery and energy storage technologies that have operating profiles in minutes to hours, hydrogen can meet the challenge of weekly or seasonal balancing of the grid that will be needed as the state moves toward higher penetrations of renewables. Hydrogen is a very long-duration (weeks to months) and scalable (from megawatts to gigawatts) energy storage medium and clean fuel that can be dispatched as a resource of last resort at scale to support grid needs for weeks or even months at time, just as SDG&E currently uses natural gas peaker plants in times of need to ensure grid reliability.

SDG&E cannot sit idly by for the next 10 to 20 plus years and then suddenly expect our employees, vendors, contractors, supply chains, and assets to be ready to meet the 2035, 2040 and 2045 deadlines of SB 100 and SB 1020, while also meeting our requirement to serve safe, reliable, affordable energy. While ten to twenty years sounds like a long time, it is not, and represents two to five GRC cycles. For example, it took 19 years for large IOUs to contract approximately 19,000 MW of renewable capacity required by the CPUC (See Figure FV-5).[302] According to the SDG&E Path to Net Zero Study, that is nearly the same capacity of new hydrogen generation (~20 GW) that will be required in 2045. A 20-year runway is an appropriate amount of time to undertake such a massive transition. If we do not begin planning for this infrastructure today, we are unlikely to reliably meet our decarbonization targets by 2045.

Figure FV-5
It took Large IOUs 19 Years to make 19,000 MW of RPS Eligible Capacity Additions



Data Source: CPUC RPS Database, September 2022

[302] CPUC. 2022 California Renewables Portfolio Standard Annual Report. Nov 2022. << https://www.cpuc.ca.gov/-/media/cpuc-website/industries-and-topics/documents/energy/rps/2022-rps-annual-report-to-the-legislature.pdf>>.

The CEC itself is taking an aggressive and early approach towards engaging on critical hydrogen-related research for power generation. Within its Gas Research and Development Plan for FY 2022-23, CEC directed millions of dollars to "advance low carbon hydrogen for hard-to-decarbonize applications such as in…dispatchable generation."[303]

Cal Advocates argues that the costs of the pilot program at Palomar outweigh the benefits. However, the true value of the pilot goes significantly beyond the avoided cost of gray hydrogen delivery and a modest reduction in system-wide GHG emissions. The true, and extremely significant value of this small pilot is in the impactful learnings SDG&E will achieve on how to manage hydrogen for multiple use cases at a generating asset. These include critical first-hand lessons and experiences for designing and managing onsite electrolytic hydrogen production and gas storage to support (1) hydrogen blending; (2) hydrogen for generator cooling; and (3) hydrogen for vehicle fueling. SDG&E will gain knowledge and experience in a variety of areas, including engineering, system design, codes and standards, controls, valves, piping, venting, safety requirements, hazards, material specifications, best practices, risk management, metering, performance data on gas turbine efficiency with blended gas, emissions data, cost data, developing asset operation and maintenance strategies, developing and publishing standard operating procedures, training staff, labor, and first responders, and developing asset management requirements and protocols.

SDG&E must actively usher in the very challenging clean energy transition with a prudent, cost-minimizing, phased approach to new technology adoption and deployment. Currently, hydrogen is the only carbon-free, non-nuclear fuel SDG&E is aware of that can be scaled to meet this need for affordable, reliable, dispatchable clean electric generation for California's future. SDG&E understands that the technology landscape is rapidly and constantly evolving, and perhaps new technologies and fuels will be available that are better suited for the energy transition. This is why SDG&E has developed a prudent, relatively low cost phased approach to technology adoption, evaluating a diverse set of potential solutions, including small hydrogen pilots.

It is significantly more cost effective to establish small hydrogen pilots at existing assets to understand the fuel today rather than wait until the last minute (2042) and spend hundreds of

[303] California Energy Commission Staff Report, Gas Research and Development Program, CEC-500-2022-001.pdf (ca.gov) p.9.

millions of dollars on a technology that SDG&E is wholly unfamiliar with and has not proven or vetted. Given that the implementation of new technologies carries technology, operational, and cost risk, execution of pilot projects now de-risks follow-on large-scale implementations later. High value technology, design, and operational experience lessons learned can be achieved at the pilot scale at lower expense.

For example, SDG&E wants to avoid being in the position which the LADWP finds itself. The City of Los Angeles has an ambitious goal to run on 100% clean energy by 2035, ten years before the rest of the state is required to do so. LADWP worked with the NREL to develop LA100, a renewable energy study, that could inform its path to clean energy. LA100, which was published in 2021, found that "new in-basin, renewable firm capacity – resources that use renewably produced and storable fuels, can come online within minutes, and can run for hours to days – will become a key element of maintaining reliability."[304]

Informed by that study, the Los Angeles City Council recently unanimously decided to convert one of its combined cycle power plants, Scattergood, to run on 30% hydrogen by 2030, and 100% hydrogen by 2035. This is a technologically risky commitment for many reasons, including because it is likely that LADWP has never piloted hydrogen generation nor operated a power plant that has used hydrogen before. Additionally, turbines that can operate at 30% hydrogen are newer, and it is uncertain how LADWP will source and store the required volumes of hydrogen. LADWP faces an incredibly steep and challenging learning curve for Scattergood; and the price tag for the risky project is staggering: $800 million.[305] SDG&E's request for funds to blend hydrogen at its Palomar Energy Center combined cycle plant using existing turbine technology should be considered a prudent and cost-effective benefit to ratepayers in terms of the clean energy transition. While LADWP must meet 100% clean electricity by 2035, SDG&E must meet 90% by 2035, still a very significant amount. Besides the modest obvious benefits Cal Advocates mentions of reducing emissions and avoiding the cost of delivered gray hydrogen, the relatively modestly priced pilot ($16,278,000 million) allows SDG&E to learn about and

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[304] Cochran, Jaquelin, and Paul Denholm, eds. 2021. *The Los Angeles 100% Renewable Energy Study*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-79444. Executive Summary p. 12. https://maps.nrel.gov/la100/.

[305] Roth, Sammy. "L.A. is shutting down its largest gas plant — and replacing it with an unproven hydrogen project." Los Angeles Times Feb 8 2023. << https://www.latimes.com/business/story/2023-02-08/l-a-is-shutting-down-a-coastal-gas-plant-and-replacing-it-with-hydrogen>>.

interact with multiple aspects and use cases of hydrogen technology at one of SDG&E's most important generating assets in a low risk and cost-minimizing way. The pilot also enables SDG&E to develop tremendous learnings around safety and operational protocols around hydrogen. These learnings will enable SDG&E to make its future hydrogen projects more prudent, efficient, and cost effective.

Cal Advocates speculates that SDG&E might face delays for its hydrogen related equipment at Palomar, and that the hydrogen fueling required for the hydrogen-fueled light duty sedans might not be available when the sedans are delivered.[306] This is mere speculation. SDG&E fully expects that the Hydrogen Systems at Palomar will be onsite, commissioned, and operating by Q3 2023, and will be used to fuel the purchased Toyota Mirai. As Cal Advocates states, if the Palomar system is not installed, "then the only way to fuel those vehicles is the singular station in San Diego County which is not located close to any SDG&E Operations Center."[307] Therefore, the SDG&E owned and operated station is necessary to support our company's HFCEV fleet vehicles.

Finally, Cal Advocates is mistaken in claiming that the Palomar pilot project "does not meet the Commission's guidelines and standards set in D.22-12-057."[308] D.22-12-057 directed the IOUs to file an application (or amend an application) to propose "pilot programs to test hydrogen blending in natural gas at concentrations above the existing trigger level, as ordered in this decision."[309] D.22-12-057 is associated with A.20-11-004, which was developed in response to the Biomethane Proceeding (R.13-02-008) Phase 4 to address safe hydrogen injection standards for the state's natural gas system from 0-20%.

D.22-12-057 is not relevant to the Palomar Hydrogen Systems funding request. The Palomar Hydrogen System request is not evaluating standards for hydrogen injection on the state's natural gas system and testing gas line integrity is not the goal of the program. All blending will be done "behind the fence" at Palomar just prior to the point of combustion, and will be isolated from the natural gas grid and limited to 1-2% hydrogen blend by volume in the existing natural gas turbines. Therefore, Palomar Hydrogen Systems is not required to abide by

[306] Ex. CA-05 (Weaver) at 33-34.

[307] *Id.* at 33.

[308] *Id.* at 32.

[309] D.22-12-057 at 68-69.

the outcome of D.22-12-057 since it is not within scope. SDG&E is currently party to A.22-09-006, filed in September 2022, in which the company seeks recovery for studying hydrogen blending on the integrity of the natural gas distribution grid at a different location at 5-20% by volume. Under that application, SDG&E is following the requirements of D.22-12-057.

For the policy reasons stated above, the Palomar Hydrogen Systems project is justified, and Cal Advocates assertion that is not justified on a policy basis should be rejected. The Palomar Hydrogen Systems project should be funded as specified in Ex. SDG&E-14 at DSB-15.

2. TURN

TURN takes issue with the capital forecast and policy justification for BC 210390, Palomar Hydrogen Systems. TURN states that "SDG&E has not done its homework to determine if there are unique learning opportunities associated with the pilot that could not be obtained by other less expensive means. Also, the costs of the project are not justified given the vague and speculative potential benefits."[310] SDG&E disagrees with these statements.

First, the unique learning opportunities associated with the pilot could not be obtained by less expensive means, this pilot is actually cost-minimizing and prudent, and the benefits are concrete, not speculative. As discussed above in my rebuttal to Cal Advocates regarding this program, the benefits of the Hydrogen Systems at Palomar program are understood and tangible, and there is no replacement for developing a real-life hydrogen project.

Second, TURN states the project produces a "miniscule amount of hydrogen relative to the amount of natural gas used at Palomar. Thus, the project is hardly a good pilot for testing and understanding the process and issues relating to large-scale fuel blending at SDG&E's large gas-fired generating stations."[311] SDG&E concurs that blending 1-2% hydrogen is a very small percentage by volume, but Palomar is a very large power plant at 588 MW. Therefore, the quantity of hydrogen that will be produced by the onsite electrolyzer on a mass basis, at up to 500 kg/day, is significant enough to allow SDG&E to understand the process and many of the issues related to higher percentages of hydrogen fuel blending. There will be important learnings to SDG&E with the prudent approach of beginning at a lower percentage and thus at less cost.

[310] Ex. TURN-06C (Monsen) at 83-84.

[311] *Id.* at 85.

For example, should SDG&E blend at a higher percentage by volume in the future, it would still require all the types of equipment and learnings that this project includes, though at a larger scale. Operationally, burning 1 to 2 percent hydrogen by volume at a power plant is very similar to burning over 30 percent hydrogen by volume, but the learnings will come at a fraction of the cost to the customer. At the 1 to 2 percent volume, SDG&E does not have to procure new turbines or generate and store large volumes of hydrogen. If SDG&E did not begin with a small pilot and instead started blending at 30% right away, it would require new turbines, making the cost of such an initiative significantly higher, likely on an order of magnitude higher, as evidenced by the costs authorized for the conversion of LADWP's Scattergood power plant.[312]

TURN states that SDG&E has provided no economic analysis demonstrating the reasonableness of this project relative to trucking in hydrogen. However, one of the main benefits of the pilot is the learnings associated with generating hydrogen onsite. TURN's proposal does not acknowledge that benefit.

TURN suggests that the proposed pilot program may not provide SDG&E with actionable data for deciding if onsite hydrogen production is the best approach for fuel blending at its gas plants.[313] TURN suggests that SDG&E test multiple approaches for procurement of hydrogen in order to make a valid comparison. SDG&E agrees with this approach and plans to use the data generated over the course of the pilot program to inform the costs of onsite hydrogen generation and compare that with other available sources of hydrogen.

TURN notes that entities such as the Electric Power Research Institute ("EPRI") are looking into blending hydrogen as a powerplant fuel.[314] To SDG&E's knowledge, the entity researching this is the Low Carbon Resource Initiative, a standalone joint initiative of EPRI and the Gas Technology Institute ("GTI"). In order to participate in that initiative, utilities are asked to provide $500,000/year in support. In Exhibit SDG&E-15R, at FV-13, I describe how SDG&E's Innovation Technology Development Program will fund participation in certain RD&D at the EPRI, but that program will be focused on technology areas outside of hydrogen

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[312] Roth, Sammy. "L.A. is shutting down its largest gas plant — and replacing it with an unproven hydrogen project." Los Angeles Times Feb 8 2023. << https://www.latimes.com/business/story/2023-02-08/l-a-is-shutting-down-a-coastal-gas-plant-and-replacing-it-with-hydrogen>>.

[313] Ex. TURN-06 (Monsen) at 87.

[314] *Id*. at 87.

generation. SDG&E feels that running its own pilots is much more effective because the learnings are much greater than spending substantial amounts of money to read a third party LCRI report or participate in a LCRI working group. At the end of the day, the utility learns by doing; operational knowledge and experience cannot be outsourced to a third party.

TURN argues that the Palomar Hydrogen Systems project is "in reality, a fleet fueling project, not a project testing fuel blended fuels at Palomar."[315] SDG&E disagrees. The main purpose of the program is to learn how to create hydrogen onsite at a generating facility and use it in multiple ways, especially for blending in the power plant. For example, it would be much easier for SDGE to develop a fleet vehicle fueling pilot at a location that is not an active generating asset. However, as blending the fuel is one of the core purposes of the program, SDG&E did not undertake that strategy.

For the foregoing reasons, the Commission should reject TURN's recommendation and fund SDG&E's Palomar Hydrogen Systems as filed.

3. CEJA

CEJA requests the denial of $4.8 million for the hydrogen fueling station at Palomar Energy Center.[316] SDG&E believes this request is based on a misunderstanding of fact. In August 2023, CEJA sent a data request stating: "Please specify the cost of installing HFEV fueling infrastructure at Palomar." SDG&E responded that the forecasted cost was $4.8 million.[317] This was based on capital costs for the project other than the electrolyzer and the blending skid. However, in another data request, TURN requested "the total dollar amount of each hydrogen related activity [at SDG&E]." In its response, SDG&E noted that the costs associated with the Palomar Hydrogen System were developed as an entire system, and not broken out by sub-system or activity.[318] The response to TURN is more accurate. The Palomar Hydrogen Systems (vehicle fueling, fuel blending, and hydrogen gas for generator cooling) all rely on common equipment, including but not limited to the common electrolyzer. Other equipment included in the $4.8 million is defined broadly as "remaining materials."[319] The remaining

[315] *Id.* at 89.

[316] Ex. CEJA-01 (Vespa et al.) at 6.

[317] Appendix B, SDG&E Response to Data request CEJA-SEU-005, Q.22(b)

[318] Appendix B, SDG&E Response to Data request TURN-SEU-042, Q.7

[319] Ex. SDGE-14-CWP (Baerman) at 52-63.

materials include piping, hydrogen storage vessels, and compressors needed for the other applications, not just the fueling station. Therefore, defunding the $4.8 million necessary for the fueling station portion of the project would also remove funding for equipment necessary for the other aspects of the project, which CEJA is not seeking to deny.

In asking to disallow the hydrogen fueling station, CEJA states that "electrolysis produced using grid electricity has a high CI score."[320] SDG&E addresses many of CEJA's concerns around the carbon intensity of grid connected electrolysis in our testimony above, Section V.H.

CEJA claims that hydrogen vehicles have significant disadvantages compared with battery electric vehicles ("BEV").[321] SDG&E refers to Exhibit SDG&E-222, rebuttal testimony of Arthur Alvarez, Fleet Services, Section III.C, which defends the role of hydrogen fuel cell electric vehicles in SDG&E's fleet decarbonization efforts, especially in times when the grid is down and battery electric vehicles are challenging to charge. It is likely that it is during these times when the team at Palomar will most require hydrogen light duty passenger vehicles to visit remote microgrids while they are operating during power outages.

For the foregoing reasons, the Commission should reject CEJA's recommendation and fund SDG&E's Palomar Hydrogen Systems as filed.

B. Electric Generation – Daniel Baerman (Exhibit SDG&E-214) – WP 1EG003.000: Non-shared O&M Generation Plant Palomar

1. CEJA

CEJA proposes a reduction of TY 2024 O&M funds by $85,000 for the forecasted maintenance costs of the Palomar Hydrogen Fueling Station.[322] This is related to CEJA's request to eliminate capital funding for the Palomar Hydrogen Fueling Station. As discussed above, SDG&E posits that the capital for the station is necessary. If it is funded, the related O&M in the amount of $85,000 is necessary in order to maintain the capital equipment. SDG&E disagrees with CEJA's proposal because of reasons described in Ex. SDG&E 15-R at FV-31 through FV-32, and in this Rebuttal at Sections V.H and VI.A, as well Exhibit SDG&E-222, rebuttal testimony of Arthur Alvarez, Fleet Services. For these reasons, SDG&E recommends

[320] Ex. CEJA-01 (Vespa et al.) at 89.

[321] *Id.* at 90.

[322] *Id.* at 61.

CEJA's adjustment be denied, and funding as originally presented by SDG&E in direct testimony be approved.

C. Electric Generation – Daniel Baerman (Exhibit SDG&E-214) – WP 1EG004.000: Non-shared O&M Generation Distributed Energy Facilities

1. TURN

TURN takes issue with the Test Year O&M forecast for budget code 1EG004.000 for O&M related to Distributed Energy Facilities found in the testimony of Daniel Baerman (Ex. SDG&E-14) (Distributed Energy Facilities O&M). TURN states that SDG&E's baseline forecast is too high given recent historical data (i.e., 2022).[323] SDG&E responds to this claim in the rebuttal testimony in Daniel Baerman (Ex. SDG&E-214), who sponsors the costs. TURN further states it is unreasonable to assume 20 Distributed Energy Facilities ("DEFs") will be online on SDG&E's system before end of 2024,[324] to which I respond here. Based upon its claims, TURN recommends a reduction of $895,000 to SDG&E's DEF O&M budget.[325]

First, TURN's proposed cut rests upon its assumption that "only 9 DEFs total are online by the end of 2024 instead of SDG&E's assumption that 20 DEFs will be online" at that point.[326] There is no factual basis for TURN's assumption that SDG&E will be performing O&M on only 9 DEFs rather than 20 DEFs. Mr. Baerman's testimony (Ex. SDG&E-14) identified the DEFs, broken out between 'online' and 'in-development,' as follows:

SDG&E's DEFs online today:

1. Ramona Solar Energy Project
2. Escondido BESS
3. El Cajon BESS
4. Miguel VRF BESS
5. Miramar Top Gun BESS
6. Kearny BESS
7. Ramona Air Attack Base WMP Microgrid

SDG&E's DEFs in-development and expected online in 2023 or 2024:

8. Fallbrook BESS

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[323] Ex. TURN-06 (Monsen) at 76.

[324] *Id.* at 77.

[325] *Id.* at 76.

[326] Ex. TURN-06 (Monsen) at 77. In that clause, TURN mistakenly identified the year SDG&E predicts 20 DEFs online as "2022," but it is clear from the first clause of that sentence, and the next sentence, that TURN means "2024."

9. Westside Canal BESS
10. Melrose BESS
11. Pala Gomez-Creek BESS
12. Boulevard BESS and Microgrid
13. Clairemont BESS and Microgrid
14. Elliott BESS and Microgrid
15. Paradise BESS and Microgrid
16. AES BESS asset at the Borrego Springs Microgrid
17. AES HESS asset at the Borrego Springs Microgrid
18. Cameron Corners WMP Microgrid
19. Butterfield Ranch WMP Microgrid
20. Shelter Valley WMP Microgrid

As shown by this list, all of these resources are currently in-development, or even online today, or will be online by the end of 2024, if not earlier. As such, TURN's proposed cut from 20 DEFs down to 9 DEFs is unfounded and should be denied. TURN also is uncertain if the DEFs identified in Ex. SDG&E-15-R "are the same as some of the named DEFs in Exhibit SDG&E-14."[327] To clarify, the "2017 new generation storage projects" and the "20 assets" referenced in Ex. SDG&E-14-WP at 29 and 34 include a couple new DEFs proposed in Ex. SDG&E-15-R. Ex. SDG&E-15-R is simply representing some capital related costs related to project (20278A Advanced Energy Storage) that will be coming online by the end of 2024, and for which the O&M is requested in Ex. SDG&E-14. As stated in Ex. SDG&E-15-R at FV-18 through FV-19, the AES resources are being deployed at the Borrego Springs Microgrid and will be maintained by the personnel requested in Ex. SDG&E-14 at DSB-13 through DSB-14. TURN appears to confuse the two exhibits and the costs represented therein.

TURN has no basis to state the 20 DEFs will not be online by the end of 2024.[328] Therefore, TURN's recommendation to cut the O&M request in Exhibit SDG&E-14 by $895,000 should be denied.

D. Electric Generation – Daniel Baerman (Exhibit SDG&E-214) - 000080 – Hybrid at Miramar Energy Facility

As I stated in my opening testimony, I am providing the business justification for the Hybrid at Miramar project while the costs are sponsored by Mr. Baerman in Ex. SDG&E-14-CWP. "The Hybrid at Miramar Energy Facility project involves installing a 10 MW/10 MWh

[327] *Id*. at 75-76.

[328] Ex. TURN-06 (Monsen) at 76.

BESS at each of the two existing gas turbines (total of 20 MW BESS). Additionally, this project will install new operational controls logic to optimize operational efficiency, reduce GHG emissions and water use between the combined use of both the existing gas turbines as well as the proposed battery energy storage units."[329]

1. Cal Advocates

"Cal Advocates does not oppose SDG&E's Miramar Energy Facility capital request associated with non-labor costs."[330] SDG&E notes that a portion of the Miramar Energy Facility capital, as laid out in Ex. SDG&E-14, is associated with the Hybrid at Miramar (000080 – Hybrid at Miramar Energy Facility). SDG&E responds to Cal Advocates' concern about labor costs for the Miramar Energy Facility capital request in Ex. SDG&E-214.

2. TURN

TURN takes issue with SDG&E's TY 2024 capital forecast for budget code 000080 (Hybrid at Miramar). TURN recommends that the Commission deny the funding request, claiming that SDG&E is "bypassing the Commission's Integrated Resource Planning (IRP) process,"[331] that the net benefit is uncertain, and that the federal Investment Tax Credit ("ITC") may make a third-party bid less expensive.

First, SDG&E disagrees with TURN's assertion that SDG&E is proposing to add new utility-owned generating projects, or that SDG&E is circumventing the IRP process, with its Hybrid at Miramar proposal. As stated in SDG&E's data request responses to TURN, the proposed Hybrid at Miramar, and its corresponding BESS, will be integrated units, with the gas turbine and battery integrated and sharing the existing CAISO meter.[332] Furthermore, as stated in my opening testimony,[333] and further explained in response to TURN's data request:

> … a hybrid configuration enhances the performance of a traditional gas peaker plant by adding a battery which will improve performance while lowering emissions. The proposed project would enhance the two simple-cycle gas turbines at Miramar Energy Facility (MEF) with two 10MW / 10MWh batteries (one each per unit). The benefits the proposed project is expected to provide includes

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329 Ex. SDG&E-15-R (Valero) at 33.

330 Ex. CA-05 at 29.

331 Ex. TURN-06C (Monsen) at 42, 44-45.

332 Appendix B, SDG&E Response to Data Request TURN-SEU-026 Question 10e.

333 *See* Ex. SDG&E-15-R (Valero) at 33.

> reducing emissions at each turbine, reducing operating hours of the electric generators, and reducing water consumption. Emission and water reductions will come from less use of the electric generators by replacing some of the generation with battery energy. Adding batteries to each gas peaker plant will result in the peaker plants each reaching their nameplate capacity of 49 MW, or a full combined interconnect capacity of 98 MW, and will allow the plant to more optimally participate in the CAISO spinning reserve market. When the Hybrid at Miramar is providing spinning reserve, it can be done without using any fuel which makes it a greenhouse gas (GHG) free resource.[334]

As such, SDG&E is not expanding capacity at the Miramar Energy Facility ("MEF") and/or proposing to add a new stand-alone utility-owned generating project which would contribute to IRP targets. For these reasons, SDG&E is not bypassing the IRP process and a separate application is not required or needed.

Second, TURN seeks to suggest "uncertainty associated with the economic viability" of the project by attacking SDG&E's cooperativeness during discovery. For example, TURN states "stunningly, it took four sets of data requests to finally get enough data to understand the basis of the capex estimate for this project. Such stonewalling has not been atypical in this proceeding."[335] This is not accurate. SDG&E would like to remind TURN that it provided the "term sheet" at issue in its response to TURN's *first* data request to SDG&E (i.e., TURN-SEU-016, Question 15m). TURN then proceeded to ask for the "term sheet" again in TURN-SEU-026 Question 1d, and SDG&E pointed TURN back to its earlier response. TURN's claim of discovery malfeasance is untrue and, in any event, does not establish that the Hybrid at Miramar is not economically viable.

Further, TURN misinterprets responses SDG&E provided during discovery.[336] For instance, TURN misinterprets SDG&E's confidential presentation to management related to the Hybrid at Miramar[337] to suggest that the project was proposed for inclusion in Commission procurement activities.[338,339] SDG&E considered including it in an SDG&E Procurement

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[334] Appendix B, SDG&E Response to Data Request TURN-SEU-026 Question 10e) and Appendix B, SDG&E Response to Data Request PAO-SDGE-029-MW5 Question 12a.

[335] Ex. TURN-06C (Monsen) at 46.

[336] Ex. TURN-06C (Monsen) at 49-53.

[337] Ex. TURN-06C (Monsen) at 49.

[338] *See* Ex. TURN-6-Atch2C, at 018.

[339] Ex. TURN-06C (Monsen) at 55.

Department request for proposal ("RFP"), but ultimately decided that it wasn't the correct venue to propose the Hybrid at Miramar because, as stated above, the project does not add capacity, but rather only allows the MEF units to each reach nameplate capacity.

For the same reason, TURN's statement that "SDG&E's actions appear to be "venue shopping" to get approval for a multi-million dollar generation project"[340] is incorrect. SDG&E is not adding capacity at Miramar, but rather allowing it to reach nameplate capacity and run more efficiently (which reduces GHG emissions). Therefore, SDG&E is not circumventing any procurement proceedings to the hinderance of any load-serving entity ("LSE") and is not cherry-picking the venue as TURN asserts incorrectly.

TURN also mistakenly suggests that "a third-party storage alternative [might] prove more cost-effective for ratepayers than a utility-owned project" because TURN wrongly believes that "federal law requires that utilities normalize the [Investment Tax Credit] rather than being allowed to flow through the benefits to customers. Normalization delays the receipt of value by ratepayers and effectively shares the benefits with utility shareholders. In contrast to this treatment, third-party energy storage projects can flow through the value of the ITC upon its receipt (in the first year of plant operations) by offering lower PPA pricing."[341]

To the contrary, for the ITC applicable to new energy storage, the Inflation Reduction Act provided an election for utilities to opt out of the normalization requirements that generally apply to ITCs.[342] SDG&E is already taking advantage of the ITC this year on multiple standalone utility-owned storage projects which are providing emergency capacity pursuant to multiple Commission decision and resolutions.[343] TURN's suggestion that a third party may offer a better price based on a differing entitlement to the ITC is based upon a misunderstanding of the law.

For all these reasons, TURN's recommendations should be denied.

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340 Ex. TURN-06C (Monsen) at 55.

341 Ex. TURN-06 (Monsen) at 54.

342 Section 13102(f)(5) of the Inflation Reduction Act revised Internal Revenue Code Section 50(d)(2) to read "Section 46(f) (relating to limitation in case of certain regulated companies). At the election of a taxpayer, this paragraph shall not apply to any energy storage technology (as defined in section 48(c)(6))," subject to various provisos.

343 *See* SDG&E's Advice Letter ("AL") 4187-E titled "Advice Letter Filed Notifying Commission of Federal Investment Tax Credit Claim."

3. CCAs

The CCAs state that the Commission should delineate the Hybrid at Miramar Energy Facility ("MEF") project (budget code 000080) into a separate Power Charge Indifference Adjustment ("PCIA") vintage than the remainder of the MEF costs.[344] The CCAs assert that the upgrades include the addition of 20 megawatts ("MW") of new battery energy storage system ("BESS") and therefore represent a new commitment on behalf of SDG&E's bundled customers.[345]

SDG&E disagrees with the CCAs' statement that the modification to the MEF represent a new commitment on behalf of SDG&E's bundled customers. First, the proposed 10 MW/10 MWh battery per turbine (for a total of 20 MW/20 MWh) at the Hybrid at Miramar are not separately metered by California Independent System Operator ("CAISO") from the MEF turbines. Instead, they are integrated as one to optimize the plant.[346]

Additionally, the CCAs' statement "…the potential incremental generation output of Miramar and the BESS dispatching to CAISO separately from the existing generation plant…" is incorrect.[347] The BESS cannot be dispatched separately by CAISO and, as stated above, the gas turbine and battery at each unit will be integrated and share the existing CAISO meter.[348] SDG&E explained this aspect of the Hybrid of Miramar proposal to the CCAs in response to their own data request inquiry: "The proposed batteries at the Hybrid at Miramar are not separately metered by CAISO from the MEF turbines. They are integrated as one to optimize the plant and were modeled as a single dispatchable resource unit..."[349] As such, SDG&E is not expanding capacity and there is no benefit only on behalf of and for bundled customers as the CCAs assert in their testimony.[350]

Second, SDG&E's proposed Hybrid at Miramar project is meant to enhance the performance of the traditional gas peaker plant, which is to the benefit of all customers,

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[344] Ex. CCAs (Georgis) at 15.

[345] Ex. CCAs (Georgis) at 23-24.

[346] Appendix B, SDG&E Response to Data Request PAO-SDGE-124-MW5 Question 5.

[347] Ex. CCAs (Georgis) at 24.

[348] Appendix B, SDG&E Response to Data Request TURN-SEU-026 Question 10e.

[349] Appendix B, SDG&E Response to Data Request CCAS-SDGE-013 Question 13.03a.

[350] Ex. CCAs (Georgis) at 15, 23-24.

regardless of them being bundled or unbundled, because the project will reduce emissions, reduce water use and allow each unit to reach nameplate capacity.[351] For MEF, reducing criteria air pollutant emissions (e.g., NO_x, CO, particulate matter) is explicitly to the benefit of all customers, regardless of them being bundled or unbundled, because the MEF is located in the local San Diego basin. As such, criteria air pollutant reductions will benefit all customers within SDG&E's service territory, but especially those in the local area of the MEF. Furthermore, the enhancements SDG&E is proposing advance state policy by lowering GHG emissions, which is the goal of SB 32,[352] and increase reliability,[353] which the state needs as more extreme heat conditions lead to increased electricity demand.[354] The MEF provides valuable energy to the CAISO grid, and eliminating the derate which constrains MEF today due to local area emission permit constraints will provide value, capacity and energy for California when it is needed most (*e.g.*, the summer months, but especially during extreme heat events).

Finally, under the CCAs' proposal, the enhancements proposed by the Hybrid at Miramar project, and their corresponding costs, would burden only bundled customers,[355] and the CCAs' proposal to delineate those costs into separate PCIA vintages other than the resource vintage it is in today would disincentivize Investor-Owned Utilities ("IOUs") from making these types of enhancements, which are in the public interest as stated above.

For all the reasons set forth above, the CCAs' recommendations that the Commission find that: (1) the Miramar upgrades are being made only on behalf of and for the benefit of bundled customers; (2) the Miramar revenue requirement should be split into two components to separate out the new 20 MW BESS; and (3) the portion of the plant's overall capacity related to

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[351] Appendix B, SDG&E Response to Data Request PAO-SDGE-029-MW5 Question 12a.

[352] SB 32 ordered a reduction in economywide emissions of 40% below 1990 levels by 2030.

[353] D.18-10-019, as modified by D.20-01-030 at p.16 states "These costs were previously approved by us for the benefit of all then bundled service customers and continue to provide reliability benefits."

[354] *See* the Phase 2 Decision, D.21-12-015, Directing Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas and Electric Company to Take Actions to Prepare for Potential Extreme Weather in the Summers of 2022 and 2023 at p. 5 and *see* the Integrated Resource Plan Decision, D.23-02-040, Ordering Supplemental Mid-Term Reliability (2026-2027) Procurement and Transmitting Electric Resource Portfolios to California Independent System Operator for 2023-2024 Transmission Planning Process at p. 6.

[355] Ex. CCAs (Georgis) at 31 states "Although the issue of customers departing to CCA service will also impact Pacific Gas & Electric Company ("PG&E") and SCE, the scale of that impact is not expected to reach the same level as for SDG&E which is expected to reach 90% by the end of 2024."

the efficiency upgrades should be assigned to the 2024 vintage for purposes of determining PCIA rates in a future Energy Resource Recovery Account ("ERRA") proceeding,[356] should all be denied. SDG&E's Hybrid at Miramar should follow the cost-recovery the MEF has established today (*e.g.*, PCIA vintage 2004 and 2008).[357]

E. Electric Generation – Daniel Baerman (Exhibit SDG&E-214) – Miguel VRF BESS

1. CCAs

The CCAs recommend that the Commission order SDG&E to make adjustments to the functionalization of distribution-related battery revenues in this GRC.[358] Specifically, the CCAs recommend to functionalize all battery related costs and revenues related to the Miguel VRF BESS to the distribution function.[359] SDG&E agrees with the CCAs that CAISO net revenues pursuant to the Miguel VRF BESS, or any forthcoming distribution-related batteries, should offset any capital distribution-related expense, whether the capital-related costs are authorized in the GRC proceeding or elsewhere.

However, SDG&E is not authorized to book CAISO charging and discharging (sales) costs and revenues related to the Miguel VRF resource into distribution rates and corresponding balancing account(s) to offset capital-related costs.[360] As such, SDG&E requests the Commission authorize the CCAs' recommendation to book CAISO related costs and revenues related to all distribution-related batteries, present or future, to SDG&E's Electric Distribution Fixed Cost ("EDFCA") Balancing Account ("BA") (See SDG&E witness Jason Kupfersmid – Regulatory Accounts Ex. SDGE-243 for more detail on the EDFCA BA) to properly off-set any distribution-related capital costs by allowing SDG&E to amend its ERRA BA and EDFCA BA preliminary statement.

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[356] Ex. CCAs (Georgis) at 24.

[357] Appendix B, SDG&E Response to Data Request CCAS-SDGE-002 Question 02.01 for the Miramar Energy Facility's PCIA vintages.

[358] Ex. CCAs (Georgis) at 14.

[359] *Id.* at 14.

[360] Appendix B, SDG&E Response to Data Request CCAS-SDGE-013 Question 13.01c.

F. Information Technology (IT) Projects – William J. Exon (Exhibit SDG&E-225) - 00920AU, 00920Y, 00920L - Local Area Distribution Controller ("LADC")

In my opening testimony, I provided the business justification for the Local Area Distribution Controller ("LADC"), the costs of which are sponsored by Mr. William J. Exon. Here, I provide further business justification for the Capital costs associated with the LADC projects in the direct and rebuttal testimony of Jamie Exon (Exhibit: SDG&E-25, SDG&E-225).

1. UCAN

UCAN recommends that funding for SDG&E's three LADC budget codes should be denied.[361] SDG&E disagrees with the intervenor's distorted statement alleging (1) no benefit from the LADC over the project's useful life; (2) not operating the distributed energy resources ("DER") in a way that maximizes the value of the assets or the LADC; and (3) SDG&E not having the experience of managing a large portfolio of DERs optimized by the selected LADC.[362]

As a threshold matter, the LADC is a software and hardware solution that enables the distribution grid operator to monitor, manage, and control the component resources of a microgrid. The LADC is necessary to augment and interoperate with SDG&E's existing advanced distribution management system ("ADMS") and supervisory control and data acquisition system. The LADC is deployed locally at a microgrid location with communication networks enabled to support remote control, visibility, and supervisory operation to all microgrids from SDG&E's distribution control center, allowing for automation features that are otherwise conducted manually in the field. The LADC increases efficiencies and response times through automation, and greatly reduces the on-site hours required by SDG&E personnel. However, it is important to not confuse the LADC with a distributed energy resource management system ("DERMS") or even ADMS, as UCAN appears to do.[363] DERMS optimizes energy storage charging limitations, aggregates customer DER dispatch to the wholesale market, and enables use of customer resources for electric distribution system

[361] Ex. UCAN (Woychik) at 293.

[362] *Id*. at 292.

[363] *Id.* at 292-293 UCAN states "The LADC is an important technology, but it must be sized and scoped to provide the services that fit the new business environment that SDG&E must operate within, including the high DER scenario."

services. The ADMS is a system that monitors the electric distribution network and identifies system issues.

SDG&E disagrees with UCAN's assertion that the LADC provides no benefits.[364] The LADC provides a multitude of benefits including connecting and simplifying remote control, while being vendor agnostic related to the resource type within the microgrid boundary to SDG&E's ADMS, and delivering a familiar control set to operators who normally control and supervise assets at the voltage level consistent with the microgrid the LADC is operating. Additionally, without the LADC, an engineering team operating the microgrid with limited experience and operational visibility would need to drive to sites and perform many steps manually with precision timing. All of that is assuming the conditions of the emergency permit travel. Finally, the LADC provides valuable cybersecurity advantages that cannot be met through interconnecting SDG&E's systems with third-party battery energy storage vendor's user interfaces, and cybersecurity is an essential part of safe and reliable utility operation.

SDG&E further disagrees with UCAN's assertion that the LADC provides no value.[365] As stated above, without the LADC, the microgrid which the LADC is helping to control would require a team of on-site operators to function. Not only does the LADC minimize personnel time on site at the applicable microgrid, it also analyzes all dependent parameters until conditions are met to safely operate the microgrid and condenses actions down to a handful of operator steps from a remote location (i.e., SDG&E's distribution control center).

Finally, SDG&E disagrees with UCAN that SDG&E does not have experience with the DERs the LADC operates.[366] SDG&E's Distribution Operations team already remotely operates SDG&E's microgrids utilizing the installed LADC via SDG&E's ADMS user-interface; this program would expand the LADC network. In addition, SDG&E's Distribution Operations team controls and operates a very large portfolio of sites (upwards of 1000), but all of them are not LADC. As such, UCAN's assertion that SDG&E has no operational experience with DERs is wrong.

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[364] *Id.* at 292.

[365] *Id.*

[366] *Id.*

SDG&E notes that UCAN did not serve even one data request regarding its LADC project. UCAN's broad assertions that the projects are not just and reasonable, or in the public interest, are not grounded in fact.[367]

For all the reason stated above, SDG&E recommends UCAN's proposal to deny the LADC budget codes should be denied.

G. Fleet Services – Arthur Alvarez (Ex. SDG&E-222) - Vehicle Additions

1. TURN

TURN takes issue with O&M costs necessary to add additional fleet vehicles and recommends the additional fleet vehicles be eliminated.[368] SDG&E disagrees with TURN's assertion that the additional fleet vehicles for Clean Energy Innovations are not needed. Included in my direct testimony and workpapers is the request for 3 Vehicle Additions to the Fleet, the cost for which can be found in Exhibit SDG&E-22-R, in support of the ACT and DER department. While there are no incremental FTEs associated with this request, the Vehicle Addition to the Fleet is needed by existing ACT staff to be onsite to oversee interconnection-, engineering- or construction-related activities related to the multitude of inflight utility-owned battery energy storage assets pursuant to the Governor's Proclamation of a State of Energy.[369,370] Additionally, the DER Engineering department utilizes fleet vehicles to provide backup support to customers impacted by Public Safety Power Shutoffs ("PSPS") and to maintain and operate SDG&E's Borrego Springs Microgrid. As such, the three incremental fleet vehicles are valuable, especially to allow for GHG reduction when team members can carpool. For these reasons, TURN's elimination of incremental fleet vehicles should be denied.

VII. CONCLUSION

To summarize, this testimony outlined how SDG&E's CEI O&M expenses proposed in the TY 2024 GRC will contribute to SDG&E's sustainability goal of decarbonizing the electric grid. Furthermore, SDG&E's CEI capital expenditures proposed in the TY 2024 GRC are

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[367] *Id.* at 291.

[368] Ex. TURN-10 at. 6.

[369] *See* Executive Department State of California, Proclamation of a State of Emergency, dated July 30, 2021, p. 2. Available at: https://www.gov.ca.gov/wp-content/uploads/2021/07/Energy-Emergency-Proc-730- 21.pdf

[370] *See* Resolution E-5193 and Resolution E-5219.

necessary to decarbonize the electric grid, lower the Company's dependency on diesel backup fuel, minimize renewable curtailment, and provide SDG&E's customers with resiliency. Finally, SDG&E requests the Commission adopt the O&M and capital projects presented in this testimony in support of other witnesses funding requests, as presented above in Section VI.

This concludes my prepared rebuttal testimony.

APPENDIX A

GLOSSARY OF TERMS

ACRONYM	DEFINITION
AB	California Assembly Bill
ACT	Advanced Clean Technology
ADMS	Advanced Distribution Management System
AES	Advanced Energy Storage
AES 2.0	Advanced Energy Storage 2.0
ARCHES	Alliance of Renewable Clean Hydrogen Energy Systems
AWG	Atmospheric Water Generation
BA	Balancing Account
BESS	Battery Energy Storage
BEV	Battery Electric Vehicles
BTM	Behind the Meter
CAISO	California Independent System Operator
Cal Advocates	The Public Advocates Office of California Public Utilities Commission
CARB	California Air Resources Board
CCS	Carbon Capture and Sequestration
CEC	California Energy Commission
CEI	Clean Energy Innovations
CEJA	The California Environmental Justice Alliance
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CSOM	Customer Side of the Meter
CWP	Capital Workpaper
D.	Decision
DAC	Disadvantaged Community
DER	Distributed Energy Resources
DER Engineering	Distributed Energy Resource Engineering Department
DERMS	Distributed Energy Resource Management System
DG	Diesel Generator
DOE	United States Department of Energy
DR	Demand Response
EDF	The Environmental Defense Fund
EDFCA	Electric Distribution Fixed Cost
EPA	Environmental Protection Agency
EPIC	Electric Program Investment Charge
EPRI	Electric Power Research Institute
ERRA	Energy Resource Recovery Account

ESJ	Environmental & Social Justice
EV	Electric Vehicle
FEA	The Federal Executive Agencies
FTE	Full Time Equivalent
gCO2e/mile	Carbon Dioxide Equivalent Per Mile
gCO2e/MJ	Carbon Dioxide Equivalent Per Megajoule
GHG	Greenhouse Gas
Gird Mod Plan	Grid Modernization Plan
GO	General Order
GRC	General Rate Case
GW	Gigawatt
H_2	Hydrogen
HESS	Hydrogen Energy Storage System
HFC	Hydrogen Fuel Cell
HFCEV	Hydrogen Fuel Cell Electric Vehicle
HHV	Higher Heating Value
HSI	Hydrogen Strategy and Implementation Department
HYEG	Average Grid Electricity
IEPR	Integrated Energy Policy Report
IIJA	Infrastructure Investment and Jobs Act
IOUs	Investor-Owned Utilities
IRA	Inflation Reduction Act
IRP	Integrated Resource Planning
IRS	Internal Revenue Service
ITC	Investment Tax Credit
kg	Kilogram
kW	Kilowatt
LADC	Local Area Distribution Controller
LADWP	Los Angeles Department of Water
LCFS	Low Carbon Fuel Standard
LDES	Long Duration Energy Storage
LSE	Load-Serving Entity
MBESS	Mobile Battery Energy Storage Systems
MD/HD	Medium Duty and Heavy Duty [On-road Vehicles]
MEF	Miramar Energy Facility
Miguel VRF	Miguel Vanadium Redox Flow
$MTCO_2e$	Metric Tons of Carbon Dioxide Equivalent
MW	Megawatts
MW_{AC}	Megawatt Alternate Current

MWh	Megawatt-hour
NEM	Net Energy Metering
NOAA	National Oceanic and Atmospheric Administration
NO_x	Oxides of Nitrogen
NREL	National Renewable Energy Laboratory
O&M	Operations and Maintenance
OIR	Order Instituting Rulemaking
PCF	The Protect Our Communities Foundation
PCIA	Power Charge Indifference Adjustment
PG&E	Pacific Gas and Electric Company
PSPS	Public Safety Power Shutoffs
PTC	[Hydrogen] Production Tax Credit
PV	Photovoltaic
R.	Rulemaking
RD&D	Research, Development and Demonstration
REC	Renewable Energy Certificate
RFO	Request for Offer
RPS	Renewable Portfolio Standard
SB	California Senate Bill
SCP	Sustainable Communities Program
SDAPCD	San Diego Air Pollution Control District
SDG&E	San Diego Gas & Electric Company
SGIP	Self-Generation Incentive Program
SLCP	Short-Lived Climate Pollutant
SME	Subject Matter Expert
SOC	State-of-Charge
TURN	The Utility Reform Network
TY	Test Year
UCAN	The Utility Consumers' Action Network
V2G	Bi-Directional Vehicle-to-Grid
WDAT	Wholesale Distribution Access Tariff
WMP	Wildfire Mitigation Plan
WP	Workpaper
ZEV	Zero Emission Vehicle

APPENDIX B

DATA REQUEST RESPONSES

Data Request Number: CCAS-SDGE-002

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Joint Community Choice Aggregators

Date Received: 9/22/2022

Date Responded: 10/5/2022

02.01. Please provide a list of each SDG&E electric generating station or other electric generation portfolio asset owned by SDG&E and the PCIA vintage assigned to each asset.

SDG&E Response 02.01.

SDG&E objects to this request under Rule 10.1 of the Commission's Rules of Practice and Procedure to the extent it seeks the production of information that is neither relevant to the subject matter involved in the pending proceeding nor reasonably calculated to lead to the discovery of admissible evidence. SDG&E also objects to the extent that this question relates to any resources for which no cost recovery is sought on the grounds that it is vague, overbroad and unfairly burdensome. Subject to and without waiving these objections, SDG&E provides the following information regarding resources for which cost recovery is sought:

Asset	PCIA Vintage
Palomar Energy Center	2004
Miramar Energy Facility (1)	2004
Desert Star Energy Center	2007
Miramar Energy Facility (2)	2008
Cuyamaca Peak Energy Plant	2011
Ramona Solar Energy Project	2012

Question 13.01-Continued

c. Are revenues generated from sales to CAISO ever used as a credit to offset costs that are in the GRC revenue requirements?

SDG&E Response 13.01c:

SDG&E objects to this request under Rule 10.1 of the Commission's Rules of Practice and Procedure on the grounds that it seeks the production of information that is not relevant to the subject matter involved in the pending proceeding, specifically regarding information about related to the ERRA proceeding. Subject to and without waiving the foregoing objection, SDG&E responds as follows:

Yes, there are existing cost recovery mechanisms to allow CAISO net revenues to offset GRC revenue requirements. However, those mechanisms are not applicable to the Miguel VRF.

As explained in SDG&E's response to supplemental Question 02.22b, the Miguel VRF is a distribution asset. However, SDG&E is not authorized to book CAISO charging and discharging (sales) costs and revenues related to the Miguel VRF resource into distribution rates and corresponding balancing account(s). As such, no revenues generated from sales to CAISO for the Miguel VRF are used to offset costs related to prior authorized capital expenditure for the Miguel VRF. SDG&E further notes that it is not seeking cost recovery in this 2024 GRC revenue requirement related to the Miguel VRF.

SDCP/CEA to SDG&E 13.03. Referring to Exhibit SDG&E-15 Valero page FV-33 and the Hybrid at Miramar Energy Facility:

a. Confirm or deny the new 20MW battery system may operate independently and dispatch to the CAISO market independently from the existing gas turbines (i.e., the 20MW batteries may dispatch to the CAISO market and the gas turbines may not run in conjunction with that dispatching). If so, how much does SDG&E anticipate the batteries could dispatch in 2024 independently from the existing gas turbines.

SDG&E Response 13.03a:

SDG&E objects to this request on the grounds that it calls for speculation and assumes facts not in evidence. Subject to and without waiving the foregoing objection, SDG&E responds as follows:

The proposed batteries at the Hybrid at Miramar are not separately metered by CAISO from the MEF turbines. They are integrated as one to optimize the plant and were modeled as a single dispatchable resource unit. As such, SDG&E cannot speculate as to whether CAISO may dispatch the batteries independent of the turbines.

Data Request Number: CEJA-SEU-005

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Proceeding Number: A2205015_016 2024 GRC

Publish To: California Environment Justice Association

Date Received: 8/23/2022

Date Responded:9/6/2022

9. Ex. SDG&E-15 at FV-6 states: "In order to evaluate future investments that may be required to deploy hydrogen infrastructure on the electric generation and the gas distribution systems, SDG&E has identified modeling and technical analysis work that will be necessary to fully understand the current challenges and the associated costs of various hydrogen solutions." For each of the four modeling and analysis projects SDG&E discusses from FV-6 to FV-8, please identify:

SDG&E Response 9:

To clarify, the costs associated with the referenced section of Mr. Valero's testimony are related to potential studies forecasted for 2022 and 2023, with no costs forecasted to extend into 2024 (see Ex. SDG&E-15-WP page 4-9). As shown on pages 4-9 of Ex. SDG&E-15-WP, SDG&E is requesting cost recovery for $100,000 in non-labor costs (for Sponsorship and other costs) associated with the Clean Energy Innovations cost center forecasted to occur in 2024. The forecasted dollars for 2022 and 2023 are included for awareness purposes and are not included in SDG&E's Test Year 2024 GRC revenue requirement forecast. SDG&E acknowledges that the narrative description in Mr. Valero's testimony at FV-6 to FV-8 is ambiguous regarding the amount to be included in the Test Year 2024 GRC revenue requirement forecast, and therefore, SDG&E will revise this testimony at the next available opportunity to remove any reference to SDG&E requesting non-labor funding for these four studies.

a. The total cost of each project

SDG&E Response 9a:

As shown on page 6 in Ex. SDG&E-15-WP

Projects Cost (2021$ 000's)	**2022**	**2023**	**2024**
Desert Star H2 Conversion Study & Technical Analysis	$ 900	$ 0	$ 0
Cuyamaca Pre-Feasibility Study	$ 0	$ 300	$ 0
Clean Gas Alternatives to Electrification Study	$ 0	$ 550	$ 0
Hydrogen Perception & Acceptance Survey	$ 0	$ 225	$ 0

b. The portion of the cost of each project that SDG&E is seeking from ratepayers in its revenue requirement request in this rate case

SDG&E Response 9b:

See response to Question 9 above.

c. Whom SDG&E anticipates will pay for the remainder of each project's cost.

SDG&E Response 9c:

See response to Question 9 above.

d. Why SDG&E is seeking to recover costs for these projects through a rate case instead of the Commission or CEC's other funding opportunities for research and development.

SDG&E Response 9d:

See response to Question 9 above.

e. Which of these projects are contingent upon securing outside funding from a source like a federal grant?

SDG&E Response 9e:

See response to Question 9 above.

Data Request Number: CEJA-SEU-005

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Proceeding Number: A2205015_016 2024 GRC

Publish To: California Environment Justice Association

Date Received: 8/23/2022

Date Responded:9/6/2022

22. Ex. SDGE-15 at FV-31 states: "A dedicated SDG&E fleet HFEV fueling pump will also be located at Palomar to fuel light-duty HFEVs used by plant operation personnel to visit remote generation sites managed out of Palomar, including SDG&E's numerous remote battery installations and microgrids."

a. Please specify the cost of installing HFEV fueling infrastructure at Palomar.

SDG&E Response 22a:

To clarify, as stated on the referenced FV-31, the testimony of Mr. Valero provides the business justification for the Palomar Hydrogen System. As contained in Mr. Daniel Baermann's testimony (Ex. SDG&E-14) and workpapers (Ex. SDG&E-14-CWP), which contain the basis of the costs for the Palomar Hydrogen system, the forecasted cost of installing the HFEV fueling system at Palomar is $4.8 million.

b. What are the estimated annual maintenance costs of a light-duty HFEV fueling station?

SDGE Response 22b:

To clarify, as stated on the referenced FV-31, the testimony of Mr. Valero provides the business justification for the Palomar Hydrogen System. The forecasted annual maintenance costs for the HFEV fueling system at Palomar is $85 thousand and is contained in Mr. Daniel Baermann's testimony (Ex. SDG&E-14) and workpapers (Ex. SDG&E-14-WP).

c. Please state how many miles SDG&E expects its light-duty vehicles to travel in a daily duty cycle when personnel visit remote generation sites managed out of Palomar.

SDG&E Response 22c:

To clarify, as stated on the referenced FV-31, the testimony of Mr. Valero provides the business justification for the Palomar Hydrogen System. As stated in the prepared direct testimony of Arthur Alvarez (Ex. SDG&E-22, page AA-13), three light-duty H2 passenger sedans will be leased for Palomar Energy Center in conjunction with the opening of the hydrogen fuel cell fueling station. SDG&E estimates that each of these light-duty vehicles will travel 150 miles each day as part of visiting remote generation sites managed out of Palomar.

Data Request Number: CEJA-SEU-007

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: California Environment Justice Association

Date Received: 9/19/2022

Date Responded: 10/3/2022

21. SDG&E's response to CEJA-SEU-05, question 8 indicates an estimated $105,000 in TY2024 non-labor costs in the Hydrogen Strategy and Implementation Department. Please provide the basis of this estimate, identifying the non-labor costs included in that estimate.

SDG&E Response 21:

As reflected in workpaper Ex. SDG&E-15-WP on page 7, the referenced $105,000 includes an estimated $100,000 in sponsorships and associations forecasted to be incurred in 2024 plus a continuation of the $5,000 non-labor costs incurred in the 2021 base year. Potential associations and sponsorships include, but are not limited to, the Green Hydrogen Coalition, the California Hydrogen Business Council, and the Western Green Hydrogen Initiative.

Data Request Number: CEJA-SEU-015

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: California Environment Justice Association

Date Received: 1/30/2023

Date Responded:2/10/2023

3. In response to CEJA-SEU-005, question 12, Sempra states that a description of the Clean Gas Alternatives to Electrification Study "is included in the referenced testimony for information only purposes and no funding associated with this study is requested in this GRC." Please reconcile the "SDG&E 2024-207 Budget Proposal" (available here: https://www.sdge.com/sites/default/files/documents/S2280030_CleanEnergyTransitionFS_08.pdf) listing among the "Highlights" of the GRC budget proposal that "SDG&E proposes to conduct 'a clean gas alternative to electrification' study …"

SDG&E Response 3:

SDG&E objects to this request under Rule 10.1 of the Commission's Rules of Practice and Procedure to the extent it seeks the production of information that is not relevant to the subject matter involved in the pending proceeding. Subject to and without waiving the foregoing objection, SDG&E responds as follows:

As stated in SDG&E's response to Question 9 from CEJA-SDGE-DR5, this potential study, and the other potential studies referenced in Ex. SDG&E-15-R at FV-6 through FV-7, are included for awareness purposes and are not included in SDG&E's Test Year 2024 GRC revenue requirement forecast.

The statements made in the above-referenced link regarding the proposed feasibility studies mistakenly describe them as being funded by this 2024 GRC revenue requirement.

Data Request Number: CEJA-SEU-018

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: California Environment Justice Association

Date Received: 2/23/2023

Date Responded: 3/9/2023

4. Please refer to SDG&E-15-WP at pages 6-7 of 35.

   a. Please specify what entities SDG&E intends to support with the $100,000 for "Sponsorships and other cost" it included in the 2024 forecast.

SDG&E Response 4a:

The $100,000 forecast may be allocated to support sponsorship of industry standards committees, consortia membership fees, industry events, conference travel and attendance, and technical advisory committees for the Hydrogen Strategy and Implementation Department.

The requests costs will also fund the critical development of hydrogen safety training modules for internal employees, project partners, first responders, and visitors from the community to SDG&E hydrogen sites.

Data Request Number: CEJA-SEU-018

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: California Environment Justice Association

Date Received: 2/23/2023

Date Responded: 3/9/2023

Date Supplemented: 3/21/2023

4. Please refer to SDG&E-15-WP at pages 6-7 of 35.

b. Please specify what entities SDG&E funded with the $100,000 for "Sponsorships and other cost" in 2022, breaking the specific amounts each entity received.

SDG&E Response 4b (March 9, 2023):

SDG&E objects to the request for 2022 cost detail for "Sponsorships and other costs" as premature. Pursuant to the December 6, 2022 ALJ ruling modifying the 2024 General Rate Case procedural schedule, SDG&E will provide Base Year + 1 data, or 2022 data in this proceeding, on March 13, 2023. Subject to and without waiving the foregoing objection, SDG&E responds as follows:

Please see SDG&E's response to Question 4a.

Additionally, please refer to SDG&E's response to Question 9 of CEJA-SEU-DR05. For O&M costs, only the 2024 forecasted costs are requested in SDG&E's revenue requirement. Accordingly, these costs are included for awareness purposes and are not included in SDG&E's Test Year 2024 GRC revenue requirement forecast.

Data Request Number: CEJA-SEU-018

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: California Environment Justice Association

Date Received: 2/23/2023

Date Responded: 3/9/2023

Date Supplemented: 3/21/2023

SDG&E Supplemental Response 4b (March 21, 2023):

SDG&E objects to this request under Rule 10.1 of the Commission's Rules of Practice and Procedure to the extent it seeks the production of information that is neither relevant to the subject matter involved in the pending proceeding nor is reasonably calculated to lead to the discovery of admissible evidence. Subject to and without waiving the foregoing objection, SDG&E responds as follows:

Please see the excel file dated March 13, 2023, titled "2022 Recorded Operating Costs - SDG&E.xlsx" on tab "2022 SDG&E OM-L NL NSE" at Row 99 and Column F for the actual 2022 spend for nonlabor costs. In 2022, SDG&E's nonlabor O&M costs were spent on consulting fees necessary to support the department while an employee was on leave and other nonlabor expenses such as employee conference travel and admission fees. SDG&E clarifies that notwithstanding the description of "Sponsorship and other costs," SDG&E did not and will not use any O&M dollars to sponsor any third-party entities.

Additionally, SDG&E clarifies that for O&M costs, only the 2024 forecasted costs are requested in SDG&E's revenue requirement. The 2022 nonlabor O&M costs listed in the excel titled "2022 Recorded Operating Costs - SDG&E.xlsx" are provided for awareness purposes and are not included in SDG&E's Test Year 2024 GRC revenue requirement forecast.

Data Request Number: PAO-SDGE-025-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office (PAO)

Date Received: 7/25/2022

Date Responded: 8/8/2022

9. SDG&E's advanced storage (AES) project 20278A was approved in D.19- 09-051 (see pp. 292-294). The total amount of capital approved was $15,154,000. In this GRC, SDG&E requests an additional $13,797,000, for a total capital cost of $28,951,000.
   a. Are the above statements correct? If not, please provide corrections in redline.

SDG&E Response 9a:

No, the above statements are not correct. SDG&E provides the following corrections in redline: *SDG&E's advanced storage (AES) project 20278A was approved in D.19-09-051 (see pp. 292-294). The total amount of capital approved was $15,154,000, with an expected in-service date of 12/31/2019. In this GRC, SDG&E requests an additional $13,797,000~~, for a total capital cost of $28,951,000~~.*

SDG&E also provides the following additional information regarding AES project 20278A. SDG&E's AES project 20278A had an expected in-service date of 12/31/2019, but the project was deferred due to a delay in spending to conduct further analysis to identify areas on the distribution system that would benefit from the deployment of AES due to excess renewable generation on a circuit. Given the delays, the expected in-service date is now June 2023 and SDG&E is forecasting the $13.797 million to accomplish the project.

   b. Why is the estimate in this Application and Testimony zero-based rather than base year recorded?

SDG&E Response 9b:

A zero-based forecast is based on costs estimated that are developed based on the specific scope of work for the project, and a base-year recorded forecast is based on the dollars spent in the base year, i.e., 2021 for this instance. The remaining scope of work and associated costs are sufficiently different from the costs incurred in 2021 to justify using a zero-based forecast methodology.

   c. What were the actual incurred costs for this project from 2017 through 2022? Please provide the answer to this question in an excel spreadsheet. Provide answers in 2021 $

SDG&E Response 9c:

Actuals as of June 30, 2022 (2021$ 000's)	2017	2018	2019	2020	2021	2022
WP 20278 - Advanced Energy Storage	-	-	-	159	6,997	721

Data Request Number: PAO-SDGE-029-MW5

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office (PAO)

Date Received: 7/28/2022

Date Responded: 8/9/2022

12. Regarding Ex. SDG&E-14-CWP, p. 31 of 61:

a. In addition to Ex. SDG&E-15, please provide a detailed summary and a "walk through" of the Hybrid at Miramar including but not limited to the cost savings, materials needed, cost breakdown per year, how this will reduce water use, completed studies, studies to be performed, benefits, benefits to ratepayers, and a comparison of response times.

SDG&E's Response 12a:

SDG&E objects to this request on the grounds that it is overbroad, compound and unduly burdensome in its blanket request for all information regarding the Hybrid MEF Project. SDG&E further objects to this request on the grounds that it is vague and ambiguous. SDG&E further objects to this request on the grounds that it calls for speculation. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

A hybrid configuration enhances the performance of a traditional gas peaker plant by adding a battery which will improve performance while lowering emissions.

The proposed project would enhance the two simple-cycle gas turbines at Miramar Energy Facility (MEF) with two 10MW / 10MWh batteries (one each per unit). The benefits the proposed project is expected to provide includes reducing emissions at each turbine, reducing operating hours of the electric generators, and reducing water consumption. Emission and water reductions will come from less use of the electric generators by replacing some of the generation with battery energy.

Adding batteries to each gas peaker plant will result in the peaker plants each reaching their nameplate capacity of 49 MW, or a full combined interconnect capacity of 98 MW, and will allow the plant to more optimally participate in the California Independent System Operators' (CAISO) spinning reserve market. When the Hybrid at Miramar is providing spinning reserve, it can be done without using any fuel which makes it a greenhouse gas (GHG) free resource.

Data Request Number: PAO-SDGE-029-MW5

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office (PAO)

Date Received: 7/28/2022

Date Responded: 8/9/2022

2. Regarding Ex. SDG&E-14:

a. Please provide a table of other applicable exhibits including page numbers and monetary request for all requests relating to the hydrogen pilot and the hydrogen fueling station requested at Palomar.

SDG&E's Response 2a:

Description:	Exhibits:	Page No.	Total Monetary Request (in millions)
Palomar Hydrogen Systems	SDGE-14-CWP_EGEN (Capital workpapers)	52 - 57	$16.278
Maintenance support for Palomar Hydrogen project	SDGE-14-WP_EGEN (O&M workpapers)	5, 8	$0.270

b. In addition to the discussion provided in Ex. SDG&E-15, please provide a detailed summary and a "walk through" of the hydrogen pilot and the hydrogen fueling station, including but not limited to the specifics on any cost breakdown per year, cost savings, materials needed, studies performed, studies to be performed, benefits, benefits to rate payers, whether hydrogen has been used as a cooling gas for generators prior to this pilot, how many fuel stations or pumps there will be, the estimated mpg/cost to fill, and how many miles can be expected from a full tank for the hydrogen vehicle SDG&E is requesting.

SDG&E's Response 2b:

SDG&E objects to this request on the grounds that it is overbroad, compound and unduly burdensome in its blanket request for all information regarding the Palomar Hydrogen Project. SDG&E further objects to this request on the grounds that it is vague and ambiguous. SDG&E further objects to this request on the grounds that it calls for speculation. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

The Palomar Energy Center is a 588-megawatt combined cycle power plant that SDG&E owns and operates in Escondido, CA. As part of the Palomar Hydrogen Systems project, solar panels will be installed to generate electricity to produce clean hydrogen on-site through electrolysis. This hydrogen will then be used in practical applications including, electric power generation, as industrial gas for generator cooling, and as a clean transportation fuel. More detail as to these specific applications are provided below:

a. Electric Power Generation: on-site production of hydrogen will be blended via a blending skid into the natural gas feedstock fueling a natural gas combustion turbine. This will allow SDG&E to gain a deeper understanding of blended feedstocks, impacts on turbine operational performance, emissions reductions benefits, and facilitates the future use of blending clean hydrogen as a tool for emissions reductions.

b. Generator Cooling: on-site production of hydrogen will also be used as a cooling gas for the electric generators. Hydrogen is currently used at the Palomar Energy Center as a cooling gas for the electric generators, however it is purchased from industrial gas vendors and trucked to the facility via fossil-fueled trucks. Assessment of operations and the value add of on-site hydrogen production will yield lessons learned that will benefit consumers of hydrogen who presently have hydrogen shipped to their facility.

c. Clean Transportation: on-site production of hydrogen will be used as a fuel to power hydrogen fuel cell vehicles as part of SDG&E's fleet. A hydrogen refueling station will be built at the Palomar Energy Center. There will be one fueling station and one pump. A typical hydrogen fuel cell passenger car is expected to have 400 miles of range with a full tank. SDG&E is adopting both electric and hydrogen FCEV fleet vehicles to reduce its carbon footprint. To facilitate SDG&E's adoption of hydrogen vehicles, the company will need reliable fueling dedicated to fleet vehicles in a location that meets operational requirements (See Ex. SDG&E-22, Direct Testimony of Arthur Alvarez, Fleet Services).

For annual cost estimates, please see Ex. SDG&E-14-CWP, supplemental workpaper at page 61 of 61.

c. Would water be needed to produce hydrogen? If no, please explain what materials are used to produce hydrogen. If yes, please answer the following:

i. Please describe the process to convert water to hydrogen.

ii. Estimated water consumption and water waste approximation.

iii. Where would the water come from?

iv. Impacts of drought for producing hydrogen.

SDG&E's Response 2c(i)-(iv):

Data Request Number: PAO-SDGE-062-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 8/31/2022

Date Responded: 9/15/2022

SDG&E response to question 7b(I) (continued)

The current forecast reflects a delayed start to implementing the project and higher costs on a 2021 vs 2016 base-year dollar basis due to inflationary impacts. The current scope of the project is consistent with the initial scope of the project.

c. If the Commission approved $15,154,000 for this project, but SDG&E (as provided in its data response) spent a total of $7,877,000, is it correct to say that SDG&E spent the remaining $7,277,000 on something else? If not, please explain what is wrong with the preceding statement

SDG&E Response 7c:

Yes, the delayed start to building the advanced energy storage project resulted in SDG&E re-prioritizing the allocation of the authorized funds. The Commission recognizes that actual spending may differ from GRC authorized amounts: “The Commission has always acknowledged that utilities may need to reprioritize spending between GRCs.” (D.20-01-002 at p. 38.) SDG&E prudently and efficiently manages its costs over the GRC cycle and executes projects to the best of its ability.

Data Request Number: PAO-SDGE-062-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 8/31/2022

Date Responded: 9/15/2022

4. This question pertains to SDG&E's Hydrogen Energy Storage System Expansion, group 212720. Did SDG&E conduct any analyses, or create any external or internal studies or reports, or solicit any consultant reports to evaluate the need for additional resources (e.g., hydrogen energy storage) in this microgrid?
   a. If yes, provide a list of all files with a narrative description of the study and its findings.
   b. Provide a copy of all studies

SDG&E Response 4:

SDG&E conducted an internal assessment to evaluate the need for an expanded hydrogen energy storage system based on the characteristics of the Borrego Springs Microgrid. The microgrid has high PV penetration levels of approximately 37 MW compared to the approximate 14MW local peak load. This output versus need comparison indicates that some PV generation may be curtailed when using either the current or planned amount of storage resources. Also considered is that at certain times of low PV generation and high load, diesel generators are deployed. Considering the benefit of hydrogen acting as a long duration storage asset, this project will capture PV generation to be stored as hydrogen, then utilized when needed to reduce the usage of diesel generators and provide benefits to the distribution system during peak load hours.

Data Request Number: PAO-SDGE-062-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 8/31/2022

Date Responded: 9/15/2022

5. This question pertains to SDG&E's Hydrogen Energy Storage System Expansion, group 212720. In an excel spreadsheet, provide a list of all non-behind-the-meter non-dispatchable generation assets (i.e., wind, solar) in the Borrego springs microgrid area. For each asset provide the technology type (i.e., wind, solar, etc.) and the AC power rating.

SDG&E Response 5:

SDG&E objects to the request on the grounds that it would impose an undue burden on SDG&E by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist. Subject to and without waiving the foregoing objection, SDG&E responds as follows:

Non-behind-the-meter (which SDG&E interprets as being synonymous with in-front-of-the-meter) non-dispatchable generation assets for the Borrego Springs microgrid area include two PV farms with the first being a 26 MW_{AC} PV installation, and the second being a 6.5MW_{AC} PV installation.

Data Request Number: PAO-SDGE-078-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 9/23/2022

Date Responded: 10/6/2022

2. In Question 4 of Cal Advocates Previous Data Request, Cal Advocates asked:

   This question pertains to SDG&E's Hydrogen Energy Storage System Expansion, group 212720. Did SDG&E conduct any analyses, or create any external or internal studies or reports, or solicit any consultant reports to evaluate the need for additional resources (e.g., hydrogen energy storage) in this microgrid?

   a. If yes, provide a list of all files with a narrative description of the study and its findings.
   b. Provide a copy of all studies.

   SDG&E's Previous Data Response stated that (emphasis added):

   > SDG&E conducted an internal assessment to evaluate the need for an expanded hydrogen energy storage system based on the characteristics of the Borrego Springs Microgrid.

   But SDG&E did not provide any documentation of this "internal assessment" aside from four sentences of prose in the Previous Data Response pdf file.

   a. Are the above statements true and correct to the best of SDG&E's knowledge? If not, provide a narrative description of all inaccuracies.

SDG&E Response 2a:

SDG&E agrees that the above is an accurate copy of Cal Advocate's question and partial copy of SDG&E's response to question 4 in Cal Advocate's data request: PAO-SDGE-062-AMY.

Data Request Number: PAO-SDGE-078-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 9/23/2022

Date Responded: 10/6/2022

b. Provide all documents (see definition 9, above) related to this "internal assessment" or any other evaluation related to the need for SDG&E's Hydrogen Energy Storage System Expansion project.

SDG&E Response to 2b:

SDG&E objects to the definitions and instructions submitted by Cal Advocates on the grounds that they are overbroad and unfairly burdensome. Special interrogatory instructions of this nature are expressly prohibited by California Code of Civil Procedure Section 2030.060(d). Subject to and without waiving the foregoing objection, SDG&E responds as follows:

An outline of SDG&E's internal assessments is provided in the table below and can be found in responses to various data requests:

Data Request Number: PAO-SDGE-080-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 9/27/2022

Date Responded: 10/10/2022

b. Provide actual (adjusted recorded) values for all spending on each of the above listed projects from 2017-2021 in 2021$. Provide this in a single excel spreadsheet wherein each project receives its own row (with one header row), and six columns contain:
   - Project Name
   - 2017 actual spending in 2021$
   - 2018 actual spending in 2021$
   - 2019 actual spending in 2021$
   - 2020 actual spending in 2021$
   - 2021 actual spending in 2021$

SDG&E Response 1b:

The recorded spending for each of the projects referenced in Question 1 are provided below and in the provided spreadsheet: PAO-SDGE-080-AMY_SDGE-15_5368 Q1B_5368.xlsx.

(2021$ 000's)	2017	2018	2019	2020	2021
Advanced Energy Storage	$ 126	$ 374	$ 3	$ 159	$ 6,999
Advanced Energy Storage 2.0	$ -	$ -	$ -	$ -	$-
Non-Lithium-Ion Energy Storage Technology	$ -	$ -	$ -	$ -	$ -
Borrego 3.0 Microgrid	$ -	$ -	$ -	$ 455	$ 2,450
Integrated Test Facility Expansion	$ -	$ -	$ -	$ -	$ -
Sustainable Communities Removal	$ -	$ -	$ -	$ 648	$ 20
Mobile Battery Energy Storage Program	$ -	$ -	$ -	$ -	$ -
Hydrogen Build Ready Infrastructure	$ -	$ -	$ -	$ -	$ -
Hydrogen Energy Storage System Expansion	$ -	$ -	$ -	$ -	$ -

Data Request Number: PAO-SDGE-080-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 9/27/2022

Date Responded: 10/10/2022

2. In response to Question 1b.I of data request PAO-SDGE-062-AMY, SDG&E stated that "The number of needed FTEs was forecasted based on a qualitative assessment by subject matter experts considering the anticipated amount of capital projects and O&M activities."
   a. Are the above statements true and correct? If not, provide correction.

SDG&E Response 2a:

Yes, SDG&E included the provided excerpt as part of its response to Question 1b in PAO-SDGE-062-AMY.

   b. For each labor line item in SDG&E's expense workpapers and capital workpapers, provide any and all scopes of work associated with that labor line item.

SDG&E Response 2b:

SDG&E objects to this request on the grounds that it is overly broad, vague, and ambiguous, particularly with respect to requesting "any and all scopes of work associated with" "each labor line in SDG&E's expense workpapers and capital workpapers". Subject to and without waiving the foregoing objection, SDG&E responds as follows:

Please refer to the testimony (Ex. SDG&E-15-R) and workpapers (Ex. SDG&E-15-CWP, Ex. SDG&E-15-WP) for a description of the anticipated work and activities associated with the expense and capital labor funding requests.

Data Request Number: PAO-SDGE-116-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 10/24/2022

Date Responded: 11/21/2022

2. Provide the average cost data (underlined) that SDG&E used to establish its estimate. Include all underlying data used to fashion this estimate.

SDG&E Response 2:

SDG&E has not been able to locate the underlying data, assumptions, and variables used to support SDG&E's capital workpaper regarding the Hydrogen Build Ready Infrastructure project (*See* Ex. SDG&E-15-CWP at page 80). In an effort to replicate the analysis, SDG&E revisited the estimate based on the most recently published Rule 21 cost guide. SDG&E is therefore providing a new supplemental workpaper (*See* provided Updated Supplemental Workpaper titled "H2-Build-Ready-Infrastructure_Supplemental_Updated.xlsx").[1] SDG&E notes that the new total estimate for the Hydrogen Build Ready Infrastructure project is slightly higher than the amount reflected in the previous supplemental workpaper. SDG&E is still requesting a total capital cost of $1.925 million and will not be updating its forecast.

[1] *See* Rule 21 Unit Cost Guide for SDG&E https://www.sdge.com/node/8681 (Dated March 31, 2022).

PAO-SDGE-116-AMY Attachment to Question 2
TY2024 GRC FORECAST - DETAILS (UPDATED 11/2022)

Budget Code:	212680
Sub-Budget Code:	
Estimated In Service Date:	Not Applicable

H2 Build Ready Infrastructure					2022			2023			2024			
Line Item	Unit Description	Labor/Non-Labor/ NSE	RAMP/Non-RAMP	Unit Metric (ea./ft./mile)	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	# of units	Cost per unit*	Total cost	Total Cost
1	Trench & Conduit	Non-Labor	Non-RAMP	feet		$ 562	$ -	600	$ 562	$ 337,200	900	$ 562	$ 505,800	$ 843,000
2	Pri 2/0 AL Cable undg feed 200'	Non-Labor	Non-RAMP	ea		$ 7,900	$ -	2	$ 7,900	$ 15,800	3	$ 7,900	$ 23,700	$ 39,500
3	FTE's	Labor	Non-RAMP	ea		$ 125,000	$ -	2	$ 125,000	$ 250,000	3	$ 125,000	$ 375,000	$ 625,000
4	Fuse Cabinet UG 3 phase	Non-Labor	Non-RAMP	ea		$ 20,100	$ -	2	$ 20,100	$ 40,200	3	$ 20,100	$ 60,300	$ 100,500
5	750kva & Sec. Cable(480/277V)- Include 100 ft of Cal	Non-Labor	Non-RAMP	ea		$ 74,000	$ -	2	$ 74,000	$ 148,000	3	$ 74,000	$ 222,000	$ 370,000
6	Secondary Service Metering	Non-Labor	Non-RAMP	ea		$ 9,200	$ -	2	$ 9,200	$ 18,400	3	$ 9,200	$ 27,600	$ 46,000

Summary								
				$ -		$ -		$ -	$ -
	Labor	Non-RAMP		$ -		$ 250,000		$ 375,000	$ 625,000
	Non-Labor	Non-RAMP		$ -		$ 559,600		$ 839,400	$ 1,399,000
	NSE	Non-RAMP		$ -		$ -		$ -	$ -
Total Project Forecast				$ -		$ 809,600		$ 1,214,400	$ 2,024,000

Data Request Number: PAO-SDGE-124-MW5

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Proceeding Number: A2205015_016 2024 GRC

Publish To: Public Advocates Office

Date Received: 11/15/2022

Date Responded:11/29/2022

5. Regarding SDG&E's response to PubAdv-SDG&E-MW5-119, questions 1d, 1e, and 1f, please explain how the Top Gun BESS and the Hybrid at Miramar project are different in scope.

SDG&E Response 5:

See response to Question 2a. Additionally, the two projects are entirely different in scope. The Top Gun BESS is a standalone utility-owned storage asset which is separately metered and dispatched by the CAISO for energy and ancillary services. Meanwhile, the proposed Hybrid at Miramar, as stated in response to PubAdv-SDG&E-MW5-119, Question 1d, is meant to optimize the **natural gas turbines** at the Miramar Energy Facility by using two battery energy storage on each turbine in order to allow the units to reach nameplate capacity and provide all the benefits identified in the Revised Direct Testimony of witness Fernando Valero (see Ex. SDG&E-15-R at FV-33).

SDG&E notes that the proposed batteries at the Hybrid at Miramar are not separately metered by CAISO from the MEF turbines. Instead, they are integrated as one to optimize the plant.

Data Request Number: PAO-SDGE-133-AMY

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: Public Advocates Office

Date Received: 11/29/2022

Date Responded: 12/12/2022

4. SDG&E's OMWP (pages 6-7) state that both 2023 and 2024 will have a forecast adjustment in labor costs of $294,000, but 2024 will have 3 additional FTEs whereas 2023 will only have 2.4 additional FTEs. SDG&E's explanation of the 2024 labor costs refers both to 2.4 and to 3.0 additional FTEs, in apparent duplication. Please explain these inconsistencies. Include the corrected Forecast Adjustment to labor and FTEs in 2024.

SDG&E Response 4:

SDG&E's O&M workpaper states that 2024 will have 3.0 additional FTEs, but that is a typo and should not have been displayed. 2024 should be consistent with 2023 with the 2.4 FTE and labor costs of $294,000. SDG&E will update its O&M workpaper at the next available opportunity.

DATA REQUEST
SCG-SDGE-UCAN-001
SoCalGas and SDG&E's 2024 GENERAL RATE CASE
A.22-05-015 and A.22-05-016
DATE RECEIVED: APRIL 7, 2023
DATE RESPONDED: APRIL 14, 2023

GENERAL OBJECTIONS

1. UCAN objects generally to each request to the extent that it seeks information protected by the attorney-client privilege, the attorney work product doctrine, or any other applicable privilege or evidentiary doctrine. No information protected by such privileges will be knowingly disclosed.

2. UCAN objects generally to each request that is overly broad and unduly burdensome. As part of this objection, UCAN objects to discovery requests that seek "all documents" or "each and every document" and similarly worded requests on the grounds that such requests are unreasonably cumulative and duplicative, fail to identify with specificity the information or material sought, and create an unreasonable burden compared to the likelihood of such requests leading to the discovery of admissible evidence. Notwithstanding this objection, UCAN will produce all relevant, non-privileged information not otherwise objected to that it is able to locate after reasonable inquiry.

3. UCAN objects generally to each request to the extent that the request is vague, unintelligible, or fails to identify with sufficient particularity the information or documents requested and, thus, is not susceptible to response at this time.

4. UCAN objects generally to each request that: (1) asks for a legal conclusion to be drawn or legal research to be conducted on the grounds that such requests are not designed to elicit facts and, thus, violate the principles underlying discovery; (2) requires UCAN to do legal research or perform additional analyses to respond to the request; or (3) seeks access to counsel's legal research, analyses or theories.

5. UCAN objects generally to each request to the extent it seeks information or documents that are not reasonably calculated to lead to the discovery of admissible evidence, or where the burden, expense, or intrusiveness of the request clearly outweighs the likelihood that the information sought will lead to the discovery of admissible evidence.

6. UCAN objects generally to each request to the extent that it is unreasonably duplicative or cumulative of other requests.

7. UCAN objects generally to each request to the extent that it would require UCAN to search its files for matters of public record such as filings, testimony, transcripts, decisions, orders, reports or other information, whether available in the public domain or through FERC or CPUC sources.

8. UCAN objects generally to each request to the extent that it seeks information or documents that are not in the possession, custody or control of UCAN.

9. UCAN objects generally to each request to the extent that the request would impose an undue burden on UCAN by requiring it to perform studies, analyses or calculations or to create documents that do not currently exist.

10. UCAN objects generally to each request that calls for information that contains trade secrets, is privileged or otherwise entitled to confidential protection by reference to statutory protection. UCAN objects to providing such information absent an appropriate protective order or non-disclosure agreement.

11. UCAN objects to any request that states that it is ongoing or that requires subsequent, supplemental information.

EXPRESS RESERVATIONS

12. No response, objection, limitation or lack thereof, set forth in these responses and objections shall be deemed an admission or representation by UCAN as to the existence or nonexistence of the requested information or that any such information is relevant or admissible.

13. UCAN reserves the right to modify or supplement its responses and objections to each request, and the provision of any information pursuant to any request is not a waiver of that right.

14. UCAN reserves the right to rely, at any time, upon subsequently discovered information.

15. These responses are made solely for the purpose of this proceeding and for no other purpose.

OBJECTIONS TO INSTRUCTIONS

16. UCAN objects to the extent that the Instructions make the data request continuing in nature. The responses reflect UCAN's best information at the time of the response.

17. UCAN objects to the instructions to the extent it purports to require the individual(s) responsible for providing the response and/or designate the proper witness to cross-examine concerning the response. The responses reflect UCAN's response as a Company to the requests and not the work of any one individual.

18. UCAN objects to the instructions to the extent it purports to require UCAN to go beyond what is required by the CPUC's Rules and Practice and Procedure.

Subject to the foregoing general objections and express reservations, UCAN responds as follows:

Question 1:

Please state whether YOU agree that SDG&E has a legal obligation to provide electric service to any person or entity in SDG&E's service territory who requests such service in accordance with SDG&E's Commission-approved tariff. If YOU disagree, please state the basis for YOUR position.

UCAN Response 1:

SDG&E does not have an obligation to serve where the costs will be unjust and unreasonable, as explained in Cal PU Code 451 and other related Cal PU Code sections.

Question 2:

Please state whether YOU contend that the California Public Utilities Commission, without further legislative action, has authority to relieve SDG&E of a legal obligation to provide electric service to any person or entity in SDG&E's service territory who requests such service in accordance with SDG&E's Commission-approved tariff.

UCAN Response 2:

See A1.

Question 3:

Please state whether YOUR proposal that SDG&E incorporate a greater reliance on Customer Side of the Meter (CSOM) distributed energy resources (DER) in its electric system planning assumes that SDG&E does not have a legal obligation to provide electric service to any person or entity in SDG&E's service territory who requests such service in accordance with SDG&E's Commission-approved tariff.

UCAN Response 3:

See answer to question 1.

Question 4:

On page 243 of the WOYCHIK TESTIMONY, YOU state: "especially when so much customer battery storage is available if SDG&E would only encourage its customers to acquire this technology." Please describe in the greatest detail you are able:

UCAN Response 4:

a. The steps YOU contend that SDG&E should take to "encourage its customers" to adopt "customer battery storage";

UCAN Response 4a:

First, avoid substitution of SDG&E battery storage (utility-side-of-the-meter or USOM), second implement CPUC directed policies; third encourage if not enable customers to adopt electric vehicles, many which will have vehicle-2-grid (V2G) capabilities going forward.

b. The aggregate nameplate capacity of the "customer battery storage" YOU contend would become available "if SDG&E would only encourage its customers to acquire this technology," and all facts and evidence supporting YOUR contention;

UCAN Response 4b:

The question is ambiguous but appears to ignore the extensive amount of CSOM battery energy storage that will be forthcoming from V2G and buildings. Also see A4a.

c. The aggregate cost of the "customer battery storage" YOU contend would become available "if SDG&E would only encourage its customers to acquire this technology," including equipment and installation, and all facts and evidence supporting YOUR contention;

UCAN Response 4c:

Customer costs for battery storage outside of SDG&E rates are not subject to CPUC jurisdiction or SDG&E's ratemaking. Questions about SDG&E response to CSOM and its equipment costs to integrate CSOM impacts are subjects of relevance to the CPUC's jurisdiction and ratemaking

d. The sources of funding for the "customer battery storage" YOU contend would become available "if SDG&E would only encourage its customers to acquire this technology," and all facts and evidence supporting YOUR contention; DATA REQUEST SCG-SDGE-UCAN-001 SoCalGas and SDG&E's 2024 GENERAL RATE CASE A.22-05-015 and A.22-05-016 3

UCAN Response 4d:

See A4c above.

e. If YOU contend that SDG&E should fund any portion of the "customer battery storage" YOU contend would become available "if SDG&E would only encourage its customers to acquire this technology," which of SDG&E ratepayers should be allocated such costs;

UCAN Response 4e:

See A4c above.

f. Whether YOU contend that SDG&E would be able to dispatch electricity stored in such "customer battery storage" when SDG&E deems appropriate;

UCAN Response 4f:

It is not clear that SDG&E would need to dispatch CSOM battery storage, unless one assumes that SDG&E acts as monopoly control entity as the only entity to dispatch this and other DERs, a concerned explained in my testimony. Third parties such as Ohmconnect or CPower could dispatch DERs. DER dispatch can also be automated to respond based on price or contract, including customer availability.

g. Whether each customer who owns such "customer battery storage" would be legally obligated to ensure that a fixed amount of electricity is available in such customer battery storage to be dispatched when directed by SDG&E.

UCAN Response 4g:

A legal requirement to dispatch CSOM storage was not assumed, rather market forces and customer incentives were assumed, including use of third parties, beyond exclusive control by SDG&E.

Question 5:

With respect to the SCOM DER resources that YOU contend will be part of the "High DER Future" by December 31, 2027:

a) State the number of persons and entities in SDG&E's service territory that YOU contend will have installed such CSOM DER resources, and state all facts and evidence supporting such contention;

UCAN Response 5a:

"SCOM" resources are not defined, which makes all questions asked under this topic unclear. Moreover, this specific question is rhetorical; if SCOM is intended to refer to CSOM, SDG&E continues to exercise hegemon and monopoly control over electrical energy in its service

territory, while responding the AJW effect (referred to in my testimony), SDG&E seems likely to attempt to severely diminish the use of CSOM DERs. CPUC encouragement of CSOM DERs is needed, such as through the multiple policy initiatives which the CPUC has ongoing, including the Cal-FUSE initiative. Appropriate policy initiatives from the CPUC are needed to reduce the deleterious impacts that SDG&E portends to exercise on CSOM DERs.

b) State what YOU contend will be the electric generation capacity of such CSOM DER resources, and state all facts and evidence supporting such contention;

UCAN Response 5b:

See A5a

c) State what YOU contend will be the total nameplate electric storage capacity that will exist on the customer side of the meter for such CSOM DER resources, and state all facts and evidence supporting such contention;

UCAN Response 5c:

If CSOM resources are intended, see A5a.

d) State what YOU contend will be the total cost of such SCOM DER resources, including associated CSOM storage, including equipment and installation, and state all facts and evidence supporting such contention;

UCAN Response 5d:

"SCOM" resources are not defined and use of the terms SCOM and CSOM are at least confusing, but if Utility-Side-of-the-Meter (USOM) resources are intended, this is a question for SDG&E.

e) State what YOU contend will be the sources of funding for such SCOM DER resources, and state all facts and evidence supporting such contention;

UCAN Response 5e:

"SCOM" resources are not defined, but if Utility-Side-of-the-Meter (USOM) resources are intended, this is a question for SDG&E.

f) State whether any portion of such funding will be charged to SDG&E customers that do not install CSOM DER, and the total amount of such funding.

UCAN Response 5f:

It is unclear what the funding in question is connected to, as SDG&E claims some responsibility such as for management of USOM DERs, such as with software systems, which are part of SDG&E's proposed spending in this case.

g) State whether YOU contend that SDG&E would be able to dispatch electricity stored in any customer battery storage associated with such CSOM DER when SDG&E deems appropriate and, if so, the amount of such electricity;

UCAN Response 5g:

SDG&E now claims it has some responsibility for dispatch of CSOM and USOM battery storage, such as with selected microgrids, but it does not indicate "the amount of such electricity." UCAN does not argue that SDG&E should have responsibility for dispatch of any CSOM DERs, unless directed by the CPUC under a market program such as CalFUSE.

h) State whether each customer who owns such CSOM DER-associated battery storage would be legally obligated to ensure that a fixed amount of electricity is available in such customer battery storage to be dispatched when directed by SDG&E.

UCAN Response 5h:

Currently CSOM battery storage, demand response, and other loads are dispatched by third parties or customers, such as CPOWER or Ohmconnect under contracts, so to this extent are legally obligated. Others including myself have CSOM battery storage that responds to notifications without a legal obligation but in response to incentives.

Question 6:

Do YOU contend that some or all persons and entities installing CSOM DER in SDG&E's service territory will terminate SDG&E electric service and disconnect from the SDG&E-operated electric grid?

UCAN Response 6: Some SDG&E customers have undoubably disconnected and are "off-grid."

If your response is affirmative, please:

a) State the percentage of such persons or entities YOU contend will terminate SDG&E electric service and disconnect from the SDG&E-operated electric grid, and state all facts and evidence supporting such contention;

UCAN Response 6a:

I have not done this detailed quantitative analysis, but can refer to the affordability analysis done by and for the CPUC and other entities for parts of California, including SDG&E's service territory where rates appear to be some of the very highest in the nation.

b) Identify with the greatest specificity that YOU are able any distribution line segments that YOU contend can be decommissioned as a result of installation of CSOM DER resources;

UCAN Response 6b:

I am aware of decommissioning studies performed to decommission utility natural gas systems, given climate change impacts and GHG goals, and I am aware of the CPUC's electric distribution resource plan process, as well as the CPUC rules on used and useful assets, which if not used and useful require decommissioning, as well as SDG&E actions to decommission lower voltage distribution and replace certain segments with higher voltage distribution. Regrettably, SDG&E does not directly consider CSOM DERs in most of these processes, as equipment sizing would be reduced, which would reduce otherwise achievable rate base investment.

c) Identify with the greatest specificity that YOU are able any transmission line segments that YOU contend can be decommissioned as a result of installation of CSOM DER resources; DATA REQUEST SCG-SDGE-UCAN-001 SoCalGas and SDG&E's 2024 GENERAL RATE CASE A.22-05-015 and A.22-05-016.

UCAN Response 6c:

Decommissioning electric transmission is usually not a question that SDG&E would want to ask about, rather the questions are about i) whether transmission should be built and commissioned, and ii) the size of electric transmission to be built, both of which may be subject to the loads that can be deferred through CSOM DERs, as well as selective USOM DERs, neither of which SDG&E sems to propose as optional investments to transmission expansion to increase rate base.

d) identify with the greatest specificity YOU are able the costs that SDG&E has proposed to recover through this proceeding that YOU contend would be avoided by such persons' and entities' termination of electric service, and state all facts and evidence supporting such contention.

UCAN Response 6d:

This question asks to identify SDG&E proposed costs that I contend should be avoided by entities' termination of electric service, however, I have not recommended cost be avoided in order to terminate electric service.

e) State whether such customers' termination of electric service would violate any applicable laws.

UCAN Response 6e:

UCAN expects that it is legal to terminate customer service, such as for non-payment of electricity bills, though a utility such as SDG&E has rates that some people simply cannot afford.

DATA REQUEST
SCG-SDGE-UCAN-001
SoCalGas and SDG&E's 2024 GENERAL RATE CASE
A.22-05-015 and A.22-05-016
DATE RECEIVED: APRIL 7, 2023
DATE RESPONDED: APRIL 14, 2023

Question 7:

On page 2 of the WOYCHIK TESTIMONY, YOU state: "Both SDG&E's electric and gas distribution capital requests should be reduced by thirty percent (30%), in major part to enable customer side of the meter (CSOM) Distributed Energy Resources (DERs) at large scale in preparation for the high DER future, avoid investments in technology that will be soon be if not already be obsolete during this rate case period …"

UCAN Response 7:

As my statement quoted above was a conclusion in summary of my 300+ pages of testimony in support, I will not replicate those pages here but refer to the document in chief.

Please explain in the greatest detail you are able:

a. How reducing SDG&E's electric and gas distribution capital requests by 30% will "enable" CSOM DER, and state all facts and evidence supporting YOUR explanation;

UCAN Response 7a:

See A7.

b. How reducing SDG&E's electric and gas distribution capital requests by 30% will "avoid investments in technology that will be soon be if not already be obsolete during this rate case period," and state all facts and evidence supporting YOUR explanation;

UCAN Response 7b:

see A7:

c. The basis upon which YOU contend that SDG&E's proposed "investments in technology … will be soon be if not already be obsolete during this rate case period," and state all facts and evidence supporting YOUR contention.

UCAN Response 7c:

See A7.

Data Request Number: TURN-SEU-026

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: The Utility Reform Network

Date Received: 1/30/2023

Date Responded: 2/10/2023

Question 10-Continued

e. Assume that two-10 MW/10 MWh batteries were installed one mile from Miramar. Also assume that SDG&E controls the operation of both Miramar and the two hypothetical batteries. Please respond to the following questions:
    i. Under this configuration, would SDG&E be able to operate the two batteries and Miramar to obtain the same benefits that the Hybrid at Miramar would provide? If your response is anything except an unqualified "yes," please explain your response and provide calculations supporting your response.

Data Request Number: TURN-SEU-026

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: The Utility Reform Network

Date Received: 1/30/2023

Date Responded: 2/10/2023

SDG&E Response 10e:

SDG&E objects to this request under Rule 10.1 of the Commission's Rules of Practice and Procedure to the extent it seeks the production of information that is neither relevant to the subject matter involved in the pending proceeding nor is reasonably calculated to lead to the discovery of admissible evidence. SDG&E further objections to this request on the grounds that it calls for speculation. SDG&E further objects to this request on the grounds that it presents a hypothetical and assumes facts not in evidence. Subject to and without waiving the foregoing objections, SDG&E responds as follows:

No, under this hypothetical situation, the hypothetical batteries and the Miramar Hybrid would be separately metered (i.e., separate resources for California Independent System Operator (CAISO)) and would be separately dispatched by the CAISO. Meanwhile under SDG&E's proposal, the Hybrid at Miramar would not be separately metered or separately dispatched by CAISO in order to optimize the natural gas turbines at the Miramar Energy Facility or to allow the units to reach nameplate capacity and provide all the benefits discussed below and in the Revised Direct Testimony of witness Fernando Valero (see Ex. SDG&E-15-R at FV-33).

As identified in the Revised Direct Testimony of witness Fernando Valero (see Ex. SDG&E-15-R at FV-33) a hybrid configuration enhances the performance of a traditional gas peaker plant by adding a battery which will improve performance while lowering emissions. The proposed project would enhance the two simple-cycle gas turbines at Miramar Energy Facility (MEF) with two 10MW / 10MWh batteries (one each per unit). The benefits the proposed project is expected to provide includes reducing emissions at each turbine, reducing operating hours of the electric generators, and reducing water consumption. Emission and water reductions will come from less use of the electric generators by replacing some of the generation with battery energy. Adding batteries to each gas peaker plant will result in the peaker plants each reaching their nameplate capacity of 49 MW, or a full combined interconnect capacity of 98 MW, and will allow the plant to more optimally participate in the CAISO spinning reserve market. When the Hybrid at Miramar is providing spinning reserve, it can be done without using any fuel which makes it a greenhouse gas (GHG) free resource.

Additionally, please see SDG&E's responses to Questions 10a through 10c above.

Data Request Number: TURN-SEU-042

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: The Utility Reform Network

Date Received: 2/23/2023

Date Responded: 3/9/2023

7. For SDG&E, please provide workpapers detailing all hydrogen related costs, including, but not limited to, the cost of fuel production, fuel blending, vehicle fueling stations, hydrogen vehicle purchases &/or lease costs, and storage and distribution infrastructure. In addition, please detail the total dollar amount for each hydrogen-related activity and the total for all hydrogen-related spending.

SDG&E Response 7:
SDG&E objects to this request on the grounds that it is overly broad, vague, and ambiguous, particularly with respect to the term "all hydrogen related costs." Subject to and without waiving the foregoing objection, SDG&E responds as follows:

The attachment titled "SDGE-15-WP-S-C Fernando Valero-Clean Energy Innovation" contains confidential and protected materials that are within the scope of data provided confidential treatment pursuant to the IOU Matrix attached to the Commission's confidentiality decision (D.06-06-066) and/or under applicable law and should be treated as confidential in its entirety. This attachment is subject to the terms of an executed Non-Disclosure Agreement for this Proceeding.

For hydrogen vehicles total procurement estimate costs, please refer to Exhibit SDG&E-22-WP-R at 68, lines labeled GRC Elect Gen 1 – Gen 3.

For estimated vehicle maintenance costs please refer to Exhibit SDG&E-22-WP-R at 122, lines labeled GRC Elect Gen 1 – Gen 3. Support for the annualized maintenance costs for these types of vehicles can be found in Exhibit SDG&E-22-WP-R at 130- 133, reference where "Maj Billing Code" is equal to "1."

For estimated fuel cost please refer to Exhibit SDG&E-22-WP-R at 157, lines labeled GRC Elect Gen 1 – Gen 3. SDG&E forecasted a zero-dollar cost to Fleet Services for hydrogen fuel in 2024.

Costs associated with the Palomar Hydrogen System (including the fuel blending, vehicle fueling station, and storage and distribution infrastructure) are allocated and detailed in Exhibit SDG&E-14-CWP at 53-60. Note that the Palomar Hydrogen System request is described as an entire system and is not broken out by sub-system or activity.

Costs associated with hydrogen fueling at Kearny C&O Center are allocated and detailed in Exhibit SDG&E-23-CWP at 353 - 359.

Costs associated with the proposed Hydrogen Build Ready Infrastructure customer program are detailed in Exhibit SDG&E-15-CWP at 71.

SDG&E Response 7 (Continued):

Data Request Number: TURN-SEU-042

Proceeding Name: A2205015_016 - SoCalGas and SDGE 2024 GRC

Publish To: The Utility Reform Network

Date Received: 2/23/2023

Date Responded: 3/9/2023

Costs associated with the proposed Hydrogen Energy Storage System Expansion at the Borrego Springs Microgrid are detailed in Exhibit SDG&E-15-CWP at page 81.

Costs associated with the proposed Hydrogen Energy Storage System portion of Advanced Energy Storage (AES) are detailed in CONFIDENTIAL Exhibit SDG&E-15-WP-S at page 1 & 2.

APPENDIX C

SDG&E'S IDENTIFIED ERROR IN CAL ADVOCATES' LABOR WORKPAPER

Appendix C: SDG&E Correction to Cal Advocates O&M Base and Incremental Labor Line Items

(a) Workpaper Number	(b) Workpaper Name	(c) Line Item	(d) Unit Description	(e) Labor / Non-Labor	(f) 2022: Total cost	(g) 2023: Total cost	(h) 2024: Total cost	Cal Advocates Proposal
1DD001.000	Hydrogen Strategy and Implementation	1	Base Forecat	Labor	$ 611,000	$ 611,000	$ 611,000	$ 305,500
1DD001.000	Hydrogen Strategy and Implementation	5	FTE	Labor		$ 294,000	$ 294,000	$ 147,000
1DD002.000	Advanced Clean Technology	1	Base Forecast	Labor	$ 1,112,000	$ 1,112,000	$ 1,112,000	$ 556,000
1DD002.000	Advanced Clean Technology	3	FTE	Labor	$ 125,000	$ 125,000	$ 156,250	$ 78,125
1DD003.000	Innovation Technology Development	7	Innov Tech Dev Staff	Labor	$ -	$ -	$ 124,800	$ 62,400
1DD003.000	Innovation Technology Development	8	Innov Tech Dev Staff	Labor	$ -	$ -	$ 124,800	$ 62,400
1DD003.000	Innovation Technology Development	9	Innov Tech Dev Staff	Labor	$ -	$ -	$ 124,800	$ 62,400
1DD003.000	Innovation Technology Development	10	Business Unit Project Support	Labor	$ -	$ -	$ 199,350	$ 99,675
1DD003.000	Innovation Technology Development	12	Host Utility for grant support piloting of virtual air gap software	Labor	$ -	$ -	$ 301,250	$ 150,625
1DD005.000	Distributed Energy Resource Engineering	1	Base Forecast	Labor	$ 246,000	$ 246,000	$ 246,000	$ 123,000
1DD005.000	Distributed Energy Resource Engineering	3	FTE - Engineer: O&M	Labor	$ 125,000	$ 125,000	$ 125,000	$ 62,500
1DD005.000	Distributed Energy Resource Engineering	4	FTE - Engineer: Tests and Studies	Labor	$ -	$ 125,000	$ 250,000	$ 125,000
1DD005.000	Distributed Energy Resource Engineering	5	FTE - Engineer: Support Capital projects	Labor	$ -	$ 32,000	$ 63,000	$ 31,500
Total							$ 3,732,250	$ 1,866,125
Unique					$ 2,219,000	$ 2,670,000	$ 2,857,250	$ 1,428,625

Appendix C: SDG&E Correction to Cal Advocates Capital Labor Line Items

(a) Budget Code	(b) Budget Item	(c) Line Item	(d) Unit Description	(e) Labor / Non-Labor	(f) 2022: Total cost	(g) 2023: Total cost	(h) 2024: Total cost	CA Projection 2022	CA Projection 2023	CA Projection 2024	SDG&E Total	Cal Advocates Total
20278A	Advanced Energy Storage Program	2	FTE's Non-Union	Labor	$ 155,000	$ 35,000	$ -	$ 77,500.00	$ 17,500.00	$ -	$ 190,000	$ 95,000.00
20278A	Advanced Energy Storage Program	3	FTEs Union	Labor	$ 125,000	$ -	$ -	$ 62,500.00	$ -	$ -	$ 125,000	$ 62,500.00
20278A	Advanced Energy Storage Program	16	SCG Labor (Billed capital)	Labor	$ 125,000	$ -	$ -	$ 62,500.00	$ -	$ -	$ 125,000	$ 62,500.00
20278A	Advanced Energy Storage Program	19	Billable Labor	Labor	$ 120,000	$ -	$ -	$ 60,000.00	$ -	$ -	$ 120,000	$ 60,000.00
212690	Advanced Energy Storage Program 2.0	2	FTEs	Labor	$ -	$ 252,000	$ 440,000	$ -	$ 126,000.00	$ 220,000.00	$ 692,000	$ 346,000.00
212710	Non-Lithium-Ion Energy Storage Technology	2	New storage technology 1	Labor	$ 125,000	$ 250,000	$ 50,000	$ 62,500.00	$ 125,000.00	$ 25,000.00	$ 425,000	$ 212,500.00
212710	Non-Lithium-Ion Energy Storage Technology	4	New storage technology 2	Labor	$ 250,000	$ 250,000	$ 250,000	$ 125,000.00	$ 125,000.00	$ 125,000.00	$ 750,000	$ 375,000.00
212710	Non-Lithium-Ion Energy Storage Technology	6	New storage technology 3	Labor	$ 250,000	$ 250,000	$ 250,000	$ 125,000.00	$ 125,000.00	$ 125,000.00	$ 750,000	$ 375,000.00
17246A	Borrego 3.0 Microgrid	1	Management Labor	Labor	$ 900,000	$ 60,000	$ -	$ 450,000.00	$ 30,000.00	$ -	$ 960,000	$ 480,000.00
17246A	Borrego 3.0 Microgrid	2	Union Labor	Labor	$ 37,500	$ -	$ -	$ 18,750.00	$ -	$ -	$ 37,500	$ 18,750.00
212680	H2 Build Ready Infrastructure	4	Project Management	Labor	$ -	$ 250,000	$ 375,000	$ -	$ 125,000.00	$ 187,500.00	$ 625,000	$ 312,500.00
21272	Hydrogen Energy Storage System Expansion	10	Project Management	Labor	$ -	$ 250,000	$ 31,000	$ -	$ 125,000.00	$ 15,500.00	$ 281,000	$ 140,500.00
Sum					$ 2,087,500	$ 1,597,000	$ 1,396,000	$ 1,043,750	$ 798,500	$ 698,000	$ 5,080,500	$ 2,540,250