FILED
10/05/18
04:59 PM

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of San Diego Gas & Electric Company (U902E) for Approval of its 2018 Energy Storage Procurement and Investment Plan.	Application 18-02-016 (Filed February 28, 2018)
And Related Matters	Application 18-03-001 Application 18-03-002

OPENING BRIEF OF SAN DIEGO GAS & ELECTRIC COMPANY (U902-E) ON AB 2868 ISSUES

E. Gregory Barnes
Attorney for
SAN DIEGO GAS & ELECTRIC COMPANY
8330 Century Park Court, 2nd Floor
San Diego, CA 92123
Telephone: (858) 654-1583
Facsimile: (619) 699-5027
Email: gbarnes@semprautilities.com

October 5, 2018

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Page(s)

STATUTES AND LEGISLATION

CALIFORNIA PUBLIC UTILITIES COMMISSION DECISIONS

OTHER AUTHORITIES

SDG&E EXHIBIT LIST

Exhibit Number	Party	Description
SDGE-01	SDG&E	Prepared Direct Testimony of Ted Reguly: Overview and Policy
SDGE-02	SDG&E	Prepared Direct Testimony of Stephen T Johnston: AB 2868 Framework
SDGE-03	SDG&E	Prepared Direct Testimony of Jennifer W. Summers: AB 2514 Solicitation Process
SDGE-04	SDG&E	Prepared Direct Testimony of Don Balfour: AB 2514 Procurement Targets
SDGE-05	SDG&E	Prepared Direct Testimony of Steven Prsha: Project Costs
SDGE-05A	SDG&E	SDG&E's Direct Testimony of Steven Prsha, February 28, 2018 (Corrected March 27, 2018 and July 27, 2018)
SDGE-05AC	SDG&E	Confidential SDG&E's Direct Testimony of Steven Prsha, February 28, 2018 (Corrected March 27, 2018 and July 27, 2018)
SDGE-06	SDG&E	Prepared Direct Testimony of Evan M. Bierman: Customer Benefits
SDGE-06A	SDG&E	SDG&E's Direct Testimony of Evan M. Bierman: Customer Benefits (Corrected July 27, 2018)
SDGE-07	SDG&E	Prepared Direct Testimony of Mayda Bandy: Low-Income Customer Program
SDGE-07A	SDG&E	SDG&E's Direct Testimony of Mayda Bandy, February 28, 2018 (Corrected July 27, 2018)
SDGE-08	SDG&E	Prepared Direct Testimony of Michael R. Woodruff and James G. Vanderhye Jr.: Revenue Requirement
SDGE-08A	SDG&E	SDG&E's Direct Testimony of Michael R. Woodruff and James G. Vanderhye Jr., February 28, 2018 (Corrected March 27, 2018)
SDGE-08AC	SDG&E	Confidential SDG&E's Direct Testimony of Michael R. Woodruff and James G. Vanderhye Jr., February 28, 2018 (Corrected March 27, 2018)
SDGE-09	SDG&E	Prepared Direct Testimony of Norma G. Jasso: Regulatory Accounts
SDGE-10	SDG&E	Prepared Direct Testimony of Kellen C. Gill: Cost Recovery
SDGE-11	SDG&E	Rebuttal Testimony of Ted Reguly
SDGE-12	SDG&E	Rebuttal Testimony of Stephen T Johnston
SDGE-13	SDG&E	Rebuttal Testimony of Steven Prsha
SDGE-14	SDG&E	Rebuttal Testimony of Evan M. Bierman
SDGE-14C	SDG&E	Confidential Rebuttal Testimony of Evan M. Bierman
SDGE-15	SDG&E	Rebuttal Testimony of George Katsufrakis
SDGE-16	SDG&E	Rebuttal Testimony of Kellen C. Gill

RECORD CITATION FORM

Citations to prepared testimony are as follows: [party nickname]-([witness surname]) [page number(s)]:[line number(s). The citations omit any witness initials preceding the page number. Citations to SDG&E's prepared testimony will add at the beginning of the citation the exhibit number ("Ex. SDGE- __") as provided in the above Exhibit List. SDG&E's exhibit numbers are those assigned in Judge Stevens' proposed decision (September 25, 2018) in the AB 2514 phase of this docket at 29-30. Note that, for simplicity and convenience in citation herein, citations to SDG&E's exhibits omit the "A" and "C" designations found on the Exhibit List. Citations to SDG&E exhibits in this brief are to the latest served, corrected versions. Highlighting plus context (Public or Confidential) will indicate whether the citation is to a confidential version of the testimony.

SUMMARY OF RECOMMENDATIONS (RULE 13.11)

San Diego Gas & Electric Company ("SDG&E") recommends that the Commission issue a prompt decision approving the subject application through findings of fact, conclusions of and orders consistent with approval of SDG&E's specific proposals, as follows:

1. SDG&E's Energy Storage Investment and Program Framework ("AB 2868 Framework"), which consists of:

    a. SDG&E ownership and investment in circuit- and service-level[1] microgrid energy storage projects on the distribution grid, to provide multiple-use applications, including microgrid islanding to provide resiliency to selected critical public sector facilities;

    b. A project evaluation framework and weighting methodology based on AB 2868 statutory criteria, which SDG&E used to select the seven circuit-level energy storage projects proposed herein, and proposes to use to evaluate future circuit-and service-level AB 2868 energy storage investments;

    c. An advice letter process for Commission approval of future circuit- and service-level energy storage projects for the remaining AB 2868 capacity amounts not proposed in this application; and

    d. A $2 million energy storage incentive for a three-year Expanded CARE Pilot Program ("pilot program") that will offer incentives to Expanded CARE[2] facilities serving low-income communities, to deploy energy storage systems behind-the-meter, to be owned by third parties, including customers.

2. Cost caps to construct the seven circuit-level energy storage projects in 2019 and 2020 with capacity totaling 100 MW / 110 MWh under the AB 2868 Framework.

3. A revenue requirement of $284.6 million for the period 2018-2068 resulting from the seven circuit-level energy storage projects.

---

[1] "Circuit-level" refers to energy storage on distribution circuits connected at distribution voltages. These are distinct from "service-level" energy storage systems, which are interconnected at secondary distribution voltages between the distribution transformer and the customer's meter.

[2] California Alternative Rates for Energy ("CARE") helps low-income residential gas and electric customers afford their utility bills as outlined in P.U. Code § 739.1. P.U. Code § 739.1(h) added nonprofit facilities, where low-income ratepayers reside, to the CARE eligibility criteria (this modification for nonprofits is often referred to as "Expanded CARE," hence the pilot program's name).

4. A balancing account to record the authorized revenue requirement associated with the seven circuit-level energy storage projects, including operations and maintenance, capital-related costs and revenues received from the operation of the resources in the wholesale energy market, with a provision for offsetting project costs, with any revenues from the storage projects' electricity sales into the wholesale energy market.

5. A balancing account to record the authorized revenue associated with and incentive payments made to eligible customers under the pilot program.

6. Rate recovery via Distribution rates for the seven circuit-level energy storage projects, and rate recovery via the Electric Public Purpose Programs ("PPP") rates for the low-income pilot program.

7. Because SDG&E plans to seek full capacity deliverability status for the seven circuit-level microgrid energy storage projects, SDG&E requests that to the extent these energy storage projects provide local capacity, that the Commission find that these projects qualify and count toward SDG&E's remaining Track IV Local Capacity Requirement, which is currently at 56 MW.

SDG&E further recommends that the Commission issue supporting findings of fact and conclusions of law to the effect that the foregoing proposed programs and investments will satisfy the AB 2868 criteria, as follows:[3]

1. "accelerate widespread deployment of distributed energy storage systems"

2. "achieve ratepayer benefits"

3. "reduce dependence on petroleum, meet air quality standards, and reduce emissions of greenhouse gases"

4. "minimize overall costs and maximize overall benefits"

5. "not unreasonably limit or impair the ability of nonutility enterprises to market and deploy energy storage systems"[4]

6. "prioritize those programs and investments that provide distributed energy storage systems to public sector and low-income customers"[5]

---

[3] From Cal. Pub. Util. Code ("P.U. Code") § 2838.2(b), except where noted.

[4] *Id.*, § 2838.2(c)(1).

[5] *Id.,* § 2838.2 (d)(2).

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of San Diego Gas & Electric Company (U902E) for Approval of its 2018 Energy Storage Procurement and Investment Plan.	Application 18-02-016 (Filed February 28, 2018)
And Related Matters	Application 18-03-001 Application 18-03-002

OPENING BRIEF OF SAN DIEGO GAS & ELECTRIC COMPANY (U902-E) ON AB 2868 ISSUES

Pursuant to Commission Rule 13.11 and the Assigned Commissioner's *Scoping Memo and Ruling* (May 24, 2018) ("scoping memo") issued in the above-captioned matter, San Diego Gas & Electric Company ("SDG&E") submits this opening brief on Assembly Bill ("AB") 2868[1] issues.[2] For the reasons set forth below, SDG&E requests that the Commission approve the programs and investments proposed in this application.

I. EXECUTIVE SUMMARY

Decision ("D.") 17-04-039[3] leaves in place utility energy storage targets previously set pursuant to AB 2514,[4] and it establishes a process to implement AB 2868, which requires the

---

1 Stats. 2016, ch.681, *codified at* Cal. Pub. Util. Code ("P.U. Code") §§ 2838.2 and 2838.3.

2 The scoping memo set this proceeding's AB 2514 issues on a separate procedural track. SDG&E submitted its AB 2514 opening brief on July 11, 2018. Because no party opposed that brief, the AB 2514 portion of SDG&E's application is submitted for decision. This AB 2868 brief contains confidential material and is being served in a public version (confidential information redacted), and in a confidential version on Commission staff and those who have executed a non-disclosure agreement. SDG&E has filed concurrently herewith a motion, *inter alia*, to seal portions of this opening brief.

3 *Decision on Track 2 Energy Storage Issues* (May 8, 2017).

4 Stats 2010, ch.469, *codified at* P.U. Code §§ 2835-2839. AB 2514 directed the Commission to determine appropriate targets, if any, for each Load Serving- Entity as defined by P.U. Code § 380(k) to procure viable and cost effective- energy storage systems and to set dates to achieve such targets.

utilities to propose, and the Commission to approve on an expedited schedule, "programs and investments" up to 500 megawatts ("MW") of additional distributed energy storage resources.[5] Pursuant to the statute and this decision, this application incorporates SDG&E's 2018 Energy Storage Procurement and Investment Plan for programs and investments for up to approximately 166 MW of distributed energy storage systems "to accelerate widespread deployment of distributed energy storage systems" above and beyond SDG&E's 165 MW share of the 1,325 MW statewide target for energy storage under AB 2514.[6]

This application embraces the opportunity to develop distributed energy storage that meets the AB 2868 criteria: solutions that prioritize public sector and low-income customers, demonstrate ratepayer benefits, seek to minimize costs and maximize overall benefits, reduce dependency on petroleum, meet air quality standards, and reduce greenhouse gas ("GHG") emissions,[7] while not unreasonably limiting or impairing the ability of nonutility enterprises to market and deploy energy storage systems.[8]

A. The proposed "programs and investments"

The application asks the Commission to approve the following SDG&E proposals:

1. SDG&E's Energy Storage Investment and Program Framework ("AB 2868 Framework"), which consists of:

    a. SDG&E ownership and investment in circuit- and service-level[9] microgrid energy storage projects on the distribution grid, to provide

---

5 *Id.,* § 2838.2(c)(1).

6 *Id.*, § 2838.2(b).

7 *Id*.

8 *Id*., § 2838.2(c)(1).

9 "Circuit-level" refers to energy storage on distribution circuits connected at distribution voltages. These are distinct from "service-level" energy storage systems, which are interconnected at secondary distribution voltages between the distribution transformer and the customer's meter.

multiple-use applications, including microgrid islanding to provide resiliency[10] to selected critical public sector facilities;

b. A project evaluation framework and weighting methodology based on AB 2868 statutory criteria, which SDG&E used to select the seven circuit-level energy storage projects proposed herein, and proposes to use to evaluate future circuit- and service-level AB 2868 energy storage investments;

c. An advice letter process for Commission approval of future circuit- and service-level energy storage projects for the remaining AB 2868 capacity amounts not proposed in this application; and

d. A $2 million energy storage incentive for a three-year Expanded CARE Pilot Program ("pilot program") that will offer incentives to Expanded CARE[11] facilities serving low-income communities, to deploy energy storage systems behind-the-meter, to be owned by third parties, including customers.

2. Cost caps to construct the seven circuit-level energy storage projects in 2019 and 2020 with capacity totaling 100 MW / 110 MWh under the AB 2868 Framework.

3. A revenue requirement of $284.6 million for the period 2018-2068 resulting from the seven circuit-level energy storage projects.

4. A balancing account to record the authorized revenue requirement associated with the seven circuit-level energy storage projects, including operations and maintenance ("O&M"), capital-related costs and revenues received from the operation of the resources in the wholesale energy market, with a provision to offset project costs with any revenues from the storage projects' electricity sales into the wholesale energy market.

5. A balancing account to record the authorized revenue associated with the incentive payments made to eligible customers under the pilot program.

---

[10] For a definition of resilience, *see* n.47 at 17, *infra*.

[11] California Alternative Rates for Energy ("CARE") helps low-income residential gas and electric customers afford their utility bills as outlined in P.U. Code § 739.1. P.U. Code § 739.1(h) added nonprofit facilities, where low-income ratepayers reside, to the CARE eligibility criteria (this modification for nonprofits is often referred to as "Expanded CARE," hence the pilot program's name). CARE provides a discount of 30-35% off a customer's total bill for low-income customers with annual household incomes no greater than 200% of the federal poverty guidelines (*id.,* § 739.1 (a) and (c)(1)).

6. Rate recovery via Distribution rates for the seven circuit-level energy storage projects, and rate recovery via the Electric Public Purpose Programs ("PPP") rates for the low-income pilot program.

7. Because SDG&E plans to seek full capacity deliverability status for the seven circuit-level microgrid energy storage projects, SDG&E requests that the Commission find, to the extent these energy storage projects provide local capacity, that they count toward SDG&E's remaining Track IV Local Capacity Requirement, which is currently 56 MW.

B. The proposed seven circuit-level energy storage projects serve multiple-use applications to minimize costs and maximize benefits

AB 2868 and D.17-04-039 encourage early deployment of distribution-connected energy storage.[12] To help minimize costs and maximize overall benefits, SDG&E has proposed multiple-use applications for its proposed seven energy storage projects. The resiliency from microgrid islanding is the projects' primary use case, and the Multi-Use Decision[13] puts backup power and resiliency in the distribution domain. The microgrid island use case will primarily serve public sector customers during grid disturbances, such as may occur during extreme weather or fire events. The energy storage assets would not minimize overall costs and maximize overall benefits if they only sit fully-charged in anticipation of an islanding use case. Therefore, when the energy storage assets are not needed for microgrid resiliency, we intend to bid the capability of the energy storage into CAISO[14] markets to generate revenue to offset project costs and to generate associated GHG reduction benefits. Such market participation

---

[12] P.U. Code § 2838.2(b) urges the Commission to require utilities to file applications for programs and investments "to accelerate widespread deployment of distributed energy storage systems." The urgency of this charge is reinforced by the fact that D.17-04-039 required the submission of such applications by March 1, 2018, and that the statute directs the Commission to "approve, or modify and approve" [*id*., § 2838.2(c)(1)] such applications "within 12 months of the date of filing of the completed application." *Id*., § 2838.2(d).

[13] The Commission recently encouraged such multiple-use applications in interim rules to govern such applications. D.18-01-003, *Decision on Multiple-Use Application Issues* ("Multi-Use Decision").

[14] California Independent System Operator Corporation.

would take place in the wholesale market domain established in the Multi-Use Decision.[15] SDG&E may also get Resource Adequacy ("RA") credit "to the extent the distributed energy storage systems and microgrid services to the public sector provide LCR."[16]

SDG&E believes that, if approved and constructed, operation of the seven projects would be the first actual market demonstration of multiple-use by an energy storage facility in California, and possibly, the nation.

C. The application satisfies the AB 2868 criteria

SDG&E's AB 2868 Framework, as described in SDG&E's prepared testimony, satisfies the following AB 2868 statutory criteria:[17]

1. **"… file applications for programs and investments to accelerate widespread deployment of distributed energy storage systems"**

This application does precisely that – the seven circuit-level energy storage projects are spread throughout SDG&E's electric system, and the Expanded CARE program will create incentives to deploy behind-the-meter storage systems for facilities serving low-income customers. As for "accelerate", only SDG&E's application offers near-term deployment of a substantial amount – 100 MW – of specific energy storage projects by the end of 2020.

2. **"achieve ratepayer benefits"**

The resiliency provided by the seven circuit-level energy storage projects are a ratepayer benefit, because the protection of energy supply to critical public safety and public health facilities benefits all customers, not just those located on the circuits affected by microgrid

---

[15] *See*, Multi-Use Decision, Appendix A, Rule 4 at 1.

[16] Ex. SDGE-03 (Summers) 8:1-18. "LCR" or local capacity resources, comes under RA in the Multi-Use Decision. Multi-Use Decision at 10-11, Table 1 and Appendix B, Table 2.

[17] From P.U. Code § 2838.2(b), except where noted.

operation. The benefits of the Expanded CARE pilot accrue to public and non-profit facilities serving an important subset of ratepayers, low-income customers. All of the environmental and fuel diversity benefits described below accrue to all ratepayers.

3. **"reduce dependence on petroleum, meet air quality standards, and reduce emissions of greenhouse gases"**

The seven circuit-level energy storage projects will reduce the use of and dependence on diesel fuel used to fire back-up generators during grid outages. The use of energy storage in a microgrid during such events will also avoid emission of air pollutants and GHGs associated with burning diesel fuel. By discharging into the CAISO market at other times, and by charging during periods of excess solar generation (*i.e.*, the "duck curve"), the projects will help reduce GHG by offsetting fossil generation and help integrate renewables into the grid. The Expanded CARE program, by providing incentives for storage supporting rooftop solar, will help to permanently shift load during peak periods and will offset fossil fuel generation.

4. **"shall seek to minimize overall costs and maximize overall benefits"**

The seven circuit-level energy storage projects will accomplish this statutory objective through multiple-use applications uniquely available to energy storage. Specifically, when not providing resiliency services, the projects will be bid into CAISO markets. In addition to the project's primary resilience mission, such sales will maximize the GHG reduction and renewable integration benefits of the storage. The revenues from such sales will also minimize costs, as they will be credited against the projects' costs. In addition, the projects will be bid out under established Commission-approved solicitation procedures, which will ensure the projects' construction will be competitively-priced, serving to minimize overall costs. Finally, the seven proposed projects are sited on currently available SDG&E land, which avoids costs and delays associated with acquiring new land.

The Expanded CARE program will minimize costs by conducting a competitive solicitation for the program administrator. Benefits will be maximized because the storage must be paired with solar, which better integrates renewables, and provides the benefits of energy storage to customers who may not otherwise be able to afford it.

5. "not unreasonably limit or impair the ability of nonutility enterprises to market and deploy energy storage systems"[18]

The plain words of AB 2868 require "investments" – which can only mean that the utility takes a financial interest in any project. The "not unreasonably limit" phrase reinforces that the statute contemplates utility ownership, because the words would be surplusage otherwise. Contrary to some contentions, there is nothing inherently unreasonable about SDG&E's ownership of the seven proposed energy storage projects, and, given the vast potential of the energy storage market, the small amount of proposed storage cannot credibly be said to "limit or impair" this market.

Moreover, the fact that each project will be competitively bid out for third-party development (to supply equipment, technology, and to construct the projects0 will substantially encourage "the ability of nonutility enterprises to market and deploy energy storage systems." The pro-competitive nature of SDG&E's proposal is confirmed by the lack of opposing testimony from storage industry trade groups, who are active and attentive participants in energy storage matters before the Commission, including this proceeding.[19]

---

[18] *Id.,* § 2838.2(c)(1).

[19] Only one storage developer, LS Power, has submitted testimony objecting to SDG&E's proposal, and the principal objection appears related to an existing LS Power project located near one of SDG&E's proposed projects.

6. "prioritize those programs and investments that provide distributed energy storage systems to public sector and low-income customers"[20]

The seven circuit-level energy storage projects are designed to provide resiliency – to maintain electric service during outages – to public sector facilities important to emergency response and other aspects of public health and safety. Locations in low-income communities were prioritized in the evaluation of potential projects, resulting in three projects being located in low-income communities. The Expanded CARE program is targeted at facilities including transitional housing (drug rehabilitation, half-way houses), short or long-term care facilities (hospice, nursing homes, children's and seniors' homes), group homes for physically or mentally disabled persons, or other nonprofit group living facilities. SDG&E's proposed pilot program is designed to complement and serve participants of the Multifamily Affordable Solar Housing ("MASH") program[21] and Solar on Multifamily Affordable Housing ("SOMAH") program.[22]

D. The recent enactment of the 100% renewable goal reinforces the importance of approving the application

While the application amply satisfies AB 2868 criteria, the recent enactment of Senate Bill ("SB")100[23] reinforces the importance and urgency of approving the application. With the

---

[20] P.U. Code § 2838.2 (d)(2).

[21] The MASH program (available at http://www.cpuc.ca.gov/general.aspx?id=3752) is an incentive for solar distributed generation designed for qualifying affordable housing, as defined in P.U. Code § 2852. The MASH incentive covered a substantial amount of the costs of installing solar. D.08-10-036 and D.15-01-027 implemented the statutory program criteria and funding. The MASH program is now closed to new participants. D.17-12-022 established SOMAH as a successor program.

[22] The SOMAH program is a solar distributed generation project incentive for multi-family affordable housing sites designed to ensure benefits from solar generation, especially bill credits, are received by tenants. SOMAH was established by AB 693 and implemented by D.17-12-022. SOMAH is funded with GHG allowances from the utilities. SOMAH is a successor program to MASH with different funding sources, rules and eligibility.

[23] *The 100 Percent Clean Energy Act of 2018,* Stats. 2018, ch.312, signed September 10, 2018. The act (section 1(b)) provides that the Commission and other state agencies "should plan for 100 percent of

stated purpose to "accelerate widespread deployment of energy storage systems", AB 2868 dovetails tightly with SB 100, which requires the Commission to "consider whether the retail seller has … [s]ought to develop … energy storage used to integrate eligible renewable energy resources"[24] in weighing whether to waive enforcement of the statute's procurement standard. To meet SB 100's ambitious target, storage on the distribution system must play a large role. SDG&E's proposals offer an early and important opportunity for the market to learn how to deploy storage for multiple uses, and for individual customers to learn how to integrate storage behind-the-meter with on-site solar generation. The Commission should approve the application and get the learning started.

II. PROCEDURAL BACKGROUND

AB 2514 directed the Commission to determine appropriate targets for each load serving entity as defined by P.U. Code § 380(k), to procure viable and cost-effective energy storage systems and to set dates to achieve any such targets. To implement this statute, D.13-10-040 (the "Energy Storage Decision") adopted targets for the utilities to procure energy storage systems during 2014-2020, and required the utilities to file biennial applications for plans to procure energy storage resources to address the targets set by the decision.[25] The utilities filed such plans for 2014 and 2016, which the Commission approved.[26]

---

total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045."

[24] *Id.*, section 3, *codified at* P.U. Code § 399.15(b)(5)(B)(ii).

[25] D.13-10-040 directs Pacific Gas and Electric Co. ("PG&E"), Southern California Edison Co. ("SCE"), and SDG&E (collectively, the "utilities") to apply, by March 1, 2014, and biennially thereafter through 2020, for approval of a plan to procure energy storage resources to address the targets and policies of the Commission's Energy Storage Procurement Framework and Design Program. D.13-10-040 at 74.

[26] SDG&E's 2014 and 2016 plans were approved by D.14-10-045 and D.16-09-007, respectively.

On September 26, 2016, Governor Brown signed AB 2868. The statute requires the utilities to propose "programs and investments" for up to 500 MW of distributed energy storage systems, distributed equally among the three utilities, above and beyond the 1,325 MW target established by the Commission in D.13-10-040 for energy storage generally. The Track 2 Decision, directed the utilities to incorporate proposals for programs and investments for up to 166.66 MW of distributed energy storage systems into their 2018 energy storage procurement and investment plans. D.17-04-039 maintains the utility energy storage targets previously set pursuant to AB 2514, and it establishes a process to implement AB 2868, in which the utilities must propose "programs and investments" for additional distributed energy storage resources up to the 500 MW target. D.17-04-039 (at 19-20) determined that these AB 2868 investment and program applications should be incorporated into the existing process and schedule for approving the biennial utility energy storage procurement plans, which placed the deadline for the instant application at March 1, 2018. Per D.17-04-039 and the scoping memo, this brief addresses only the AB 2868 issues submitted with the application.[27]

In support of the AB 2868 proposals in its application, SDG&E served concurrently with the application the following prepared direct testimony:[28]

- Overview and policy - Ted Reguly (Ex. SDGE-01),[29]
- AB 2868 Framework - Stephen T Johnston (Ex. SDGE-02),

---

[27] Per the scoping memo, the AB 2514 issues were submitted July 20, 2018 on reply briefs.

[28] SDG&E's prepared rebuttal testimony is described at 13-14, *infra*. SDG&E's exhibit numbers are reflected in the Exhibit List found at vii, *supra*. SDG&E moves these exhibits into the evidentiary record in a motion filed concurrently with this brief.

[29] Mr. Reguly's testimony (at 9:11-10:11) also addresses certain AB 2514 issues.

- AB 2514 solicitation process and local capacity requirement credits - Jennifer W. Summers (Ex. SDGE-03),[30]
- AB 2514 procurement targets – Don Balfour (Ex. SDGE-04),
- AB 2868 Project costs - Steven Prsha (Ex. SDGE-05) (corrected July 27, 2018),
- AB 2868 Customer benefits – Evan M. Bierman (Ex. SDGE-06) (corrected July 27, 2018),
- AB 2868 Low-income customer program – Mayda Bandy (Ex. SDGE-07) (corrected July 27, 2018),[31]
- AB 2868 Revenue requirement - Michael R. Woodruff and James G. Vanderhye Jr. (Ex. SDGE-08) (corrected July 27, 2018),
- AB 2868 Regulatory accounts – Norma G. Jasso (Ex. SDGE-09),
- AB 2868 Cost recovery – Kellen C. Gill (Ex. SDGE-10).

The exhibit numbers for SDG&E's prepared testimony are those assigned in Judge Stevens' proposed decision (September 25, 2018) in the AB 2514 phase of this docket at 29-30. Note that, for simplicity and convenience in citation herein, the foregoing exhibit numbers omit the "A" and "C" designations (which can be found on the above Exhibit List). The exhibits cited are to the latest served, corrected versions, and highlighting plus context (Public or Confidential) will indicate whether the citation is to a confidential version of the testimony.

Note that certain portions of the foregoing testimony refer to confidential market information. As recited in the application (at 24, section V), SDG&E submitted the supporting

[30] While Ms. Summers' testimony included AB 2514 issues, pertinent to the relief requested under AB 2868, she describes SDG&E's request that, to the extent these energy storage projects provide local capacity, that they qualify toward SDG&E's remaining Track IV Local Capacity Requirement. *See*, Ex. SDGE-03 (Summers) 4:10-8:18.

[31] Ms. Bandy has moved on to another position at SDG&E, and George Katsufrakis, Ms. Bandy's direct supervisor, has adopted her direct testimony. Ex. SDGE-15 (Katsufrakis) 1:7-13. This brief will continue to reference Ms. Bandy where it cites Ex. SDGE-07.

testimony in both public (redacted) and non-public (unredacted and confidential) versions, consistent with SDG&E's declaration of confidential treatment attached to certain of the testimony in conformance with D.17-09-023.[32]

The application (at Attachment 1 thereto) also contains letters of support for SDG&E's proposals from the following stakeholders: City of San Diego, San Diego County Air Pollution Control District, San Diego North Economic Development Council, Low Income Oversight Board, City of Chula Vista, City of Vista, CONNECT, County of San Diego, Federal Aviation Administration, Promises2Kids, Cleantech San Diego, Marine Corps Air Station Miramar, San Diego Unified Port District, San Diego County Sheriff's Department, and University of California, San Diego.

Timely protests to the application and supporting testimony were filed April 6, 2018 by Alliance for Retail Energy Markets and Direct Access Customer Coalition ("AReM/DACC"), California Energy Storage Alliance ("CESA"), California Solar & Storage Association ("CALSSA"), LS Power Development, LLC ("LS Power"), and Office of Ratepayer Advocates.[33] Responses were submitted by Coalition of California Utility Employees ("CUE"), GRID Alternatives, the California Housing Partnership Corporation and Sunrun, Inc. (collectively, "Joint Parties"), and Tesla, Inc. In sum, CUE and Tesla support SDG&E's project proposals, while the Cal PA, LS Power, AReM/DACC, CESA, and CALSSA protests raised

---

[32] Confidential versions of the following prepared direct testimony were served on Commission staff and on certain parties who executed a non-disclosure agreement: Ex. SDGE-05 (Steven Prsha) and EX. SDGE-08 (Michael R. Woodruff and James G. Vanderhye Jr.) In addition, this brief contains certain confidential information from SDG&E's prepared testimony. Concurrently with this brief, SDG&E has filed a motion to admit into the record its prepared testimony, to seal portions of this testimony, and to seal portions of this opening brief.

[33] The Office of Ratepayer Advocates was renamed the Public Advocates Office of the Public Utilities Commission pursuant to Senate Bill 854, signed by the Governor on June 27, 2018 (Stats. 2018, ch. 51). This brief will refer to this party as "Cal PA."

various concerns, including utility-ownership/competition, cost-effectiveness, cost recovery, and the proposed Tier 3 advice letter process for future project approvals. Protesting and responding parties generally supported the Expanded CARE pilot program, with modifications, including increasing the program size and budget.

After the May 1, 2018 prehearing conference in the consolidated dockets, the scoping memo issued, consolidating SDG&E's application with those of the other utilities, and setting separate procedural schedules for AB 2514 and AB 2868 issues. For the AB 2868 issues, the scoping memo (at 7) provided for submission of intervenor prepared direct testimony by August 10, and rebuttal testimony by August 24, 2018. Five parties timely filed intervenor testimony addressing SDG&E's application: Cal PA, TURN,[34] LS Power, SBUA,[35] and AReM/DACC.[36] In addition to the utilities, Cal PA and SBUA submitted what purported to be rebuttal testimony on August 24, 2018. SDG&E's prepared rebuttal testimony consists of:[37]

- Overview and policy - Ted Reguly (Ex. SDGE-11),
- AB 2868 Framework - Stephen T Johnston (Ex. SDGE-12),
- AB 2868 Project costs - Steven Prsha (Ex. SDGE-13),
- AB 2868 Customer benefits – Evan M. Bierman (Ex. SDGE-14),

---

[34] The Utility Reform Network. TURN moved for party status on April 19, 2018, which Judge Stevens granted in an April 24, 2018 email ruling.

[35] Small Business Utility Advocates. SBUA moved for party status on May 31, 2018, which Judge Stevens granted in a June 19, 2018 email ruling.

[36] This testimony was also submitted on behalf of the five community choice aggregators ("CCAs") that are parties to this proceeding: MCE, the California Choice Energy Authority, Peninsula Clean Energy, Silicon Valley Clean Energy, and Sonoma Clean Power. CCAs filed a protest to PG&E's application (A.18-03-001) on April 6, 2018.

[37] SDG&E's exhibit numbers are reflected in the Exhibit List found at vii, *supra*. SDG&E moves these exhibits into the evidentiary record in a motion filed concurrently with this brief.

- AB 2868 Low-income customer program – George Katsufrakis (Ex. SDGE-15),[38]
- AB 2868 Cost recovery – Kellen C. Gill (Ex. SDGE-16).

Certain portions of rebuttal testimony of Evan M. Bierman (Ex. SDGE-14) refer to confidential market information. SDG&E submitted such testimony in both public (redacted) and non-public (unredacted and confidential) versions,[39] consistent with SDG&E's declaration of confidential treatment attached to certain of the testimony in conformance with D.17-09-023.

Beginning with the filing of the application, SDG&E was served with substantial discovery by Cal PA, TURN, and SBUA, to which SDG&E responded with complete answers. A total of 140 discrete data request questions were propounded and answered. Cal PA included SDG&E's data request responses to ORA-SDG&E DR-02, DR-03, DR-04, and two supplemental responses to DR-04, as exhibits to Cal PA's testimony, including responses to several questions directed at LS Power's allegations surrounding its Vista project.

The scoping memo also provided for motions for evidentiary hearings to be submitted no later than August 28, 2018. No party, except for LS Power, moved for evidentiary hearings. On August 31, 2018, SDG&E filed a response in opposition to LS Power's motion. By email ruling of September 11, 2018, Judge Stevens denied LS Power's motion.

Given the successive rounds of prepared testimony, bolstered by substantial discovery, the Commission has before it a robust record upon which to base approval of this application.

---

[38] Mr. Katsufrakis adopted the direct testimony of Mayda Bandy, Ex. SDGE-07. Ex. SDGE-15 (Katsufrakis) 1:7-13. This brief will reference Ms. Bandy where it cites Ex. SDGE-07.

[39] The confidential version was served on Commission staff and on certain parties who executed a non-disclosure agreement.

III. THE PROPOSED PROJECT INVESTMENTS MEET AB 2868 CRITERIA AND ARE REASONABLE

A. The projects aim to satisfy the AB 2868 purpose and goals

AB 2868 requires "the state's three largest electrical corporations to file applications for programs and investments to accelerate the widespread deployment of distributed energy storage systems."[40] In accordance with this direction, SDG&E has incorporated its proposals for programs and investments for up to approximately 166 MW of distributed energy storage systems into this 2018 energy storage procurement and investment plan.

Pursuant to AB 2868 and D.17-04-039, SDG&E's proposals aim to accelerate the widespread deployment of energy storage systems to achieve ratepayer benefits, reduce dependence on petroleum, meet air quality standards, and reduce emissions of GHGs. Overall, SDG&E's proposals seek to minimize costs and maximize overall benefits. The proposed circuit-level microgrid projects utilizing energy storage will maximize ratepayer benefits through multiple-use applications by providing: distribution resiliency microgrid services; wholesale market services; and reduced use of diesel backup generators, thereby reducing dependence on petroleum. The projects will also enable greater renewable integration, and may reduce bulk system load shedding. Finally, microgrids may provide local control and smoothing of intermittent renewables, thus allowing higher overall renewable penetration within the electric grid.[41] These projects will use land owned by SDG&E, or where customers can offer suitable

---

[40] P.U. Code § 2838.2(b). *See also* D.17-04-039 at 19-20, implementing this statute.

[41] Cal. Energy Comm'n, Energy Research and Development Division, *Final Project Report – Microgrid Assessment and Recommendation(s) to Guide Future Investments* (July 2015) at 7. Available at http://www.energy.ca.gov/2015publications/CEC-500-2015-071/CEC-500-2015-071.pdf

land. All targeted sites serve public sector customers. Locations in low-income communities were prioritized in the project selection evaluation.[42]

The resulting increased demand for energy storage technologies will drive new business opportunities and create jobs. The energy storage projects that are either owned or controlled by SDG&E will seek to maximize value to ratepayers by providing multiple services.[43] Consistent with AB 2868, the proposed distributed energy storage programs and investments prioritize public sector and low-income customers.

B. SDG&E's substantial experience with storage and microgrids inspired the proposed projects

SDG&E's deployment of storage is at the forefront in delivering results consistent with reliable, clean energy and carbon emission reduction goals. In May 2016, the Commission directed Southern California utilities to accelerate energy storage to enhance regional energy reliability.[44] In response, SDG&E expedited ongoing negotiations and contracted with AES Energy Storage to build two projects for a total of 37.5 MW of lithium-ion battery energy storage.[45] Recently, the Commission approved five energy storage projects, totaling 83.5 MW, as part of SDG&E's 2016 Preferred Resources Local Capacity Requirement ("LCR") Request

---

42 Ex. SDGE-01 (Reguly) 13:12-20; Ex. SDGE-02 (Johnston) 9:20-10:2, 16:1-16.

43 *See* D.18-01-003 at 2.

44 Resolution ("Res.") E-4791 (May 26, 2016) instructs SDG&E and SCE to seek expedited energy storage projects to mitigate potential electric system reliability and other issues arising from partial shutdown of the Aliso Canyon natural gas storage facility.

45 A 30 MW facility was built in Escondido, and a 7.5 MW installation was built in El Cajon, California. SDG&E Advice Letter ("AL") 2924-E (July 18, 2016) sought approval of this 37.5 MW of energy storage resources to count toward local capacity and energy storage mandates (*approved*, Res. E-4798, August 18, 2016).

for Offers ("RFO").[46] These projects demonstrate SDG&E's substantial experience with energy storage and its commitment to deliver clean energy to customers and to provide a more reliable power supply to the grid.

Recent events, such as extreme weather, wild fires, and cyber security attacks, have elevated the importance of resilience[47] in SDG&E's system planning and operation, in addition to traditional reliability. The use case for the seven projects was inspired by SDG&E's experience with a storage-supported microgrid solution to serve an isolated portion of SDG&E's system, as described by Mr. Reguly.[48] Borrego Springs is a small, isolated desert community located in northeast San Diego County, fed only by a single radial sub-transmission line.[49] The Borrego Springs microgrid project uses advanced technologies to provide additional resiliency, powering the entire community of Borrego Springs during planned grid maintenance and forced outages, thus avoiding or mitigating major service interruptions to these isolated customers. The Borrego Springs microgrid deploys energy storage to serve multiple circuits which integrate third-party owned renewables at service-level voltages for specific customer sites. In addition to

---

46 D.18-05-024, *approving*, A.17-04-017.

47 *See*, Department of Homeland Security, National Infrastructure Advisory Council, *Final Report and Recommendations, A Framework for Establishing Critical Infrastructure Resilience Goals*, (October 19, 2010) at 5 ("In its simplest form, infrastructure resilience is the ability to reduce the magnitude and/or duration of disruptive events"). Available at https://www.dhs.gov/sites/default/files/publications/niac-framework-establishing-resilience-goals-final-report-10-19-10-508.pdf. Applying the concept to the utility grid, the National Renewable Energy Laboratory ("NREL") states: "For a power system to be resilient, it must be capable of islanding and operating independently from the grid during outages." NREL, *Valuing the Resilience Provided by Solar and Battery Energy Storage Systems* (January 2018) at 1. Available at https://www.cleanegroup.org/wp-content/uploads/Valuing-Resilience.pdf

48 Ex. SDGE-01 (Reguly) 6:16-7:11.

49 *Id. See,* Department of Energy, Microgrids at Berkeley Lab, *Borrego Springs* (2018). Available at https://building-microgrid.lbl.gov/borrego-springs

onsite generation and energy storage systems, SDG&E uses a portion of NRG Energy's nearby 26 MW Borrego Solar facility to supply electricity to all 2,800 customers in the area during certain island configurations. The microgrid is connected to the centralized (albeit radially-served) energy grid, but can disconnect from the larger grid and function independently during emergencies, which may include severe weather events across the service territory, supplying vital electricity to the local community through its onsite resources, including storage.[50]

The following describes the projects and the selection process for the new investments that SDG&E intends to count towards its share of the AB 2868 authorization – up to approximately 166 MW:

C. Project evaluation process and application of statutory factors

1. Overview of site selection

To select investments that align with AB 2868's statutory factors, SDG&E proposed the following evaluation process, which was used to select the seven circuit-level projects described below. To prioritize public sector and low-income customers, SDG&E started with a list of municipal critical facilities, and then selected sites based on an evaluation process using the benefits described in AB 2868. SDG&E identified the types of facilities that provide a public sector service, including (Ex. SDGE-02 (Johnston) 17:19-18:1-14):

---

[50] Note that SDG&E supports storage technology other than lithium-ion batteries, as exemplified by our vanadium redox flow ("VRF") battery storage demonstration project. SDG&E piloted a 2 MW VRF battery storage project in March 2017, in coordination with Sumitomo Electric, which stemmed from a partnership between Japan's New Energy and Industrial Development Organization ("NEDO") and the California Governor's Office of Business and Economic Development ("GO-Biz"). During the four-year demonstration project, SDG&E is researching how flow battery technology can economically enhance the delivery of reliable energy to customers, integrate growing amounts of renewable energy, and increase the company's ability to flexibly manage its electric system. The pilot shows SDG&E's commitment to understanding how various energy storage technologies can increase the reliable delivery of clean energy to our customers. Ex. SDGE-01 (Reguly) 7:12-8:7.

(i) an Essential Customer site;[51]

(ii) a Cool Zone;[52]

(iii) a critical or priority municipal facility as initially identified by a city or county representative, and modified after discussions on available land; and

(iv) a critical facility identified by a state or federal agency representative, including military sites.

These candidate sites were then cross-referenced with multiple maps to identify sites that are located on or near preferred areas, specifically:

(a) low-income communities,[53] to align with AB 2868 directives to prioritize low-income customers;

(b) disadvantaged communities ("DAC"),[54] to align with AB 2868 directives of meeting air quality standards and prioritizing low-income customers; and

(c) SDG&E-owned land, according to the utility's Geographic Information System ("GIS") database, to align with AB 2868 directives to minimize overall costs.

This illustrates the process used to identify suitable critical facility sites and candidate projects and their location on or near the preferred areas (Ex. SDGE-02 (Johnston) 19, Figure 4):

---

[51] Essential Customer sites are identified by Appendix E, Priority System for Rotating Outage in the SDG&E 2017 Electric Emergency Load Curtailment Plan (June 1, 2017) at 73, submitted per D.02-04-060, which has a list of essential customers at Attachment B.

[52] Cool Zones are places where senior citizens and people with special needs can comfortably escape mid-day summer heat and reduce their air-conditioning use, which helps save on energy costs. *See* https://www.sdge.com/cool-zones

[53] Map available at https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/communityinvestments.htm

[54] *Id.* DAC is defined by SB 535, Stats. 2012, ch.830, *codified at* Cal. Health & Saf. Code § 39711.

PROCESS TO INDENTIFY SUITABLE AB 2868 PROJECTS

This graphic is purely illustrative, and any locations shown are arbitrary.

2. **Project evaluation process** (Ex. SDGE-02 (Johnston) 19:5-23:2)

For any candidate site, suitable and available land is needed to locate the energy storage system and microgrid hardware to serve the critical facility. Only sites that might be served immediately by available, suitable land were evaluated further as candidates – typically, sites where SDG&E has land or specific critical agency sites where the agency is willing to make suitable land available and the deployment aligns well with AB 2868 goals.

SDG&E identified available and suitable SDG&E-owned land. The initial analysis was for circuit-level microgrids, primarily at electric substations. The circuit-level investments may support larger-megawatt energy storage systems and may be deployed on circuits connecting to multiple-candidate critical facilities. This initial analysis maximizes ratepayer benefits while minimizing overall costs, by reducing the costs for land acquisition and by serving multiple priority customer facilities with individual projects.

The following matrix of criteria was used to evaluate each candidate project.

PROJECT EVALUATION CRITERIA (Ex. SDGE-02 (Johnston) 20, Figure 5)

AB 2868 Attribute	Reduce GHG Emissions	Integration of Renewables	Reduced Dependence on Petroleum	Air Quality	Public Sector	Low-income Community	Number of Facilities Served	Can Participate in Markets	Meets Local RA or LCR
Weight	Approximately 50%				Approximately 20%		Approximately 30%		
Scoring Method	MW deployable at site (proxy)	Size of Renewable Generation at Site	Critical Facility Load (proxy)	Located in a DAC (proxy) Yes or No	Yes or No	Yes or No	# of facilities served by microgrid	Yes or No	Yes or No

Figure 5: Evaluation of projects based on criteria representing AB 2868 goals and priorities.

The following describes how the AB 2868 attributes were applied in the evaluation of projects:

(i) **Reduce GHG Emissions**: For evaluation purposes, this attribute assumes that each megawatt of energy storage has the ability to reduce GHG emissions irrespective of site or location by: (i) reducing petroleum-fueled backup generator use at the critical facility, or (ii) participating in energy markets in a way that reduces GHG emissions as described in Ex. SDGE-06 (Bierman). The evaluation gave larger megawatts of deployable energy storage higher scores;

(ii) **Integration of Renewables**: This attribute prioritizes renewable energy generation systems deployed at the site which would be served by the microgrid. For evaluation purposes, larger megawatts of renewable generation are scored higher;

(iii) **Reduced Dependence on Petroleum**: This attribute prioritizes facilities where the microgrid energy storage might offset fossil fuel use and reduce dependence on petroleum. For the purposes of evaluation, facilities with larger critical load

which might otherwise be served by a petroleum-based generator are scored higher;

(iv) **Air Quality**: This attribute prioritizes facilities where the microgrid energy storage might help meet air quality standards. This evaluation used a proxy metric of whether the facility is located in a DAC location. This proxy is appropriate for evaluating projects because AB 2868 directs utilities to propose investments and programs for energy storage that meet air quality standards and that prioritize low-income customers, and these criteria align with how the California Environmental Protection Agency ("CalEPA") identifies DACs.[55] SDG&E used the top quartile of census tracts identified by CalEnviroScreen on a utility territory basis[56] to determine if the facilities served are located in a DAC;

(v) **Public Sector**: This attribute identifies if the project is for a public sector customer according to the definition herein;

(vi) **Low-income**: This attribute identifies if one or more facilities served by the project is located in a low-income community, according to the definition described herein. SDG&E used the AB 1550 map from the California Air

---

[55] SB 535, *codified at* Cal. Pub. Health & Saf. Code § 39711, directs CalEPA to identify DACs based on "areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure, or environmental degradation" and "areas with concentrations of people that are of low-income, high unemployment, low levels of home ownership, high rent burden, sensitive populations, or low levels of educational attainment." *Id.* at § 39711(a) and (b).

[56] *See* D.18-01-024 at 6, n.9: "For the purposes of this decision, DACs are defined as sites in the top quartile of census tracts defined through the most updated version of [CalEPA's] CalEnviroScreen, either on a state-wide or utility territory basis, whichever is broader."

Resource Board website[57] to determine if the facility served is located in a low-income community;

(vii) **Number of Facilities Served**: This attribute maximizes ratepayer benefit by prioritizing projects where multiple critical facilities can be served by the microgrid, scored relative to the number of critical facilities served;

(viii) **Participates in Market**: This attribute maximizes ratepayer benefit by prioritizing projects which can, due to size, location, and interconnection, participate in energy markets as a stand-alone asset. Energy storage assets that cannot participate in energy markets as a stand-alone asset may be aggregated, but those are not scored in this metric; and

(ix) **Meets Local RA/LCR**: This attribute minimizes overall costs by prioritizing projects where the asset meets an RA/LCR need and meets multiple regulatory requirements with the deployment of a single asset.

Based on its evaluation, SDG&E is proposing specific projects in its 2018 Energy Storage Procurement and Investment Plan as discussed in detail below.

3. **Weighting of statutory factors** (Ex. SDGE-02 (Johnston) 23:4-24:2)

As shown in Figure 4 (AB 2868 Project Evaluation Criteria) above, certain factors are given relative weights. Approximately 50% of the weight is given to attributes that align with the goals of AB 2868. These are: reducing GHG emissions, reducing dependence on petroleum, and meeting air quality standards. Integrating renewables is included in the evaluation as it reinforces GHG reduction and is stated as a guiding principal in D.14-10-045.[58] Approximately

---

[57] California Air Resources Board, *Disadvantaged and Low-income Communities Investments*. Available at https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/communityinvestments.htm

[58] *See* D.17-04-039 at 5.

20% of the weight for attributes is given to the priority customers stated in AB 2868, namely public sector and low-income. Approximately 30% of the weight is given to attributes that maximize ratepayer benefits, namely the number of facilities served by the microgrid, whether the energy storage asset can participate in energy markets to generate revenues as a standalone asset, and whether the energy storage asset meets an RA/LCR need.

SDG&E's AB 2868 investments in energy storage provide resiliency services to critical public sector customers through the use of microgrid designs along with other multiple-use applications such as participation in energy markets. Therefore, the AB 2868 evaluation protocol herein is distinct from the energy storage procurement framework described in D.13-10-040 pursuant to AB 2514. As such, the SDG&E proprietary protocol used to evaluate bids under prior energy storage procurement frameworks do not apply to AB 2868 projects. For these same reasons, the Consistent Evaluation Protocol ("CEP")[59] should not be used to evaluate any investments and programs proposed to meet AB 2868 purposes. SDG&E does not intend to complete the CEP for each AB 2868 project, but SDG&E may use criteria from the CEP in the supply management process to evaluate conforming bids. Section 5 on the next page shows why SDG&E did not use a cost-effectiveness analysis.

4. Results of Initial AB 2868 Evaluation Process

Using the evaluation process described above, SDG&E scored and ranked critical public sector facilities and certain circuit-level projects that might serve those facilities. The seven projects listed in Ex. SDGE-05 (Prsha) were selected because they ranked favorably in the AB 2868 evaluation and suitable land is available. Other projects and sites were evaluated that were

[59] *See* D.13-10-040, Energy Storage Procurement Program Design, Appendix A, section 3(d) at 9. *See also* D.14-10-045, CEP, section 6.2 at 64-71.

not selected or pursued further due to a variety of reasons, including the unavailability of suitable land. These specific projects, including application of the evaluation criteria, are described in the next section and in Ex. SDGE-05 (Prsha) 2:6–22:1.

5. **Cost-effectiveness is not the test under AB 2868** (Ex. SDGE-14 (Bierman) 1:5-4:62)

Several parties[60] submitted testimony questioning whether SDG&E's proposed AB 2868 circuit-level energy storage microgrid projects are the most cost-effective solution to meet the stated goals of AB 2868. Such questioning around cost-effectiveness misses the mark, as the appropriate issue is whether these projects have minimized costs and maximized benefits as specified in AB 2868. SDG&E focused on this requirement in developing its AB 2868 proposal for two reasons. First, cost-effectiveness is not a requirement for approval of AB 2868 projects. AB 2868, at P.U. Code § 2838.2(a)(b), plainly states, "Programs and investments proposed by the state's three largest electrical corporations shall seek to minimize overall costs and maximize overall benefits." Second, the term "cost-effective" is not found in the section 2838.2(a)(1) definition of "distributed energy storage system" which governs AB 2868, nor is it elsewhere in the statute.[61] In addition, the AB 2868 statutory language mirrors the language in SB 350[62] directing utilities to invest in transportation electrification: "minimize overall costs and maximize overall benefits." In the SB 350 context, the Commission recently rejected

---

60 Cal PA, TURN, LS Power, and Small Business Utility Advocates ("SBUA").

61 P.U. Code § 2838.2(a)(1): "'Distributed energy storage system'" means an energy storage system with a useful life of at least 10 years that is connected to the distribution system or is located on the customer side of the meter." Contrast this definition with AB 2514 energy storage procurement, which requires an energy storage system to be "cost effective" (*see* P.U. Code § 2835(a)(2)(B)(3)). There is no basis upon which to impute "cost effective" into the statute, especially when the legislature has placed that specific phrase in other statutes concerning the Commission's regulation.

62 SB 350, Stats. 2015, ch.547.

contentions by TURN and Cal PA similar to those here – that utility SB 350 applications were subject to quantitative cost-effectiveness tests.[63] This confirms the plain words of the statute.

Much of the intervenor testimony mistakenly focuses on the cheapest way to simply deploy energy storage (or reduce GHG emissions), rather than focusing on energy storage solutions that meet all of the objectives and requirements of AB 2868 - prioritize public sector and low-income customers, achieve ratepayer benefits, reduce dependence on petroleum, meet air quality standards, and reduce GHG emissions, while also seeking to minimize overall costs and maximize overall benefits.[64] Such an approach fails to account for AB 2868's explicit goals. SDG&E's proposed circuit-level energy storage microgrid projects were designed to meet *all* the statutory goals of AB 2868, not solely GHG reduction, while also minimizing overall costs and maximizing overall benefits.

TURN focuses exclusively on reducing GHG emissions at the lowest costs: "TURN finds that other resources could be procured much more cost-effectively to reduce GHG

---

[63] D.18-05-040 at 90, rejected contentions by Cal PA (formerly, ORA) and TURN as follows (footnotes omitted):

> In addition, ORA and TURN argue that the utilities have not demonstrated that the proposed programs are in the interest of ratepayers, necessary, or the most effective means of accelerating transportation electrification, citing Pub. Util. Code § 740.12(b) for these "requirements." The EJ Parties point out that no such requirements are found in the statute, only that "[p]rograms proposed by electrical corporations shall seek to minimize overall costs and maximize overall benefits" and that "SB 350 sets no thresholds for assessing cost-effectiveness, and does not require a quantitative cost-benefit analysis to show that the costs are outweighed by the benefits."
>
> The EJ Parties suggest, and we agree, that the utility medium- and heavy-duty programs generally propose to provide make-ready infrastructure to an appropriate number of sites, striving to "maximize the benefits of transportation electrification by targeting medium- and heavy-duty vehicles and equipment. These vehicles and equipment create significant levels of pollution, disproportionately impact disadvantaged communities, are ripe for electrification, are the targets of other public investment for electrification,

[64] P.U. Code § 2838.2, *et seq*.

emissions between now and 2030."[65] TURN also contends that "it is only through an integrated framework that solutions should be procured for renewable integration."[66] SDG&E does not dispute that, in isolation, SDG&E's proposed circuit-level energy storage microgrid projects may not be the most cost-effective way to reduce GHG emissions – if that were the sole objective. SDG&E also does not dispute TURN's assertion that the Integrated Resource Plan ("IRP") process[67] is the best proceeding in which to establish the most cost-effective way to reduce GHG emissions. However, TURN misses that, in the context of AB 2868's objectives, GHG reduction is but one of several enumerated goals and objectives (*i.e.*, accelerate the widespread deployment of distributed energy storage systems which prioritize public sector and low-income customers, achieve ratepayer benefits, reduce dependence on petroleum, meet air quality standards, and *reduce emissions of GHG*, while also seeking to minimize overall costs and maximize overall benefits). As described in the direct testimony of Stephen Johnston,[68] due to the multiple requirements outlined in AB 2868, SDG&E established a project evaluation matrix and process to account for the varied goals and objectives of AB 2868, which assisted SDG&E in its selection of energy storage projects. Further, SDG&E's proposed circuit-level energy storage projects will have the ability to microgrid portions of the circuits thereby providing distribution resiliency to critical public sector customers as well as other incidental customers who are part of the microgrid.[69] Intervenors have failed to demonstrate in totality that SDG&E's

---

65 TURN (Borden) 15:24-25.

66 *Id*. at 15:2-3 (original emphasis).

67 SDG&E notes that it included AB 2868 energy storage in its *2018 Individual Integrated Resource Plan*, filed in R.16-02-007 on August 1, 2018. *See* p. 9.

68 *See* Ex. SDGE-02 (Johnston) 19:5–20:9, Figure 5.

69 Ex. SDGE-13 (Prsha) 4:18–5:2.

proposed AB 2868 circuit-level energy storage microgrid projects fail to satisfy all of the AB 2868 goals.

SDG&E has taken a prudent and measured approach to the design of these proposed circuit-level energy storage microgrid projects and their use cases in order to meet the statute's goals, rather than just focusing on one issue (such as maximizing GHG benefits). For example, SDG&E undertook a careful examination to determine each circuit's minimum load requirements during islanding, and as a result designed most of the systems[70] to be one-hour duration systems instead of four. While four-hour duration systems would have provided additional GHG benefits, SDG&E determined that the incremental GHG reduction benefits did not justify the additional costs to customers. SDG&E does not rule out increasing the duration of the energy storage systems at a future time, assuming there is land available, energy storage prices decline, and the need is merited.

D. Description of the proposed circuit-level[71] storage projects and costs

The proposed energy storage investments are circuit-level microgrid projects and were selected using the evaluation process described in the previous section. In accordance with the *Multi-Use Decision,*[72] these seven projects are designed to provide "multiple benefits and services to the electricity system."[73] The primary use case for these projects is to provide backup

---

[70] There is one, two-hour duration system at Kearny which was designed as such due to the additional load present at that circuit during islanding.

[71] Circuit-level refers to assets on distribution circuits, and is used to distinguish service-level facilities, which are facilities on the customer services side of the distribution service transformer.

[72] D.18-01-003.

[73] *Id.* at 2.

power and to enhance circuit resiliency[74] to critical public sector facilities and to prioritized locations in low-income communities.

The circuit-level microgrid projects will be located on existing SDG&E substation property and connected to SDG&E's distribution system. However, during a substation outage or for other distribution operation needs, these energy storage assets will be able to disconnect from the larger grid and island a predetermined load. The energy storage resource will continue to power critical public sector facilities and coincidental load located on the microgrid. An overview of the seven circuit-level proposed energy storage projects is provided below in Table SP-1, including the name, location, capacity, expected commercial on-line date, term and multiple customer sites served by each project (Ex. SDGE-05 (Prsha) 3:7-4:1).

Table SP – 1 - Utility-Owned Energy Storage Projects

Project Name	Location	Capacity	Expected COD	Customer Sites	Low-Income[75]	DAC[76]
Kearny	Kearny Mesa San Diego, CA	30 MW / 40 MWh	12/31/2019	City of San Diego Metropolitan Operations Center, Polinsky Children's Center, CA State Police and Border Division HQ, County Office of Emergency Services, San Diego County Sheriff's Department Headquarters	No	Yes

[74] NREL states: "For a power system to be resilient, it must be capable of islanding and operating independently from the grid during times of outages." *See* NREL, *Valuing the Resilience Provided by Solar and Battery Energy Storage Systems* (January 2018) at 1. Available at https://www.cleanegroup.org/wp-content/uploads/Valuing-Resilience.pdf. *See also* D.16-12-036 at 78, ordering paragraph 2.

[75] *See* Ex. SDGE-02 (Johnston) 17:1-16, for a description of the low-income designation

[76] For the purposes of this testimony, DACs are defined as sites in the top quartile of census tracts defined through the most updated version of CalEPA's CalEnviroScreen, either on a state-wide or utility territory basis, whichever is broader. DACs must also meet the spirit of the definition, as described in D.16-12-065. *See* CalEPA, *CalEnviroScreen 3.0*. Available at https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30

Melrose	Vista, CA	20 MW / 20 MWh	12/31/2019	Vista Library Cool Zone, Civic Center, Fire Station 6, Vista Courthouse, Vista Detention Facility, San Diego County Sheriff's Department Vista Patrol station	Yes	No
Boulevard	Boulevard, CA	10 MW / 10 MWh	12/31/2019	San Diego County Sheriff's Department, San Diego County Fire Station 47, Boulevard Border Patrol Station, Campo Reservation Fire Station, CAL Fire White Star	Yes	Yes
Clairemont	Clairemont Mesa San Diego, CA	10 MW / 10 MWh	12/31/2020	Balboa Branch Library (Cool Zone), Fire Station 36	No	No
Paradise	Skyline San Diego, CA	10 MW / 10 MWh	12/31/2020	Fire Station 51, South East Division Police department, Fire Station 32	Yes	Yes
Elliot	Tierrasanta, San Diego, CA	10 MW / 10 MWh	12/31/2020	Fire Station 39, Tierrasanta Public Library (Cool Zone)	No	No
Santee	Santee, CA	10 MW / 10 MWh	12/31/2020	Fire Station 4, Padre Dam Northcote Pump Station	No	No

1. **2019 Projects – description, evaluation and costs** (Ex. SDGE-05 (Prsha) 4:2-13:1)

This section describes each of the circuit-level projects proposed in the 2019 timeframe, estimated project costs, and proposed cost cap. The following three circuit-level microgrid energy storage projects located at SDG&E's Kearny, Melrose and Boulevard substations are identified as optimal sites for deployment in the 2019 timeframe due to the multiple benefits offered by each project, as well as the ability to construct the projects in the expedited timeframe.[77] By using utility-owned land and existing infrastructure, these sites were selected to maximize benefits and minimize costs. These circuit-level projects also serve multiple critical facilities. With the ability to construct them quickly, these projects will readily provide resiliency services to the community during emergencies and other unforeseen outages. Accordingly, these projects merit an expedited online date of 2019.

[77] Ex. SDGE-05 (Prsha) 4:2-14. This target can change based on the Commission approval date of the SDG&E AB 2868 program and other possible factors. *Id*. 4:8-9.

2. **Kearny** (Ex. SDGE-05 (Prsha) 4:15–8:1)

a. Project overview

The Kearny circuit-level energy storage project is a 30 MW, 40 MWh energy storage project located on SDG&E's Kearny Operations Center in San Diego, California. Kearny Mesa is a community in the eastern part of San Diego, California. The site will be constructed after a Request for Proposal ("RFP") competitive solicitation process. The proposed on-line date is December 31, 2019. The Kearny energy storage project will be constructed on existing SDG&E land within the boundaries of an existing SDG&E Operations Center and adjacent to SDG&E's Kearny substation. The energy storage systems will interconnect to the Kearny substation on three separate circuits, each of which serve the facilities/agencies noted in Table SP-1 above. The project site provides an ideal location for leveraging existing interconnection capacity to repower the site with a modern grid-scale energy storage resource. Ex. SDGE-05 (Prsha) 4:17–5:8.

The Kearny facility will have the capability to island[78] during a system disturbance, providing back-up power resiliency to multiple critical public sector facilities, including: City of San Diego Metropolitan Operations Center, Polinsky Children's Center, California State Police and Border Division headquarters, County Office of Emergency Services, and San Diego County Sheriff's Department Headquarters. Ex. SDGE-05 (Prsha) 5:9-13.

The Polinsky Children's Center is a 24-hour facility for temporary emergency shelter of children who must be separated from their families for their own safety, or when parents cannot

[78] "Island" refers to the ability to isolate a portion of the grid and to operate that portion independently from the rest of the grid.

provide care. Each month more than 300 children of all ages to 18 are admitted to the Center.[79] The California State Police and Border Division headquarters office is strategically located to provide the highest level of safety, service and security from the California Highway Patrol. The County Office of Emergency Services ("OES") coordinates the overall San Diego County response to disasters. The OES is responsible for alerting appropriate agencies when disaster strikes, coordinating all agencies that respond, ensuring resources are available and mobilized in times of disaster, developing plans and procedures for response to and recovery from disasters, and developing and providing preparedness materials for the public.[80] The Kearny circuit-level microgrids will allow the critical facilities described above to remain operational during power outages. This increased grid resilience benefits the community by ensuring the uninterrupted availability of essential services. Ex. SDGE-05 (Prsha) 6:4-7.

b. AB 2868 evaluation results

In addition to supporting multiple critical facilities outlined above, the Kearny site will provide 30 MW of energy storage to help integrate renewables and reduce GHG emissions. There are 1300 kW of renewables (solar) already installed on the distribution circuits feeding into the circuit-level microgrids with more proposed to be added in the future. The energy storage system will be able to absorb and store excess solar generation and provide that energy back on the grid when it is needed. The project will help reduce dependence on petroleum by limiting the need for back-up diesel generation at these critical facilities. Currently, at least four of the facilities have back-up generation (City of San Diego Metro Ops Center, OES, San Diego

[79] Promises2Kids (co-located with the Polinsky Children's Center) submitted a letter of support for this application. Application, Attachment 1 at PDF p. 42. *See also* https://www.sandiegocounty.gov/hhsa/programs/cs/child_welfare_services/polinsky_childrens_center.html

[80] *See* https://www.sandiegocounty.gov/oes/

County Sheriff's Department Headquarters, and County Ops Center), the use of which would be offset by the integration of energy storage systems. This site prioritizes the public sector by providing resiliency to the multiple critical sites located on the distribution circuit. Lastly, this site will be able to participate in the CAISO market[81] and used to provide local resource adequacy to the extent these resources qualify for resource adequacy.[82]

c. Project costs

Table SP-2 below provides details around the total direct and indirect costs outlined in the capital cost cap, as well as the anticipated O&M direct costs associated with the Kearny project.[83] All values are shown on a nominal basis. Based on the estimated project costs, SDG&E requests Commission approval of approximately [redacted] for the Kearny project. This is a not-to-exceed cost cap.

Kearny Mesa Estimated Project Costs (Ex. SDGE-05 (Prsha) 7, Table SP-2)

Capital Cost	Amount	Notes
Total Direct Costs	[redacted]	Includes interconnection and CAISO network upgrade costs
Total Indirect Costs	[redacted]	
Contingency	[redacted]	
Total Project Costs	[redacted]	
Operations and Maintenance Costs	**Amount**	**Notes**

[81] *See* Ex. SDGE-06 (Bierman) *passim*.

[82] *See* Ex. SDGE-03 (Summers) 8:1-18.

[83] None of the costs provided in Table SP-2 assume offset by sales in CAISO markets, although revenues from such sales will be used to offset project costs and are expected to be substantial. *See* Ex. SDGE-06 (Bierman) *passim*.

O&M Fixed Maintenance[84]	[redacted]	5% of total direct project costs
O&M Variable Costs (per cycle)	[redacted]	Variable costs for each MWh of discharged energy

3. **Melrose** (Ex. SDGE-05 (Prsha) 8:1–10:2)

a. Project overview

The Melrose circuit-level energy storage project is a 20 MW, 20 MWh energy storage project located in Vista, California. Vista is located in northwestern San Diego County and is a designated low-income community.[85] The site will be constructed after a RFP competitive solicitation process. The proposed on-line date is December 31, 2019. The Melrose energy storage project will be constructed on existing SDG&E land and will interconnect to SDG&E's Melrose substation. The Melrose facility will have the capability to island critical public sector facilities, including the Vista Civic Center, Fire Station 6, Vista Courthouse, Vista Library Cool Zone, Vista Detention Facility and San Diego County Sheriff's Department Vista Patrol station, during a system disturbance, thus providing back-up power resiliency.

Fire Station 6 serves Otay Mesa and environs. Vista Library Cool Zone is a designated, air-conditioned building where residents, especially seniors, disabled persons, and others with health problems that can be complicated by heat, can find free relief.[86] The Vista Detention Facility serves as the primary intake point for arrestees in northern San Diego County. The San

[84] O&M estimations are included in the cost cap but are subject to change. These estimates contain two categories: fixed and variable. The fixed O&M has been estimated at 5% of the total direct project costs. The variable O&M is estimated at [redacted] per MWh of discharge from the unit. The cycling is estimated at 365 deep cycles per year for 10 years.

[85] *See* Ex. SDGE-02 (Johnston) 17:1-16, for a description of the low-income designation.

[86] *See* http://www.ci.vista.ca.us/services/residential-services/cool-zones

Diego County Sheriff's Department Vista Patrol Station ensures the safety and security of those living, working, and visiting the area and it provides a full range of public safety services.

b. AB 2868 evaluation results

The Melrose site will provide 20 MW of energy storage on two separate circuits (10 MW each) to help integrate renewables and reduce GHG emissions. The circuit-level microgrids will support the multiple critical facilities outlined above. There is 2250 kW of renewables already installed on the distribution circuits feeding into the circuit–level microgrids. The project will help reduce dependence on petroleum by offsetting backup diesel generation at these facilities. Currently, at least three of the facilities have back-up generation: Civic Center, Fire Station 6, and Vista Detention Facility, the use of which would be reduced by the integration of energy storage. Lastly, this site will be able to participate in the CAISO market[87] used to provide local resource adequacy to the extent these resources qualify for resource adequacy.[88]

c. Project costs

The below Table SP-3 provides details around the total direct and indirect costs comprising the capital cost cap, as well as anticipated O&M direct costs, associated with the Melrose energy storage circuit-level microgrid project.[89] All the values are shown on a nominal basis. Based on the estimated project costs, SDG&E requests Commission approval of approximately [redacted] for the Melrose project. This is a not-to-exceed cost cap.

---

87 *See* Ex. SDGE-06 (Bierman) *passim*.

88 *See* Ex. SDGE-03 (Summers) 8:1-18.

89 None of the costs provided in Table SP-3 assume offset by sales in CAISO markets, although revenues from such sales will be used to offset project costs and are expected to be substantial. *See* Ex. SDGE-06 (Bierman) *passim*.

Table SP – 3
Melrose Estimated Project Costs

Capital Cost	Amount	Notes
Total Direct Costs	[redacted]	Includes interconnection and CAISO network upgrade costs
Total Indirect Costs	[redacted]	
Contingency	[redacted]	
Total Project Costs	[redacted]	
Operations and Maintenance Costs	**Amount**	**Notes**
O&M Fixed Maintenance	[redacted]	5% of total direct project costs
O&M Variable Costs (per cycle)	[redacted]	Variable costs for each MWh of discharged energy

4. **Boulevard** (Ex. SDGE-05 (Prsha) 10:6-13:1)

a. Project overview

The Boulevard circuit-level energy storage project is a 10 MW, 10 MWh energy storage project located in Boulevard, California. The Boulevard area is a rural desert community along the Mexican border in the eastern extreme of San Diego County, and it is a designated low-income community.[90] The site will be constructed after a RFP competitive solicitation process. The proposed on-line date is December 31, 2019. The Boulevard energy storage project will be constructed on existing SDG&E land and will interconnect at SDG&E's Boulevard substation. The Boulevard facility will be able to island critical preselected load, including the San Diego County Sheriff's Department, San Diego County Fire Station 47, Boulevard Border Patrol

[90] *See* Ex. SDGE-02 (Johnston) 17:1-16, for a description of the low-income designation.

Station, Campo Reservation Fire Station, and CAL Fire[91] White Star, during a system disturbance thus providing back-up power resiliency.

The Boulevard County Sheriff's office serves an area of over 200 square miles, including the communities of Boulevard and Jacumba. The Boulevard community is located in the rural high desert along the east San Diego/Mexico border. Jacumba is located in the Jacumba Mountains along the U.S./Mexico border.[92] San Diego County's Fire Station 47 serves Pacific Highlands Ranch and its surrounding areas. The Boulevard Border Patrol Station is also responsible for two eastbound tactical checkpoints, which are an integral part of the San Diego Sector's defense. The Campo Reservation Fire Station, located on Campo Kumeyaay Nation Indian Reservation, provides protection from fire and other emergencies to the surrounding communities. CAL Fire White Star provides fire protection and stewardship of the local wildlands. In addition, the facility provides varied emergency services.

b. AB 2868 evaluation results

The Boulevard site will provide 10 MW of energy storage to help integrate renewables and reduce GHG emissions. The circuit-level microgrid will support the multiple critical public sector facilities outlined above. There is 600 kW of renewables already installed on the distribution circuit feeding into the circuit–level microgrid. The energy storage system will be able to absorb and store excess solar generation and provide that energy back on the grid when it is needed. The project will help reduce dependence on petroleum by limiting the need for back-

[91] California Department of Forestry and Fire Protection. In addition to its wild fire fighting mission, Cal Fire provides varied emergency services in 36 of the State's 58 counties via contracts with local governments. Beyond its wildland fire fighting role, CAL Fire answers the call more than 350,000 times for other emergencies each year, including serving as the lead agency in response to other natural disasters. *See*: http://www.calfire.ca.gov/about/about

[92] *See* https://www.sdsheriff.net/patrolstations/boulevard.html

up diesel generation at these critical facilities. Currently, one of the facilities (San Diego County Fire Station 47) has back-up generation, the use of which would be offset by the integration of an energy storage system. This site prioritizes the public sector by providing resiliency to the multiple critical sites on the distribution circuit. This site can participate in the CAISO market,[93] and will be used to provide local resource adequacy to the extent these resources qualify for resource adequacy.[94]

c. Project costs

The below Table SP-4 provides details around the total direct and indirect costs in the capital cost cap, as well as the anticipated O&M direct costs associated with the Boulevard energy storage circuit-level microgrid project.[95] All the values are shown on a nominal basis. Based on the estimated project costs, SDG&E requests Commission approval of approximately [redacted] for the Boulevard project. This is a not-to-exceed cost cap.

Table SP – 4
Boulevard Estimated Project Costs

Capital Cost	Amount	Notes
Total Direct Costs	[redacted]	Includes interconnection and CAISO network upgrade costs
Total Indirect Costs	[redacted]	
Contingency	[redacted]	
Total Project Costs	[redacted]	

93 *See* Ex. SDGE-06 (Bierman) *passim*.

94 *See* Ex. SDGE-03 (Summers) 8:1-18.

95 None of the costs provided in Table SP-4 assume offset by sales in CAISO markets, although revenues from such sales will be used to offset project costs and are expected to be substantial. *See* Ex. SDGE-06 (Bierman) *passim*.

Operations and Maintenance Costs	Amount	Notes
O&M Fixed Maintenance	[redacted]	5% of total direct project costs
O&M Variable Costs (per cycle)	[redacted]	Variable costs for each MWh of discharged energy

5. **2020 projects - description, evaluation and costs** (Ex. SDGE-05 (Prsha) 13:2-10)

This section describes each of the circuit-level projects proposed in the 2020 timeframe, as well as approximate project costs (not to exceed the estimated cost cap). The following four circuit-level microgrid energy storage projects located at SDG&E's Paradise, Clairemont, Elliot, and Santee substations have been identified as optimal sites to be deployed by the end of 2020. This target can change based on the Commission approval date of the SDG&E AB 2868 program and other possible factors. These sites were ranked among the highest to maximize benefits and minimize costs in accordance with the AB 2868 evaluation matrix described in Ex. SDGE-02 (Johnston) 20:7-9.

6. **Paradise** (Ex. SDGE-05 (Prsha) 13:11-15:11)

a. Project overview

The Paradise circuit-level energy storage project is a 10 MW, 10 MWh energy storage project located in the Skyline community of San Diego, California. Skyline is a hilly neighborhood in Southeastern San Diego and is a designated low-income community.[96] The site will be constructed after a RFP competitive solicitation process. The proposed on-line date is December 31, 2020.[97] The Paradise energy storage project will be constructed on existing SDG&E land and will interconnect at SDG&E's Paradise substation. The Paradise facility will

[96] *See* Ex. SDGE-02 (Johnston) 17:1-16, for a description of the low-income designation.

[97] SDG&E may accelerate the in-service date for Paradise to mid-year 2020.

have the capability to island critical pre-determined load Fire Station 51, South East Division Police department, and Fire Station 32 during a system disturbance, thus providing back-up power resiliency.

Fire Station 51 and Fire Station 32 serves Skyline Hills and Paradise Hills and their surrounding areas respectively, providing essential services such as fire, emergency medical and emergency management services. This includes 9-1-1 services, fire inspections, permits and community education. The South East Division Police department serves the southeastern neighborhoods of San Diego.

b. AB 2868 evaluation results

The Paradise site will provide 10 MW of energy storage to help integrate renewables and reduce GHG emissions. The circuit-level microgrid will support several critical facilities outlined above. There is 1,500 kW of renewables already installed on the distribution circuit feeding into the circuit–level microgrid. The energy storage system can absorb and store excess solar generation and discharge that energy back on the grid when needed. The project will help reduce dependence on petroleum by offsetting the use of the back-up diesel generation located at both facilities. Currently, two facilities (Fire Station 51 and Fire Station 32) have back-up generation, the use of which would be offset by the integration of energy storage. This site prioritizes the public sector by providing resiliency to the multiple critical sites located on the distribution circuit. This site will be able to participate in the CAISO market,[98] and will be used to provide local resource adequacy to the extent these resources qualify for resource adequacy.[99]

[98] *See* Ex. SDGE-06 (Bierman) *passim*.

[99] *See* Ex. SDGE-03 (Summers) 8:1-18.

c. Project costs

Table SP-5 below provides details of the total direct and indirect costs outlined in the capital cost cap, as well as the anticipated O&M direct costs associated with the Paradise energy storage circuit-level microgrid project.[100] All the values are shown on a nominal basis. Based on the estimated project costs, SDG&E requests Commission approval of approximately [redacted] for the Paradise project.

Table SP – 5
Paradise Estimated Project Costs

Capital Cost	**Amount**	**Notes**
Total Direct Costs	[redacted]	Includes interconnection and CAISO network upgrade costs
Total Indirect Costs	[redacted]	
Contingency	[redacted]	
Total Project Costs	[redacted]	
Operations and Maintenance Costs	**Amount**	**Notes**
O&M Fixed Maintenance	[redacted]	5% of total direct project costs
O&M Variable Costs (per cycle)	[redacted]	Variable costs for each MWh of discharged energy

7. **Clairemont** (Ex. SDGE-05 (Prsha) 16:1-18:1)

a. Project overview

The Clairemont circuit-level energy storage project is a 10 MW, 10 MWh energy storage project located in Clairemont, a community located within the City of San Diego. The project

[100] None of the costs provided in Table SP-5 assume offset by sales in CAISO markets, although revenues from such sales will be used to offset project costs and are expected to be substantial. *See* Ex. SDGE-06 (Bierman) *passim*.

will be constructed after a RFP competitive solicitation process. The proposed on-line date is December 31, 2020.[101] The Clairemont energy storage project will be constructed on existing SDG&E land adjacent to SDG&E's Clairemont substation and will interconnect to one circuit at that substation. The Clairemont facility will be able to island critical pre-determined load, including Balboa Branch Library (Cool Zone) and Fire Station 36 during a system disturbance, thus providing back-up power grid resiliency.

Fire Station 36 serves East Clairemont and its surrounding areas. Fire Station 36 is responsible for repairing and maintaining approximately 450 Self Contained Breathing Apparatus ("SCBA") and approximately 1,400 Air Cylinders used by City of San Diego and Poway firefighters.[102] The Balboa Branch Library is a designated cool zone.

b. AB 2868 evaluation results

The Clairemont site will provide 10 MW of energy storage to help integrate renewables and reduce GHG emissions. The circuit-level microgrid will support multiple critical facilities outlined above. There is 1,700 kW of renewables already installed on the distribution circuit feeding into the circuit–level microgrid. The energy storage system will absorb and store excess solar generation and provide that energy back on the grid when it is needed. The project will help reduce dependence on petroleum by offsetting the use of backup diesel generation at one of these critical facilities (Fire Station 36). This site prioritizes the public sector by providing resiliency to the multiple critical sites located on the distribution circuit. This site will be able to

[101] SDG&E may accelerate the in-service date for the Clairemont facility to mid-year 2020.

[102] SCBAs are portable air units that supply breathable air to firefighters when entering oxygen-deprived environments where the air supply is contaminated by smoke, toxic gases or other hazardous materials. *See* https://www.sandiego.gov/fire/about/firestations/sta36

participate in the CAISO market,[103] and will be used to provide local resource adequacy to the extent these resources qualify for resource adequacy.[104]

c. Project costs

Table SP-6 below provides the total direct and indirect costs in the capital cost cap, as well as the anticipated O&M direct costs, associated with the Clairemont energy storage circuit-level microgrid project.[105] All the values are shown on a nominal basis. Based on the estimated project costs, SDG&E requests Commission approval of approximately [redacted] for the Clairemont project. This is a not-to-exceed cost cap.

Table SP – 6
Clairemont Estimated Project Costs

Capital Cost	**Amount**	**Notes**
Total Direct Costs	[redacted]	Includes interconnection and CAISO network upgrade costs
Total Indirect Costs	[redacted]	
Contingency	[redacted]	
Total Project Costs	[redacted]	
Operations and Maintenance Costs	**Amount**	**Notes**
O&M Fixed Maintenance	[redacted]	5% of total direct project costs
O&M Variable Costs (per cycle)	[redacted]	Variable costs for each MWh of discharged energy

[103] *See* Ex. SDGE-06 (Bierman) *passim*.

[104] *See* Ex. SDGE-03 (Summers) 8:1-18.

[105] None of the costs provided in Table SP-6 assume offset by sales in CAISO markets, although revenues from such sales will be used to offset project costs and are expected to be substantial. *See* Ex. SDGE-06 (Bierman) *passim*.

8. **Elliot** (Ex. SDGE-05 (Prsha) 18:2–20:1)

a. Project overview

The Elliot circuit-level energy storage project is a 10 MW, 10 MWh energy storage system located in Tierrasanta, a community located in the northeastern part of the City of San Diego. The site will be constructed after a RFP competitive solicitation process. The proposed on-line date is December 31, 2020. The Elliot energy storage project will be constructed on existing SDG&E land and will interconnect to SDG&E's Elliot substation. The Elliot facility will have the capability to island critical predetermined load, including Fire Station 39 and Tierrasanta Public Library, during a system disturbance. Fire Station 39 serves Tierrasanta and the surrounding areas. The Tierrasanta Public Library is a designated cool zone.

b. AB 2868 evaluation results

The Elliot site will provide 10 MW of energy storage to help integrate renewables and reduce GHG emissions. The circuit-level microgrid will support the multiple critical facilities outlined above. There is 2650 kW of renewables already installed on the distribution circuit feeding into the circuit–level microgrid. The energy storage system will absorb and store excess solar generation and provide that energy back on the grid when it is needed. The project will help reduce dependence on petroleum by offsetting the use of backup diesel generation at one of these critical facilities (Fire Station 39). This site prioritizes the public sector by providing resiliency to the critical sites located on the distribution circuit. This site will be able to participate in the CAISO market,[106] and will be used to provide local resource adequacy to the extent these resources qualify for resource adequacy.[107]

---

[106] *See* Ex. SDGE-06 (Bierman) *passim*.

[107] *See* Ex. SDGE-03 (Summers) 8:1-18.

c. Project costs

Table SP-7 below provides details around the total direct and indirect costs outlined in the capital cost cap, as well as the anticipated O&M direct costs,[108] associated with the Elliot energy storage circuit-level microgrid project. The values are shown on a nominal basis. Based on the estimated project costs, SDG&E requests Commission approval of approximately [redacted] for the Elliot project. This is a not-to-exceed cost cap.

Table SP – 7
Elliot Estimated Project Costs

Capital Cost	**Amount**	**Notes**
Total Direct Costs	[redacted]	Includes interconnection and CAISO network upgrade costs
Total Indirect Costs	[redacted]	
Contingency	[redacted]	
Total Project Costs	[redacted]	
Operations and Maintenance Costs	**Amount**	**Notes**
O&M Fixed Maintenance	[redacted]	5% of total direct project costs
O&M Variable Costs (per cycle)	[redacted]	Variable costs for each MWh of discharged energy

9. **Santee** (Ex. SDGE-05 (Prsha) 20:2–22:1)

a. Project overview

The Santee circuit-level energy storage project is a 10 MW, 10 MWh energy storage project located in Santee, California, in eastern San Diego County. The site will be constructed

[108] None of the costs provided in Table SP-7 assume offset by sales in CAISO markets, although revenues from such sales will be used to offset project costs and are expected to be substantial. *See* Ex. SDGE-06 (Bierman) *passim*.

after a RFP competitive solicitation process. The proposed on-line date is December 31, 2020. The Santee energy storage project will be constructed on existing SDG&E land and will interconnect at SDG&E's Santee substation. The Santee facility will have the capability to island critical predetermined load, including City of Santee Fire Station 4 and Padre Dam Northcote pump station during a system disturbance, thus providing back-up power resiliency. The City of Santee Fire Station works to protect life and property in the community through fire suppression, public education and emergency medical services.[109]

b. AB 2868 evaluation results

The Santee site will provide 10 MW of energy storage to help integrate renewables and reduce GHG emissions. The energy storage system will absorb and store excess solar generation and provide that energy back on the grid when it is needed. There is 1,250 kW of renewables already installed on the distribution circuit feeding into the circuit–level microgrid. The project will help reduce dependence on petroleum by offsetting the use of backup diesel generation at City of Santee Fire Station 4. This site prioritizes the public sector by providing resiliency to the multiple critical sites located on the distribution circuit. This site can participate in the CAISO market,[110] and will be used to provide local resource adequacy to the extent these resources qualify for resource adequacy.[111]

[109] *See* https://www.santeefiredepartment.org/

[110] *See* Ex. SDGE-06 (Bierman) *passim*.

[111] *See* Ex. SDGE-03 (Summers) 8:1-18.

c. Project costs

Table SP-8 below provides the total direct and indirect costs in the capital cost cap, as well as the anticipated O&M direct costs,[112] associated with the Santee energy storage circuit-level microgrid project. All the values are shown on a nominal basis. Based on the estimated project costs, SDG&E requests Commission approval of approximately [redacted] for the Santee project. This is a not-to-exceed cost cap.

Table SP – 8
Santee Estimated Project Costs

Capital Cost	**Amount**	**Notes**
Total Direct Costs	[redacted]	Includes interconnection and CAISO network upgrade costs
Total Indirect Costs	[redacted]	
Contingency	[redacted]	
Total Project Costs	[redacted]	
Operations and Maintenance Costs	**Amount**	**Notes**
O&M Fixed Maintenance	[redacted]	5% of total direct project costs
O&M Variable Costs (per cycle)	[redacted]	Variable costs for each MWh of discharged energy

E. Future AB 2868 projects and approval process

SDG&E has presented a clear method for how potential projects that maximize ratepayer benefits will be evaluated and how the distributed energy storage systems will be used to meet AB 2868 goals. The evaluation method and multiple use application were discussed in public

[112] None of the costs provided in Table SP-8 assume offset by sales in CAISO markets, although revenues from such sales will be used to offset project costs and are expected to be substantial. *See* Ex. SDGE-06 (Bierman) *passim*.

workshops with stakeholders and the Energy Division. Supported by this framework and adherence to AB 2868, future circuit-level and service-level projects which SDG&E will evaluate using the presented framework should be approved via an Advice Letter filing as discussed below. The Advice Letter process is another factor that will accelerate the widespread deployment of distributed energy storage systems.

In addition to the seven circuit-level projects proposed with this application, this application proposes a Tier 3 advice letter process in which to seek future energy storage project approvals as SDG&E identifies projects meeting the goals of the statute.[113] Some of the future projects may be service-level or circuit-level projects.

1. Service-level projects can serve smaller customers and loads

SDG&E is not proposing or seeking funding for specific service-level energy storage microgrid projects in this 2018 application. Therefore, no specific project costs or benefits are proposed in this application. However, service-level energy storage microgrid projects are part of SDG&E's AB 2868 Framework as a future proposed use case to accelerate the widespread deployment of energy storage as outlined in AB 2868. Ex. SDGE-02 (Johnston) 27:16-21.

Service-level energy storage microgrid projects are intended for specific critical facilities or priority sites such as cool zones[114] or priority municipal buildings on the services side of the distribution service transformer. As with the seven circuit-level projects proposed here, the service-level projects will seek to maximize ratepayer benefits through multiple-use applications when possible by providing community resiliency through distribution back-up power, and may aggregate when possible to participate in wholesale energy markets when connected to the grid.

---

[113] Ex. SDGE-02 (Johnston) 11:11-15, 27:16-21. In addition, pursuant to D.17-04-039, SDG&E plans to submit programs and investments as part of the next AB 2514 cycle. *Id.,* 27:16-21.

[114] Cool zones provide shelter for those without air-conditioning during severe heat waves.

Locations in low-income communities will be prioritized in the evaluation to select these projects. The microgrids may reduce the use of diesel backup generators, reduce dependence on petroleum and enable greater renewable integration for the selected sites. SDG&E will seek to minimize overall costs by using SDG&E right of way or suitable land offered by customers. All targeted sites are public sector customers, and low-income communities will get priority. Ex. SDGE-01 (Reguly) 16:4-20; Ex. SDGE-02 (Johnston) 10:14-15, 11:16-13:8.

Service-level energy storage microgrid projects are generally smaller energy storage systems interconnected at secondary distribution voltages (nominally, 240 V and 120 V) and designed to serve individual or multiple critical public sector facilities if connected to the same service-level transformer. Smaller systems may be between 50 kW to 500 kW each, but could be larger or smaller depending on the specific project needs. These investments may use SDG&E-controlled land where available, such as rights-of-way, but may alternatively be deployed on customer or third-party land if suitable SDG&E land is not readily available. Although this testimony discusses an individual facility, there may be cases where the service-level microgrid serves more than one facility. Ex. SDGE-02 (Johnston) 10:9-17.

A simplified diagram to illustrate the service-level microgrid is shown below:

Figure 3 –EXAMPLE OF A SERVICE-LEVEL MICROGRID
Ex. SDGE-02 (Johnston) 10:18-11:3

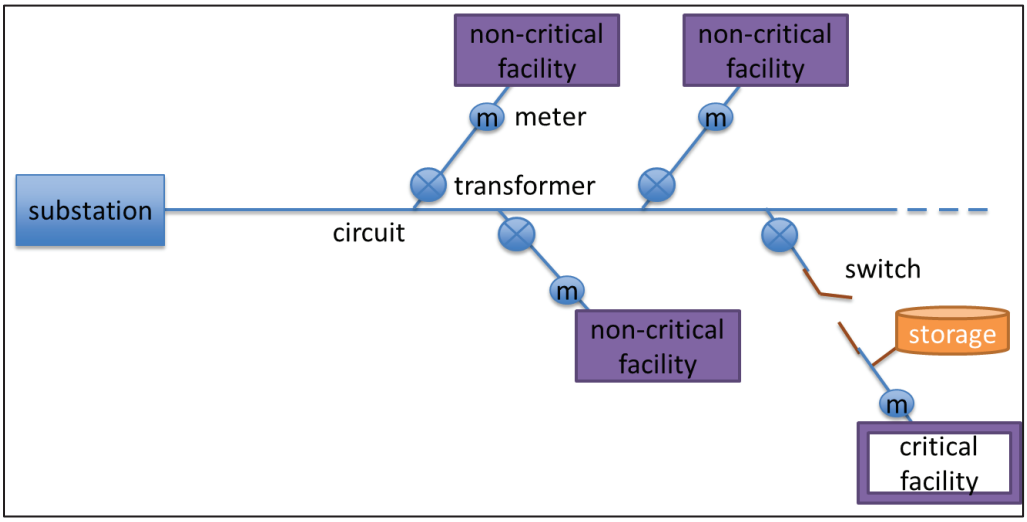


Figure 1: Illustrative example of a service-level microgrid

In the service-level microgrid, the energy storage and switch (shown in orange) can isolate the energy storage and public sector critical facility. When the switch is closed, the critical facility is connected normally, and the energy storage may be used for other grid purposes. Actual microgrid designs may vary based on the circuit configuration. The energy storage for service-level microgrids is expected to be deployed on the utility side of the meter in most cases as shown in the diagram above. Customer side microgrids may be applicable for some master-metered customers in SDG&E's service territory, like military bases. Ex. SDGE-02 (Johnston) 11:4-10.

2. **Service-level projects should satisfy the AB 2868 criteria**

The primary application of the service-level microgrid deployments would be to provide resiliency services, or backup power, to critical public sector facilities when the microgrid is in island mode. This is achieved via the microgrid design, which isolates the service side of the transformer from the circuit to serve one or more public sector facilities during an islanding event. A potential additional application of the service-level microgrid may be in aggregating

the smaller energy storage systems to participate in wholesale energy markets when the microgrids are connected to the grid. Ex. SDGE-02 (Johnston) 11:16-12:5.

The service-level microgrid category is intended to maximize overall benefits while minimizing overall costs. Ratepayer benefits are maximized through multiple-use application of the energy storage system where possible. Benefits may include but are not limited to:

(i) reducing the dependence on petroleum for critical public sector facilities by providing resiliency services from the service-level energy storage instead of using petroleum-based (such as diesel) backup power generators that would otherwise be used during a grid outage affecting that public sector facility;

(ii) reducing GHG emissions associated with the use of petroleum-based backup power generators that would otherwise be used during a grid outage affecting that public sector facility;

(iii) enabling greater integration of renewables located within the service-level microgrid;

(iv) providing community resilience through distribution backup power services when in island mode; and

(v) aggregating when possible to participate in wholesale energy markets when the service-level energy storage is connected to the grid.

Ex. SDGE-02 (Johnston) 12:6-20.

SDG&E intends to minimize overall costs for service-level deployments. Service-level investments are smaller energy storage systems, which may be deployed on SDG&E rights-of-way. Where SDG&E-controlled land is not available, SDG&E intends to work with various municipalities and public agencies to obtain the use of suitable land at minimal cost. Second,

SDG&E intends to solicit proposals from suitable vendors or contractors that can deploy these systems in a manner that minimizes costs. Ex. SDGE-02 (Johnston) 12:21-13:3.

Service-level microgrid investments prioritize public sector and low-income customers in the following ways. First, all customer sites identified for the service-level microgrid deployments will be public sector customer facilities. Second, facilities that are located in low-income communities are prioritized in the evaluation process described above. Ex. SDGE-02 (Johnston) 13:4-8.

3. **Framework for evaluation and approval of future proposals**

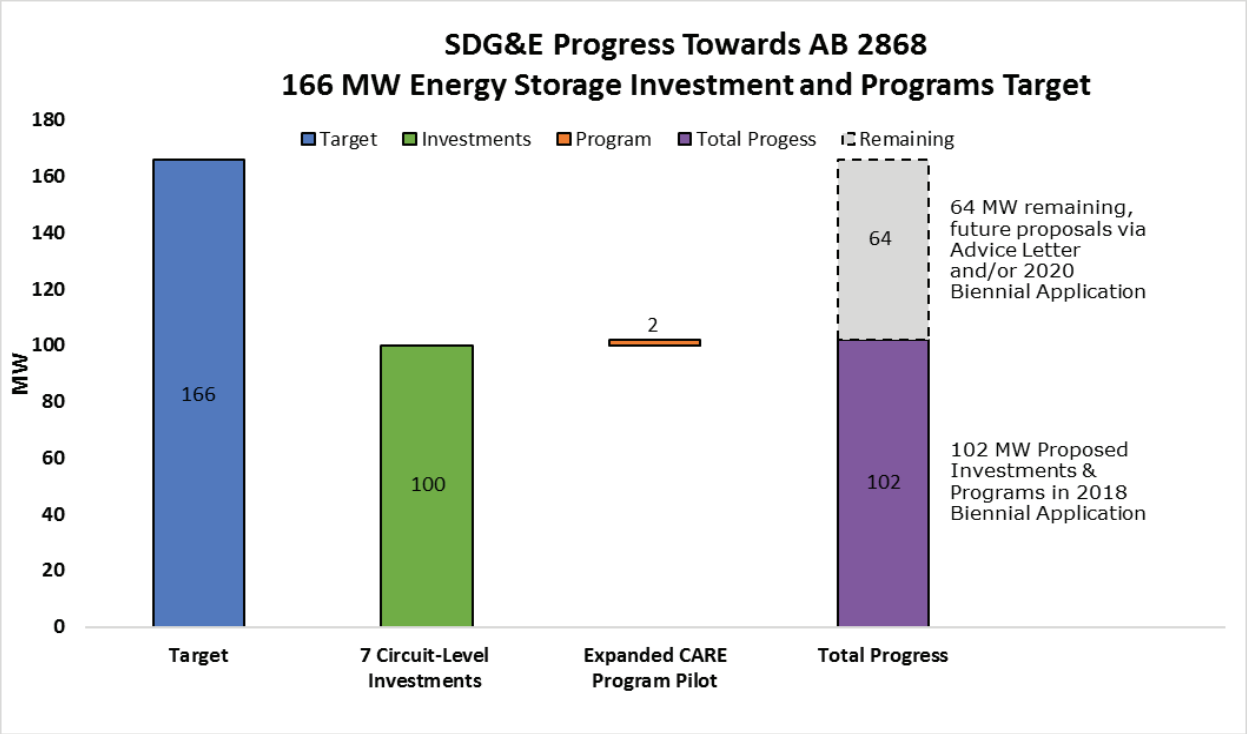
In sum, SDG&E's testimony (Ex. SDGE-02 (Johnston) 6:6-13:11) describes its proposed AB 2868 Framework, which includes a methodology for evaluating circuit-level and service-level proposals in accordance with the AB 2868 statutory criteria. SDG&E plans to seek Commission approval of future energy storage projects as projects meeting the goals of the statute are identified. As proposed in Ex. SDGE-02 (Johnston) 6:11-14, 27:1-21, SDG&E may request approval of future projects via Tier 3 Advice Letters or include future proposed projects in SDG&E's 2020 Energy Storage Procurement and Investment Plan.[115]

4. **SDG&E's AB 2868 energy storage target**

Table TR-2 below outlines SDG&E's intended progress towards the AB 2868 target, by total investments and programs. Ex. SDGE-01 (Reguly) 18:11-19:3.

[115] Pursuant to D.17-04-039, SDG&E may also submit programs and investments as part of the next AB 2514 cycle.

Table TR-2: SDG&E's AB 2868 Investments and Programs Energy Storage Target



F. Multiple-use applications maximize customer benefits and minimize costs

SDG&E's proposed investments will pioneer multiple-use applications of distributed energy storage systems in the electricity market. A key component of such multiple-use functionality will be the storage participating in CAISO markets when not performing or standing-by for resiliency purposes, and using the resulting revenues to offset project costs, reduce GHG, and reduce RA requirements.

The potential wholesale market benefits are substantial. The seven proposed energy storage systems will be offered into CAISO markets. Revenues generated will go into the Distribution Energy Storage Balancing Account ("DESBA").[116] These revenues will reduce the overall costs of the energy storage systems. Costs for the energy storage systems will be

[116] Ex. SDGE-09 (Jasso) 2:8-24.

included in the distribution rate, and thus any wholesale market revenue offsets will be shared by all benefiting customers. SDG&E requests that the Commission make an upfront determination on reasonableness of the wholesale market revenues, such that actual wholesale market revenues generated through the market participation of these energy storage systems are not subject to retroactive reasonableness review. Ex. SDGE-06 (Bierman) 3:14-17. SDG&E also expects that any future projects later submitted under its 2018 Framework may provide such wholesale services. Ex. SDGE-02 (Johnston) 12:3-5,19-20.

As the market is currently constructed, these energy storage resources can provide three main market benefits:

1. **Energy arbitrage and GHG reduction** (Ex. SDGE-06 (Bierman) 4:1-13)

Energy storage systems have the ability to store energy from periods of excess renewable generation when market prices are low. Such energy storage systems can then discharge this energy later during high-priced market periods where the marginal generating unit is a low-efficiency natural gas unit. The arbitrage during high-priced times - where high demand and a high proportion of fossil generation mean high GHG output - and low-priced lower-demand hours with lower GHG intensity due to a high proportion of renewable generation, can lead to both wholesale market revenues and a net reduction in GHG emissions. This energy arbitrage revenue and GHG savings is affected by the round-trip efficiency of the battery, the Variable Operating Maintenance Cost, and the exact times and market prices when the battery dispatches. In addition, SDG&E will consider the timing of discharge relative to the

potential need for resiliency services, *e.g.*, during a Santa Ana weather event, which often coincides with SDG&E's system peak, and high wildfire risk.[117]

2. **Ancillary Services** (Ex. SDGE-06 (Bierman) 4:146:10)

Ancillary services are those that help provide the "reliable" component of SDG&E's supply of clean, safe, and reliable energy to its customers. The two main categories are:

Regulation: Regulation is defined by the CAISO as a resource that can increase ("Reg Up") or decrease ("Reg Down") its energy production, or decrease (Reg Up) or increase (Reg Down) its energy consumption, in response to a direct electronic signal from the CAISO.[118] The CAISO uses these resources to both help maintain the proper grid frequency and to help balance generation and load during periods of fast changing conditions.

Spinning Reserve: The CAISO defines spinning reserve as "the portion of unloaded synchronized resource capacity that is immediately responsive to system frequency and that is capable of being loaded in ten (10) minutes, and that is capable of running for at least thirty (30) minutes from the time it reaches its award capacity."[119] This generation provides additional generation in case of emergencies, unplanned generator outages, and unforeseen load swings.

As the quantity of renewables on the grid have increased, the demand for, and price of, ancillary services has increased. The CAISO's annual market report[120] on the state of the market reflects these trends:

---

[117] Ex. SDGE-06 (Bierman) 4:11-13; Ex. SDGE-11 (Reguly) 12:23-17:12. Such times usually include high temperatures, and would give priority to supporting public health and safety infrastructure such as fire stations and cool zones.

[118] *See* CAISO, *Fifth Replacement Electronic Tariff* (February 15, 2018) at 151. Available at http://www.caiso.com/Documents/AppendixA_MasterDefinitionSupplement_asof_Feb15_2018.pdf

[119] *Id*. at 178.

[120] *See* CASIO, *2016 Annual Report on Market Issues & Performance* (May 2017). Available at http://www.caiso.com/Documents/2016AnnualReportonMarketIssuesandPerformance.pdf

> Ancillary service costs increased to $119 million, nearly doubling from $62 million in 2015. This represents an increase from 0.7 percent of total wholesale energy costs in 2015 to about 1.6 percent in 2016. This was primarily driven by the increased regulation requirements to manage variability of renewable resources.
>
> However, between February and June the ISO roughly doubled the regulation requirements to manage increased variability of renewable resources. During these months, regulation costs were about six times higher than the same months in 2015.
>
> Average day-ahead requirements for regulation up and down increased by about 19 and 28 percent from 2015, respectively. The average day-ahead requirements were 412 MW for regulation up and 417 MW for regulation down.[121]

The key to a reliable and resilient grid is to have flexible resources to meet the changing dynamics of a grid that is integrating more and more renewable resources. Energy storage devices, such as those proposed here, are uniquely suited to accomplish this. Renewable energy benefits the environment and our society, but it is inherently difficult to manage from a reliability perspective due to intermittency. The sun rises and sets every day, but clouds will intermittently and erratically block the sun, and wind will gust strongly and then stop without warning. These intermittencies place a premium on having resources that can deliver flexible ancillary services to help manage the grid during times of highly variable generation and load. With the expected increase in penetration of renewables, the amount of and premium for these services should also increase.

3. **Resource adequacy** (Ex. SDGE-06 (Bierman) 6:11-7:13)

California's RA program is managed both by the Commission and the CAISO. This program is designed to ensure that load-serving entities ("LSEs"), such as SDG&E, procure enough generation ahead of time, so there is no scarcity when power is needed. It can take many

[121] *Id.* at 141.

years to build a generating facility, and so it is impractical to procure generation the day that it is needed, and thus a robust planning process is paramount. SDG&E, in conjunction with the Commission and the CAISO, forecasts load and projects the resources necessary to meet this load, plus a reserve margin. For example, due to the retirement of the San Onofre Nuclear Generating Station ("SONGS"), the Commission authorized SDG&E to procure 500 – 800 MW of new local capacity (*i.e.*, SDG&E's LCR).[122] SDG&E intends to seek local RA qualification for these energy storage systems and, to the extent they qualify, their capacity will contribute towards the remaining Track IV LCR obligation of 56 MW, offsetting the need to purchase additional resources for Track IV LCR purposes.[123] By doing so, these energy storage systems provide direct savings to customers and fulfill Commission and CAISO RA requirements.

The LCR obligation is for all of SDG&E's local territory, not specifically for SDG&E's bundled customers. The Commission implemented the mechanism pursuant to P.U. Code § 365.1 and D.06-07-029, to allocate RA capacity credits to all benefiting customers. Since the Track IV LCR obligation applies to all customers and these resources could benefit all customers, SDG&E proposes that any RA capacity credits[124] would also be shared amongst the other LSEs in SDG&E's service territory by share of coincident peak, adjusted monthly.

---

[122] *See* D.14-03-004, ordering paragraph 2 at 143. *See also* Ex. SDGE-03 (Summers) 6:3-7:3.

[123] *See* Ex. SDGE-03 (Summers) 8:2-5: "To the extent the AB 2868 investments proposed within this application provide LCR, SDG&E requests that the Commission authorize SDG&E to count up to 27.5 MW of LCR resources toward SDG&E's 56 MW of LCR resource authorization needed online by the end of 2021."

[124] SDG&E expects this to be ~27.5 MW under the current RA rules, all counted toward the remaining 56 MW obligation.

4. Modeling suggests substantial multiple-use benefits

SDG&E's direct testimony described the study SDG&E commissioned from a well-respected industry expert, Enovation Partners, to model the potential market revenues from projects similar to those proposed here, using a proven energy storage system technology, with established cost information and market rules.[125] This study, while illustrative, demonstrated that substantial market revenues and GHG reductions can be expected from the proposed projects.[126]

5. SDG&E can harmonize the multiple uses to maximize benefits and minimize costs

a. Dynamically managing the state-of-charge to reserve capacity for resiliency purposes can accommodate robust market participation

Cal PA brings up some pertinent questions regarding how SDG&E plans to provide resiliency benefits during times of planned and unplanned outages, and how SDG&E will do this while also demonstrating GHG benefits and earning CAISO revenues to help offset the costs of these resources. Cal PA states that SDG&E's:

> … storage systems will provide resiliency but its revenue and GHG emission reduction forecasts assume that the system is never islanded, and no minimum State of Charge (SOC) is maintained in order to reserve capacity for resiliency. In doing so, SDG&E is claiming benefits from two scenarios that cannot exist simultaneously. If the systems provide resiliency by islanding the circuit, the extent to which the systems can participate in the wholesale market will be reduced, as will revenues and GHG emission reductions. Outages on the circuits

---

[125] Ex. SDGE-06 (Bierman) 7:14-14:2. Enovation Partners is a strategy and analytics consultancy focused entirely on the energy transition, with offices in Chicago, London, San Francisco, and Washington. Ex. SDGE-06 (Bierman) 7, n. 16 and Appendix A at 29-30.

[126] Ex. SDGE-06 (Bierman) 7:16-8:10. While it is unlikely these resources will operate exactly as modeled because of the numerous assumptions used in forecasting and modeling, the Enovation Partners study, using the modeled representative energy storage projects as a proxy, estimated the total discounted gross margin for the entire set of 100 MW of energy storage systems over the 20 year study period at ~$115 million. *Id.,* 13:3-7.

> served by the projects, or the choice to reserve some capacity for resiliency could both make capacity unavailable for whole market participation. Alternatively, if the systems do not provide resiliency, SDG&E cannot claim the benefits associated with resiliency.[127]

Cal PA's point merits further explanation.

SDG&E's operational control of distribution resources and unique awareness of locational and forecast conditions on the distribution system will enable SDG&E to dynamically manage the energy storage unit's state-of-charge to preserve resiliency. SDG&E did not assume a specific residual amount of capacity that would be reserved at all times for resiliency benefits. Rather, SDG&E has been working internally and in coordination with CAISO to develop an approach to dynamically manage the state-of-charge on SDG&E's owned and operated circuit-level microgrids. Ex. SDGE-11 (Reguly) 12:4-13:2.

SDG&E's operations team routinely monitors current and forecast grid and weather conditions, including Red Flag Warnings.[128] It will use this information to actively manage the state-of-charge for the proposed projects. The storage will be charged and available as necessary when a planned outage occurs for grid maintenance. When circuit conditions are expected to be normal (which will be most of the time), and when loads are light, the storage will be managed to maximize revenues in the wholesale market. The following sections detail how SDG&E intends to provide resiliency benefits: (1) if forecast conditions indicate an elevated risk of unplanned outages; (2) if real time conditions change to indicate an elevated risk of unplanned outages; and (3) if conditions on the distribution circuit are forecasted to be normal. Finally, we explain why reserving an arbitrary amount of discharge capability on the storage will not maximize overall

---

[127] Cal PA (Peterson) 4-5:13 – 4-6:3 (internal citations omitted).

[128] "A Red Flag Warning means warm temperatures, very low humidities, and stronger winds are expected to combine to produce an increased risk of fire danger." National Weather Service, at: https://www.weather.gov/mqt/redflagtips

benefits and minimize overall costs for ratepayers and why SDG&E recommends dynamically managing the state-of-charge of the seven circuit-level energy storage devices. Ex. SDGE-11 (Reguly) 13:3-15.

b. Faced with a planned outage or elevated risk of unplanned outage, the storage will be taken out of the market, and have a sufficient state-of-charge in case of an outage (Ex. SDGE-11 (Reguly) 13:16-15:12)

The storage will be charged and available to discharge or (discharged and available to charge) as necessary when a planned outage occurs. When a circuit outage is planned for the next day due to maintenance being performed, SDG&E will inform the CAISO that the storage resource will be unavailable in the day-ahead market.[129] If it qualifies for RA, then replacement capacity will be found to meet the resources' must-offer obligation. At the time of planned outage, SDG&E's Electric Distribution Operations group will initiate the islanding event.

Similarly, the storage will be charged and available as necessary when next day conditions indicate elevated risk of an unplanned circuit outage.[130] SDG&E will actively manage the storage capacity to provide backup capacity year-round. Cal PA questions how SDG&E can guarantee resiliency benefits year-round. Cal PA expresses concern that:

> … [i]f SDG&E chooses not to reserve any energy for resiliency services, the storage system's ability to island the distribution circuit is limited to the energy that happens to be stored in the storage system at the time of the outage. There

[129] This means, that on the following day, there will be no *scheduled* discharges or charges in any hour that could compromise the resource's ability to provide the required islanding service.

[130] SDG&E will define an Elevated Risk of Unplanned Outage to include the following situations: National Weather Service declares a red flag warning; SDG&E's system loads are forecast to exceed 4000 MW; meteorology forecasts an Extreme Fire Potential Index without a declared red flag warning; transmission outage may result in an overloaded element that can be mitigated by islanding a circuit and supplying the critical loads on the islanded circuit with the storage.

> may not be any energy available, or the storage system may only be able to power the circuit for a short period of time.[131]

Cal PA misunderstands how the microgrid resiliency projects will work. SDG&E clarifies that it will monitor forecasted load, generation, and system state, and manage charging (or discharging) accordingly. For example, if next day conditions indicate the potential for planned outages with limited advance notice, or elevated risks of unplanned outages, the storage will be taken out of the Day-Ahead market and charged to help ensure there is an elevated state-of-charge to provide emergency resiliency. Specifically, these energy storage resources will provide resiliency and (microgrid) services which are defined as "load-modifying or supply services capable of improving local distribution reliability and/or resiliency." Ex. SDGE-11 (Reguly) 14:12-19.

While there is no perfect foresight into when an outage can occur, SDG&E sought to devise an operating plan for these multiple-use applications that considers the probability of an outage, while also maximizing benefits and minimizing the costs of the seven circuit-level energy storage projects.[132]

In most instances, SDG&E will have forward visibility into weather events such as red flag warnings and high temperature days when the distribution system is stressed and is more likely to experience an unplanned outage. SDG&E's meteorology begins tracking potential fire or heat risk events as early as seven to ten days in advance, using state-of-the-art long-range

---

131 Cal PA (Peterson) 4-8:7-10.

132 *Decision on Multiple-Use Application Issues*, D.18-01-003 (January 11, 2018) at 2. The Commission provided direction to the utilities on how to promote the ability of storage resources to realize their full economic value when they can provide multiple benefits and services to the electricity system, including the adoption of eleven rules and definitions to govern evaluation of these multiple-use energy storage applications. The Commission "encourage[d] the utility to maximize value to ratepayers by providing multiple services, consistent with the rules we adopt here." *Id.* at 24.

forecast models. Potential events are closely monitored. For instance, from three days in advance to the day of the weather event, high-resolution forecast models are used to further refine the forecast details, including locations and strength of wind gusts, maximum temperatures and humidity levels. When an outage occurs, distribution operations will initiate the islanding event through the Distributed Energy Resource Management System ("DERMS"). Ex. SDGE-11 (Reguly) 15:3-12.

c. If real time conditions change to indicate elevated risk of an unplanned outage, distribution operations will manage the resource to ensure a satisfactory state-of-charge (Ex. SDGE-11 (Reguly) 15:16-16:6)

The seven circuit-level energy storage resources will be utility-owned/controlled and tightly integrated with our distribution management systems. Based on the Enovation model referenced in Ex. SDGE-06 (Bierman), the available state-of-charge will unlikely be zero, and in most instances will be higher than 25 percent.[133] In the case of an unplanned outage, SDG&E will immediately inform the CAISO that the storage resource will be taken out of the market to ensure the resource is available for distribution resiliency purposes.

When SDG&E becomes aware of an elevated risk of outage in the near future, SDG&E will immediately charge the resource, as necessary, in anticipation of a potential islanding event. If and when an outage occurs, distribution operations will initiate the islanding event through SDG&E's DERMS.

[133] Cal PA at PDF p. 388, *citing* SDG&E's response to Data Request ORA-SDG&E DR-04 Supplement, which demonstrates based on the Enovation study that the energy storage unit at least 80% of the time had a state-of-charge greater than 25%. Based on Enovation model which formulated forward projections of how the AB 2868 storage projects will operate in the CAISO energy and ancillary service markets.

d. If normal next-day conditions on the distribution circuit are expected, the storage will be managed in the day-ahead market to maximize net revenues (Ex. SDGE-11 (Reguly) 16:7-17:12)

As islanding events are infrequent and are not forecasted years in advance, the Enovation study referenced in Ex. SDGE-06 (Bierman) did not assume any resiliency reservation periods, but, as stated in the testimony, the purpose of the study was to illustrate the scope of potential economic benefits in the CAISO market.[134] In periods of normal circuit conditions, the storage will participate in the CAISO ancillary and energy market to better integrate renewables and lower GHG emissions, while also managing resiliency needs dynamically. Under dynamic management, if conditions change following the day-ahead market deadline, SDG&E will notify the CAISO that the storage will be removed from the market as necessary to charge (or discharge) the storage in preparation for the changed conditions.

To the extent these storage resources qualify for Resource Adequacy, the full amount of qualifying capacity will be bid into the CAISO's day-ahead market to satisfy the RA must offer obligation. Similarly, 100% of the capacity will be eligible to participate in the CAISO's energy and ancillary service market during normal periods. The net market revenues earned will offset the project's fixed costs. Also, having the full capacity of the storage participate in the CAISO market will help integrate renewables. As stated in Ex. SDGE-06 (Bierman) 10:5-8, the energy storage devices can charge during periods when there is abundant renewable energy on the electric system and discharge that energy during times of relatively high GHG intensity, potentially abating less efficient natural gas production. This can reduce GHG emissions and save our customers money. In addition, by providing ancillary services in the CAISO market,

[134] Ex. SDGE-06 (Bierman) 7:16-17.

the energy storage resources will smooth the intermittency of renewable resources on to the electric grid.[135]

e. Reserving a fixed amount capacity on the storage will not maximize benefits and minimize costs (Ex. SDGE-11 (Reguly) 17:13-18:15)

Conversely, SDG&E could have the storage reserve a fixed state-of-charge year round to provide microgrid resiliency for these proposed seven circuit level storage projects. To maximize overall benefits and minimize overall costs, SDG&E does not advocate fixed capacity reservation levels for this type of multiple-use application. Outages, and any accompanying islanding on the circuits served by the proposed storage are expected to be infrequent. Therefore, if the storage remains charged year-round at a pre-determined fixed level for the exclusive purpose of standing by to provide resiliency benefits, most days this stored energy would go unused. This would forgo revenues from sales in CAISO markets which would otherwise offset project costs, and therefore would not "minimize overall costs and maximize overall benefits" for ratepayers.

Instead, given SDG&E's unique insight into the distribution system, and SDG&E's ability to directly control the storage, charging (and discharging) should be dynamically managed – *i.e.,* the charging level should not be set at a certain minimum. Put differently, SDG&E intends to dynamically manage a state-of-charge so that resiliency can be provided when events occur with little or no warning. However, the precise level of this state-of-charge will not be a predetermined fixed amount but rather will be adjusted in the day-ahead market and/or as real-time conditions warrant (*e.g*., as next-day and/or next-hour forecast loads on the sensitive circuits increase or decrease). This dynamic management approach: (i) recognizes that

[135] This "smoothing" effect is described at Ex. SDGE-06 (Bierman) 2:20-3:3 and n. 4.

resiliency is the primary objective for the storage, and (ii) maximizes the economic value of the storage given this objective. The Commission recognizes that resiliency may be dynamic by including resiliency/microgrid/islanding as one of many multiple-use cases,[136] otherwise the Commission would have specified resiliency as a single or isolated use case for energy storage.

Permitting the proposed flexible use of such storage can integrate intermittent renewables, reduce GHGs and can island/microgrid sections of the distribution circuit to support critical public services during outages. The proposed storage represents a low-risk opportunity to learn the management of multiple-use applications and quantify the benefits of multiple use applications in actual operation. Public utility regulation has never sought 100% reliability without regard to cost. To reserve a substantial charge to support resiliency at all times would forgo substantial revenue and learning, without a substantial increase in resiliency support.[137] SDG&E requests that the Commission reject a specific reserved minimum state-of-charge, and approve the foregoing multiple-use operational plan for its proposed storage projects.

f. Cost recovery and resource adequacy

As highlighted above, the seven proposed energy storage projects will be multi-use. Their primary purpose and function will be to provide distribution resiliency to critical public sector customers. The proposed energy storage projects will be located within existing utility-owned property, and will augment the existing 12 kV electric distribution system, allowing critical public sector customer distribution circuits to be able to operate independently,

---

136 *Multi-Use Decision*, D.18-01-003, Table 1, at 10.

137 SDG&E has no incentive to maximize electricity sales at the expense of the resiliency operation. In California, electricity sales are "decoupled" from the utility's profits, which means there is no financial pressure on the utility to sell a unit of electricity. *See, e.g.*, Cal. Pub. Util. Com'n, *Actions to Limit Utility Costs and Rates, P.U. Code Section 913.1 Annual Report to the Governor and Legislature* (May 2018) at 10.

essentially creating self-contained electric distribution systems during outages (*i.e.*, microgrids). The proposed seven energy storage projects will be located at, and connected to, existing SDG&E electric substations solely at the 12 kV electric distribution voltage. Due to their nature as critical load circuit support, these proposed energy storage projects can be controlled and operated as part of the electric distribution system during grid disturbances (such as a substation outage) to provide resiliency to the associated distribution circuit.

As discussed above, when a proposed energy storage project is not prioritized to provide distribution resiliency, the proposed project will be scheduled in the CAISO market and generate market revenues. SDG&E plans to seek Full Capacity Deliverability Status for these proposed energy storage projects, and to the extent qualified, serve as RA resources contributing to SDG&E's remaining Track IV Local Capacity Requirement as discussed in Ex. SDGE-03 (Summers) 8:2-18. SDG&E proposes that any RA capacity credits would be shared amongst the other LSEs in SDG&E's service territory as described in Ex. SDGE-06 (Bierman) 7:6-13.

Because the proposed energy storage projects are located on and augment SDG&E's distribution system, and their primary purpose and function is to provide resiliency to distribution circuits, their costs should be recovered in Distribution rates, like other SDG&E distribution system assets. However, as discussed in Ex. SDGE-09 (Jasso) 2:3-24, SDG&E proposes a new mechanism to capture the CAISO market revenues of the proposed projects when they are not prioritized to provide distribution resiliency, and to use those revenues to offset the costs of the proposed projects which will be borne by distribution customers. This mechanism allows the actual CAISO market revenues of the proposed energy storage projects to flow to the same set of customers paying for the distribution resiliency service.

G. Utility Investments and Programs Do Not Unreasonably Impair Non-Utility Enterprises to Market and Deploy Energy Storage Systems (Ex. SDGE-01 (Reguly) 20:4-21-6)

SDG&E's proposed investments for AB 2868 provide resiliency services to public sector customers and critical facilities. These investments will reduce dependence on petroleum and may reduce GHG emissions and help meet air quality standards. During the AB 2868 workshops required by the Track 2 Decision, stakeholders generally agreed that public sector critical infrastructure resiliency is important, and that resiliency services are suitable for utilities to offer. SDG&E's proposed energy storage investments are focused on critical facilities of public sector customers and designed to reduce the risk of outages for public sector customers. Like other traditional distribution system upgrade investments, investments in these storage devices are not designed to and will not impede nonutility enterprises from also pursuing potential storage investments. SDG&E will use competitive solicitations to select the most cost-effective energy storage solutions, which minimize overall costs in accordance with AB 2868. Such competitive solicitations will increase opportunities for nonutility enterprises to market and build energy storage systems, encourage competition across energy storage technology providers, and drive down the costs for SDG&E's customers.

In addition, SDG&E's proposed pilot provides financial incentives to Expanded CARE facilities to deploy new energy storage systems. This pilot provides funding for customers to pay for storage systems and thereby directly supports the ability for nonutility enterprises in marketing and deploying energy storage systems. By providing additional financial incentives to customers, SDG&E's pilot program is expected to lower the economic barrier for eligible low-income customers to purchase energy storage and deploy it on the customer side of the meter for their own benefit. Such a program should increase the market opportunities for nonutility storage developers and technology providers.

1. **Challenges to utility ownership lack merit** (Ex. SDGE-11 (Reguly) 2:7-4:8)

Cal PA recommends that the Commission dismiss SDG&E's seven circuit-level microgrid energy storage projects under AB 2868, claiming SDG&E has not justified utility ownership.[138] SDG&E strongly disagrees with this claim. Cal PA is incorrect because the statute itself encourages utility ownership, so no justification is needed unless one asserts that such ownership somehow frustrates the statute.[139] Furthermore, Cal PA ignores the distinct benefits of utility ownership in SDG&E's testimony supporting the application, which demonstrates how utility operation of energy storage on the distribution grid will provide system resiliency while offsetting costs, which will benefit not just individual customers but the entire San Diego region. The benefits of adding flexible storage resources extend beyond the San Diego region. The entire CAISO Balancing Authority area benefits from the ability of storage resources to provide ramping and balancing services in a system with large amounts of non-dispatchable intermittent resources. The benefits of resulting reduced GHG emissions extend to everyone.

2. **AB 2828 investment is not procurement** (Ex. SDGE-11 (Reguly) 4:16-6:11)

AB 2868 requires the utilities to propose "programs and investments" for up to 500 MW (in total for all three utilities) of additional distributed energy storage resources. Specifically, to implement AB 2868, D.17-04-039 directs each investor-owned utility to incorporate programs and investments of up to 166.66 MW per utility of distributed energy storage systems into their

---

[138] Cal PA (Peterson) 5:20.

[139] AB 2868 requires the Commission to direct the state's three largest electrical corporations to "file applications for programs and investments to accelerate widespread deployment of distributed energy storage systems." P.U. Code § 2838.2(b).

2018 energy storage and investment plans. D.17-04-039 stated that, in "recognition that AB 2868 includes proposals for investments in storage, *and not just procurement*, the biennial 2018 and 2020 applications cycles will now be referred to as the 2018 and 2020 energy storage procurement *and investment* plans" (emphasis added).[140] Since, the Commission explicitly added the term "investment" to the 2018 Plan, and more broadly, because the AB 2868 statute explicitly contemplates direct utility investment, the statute intended utility ownership. Therefore, the question posed by this application is not whether SDG&E should own energy storage under the proposed investments under AB 2868, but rather whether the programs and investments proposed by the utility meet the statutory criteria, including whether such investments "unreasonably limit or impair the ability of nonutility enterprises to market and deploy energy storage systems."[141]

The Utility Reform Network ("TURN") believes that the Commission should require AB 2868 programs and investments to be spread equally across third-party owned storage and utility-owned storage. Specifically, TURN recommends "for all AB 2868 procurement, 50% of the storage facilities should be utility-owned and 50% owned by third parties."[142] Despite the Commission defining procurement and investment as separate tracks for the utility applications in this proceeding, TURN purposefully conflates the term procurement with investment throughout their testimony.

---

[140] D.17-04-039 at 20.

[141] AB 2868, P.U. Code § 2838.2(c)(1).

[142] TURN (Borden) 4:18-20, 18:2-3.

Cal PA also conflates procurement and investments.[143] The Track 2 Decision (D.17-04-039) set forth the process for AB 2868 implementation, as well as whether to modify the existing energy storage procurement target established pursuant to AB 2514.[144] A plain reading of D.17-04-039 shows that decision acknowledges the AB 2868 proposals for investments and programs as a separate vehicle to help accelerate the deployment of energy storage resources "*above and beyond* the 1,325 MW target for energy storage" set under AB 2514.[145] Put differently, any utility investment under AB 2868 would be incremental to the AB 2514 utility-owned subset. There is simply no basis in AB 2868 to impute any limit of 50% utility ownership of the storage facilities. Notably, AB 2514 specifically disclaims any intent to disadvantage utility ownership.[146]

LS Power counters that "SDG&E's exclusive focus on utility ownership results in it overlooking the possibility of contracting with existing large third-party owned storage projects for microgrid services at the lowest possible cost to ratepayers."[147] SDG&E disagrees. The design of the seven circuit-level microgrid investments within SDG&E's existing substation land enables the storage to be more seamlessly integrated within SDG&E's existing operations and

---

[143] Cal PA states, "that the Legislature used the terms 'procurement' and 'investment' interchangeably." Cal PA (O'Brien) 1-7:22-1-8:1.

[144] P.U. Code § 2836 directs the Commission to adopt and routinely reevaluate the energy storage mandated procurement target.

[145] D.17-04-039 at 63, findings of fact 11.

[146] P.U. Code § 2835(f): "Procure" and "procurement" means, in reference to the procurement of an energy storage system, to acquire by ownership or by a contractual right to use the energy from, or the capacity of, including ancillary services, an energy storage system owned by a load-serving entity, local publicly owned electric utility, customer, or third party. *Nothing in this chapter, and no action by the commission, shall discourage or disadvantage development and ownership of an energy storage system by an electrical corporation.* [emphasis added]

[147] LS Power (Hill) 4:2-5.

control systems than would be possible with large third-party owned storage facilities located on other properties. By doing this, the storage resources for this proposed specific use case will be better and more quickly optimized to provide customer benefits in both times of normal conditions, maintenance, contingency scenarios, and emergencies. For instance, because of its integration with other SDG&E distribution assets, the proposed energy storage resources will be able to seamlessly create islands during planned or unplanned outage events. The SDG&E distribution operations team will be able to island the distribution circuit-level microgrid to provide resiliency to critical public sector infrastructure as well as to non-critical customers located on the same distribution circuit.

It would impede the resiliency operation to insert a third-party into the process. SDG&E has the responsibility to serve, safely and reliably, the existing and foreseeable load of all of its customers, but third parties are not under such a fundamental obligation. And, unlike non-utility operators, SDG&E cannot profit on electricity sales in CAISO markets. No matter how well-motivated, a third-party operator would add a layer of decision-making and dilute responsibility for actions which could take seconds to implement in emergency circumstances. Adding such complexity would frustrate the resiliency goal. And, in this case, the resiliency will be provided to critical public sector facilities that are especially important to public safety during emergencies, so the operational value of utility ownership is both prudent and sensible. Moreover, a third party would be conflicted in fulfilling the resiliency mission because it is incented to maximize profit by charging and discharging the storage into the CAISO market based solely on market opportunity. No amount of creative contracting or good intentions can avoid these inherent drawbacks of third-party ownership for this specific application, especially given the novelty of the proposed operations.

3. **SDG&E's proposed investments create opportunity for third-party storage developers** (Ex. SDGE-11 (Reguly) 11:14-12:2)

Contrary to opponents' allegations, SDG&E ownership of the seven circuit-level energy storage microgrid projects will not reduce opportunities for non-utility enterprises. In fact, the proposed seven circuit-level projects create new opportunities to the energy storage market to supply equipment and, indeed, complete projects (including the ongoing maintenance of such projects for 10 years). As stated in its testimony,[148] SDG&E has and will conduct RFPs for Engineering, Procurement and Construction ("EPC"), Build-Own-Transfer ("BOT") projects and acquisitions through a competitive and independently evaluated process with wide participation from the energy storage industry. This enables selection of the optimal technology solutions at the lowest cost. Therefore, SDG&E's proposed ownership does not unreasonably impair the ability of non-utility enterprises to market and deploy energy storage, it enhances it.

4. **The proposed projects do not interfere with LS Power's Vista project** (Ex. SDGE-11 (Reguly) 10:7-12:2)

LS Power claims that SDG&E is interfering with their Vista project, which is already online stating that:

> SDG&E is aware, through many avenues including the information made available in interconnection facility coordination, that LS Power has constructed and is operating a 40 MW energy storage facility with a direct connection to the Melrose substation (the Vista project) at a site across the street from the Melrose substation. Moreover, the Vista project is already in operation and is available today, a year and a half before SDG&E's proposed storage project, to provide storage services and benefits to SDG&E's ratepayers.[149]

---

[148] *See*, Ex. SDGE-02 (Johnston) 24:12-21; Ex. SDGE-11 (Reguly) 11:16-12:2.

[149] LS Power (Hill) 5:21-6:3.

There are a few things incorrect or misleading with this statement. First, the proximity of LS Power's existing Vista project to SDG&E's proposed Melrose project[150] does not change the fact that it will be easier to seamlessly integrate the Melrose project with SDG&E's distribution operations, especially considering that the Vista project is already connected to the transmission system, not the distribution system. The Melrose project will not interfere with the Vista project's participation in the CAISO market any more than any addition of an energy storage project in the northern San Diego county that participates in that market. The Vista project is similar to the proposed Melrose project only to the extent that they are both energy storage projects. For instance, the Vista project is much larger and is transmission-connected and solely serves market participation for LS Powers' benefit, while the Melrose project is smaller and will be connected to the distribution system and primarily serves resiliency for public sector facilities while also participating in energy markets for maximum ratepayers' benefit. LS Power asserts that "by limiting storage projects to those owned by SDG&E, [SDG&E's 2018 Plan] directly limits LS Power's ability to compete with SDG&E and other independent storage developers."[151] This assertion lacks logical and factual support. LS Power, along with other nonutility storage developers, were invited to compete in the ongoing competitive solicitations where SDG&E will select vendors to supply equipment and build SDG&E's proposed circuit-level energy storage projects. LS Power has been an active participant in the RFP process, which includes an independent evaluator to assess which bids present the best value to customers. Therefore, SDG&E's ownership of these specific proposed projects cannot unreasonably limit or impair LS Power, or other third-parties, from marketing or deploying energy storage. SDG&E focuses on

[150] The Melrose project is one of the seven storage projects proposed in this application.

[151] LS Power (Hill) 5:17-18.

delivering the highest value to its customers at the lowest cost and therefore, vendor selection should be based on the results of the ongoing competitive solicitation process open to LS Power and other nonutility developers.

In addition, while the stated object of AB 2868 is the development of new storage, SDG&E has stated its willingness to consider existing storage facilities if such offers an economic solution for the use case proposed for any of the seven projects in SDG&E's application. LS Power's Vista project is not foreclosed from competing for the business. As described in Ex. SDGE-02 (Johnston) 24:14-19 (emphasis added):

> … SDG&E intends to seek arrangements with third parties to deploy distributed energy storage facilities comporting with SDG&E's specifications as both circuit-level and service-level microgrid projects. Such arrangements may include, but are not limited to; Build, Own, Transfer ("BOT") agreements, Engineering, Procurement, and Construction ("EPC") agreements, and/or project acquisition structures with the selected bidders.

SDG&E has invited LS Power to bid into its AB 2868 circuit-level RFP for the Melrose, Kearny, and Boulevard projects. [152] LS Power thus can present its Vista project in that context, provided it meets the RFP requirements. By comparing the Vista project to other bidders for a project at the Melrose substation, SDG&E ensures it is seeking the best value for its customers.[153] The commercial RFP process is the proper venue for LS Power's concerns, not this proceeding. SDG&E has in fact considered LS Power proposals for the Vista project in the AB 2868 context and others on the merits of the economics and fit to the use cases. Given this

---

[152] Notwithstanding LS Power being invited to participate in SDG&E's ongoing competitive solicitations for SDG&E's proposed circuit-level energy storage projects, it is important to note that nothing in SDG&E's application inhibits LS Power from marketing and selling the services of its Vista energy storage project to other LSEs (such as direct access providers and community choice aggregators).

[153] SDG&E described this invitation to LS Power in its *Reply of … SDG&E to Protests and Responses* (April 16, 2018) at 13.

context, it is clear LS Power aims to leverage its opposition to SDG&E's application for advantage in commercial negotiations.

5. **There is no evidence that utility ownership harms non-utility enterprises in deploying storage, and ample evidence that non-utility participation in the storage market is thriving** (Ex. SDGE-11 (Reguly) 6:13-10:5)

SBUA also conflates procurement with utility ownership, arguing that: "Utility procurement and ownership of [storage] will impair non-utility enterprises from marketing and deploying [storage]. Utility preference for fewer, larger deployments mean that fewer parties will likely be able to participate in the learning."[154] SDG&E disagrees, and SBUA offers nothing to support its assertion. Because of existing well-funded programs, customer adoption of behind-the-meter ("BTM") storage is flourishing in SDG&E's service territory for residential and commercial and industrial ("C&I") customers alike. More specifically, beyond AB 2514 and AB 2868 energy storage procurement and investment targets, the Integrated Resource Plan[155] and Distribution Resources Plan[156] direct the utilities to consider distributed energy resources, including energy storage, to defer traditional utility investment and help meet the state's climate goals and other policy objectives. Separately, there is the Electric Program Investment Charge ("EPIC"), which funds research and development of distributed energy storage resources and the Self-Generation Incentive Program ("SGIP"), which provides subsidies directly to electric customers who install distributed storage behind-the-meter. There is also the Federal Investment Tax Credit ("ITC") for qualifying energy storage collocated with solar as well as ratepayer-funded Net Energy Metering ("NEM") and demand response programs, which

[154] SBUA (Chernick) 21:16-19.

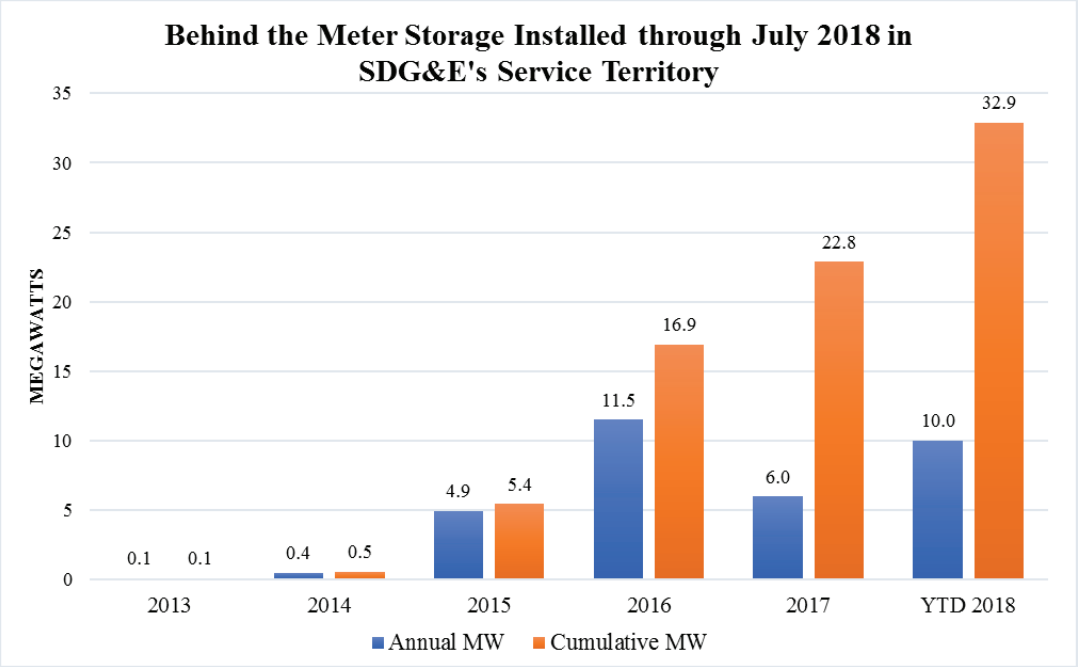
[155] *See* R.16-02-007.

[156] *See* R.14-08-013.

are other forms of ratepayer subsidies that directly benefit qualifying BTM customer distributed energy resources, including storage.

As costs continue to decline and subsidies remain steady, the trend of BTM storage adoption will most likely continue and even accelerate going forward, as can be seen in the most recent uptick in BTM storage in SDG&E's service territory. Below is a graph that shows the recent increase in BTM storage adoption (Ex. SDGE-11 (Reguly) 8: Exhibit 1):

Exhibit 1: SDG&E Behind the Meter Energy Storage Adoption (MW)



Contrary to SBUA's assertion, smaller, localized energy storage programs are already blossoming in the market, with a generous amount of funding now being provided to create incentives for deployment of behind-the-meter storage. The exception to this growth is among low-income customers and in public sector resiliency, which AB 2868 and the public workshop stakeholder process highlighted as a key priority.

Thus, AB 2868 specifically intended for the utilities to pursue additional investment and programs for these two neglected sectors. SDG&E filed its seven circuit-level microgrid projects

in support of providing resiliency to critical public infrastructure and a pilot for energy storage incentive for Expanded CARE customers. SDG&E developed these proposed investments and programs because these use cases and markets were highlighted as areas of unique capability of utilities to serve while also not unreasonably limiting or impairing third-party opportunities. In addition to the seven circuit-level projects, SDG&E proposed in its applications service-level energy storage microgrid projects as part of SDG&E's AB 2868 Framework as described in Stephen Johnston's testimony. These future projects will be generally smaller energy storage systems interconnected at secondary distribution voltages and designed to serve individual or multiple critical public sector facilities if connected to the same service-level transformer. No specific service-level projects were proposed in the 2018 Plan, but, if this application is approved, as discussed above, SDG&E anticipates following up with the projects in a later advice letter filing.

In the workshop process leading to this application, SDG&E worked in concert with the energy storage industry and other stakeholders, including low-income representatives to better focus proposed investments and programs that met currently underserved markets with little potential for third parties to monetize.[157] CESA stated in its presentation during the first Commission-sponsored AB 2868 Workshop that "AB 2868 allows an opportunity to explore storage-related solutions to grid problems that may not currently have monetizable benefit streams."[158] As a result of the workshops, resiliency was underlined as a key area of focus for the utilities to pursue as it is challenging third-parties to monetize benefits in these underserved

[157] As noted in Ex. SDGE-15 (Katsufrakis) 3:3-7, SDG&E consulted with low-income representatives such as The Low Income Oversight Board, GRID Alternatives, Everyday Energy, RAHD Group ("Affordable Housing provider").

[158] Cal PA at PDF p. 272.

markets. With that intention, resiliency for public critical infrastructure was underlined as a key role for utility investment and an important source of learning. Third-party storage projects are not active in these spaces.

The SDG&E distribution operations team will be able to island the distribution circuit-level microgrids to provide resiliency to critical public infrastructure as well as customers located on those microgrid sections of the distribution circuits. By providing microgrid resiliency targeting critical public infrastructure that serves the community, and by also using the storage to integrate intermittent renewable resources through participation in the CAISO energy and ancillary markets, and while in the microgrid configuration, these investments will meet the goal of the statute to achieve ratepayer benefits while not unreasonably limit or impair the ability of nonutility enterprises to market and deploy energy storage systems.

H. AB 2868 investments will use organized labor and provide workforce training to benefit low-income communities (Ex. SDGE-01 (Reguly) 21:7-17)

SDG&E will require that all construction, and installation of AB 2868 facilities that is not performed by employees of SDG&E, shall be performed by AFL/CIO unions, as defined in the current Amended Agreement between SDGE and IBEW 465 dated September 1, 2015. All electrical work will be performed by contractors who hold a valid C-10 contractor's license. All specialized electric work on batteries and conversion systems will be performed by contractors and electricians who have Energy Storage and Microgrid Training and Certification. The union contractors will work with the local trade unions to use local labor when available and provide workforce training opportunities as much as possible.

I. Importance of timely approval (Ex. SDGE-01 (Reguly) 15:7-16:3)

Three of the seven circuit-level projects are proposed to be constructed in the 2019 timeframe. The three circuit-level microgrid energy storage projects are located at SDG&E's

Kearny Mesa, Melrose and Boulevard substations, and have been identified as optimal sites to be deployed in the 2019 timeframe due to the multiple benefits offered by each project as well as the ability to construct the projects in the expedited timeframe. Some of the critical public sector customers these projects support are as follows:

- Kearny Mesa circuit-level microgrid: supports multiple critical facilities that provide essential services to the San Diego region, including an emergency operations center used for coordination during emergencies and natural disasters, local fire department, and sheriff's department headquarters.
- Melrose circuit-level microgrid: supports a local fire station, sheriff's department, and local operations center providing evacuation relief during natural disasters and other emergencies.
- Boulevard circuit-level microgrid: located in a wildfire prone area, supports three local fire stations as well as local police that serve the surrounding community.

The proposed projects use utility-owned land and infrastructure, which allows construction in an expedited timeframe so that these energy storage microgrid projects can provide distribution resiliency to these critical public sector facilities in 2019. Therefore, SDG&E requests that the Commission review these projects expeditiously and approve them in a timely manner.[159]

SDG&E has positioned its solicitation for the projects to take advantage of timely Commission action. As indicated in SDG&E's direct testimony (Ex. SDGE-02 (Johnston) 26:5), SDG&E commenced the solicitation process prior to filing this application. To achieve the 2019

[159] In this regard, note that AB 2868 directs the Commission to "approve, or modify and approve" [*id*., § 2838.2(c)(1)] such applications "within 12 months of the date of filing of the completed application." *Id*., § 2838.2(d).

proposed operation dates for the Boulevard, Kearny and Melrose projects, SDG&E issued a request for information ("RFI") on February 12, 2018, and a subsequent RFP on April 6, 2018.[160] The RFP was an independently-evaluated (PA Consulting) process with wide participation from the energy storage industry. SDG&E has selected and has begun discussions with respondent(s) for the Boulevard, Kearny, and Melrose projects. Agreements for these circuit-level projects should be completed by Commission approval of this application.[161] SDG&E plans to launch a similar RFI/RFP process in October 2018 for the proposed 2020 projects (Clairemont, Elliot, Paradise, and Santee).

IV. THE EXPANDED CARE PILOT SATISFIES AB 2868 GOALS

A. Overview - energy storage incentive for Expanded CARE pilot (Ex. SDGE-07 (Bandy) 1:7-3:13)

SDG&E proposes a $2 million, three-year pilot program designed to provide incentives for the purchase, installation and ongoing maintenance of up to 2 MW of energy storage to Expanded CARE facilities. One of the primary purposes of the program is to permanently shift load during peak periods. As outlined in a report by Clean Energy Group, California Housing Partnership, and the Center for Sustainable Energy,[162] additional incentives for storage are needed, and without them low-income customers will not be able to obtain energy storage and

[160] The RFI and RFP processes are discussed at Ex. SDGE-02 (Johnston) 25:7-26:4.

[161] The solicitation documents acknowledged that the process is subject to the Commission's approval of SDG&E's application and costs caps, as will any subsequent agreements.

[162] Clean Energy Group, *et al.*, *Closing the California Clean Energy Divide: Reducing Electric Bills in Affordable Rental Housing with Solar + Storage* (May 2016). Available at https://www.cleanegroup.org/wp-content/uploads/Closing-the-California-Clean-Energy-Divide.pdf

the benefits of resiliency, despite efforts to reserve funds for their use in programs such as the SGIP.[163]

Expanded CARE facilities include transitional housing (drug rehabilitation, half-way houses), short or long-term care facilities (hospice, nursing homes, children's and seniors' homes), group homes for physically or mentally disabled persons, or other nonprofit group living facilities. SDG&E's proposed pilot is designed to serve participants of the California Solar Initiative, MASH program[164] and SOMAH program.[165] SDG&E's proposed incentive would accelerate energy storage deployment at these Expanded CARE facilities. SDG&E requests Commission approval of a $2 million budget with a $75,000 per project cap for up to 2 MW.

The following summarizes SDG&E's proposed pilot program:

1. An incentive of $1.20/Watt hour to accelerate energy storage deployment at Expanded CARE facilities. The incentive will be capped at $75,000 or eligible costs consistent with SGIP (whichever is less) per facility to address the up-front costs of installation labor as well as the ongoing maintenance of the energy storage system for 10 years;

---

[163] SGIP offers incentives in a multi-step process to support existing, new, and emerging distributed energy resources. The incentives are geared for behind-the-meter and limited to qualifying technologies such as: wind turbines, waste heat to power technologies, pressure reduction turbines, internal combustion engines, microturbines, gas turbines, fuel cells, and advanced energy storage systems.

[164] The MASH program (http://www.cpuc.ca.gov/general.aspx?id=3752) is an incentive for solar distributed generation designed for qualifying affordable housing, as defined in P.U. Code § 2852. The MASH incentive was designed to cover a substantial amount of the costs of installing solar. D.08-10-036 and D.15-01-027 implemented the statutory program criteria and funding. The MASH program is now closed to new participants. D.17-12-022 established SOMAH as a successor program.

[165] The SOMAH program is a solar distributed generation project incentive for multi-family affordable housing sites designed to ensure benefits from solar generation, especially bill credits, are received by tenants. SOMAH was established by AB 693 and implemented by D.17-12-022. SOMAH is funded with GHG allowances from the investor-Owned Utilities ("IOUs"). SOMAH is a successor program to MASH with different funding sources, rules and eligibility.

2. A $2 million budget for the three-year pilot program for up to 2 MW. Under this budget, approximately 24 Expanded CARE facilities could participate; and

3. SDG&E anticipates issuing a solicitation to identify a third-party implementer to administer a turnkey solution for this pilot program.

B. Eligible Participants (Ex. SDGE-07 (Bandy) 3:14-6:5)

SDG&E's proposed pilot is designed to provide incentives for energy storage to Expanded CARE facilities, who purchase energy storage to permanently shift load during system peak periods.[166,167] As of the submittal of direct testimony, there were 683 Expanded CARE accounts in SDG&E's service area consisting of more than 100 unique customers. Of the 683 accounts, 14 are in Orange County and 669 are in San Diego County; 285 are in the inland and mountain climate zones; and more than 80 are in disadvantaged communities as defined by CalEnviroScreen's 25% most affected census tracts statewide.[168]

Some of the fire-prone areas in San Diego County such as Campo, Fallbrook, Warner Springs and Julian have Expanded CARE facilities that would be eligible for the pilot program.

The eligible Expanded CARE facilities are not homogenous and are served under various rates depending on their classification. These facilities are classified as both residential and/or commercial and hence, some may or may not have demand charges, grandfathered peak periods and other intricacies associated with their accounts. Evaluating potential eligible participants

---

[166] *See* D.17-12-022 at 21 (original emphasis): "To ensure that the SOMAH Program is consistent with our overall NEM policies, we continue the mandatory TOU requirement for *common area accounts* participating in the SOMAH Program to encourage property owners to participate in additional energy efficiency, demand response, and other energy management activities."

[167] Pairing with SOMAH is not required, but taking service under a TOU rate will be required for common areas consistent with the SOMAH requirements, regardless of participation in SOMAH.

[168] Two maps showing the location of these facilities are at Ex. SDGE-07 (Bandy) 4:1-5:2, Figure 1 - Expanded CARE within Disadvantaged Communities, and Figure 2 - Expanded CARE Accounts in SDG&E Service Area.

must include identifying those who would most benefit from the pilot. Of the 683 accounts, 100 accounts are already taking service on a NEM rate and would also be eligible to participate.

The usage profile for the Expanded CARE facilities varies, depending on the type of services they offer to low-income customers in addition to housing. As of the submittal of direct testimony, average monthly kW and monthly kWh for the eligible facilities were 11.7 kW and 2,928 kWh, respectively. The optimal size for storage for each customer will depend on peak usage, existence of demand charges, and rates applied.

C. Eligibility Criteria (Ex. SDGE-07 (Bandy) 6:6-14)

To be eligible for the pilot program, SDG&E proposes the following criteria to minimize the burden on ratepayers and ensure that funds are maximized:

- ✓ Must be able to pair energy storage with an existing or new solar system;
- ✓ For new solar installations, must be a participant in MASH or SOMAH,[169] which requires: an energy efficiency audit, tenant notifications regarding the Energy Savings Assistance Program ("ESA"),[170] allocation of bill credits to tenants, and adherence to the low-income rental definition in P.U. Code § 2852; and
- ✓ Must take service under TOU rate for common areas.

D. Program Budget (Ex. SDGE-07 (Bandy) 6:15-9:5)

SDG&E proposes a budget of $2 million for the pilot program to be spent over a 3-year period. There are total of 683 eligible accounts. For purposes of the pilot program, SDG&E intends to target approximately 24 accounts, which is roughly 4% of the eligible accounts in

[169] Existing installations do not require participation in MASH or SOMAH.

[170] The ESA Program provides no-cost weatherization and energy efficiency upgrades to reduce bills and improve health, comfort and safety for eligible customers who meet the same criteria as the CARE program. *See* http://www.cpuc.ca.gov/esap/

SDG&E's service territory, to identify best practices, current costs, calibrate incentives and scaling, and to determine whether expanding the pilot program is a viable option for Expanded CARE facilities. It is anticipated that costs for storage will continue to decline as production of energy storage expands, resulting in lower costs and the ability to serve more customers.

SDG&E proposes a $1.20/Watt hour incentive to cover the full cost of energy storage for Expanded CARE facilities.[171] The costs used to calculate the proposed incentive along with other key assumptions were obtained from the report *Closing the California Clean Energy Divide: Reducing Electric Bills in Affordable Rental Housing with Solar + Storage*.[172]

SDG&E's proposed incentive assumes that SGIP funds will not be available to its pilot program participants, as stated in Section 3.2.6 of the SGIP Statewide Handbook:[173]

> For other incentives funded 100% by Investor-Owned Utility (IOU) ratepayers, the total SGIP incentive will be reduced by the full amount of the other incentive.[174]

The distribution between incentive and non-incentive budget for the pilot program is proposed at 87.2% and 12.8% respectively, leaving $1,745,000 for incentives and $255,000 for administration, marketing and workforce education and training. The proposed administration cap of 10% of the budget is consistent with the administrative cap used in other proceedings such

---

[171] This incentive will be in addition to the ITC. The ITC is a 30% tax credit via the United States Internal Revenue Service for solar, battery storage, fuel cells and wind. *See* https://energy.gov/savings/business-energy-investment-tax-credit-itc

[172] *See* p. 80, n. 162, *supra*.

[173] Center for Sustainable Energy, *et al*., *Self-Generation Incentive Program Handbook* (December 18, 2017) at 30. Available at https://www.selfgenca.com/home/resources/

[174] This section of the Commission-approved handbook is affirmed by D.04-12-045, section 3.3 at 10-11. SDG&E sought clarification regarding this rule from the SGIP working group, which verified that the pilot program participants would likely be subject to this handbook provision, and that SDG&E would not be able to leverage SGIP incentives for the pilot. As a result, SDG&E's proposed incentive assumes the absence of SGIP funding.

as energy efficiency.[175] The costs for marketing and workforce education and training are under 3% of the project costs. Table MB-1 summarizes the budget inputs and assumptions:

Table MB – 1 - Expanded CARE Energy Storage Pilot
(Ex. SDGE-07 (Bandy) 8:9-10)

Estimated Expanded CARE Energy Storage Pilot Budget			
Estimated Total Budget		**$ 2,000,000**	**3 years**
Incentive Budget		**$ 1,745,000**	**87.2% of Budget**
Non Incentive Budget		**$ 255,000**	**12.8% of Budget**
Administration		*$ 200,000*	*10% of Budget*
Marketing		*$ 25,000*	*1.3% of Budget*
Workforce Education & Training		*$ 30,000*	*1.5% of Budget*
Incentive (Up to)	$	1.20	/Wh
Avg Storage Capacity/Project		30	kW
SDG&E Incentive Cap	$	75,000[176]	/project
Estimated Proposed # of Installations		24	Installations

SDG&E proposes to recover the costs for the pilot through SDG&E's PPP rate component. Since PPP funds are designed for programs that meet low-income objectives among other objectives,[177] SDG&E believes recovery of the costs for the pilot program should be through the PPP rate component. The authorized revenues and costs associated with the pilot program will be recorded in a balancing account as described in Ex. SDGE-09 (Jasso). The rate recovery for the pilot program is described in Ex. SDGE-10 (Gill). The term of the recovery is

[175] D.09-09-047 established a 10% cap for IOU administration activities in energy efficiency.

[176] Not to exceed SGIP eligible costs or $75,000, whichever is less.

[177] *See* P.U. Code § 381, 382(e) and (f).

2019 – 2021. Should a decision on this proceeding be delayed, modifications to the recovery period would be necessary.

E. Administration, Marketing & Workforce Education & Training (Ex. SDGE-07 (Bandy) 9:6-10:17)

SDG&E proposes to allocate 12.8% of budgeted funds towards administration, marketing and workforce education and training to support the pilot program. As outlined in the budget section, the estimated budget for the three categories are as follows:

Estimated Non-Incentive Budget[178]	**$**	**255,000**	**12.8% of Budget**
Administration	*$*	*200,000*	*10% of Budget*
Marketing	*$*	*25,000*	*1.3% of Budget*
Workforce Education & Training	*$*	*30,000*	*1.5% of Budget*

Marketing will focus on the eligible customers (683 accounts) and will be conducted by SDG&E's Marketing & Communications team, in collaboration with the selected provider, to maximize efficiency. Marketing efforts will likely include email, flyers and direct outreach. Workforce education and training can be administered by SDG&E, outsourced, or by a combination. The goal for workforce education and training is to develop an energy storage training module for the pilot program. SDG&E intends to provide 1-2 classroom trainings to the community within and surrounding the Expanded CARE facility sites in the first year and to leverage local partners in this process. Additionally, SDG&E plans to integrate the training with existing SOMAH training to maximize efficiency.

SDG&E anticipates issuing a solicitation to identify a third-party implementer to administer the pilot program as a turnkey solution. The desired third-party implementer will

[178] Breakout values between administration, marketing and workforce, education and training are estimates and may need to be modified in the future.

possess experience with energy storage installations in the residential sector and preferably have experience working with multifamily and/or nonprofits. SDG&E will work with the third-party implementer to develop processes and procedures, outreach and marketing efforts, coordinate workforce education and training, identify data collection protocols, and conduct reporting and reviews of applications. Furthermore, SDG&E will also ensure that the SDG&E Single Point of Contact for multifamily sites provides any and all other available resources and additional benefits to the customer. The desired third-party implementer will also focus on pairing energy storage installations with solar and simplifying the process for customers. Potential third-party implementers may propose a turnkey solution that includes revenue streams as long as they adhere to the following criteria:

- Bill savings are passed on to tenants and landlords; and
- Changes do not impact or require modifications to SDG&E's billing system.

It is anticipated that seven to eleven months will be needed to initiate the program after a final decision by the Commission. The proposed schedule is:

Milestones	Timeline
Issue Request for Abstracts (RFA)	1-2 Months After CPUC Approval
Issue Request for Proposals (RFP)	1-2 Months After RFA
Sign Contract with Third Party Implementer	3-4 Months After RFP
Initiate Program	2-3 Months After Contract Signature

F. SDG&E's proposed pilot aligns with AB 2868 criteria (Ex. SDGE-07 (Bandy) 11:1-12:16)

SDG&E's proposed pilot program supports AB 2868's goal to accelerate the widespread deployment of distributed energy storage systems[179] by providing capacity behind-the-meter[180] and prioritizing low-income customers.[181] The pilot program targets Expanded CARE facilities that serve multifamily, low-income customers. The pilot program provides financial incentives for these facilities to deploy energy storage on the customer's side of (*i.e.*, behind) the meter. The pilot program requires these facilities to have renewable solar generation installed at the site where the energy storage will be deployed. This eligibility criteria incentivizes the deployment of renewable energy generation combined with energy storage, which can provide the following benefits, depending on how the energy storage is managed:

- reducing GHG emissions by only charging the energy storage from behind-the-meter renewable generation (primarily solar), which reduces GHG emissions from generation elsewhere; and
- reducing dependence on petroleum and meeting air quality standards for multi-family facilities that might otherwise use diesel or petroleum-based backup generators.

---

[179] AB 2868, *codified at* P.U. Code § 2838.2(b) states, in part: "The commission, in consultation with the State Air Resources Board and the Energy Commission, shall direct the state's three largest electrical corporations 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."

[180] P.U. Code § 2838.2(c)(2): "No more than 25 percent of the capacity of distributed energy storage systems approved for programs and investments pursuant to this section shall be provided by behind-the-meter systems."

[181] P.U. Code § 2838.2 (d)(2): "The commission shall prioritize those programs and investments that provide distributed energy storage systems to public sector and low-income customers."

SDG&E's pilot for AB 2868 is also consistent with California Solar Energy Industries Association's written comments provided during the AB 2868 workshops,[182] including the following:

> One of the goals of AB 2868 implementation should be to provide funding for storage projects in coordination with AB 693 solar projects. AB 693 projects will seek out multi-family low-income projects and providing for storage simultaneously would be an efficient use of ratepayer funds.[183]

SDG&E's pilot proposal also addresses the economic barriers for energy storage adoption and prioritizes reducing peak loads for low-income customers during peak periods which in turn reduces costs. The pilot program is designed to complement and serve participants of the California Solar Initiative MASH, and SOMAH Programs. Pairing the pilot incentives with SOMAH will ensure that bill credits are accrued primarily to tenants in affordable housing, subsequently reducing the CARE subsidy funded by other ratepayers. Allowing MASH customer participation will ensure that solar energy produced by their solar installations offsets customer costs during peak periods. The leveraging of these programs, along with the SDG&E incentive, focus on alleviating pressure on the grid during peak periods and decreasing customer energy costs.

---

[182] *See* D.17-04-039, ordering paragraphs 2 and 3 at 67 (ordering the three investor owned utilities to: "… host a minimum of two workshops by the end of 2017 for the parties to discuss and develop consistent definitions of terms, proposals for how to evaluate projects against the statutory criteria, and their plans for incorporating distributed energy storage systems into their 2018 energy storage procurement and investment plans" and to "host a preview session of their 2018 applications in December 2017 to describe their 2018 procurement and investment plan for distributed energy storage systems, with specific emphasis on how feedback from the workshops was incorporated."

[183] California Solar Energy Industries Association, *Comments on the September 14, 2017 AB 2868 Implementation Workshop* (October 2, 2017) at 4, section II, Low-Income Customers.

G. **Workshop process and stakeholder feedback** (Ex. SDGE-07 (Bandy) 12:17-13:11)

SDG&E participated in three workshops that allowed for industry and stakeholder input and feedback regarding potential areas of focus for AB 2868 investment and programs. The workshops and comments from stakeholders helped develop consistent definition of terms, proposals for how to evaluate the projects against the statutory criteria, and plans for incorporating the proposed programs and investments for distributed energy storage systems in SDG&E's energy storage and investment plans. Feedback pertinent to the proposed pilot as highlighted in the preview session included:

- Maximizing ratepayer benefits is the most important statutory factor;
- The roll-out of Energy Storage is critical to support California's GHG reduction goals;
- Low-income multi-family dwellings are hard to reach for energy storage; and
- Further support for low-income is suitable for utilities to offer.

SDG&E believes it has incorporated this feedback into the proposed pilot program proposal.

With its $2 million Energy Storage for the Expanded CARE pilot program, SDG&E looks to close the gap for low-income customers looking to attain resiliency and to reduce energy costs by pairing energy storage and solar. The $1.20/Watt hour incentive makes energy storage viable for low-income, Expanded CARE facilities. Although SDG&E's pilot program proposal is modest in terms of MW subscription (up to 2 MW), it intends to provide unique test cases and a model for expansion of this pilot at Expanded CARE sites that help seniors, homeless and other customers in need.

V. THE REVENUE REQUIREMENT, ACCOUNTING TREATMENT AND COST RECOVERY MECHANISMS ARE REASONABLE

A. **Revenue requirement** (Ex. SDGE-08 (Woodruff/Vanderhye) 1:1-3:13)

This section addresses the revenue requirement resulting from seven energy storage projects ("proposed projects") and the capital and O&M spend. The total revenue requirement for the proposed projects is $284.6 million, over the period 2018 to 2068.

The revenue requirement associated with the proposed projects is based on the forecasted capital and O&M costs described in Ex. SDGE-05 (Prsha). Table 1 below summarizes the direct costs (including contingency) of the projects.

Table 1: Direct Costs
(In Millions of Dollars, Nominal)

	2018	2019	2020	2021	Total
Kearny	$ -				
Melrose	$ -				
Clairemont	$ -				
Paradise	$ -				
Elliott	$ -				
Boulevard	$ -				
Santee	$ -				
TOTAL	$ -				

The methodology to determine a revenue requirement involves several steps and considerations. First, the incremental capital and O&M costs are adjusted to include overhead allocations, consistent with their classification as company labor, contract labor, or purchased services and materials. Overhead allocations are those activities and services that are associated with direct costs, such as payroll taxes and pension and benefits, or costs that cannot be economically direct-charged, such as administrative and general overheads. The overhead allocations adhere to the methodology established by the Federal Energy Regulatory Commission, and were derived using the same methodology used in SDG&E's most recent

General Rate Case filing.[184] SDG&E used December 2017 internal overhead planning rates for illustrative purposes in this Application; however, actual overhead rates will be applied in the determination of actual revenue requirement, and only overheads that are incremental to the proposed projects will be included.

Next, the variable O&M costs are escalated for inflation. SDG&E applied the indices published in IHS Global Insight's 3rd Quarter 2017 Utility Cost Forecast for this Application. Table 2 below summarizes the fully loaded and escalated costs of the proposed projects.

Table 2: Fully Loaded and Escalated Costs Summary
(In Millions of Dollars, Nominal)

	2018	2019	2020	2021	Total
Kearny	$ -				
Melrose	$ -				
Clairemont	$ -				
Paradise	$ -				
Elliott	$ -				
Boulevard	$ -				
Santee	$ -				
TOTAL	$ -				$ 155,594,124

The revenue requirement calculation assumes all capital costs, including Allowance for Funds Used During Construction ("AFUDC"), are recovered through depreciation over the book-life of the assets. In addition to the fully loaded and escalated costs shown in Table 2, this revenue requirement captures all capital-related costs-such as the authorized return on investment, taxes, and franchise fees and uncollectibles needed to support the investment for its useful life. The revenue requirement calculation uses the current authorized rate of return of 7.55%. Table 3 below summarizes the forecasted revenue requirement for costs for SDG&E to complete the proposed projects.

[184] A.17-10-007/008 (consolidated).

Table 3: Forecasted Revenue Requirement Summary
(In Millions of Dollars, Nominal)

	2018	2019	2020	2021 - 2068	Total
Kearny	$ -	$ 569,430	$ 9,120,891	$ 68,520,445	**$ 78,210,766**
Melrose	$ -	$ 381,013	$ 6,129,544	$ 46,713,272	**$ 53,223,829**
Boulevard	$ -	$ 219,871	$ 3,430,979	$ 24,519,060	**$ 28,169,909**
Clairemont	$ -	$ -	$ 218,808	$ 28,626,429	**$ 28,845,237**
Paradise	$ -	$ -	$ 244,507	$ 35,037,076	**$ 35,281,583**
Elliott	$ -	$ -	$ 223,011	$ 29,456,077	**$ 29,679,088**
Santee	$ -	$ -	$ 227,229	$ 31,006,745	**$ 31,233,974**
TOTAL	**$ -**	**$ 1,170,314**	**$ 19,594,969**	**$ 263,879,104**	**$ 284,644,388**

SDG&E will determine the actual capital and O&M costs of the proposed projects as they are completed, and will calculate the actual revenue requirements associated with those costs for recovery in rates. Further details of the regulatory accounting treatment of the actual revenue requirements are discussed in Ex. SDGE-09 (Jasso).

SDG&E uses the forecasted revenue requirement for purposes of illustrating the potential rate impact as a result of the proposed projects. The details of the illustrated rate impacts are discussed in Ex. SDGE-10 (Gill).

B. Regulatory accounting mechanism (Ex. SDGE-09 (Jasso) 1:1-3:11)

This section explains the regulatory account mechanism related to the AB 2868 investments and pilot program in SDG&E's 2018 Energy Storage Procurement and Investment Plan application. As discussed above, the investments will focus on utility-owned circuit-level and service-level energy storage microgrid projects that may provide multiple services, including resiliency, using microgrid designs to public sector customers. This application proposes seven circuit-level energy storage microgrid projects totaling 100 MW. SDG&E expects to propose

future circuit-level and service-level energy storage microgrid projects to meet the remaining AB 2868 capacity.[185]

SDG&E also proposes an Energy Storage Incentive for the pilot program that will focus on behind-the-meter opportunities to incentivize Expanded CARE facilities that serve low-income customers, as described in Ex. SDGE-07 (Bandy).

SDG&E proposes to record revenue and costs associated with the AB 2868 investments and pilot in two separate balancing accounts. Details of the revenue requirement associated with the proposed seven circuit-level energy storage microgrid projects are presented in Ex. SDGE-08 (Woodruff/Vanderhye). Details of the revenue requirement associated with the pilot are presented in Ex. SDGE-07 (Bandy) 8:3-9:10.

SDG&E requests authority to establish a two-way balancing account for the seven circuit-level energy storage microgrid projects proposed in this application as well as yet-to-be proposed circuit-level and service-level energy storage microgrid projects, and a one-way balancing account for the pilot.

1. Circuit-level and service-level energy storage microgrid projects

SDG&E requests authorization to recover utility-owned circuit-level and service-level energy storage microgrid project investments, corresponding O&M and capital-related costs in a two-way balancing account. The DESBA will track the difference between the authorized revenue requirement associated with the energy storage units and actual costs: O&M and capital-related costs (*i.e.*, depreciation, taxes and return), as well as revenues received from the operation of the resources in the wholesale energy markets.

[185] *See* Ex. SDGE-02 (Johnston) 11:11-15, 27:16-21.

SDG&E proposes to return to ratepayers on an annual basis, the revenues received from wholesale markets. This will be accomplished through the annual regulatory account update filing, which is scheduled to be submitted as a Tier 2 advice letter in October of each year. In this Tier 2 advice letter, SDG&E presents the forecasted year-end balances of certain regulatory accounts for amortization in rates effective January 1 of the following year. In this case, SDG&E would only present the amount to be returned to ratepayers.

Further, SDG&E proposes to stop recording the authorized revenue and costs of the energy storage units in the DESBA once the assets are rolled into rate base in a future General Rate Case, currently estimated to be Test Year 2025.

2. **Expanded CARE pilot program**

SDG&E proposes to establish the Energy Storage Incentive Balancing Account ("ESIBA") as a one-way balancing account to record the authorized revenue and costs associated with the pilot program described in Ex. SDGE-07 (Bandy) 8:3-9:10.

During the pilot program period (estimated to be 2019-2021, subject to timing of this application's approval) the balance in the ESIBA will be carried forward to the following year. Upon completion of the pilot program, SDG&E will address the balance of the account in its Electric PPP rates filing, only if the balance in the account is an overcollection. However, if the balance is undercollected, SDG&E will not request recovery. The annual PPP filing is scheduled to be submitted as a Tier 2 advice letter on October 1 of each year to revise its electric PPP rates effective January 1 of the following year.

C. Recovery of costs through distribution rates is reasonable

1. **The proposed rate recovery and rate impact** (Ex. SDGE-10 (Gill) 1:4-3:13)

As described below, SDG&E proposes to recover the costs[186] of implementing the utility-owned energy storage microgrid projects through Distribution rates[187] and the pilot program through PPP[188] rates.

Table KG-2 presents the illustrative class average electric rate impacts for 2020 through 2023 of the proposed revenue requirements as presented in Ex. SDGE-08 (Woodruff/Vanderhye), *passim* (for the energy storage microgrid projects), and Ex. SDGE-07 (Bandy) 8:3-9:10 (for the pilot program) compared to SDG&E's current[189] rates at the time of filing. In addition, the revenue requirements presented in Ex. SDGE-08 (Woodruff/Vanderhye) and Ex. SDGE-07 (Bandy) reflect revenue requirements beginning in 2019. SDG&E proposes to combine the 2019 and 2020 revenue requirement and recover the 2019 revenue requirement in 2020 to coincide with SDG&E's rate change occurring on January 1, 2020.[190] The amount SDG&E proposes to recover in rates in 2020 is based on the revenue requirements presented in Ex. SDGE-08 (Woodruff/Vanderhye) and Ex. SDGE-07 (Bandy). Table KG-1 the amounts to be

---

[186] Costs include (but are not limited to) distributed energy storage resources, labor and installation, electrical infrastructure, and staff necessary for equipment, maintenance, incentives and administrative support. *See* Ex. SDGE-05 (Prsha) and SDGE-07 (Bandy) for a detailed description of the costs.

[187] The Distribution rate recovery component is described in Ex. SDGE-01 (Reguly) 14:21-24; Ex. SDGE-11 (Reguly) 21:7-22:17.

[188] The PPP rate recovery components are described in Ex. SDGE-07 (Bandy) 8:11-9:5.

[189] Advice Letter 3167-E, approved April 30, 2018, effective January 1, 2018.

[190] Timing of implementation depends upon when approval issues.

collected through Distribution and PPP rates in 2020 based on the foregoing revenue requirements (without FF&U).[191]

Table KG-1: 2020 Revenue Requirement (without FF&U)

2020			
	Distribution	PPP	Total
Energy Storage Microgrid Projects	$ 20,765,284		$ 20,765,284
Pilot Program			
Incentive		$ 1,627,083	$ 1,627,083
Non-incentive			
Administrative		155,833	155,833
Marketing		25,000	25,000
Workforce, Education & Training		30,000	30,000
Total Pilot Program		$ 1,837,916	$ 1,837,916
Total Revenue Requirement	$ 20,765,284	$ 1,837,916	$ 22,603,200

The combined revenue requirement for both PPP and Distribution in 2020 is $22.603 million (without FF&U) or $23.446 million (with FF&U). SDG&E proposes to recover ongoing costs associated with this application in a future General Rate Case.

Table KG-2: Illustrative Class Average Electric Rates Impact

	Current 1/1/18 (¢/kWh)	2020 Proposed Rate (¢/kWh)	2020 Change from Current (¢/kWh)	2020 Change from Current (%)	2021 Proposed Rate (¢/kWh)	2021 Change from Current (¢/kWh)	2021 Change from Current (%)	2022 Proposed Rate (¢/kWh)	2022 Change from Current (¢/kWh)	2022 Change from Current (%)	2023 Proposed Rate (¢/kWh)	2023 Change from Current (¢/kWh)	2023 Change from Current (%)
Residential	27.561	27.714	0.153	0.56%	27.788	0.227	0.82%	27.779	0.218	0.79%	27.769	0.208	0.75%
Small Comm.	26.242	26.400	0.158	0.60%	26.478	0.236	0.90%	26.468	0.226	0.86%	26.457	0.215	0.82%
Med & Lg C&I	21.385	21.473	0.088	0.41%	21.510	0.125	0.58%	21.505	0.120	0.56%	21.499	0.114	0.53%
Agriculture	19.468	19.570	0.102	0.52%	19.615	0.147	0.76%	19.610	0.142	0.73%	19.603	0.135	0.69%
Lighting	21.635	21.808	0.173	0.80%	21.894	0.259	1.20%	21.883	0.248	1.15%	21.871	0.236	1.09%
System Total	23.997	24.116	0.119	0.50%	24.170	0.173	0.72%	24.163	0.166	0.69%	24.155	0.158	0.66%

[191] FF&U is Franchise Fees and Uncollectibles.

The illustrative 2020 annual bill impact based on the revenue requirements[192] is an increase of approximately $8.99 for a typical residential customer using 500 kWh per month in both the Inland and Coastal climate zones, compared to current rates. On a percentage basis, this equals an illustrative annual bill increase of 0.5%. The illustrative annual 2023 bill impact based on the revenue requirements[193] is an increase of approximately $12.19 for a typical residential customer using 500 kWh per month in both the Inland and Coastal climate zones, compared to current rates. On a percentage basis, this equals an illustrative annual increase of 0.7%.

2. **SDG&E's proposed cost recovery approach is reasonable** (Ex. SDGE-11 (Reguly) 21:8-22:17)

AReM, DACC and five C object,[194] stating that by SDG&E seeking to recover all costs through distribution rates, SDG&E's "cost allocation proposals for their multi-use energy storage projects deviate from the Commission's direction to adopt either the usage-based mechanism or another alternative with costs recovered through both generation *and* distribution rates."[195] This conclusion is wrong.

AB 2868 requires an electric corporation's proposed energy storage programs and investments to contain a "reasonable mechanism for cost recovery."[196] AB 2868 further states that "… the commission, in authorizing an electric corporation to recover the costs of approved

---

192 *See* Ex. SDGE-08 (Woodruff/Vanderhye) *passim,* and Ex. SDGE-07 (Bandy) 8:3-9:10, for further details regarding the revenue requirements.

193 *Id*.

194 This testimony was a joint effort by AReM, DACC, and the five CCAs that are parties to this proceeding: MCE, the California Choice Energy Authority, Peninsula Clean Energy, Silicon Valley Clean Energy, and Sonoma Clean Power. This testimony will be cited as "AReM."

195 AReM (Mara) 8:6-10 (original emphasis).

196 P.U. Code § 2838.2(c)(1).

energy storage programs and investments from all customers … shall ensure that the costs for the programs and investments are recovered in proportion to the benefits received, consistent with Section 451."[197] SDG&E believes a "reasonable mechanism for cost recovery" is that the proposed energy storage projects should be recovered in distribution rates, like other SDG&E distribution system assets, because these projects will augment SDG&E's distribution system, and their primary purpose and function is to provide distribution resiliency to distribution circuits. Nothing in the intervenors testimony suggests otherwise.

Further, AReM fails to recognize the approach SDG&E outlines in its direct testimony. Specifically, they ignore how a new balancing account will be established to capture the CAISO market costs and market revenues associated with operation of the proposed projects, and will use the net of those market costs and market revenues to offset the fixed costs of the project. Any remaining costs will be collected from all ratepayers (bundled and unbundled) as is the case for all distribution assets.[198] In addition, any RA capacity credits will be shared among the other load serving entities in SDG&E's service territory by share of coincident peak, adjusted monthly.[199] In short, RA capacity credits, CAISO costs and revenues and resiliency benefits will be shared among bundled and unbundled customers alike.

---

[197] P.U. Code § 2838.3. P.U. Code § 451 requires "[a]ll charges demanded or received by any public utility … for any product or commodity furnished or to be furnished or any service rendered or to be rendered shall be just and reasonable."

[198] Ex. SDGE-09 (Jasso) 2:11-18. It is possible that instead of a remaining cost, there would be a remaining surplus. In this case all customers (both bundled and unbundled) would receive a credit.

[199] SDGE-06 (Bierman) 7:7-13.

3. **A usage-based approach would lead to bundled customers subsidizing unbundled customers** (Ex. SDGE-11 (Reguly) 23:1-24:19)

AReM proposes a usage-based cost allocation policy for multi-use storage, such that project costs would be allocated between generation and non-generation rate components based on the time the project is operating in the market versus performing other functions.[200] Such an approach as applied to SDG&E's proposed circuit-level energy storage microgrid projects would have the effect of project costs being split between generation rates (bundled customers) and distribution rates (bundled and unbundled customers) depending on the amount of time SDG&E's proposed multi-use circuit-level energy storage microgrid projects are performing a market function, versus providing distribution resiliency in the form of microgrids. Such an approach is without merit, unreasonable and would have bundled customers subsidizing unbundled customers.

SDG&E's proposed circuit-level energy storage projects will truly be multi-use. They will provide distribution resiliency microgrid services, wholesale market services, greater renewable integration, and reduce the amount of load that will be unserved in the event of a wide-spread system outage (such as occurred on September 8, 2011). While SDG&E cannot forecast the percentage of time the proposed energy storage projects will be carrying out a particular function, assume for a moment that SDG&E's proposed circuit-level energy storage projects will provide distribution resiliency microgrid services 10% of the time, and will provide wholesale market services the remaining time (90%). Under AReM's usage-based approach, unbundled and bundled customers would be responsible via distribution rates for 10% of the project costs (for the time the energy storage was providing distribution resiliency microgrid

[200] AReM (Mara) 10:27-11:1-6.

services), while bundled customers alone would be responsible for 90% of the project costs (for the time the energy storage was providing wholesale market services).

Such an approach is akin to having bundled customers paying the ongoing insurance premium for distribution resiliency, while limiting unbundled customers to only paying a portion of the deductible to cover a grid disturbance when distribution resiliency is required. SDG&E's proposed circuit-level energy storage microgrid projects will provide distribution resiliency to fire stations, police stations, and emergency operations centers. Both bundled and unbundled customers equally benefit from such facilities remaining operational despite potential grid disturbances. Therefore, it makes little sense to bifurcate costs in such a manner to create inequities between bundled and unbundled customers.

AReM also proposes to count a portion of the energy storage installed by the utilities for integrated resource planning (IRP), GHG emissions reduction, and disadvantaged community purposes (DAC).[201] What is not clear from AReM's proposed counting of energy storage installed by the utilities is whether such counting of energy storage for these purposes would be subject and proportional to AReM's proportional usage-based cost allocation. If AReM is inconsistent in their approach in payment of costs and the claiming of benefits, then this would be another instance in which bundled customers subsidize unbundled customers. Such an unbalanced outcome is avoided if SDG&E's proposed cost recovery mechanism is adopted.

4. **SBUA misunderstands Commission ratemaking** (Ex. SDGE-16 (Gill) 1:13-2:15)

SBUA complains about the effect of the proposed rated on the small business customer class. To summarize SBUA's position:

[201] AReM (Mara) 27:1-14.

- "…SDG&E – provided an analysis of the class rate effects of its proposals. That analysis forecasts that small businesses would pay more for the AB 2868 mandate than any other major rate class (excluding lighting), both in terms of the $/kWh rate change and the percentage change from current rates…"[202]
- "This allocation results in subsidies from smaller, less sophisticated parties (small business and residential) to larger, more sophisticated ones."[203]

Allocation factors are addressed in rate design proceedings, such as the General Rate Case ("GRC") Phase 2. SDG&E's current effective distribution cost allocation was approved in the utility's 2016 GRC Phase 2.[204] SDG&E is not proposing an update to the cost allocation for distribution revenue in this application. Small businesses are paying no more or less for the revenue requirements that are the subject of this application than they would for any other project put before the Commission for approval using the effective 2016 GRC distribution cost allocation. SBUA also asserts that "this allocation results in subsidies from smaller, less sophisticated parties (small business and residential) to larger, more sophisticated ones."[205] It appears that SBUA is characterizing this "subsidy" as a cost shift when no cost shift is occurring as a result of the cost allocation. Therefore, SBUA is raising an out-of-scope issue. Specifically, cost allocation was addressed in D.17-08-030, *Decision Adopting Revenue Allocation and Rate* Design for SDG&E in A.15-04-012 (Phase 2 of SDG&E's 2016 GRC), where SBUA was not a

[202] SBUA (Chernick) 10:18-21.

[203] *Id*. at 11:6-8.

[204] D.17-08-030 at 2, approved the Joint Motion to Adopt Revenue Allocation Settlement Agreement.

[205] SBUA (Chernick) 11:6-8.

party. Any remaining concerns about revenue allocations is most appropriately addressed in SDG&E's next GRC Phase 2 proceeding.

VI. CONCLUSION

Based on the showing in its testimony and this brief, SDG&E requests approval of the AB 2868 programs and investments presented in its application.

Respectfully submitted,

/s/ E. Gregory Barnes

E. Gregory Barnes
Attorney for
SAN DIEGO GAS & ELECTRIC COMPANY
8330 Century Park Court, 2nd Floor
San Diego, CA 92123
Telephone: (858) 654-1583
Facsimile: (619) 699-5027
Email: gbarnes@semprautilities.com

October 5, 2018