Application: A.18-02-___

Exhibit: SDGE

Witness: Stephen T Johnston

DIRECT TESTIMONY OF

STEPHEN T JOHNSTON

ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

FEBRUARY 28, 2018

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DIRECT TESTIMONY OF STEPHEN T JOHNSTON

I. INTRODUCTION

My direct testimony provides a framework for the investments and programs to accelerate widespread deployment of distributed energy storage systems by San Diego Gas & Electric Company ("SDG&E") as directed by California Assembly Bill ("AB") 2868 ("AB 2868").[1] Additionally, my testimony incorporates the topics[2] and feedback from the two workshops and program preview session hosted in 2017 in accordance with Decision ("D.") 17-04-039.[3]

This application intends to accelerate the widespread deployment of distributed energy storage systems through programs and investments that are aligned with AB 2868 goals, as described in the testimony of Ted Reguly.[4] Investments focus on utility-owned energy storage that may provide multiple services, including resiliency,[5] using microgrid[6] designs to public sector

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1 *As codified*, Cal. Pub. Util. Code ("P.U. Code") §§ 2835-2839.

2 Topics were listed in D.17-04-039,*Decision on Track 2 Energy Storage Issues* (May 8, 2017), section 4.2, at 21-22.

3 *Id.*, at 67, ordering paragraphs ("OP") 2 and 3. Workshops were held September 14 and October 17, 2017, the preview session on December 15, 2017.

4 Unless otherwise indicated, references to testimony herein are to the prepared direct testimony served in support of this application.

5 "In its simplest form, infrastructure resilience is the ability to reduce the magnitude and/or duration of disruptive events." Department of Homeland Security("DHS"), National Infrastructure Advisory Council, *A Framework for Establishing Critical Infrastructure Resilience Goals Final Report and Recommendations* (October 19, 2010) at 5. Available at https://www.dhs.gov/xlibrary/assets/niac/niac-a-framework-for-establishing-critical-infrastructure-resilience-goals-2010-10-19.pdf *See also*: DHS, National Infrastructure Advisory Council, *Critical Infrastructure Resilience Final Report and Recommendations* (September 8, 2009) at 8. Available at: https://www.dhs.gov/sites/default/files/publications/niac-critical-infrastructure-resilience-final-report-09-08-09-508.pdf

6 Applying the concept of resilience 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. Installed with additional hardware—including transfer switches, critical load panels, and appropriate controls—these systems can act as self-sufficient microgrids, generating energy and powering critical loads until utility services are restored." NREL,

customers, such as municipal critical facilities or public sector agencies. Energy storage deployed through these investments maximize ratepayer benefits by providing multiple services, as encouraged by multiple-use application policies[7] where possible. SDG&E will select investments that align with AB 2868 and meet California's greenhouse gas ("GHG") emissions reduction goals, by deploying the energy storage to participate in wholesale energy markets where possible, as well as provide resiliency service to critical public sector infrastructure. SDG&E also support low-income customers through a customer incentive pilot program. The program focuses on behind-the-meter opportunities to incentivize Expanded California Alternate Rates for Energy ("CARE")[8] facilities that serve low-income customers. In these ways, SDG&E maximizes ratepayer benefits, prioritizes public sector and low-income customers, and accelerates the deployment of distributed energy storage systems.

The following is a brief overview of SDG&E's Energy Storage Investment and Program Framework to meet AB 2868 ("AB 2868 Framework"):

1. SDG&E ownership and investment in both circuit- and service-level microgrid energy storage projects within the distribution grid, which provide multiple-use applications where possible, including microgrid islanding for selected critical public sector facilities;

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, OP 2 at 78.

[7] D.18-01-003, *Decision on Multiple-Use Application Issues* (January 1, 2018) at 24 (section 6, Application of Adopted Rules to 2018 Request for Offers), states, "For storage projects that are either owned or controlled entirely by the utility, we encourage the utility to maximize value to ratepayers by providing multiple services, consistent with the rules we adopt here."

[8] 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 (P.U. Code §739.1(c)(1)).

2. A project evaluation and weighting methodology based upon AB 2868 statutory criteria, which SDG&E utilized for evaluation and selection of the seven circuit-level energy storage projects proposed herein, and proposes to use for evaluation and selection of future AB 2868 energy storage investments;

3. 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

4. Program aimed at accelerating the deployment of distributed energy storage systems behind-the-meter, to be owned by third parties, including customers.

Pursuant to this AB 2868 Framework, SDG&E seeks approval of the cost caps to construct seven proposed circuit-level energy storage projects, described further in the testimony of Steven Prsha, which were evaluated and selected using the evaluation and weighting methodology described herein.

Additionally, pursuant to this AB 2868 Framework, SDG&E seeks approval of an Expanded CARE Pilot Program ("pilot program") that offers incentives to facilities that serve low-income customers to deploy energy storage behind-the-meter, as described further in the testimony of Mayda Bandy.

The expected benefits of these proposals are aligned with the goals of AB 2868, namely:

- Maximizing ratepayer benefits, including potential energy market revenues as described in this testimony and in the testimony of Evan M. Bierman;
- Reducing GHG emissions, as described in the testimony of Evan M. Bierman;
- Meeting air quality standards as described in this testimony;
- Reducing dependence on petroleum as described in this testimony;
- Minimizing overall costs, as described in this testimony and the testimony of Steven Prsha.

- Prioritizing programs and investments that provide distributed energy storage systems to public sector and low-income customers, as described in this testimony and the testimony of Ted Reguly, Steven Prsha and Mayda Bandy; and
- The proposed programs and investments do not unreasonably impair non-utility enterprises to market and deploy energy storage systems, as described in the testimony of Ted Reguly.

II. AB 2868 ENERGY STORAGE INVESTMENTS AND PROGRAM FRAMEWORK

To accelerate the widespread deployment of distributed energy storage systems, this application proposes an AB 2868 Framework for the energy storage investments and programs to meet AB 2868 goals. SDG&E's AB 2868 Framework includes microgrid use cases investments under which SDG&E proposes to deploy energy storage at various levels within the distribution grid, including: at the circuit-level, where the energy storage is interconnected at primary distribution voltages; and at the service-level, where the energy storage is interconnected at service-level voltages. Within this microgrid use case, the application proposes seven specific circuit-level projects. SDG&E intends to file a proposal to deploy service-level microgrid use case investments at a future time, as described below. SDG&E's AB 2868 Framework also includes a pilot program that offers incentives to Expanded CARE facilities, which serve low-income customers, for the purchase and installation of energy storage.

SDG&E's AB 2868 Framework accelerates deployments on both the utility side of the meter and on the customer side of the meter (also referred to as behind-the-meter). SDG&E's AB 2868 Framework supports utility ownership in the proposed circuit and service-level microgrid

investments and third-party or customer ownership in the proposed pilot program. SDG&E believes this range of ownership, interconnection levels, and placement on both sides of the meter meets the goal of widespread deployment of distributed energy storage systems. The following figure illustrates SDG&E's AB 2868 Framework concept:

Figure 1 – ILLUSTRATIVE DIAGRAM FOR AB 2868 ENERGY STORAGE INVESTMENT AND PROGRAM FRAMEWORK

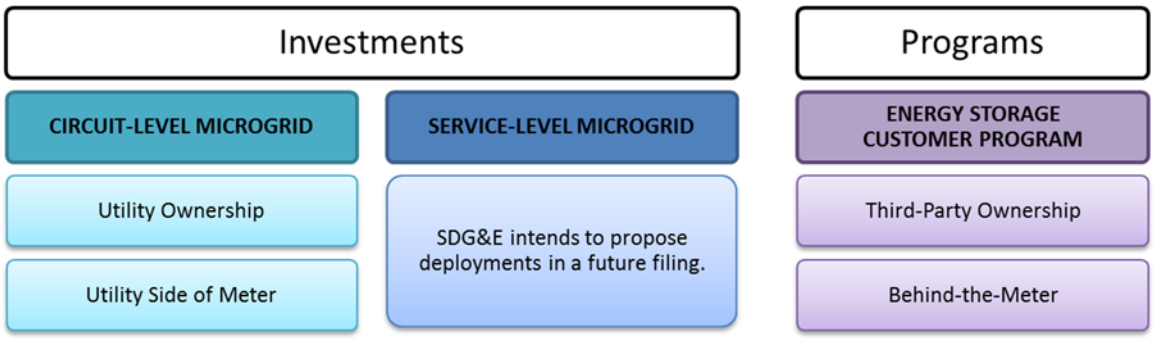

Figure 1: Illustrative framework for AB 2868.

A. AB 2868 Energy Storage Investments

To accelerate the widespread deployment of distributed energy storage systems, SDG&E proposes two main categories of investments: (1) circuit-level energy storage microgrid projects, and (2) service-level energy storage microgrid projects. The circuit-level investments will be owned by SDG&E. This application proposes seven (7) circuit-level energy storage microgrid projects for Commission approval, which are described in detail in the testimony of Steven Prsha. SDG&E also proposes to file future circuit and service-level energy storage microgrid projects via a Tier 3 Advice Letter in advance of its 2020 biennial energy storage procurement and investment plan, as described further below.

Both microgrid project categories provide resiliency services to critical and priority public sector customers in SDG&E's territory. A critical public sector facility is one that provides emergency, safety, or health services that benefit the general population. Examples of critical facilities include, but are not limited to; city or county emergency operation sites, state or federal emergency facilities, fire or police stations, border patrol stations, evacuation centers, and emergency or safety support services, that provide public services that benefit population in

SDG&E's territory. These facilities may be activated during local or widespread emergencies, which may include California wildfires.

1. Circuit-level microgrid category

The circuit-level energy storage microgrid projects are generally large energy storage systems interconnected at primary distribution voltages (nominally, 12 kV and 4 kV in SDG&E's service territory) and designed to serve multiple critical public-sector facilities on a circuit segment. Large systems may be between 1 MW to 10 MW each, but may be larger or smaller depending on the specific project needs. These investments will typically be on SDG&E land, such as substations, but might be sited elsewhere if suitable SDG&E land is not readily available. These projects will be deployed on the utility side of the meter and controlled by SDG&E.

A simplified diagram to illustrate the circuit-level microgrid is shown below.

Figure 2 – ILLUSTRATIVE EXAMPLE OF A CIRCUIT-LEVEL MICROGRID

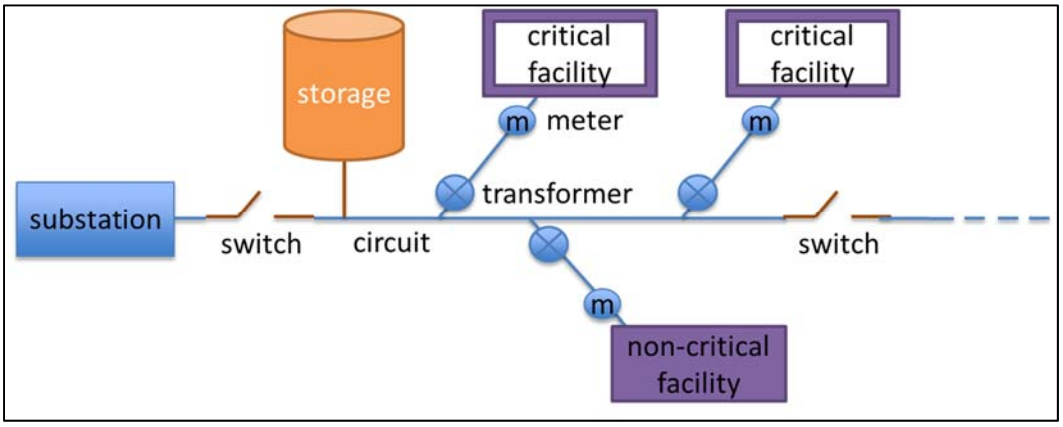

Figure 2: Illustrative example of a circuit-level microgrid

In the circuit-level microgrid diagram, the energy storage and switches (shown in orange) can isolate single or multiple critical facilities from the rest of the circuit. Other non-critical facilities may receive the microgrid benefit, depending on the circuit layout. When the switches are closed, the circuit operates normally and the storage can be used to support other grid applications. Actual microgrid designs may vary based on the circuit configuration.

One application of the circuit-level microgrid deployments is to provide resiliency services, or backup power, to critical public sector facilities when the microgrid is not connected to the grid (in island mode). This is achieved via the microgrid design which isolates a part of the circuit to serve one or more public sector facilities during an islanding event. This microgrid application addresses AB 2868's goal of reducing dependency on petroleum that might otherwise be used in backup power generators during the islanding event, if the energy storage was not present to provide back-up power. Additionally, the proposed microgrid application may reduce the GHG emissions associated with such fossil-fired backup power generators, in accordance with AB 2868.

Another application of energy storage in the circuit-level microgrid may be to provide distribution, wholesale energy market, and local resource adequacy ("RA") or local capacity reliability ("LCR") services when the microgrid energy storage is connected to the grid. This application addresses the goals in AB 2868 to reduce GHG emissions and to maximize ratepayer benefits. Energy storage used in energy markets may reduce GHG emissions, as described in the testimony of Evan M. Bierman. Energy storage used in energy markets may also produce additional financial benefits that maximize ratepayer benefits and minimize overall costs. The potential energy market revenues are described in the testimony of Evan Bierman, and the return to ratepayers of those revenues is described in the testimony of Norma G. Jasso.

This circuit-level microgrid proposal maximizes overall benefits while minimizing overall costs. Ratepayer benefits are maximized through multiple-use applications of the energy storage system where and when possible. Benefits may include:

(i) reducing the dependence on petroleum for critical public sector agencies by providing resiliency services from the circuit-level energy storage instead of using petroleum-

based (such as diesel) backup power generators that would otherwise be used during a grid outage affecting the public sector facilities;

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

(iii) enabling greater integration of renewables located on the circuit-level microgrid;

(iv) contributing to SDG&E's LCR requirement, and may be used for local resource adequacy fulfillment;

(v) providing wholesale market services when connected to the grid;

(vi) providing distribution services when connected to the grid; and

(vii) reducing the incidence and volume of bulk system load shedding in the case of inadequate generation.

Circuit-level microgrid deployments are intended to minimize overall costs, as specified in AB 2868, by:

- serving multiple critical facilities using a single energy storage resource;
- meeting local resource capacity or LCR requirements where possible, avoiding additional costs that would otherwise be incurred; and
- by using existing SDG&E-owned land where possible. Where existing land is not available, SDG&E intends to obtain suitable land at minimal cost.

Circuit-level microgrid investments prioritize public sector and low-income customers in the following ways. First, all customer sites identified for the circuit-level microgrid deployment are public sector facilities. Other customers may also be served by a circuit-level microgrid project depending on the circuit layout, but the priority for evaluation purposes is to serve the prioritized

public sector sites. Second, facilities located in low-income communities are prioritized in the evaluation process as explained further below in this testimony.

The Distributed Energy Resource Management System ("DERMS") provides SDG&E a software control platform to operate a fleet of energy storage and microgrid assets remotely. SDG&E intends to use the DERMS platform for the circuit-level energy storage and microgrids deployed for AB 2868, in addition to dispatch controls required to participate in wholesale energy markets operated by the California Independent System Operator ("CAISO"). The use of DERMS is further described in the testimony of Steven Prsha.

2. Service-level microgrid category

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 may 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.

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

Figure 3 – ILLUSTRATIVE EXAMPLE OF A SERVICE-LEVEL MICROGRID

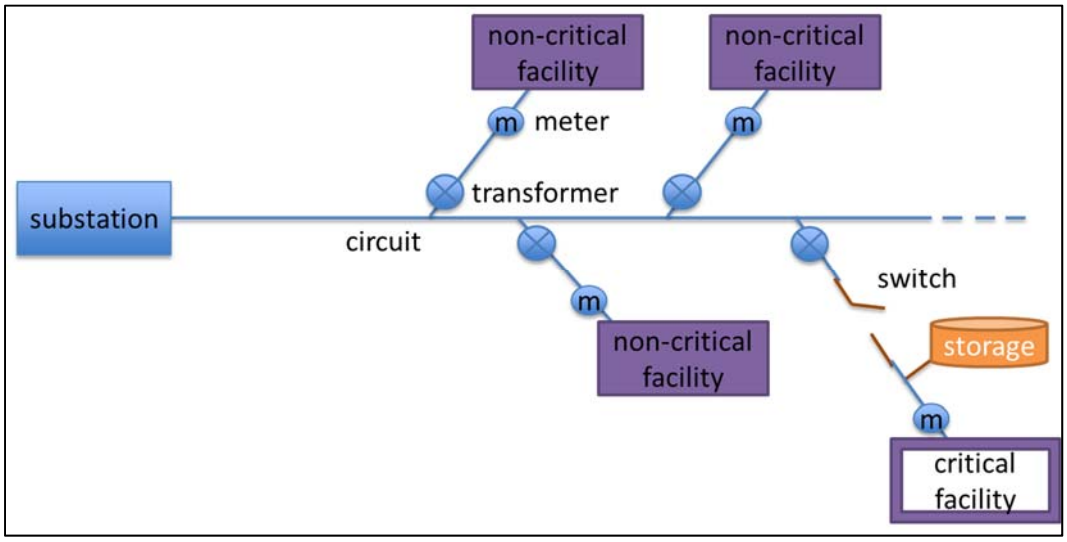

Figure 3: Illustrative example of a service-level microgrid

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.

SDG&E is not proposing any specific service-level energy storage microgrid projects in this 2018 Energy Storage Procurement and Investment Plan. SDG&E intends to propose service-level microgrid projects with the Commission at a later time, as described further below. If any service-level microgrid investments are proposed in the future, those projects and the associated use case, costs, and benefits will be described at that time.

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 aggregating the smaller energy storage systems to participate in wholesale energy markets when the microgrids are connected to the grid.

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.

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.

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 as explained further below in the project evaluation process within this testimony.

SDG&E intends to use the DERMS platform for all service-level energy storage systems and microgrids deployed for AB 2868. The use of DERMS is further described in the testimony of Steven Prsha.

B. AB 2868 Energy Storage Customer Pilot Program

The proposed Expanded CARE pilot program accelerates the deployment of distributed energy storage systems on the customer side of the meter by providing a financial incentive for Expanded CARE facilities that serve low-income customers to deploy and use energy storage. SDG&E's proposed pilot program addresses economic barriers for energy storage adoption by certain customers, which was discussed in the AB 2868 workshops.[9] Energy storage deployed through the pilot program will be owned by third parties, which may include customer ownership. The pilot program that SDG&E proposes to meet the goals of AB 2868 is addressed in detail in the testimony of Mayda Bandy.

[9] California Energy Storage Alliance workshop presentation, "*AB 2868 How to Proceed,*" presented October 17, 2017, slide 6.

III. DEFINITIONS OF STATUTORY TERMS

A. Definitions of AB 2868 Statutory Factors

For the purposes of evaluating AB 2868 energy storage programs and investments against the AB 2868 statutory criteria, the utilities were directed to host workshops[10] for parties to discuss and develop consistent definitions of statutory terms. SDG&E has considered and incorporated parties' feedback from these workshops. The following describes how SDG&E defines AB 2868's statutory factors and attributes for the purposes of evaluating AB 2868 energy storage programs and investments.

1. Achieve ratepayer benefits

For the purposes of evaluating AB 2868 energy storage programs and investments, SDG&E considers the definition of "ratepayer benefits" to include AB 2868 environmental benefits (i.e., reducing the dependence on petroleum, meeting air quality standards, and reducing emission of GHG as defined further below) as well as any of the following benefits related to deployment and use of energy storage systems, which may include:

(i) generating revenues that reduce the project costs collected in rates;

(ii) providing resiliency or backup power services, such as those provided by a microgrid operating in an island mode;

(iii) providing distribution services, such as voltage support or reliability services;

(iv) providing wholesale energy market services, such as frequency regulation, spinning reserves, non-spinning reserves, flexible ramping, and energy arbitrage; and

(v) providing local RA services or meeting an LCR.

[10] D.17-04-039 (May 8, 2017), OP. 2 at 67.Workshops were held September 14 and October 17, 2017.

2. Reduce dependence on petroleum

For the purposes of evaluating AB 2868 energy storage programs and investments, SDG&E considers "reduce dependence on petroleum" to mean decreasing the use of or lessening the requirement for petroleum-based products, which are refined products and by-products from the processing of crude oil, also referred to as fossil fuels, used for engines or electric generators.

3. Meet air quality standards

For the purposes of evaluating AB 2868 energy storage programs and investments, SDG&E considers "meet air quality standards" to mean: (i) complying with or conforming to California Ambient Air Quality Standards as established by the California Air Resources Board, and (ii) National Ambient Air Quality Standards as established by the United States Environmental Protection Agency, where applicable.

4. Reduce emissions of greenhouse gases

For the purposes of evaluating AB 2868 energy storage programs and investments, SDG&E considers "reduce emissions of GHG" to mean decreasing the release or discharge of effluent that is listed on the California Air Resource Board definition of Greenhouse Gas (*see* https://www.arb.ca.gov/cc/inventory/faq/ghg_inventory_glossary.htm).

5. Maximize overall benefits

For the purposes of evaluating AB 2868 energy storage programs and investments, SDG&E considers "maximize overall benefits" to mean that any proposed program or investment for AB 2868 is designed to accomplish maximum total ratepayer benefits (as defined above) over the life of the asset(s), while conforming to all safety, reliability, and service standards of the utility and meeting all statutory, regulatory, and other requirements for energy storage systems.

6. Minimize overall costs

For the purposes of evaluating AB 2868 energy storage programs and investments, SDG&E considers "minimize overall costs" to mean that the proposed program or investment for AB 2868 is designed to have minimum total costs over the life of the asset(s), while conforming to all safety, reliability, and service standards of the utility and meeting all statutory, regulatory, and other requirements for energy storage systems.

7. Public sector

For the purposes of evaluating AB 2868 energy storage programs and investments, SDG&E considers "public sector" customer to mean an agency or organization that:

- Is a government agency that provides a public service (Local, State, or Federal);
- Produces or distributes goods or services by or through a government agency;
- Provides goods or services as part of a public/private partnership; and
- Is a private or non-profit organization that provides a public service.

Examples of public sector agencies are city or county or federal facilities, police and fire stations, ambulance dispatch centers, emergency operations and evacuation centers, hospitals, correctional facilities, airports and sea ports, border protection stations, military facilities, water or sewage treatment facilities, schools, and public or low-income housing facilities.

This definition and these examples were proposed in the AB 2868 workshops and were generally accepted.

8. Low-income

For the purposes of evaluating AB 2868 energy storage programs and investments, SDG&E uses the definition for low-income as was used in AB 1550:[11]

> (d)(1) "Low-income households" are those with household incomes at or below 80 percent of the statewide median income or with household incomes at or below the threshold designated as low income by the Department of Housing and Community Development's list of state income limits adopted pursuant to Section 50093.
>
> (d)(2) "Low-income communities" are census tracts with median household incomes at or below 80 percent of the statewide median income or with median household incomes at or below the threshold designated as low income by the Department of Housing and Community Development's list of state income limits adopted pursuant to Section 50093.

The evaluation process included in this testimony uses the AB 1550 definition of low-income communities for the purposes of critical facility location, and the customer pilot program uses the AB 1550 low-income definition along with other eligibility restrictions. The details and application of this definition are further explained in the testimony of Mayda Bandy.

IV. PROJECT EVALUATION PROCESS AND WEIGHTING OF STATUTORY FACTORS FOR AB 2868 INVESTMENTS

To select investments that align with AB 2868's statutory factors, SDG&E proposes the following evaluation process, which was used to select the seven circuit-level projects proposed in the testimony of Steven Prsha. To prioritize energy storage for public sector and low-income customers, SDG&E started with a list of initial municipal critical facilities and then selected sites based on an evaluation process using the AB 2868 benefits and definitions defined above. The facilities that provide a public sector service, included:

[11] AB 1550 (Gomez), Sec.1, *codified at* Cal. Health & Saf. Code § 39713(d).

(i) an Essential Customer site;[12]

(ii) a Cool Zone;[13]

(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,[14] to align with AB 2868 directives to prioritize low-income customers;

(b) disadvantaged communities ("DAC"),[15] 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.

The following graphic illustrates the process used to identify suitable critical facility sites and candidate projects and their location on or near the preferred areas:

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[12] 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.

[13] 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

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

[15] *Id.* DAC is defined by California Senate Bill ("SB") 535, De Leon, Chapter 830, Statutes of 2012, *codified at* Cal. Health & Saf. Code § 39711.

Figure 4 –GRAPHIC THAT ILLUSTRATES THE PROCESS USED TO INDENTIFY SUITABLE AB 2868 PROJECTS

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

A. AB 2868 Project Evaluation Process

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 and suitable land were evaluated further as candidates for AB 2868 for this 2018 Energy Storage Procurement and Investment Plan. SDG&E intends to propose additional AB 2868 projects for additional candidate sites in future filings.

SDG&E does not intend to provide microgrid services to all sites evaluated. SDG&E intends to provide such services to projects that score relatively high in the evaluation process, where suitable land can be obtained, and within the AB 2868 megawatt capacity limits. SDG&E intends to evaluate specific critical agency sites where those agencies are 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 for circuit-level investments 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.

Figure 5 - AB 2868 PROJECT EVALUATION CRITERIA

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 the testimony of Evan M. Bierman. For evaluation purposes, larger megawatts of deployable energy storage are scored higher;

(ii) **Integration of Renewables**: This attribute prioritizes facilities that have renewable energy generation systems deployed or actively being 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 a critical public sector facility. For the purposes of evaluation, facilities with larger critical load which might be 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. For this evaluation, SDG&E uses a proxy metric of whether the facility is located in a DAC location. SDG&E states that this proxy metric is appropriate for evaluating projects for AB 2868 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.[16] SDG&E used the top quartile of census tracts as identified by CalEnviroScreen on a utility territory basis[17] to determine if the facilities served are located in a DAC.

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[16] SB 535, *codified at* Cal. Pub. Health & Saf. Code § 39711, directed CalEPA to identify DAC's 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."

[17] *See* D.18-01-024 (January 17, 2018) 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 California

(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 herein. SDG&E used the AB 1550 map available on the California Air Resource Board website[18] to determine if the facility served is located in a low-income community area;

(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) **Asset Participates in Market**: This attribute maximizes ratepayer benefit by prioritizing projects where asset is capable in size, location, and interconnection to 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) **Asset Meets Local RA / LCR**: This attribute minimizes overall costs, as directed by AB 2868, by prioritizing projects where the asset meets an RA / LCR criteria to meet multiple regulatory requirements with the deployment of a single asset.

SDG&E has conducted some evaluation on projects where suitable and available land has been identified, and is proposing specific projects in this 2018 Energy Storage Procurement and

Environmental Protection Agency's CalEnviroScreen, either on a state-wide or utility territory basis, whichever is broader."

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

Investment Plan as discussed in detail in the testimony of Steven Prsha. As further analysis is conducted to identify land, those sites may be evaluated and proposed accordingly in future filings.

B. Weighting Factors

As shown in Figure 4 (AB 2868 Project Evaluation Criteria) above, certain factors are given relative weights. Approximately 50% of the weighting for attributes is given to those 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 was stated as a guiding principal in D.14-10-045.[19] Approximately 20% of the weighting for attributes is given to the priority customers stated in AB 2868, namely public sector and low-income. Approximately 30% of the weighting 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")[20] 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

[19] *See* D.17-04-039 (May 8, 2017), Scoping Memo Issues at 5.

[20] *See* D.13-10-040 (October 21, 2013), Energy Storage Procurement Program Design, Appendix A, section 3(d) at 9. *See also* D.14-10-045 (October 22, 2014), CEP, section 6.2 at 64-71.

each AB 2868 project, but may use similar criteria from the CEP in the supply management process to evaluate conforming bids.

C. Results of Initial AB 2868 Evaluation Process

Using the evaluation process described herein, SDG&E scored and ranked critical public sector facilities and certain circuit-level projects that might serve those facilities. The seven projects listed in the testimony of Steven Prsha were selected because they ranked favorably in the AB2868 evaluation and suitable land is available. Other projects and sites were evaluated that were not selected or pursued further due to a variety of reasons, including the availability of suitable land. These specific projects are further described in the testimony of Steven Prsha.

V. SDG&E WILL USE ITS SUPPLY MANAGEMENT PROCESS FOR AB 2868 SOLICITATIONS

SDG&E's AB 2868 solicitation process creates opportunities for third-party energy storage manufacturers, technology and service providers, developers, and associated contractors and subcontractors. For the investments in SDG&E's AB 2868 Framework, 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 intends to use a standard supply management competitive bidding process to fairly select the proposal that maximizes ratepayer benefits while minimizing overall costs.

For the customer pilot program described in this 2018 Energy Storage Procurement and Investment Plan, SDG&E intends to select a program administrator best able to administer the program, as described in the testimony of Mayda Bandy.

Included in the standard supply management competitive bidding process are certain supplier diversity goals. This includes the Utility Supplier Diversity Program[21] monitored by the Commission, which includes women; minority; lesbian, gay, bisexual and transgender; and disabled veteran-owned business enterprises. Use of diverse contractors and suppliers will be one of the evaluation criteria in the solicitation process.

A. Two-Step Solicitation Process for AB 2868 Investments

A two-step process to solicit bids from third parties will be used to deploy distributed energy storage facilities as circuit-level or service-level microgrid investments to accelerate widespread deployment of distributed energy storage systems under AB 2868.

The first step is a Request for Information ("RFI") process. SDG&E issues an RFI providing basic project details, and which requests bidder compliance with minimum bidder qualifications. Bidders are required to prove that they satisfy these minimum bidder qualifications and are able to provide the requested energy storage systems for at least one project to advance to the second step, the Request for Proposals ("RFP") stage.

As part of the RFP stage, SDG&E solicits detailed proposals for specific energy storage system projects at one or more locations from bidders that met SDG&E's minimum bidding criteria during the RFI stage. SDG&E provides technical specifications and requirements in the RFP for each project. SDG&E develops weighted scoring criteria for each project, which include, among others, the expected cost of the project and the required performance, schedule, and the technical and operational specifications of the project. Proposals received from bidders as part of the RFP process are evaluated against each project's specific weighted scoring criteria. This is a separate and distinct process from the AB 2868 project evaluation process described in Section IV in this testimony. The

[21] *See* CPUC Utility Supplier Diversity Program. Available at: http://www.cpuc.ca.gov/supplierdiversity/

RFP process is intended to identify the best proposal that maximizes ratepayer benefits and minimizes overall costs. Once SDG&E selects the most qualified bidder, SDG&E initiates negotiations with the selected bidder to contract for the construction and/or acquisition of the project.

SDG&E has already issued the above-described RFI for the seven energy storage projects described in the testimony of Steven Prsha. SDG&E intends to use this process for any future circuit-level investments that may be proposed. The competitive bidding process that SDG&E intends to follow for service-level microgrids will be consistent with the standard supply management process described here.

B. Energy Storage Customer Pilot Program

SDG&E intends to select a program administrator who is best able to administer the customer pilot program described in this testimony, according to the process described in the testimony of Mayda Bandy.

VI. APPROVAL PROCESS

SDG&E recommends that the Commission refrain from prescribing a total program and investment capacity target for the 2018 and 2020 application cycles. SDG&E recommends that each investor-owned utility track the proposed, approved, and installed energy storage megawatts in their respective 2020 energy storage plans.

SDG&E will track deployments of any behind-the-meter capacity to ensure it does not exceed the 25% behind-the-meter limit[22] and determine how many megawatts have been deployed behind-the-meter by the time of the 2020 biennial report.

[22] *See* AB 2868, Sec. 2, *codified at* 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."

SDG&E intends to submit requests for additional circuit-level and service-level energy storage microgrid investments consistent with its proposed AB 2868 Framework. SDG&E requests the Commission to permit any future proposals to be filed for approval via a Tier 3 Advice Letter in advance of its 2020 biennial energy storage procurement and investment plan.

A. Funding Approvals

1. Circuit-level microgrid investments

SDG&E is requesting funding approval for seven circuit-level microgrid projects as part of this 2018 Energy Storage Procurement and Investment Plan, described in the testimony of Steven Prsha. The revenue requirement for the seven proposed projects is described in the testimony of Michael R. Woodruff and James G.Vanderhye Jr. The funding request is a not-to-exceed cost cap for each project, based on the engineering and project analysis conducted to date.

If additional circuit-level microgrid projects are proposed, SDG&E intends to request funding approval for those using a Tier 3 Advice Letter process or as part of a future biennial energy storage plan application in the 2020 cycle.

2. Service-level microgrid investments

SDG&E is not requesting funding approval for service-level microgrid projects in this 2018 Energy Storage Procurement and Investment Plan. Instead, SDG&E intends to determine the level of funding needed to address the service-level microgrid investment as described earlier in this testimony and request funding approval at a future time. SDG&E intends to request funding approval for this using a Tier 3 Advice Letter process or as part of a future biennial energy storage plan application in the 2020 cycle.

3. Energy storage customer pilot program

SDG&E is requesting funding approval for a customer pilot program for AB 2868 energy storage as part of this 2018 Energy Storage Procurement and Investment Plan as described in the testimony of Mayda Bandy.

VII. CONCLUSION AND SUMMARY

Through the AB 2868 Framework described above, SDG&E intends to accelerate the widespread deployment of distributed energy storage systems in alignment with AB 2868's goals. The proposed program and investments prioritize both public sector and low-income customers. The deployments proposed would be on both sides of the meter, and at multiple interconnection levels. The proposals target both utility and third-party (including customer) ownership. The proposed energy storage investments focus on providing resiliency using microgrid designs to public sector customers. Energy storage deployed through these investments maximize ratepayer benefits by providing additional services when the microgrid is connected to the grid.

The proposed energy storage pilot program focuses on behind-the-meter opportunities to incentivize facilities that serve low-income customers.

This concludes my prepared direct testimony.

VIII. STATEMENT OF QUALIFICATIONS

My name is Stephen T Johnston, and my business address is 8690 Balboa Avenue, CPA02, San Diego, California 92123.

I am the Growth Development Manager in the Asset Management department. I have been employed by SDG&E since February of 2012. I have held various positions, including Team Lead with the Customer Generation group, Project Manager with Customer Services, and Product Manager, introducing new products and services such as the Renewable Meter Adapter and Mover Services.

I received a bachelor's degree in physics from Rochester Institute of Technology and a master's degree in physics from the University of Akron. I received a master's degree in business administration from London Business School.

Prior to joining SDG&E, I was a product manager within the high-tech and semiconductor industries. I received an honorable discharge from the United States Marine Corps Reserve.

I have submitted prepared testimony in a proceeding before the California Public Utilities Commission.