Application: 18-02-016

Exhibit: SDGE-

REBUTTAL TESTIMONY OF

STEVEN PRSHA

ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

AUGUST 24, 2018

TABLE OF CONTENTS

REBUTTAL TESTIMONY OF STEVEN PRSHA

I. INTRODUCTION

I previously submitted prepared direct testimony in support of this application (A.18-02-016). My rebuttal testimony addresses three issues raised by The Utility reform Network ("TURN"), LS Power, and Small Business Utility Advocates ("SBUA").[1]

II. THE SIZE OF THE PROPOSED ENERGY STORAGE MICROGRID PROJECTS RELATIVE TO CRITICAL LOAD IS REASONABLE

TURN, LS Power, and SBUA express concerns about the size of the proposed projects compared to their intended use.

TURN contends that SDG&E has proposed "excessive amounts" of storage for the primary purpose of its proposal, citing to an SDG&E response to a TURN data request ("DR") for support:[2]

> A typical SDG&E 12 kv distribution feeder is rated for 10 MW of capacity. In order to seamlessly island the predetermined microgrid load, the energy storage system must have the capability to briefly island the entire circuit while remote controlled distribution switches shed non-critical load. Therefore, an energy storage system with 10 MW of capacity was proposed.[3]

TURN concludes that "the entire circuit does not need to be islanded in order to provide backup for specific facilities. SDG&E should have sought to island only the portion of the circuit related to the facilities which it has deemed 'critical.'"[4]

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[1] Intervenor testimony will be cited herein as follows: "[party nickname] [page number(s):line number(s)]."

[2] TURN 9:4-15, *citing* SDG&E's Response to TURN-DR-01, Question 9e.

[3] TURN 9:11-15, *citing* SDG&E's Response to TURN-DR-01, Question 9e.

[4] TURN 9:18-20.

TURN fundamentally misunderstands the islanding operation of SDG&E's microgrid energy storage proposal as it relates to the size of the proposed energy storage projects relative to critical load. "Island," in this context, refers to isolating a discrete portion of the electric grid while maintaining the electricity supply to the isolated portion that otherwise would have experienced an outage. To successfully transition a predetermined critical load to an island without experiencing an outage at the primary voltage level, the energy storage system ("ESS") must have the capability to temporarily island the ***entire circuit*** briefly (*i.e.*, minutes). Such a process must occur for the following reasons: when an unplanned grid outage occurs, each circuit will likely be in its normal configuration with all distribution switches closed and the entire circuit energized. The SCADA ("Supervisory Control and Data Acquisition") - controlled distribution switches are currently not able to recognize that a larger grid outage has occurred quickly enough to shed non-critical load in the timeframe required for a seamless transition to island the predetermined critical-load. For a seamless transition to occur, the energy storage system must be capable of ramping-up output to feed the entirety of the circuit[5] load in an extremely short duration of time (*i.e.* milliseconds) to maintain frequency stability and prevent a prolonged voltage drop, which could lead to an outage. Only after system stability is reached for the islanded portion of the circuit (typically one to several minutes) can the SCADA-controlled distribution switches be opened to safely shed non-critical load without causing an outage to the predetermined critical load.

To illustrate the type of circuit reconfiguration SDG&E will create with the proposed AB 2868 circuit-level energy storage microgrids, below is a representation of what a typical

[5] As mentioned above, a typical SDG&E 12 kV distribution feeder is rated for 10 MW of capacity.

microgrid would look like before and after islanding. In this example, SDG&E will be islanding approximately half the customers on the circuit:

Before Islanding

Figure 1: AB2868 Circuit Normal Topology

After Islanding

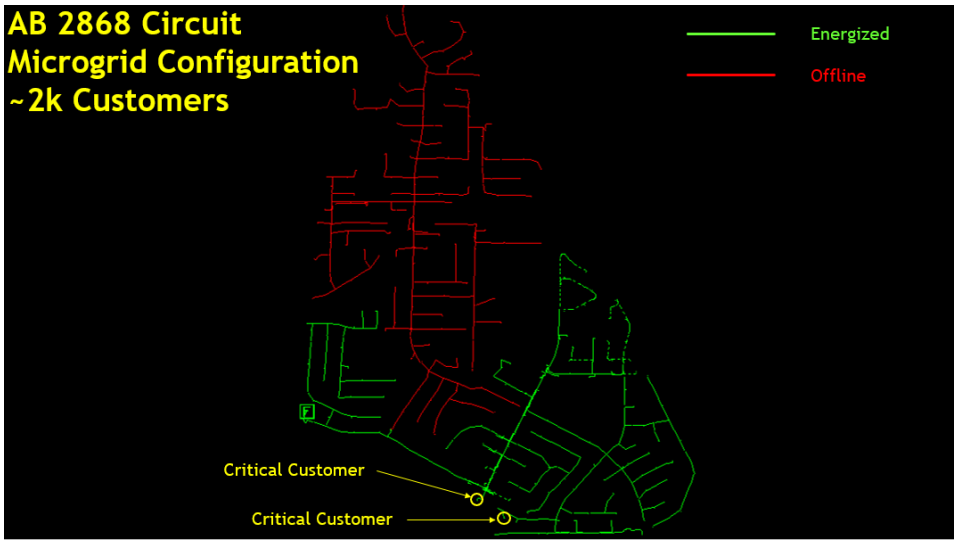

Figure 2: AB2868 Circuit Microgrid Topology

TURN's misunderstanding compares the relative energy storage system size to the peak circuit load:

> … even under SDG&E's rationale that the whole circuit should be energized by the storage asset during an outage, the utility would need to procure storage relative to the circuit's *load,* not total capacity. Even if one assumes, conservatively, that the storage facility should be capable of islanding the peak load of each circuit, SDG&E could procure around about one-half of the storage it has proposed.[6]

Although this statement seems logical, it ignores that there are other technical factors that influenced SDG&E's proposal for its energy storage sizing. Such factors include; enabling the energy storage system to accommodate additional loads from load growth or system reconfigurations (both temporary and permanent), sizing inverters to meet inrush demands from motor (reactive) loads on a circuit during a blackstart operation, and accommodating instantaneous circuit load increases due to photovoltaic systems tripping off during an island transition. Prudent planning merits sizing the energy storage system for both the present and the future, and accommodating for potential abnormal system configurations (such as a tie switch closing causing the energy storage system to pick up load from another circuit). In addition, other non-technical factors were taken into account as addressed in the rebuttal testimony of Stephen Johnston.

Lastly, TURN "recommends that storage procured by SDG&E be sized to the peak load of the critical facilities rather than the entire circuit."[7] SDG&E has proposed circuit-level microgrids to provide resiliency benefits to critical public-sector facilities on a circuit segment, which may also contain non-critical customers. SDG&E's proposed energy storage systems enable these additional customers, some of which are low-income and/or in disadvantaged communities, to receive the same resiliency benefits from the energy storage systems as the

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[6] TURN 9:22-26.

[7] *Id*. at 11:5-6.

critical public-sector facilities. A larger system allows for a longer island duration for customers that are part of the microgrid.

SDG&E's "utility-scale" approach also achieves greater economies of scale by providing circuit-level redundancy by only requiring one island controller, one communications system, one grid-synching switch, and a more condensed set of fire suppression systems, compared to the numerous control systems that would be required with more disaggregated microgrids. The additional benefits of circuit-level microgrids for ratepayers are described in Ted Reguly's testimony.

III. SDG&E's PROPOSED ENERGY STORAGE COST CAPS ARE REASONABLE

TURN states that the cost caps appear high.[8] TURN's speculation that the cost caps are too high is unsubstantiated. TURN, by its own admission, does not have recent or readily-accessible bid prices for one-hour duration energy storage systems, but recommends using a recent Energy Information Administration ("EIA") report:

- TURN compares SDG&E's dollar per MW and MWh cost cap to a recent EIA report containing average cost for medium-duration systems (.5 hour – 2 hour).[9]
- TURN recommends SDG&E's "cost cap" for its AB 2868 procurement should be set at an unreasonable low level based on $1.35 million per MWh.[10]

It is important to note that the EIA report TURN used to reference the $1.35 million per MWh caveats its estimates by including the following language:

> The average characteristics of the duration-binned sample data are summarized in Table 1. ***Given the small sample size for each bin (between 8–10 reported units), the values should be used with caution. No conclusions about the state of the industry as a whole can be drawn from these values***. Instead, they are used in this report to illustrate the importance of defining the system

[8] TURN 13:3.

[9] *Id.* at 13:5-7.

[10] TURN (Confidential) 18:8-9.

> characteristics when discussing costs, especially in terms of power capacity versus energy capacity. The reported capital cost values are from large-scale battery storage systems installed across the United States between 2013 and 2016 and include multiple reported battery chemistries. As a result, these reported values do not necessarily reflect trends in time or technology-specific tradeoffs.[11]

The cited EIA report plainly states that the average values should be used with caution due to the small sample size, and it would be imprudent to create cost caps based on this repoet when the EIA study itself urges such caution. SDG&E agrees with EIA's assertion that its important to define system characteristics when evaluating costs. Specifically, the seven proposed circuit-level energy storage projects have unique characteristics in their microgrid functionality, and therefore these projects have technology and other equipment costs that other energy storage systems may not possess. SDG&E maintains that its cost caps are accurate and, unlike EIA, depict a medium-duration energy storage system and SDG&E's location-specific proposed microgrid use case. Additionally, because the cost caps are merely a not-to-exceed amount, lower per-unit pricing is possible due to SDG&E's competitive solicitation process, and any cost underruns would be returned to customers as specified in the testimony of Norma Jasso.[12]

IV. LS POWER CONCERNS ABOUT MELROSE MICROGRID OPERATION LACK MERIT

LS Power states:

> LS Power understands that the addition of even 5 MW from any project on the Melrose distribution circuits identified in the RFP will be challenging, making the

[11] U.S. Energy Information Administration, *U.S. Battery Storage Market Trends* (May 2018) at 12 (emphasis added), *available at* https://www.eia.gov/analysis/studies/electricity/batterystorage/pdf/battery_storage.pdf.

[12] SDG&E (Jasso) NJ 1-2.

whole microgrid project operation potentially infeasible at rated power unless significant upgrades are made.[13]

SDG&E agrees that the ESS charging rate will be limited to the available capacity of the distribution circuit at any given time based on real-time system conditions. The ESS may not be able to charge at maximum rated power at all times due to various system constraints, but if a grid disturbance occurs, the larger system will be able to transition connected load on the circuit to a microgrid using its full capacity.

A limitation in spare capacity of the circuit does not affect the microgrid's ability to island critical load. Under normal conditions, a microgrid will only pickup the present load that is on the connected circuit (*e.g.*, if the load on a circuit is 6 MW when there is a loss of potential, the microgrid will only pick up 6 MW of load).

V. CONCLUSION

This concludes my rebuttal testimony. My qualifications were included with my direct testimony submitted previously in this proceeding.

[13] LS Power 8:16-19.