

Exhibit No. _____

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Application of San Diego Gas & Electric
Company (U 902-E) for Approval of the Results
from Its 2016 Track IV Local Capacity
Requirement Preferred Resources Request for
Offers.

Application No. 17-04-_____
(Filed April 19, 2016)

**PREPARED DIRECT TESTIMONY
OF KENDALL HELM**

ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

April 19, 2017



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I. INTRODUCTION – PURPOSE AND OVERVIEW

This application seeks approval and cost recovery for three third-party energy storage resources, two utility owned energy storage resources and one demand response (“DR”) resource that resulted from San Diego Gas & Electric Company’s (“SDG&E”) 2016 Track IV Preferred Resources Local Capacity Requirements Request for Offers (“Preferred Resources LCR RFO”). As explained below, and in the direct testimony of other SDG&E witnesses,¹ these resources provide continued electric grid reliability to all electric customers in SDG&E’s service territory for the duration of the contracts, and fill local capacity (“in-basin”) need. In addition to enhancing reliability, these resources will enable SDG&E to effectively integrate greater levels of renewable power on the grid. As SDG&E customers are already receiving over 40 percent of their energy from renewable sources,² this integration ability is essential. As we look to the future, further development in the energy storage sector can bolster state efforts to reduce greenhouse gas emissions, and this application’s utility owned energy storage projects underpin SDG&E’s commitment in moving this market and technology forward. Most importantly, this application seeks approval of contracts that represent the most cost-effective resources to meet customer needs, and where possible, have been leveraged for multiple mandates to maximize ratepayer value.

¹ References to witness “testimony” herein are to the prepared direct testimony served concurrently in support of this application.

² SDG&E delivered more than 40% renewable energy to its customers in 2016.
<http://www.prnewswire.com/news-releases/sdge-president-scott-d-drury-begins-role-300384965.html>.

1 My testimony provides the policy justification for this procurement effort, an overview of
2 the need and authorization for the resources SDG&E procured in its Preferred Resource LCR
3 RFO, and a summary of the request for offer (“RFO”) results and resources selected.

4 **II. BACKGROUND – COMMISSION AUTHORIZATIONS AND SDG&E** 5 **PROCUREMENT LEADING TO THIS RFO**

6 The early retirement of San Onofre Nuclear Generating Station (“SONGS”) left
7 SDG&E’s service territory with a need for local resource capacity.³ Replacing the capacity from
8 SONGS is not a simple endeavor; SONGS is located in a critical spot straddling the service
9 territories of Southern California Edison Company (“SCE”) and SDG&E, providing energy,
10 capacity and ancillary services to both service territories.⁴ In order to ensure regional safety and
11 reliability, SDG&E has sought cost-effective resources to meet its local capacity requirements
12 and to further California’s energy goals of reducing greenhouse gas emissions.

13 The Track IV Decision authorized SDG&E to procure a total of 500-800 megawatts
14 (“MW”) of capacity by the end of 2021 to meet this in-basin need.⁵ This decision required
15 SDG&E to procure at least 25 MW of capacity from energy storage resources and, consistent
16 with the Loading Order of the Energy Action Plan,⁶ to procure at least 175 MW of capacity from

³ Decision (“D.”) 14-03-004, the “Track IV Decision” at 22.

⁴ *Id.*

⁵ D.14-03-004 at ordering paragraph (“OP”) 2.

⁶ See, http://www.energy.ca.gov/energy_action_plan/2005-09-21_EAP2_FINAL.PDF, p. 2. Energy Action Plan II issued September 21, 2005, describes the loading order, or priority sequencing, of energy resources to meet increasing energy needs. These are: energy efficiency, demand response, renewable resources, distributed generation and combined heat and power. To the extent these resources are unable to satisfy the need, clean and efficient fossil-fired generation is listed as the final option.

1 preferred resources or energy storage.⁷ SDG&E is authorized to procure through RFO processes
2 and bilateral contracts.⁸

3 The Commission issued D.13-10-040 (“the Energy Storage Decision”) in response to
4 Assembly Bill (“AB”) 2514,⁹ setting SDG&E’s energy storage procurement target at 165 MW.¹⁰
5 The Energy Storage Decision instructs the utilities to consider all forms of resource ownership
6 (utility owned, third-party owned, customer-owned and joint ownership).¹¹ In SDG&E’s
7 approved Track IV Procurement Plan, SDG&E stated that it would consider energy storage
8 procured in response to the Track IV Decision toward both local capacity requirements and
9 SDG&E’s energy storage mandate.¹²

10 To be consistent with procurement requirements under the energy storage mandate, the
11 Track IV Procurement Plan also provides that SDG&E would consider both third-party and

⁷ D.14-03-004 at OP 2; *see also* “The Loading Order established that the state, in meeting its energy needs, would invest first in energy efficiency and demand-side resources, followed by renewable resources, and only then in clean conventional electricity supply.” *Id.* at 14 *citing* Energy Action Plan 2008 Update at 1.

⁸ D.14-03-004 at OP 3, 6.

⁹ 2010 Cal. Stat. ch 469, amended by AB 2227 (2012 Cal. Stat. ch 606).

¹⁰ SDG&E’s energy storage mandate of 165 MW (transmission 80 MW, distribution 55 MW and customer 30 MW) is explained further in D.13-10-040 at 15-16.

¹¹ This is reinforced by *id.*, finding of fact 21, at 73: “The definition of energy storage system embraces a mix of ownership models.” The Energy Storage Decision’s direction for utilities to consider utility-owned energy storage projects is consistent with Cal. Pub. Util. Code (“P.U. Code”) § 2835(a)(2)(B), which permits a variety of ownership models (emphasis added):

(2) An “energy storage system” may have any of the following characteristics:

* * *

(B) Be either *owned by a load-serving entity* or local publicly owned electric utility, a customer of a load-serving entity or local publicly owned electric utility, or a third party, or is jointly owned by two or more of the above.

¹² SDG&E LTPP/Track 4 Procurement Plan (Preferred Resources) dated July 18, 2014, *approved*, letter dated July 22, 2014, Edward F. Randolph, Director, Energy Division, to Dan Baerman (*see* Attachments D and F to testimony of Patrick Charles). For support that energy storage can meet local capacity needs, *see* D.13-10-040 at 34; D.14-03-004 at 61, 100 and OP 2; Resolution E-4791 at 10,

1 utility owned energy storage offers in the Preferred Resources LCR RFO. Commission direction
2 authorizes SDG&E to procure utility owned energy storage resources, provided they are
3 considered with third-party owned energy storage resources in a fair and consistent manner.¹³
4 SDG&E followed the requirements outlined in the Energy Storage Decision for a fair and
5 consistent evaluation. As detailed in the testimony of Patrick Charles, SDG&E assessed energy
6 storage offers fairly and consistently by selecting the least-cost-best-fit offers and by relying on
7 oversight of the Independent Evaluator, its Procurement Review Group, and adhering to a strict
8 code of conduct that defined roles for the bid evaluation and cost development teams.¹⁴

9 With regard to Track IV procurement progress, D.15-05-051 approved SDG&E's
10 application¹⁵ for 600 MW of local capacity from a purchase power tolling agreement ("PPTA")
11 with Carlsbad Energy Center, LLC. The Commission conditionally approved the Carlsbad
12 PPTA, subject to submittal of an amended PPTA, for 500 MW and stated that "[a]ll of the 100
13 MW in residual procurement authority ... must consist of preferred resources or energy storage"
14 ("Carlsbad Decision").¹⁶ The Carlsbad Decision did not increase the minimum requirement of
15 175 MW for preferred resources or energy storage from the Track IV authorization, but simply
16 clarified that the remaining procurement authority resulting from the reduction of the Carlsbad

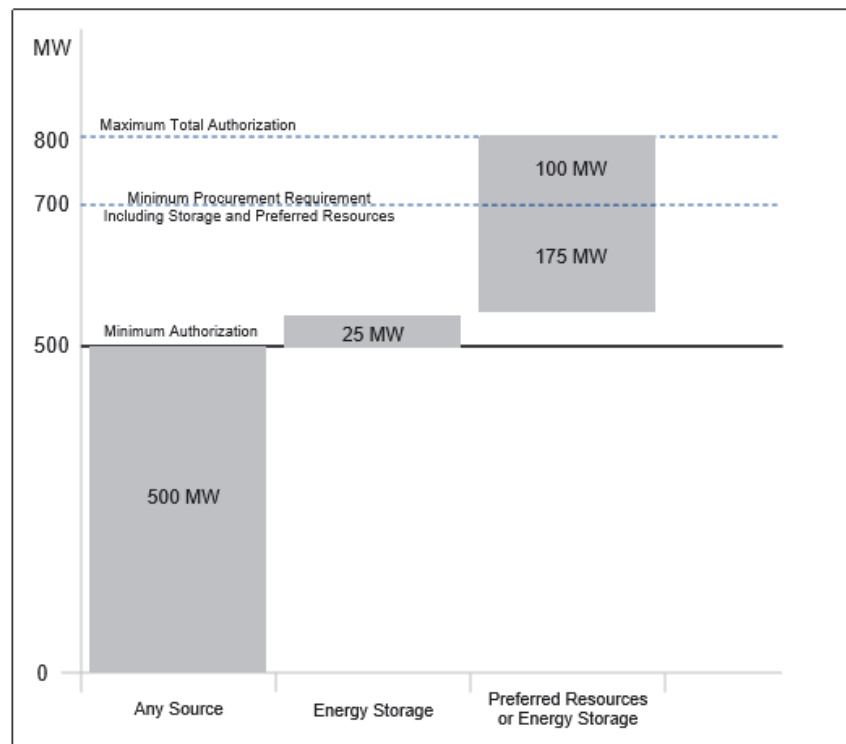
¹³ D.13-10-040 at 52 ("We shall allow the IOU to procure utility-owned energy storage systems either through the Storage Framework or as authorized in other Commission proceedings. Utility-owned energy storage systems shall be subject to the same evaluation criteria and must meet the same requirements as third-party storage systems.... Thus, an IOU proposing utility-owned storage in any grid domain shall pursue a competitive process consistent with LTPP processes outlined in D.07-12-052.")

¹⁴ Testimony of Patrick K. Charles at PKC-15-17 and 22-24.

¹⁵ Application ("A.") 14-07-009, approved May 21, 2015, *upheld in pertinent part on rehearing*, D.15-11-024.

¹⁶ D.15-05-051 at OP 1-2. The Carlsbad Decision defines preferred resources as energy efficiency, demand response and renewable resources. *Id.* at 2.

PPTA be limited to the procurement of preferred resources or energy storage. The diagram below summarizes SDG&E's Track IV procurement authorization, after the Carlsbad Decision.



In addition to the Carlsbad PPTA, SDG&E received Commission approval for several projects that provide in-basin capacity. In August 2016, the Commission approved 37.5 MW of energy storage resources procured in response to Resolution E-4791 to count toward SDG&E's local capacity and energy storage requirement.¹⁷ In December 2016, the Commission approved an 18.5 MW Energy Efficiency ("EE") contract resulting from SDG&E's 2014 All Source RFO.¹⁸ In all cases, SDG&E has selected safe and reliable contracts based on market conditions and the need to make continued progress toward meeting local RA requirements.

¹⁷ Resolution 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. SDG&E Advice Letter 2924-E (July 18, 2016) sought approval of 37.5 MW of energy storage resources to count toward local capacity and energy storage mandates (*approved*, effective August 18, 2016 by letter dated August 24, 2016).

¹⁸ D.16-12-041 at OP 1.

1 This application seeks approval of an additional six resources that will provide 88 MW of
2 energy storage and demand response in furtherance of SDG&E's Track IV requirement, which
3 will provide continued improved grid reliability and stability.

4 **III. SUMMARY OF RFO RESULTS**

5 **A. Resource Selection Objectives**

6 On February 26, 2016, SDG&E released its Preferred Resources LCR RFO, targeting up
7 to 140 MW across five different product types: EE, DR, energy storage, renewable power and
8 distributed generation ("DG"). In addition to meeting conformance requirements, including
9 safety, and least-cost-best-fit criteria,¹⁹ SDG&E considered multiple objectives in shortlisting
10 resources from the RFO, including:

- 11 • continuing progress in meeting Track IV reliability needs;
- 12 • continuing progress in meeting energy storage procurement targets;
- 13 • mitigating portfolio risk by procuring a diverse mix of resources from a diverse
14 set of suppliers;
- 15 • mitigating market and technology risk by procuring a diverse mix of contract
16 tenors; and
- 17 • optimizing timing to benefit from market and technology development.

18 **B. The Portfolio of Resources Selected Achieve Multiple Objectives**

19 Together, the six selected resources successfully meet the requirements and shortlisting
20 objectives outlined above. All six resources met the safety and local reliability conformance
21 requirements and represent least-cost-best-fit solutions according to our net market value
22 ("NMV") analysis described further in the testimony of Scot Rolfe.

23 In total, the six resources provide 88 MW of in-basin capacity, comprised of energy
24 storage and demand response resources essential to integrating increasing levels of renewables.

¹⁹ See SDG&E LTPP/Track 4 Procurement Plan (Preferred Resources) dated July 18, 2014, *approved*, letter dated July 22, 2014, Edward F. Randolph, Director, Energy Division, to Dan Baerman at 15 (Attachments D and F to testimony of Patrick K. Charles).

1 With these resources, SDG&E's total post-Carlsbad procurement under the Track IV
2 authorization will increase to 144 MW of local capacity resources, all of which will be in service
3 by 2022.

4 With the five selected energy storage resources SDG&E's total procurement under the
5 energy storage mandate will increase to 180.1 MW, not including ongoing energy storage
6 installations behind the meter.²⁰ These energy storage resources provide customers with
7 considerable savings; they simultaneously satisfy two shortlisting objectives and meet the energy
8 storage mandate and the Track IV need for local capacity resources.

9 Resources selected also bring resource diversity to SDG&E's portfolio, reducing
10 exposure to resource seasonality, plant outages, counterparty risk, project failure and technology
11 development affecting future prices. Among resources selected, six different counterparties are
12 represented, three different energy storage product types are included, two different resource
13 types are procured, and contract terms range from 5 years to 20 years. Among utility owned
14 energy storage projects, SDG&E also selected resources that provide diversity in development
15 responsibilities and risk. Finally, two selected resources are with a Diverse Business Enterprise
16 ("DBE").²¹

17 A summary of the resources selected in the Preferred Resource LCR RFO is provided
18 below in Table 1. Details regarding the procurement process and the third-party energy storage
19 contracts are provided in the testimony of Patrick K. Charles. Details regarding the utility owned

²⁰ This application seeks 83.5 MW of energy storage, which is in addition to progress already made toward its storage mandate, including 40 MW of transmission, 43.65 MW of distribution and approximately 12.95 MW of customer storage.

²¹ SDG&E maintains annual goals for overall procurement from DBEs to support growth in DBE enterprises. SDG&E 2014 Long Term Procurement Plan at 34, Advice Letter 2850-E-A, effective February 19, 2016.

energy storage contracts are provided in the testimony of Joshua Gerber. Details regarding the DR contract are provided in the testimony of E Bradford Mantz.

Table 1
Track IV All Source RFO Contracts

Product Category	Product Type	Counterparty	Commercial Operation Deadline	Term (yrs.)	MW (Avg. Contract Capacity)
Energy Storage	EPC ²²	RES Americas Construction, Inc.	March 31, 2019	20	30
Energy Storage	BOT ²³	AES Energy Storage, LLC	March 31, 2021	20	40
Energy Storage	PPTA	Enel Green Power North America, Inc.	December 31, 2021	15	3
Energy Storage	PPTA	Advanced Microgrid Solutions, Inc.	December 1, 2019	20	4
Energy Storage	PPTA	Powin Energy	June 30, 2021	10	6.5
Demand Response	DR	Ohmconnect, Inc.	January 1, 2018	5	4.5
Total Preferred Resources and Energy Storage					88

C. Utility Owned Energy Storage Projects Were Considered in a Fair and Consistent Manner and Provide Ratepayers with Cost-Effective Resources

The evaluation process for utility owned energy storage project offers was conducted in a fair and consistent manner to ensure that viable projects and cost-effective resources were selected that meet local reliability needs. To ensure that the economic assessment was robust, all energy storage bids were evaluated without regard to project ownership. To ensure the RFO process in its entirety was conducted in a fair and consistent manner, SDG&E relied on oversight of the Independent Evaluator, its Procurement Review Group, and adhered to a strict code of

²² “EPC” refers to Engineering-Procurement-Construction.

²³ “BOT” refers to Build-Own-Transfer.

1 conduct. Additional details on the fair and consistent process SDG&E followed are provided in
2 the testimony of Joshua Gerber and the testimony of Patrick K. Charles.

3 SDG&E selected two utility owned energy storage projects, comprising a total of 70
4 MW, as shown in the first two rows of Table 1. In the RFO, SDG&E received approximately
5 240 energy-storage bids, from both utility owned and third-party owned projects. Among the
6 more cost-competitive bids received, there were several very large projects (100 MW or more)
7 that SDG&E did not select because they would overly concentrate risk in our energy storage
8 portfolio. In addition, SDG&E received several bids for third-party owned resources that only
9 provide resource adequacy (“RA”) and not energy. While these bids were conforming, SDG&E
10 ultimately chose not to select these bids because of constant changes in the resource adequacy
11 program and the resulting uncertainty in the long-term value of those projects.

12 To ensure cost-effectiveness, among the remaining bids, SDG&E selected the two utility
13 owned projects for the value they provide. These resources had the highest quantitative values,
14 even before the consideration of qualitative benefits, and provide ratepayers with net market
15 values of approximately 45% higher than the average net market value for the most cost-
16 competitive shortlisted third-party owned projects.²⁴ With utility owned energy storage,
17 customers automatically receive all value that remains from the project after the duration of the
18 contract. This full “residual value” is a real and material economic benefit for our customers that
19 is reflected and embedded in the net market value results.²⁵

²⁴ Values are relative to the zero net market value benchmark. Additional details on the net market value analysis are provided in the testimony of Scot Rolfe.

²⁵ Third-party offers may also include residual value in the price and, hence, NMV. The amount of residual value embedded in the pricing of a third-party offer is unknown at the time of evaluation and ultimately up to the counterparty. If a third-party offer excludes any residual value, customers could see larger economic benefits from utility owned projects. Details on the residual values of the utility owned projects are provided in the testimony of Joshua Gerber.

1 **D. Additional Benefits of Selected Utility Owned Projects**

2 In addition to the economic value directly assessed in the RFO, SDG&E expects to
3 garner other benefits from the utility owned energy storage projects. SDG&E's expertise and its
4 proven track record of getting utility owned energy storage built reduces development and delay
5 risk. In July of 2016, SDG&E responded to an exigent need for capacity stemming from the leak
6 of natural gas at Aliso Canyon. By February of 2017, SDG&E in partnership with AES Energy
7 Storage, debuted the world's largest lithium ion battery-based energy storage installation,
8 providing a total of 37.5 MW of power and 75 MW of flexible resources to the grid.

9 Second, utility ownership provides SDG&E with increased optionality and the ability to
10 adjust to changing market rules without incremental costs. SDG&E ownership can also provide
11 the Commission with more detailed insight into energy storage operations, as SDG&E will have
12 a firsthand role in operation of the resource. As energy storage markets and technology evolve,
13 this learning can play an important role in facilitating future growth of storage resources and
14 optimized procurement.

15 A detailed explanation of the utility owned energy storage contracts and associated
16 benefits is included in the testimony of Joshua Gerber. The explanation of the evaluation
17 showing that the selected utility owned resources represent a good value for ratepayers, along
18 with an explanation of the specific outcome of the evaluation is included in the testimony of Scot
19 Rolfe.

20 **E. Remaining Track IV and Energy Storage Procurement**

21 At every step, SDG&E has made reasonable and deliberate procurement decisions to
22 benefit its grid and customers. SDG&E designed and conducted its Preferred Resource LCR

RFO based upon the procurement plan approved by the Commission.²⁶ The Commission and the Office of Ratepayer Advocates have regularly been briefed by SDG&E on the status of its Track IV procurement and the solicitation goals of each RFO.

With approval of these resources SDG&E will have substantially met its Track IV target.

Table 2
SDG&E's Remaining Track IV Authorization

Resource Type	Track IV Authorization Target (MW)	Procured (MW)	Remaining Track IV Authorization Target (MW)
Preferred Resources or Energy Storage	200 (minimum)	144	56
Conventional	500	500	0
Total	700 (minimum)²⁷	644	56

Moving forward, SDG&E intends to continue utilizing existing or expected procurement efforts to secure additional resources that will provide local capacity, such as: SDG&E's Combined Heat and Power ("CHP") RFO, Demand Response Auction Mechanism ("DRAM"), and energy storage procurement.

Since the approval of its 2016 Energy Storage Procurement Plan,²⁸ SDG&E has been on track to meet its energy storage procurement targets by 2020.²⁹ SDG&E anticipates filing its 2018 Energy Storage Procurement Plan on March 1, 2018, with a full update on its progress

²⁶ SDG&E LTPP/Track 4 Procurement Plan (Preferred Resources) dated July 18, 2014, approved letter dated July 22, 2014, Edward F. Randolph, Director, Energy Division, to Dan Baerman (*see* Attachments D and F to testimony of Patrick K. Charles).

²⁷ Maximum total authorization is 800 MW.

²⁸ D.16-09-007, *Decision Approving Storage Procurement Framework for the 2016 Biennial Procurement Period*.

²⁹ *See* Table 3.

towards reaching the goal, including details on how SDG&E plans to achieve the minimum 50% of its targets (82.5 MW) with third-party procurement.

Table 3
SDG&E's Progress Toward Energy Storage Decision Procurement Targets

Domain	Domain Target (MW)	Previously Approved (MW)	New Projects or Customer Interconnections (MW)	Total (MW)	MW Remaining to Domain Target³⁰	Third Party Owned
Transmission	80	40	70 – Preferred Resources LCR RFO	110	0	40
Distribution	55	43.65	13.5 – Preferred Resources LCR RFO	57.15	0	13.5
Customer	30	12.95	9.55 (customer or third party owned, not contracted)	22.5	7.5	22.5
Total	165	96.6	93.05	189.65	7.5	76

If local capacity requirements remain, SDG&E will evaluate the optimal timing and considerations for further Track IV RFOs. SDG&E is committed to ensuring our customers and the wider community have access to safe, clean, and reliable energy.

IV. QUALIFICATIONS

My name is Kendall K. Helm, and since June 2016 I have been the Director of Origination and Portfolio Optimization in the Energy Procurement department at San Diego Gas & Electric. My business address is 8315 Century Park Court, San Diego, California 92123.

In my current job, I oversee the procurement of all long-term energy resources. My responsibilities include overseeing the procurement process and managing the review of bids

³⁰ Assumes no transfers between domains.

1 received within solicitations, including the Track IV Decision, Demand Response Auction
2 Mechanism, Resource Adequacy, Renewable Auction Mechanism and Green Tariff Shared
3 Renewables.

4 I have been with the Sempra Energy family of companies since 2012. Prior to taking my
5 current position at SDG&E, I was the Director of Investor Relations at Sempra Energy. I have
6 also worked as Manager of Corporate Economics for Sempra Energy, where I provided research
7 on the company's valuation, capital structure and corporate strategy. Prior to joining the Sempra
8 Energy companies, I was Senior Economist for International Affairs and Trade at the U.S.
9 Government Accountability Office, where I reported to Congress on topics relating to climate
10 change, energy export promotion, and international competitiveness.

11 I received a bachelor's degree in economics and international studies from the University
12 of Denver and a Ph.D. in economics from American University.

13 I have not previously testified before the California Public Utilities Commission.

14 This concludes my prepared direct testimony.
15