

Application No. 16-03-____
Exhibit No.: (SDG&E-____)

PREPARED DIRECT TESTIMONY OF
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ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

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

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1 whether acquiring energy storage for this use case is cost-effective for customers.

2 The RFO and RFP procurement processes proposed for SDG&E’s 2016 cycle are
3 functionally identical to the Commission-approved procurement process SDG&E proposed in its
4 2014 Energy Storage Procurement Plan. There, as here, SDG&E used an RFO process to solicit
5 storage to fill local and flexible capacity shortfalls, and a separate RFP process to solicit storage
6 to potentially defer or replace investment in more conventional distribution system upgrades.
7 Because the products SDG&E proposes to obtain through this 2016 procurement cycle
8 solicitation substantially mirror the products SDG&E solicited in the 2014 cycle, the proposed
9 evaluation protocols discussed below also mirror the evaluation approaches that SDG&E
10 previously proposed, and the Commission approved, in the 2014 cycle.²

11 SDG&E asks that the Commission approve the evaluation methodology described in my
12 testimony.

13 **II. BACKGROUND**

14 The Energy Storage Decision directed the IOUs to include in their biennial procurement
15 plan applications “[a] proposed methodology for an analysis that evaluates bids on cost and fit
16 submitted in a solicitation that draws on:

- 17 • The full range of benefits and costs identified in the use case framework developed
18 and the EPRI and DNV KEMA reports submitted in this proceeding;
- 19 • An optional utility-specific proprietary evaluation protocol; and
- 20 • An evaluation protocol consistent across the IOUs that includes a consistent set of
21 assumptions and methods for valuing storage benefits, such as market services
22 and avoided costs, and estimating project costs that allow adjustments for utility-
23 specific factors (such as location, portfolio, cost of capital, etc.) and utility-
24 specific modeling tools based outputs affecting valuation as appropriate to
25 provide a consistent basis for comparison across utilities, bids and use cases. The
26 consistent evaluation protocol shall be developed by the IOUs through joint
27 consultation between the IOUs and the Commission Staff prior to the filing of the

² D.14-10-045

1 application and referenced in that application.”³

2 SDG&E’s proposed evaluation protocols, discussed below, meet this directive.

3 **III. EVALUATION PROTOCOL FOR THE PREFERRED RESOURCE RFO**
4 **SEEKING LOCAL AND FLEXIBLE CAPACITY**

5 As discussed in detail in Mr. Charles’s testimony, SDG&E is soliciting up to 140 MW of
6 energy storage to meet SDG&E’s local and flexible capacity needs using an RFO process. In
7 this RFO, energy storage will compete head-to-head with distributed generation, energy
8 efficiency, demand response, and renewable generation resources. Identical to SDG&E’s recent
9 2014 All Source RFO, parties bidding into the Preferred Resource RFO can propose energy
10 storage projects that interconnect in the transmission or distribution domains, or in the customer
11 domain as a storage-assisted demand response product that meets RA eligibility criteria. Also
12 similar to the 2014 All Source RFO, SDG&E will seek offers for both third-party owned storage
13 resources and utility-owned resources storage. SDG&E will follow a methodology similar to the
14 one utilized in SDG&E’s Long-Term Procurement Plan that includes, among other steps, the
15 preparation of an evaluation protocol for offer analysis and selection.

16 The evaluation protocol described below is transparent, and is designed not to favor any
17 particular length of contract, technology or counterparty. This evaluation protocol may require
18 adjustments to respond to potential market, regulatory, and/or business context changes. Should
19 these context changes arise, SDG&E will work with its Independent Evaluator (“IE”) to revise
20 this methodology as necessary.

21 Identical to the Commission-approved 2014 evaluation protocol, SDG&E is proposing to
22 evaluate and rank storage offers providing a local or flexible capacity product based on Least-
23 Cost, Best-Fit (“LCBF”) principles. The LCBF analysis evaluates both quantitative and

³ *Id.*, Appendix A at 9 (footnote omitted).

1 qualitative aspects of each offer to estimate its value to SDG&E’s customers and its relative
2 value in comparison to other offers. The valuation of an offer takes into account both benefits
3 and costs. The primary quantitative metric used in SDG&E’s LCBF process is a Net Market
4 Value (“NMV”) calculation. The NMV calculation is a quantification of the value of an offer
5 when compared to a set of price benchmarks for capacity, electrical energy, ancillary services,
6 natural gas, and Green House Gas (“GHG”) compliance. Additionally, SDG&E may consider
7 portfolio effects (costs or benefits) associated with the offer on the portfolio. These benefit and
8 cost components are netted and discounted to yield a NMV for each offer. The NMV of an offer
9 is compared to the NMV of other offers to determine whether that offer is one of the highest
10 ranked.

11 The initial evaluation will be done without regard to credit costs. Once an initial listing
12 of the highest ranked offers is determined, a credit analysis will be conducted and credit costs
13 will be considered. The economic evaluation normalizes the MW size differences of offers by
14 finding the most attractive NMV per MW of capacity (“Least Cost”).

15 The NMV calculation sums all quantifiable benefits then subtracts all quantifiable cost to
16 determine the offer’s NMV as illustrated in the following equation:

$$17 \quad \text{NMV} = (\text{Quantifiable Benefits}) - (\text{Quantifiable Costs})$$

18 SDG&E evaluates the quantifiable attributes of each offer individually. These individual
19 attributes will include: capacity benefits, energy benefits, ancillary service benefits, contract
20 payments (or anticipated equipment ownership costs for utility owned projects), and project
21 development costs – for siting, permitting and interconnection – (utility owned offers), GHG
22 emissions and costs, congestion costs, and transmission losses and costs. NMV’s quantifiable
23 benefits include:

- 1 • Net Capacity Benefits – to the extent the capacity provided by the energy storage
2 project can be counted towards SDG&E’s local or system Resource Adequacy
3 (“RA”) requirements.
- 4 • Net Flexible Capacity Benefits – to the extent capacity provided by the energy
5 storage project can be counted towards SDG&E’s discrete flexible RA
6 requirements.
- 7 • Net Energy Benefits.
- 8 • Net Ancillary Services Benefits.
- 9 • Residual Capacity and Energy Benefits – for utility owned projects, SDG&E will
10 require that bidders guarantee the rated capacity of each storage system for some
11 term. At the end of the capacity guarantee period, the system will have 100% of
12 its rated capacity, and can be operated for some additional period, providing
13 residual capacity and energy benefits without incurring additional capacity
14 guarantee costs. SDG&E will require bidders for utility owned projects to
15 guarantee degradation using an agreed-upon post-capacity guarantee use profile,
16 and will use this information to quantify residual capacity and energy benefits for
17 these offers.

18 NMV’s quantifiable costs include, but are not limited to:

- 19 • Energy storage agreement (contract) costs – SDG&E will calculate a levelized
20 contract cost
21 Interconnection costs – Network upgrade costs for interconnection
of the energy storage system.
- 22 • If an interconnection cost estimate cannot be provided by the bidder due to timing
23 of interconnection studies, SDG&E may assign a network upgrade cap value
24 (based on a reasonable estimate of such costs) for purposes of evaluating the
25 offer. If this cap value is then exceeded when the interconnection cost studies are
26 completed, a walk away provision could be included in the energy storage
27 contract.
- 28 • Congestion-related costs if applicable – SDG&E will conduct a marginal analysis
29 to determine the difference in locational pricing between the project’s point of
30 delivery and SDG&E’s default load aggregation point (“DLAP”). SDG&E will
31 work with the IE to establish the proper methodology to include this cost as part
32 of the NMV.
- 33 • Any other benefits or costs that are identified and able to be suitably quantified
34 may be used in the NMV calculation.

35 The 2016 Preferred Resource RFO will also solicit utility-owned energy storage systems
36 to provide local and flexible capacity as indicated in the testimony of Mr. Charles. For any

1 utility-owned storage bid, SDG&E will calculate all NMV quantitative benefits and quantitative
2 costs as described above. A substantive difference is that for utility-owned energy storage
3 systems, the levelized cost will be derived using traditional utility ratemaking methodologies to
4 calculate revenue requirements for utility-owned infrastructure. SDG&E will then compare on
5 an apples-to-apples basis the cost-effectiveness of utility-owned energy storage capacity versus
6 third-party owned capacity in order to propose the best option. Finally, as described above,
7 SDG&E will consider residual capacity and energy benefits for utility-owned storage projects
8 providing local and flexible capacity.

9 As with the evaluation methodology used in the 2014 All Source RFO, to evaluate the
10 identified costs and benefits, SDG&E will use a proprietary modeling approach that analyzes the
11 charging and discharging of the energy storage system to achieve an optimization of the
12 contracted energy storage project. This model performs a quantitative analysis under the LCBF
13 and NMV methodology, and quantifies capacity benefits, energy benefits and ancillary services
14 (“AS”) benefits including the modeling of future values for energy, capacity and AS and the
15 corresponding operation of the storage system. Other quantifiable costs include contract costs,
16 network upgrade costs and congestion costs (or benefits) over the same analysis timeframe.
17 SDG&E will use these modeling tools to analyze and optimize each of the offers received.

18 Additional project-specific qualitative benefits may be used to further differentiate
19 closely-ranked offers. SDG&E will conduct a process to normalize for different lengths of
20 contracts, useful lives of the storage asset where applicable, technology, operational
21 characteristics and risk profiles. Qualitative factors and benefits will be used to determine which
22 projects are the “Best Fit” for SDG&E’s portfolio. SDG&E may use these factors to determine
23 advancement onto the short list or evaluate tie-breakers, if any. Qualitative factors may include,

1 but are not limited to, project viability, diversity, and adherence to terms and conditions.

2 **IV. EVALUATION PROTOCOL FOR DISTRIBUTION RELIABILITY/POWER**
3 **QUALITY PROJECTS**

4 The Energy Storage Decision directed SDG&E to also procure energy “storage systems
5 involving distribution reliability applications” by utilizing “existing processes used by IOUs for
6 other distribution reliability utility assets.”⁴ As described in Mr. Charles’s testimony, as part of
7 its 2016 energy storage procurement plan SDG&E will conduct a competitive Request for
8 Proposals (“RFP”) process to procure energy storage systems to potentially defer or displace
9 investment in conventional distribution system infrastructure. In accordance with the Energy
10 Storage Decision, SDG&E will use existing supply management evaluation and procurement
11 methodologies in this RFP process and will select the best option based on quantitative costs and
12 benefits as well as qualitative aspects. SDG&E will identify a specific distribution system need
13 or use case, and it will then compare utility-owned energy storage systems versus other
14 traditional or alternative solutions. The following are some of the areas that SDG&E will cover
15 as part of this evaluation protocol:

- 16 • Conduct an RFP process based on technical and operational requirements required
17 for each of the distribution system use cases or applications proposed under this
18 program.
- 19 • Conduct an analysis of all the conforming offers received from qualified
20 vendors/developers.
- 21 • Compare the cost for energy storage systems to the cost of other traditional and
22 alternative solutions.
- 23 • Calculate quantifiable benefits for the energy storage systems and other traditional
24 and alternative solutions.
- 25 • Calculate and compare real and/or nominal Benefit-to-Cost ratios of energy storage
26 systems to other traditional and alternative solutions.

⁴ D.13-10-040 at 5.

- 1 • Identify and compare qualitative benefits for energy storage systems and other
2 traditional and alternative solutions.

3 To evaluate these costs and benefits, SDG&E will develop/procure modeling tools to
4 conduct the quantitative analysis to select the best option under the distribution reliability/power
5 quality. This analysis includes the calculation of quantitative benefits and cost for the different
6 use cases and application to be proposed by SDG&E for all utility-owned energy storage systems.
7 SDG&E will use these modeling tools to analyze and optimize each of the proposed systems to
8 compare with other traditional and alternative options for each of the use cases and applications to
9 be proposed by SDG&E. SDG&E is proposing in the testimony of Ms. Fang the cost recovery
10 for these expenses to procure/develop the modeling tools.

11 **V. CONSISTENT EVALUATION PROTOCOL**

12 The Energy Storage Decision directed SDG&E and the other IOUs to use a consistent
13 evaluation protocol (“CEP”) to analyze the offers received for each of the RFOs to be proposed
14 by each utility. SDG&E will utilize the CEP for all shortlisted bidders in both the 2016 Preferred
15 Resources RFO and the Distribution Reliability RFP as described in Sections III and IV, above. The
16 CEP will be used as a benchmarking tool but will not be used as the basis for bid selection by
17 SDG&E.

18 **VI. CONCLUSION**

19 SDG&E asks the Commission to approve the evaluation methodologies described above.
20 This concludes my prepared direct testimony.

1 **VII. STATEMENT OF QUALIFICATIONS**

2 My name is Randy Nicholson. My business address is 8306 Century Park Court, San
3 Diego, California 92123. I am employed by SDG&E as Policy Manager for SDG&E’s Advanced
4 Technology Integration group. My current responsibilities include developing policy and strategy for
5 SDG&E’s energy storage portfolio and procurement efforts, and representing SDG&E on regulatory
6 and legislative issues at the state and federal level. I have been employed by SDG&E since 2007
7 and have held various management level positions focusing primarily on energy policy, capacity
8 procurement, resource adequacy, and CAISO market design.

9 I have a B.A. from the University of California, San Diego, and a J.D. from Golden Gate
10 University School of Law in San Francisco.

11 I have not testified previously before this Commission.