



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

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Application of Pacific Gas and Electric Company (U 39-E) for Authorization to Procure Energy Storage Systems during the 2016-2017 Biennial Procurement Period Pursuant to Decision 13-10-040	Application 16-03-001 (Filed March 1, 2016)
Application of Southern California Edison Company (U338-E) for Approval of Its 2016 Energy Storage Procurement Plan.	Application 16-03-002 (Filed March 1, 2016)
Application of San Diego Gas & Electric Company (U 902 M) for approval of Energy Storage Procurement Framework and Program as Required by Decision 13-10-040	Application 16-03-003 (Filed March 1, 2016)

**OPENING BRIEF OF SAN DIEGO GAS & ELECTRIC (U902 E) COMPANY**

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**OPENING BRIEF OF SAN DIEGO GAS & ELECTRIC (U902 E) COMPANY**

Pursuant to the June 3, 2016 *Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judge* (“scoping memo”) issued in the above consolidated matters, San Diego Gas & Electric Company (“SDG&E”) submits this opening brief.

**I. PROCEDURAL BACKGROUND**

On October 21, 2013, the Commission issued Decision (“D.”) 13-10-040 (the “Energy Storage Decision”) adopting procurement targets for SDG&E to procure energy storage systems during 2014-2020.<sup>1</sup> The Energy Storage Decision (at Appendix A) also included an energy storage procurement framework and design program to achieve procurement targets, and it ordered the utilities to file procurement applications containing a proposal for procuring energy storage resources. *See*, Energy Storage Decision, Appendix A, Section 3.d.

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<sup>1</sup> SDG&E’s procurement target is indicated in Table JG-1 of SDG&E witness Joshua M. Gerber’s testimony, Ex. SD-1. SDG&E’s record exhibits in this proceeding are cited as follows: “Ex. SD-[exhibit number] ([witness surname]) at [page:line number(s)].”

Pursuant to the Energy Storage Decision, SDG&E filed its first such application, A.14-02-006, which proposed SDG&E's 2014 biennial electric storage procurement plan, and which D.14-10-045<sup>2</sup> subsequently approved. The instant Application (16-03-003) provides SDG&E's 2016 biennial electric storage procurement plan, which updates the prior plan based on data and experience from the past two years.

In support of this application, SDG&E submitted prepared direct testimony with the application as follows: Joshua M. Gerber – an overview of SDG&E's energy storage procurement; Patrick K. Charles – procurement methodology; Randy Nicholson – evaluation; and Cynthia Fang – rates. Amended testimony for Mr. Gerber was served on April 5, 2016, and second revised testimony for Ms. Fang was served on June 22, 2016.<sup>3</sup> Subject to confirmation by Judge Cooke, SDG&E has identified as its evidentiary exhibits, and offers in evidence, the final version of the testimony for each witness as follows: Gerber, Ex. SD-1;<sup>4</sup> Charles, Ex. SD-2; Nicholson, Ex. SD-3; and Fang, Ex. SD-4.<sup>5</sup>

After a prehearing conference was held in the consolidated dockets on May 24, 2016, the scoping memo issued, setting for briefing six issues (at 4-5), which are set forth in this brief *seriatim*, as the heading in the next section.

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<sup>2</sup> *Decision Approving ... [SDG&E], Pacific Gas & Electric Company and Southern California Edison Company's Storage Procurement Framework and Program Applications for the 2014 Biennial Procurement Period*

<sup>3</sup> Per Judge Cooke's ruling at the May 24, 2016 prehearing conference (transcript, p. 49), on June 3 SDG&E submitted revised testimony for Ms. Fang to remove out-of-scope discussion of the Joint IOU Protocol for the power charge indifference adjustment ("PCIA"). SDG&E served a second revision of Ms. Fang's testimony on June 22, which removed references to cost recovery, an issue that the scoping memo (at 5) held is out-of-scope for this proceeding.

<sup>4</sup> This is Mr. Gerber's amended testimony.

<sup>5</sup> This is Ms. Fang's second revised testimony.

## II. ISSUES FOR DETERMINATION

### 1. Should PG&E's, SCE's, and SDG&E's proposed procurement plans for the 2016 Biennial Solicitation be adopted?

Yes. See below.

### 2. Do the proposed procurement plans, including the evaluation methodologies for shortlisting the utilities' 2016 Energy Storage RFO protocols, comply with D.13-10-040 and D.16-01-032?

Yes. While SDG&E is in compliance with its various Commission-established 2016 procurement targets in each domain, SDG&E believes there are near-term opportunities to address local capacity and preferred resource requirements with energy storage resources – and SDG&E is moving on an accelerated timeline to address those requirements. Similarly, SDG&E believes there are opportunities to address evolving needs on the distribution system with storage technologies. To explore these opportunities, and as outlined in supporting testimony submitted in this proceeding, SDG&E is currently running Request for Offers (“RFO”) seeking energy storage resources to provide local resource adequacy capacity.<sup>6</sup> Additionally, SDG&E proposes to issue a Request for Proposals (“RFP”) seeking energy storage resources to enable some measure of distribution capacity deferral, or to address reliability and/or provide outage management support. *See*, Ex. SD-1 (Gerber) JMG-3:6-13.

Across both the RFO and the RFP, SDG&E seeks to procure energy storage in the customer, distribution, and transmission domains, for purposes ranging from local capacity to distribution system reliability, and under a variety of ownership structures, including third-party, utility and customer. The breadth of interconnection domains, use cases, and ownership

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<sup>6</sup> On February 26, 2016, SDG&E issued its 2016 Preferred Resources LCR RFO that includes five product types: 1) Demand Response (“DR”), 2) Energy Efficiency (“EE”), 3) Renewables, 4) Energy Storage (“ES”), and 5) Distributed Generation (“DG”). Energy storage-based offers could be offered into the DR, ES or DG product types depending on configuration and operating characteristics. *See*, Ex. SD-1 (Gerber) JMG-9:7-JMG-10:22.

structures in SDG&E’s proposed procurement plan is consistent with the guiding principles established in Assembly Bill 2514,<sup>7</sup> and the framework objectives outlined in D.13-10-040 and D.16-01-032.

**a. Evaluation Protocol for the 2016 Preferred Resources RFO seeking Local and Flexible Capacity**

Similarly, SDG&E’s proposed evaluation methodologies for shortlisting energy storage projects are consistent with the Energy Storage Decision and D.16-01-032. The Energy Storage Decision authorizes the utilities to create proprietary evaluation methodologies for energy storage solicitations. As outlined in its supporting testimony,<sup>8</sup> SDG&E’s proposed evaluation protocols for its 2016 energy storage procurement efforts are both consistent with these authorizations, and identical to the Commission-approved 2014 evaluation protocols.

In this RFO, energy storage will compete head-to-head with distributed generation, energy efficiency, demand response, and renewable generation resources to provide local and/or flexible capacity in the San Diego area. SDG&E is proposing to evaluate and rank storage offers providing a local or flexible capacity product based on Least-Cost, Best-Fit (“LCBF”) principles. The LCBF analysis evaluates both quantitative and qualitative aspects of each offer to estimate its value to SDG&E’s customers and its relative value in comparison to other offers. The valuation of an offer takes into account both benefits and costs. The primary quantitative metric

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<sup>7</sup> *Codified in pertinent part in* Pub. Util. Code §2835(a) (3). These guiding principles include (Ex. SD-1 (Gerber) JMG-2:6-13:

- The optimization of the grid, including peak reduction, contribution to reliability needs, or deferment of transmission and distribution upgrade investments;
- The integration of renewable energy, and
- The reduction of greenhouse gas emissions to 80 percent below 1990 levels by 2050, per California’s goals.

<sup>8</sup> Ex. SD-3 (Nicholson) 3:3-7:1.

used in SDG&E’s LCBF process is a Net Market Value (“NMV”) calculation. The NMV calculation is a quantification of the value of an offer when compared to a set of price benchmarks for capacity, electrical energy, ancillary services, natural gas, and Green House Gas (“GHG”) compliance. Additionally, SDG&E may consider effects on the portfolio (costs or benefits) associated with the offer. These benefit and cost components are netted and discounted to yield a NMV for each offer. The NMV of an offer is compared to the NMV of other offers to determine whether that offer is one of the highest ranked from a quantitative perspective.

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

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

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

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

- Net Capacity Benefits – to the extent the capacity provided by the energy storage project can be counted towards SDG&E’s local or system RA requirements.

- Net Flexible Capacity Benefits – to the extent capacity provided by the energy storage project can be counted towards SDG&E’s discrete flexible RA requirements.
- Net Energy Benefits.
- Net Ancillary Services Benefits.
- Residual Capacity and Energy Benefits – for utility owned projects, SDG&E will require that bidders guarantee the rated capacity of each storage system some term. At the end of the capacity guarantee period, the system will have 100% of its rated capacity, and can be operated for some additional period, providing residual capacity and energy benefits without incurring additional capacity guarantee costs. SDG&E will require bidders for utility owned projects to guarantee degradation using an agreed-upon post-capacity guarantee use profile, and will use this information to quantify residual capacity and energy benefits for these offers.

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

- Energy storage agreement (contract) costs – SDG&E will calculate a levelized contract cost
- Interconnection costs – Network upgrade costs for interconnection of the energy storage system. If an interconnection cost estimate cannot be provided by the bidder due to timing of interconnection studies, SDG&E may assign a network upgrade cap value (based on a reasonable estimate of such costs) for purposes of evaluating the offer. If this cap value is then exceeded when the interconnection cost studies are completed, a walk away provision could be included in the energy storage contract.
- Congestion-related costs if applicable – SDG&E will conduct a marginal analysis to determine the difference in locational pricing between the project’s point of delivery

and SDG&E's default load aggregation point ("DLAP"). SDG&E will work with the Independent Evaluator ("IE") to establish the proper methodology to include this cost as part of the NMV.

- Any other benefits or costs that are identified and able to be suitably quantified may be used in the NMV calculation.

The 2016 Preferred Resource RFO will also solicit utility-owned energy storage systems to provide local and flexible capacity as indicated in the testimony of Mr. Charles (Ex. SD-2). For any utility owned storage bid, SDG&E will calculate all NMV quantitative benefits and quantitative costs as described above. A substantive difference is that for utility-owned energy storage systems, the levelized cost will be derived using traditional utility ratemaking methodologies to calculate revenue requirements for utility-owned infrastructure. SDG&E will then compare on an apples-to-apples basis the cost-effectiveness of utility-owned energy storage capacity versus third-party owned capacity in order to propose the best option. Finally, as described above, SDG&E will consider residual capacity and energy benefits for utility-owned storage projects providing local and flexible capacity.

As with the evaluation methodology used in the 2014 All Source RFO to evaluate the identified costs and benefits, SDG&E will use a proprietary modeling approach that analyzes the charging and discharging of the energy storage system to evaluate the net energy benefits of the energy storage project. Additional modeling performs a quantitative analysis under the LCBF and NMV methodology, and quantifies capacity and ancillary services benefits and includes the modeling of future values for energy, capacity and ancillary services and the corresponding operation of the storage system. Other quantifiable costs include contract costs, network upgrade

costs and congestion costs (or benefits) over the same analysis timeframe. SDG&E will use these modeling tools to analyze and optimize each of the offers received.

Additional project-specific qualitative benefits may be used to further differentiate closely-ranked offers. SDG&E will conduct a process to normalize for different lengths of contracts, useful lives of the storage asset where applicable, technology, operational characteristics and risk profiles. Qualitative factors and benefits will be used to determine which projects are the “Best Fit” for SDG&E’s portfolio. SDG&E may use these factors to determine advancement onto the short list or evaluate tie-breakers, if any. Qualitative factors may include, but are not limited to, project viability, diversity, and adherence to terms and conditions.

**b. Evaluation Protocol for Distribution Reliability/Power Quality Request for Proposals (Ex. SD-3 (Nicholson) 7:2-8:10)**

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

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<sup>9</sup> D.13-10-040 at 5.

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

To evaluate these costs and benefits, SDG&E will develop/procure modeling tools to conduct the quantitative analysis to select the best option under the distribution reliability/power quality. This analysis includes the calculation of quantitative benefits and cost for the different use cases and application to be proposed by SDG&E for all utility-owned energy storage systems. SDG&E will use these modeling tools to analyze and optimize each of the proposed systems to compare with other traditional and alternative options for each of the use cases and applications to be proposed by SDG&E.

**3. Have the utilities correctly counted existing eligible energy storage credits toward their 2016 energy storage?**

Based on the counting rules established in D.13-10-040, and Commission prior approval in D.14-10-045, SDG&E has correctly counted its existing eligible energy storage credits towards its 2016 energy storage procurement targets. In addition to the 50.81 MW previously

approved by the Commission, SDG&E has requested approval of an additional 28.29 MW of Total New Incremental Capacity from the 2014 Energy Storage Procurement Cycle.<sup>10</sup>

As set forth in Mr. Gerber’s testimony,<sup>11</sup> the Commission authorized SDG&E in 2014 to count 50.81 MW of existing or in-progress storage projects towards SDG&E’s 165 MW target.<sup>12</sup> This authorization included: 1) SDG&E’s Lake Hodges Pumped Hydro project, 2) energy storage deployed in SDG&E’s Borrego Springs Microgrid project, and 3) energy storage systems deployed as part of SDG&E’s 2012 General Rate Case. The remaining quantity comes from existing customer side programs such as Self-Generation Incentive Program (“SGIP”) and Permanent Load Shifting program, which are approved for procurement eligibility in the Energy Storage Decision.<sup>13</sup>

For new projects procured subsequent to D.14-10-045, SDG&E has requested approval for counting an additional 20 MW transmission level energy storage project, procured as a result of its 2014 All Source RFO, and an additional 8.29 MW of customer domain energy storage which has been installed or is progressing through SDG&E’s customer generation interconnection queue.

To date, the Commission has not established a framework for the implementation of the “50-50 counting rules” established in D.16-01-032.<sup>14</sup> Therefore SDG&E has shown the full amount as an expected offset against its targets. SDG&E believes that a framework should be

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<sup>10</sup> Ex. SD-1 (Gerber), Table JG-4 at p. JMG-8.

<sup>11</sup> Ex. SD-1 (Gerber) table JG-3, p. JMG-6.

<sup>12</sup> D.14-10-045, Attachment A.

<sup>13</sup> *Id.*

<sup>14</sup> D.16-01-032, conclusion of law 29.

established which provides a process for a CCA or ESP to verify that the SGIP funded project is in their territory and to submit that request to the applicable utility.

**4. Are the safety requirements in the utilities' 2016 Energy Storage RFO protocols reasonable and will the utilities' proposed procurement plans ensure safe and reliable delivery of energy to customers?**

SDG&E comprehensively considers safety in its energy storage procurement efforts. SDG&E's safety requirements are reasonable and they will ensure safe and reliable delivery of energy to customers. SDG&E's safety requirements for energy storage procurement are explained in detail below and in Attachment A.

SDG&E takes seriously its efforts to ensure its energy storage procurements yield storage systems that are designed, constructed and operated safely, regardless of use case or ownership structure. SDG&E's recently issued 2016 Preferred Resources Local Capacity Requirement ("LCR") Request for Offer ("RFO") illustrates SDG&E's commitment to safety. For utility-owned energy storage systems, SDG&E will undertake a comprehensive evaluation of all components of each respondent's offers. This evaluation will include a pre-evaluation process where SDG&E will evaluate counterparty risk, including the respondent's prior experience in safely constructing and operating energy storage systems, the technical merit of the proposed system, including safety components, and overall project cost.

On March 18, 2016, respondents who expressed interest in submitting offers for utility-owned projects received an addendum and associated documents to the 2016 Preferred Resources LCR RFO detailing additional requirements for utility owned offers, setting forth each respondent's obligations, describing the procedures that each respondent must follow, and outlining the pre-evaluation process each conforming offer will undergo.

As part of the pre-evaluation process, SDG&E will collect safety plans on utility-owned offers. SDG&E will qualitatively evaluate and rank respondents based on the quality of depth of

their proposed safety plans. In addition, respondents submitting offers to provide utility-owned energy storage systems must construct their proposed systems in compliance with SDG&E's Energy Storage Technical Specification.<sup>15</sup> While respondents are permitted to redline the Technical Specification, SDG&E discourages material modifications and will consider any material modifications in the pre-evaluation process. Safety considerations and requirements are embedded throughout the Technical Specification. As outlined in Attachment A, safety requirements are particularly prevalent in Sections 1.1, 1.2, 4.4, 4.7, 4.13, and Appendix B of the Technical Specifications.

In addition, the pro forma EPC contract SDG&E supplied to EPC respondents on March 18, 2016 also outlines safety obligations respondents must adhere to. While respondents are permitted to redline the pro forma, SDG&E again discourages modifications and will consider any material modifications in the pre-evaluation process. Safety considerations and requirements are embedded throughout the pro forma and are particularly prevalent in Section 3.10. *See* Attachment A.

For third-party-owned energy storage systems offering a local capacity product like that solicited in the 2016 Preferred Resource LCR RFO, SDG&E requires, as a condition of conformance (determined during the initial stages of offer processing), that respondents commit to operating and maintaining their facility in accordance with accepted electrical practices, applicable law and industry standards, including those that are related to safety.

If the respondent is unwilling to commit to these requirements in their offer package, the offer will be considered non-conforming and be removed from further consideration. If the respondent does commit to these requirements in their offer package, and their offer is ultimately

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<sup>15</sup> SDG&E provided the technical specification to all utility-owned respondents on March 18, 2016.

shortlisted and the energy storage contract fully executed, the third party owner and operator of the energy storage system under contract to SDG&E is then contractually bound to the safety provisions in the energy storage agreement. Attachment A hereto outlines those provisions.

**5. Are the terms and conditions for the provision of energy storage services in the utilities' 2016 Energy Storage RFO protocols reasonable?**

Yes. As part of the supporting testimony submitted with A.16-03-003, SDG&E attached copies of two RFO documents that include elements of energy storage procurement and are included in SDG&E's 2016 Preferred Resources LCR RFO: the Demand Response RFO and the Energy Storage RFO.<sup>16</sup> These documents describe the overall procurement process, respondent and offer participation and eligibility requirements, credit support terms and conditions, evaluation process and criteria as well as offer rejection and confidentiality provisions and a description of the overall program parameters and involvement of the Procurement Review Group and the Independent Evaluator ("IE"). In short, these documents describe the terms and conditions for the provision of energy storage in the 2016 cycle.

The 2016 Preferred Resources LCR RFO follows from SDG&E's 2014 All Source LCR RFO that also included a Demand Response and an Energy Storage product type and both solicitations are based on the same procurement authority<sup>17</sup> and therefore include nearly identical requirements. The RFO terms and conditions included in the 2016 solicitation are nearly identical to those included in the 2014 All Source LCR RFO, but in some areas the requirements have evolved to reflect the maturation of some product types. For example, in the 2014 All Source LCR RFO related to energy storage, there was not a specific requirement related to

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<sup>16</sup> Ex. SD-2 (Charles) Attachments A and B. Ex. SD-2 (Charles) PKC-1:13 – PKC-9:11, describes SDG&E's energy storage procurement methodology.

<sup>17</sup> Both the 2014 All Source LCR RFO and the 2016 Preferred Resources LCR RFO are based on the authorization to procure from D.14-03-004, *Decision Authorizing Long-Term Procurement for Local Capacity Requirements Due to Permanent Retirement of the San Onofre Nuclear Generation Station*.

interconnection progress, but in the 2016 Preferred Resources LCR RFO related to Energy Storage, a completed phase one interconnection study is required.<sup>18</sup>

The following three factors are the primary support for the reasonableness of the terms and conditions included in SDG&E's 2016 energy storage-related RFO protocols:

- 1) The opinion of the IE as to the adequacy (and reasonableness) of SDG&E's 2014 All Source LCR RFO materials;
- 2) The fact that, in response to SDG&E's 2014 All Source LCR RFO, SDG&E received a robust response and entered into a 20 year Energy Storage agreement with Hecate Energy Bancroft LLC for a 20 MW battery energy storage project to be located in SDG&E's service territory; and
- 3) The acceptance of the 2016 Preferred Resources LCR solicitation materials without adverse comment from the IE or complaints from potential respondents and with indications that a robust response is to be expected.

With regard to the opinion of the IE as to the adequacy (and reasonableness) of SDG&E's 2014 All Source LCR RFO materials, SDG&E points to the "San Diego Gas & Electric, Independent Evaluator Report – 2014 LCR RFO" dated March 24, 2016 ("IE Report"), section two, entitled "Adequacy of SDG&E's Outreach" (pp. 10-11).<sup>19</sup> Section 2.2, titled "Solicitation Material" describes in depth the RFO materials and means by which SDG&E promulgated these materials. In addition, the IE describes the process SDG&E observed in terms of changes to the RFO materials and the question and answer process SDG&E utilized during the

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<sup>18</sup> Or a repowering of comparably sized existing facility in accordance with the CAISO Business Practice Manual for Generator Management.

<sup>19</sup> This report (public version) is posted as part of A.16-03-014, SDG&E's Track IV All-Source RFO application, at:

<http://www.sdge.com/regulatory-filing/17416/sdge%E2%80%99s-track-iv-all-source-rfo-application>

solicitation. The 2016 Preferred Resources LCR RFO mirrored the 2014 process and SDG&E retained the same IE (P. A. Consulting) as used for the 2014 All Source LCR RFO, and, to date, the IE has not raised concerns regarding the 2016 solicitation materials and/or process suggesting that the 2016 materials will be evaluated any differently than the 2014 materials. In short, the IE Report states “In PA’s opinion, SDG&E provided appropriate RFO solicitation materials and provided prompt response to any questions received by potential bidders.”<sup>20</sup>

In response to the 2014 All Source LCR RFO, SDG&E received in excess of 300 offers, of which more than half were in the energy storage product type, and more than 60 were in the demand response product type. This indicates to SDG&E a very robust market response to these solicitations. Based on this response and the evaluation of the offers for conformance, and then further qualitative and quantitative analysis and contract negotiations, SDG&E entered into a 20 year energy storage agreement with Hecate Energy Bancroft LLC for a 20 MW battery energy storage project to be located in SDG&E’s service territory. SDG&E has requested approval of that contract from the Commission via A.16-03-014, available on SDG&E’s website.<sup>21</sup>

SDG&E issued the 2016 Preferred Resources LCR RFO on February 26, 2016, and a bidder’s conference was conducted in-person (and via conference call / webinar) at SDG&E’s Energy Innovation Center facility on April 13, 2016. More than 50 attended in person and more than 90 participated remotely via the conference call / webinar. Numerous questions were received and answers provided,<sup>22</sup> and, to date, nearly 150 questions have been answered in

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<sup>20</sup> IE Report, p. 11.

<sup>21</sup> SDG&E’s A.16-03-014 is available here: <http://www.sdge.com/regulatory-filing/17416/sdge%E2%80%99s-track-iv-all-source-rfo-application>

<sup>22</sup> Question and answer documents are available for each of the product types included in the 2016 Preferred Resources LCR RFO, and four additional documents related to matters pertaining to all product types on the RFO website, here: <http://www.sdge.com/procurement/2016PrefResourcesLCRRFO>

writing, including more than 20 energy storage questions and more than 30 demand response related questions.<sup>23</sup> The IE was involved in the development of the solicitation materials and in answering potential offeror questions. Throughout this process, the IE has not provided any adverse comments regarding the reasonableness of the 2016 Preferred Resources LCR RFO terms and conditions, nor have any potential respondents made complaints related to these terms and conditions. Based on the interactions with potential respondents and registrations received to date on Power Advocate (the web-based platform through which SDG&E receives offers), SDG&E expects a robust response to its 2016 Preferred Resources LCR RFO.

**6. Should SDG&E be allowed to include a contingency provision in its selection process that shortlisted offers may be considered non-conforming in the event that the Commission does not adopt SDG&E's proposed time of use periods in A.15-04-012 as amended on February 9, 2016?**

Yes. In the 2014 All Source LCR RFO for the demand response product type, SDG&E deemed that demand response offers based on energy storage technology installed behind the customer meter would be considered conforming on a contingent basis: these bids would only be considered conforming if the updated time-of-use ("TOU") periods requested by SDG&E are approved by the Commission.<sup>24</sup> SDG&E submits that the old, out-of-date TOU periods do not accurately reflect the costs to serve customers, and SDG&E has therefore applied to update these

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<sup>23</sup> The referenced questions and answers are posted at:

[https://www.sdge.com/sites/default/files/documents/64776091/2016\\_PreferedResourcesLCRRFO%20-%20FAQs%20-%20Egy%20Storage.pdf?nid=17456](https://www.sdge.com/sites/default/files/documents/64776091/2016_PreferedResourcesLCRRFO%20-%20FAQs%20-%20Egy%20Storage.pdf?nid=17456) ;  
[https://www.sdge.com/sites/default/files/documents/1982802527/2016\\_PreferedResourcesLCRRFO%20-%20FAQs%20-%20DR.pdf?nid=17451](https://www.sdge.com/sites/default/files/documents/1982802527/2016_PreferedResourcesLCRRFO%20-%20FAQs%20-%20DR.pdf?nid=17451)

<sup>24</sup> Ex. SD-2 (Charles) Attachment B, p. 14.

TOU periods.<sup>25</sup> Because the old TOU periods do not accurately reflect the costs to serve customers, SDG&E believes that the behind-the-meter storage devices will operate in response to inaccurate price signals, that this will result in the avoidance of some on-peak commodity and/or demand charges, and that these offers will therefore be subsidized by other customers, in violation of the RFO's conformance criteria. The IE (PA Consulting) agreed with these points.<sup>26</sup>

PA agreed with SDG&E that ratepayers are best served by a TOD pricing program in which period definitions are correctly aligned with supply costs. SDG&E's TOU periods ought to reflect true costs. And, if TOU periods didn't reflect true costs, PA agreed that resources which profit from TOU differentials (like storage) would be receiving payments that were not commensurate with the benefits provided.

This contingency is still in place for the DR product type within SDG&E's 2016 Preferred Resources LCR RFO. This contingency is described in the DR product type RFO,<sup>27</sup> and that document lists as resource criteria number four the conformance requirement that this situation violates (p. 8).

This requirement is reasonable because such a subsidy means that some customers will pay more than their fair share (those customers that do not have such energy storage devices), and others will pay less than their fair share (those that do have such energy storage devices and are operating them in response to the out-of-date TOU periods). This inaccuracy in the rate

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<sup>25</sup> The request to update the TOU periods, made in A.15-04-012, is still pending before the Commission, and is available here: <http://www.sdge.com/sdge-2016-GRC-Phase-2>. For a summary of the TOU period change request, see A.15-04-012, Chapter 1 – Testimony of Cynthia Fang, Table 2, pp. CF-20-CF-21 (found at the forgoing link).

<sup>26</sup> IE Report, p. 19. In an aside, the IE did not agree that this situation was a “subsidy,” at least from the “normal bidder” perspective, because it was “not part of an identified and approved subsidy program.” *Id.* The IE Report did not specifically comment on the overall reasonableness of these conformance criteria since the contingent conforming bids from the 2014 All Source LCR RFO were not competitive on a net market value basis.

<sup>27</sup> *Id.*, p. 25. The DR RFO document is available here: <https://www.sdge.com/sites/default/files/documents/699306575/2016%20SDGE%20PrefRes%20RFO%20DR.pdf?nid=17171>

structure is not sustainable, is inherently unfair, and does not observe the sound rate making principle of cost causation.<sup>28</sup>

### III. CONCLUSION

For the reasons set forth above and in its application, SDG&E requests that the Commission approve its energy storage procurement framework.

Respectfully submitted,

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<sup>28</sup> Cost causation means that the rates that customers pay should accurately reflect the costs to serve those customers.

**ATTACHMENT A**

## **Relevant Safety Provisions From SDG&E's Energy Storage Technical Specification for Utility Owned Storage Projects**

### **1.1. Applicable Documents**

Except as modified herein, the ESS, including the storage assemblies, Power Conversion System, and Site Energy Controller shall be designed, manufactured, and tested in compliance with the latest revision of the applicable standards of ANSI, IEEE, NEC, CPUC General Orders, NEMA, OSHA, ASTM, ASME, and the California Division of Industrial Safety Regulations. See Appendix B for applicable Standards and Codes.

### **1.2. Safety**

- 1.2.1. The ESS must be compliant with IEEE 1547 and UL 1642 as appropriate. Systems must be able to protect themselves from internal failures and utility grid disturbances. As such, systems must be self-protecting for AC or DC component system failures. In addition, systems must be able to protect themselves from various types of external faults and other abnormal operating conditions on the grid.
- 1.2.2. Systems must be designed to be in compliance with applicable safety standards with regard to construction and potential exposure to chemicals and with regard to module or enclosure resistance to hazards such as ruptures and exposure to fire.
- 1.2.3. For all ESS equipment, the Contractor shall provide information on all known or anticipated safety issues related to the equipment, including appropriate responses on how to handle the energy storage system in case of an emergency, such as fires or module ruptures.
- 1.2.4. Systems must be designed such as to minimize risk of injury to the workforce and public during installation, maintenance, and operation.
- 1.2.5. Visual and audible alarms should be included as necessary to ensure safety, for events such as chemical leaks or fires.

### **4.4 System Protection Requirements**

- 4.4.1. Contractor shall adhere to rules and regulations described on SDG&E's Process For Generation Interconnection Customers website (<http://www.sdge.com/direct-access/electricity/process-generation-interconnection-customers>). SDG&E will not consider energy storage systems that do not adhere to these requirements.

- 4.4.2. Protection relays for the interconnection shall be utility grade and shall meet the minimum requirements specified in IEEE C37.90 (latest edition) including requirements for EMI and surge withstand according to applicable standards for the intended location of the ESS.
- A complete protective relaying system based on prudent industry practices shall be a part of the AC system. The protective relaying and metering shall be integrated with the ESS control system and communications channel to SDG&E's SCADA system. However, integration into the ESS control system shall not circumvent normal protective relaying functions. All protective equipment and schemes shall be properly coordinated with the protection of the utility substation where the ESS is located. Information on the protective relaying system for each location will be provided to the successful Contractor.
- The Contractor shall use microprocessor type protection equipment to the extent possible. As a minimum, the Contractor shall provide differential and phase and neutral overcurrent protection for the main step-up transformer.
- The low side bus and cable shall be protected by differential and overcurrent relays.

#### **4.7. Physical Characteristics**

- 4.7.1. Systems shall meet all Occupational Safety and Health Administration (OSHA), National Electric Code (NEC), and National Fire Protection Association (NFPA) requirements for electrical and fire safety.
- 4.7.2. Systems shall be designed to minimize footprint and volume. Systems may also be designed to include subsurface components or modules, provided relevant operating and environmental factors normally addressed for submersible equipment are considered to assure full life-cycle performance requirements are met.
- 4.7.3. The ESS components shall be contained within weatherproof, tamper resistant, metal enclosures suitable for mounting outdoors on a concrete, fiberglass or equivalent pad with a minimum NEMA 3R rating if installed in a standalone outdoor application, or within a building that meets all seismic, safety, and fire resistance requirements stated in this specification.
- 4.7.4. Any enclosures (if applicable) shall be dust tight, except as designed to allow forced air exchange with the atmosphere.
- 4.7.5. ESS Modules (if applicable), PCS, and controls shall be accessible and removable for replacement.

- 4.7.6. All necessary safety signs and warnings as described in ANSI Z535-2002 (entire series from Z535.1 through Z535.6) shall be included on the building or each enclosure.
- 4.7.7. All necessary signs and warnings for identification of hazardous materials as described in NFPA 704 shall be included on the building or each enclosure.

**4.13 Information Security**

- 4.13.1 Contractor shall design the ESS to be hardened against willful attack or human negligence as per NISTIR 7628. See Appendix G for details.
- 4.13.2 Contractor shall contract information/cyber security scans and penetration tests by an SDG&E approved 3rd party security company, prior to SDG&E acceptance. SDG&E reserves the right to perform its own internal security testing in addition to the Contractor’s testing.
- 4.13.3 Contractor shall develop a cybersecurity plan that addresses and mitigates the critical vulnerabilities inherent in both the hardware and software that comprise the control and data acquisition systems.

**APPENDIX B: Applicable Standards and Codes**

<b>1</b>	<b>ANSI/IEEE C2</b>	National Electric Safety Code
<b>2</b>	<b>IEEE 519</b>	IEEE Recommended Practices and Requirements for harmonic Control in Electrical Power Systems
<b>3</b>	<b>IEEE 1547</b>	IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems
<b>4</b>	<b>IEEE 1547.1</b>	Standard Conformance Test Procedure for Equipment Interconnecting Distributed Resources with Electric Power Systems
<b>5</b>	<b>IEEE 1547.2</b>	Interconnecting Distributed Resources with Electric Power Systems
<b>6</b>	<b>IEEE 1547.3</b>	Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems
<b>7</b>	<b>ANSI Z535</b>	Product Safety Signs and Labels
<b>8</b>	<b>ANSI C57/IEEE</b>	Transformer Standards, whenever applicable
<b>9</b>	<b>ANSI C37/IEEE</b>	Surge withstand capabilities, whenever applicable
<b>10</b>	<b>UL 1642/IEC 62133</b>	Applicable sections related to battery cell safety, where applicable
<b>11</b>	<b>UL 1741</b>	Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources
<b>12</b>	<b>NFPA 704</b>	Standard System for the Identification of the Hazards of Materials for Emergency Response

13	UL 1778	Underwriters Laboratory’s Standard for Uninterruptible Power Systems (UPS) for up to 600V A.C.
14	Electric Tariff Rule 21	Generating Facility Interconnections
15	NISTIR 7628	Guidelines for Smart Grid Cyber Security

**Relevant Safety Provisions from SDG&E’s EPC Pro Forma for Utility Owned Storage Projects**

3.10 **Site Security and Safety.** Contractor shall, and shall cause its Subcontractors to, comply with Contractor’s Safety and Site Security Procedures and “Hot Work Requirements” set forth in Exhibit D. Without limitation of Section 3.2, Contractor is solely responsible for ensuring that the Work is performed in a safe manner and in compliance with all provisions of this Agreement, and Applicable Laws and Industry Standards, regarding worker health and safety, including the Occupational Safety and Health Act of 1970 (84 U.S. §§ 1590 et seq.) and any state plans approved thereunder, and regulations thereunder, to the extent applicable. Within thirty (30) days after the Full Notice to Proceed Date, Contractor shall provide draft Site specific environmental, health and safety plan for Owner review. Within sixty (60) days after the Full Notice to Proceed Date, Contractor and Owner shall agree on a Site specific environmental, health and safety plan to be used by Contractor in the performance of the Work. Contractor shall perform all Work in accordance with the approved Site specific environmental, health and safety plan. Contractor shall appoint one (1) or more (as appropriate) safety and environmental representative(s) acceptable to Owner who shall be stationed at the Site during any period in which Work is being performed at the Site, and shall have responsibility to immediately correct unsafe conditions or unsafe acts associated with the Work, act on behalf of Contractor on safety, health and environmental matters, and participate in periodic health, safety and environmental meetings with Owner after Work has commenced at the Site. Contractor further agrees to provide or cause to be provided necessary training and safety equipment to its employees and Subcontractors, and to the employees and subcontractors of Owner or the Other Contractors entering the Site, to ensure their compliance with the foregoing health, safety and environmental rules and standards and enforce the use of such training and equipment. Contractor shall maintain all accident, injury and any other documents and records required by Applicable Laws or reasonably required by Owner.

**Relevant Safety Provisions from SDG&E’s Energy Storage Agreement for Third Party Owned Storage Projects**

*8.1.4 Seller shall maintain and make available to Buyer and the CPUC, or any division thereof, records including logbooks, demonstrating that the Project is operated and maintained in accordance with Accepted Electrical Practices, Applicable Law and Industry Standards, including those related to safety. Seller shall comply with all reporting requirements and permit on-site audits, investigations, tests and inspections permitted or required under any Industry Standards or Applicable Laws.*

8.1.7 *Seller shall, during the Term, only employ appropriately qualified (determined in Seller's reasonable opinion consistent with Accepted Electrical Practices) personnel for the purposes of operating and maintaining the Project. Seller shall at all times require such personnel to adhere to all applicable safety standards in accordance with Accepted Electrical Practices, Applicable Law and Industry Standards.*

“Accepted Electrical Practices” means those practices, methods, applicable codes and acts engaged in or approved by a significant portion of the electric power industry during the relevant time period, or any of the practices, methods and acts which, in exercise of reasonable judgment in light of the facts known at the time a decision is made, could have been expected to accomplish a desired result at reasonable cost consistent with good business practices, reliability, safety and expedition. Accepted Electrical Practices are not intended to be limited to the optimum practices, methods or acts to the exclusion of other, but rather to those practices, methods and act generally accepted or approved by a significant portion of the electric power industry in the relevant region, during the relevant time period, as described in the immediately preceding sentence.

“Applicable Laws” means all applicable statutes, laws, court decisions, ordinances, rules, order, writ, subpoena or regulations of any Governmental Authority, or the rules or regulations of any exchange or control grid operator.

“Industry standards” is defined in section 8.1.1 of the agreement:

*8.1.1 When notified of a dispatch by Buyer (or the CAISO), Seller shall operate the Project in accordance with Accepted Electrical Practices, Applicable Laws, Permit Requirements and applicable California utility industry standards, including without limitation the standards established by the California Electricity Generation Facilities Standards Committee, pursuant to Public Utilities Code Section 761.3, and enforced by the CPUC, and CAISO-mandated standards, as set forth in Section 5 of the Tariff (collectively, “Industry Standards”). In addition, Seller shall at all times maintain and operate the Energy Storage System in a safe manner as required by Accepted Electrical Practices, Industry Standards, statutes, regulations or other Applicable Law.*