

PUBLIC UTILITIES COMMISSION

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November 27, 2018

**Advice Letter 5322-E**

Erik Jacobson  
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**SUBJECT: Energy Storage Contracts Resulting From PG&E's Local Sub-Area  
Request for Offers Per Resolution E-4909**

Dear Mr. Jacobson:

Advice Letter 5322-E is effective as of November 8, 2018 per Resolution E-4949  
Ordering Paragraphs.

Sincerely,

A handwritten signature in dark ink that reads "Edward Randolph".

Edward Randolph  
Director, Energy Division

June 29, 2018

## **Advice 5322-E**

(Pacific Gas and Electric Company ID U 39 E)

Public Utilities Commission of the State of California

**Subject: Energy Storage Contracts Resulting from PG&E's Local Sub-Area  
Request for Offers Per Resolution E-4909**

### **I. Purpose**

Pursuant to Resolution E-4909 (Resolution), Pacific Gas and Electric Company (PG&E) hereby submits this Advice Letter to seek approval from the California Public Utilities Commission (Commission or CPUC) of four energy storage projects resulting from PG&E's Local Sub-Area Energy Storage Request for Offers (LSA ES RFO):

Counterparty (Project Name)	Storage Technology	On-Line Date	Term (Years)	Discharge Duration (Hours)	Size (MW)	Local Sub-Area
Dynegy Marketing and Trade, LLC (Vistra Moss Landing Energy Storage)	Lithium Ion Batteries	12/01/2020	20	4	300	South Bay – Moss Landing
Hummingbird Energy Storage, LLC (Hummingbird Energy Storage)	Lithium Ion Batteries	12/01/2020	15	4	75	South Bay – Moss Landing
Micronoc Inc. (mNOC AERS Energy Storage)	Lithium Ion Batteries	10/01/2019	10	4	10	South Bay – Moss Landing
Tesla Inc (Moss Landing Energy Storage) <sup>1</sup>	Lithium Ion Batteries	12/31/2020	20	4	182.5	South Bay – Moss Landing

<sup>1</sup> As described more fully below, this is proposed to be a utility-owned project.

## II. Background

On March 15, 2017, the California Independent System Operator (CAISO) Board of Governors approved a Reliability Must Run (RMR) designation for Yuba City Energy Center (Yuba City) in the Pease sub-area and Feather River Energy Center (Feather River) in the Bogue sub-area.<sup>2</sup> On November 2, 2017, the CAISO Board of Governors approved a RMR designation for Metcalf Energy Center (Metcalf) for the Moss Landing sub-area.<sup>3</sup> On November 2, 2017, Calpine filed the three RMR agreements with the Federal Energy Regulatory Commission (FERC).<sup>4</sup>

On January 12, 2018, the Commission issued E-4909, which ordered PG&E to hold one or more competitive solicitations for energy storage and/or preferred resources to address the South Bay – Moss Landing and Pease local sub-area capacity deficiencies and to manage voltage issues in the Bogue sub-area.<sup>5</sup> Furthermore, E-4909 outlined requirements for the solicitation, including evaluation criteria and other considerations that should be applied in the selection of projects from the solicitation.

On February 28, 2018, in compliance with the timeline established by E-4909, PG&E issued its LSA ES RFO. PG&E now submits this Tier 3 Advice Letter seeking approval of four cost-effective energy storage contracts resulting from this RFO to address local capacity deficiencies in the South Bay - Moss Landing local sub-area.

## III. Introduction

The Resolution provided that:

1. PG&E should hold a solicitation at its earliest opportunity, but should PG&E not commence the solicitation within 90 days of its effective date, PG&E must notify the Commission's Executive Director in writing with justification.<sup>6</sup>

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<sup>2</sup> CAISO Board of Governors Memo, Decision on reliability must-run designations for the Yuba City Energy Center and the Feather River Energy Center, [https://www.caiso.com/Documents/Decision-RequestforReliabilityMust-RunDesignations-Memo-Mar2017.pdf].

<sup>3</sup> CAISO Board of Governors Memo, Decision on reliability must-run designation for Metcalf Energy Center, [http://www.caiso.com/Documents/Decision\_ReliabilityMust-RunDesignation\_MetcalfEnergyCenter-UpdatedMemo-Nov2017.pdf].

<sup>4</sup> Metcalf Energy Center filing at [https://elibrary.ferc.gov/idmws/file\\_list.asp?accession\\_num=20171102-5246](https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20171102-5246). Gilroy Energy Center filing for Yuba City and Feather River at [https://elibrary.ferc.gov/idmws/file\\_list.asp?accession\\_num=20171102-5142](https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20171102-5142)

<sup>5</sup> Resolution at 20 (Ordering Paragraph (OP) 1).

<sup>6</sup> *Id.* at 7.

2. For its Solicitation, PG&E was given parameters for the solicitation, which included that it: (a) take into consideration any new or planned transmission solutions;<sup>7</sup> (b) solicit offers for energy storage and/or preferred resources; (c) consider accelerating projects from the 2016 Energy Storage RFO;<sup>8</sup> and (d) if feasible and at a reasonable cost, resources should be online and operational between 2019 and 2022.<sup>9</sup> All resources procured in the solicitation must be located within the relevant local sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues raised in the Resolution.<sup>10</sup>
3. PG&E must coordinate with the CAISO to evaluate the portfolio of resources procured, including consideration of any new or planned transmission solutions, and indicate whether the CAISO agrees they address the deficiencies identified.<sup>11</sup>
4. Resolution E-4909 also addresses several other discrete areas including: (a) that PG&E ensure sellers operate their electrical facilities in accordance with prudent electrical practices;<sup>12</sup> (b) cost recovery, including authorizing PG&E to request recovery for resources procured pursuant to this Resolution through its Cost Allocation Mechanism (CAM);<sup>13</sup> and (c) resources procured pursuant to the Resolution may count toward PG&E's overall storage mandate obligation if the procured resources meet existing eligibility requirements.<sup>14</sup>

#### **IV. Overview of Local Sub-Area Request for Offers (RFO)**

PG&E developed and conducted the Local Sub-Area Request for Offers (LSA ES RFO) in accordance with the requirements of the Resolution. PG&E describes the RFO process below and provides additional detail about its Evaluation Methodology in Appendix L.

##### **A. RFO Structure**

PG&E issued its LSA ES RFO on February 28, 2018 to solicit offers for energy storage, to address the deficiencies in the affected local sub-areas: Pease; Bogue; and South Bay - Moss Landing. Considering the requirement to launch an RFO within 90-days of the final resolution, PG&E chose to seek only energy storage projects, leveraging its recent 2016 Energy Storage Solicitation as a template.

In its LSA ES RFO materials, PG&E provided detailed guidance on project requirements to prospective participants. The RFO required online dates of 2018, 2019 or 2020 and

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<sup>7</sup> *Id.* at 20 (OP 4).

<sup>8</sup> *Id.* at 20 (OP 11).

<sup>9</sup> *Id.* at 20 (OP 5).

<sup>10</sup> *Id.* (OP 6).

<sup>11</sup> *Id.* (OP 9).

<sup>12</sup> *Id.* at 19 (Finding 14).

<sup>13</sup> *Id.* at 20 (OP 15).

<sup>14</sup> *Id.* at 19 (Finding 12).

called for offers for both third-party and utility-owned resources. Offers for third party-owned projects had a minimum size requirement of 1 MW and had to interconnect to one of the feeders or substations associated with the three local sub-areas. Participants had to demonstrate site control, except for the utility ownership project at Moss Landing (on PG&E-owned land) and the Behind-the-Retail Meter (BTM) projects. Offers had to meet the applicable CPUC requirements for duration and CAISO requirements for deliverability, as well as any other requirements that will enable PG&E to receive all the Resource Adequacy (RA) benefits associated with the project.

Participants that submitted offers for the third-party owned projects could seek to execute an Energy Storage Resource Adequacy Agreement (ESRAA) or a Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA). Participants could also submit offers in the three local sub-areas for projects using a Build-Own-Transfer (BOT) Agreement which would be utility-owned projects. BOT projects would be constructed on a third-party owned site, and then PG&E would take ownership at construction completion. Finally, participants could submit offers to construct storage projects at the Moss Landing substation, to be owned and operated by PG&E, using the Turnkey Engineering, Procurement and Construction (EPC) Agreement.

## **B. Participant Outreach**

PG&E announced the issuance of the LSA ES RFO by email notification and provided three e-mail update notifications to PG&E's mailing list, which included approximately 2,700 recipients. The issuance email gave potential participants information on the location of solicitation documents, participant webinar information, and important action items.

LSA ES RFO documents were finalized for release on February 28, 2018 and remain available on the PG&E website.<sup>15</sup> The documents include the LSA ES RFO solicitation protocol which includes information, requirements, and directions to submit a conforming offer. In addition to the LSA ES RFO dedicated website, PG&E set up a LSA ES RFO mailbox ([LocalSubAreaRFO@pge.com](mailto:LocalSubAreaRFO@pge.com)) for participants and other interested parties to submit questions. PG&E received over 100 questions, and posted the questions and corresponding answers that might be useful to all participants in a frequently asked questions (FAQ) document on the website.

On February 28, 2018, PG&E also held a site visit for participants who had expressed an interest in providing EPC services as part of the utility-owned Moss Landing project. Two 90-minute sessions were held, providing over 30 participants with an opportunity to familiarize themselves with the site and to ask questions.

On March 7, 2018, PG&E conducted a participants' conference via webinar to explain the LSA ES RFO solicitation protocol, the offer evaluation methodology, and form

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<sup>15</sup> [www.pge.com/rfo](http://www.pge.com/rfo), Local Sub-Area Energy Storage RFO

agreements as well as answer questions from potential participants. About 100 individuals attended the webinar via phone or WebEx. PG&E posted the presentation, an audio file of the presentation, and the list of attendees to the LSA ES RFO website after the webinar.

PG&E requested offers for the LSA ES RFO by March 28, 2018 and notified participants via e-mail of their status regarding the shortlist on April 18, 2018. Shortlisted participants were notified in their email letter of additional requirements to remain on the shortlist and be eligible for negotiations. PG&E conducted calls with participants who were not shortlisted to provide feedback on their offers.

### **C. Offers Received**

In response to the LSA ES RFO, PG&E received 29 offers totaling 100 variations. Several of the offer variations or offers in their entirety were non-conforming for one or more of the following reasons:

1. Exceeded the maximum number of variations allowed for a specific interconnection point.
2. Online date after the required date set forth in the solicitation protocol.
3. The project did not add capacity to an existing interconnection.
4. Ineligible pricing structures

PG&E provided participants with an opportunity to revise offers that were missing information or required clarification by sending deficiency notices requesting further information by a specified date. Some participants were not able to rectify their non-conforming issues. Where an offer was non-conforming and subsequent modification by the participant did not result in a conforming offer, or where PG&E determined that an offer was in violation of the terms of RFO participation, that offer or variation was considered non-conforming and eliminated from further evaluation.

### **D. Local Sub-Area RFO Evaluation Protocol and Shortlist**

PG&E evaluated offers based on Net Market Value (NMV) and Portfolio Adjusted Value (PAV), which is consistent with the methodology used in PG&E's 2014 and 2016 Energy Storage RFOs. PG&E did not receive a high level of diversity, as seen in previous Energy Storage RFOs. Technology, online date, and term were consistent amongst the offers received. The evaluation methodology used to select shortlisted offers is described in Appendix L.

PG&E shortlisted offers based on a combination of NMV, PAV, and other qualitative factors included in the solicitation protocol to achieve a shortlisted portfolio that could contribute to the Local Capacity Requirement (LCR) need of the Local Sub-Areas identified in the Resolution. The shortlisted projects represented three different

agreement types: ESRAA, BTM CSA, and EPC Agreements, for utility ownership. The shortlisted projects also represented each of the three Local Sub-Areas specified in the Resolution: South Bay – Moss Landing; Pease; and Bogue.

Separately, PG&E also evaluated the projects from its 2016 ES RFO.<sup>16</sup> Of the executed agreements, only the Llagas project is located in a relevant local sub-area (South Bay - Moss Landing). Due to additional costs and potential challenges, PG&E did not elect to propose to accelerate this project. However, this project is currently pending before the Commission and, if approved, will provide an additional 20 MW of capacity in the constrained South Bay – Moss Landing local sub-area.

#### **E. Negotiations with Offers for Third-Party Owned Projects and Offers for Utility-Owned Projects**

PG&E implemented a code of conduct within the LSA ES RFO to separate offers for both third-party owned and utility-owned energy storage projects. The purpose of the code of conduct was to ensure that offers leading to utility ownership of storage facilities were not favored over third-party owned projects. PG&E employees and consultants working on RFO offers associated with utility-owned energy storage projects were “walled off” from PG&E employees working on RFO offers associated with third-party owned energy storage projects to ensure that those evaluating the utility-owned project offers could not acquire sensitive RFO information that other, non-utility developers did not have.

The code of conduct outlined the restrictions on information sharing between those PG&E employees working on third-party-owned project evaluations, and those PG&E employees working on utility-ownership project evaluations. PG&E implemented the code of conduct by requiring all employees and contractors supporting the LSA ES RFO to review code of conduct training materials and to sign the Local Sub-Area Energy Storage Request for Offers Confidentiality Protocol and Code of Conduct. PG&E also created separate shared drive locations and SharePoint sites, and restricted physical access of employees and consultants engaged in utility-ownership project review to those floors and spaces where PG&E employees and consultants engaged in third-party-owned project receipt and review.

For the third-party ownership offers, PG&E initiated negotiations with each third-party participant whose offer was on the shortlist to review its offer and receive any updates to the project since the offer was submitted. PG&E also confirmed with participants if they would be able to accept the agreement as-is, noting that the per Solicitation Protocol, PG&E did not intend to entertain substantive modifications to the form. All shortlisted participants were told that some negotiations would not necessarily result in an executed agreement.

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<sup>16</sup> See Resolution at 21 (OP 11).

For offers for utility-owned projects, PG&E created a shortlist based on the initial submissions from all interested parties and initiated negotiations with the shortlisted counterparties. Shortlisted counterparties were notified of PG&E's intent to select one counterparty to negotiate with and that there was no guarantee that negotiations would result in an executed contract at the conclusion of the RFO process. Initial negotiations with the shortlisted parties focused on gaining clarifications and updates on key items of their offers. PG&E conducted a second site walk for each shortlisted party (which was incremental to the initial site walk that was held on February 28, 2018 for all interested parties). Each shortlisted party was then requested to submit their best and final offer, addressing all technical, commercial and pricing issues. Based on PG&E's review of the best and final offers, in conjunction with considering other qualitative factors, PG&E selected one entity for final negotiations.

#### **F. CAM/Procurement Review Group**

PG&E conducted two detailed meetings with its joint CAM/Procurement Review Group (PRG) throughout the LSA ES RFO process. On February 16, 2018, PG&E distributed the LSA ES RFO materials for review at the February 22, 2018 meeting. This timing was to ensure that PG&E could incorporate any CAM/PRG feedback before issuance of the LSA ES RFO.

On April 12, 2018, PG&E distributed materials for its joint CAM/PRG meeting on April 16, 2018. In this meeting, PG&E reviewed the shortlist with the CAM/PRG. PG&E sent an e-mail to the CAM/PRG on May 24, 2018, which reviewed the list of projects with which it would seek to execute agreements.

#### **G. Independent Evaluator**

PG&E engaged an Independent Evaluator (IE) from the Commission's approved list of IEs for the LSA ES RFO. The IE for this solicitation was Merrimack Consulting, with Wayne Oliver as the IE representative. The IE was extensively involved in the review of RFO documentation before the RFO was issued. The IE also participated in all the LSA ES RFO-related joint CAM/PRG meetings.

The IE was actively involved in reviewing and evaluating offers received as well as in shortlist development. The IE also participated in shortlist notification, feedback calls with participants, and contract negotiations. The confidential version of the IE Report is provided in Appendix F1, and the public version of the IE Report is provided in Appendix F2.

#### **V. Selected Energy Storage Projects and Planned Transmission Projects**

PG&E is requesting approval of four energy storage projects resulting from PG&E's LSA ES RFO as described below. These projects are all interconnected within the South Bay-Moss Landing sub-area identified in the Resolution. The final executed agreements can



be found in Confidential Appendices A-D and additional contract terms can be found in Confidential Appendices G-I.

Additionally, while not requesting approval in this Advice Letter, PG&E also describes the planned transmission projects that reduce the local area needs. Additional details on these transmission projects are available in Appendix K.

#### **A. Dynegy – Vistra Moss Landing Energy Storage Project**

PG&E executed an ESRAA for the Vistra Energy Moss Landing Storage project. The project will be owned by Dynegy Marketing and Trade, LLC (Dynegy). Dynegy is a subsidiary of Vistra Energy Corp. Vistra Energy Corp. merged with Dynegy Inc. in April 2018 and the combined entity manages a portfolio of 41 gigawatts (GW) of installed capacity across 12 states.

The project will be a transmission-connected, stand-alone lithium ion battery energy storage resource located in Moss Landing in Monterey County, addressing resource needs in the South Bay – Moss Landing Sub-Area. The project is a 300 MW, four-hour duration project. The project is going through the CAISO Interconnection process. Appendix G provides additional project and ESRAA detail..

Term	Provision
Counterparty and Project	Dynegy Marketing and Trade, LLC, Vistra Energy Moss Landing Storage
Technology	Lithium Ion Battery
Location	Moss Landing, CA
Sub-Area	South Bay – Moss Landing
Type of Interconnection	Transmission
Term	20 years
Initial Delivery Date	December 1, 2020
Capacity (DMax)	300 megawatt (MW)
Discharge Duration	4 hours

#### **B. esVolta – Hummingbird Energy Storage Project**

PG&E executed an ESRAA for the Hummingbird Energy Storage Project. It will be owned by Hummingbird Energy Storage, LLC (Hummingbird), which is a subsidiary of esVolta, LP. esVolta, LP is a newly formed company that has partnered with Powin Energy Corp. and Blue Sky Alternative Investments.

The project will be a transmission-connected, stand-alone lithium ion battery energy storage resource located in Morgan Hill in Santa Clara County, addressing resource needs in the South Bay – Moss Landing sub-area. The project is a 75 MW, four-hour

duration project. The Hummingbird Energy Storage project going through the CAISO Interconnection process. Appendix G provides additional project and ESRAA detail.

Term	Provision
Counterparty and Project	Hummingbird, Hummingbird Energy Storage
Technology	Lithium Ion Battery
Location	Morgan Hill, CA
Sub-Area	South Bay – Moss Landing
Type of Interconnection	Transmission
Term	15 years
Initial Delivery Date	December 1, 2020
Capacity (DMax)	75 MW
Discharge Duration	4 hours

### **C. Micronoc – mNOC AERS Energy Storage Project**

PG&E executed a BTM CSA for the mNOC AERS project. It will be owned by mNOC AERS LLC (mNOC), a subsidiary of Micronoc Inc., a company that develops projects in the distributed energy storage market. Micronoc Inc. has installed 6.12 MW / 8.76 megawatt-hour (MWh) of energy battery storage, primarily in South Korea.

The project will be an aggregation of distribution-connected, BTM resources comprised of lithium ion batteries located at customer sites and electrically interconnected to one of the substations or feeders associated with one of the substations in the South Bay – Moss Landing Sub-Area. The project is a 10 MW, four-hour duration project. The mNOC AERS project will go through the appropriate interconnection process for behind-the-retail meter energy storage resources. Appendix G provides additional project and BTM CSA detail.

Term	Provision
Counterparty and Project	mNOC, mNOC AERS Project
Technology	Lithium Ion battery
Location	Aggregated resources in the South Bay – Moss Landing sub-area
Sub-Area	South Bay – Moss Landing
Type of Interconnection	BTM
Term	10 years
Initial Delivery Date	October 1, 2019
Capacity (DMax)	10 MW
Discharge Duration	4 hours

#### **D. Tesla – Moss Landing Energy Storage Project**

PG&E executed an EPC agreement and Long-Term Performance and Maintenance Agreement (LTPMA) for the battery energy storage system (BESS) portion of the Moss Landing Battery Energy Storage Project (Moss Landing Project). Under these agreements, the BESS will be designed, constructed, and maintained by Tesla, Inc. (Tesla) and will be owned and operated by PG&E. Tesla has significant experience with the deployment of utility-scale stationary energy storage facilities, including over 700 MWh of energy storage systems installed globally as of December 2017.

The project will be a 182.5 MW, four-hour lithium ion battery energy storage resource located in Moss Landing in Monterey County, California. The land for the project site is currently owned by PG&E within the footprint of the existing Moss Landing Substation. The project will provide capacity to meet the South Bay – Moss Landing local sub-area capacity requirements. Additionally, the Moss Landing Project will participate in the CAISO markets, providing energy, ancillary services, and other services to the CAISO-controlled grid.

The Moss Landing Project will be comprised of Tesla PowerPacks, a modular, fully integrated, pad-mounted energy storage system. The BESS will be connected to a newly constructed PG&E-furnished medium-voltage (MV) switchgear building. PG&E will be responsible for designing, procuring, and installing the MV switchgear and all required equipment through the high-voltage (HV) interconnection point to the CAISO-controlled grid (including scope identified in the project specific CAISO Phase I interconnection study results for reliability network and local delivery network upgrades). PG&E will be responsible for the CAISO remote intelligent gateway (RIG)/meter, telecommunications, and Supervisory Control and Data Acquisition (SCADA) system for the project. Appendix H provides additional details regarding the Moss Landing Project's EPC and LTPMA.

Term	Provision
Counterparty and Project	Tesla, Moss Landing Project
Technology	Lithium Ion battery
Location	Moss Landing Substation in the South Bay – Moss Landing sub-area
Sub-Area	South Bay – Moss Landing
Type of Interconnection	115 kV Transmission
Term	20 years PG&E will own the facility, seller will construct the BESS and provide a 20-year performance guarantee and associated maintenance services on the BESS.
Guaranteed Substantial Completion Date	12/31/2020
Capacity (DMax)	182.5
Discharge Duration	4

**E. South Bay-Moss Landing Transmission Projects**

PG&E is implementing several transmission projects in the South Bay Moss Landing sub-area, which, when taken together, would reduce the LCR needs by 568 MW for this sub-area; the projects are expected to be completed by February 2019 and include:

1. Monta Vista-Ames 115 kV Path Closing
2. San Jose 'B'-Trimble 115 kV Line Limiting Facility Upgrade
3. San Jose 'B'-Trimble 115 kV Line Series Reactor
4. Moss Landing-Panoche 230 kV Path Upgrade

The collection of the above transmission projects will together address the LCR needs and issues identified by the Resolution and the CAISO that resulted in backstop procurement by the CAISO. Additional details regarding these projects can be found in Appendix K.

**F. Pease Sub-Area Transmission Projects**

PG&E is implementing two transmission projects in the Pease sub area, which will increase transmission import capacity to the Pease sub-area beginning December 2020. The two projects are:

1. South of Palermo 115 kV Power Line Reinforcement (South of Palermo)
2. Pease 115/60 kV Transformer Addition

Together, these projects will reinforce 115 kV transmission lines between the Palermo, Pease, Bogue, and Rio Oso 115 kV substations as well as add transformer capacity at Pease Substation. Overall, as PG&E completes the reinforcement of each transmission line section and installs the new Pease substation equipment, the added capacity will help improve service reliability and will address the thermal overloads that have been identified in LCR and reliability studies in this sub-area. Additional details regarding these projects can be found in Appendix K.

**G. Bogue Sub-Area Transmission Projects**

PG&E is implementing two transmission projects in the Bogue sub area, which will provide voltage support equipment to manage 230 and 115 kV system high or low voltage conditions in the Bogue sub-area starting June 2022 when they become operational. The two projects are:

1. Rio Oso 230/115 kV Transformer Upgrades (Banks 1 and 2)
2. Rio Oso Area 230 kV Voltage Support (SVC)

Once these two projects are operational, PG&E expects that system operators will have sufficient voltage control equipment and flexibility in order to minimize reliance on switching actions and market generation to manage high voltages during light loading conditions. Additional details regarding these projects can be found in Appendix K.

## **VI. Portfolio to Meet Local Sub-Area Need**

The CAISO determines the LCR need in each local area through its local capacity Technical Study process. As discussed below, PG&E's proposed portfolio will help meet these local sub-area needs through both transmission projects—which reduce the LCR need—and energy storage—which contributes to the overall capacity and helps meet the LCR need. Together these solutions address the original deficiency identified by the CAISO and reduce the risk of future backstop procurement in the South Bay – Moss Landing and Pease local sub-areas and the voltage deficiency in the Bogue local sub-area.

### **A. Local Capacity Requirements (LCR) Process<sup>17</sup>**

The CAISO identifies specific areas within the CAISO footprint that have limited import capability—i.e., where local load cannot be wholly supplied by the transmission system—and then determines the minimum generation capacity to maintain reliability in these areas. This minimum generation capacity is referred to as the LCR.

Within the CAISO controlled grid, there are 10 Local Capacity Areas, each with its own LCR; the Local Capacity Areas are then further divided into local sub-areas, also with a corresponding LCR.<sup>18</sup> Of these, the Resolution focused on the Bogue and Pease local sub-areas, which are part of the Sierra Local Capacity Area, and the South Bay-Moss Landing local sub-area, which is part of the Greater Bay Area Local Capacity Area.

Through the annual Local Capacity Technical Study process, the CAISO iterates on the LCR need for each Local Capacity Area and the corresponding sub-areas. The annual assessment, among other things, evaluates factors that would tend to increase LCR need, like load growth, and factors that would tend to reduce the LCR need, like increased transmission capacity.<sup>19</sup>

The Local Capacity Technical Study process also aggregates the resource adequacy (RA) supply plans of load serving entities to identify capacity deficiencies and evaluate the need for any backstop procurement. This was not followed in the case of Yuba, Feather River, and Metcalf because the retirement declarations were received after the 2017 process was completed.

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<sup>17</sup> <http://www.caiso.com/informed/Pages/StakeholderProcesses/LocalCapacityRequirementsProcess.aspx>

<sup>18</sup> Note that the CAISO distinguishes between a Category B (single element or a generator out followed another single contingency) and Category C (double element) contingency.

<sup>19</sup> Note that transmission capacity projects are identified in the CAISO's Transmission Planning Process.

In Sections VI. B to VI. D, PG&E discusses how it plans to eliminate the original deficiencies that led to an RMR designation and reduce the risk of future backstop procurement. However, through Section 41 of its FERC approved tariff, the CAISO retains the exclusive right at any time to designate a resource as an RMR unit based on its own assessment of what it sees as need for system reliability.

## **B. South Bay - Moss Landing Local Sub-Area**

The 2018 Local Capacity Technical Analysis process—the cycle that directly proceeded an RMR designation for the Metcalf Energy Center—showed that the South Bay-Moss Landing was highly constrained from a capacity perspective. Specifically, that the South Bay-Moss Landing sub-area had an LCR need of 2,221 MWs and 2,408 MWs of available generation.<sup>20</sup>

The declared unavailability of Metcalf, (570 MWs) for CAISO dispatch, based on the CAISO's analysis,<sup>21</sup> created a deficiency and resulted in an RMR designation for that unit in 2018. As described in Section V, E. South Bay-Moss Landing Transmission Projects, the transmission solutions CAISO approved as part of the 2017-2018 TPP<sup>22</sup> for the South Bay-Moss Landing sub-area, combined with the most recent load forecast, resulted in the reduction of the LCR need by 568 MWs for 2019, and thus eliminate the specific deficiency that led the CAISO to an RMR designation for Metcalf. This was also confirmed through PG&E's coordination with the CAISO, as required by the Resolution.<sup>23</sup>

Since the 2018 Local Capacity Technical Analysis, the CAISO has completed the 2019 Local Capacity Technical cycle. This reflects the contribution of the approved transmission projects and a reduced LCR need of 1,653 MWs.<sup>24</sup> Additionally, CAISO analyses for 2023 indicate that this sub-area also shows a forecasted increase in the LCR need to 1,977 MW<sup>25</sup> and, thus, is expected to remain constrained during this period of

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<sup>20</sup> CAISO, 2018 Local Capacity Technical Analysis Final Report (the 2018 LCR Report), South Bay-Moss Landing Sub-area section IV, page 42, [<http://www.caiso.com/Documents/Final2018LocalCapacityTechnicalReport.pdf>].

<sup>21</sup> CAISO Board of Governors Memo, Decision on reliability must-run designation for Metcalf Energy Center, [[http://www.caiso.com/Documents/Decision\\_ReliabilityMust-RunDesignation\\_MetcalfEnergyCenter-UpdatedMemo-Nov2017.pdf](http://www.caiso.com/Documents/Decision_ReliabilityMust-RunDesignation_MetcalfEnergyCenter-UpdatedMemo-Nov2017.pdf)].

<sup>22</sup> California ISO 2017-2018 Transmission Plan, South Bay-Moss Landing Sub-Area Local Capacity Requirements section, Pages 262 and 263, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

<sup>23</sup> See Attachment J to this Advice Letter (CAISO Letter to PG&E, May 21, 2018).

<sup>24</sup> CAISO, 2019 Local Capacity Technical Analysis Final Report (the 2019 LCR Report), South Bay-Moss Landing Sub-area section IV, page 42, [<http://www.caiso.com/Documents/Final2019LocalCapacityTechnicalReport.pdf>].

<sup>25</sup> CAISO, 2023 Local Capacity Technical Analysis Final Report (the 2023 LCR Report), South Bay-Moss Landing Sub-area section IV, page 39, [<http://www.caiso.com/Documents/Final2023Long-TermLocalCapacityTechnicalReport.pdf>]

time, where the notice of a single generator retirement might necessitate backstop procurement.

Therefore, even with a reduced LCR need, there is continued risk of backstop procurement from the CAISO to meet the LCR need due to contracts with existing generators expiring in future years. PG&E's proposed cost-effective energy storage projects from the LSA RFO would add 567.5 MWs of capacity to this constrained area, thereby helping to mitigate the risk of a deficiency by contributing to the available local capacity.

### **C. Pease Sub-Area**

The 2018 Local Capacity Technical Analysis process that directly preceded an RMR designation for Yuba showed that the Pease sub-area was highly constrained from a capacity perspective. Specifically, the study showed that the Pease sub-area had an LCR need of 101 MW,<sup>26</sup> for the most constraining Category B outage, and a total of 104.7 MW of available generation. This same Category B need was updated to 79 MWs in the 2019 Local Capacity Technical Analysis report.<sup>27</sup> The 2019 LCR studies also identify a 92 MW need for the most constraining Category C outage.

The declared retirement of Yuba, based on the CAISO's analysis, created a deficiency of 42.3 MWs and resulted in an RMR designation for that unit in 2018. As described in Section V F. Pease Sub-Area Transmission Projects and Appendix K, PG&E's previously approved South of Palermo project is expected to eliminate the entire LCR need for the most constraining Category B outage (the original deficiency that led to the RMR designation for Yuba).<sup>28</sup>

PG&E received limited offers in the Pease sub-area and has chosen not to execute agreements for energy storage projects because the transmission solutions would eliminate the LCR need completely by December 2020. Should the LCR need profile change, PG&E would consider re-engagement with the participants who proposed projects in the Pease local sub-area.

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<sup>26</sup> CAISO, 2018 Local Capacity Technical Analysis Final Report (the 2018 LCR Report), [<http://www.caiso.com/Documents/Final2018LocalCapacityTechnicalReport.pdf>], Pease Sub-area section, page 32.

<sup>27</sup> CAISO, 2019 Local Capacity Technical Analysis Final Report (the 2019 LCR Report), [<http://www.caiso.com/Documents/Final2019LocalCapacityTechnicalReport.pdf>], Pease Sub-area section, page 32.

<sup>28</sup> The remaining Category C need identified in the 2019 studies may be addressed with the previously approved Pease 115/60 kV Transformer Addition project along with a low cost-effective transmission solution such as a Remedial Action Scheme (RAS).

#### **D. Bogue Sub Area**

In recent years, the Bogue sub-area has experienced high voltage issues and these are typically managed through real-time operations. The declared retirement of Feather River would have worsened the existing high voltage issues in Bogue and, based on the CAISO's analysis, an RMR designation for Feather River was necessary.

As described in Section V.G. Bogue Sub-Area Transmission Projects, these voltage issues will be addressed by the Rio Oso 230/115 kV Transformer Upgrades (Bank 1 and 2) and the Rio Oso Area 230 kV Voltage Support (SVC) by June 2022.

PG&E has chosen to decline executing agreements with projects located in the Bogue local sub-areas in this submittal because the transmission solutions will eliminate the voltage mitigation need and the proposed projects will be ineffective as a single solution to mitigate the high voltages mostly under light load conditions.

#### **VII. Safety**

As with previous PG&E Energy Storage RFOs, the LSA ES RFO included safety as a qualitative criterion. As a condition of remaining on PG&E's shortlist for LSA ES RFO negotiations, participants were required to provide information about their storage technology and the safety history of the participant and/or contractors (if known). Shortlisted participants were also required to complete PG&E's safety registration and prequalification process with ISNetwork, PG&E's primary safety management contractor, as a condition of contract execution. PG&E also required shortlisted participants to submit preliminary site safety plans for the development, construction, and operation of their projects, as applicable.

To reduce, manage, and address the potential safety risks with respect to the proposed energy storage projects, PG&E used enhanced safety provisions similar to those previously included in PG&E's 2016 ES RFO agreements. The enhanced safety provisions require sellers to practice responsible safety management through contractual terms and conditions based on standards of Prudent Electrical Practice, applicable laws and regulations, and requirements of the PG&E's Contractor Safety Program (Safety Requirements).

Under each of the agreements with third parties proposed for approval, each seller is required to provide a project safety plan that demonstrates responsible safety management during all phases of the project lifecycle, including project design, construction, operation, and maintenance. Each project safety plan references the applicable safety-related codes and standards and the seller's current safety programs and policies. It includes a summary of the project design and description of key safety-related systems. The seller must also describe potential hazards and include risk mitigations and safeguards, such as operating procedures, incident response and recovery plans, and personal protective equipment and procedures. In addition, the seller



is required to demonstrate and enforce its contractors' and subcontractors' compliance with the Safety Requirements.

Before execution, PG&E used its Contractor Safety Program prequalification standards to assess safety performance and practices of each seller's organization. As additional project details become available during project development, PG&E will continue to monitor and perform additional safety checks of each seller's project safety plans for consistency with the Safety Requirements. Contract terms provide PG&E with the ability to enforce those requirements or, in certain cases, terminate the contracts in the case of non-compliance.

### **VIII. Permitting Issues Related to PG&E's Utility-Owned Energy Storage Project**

The Moss Landing Energy Storage Project involves construction of electrical facilities by an investor-owned utility (IOU) and is thus governed by Commission General Order (G.O.) 131-D as it relates to permitting. GO 131-D sets forth a tiered permitting regime for electric generation facilities, electric transmission and distribution line facilities, substations, and other electrical facilities, and establishes that local discretionary authority over such projects is preempted. Under G.O. 131-D, a certificate of public convenience and necessity (CPCN) is required for generation facilities over 50 megawatts and, unless the project falls within one of numerous exemptions specified in Section III(A), major transmission line facilities over 200 kilovolts (kV). A permit to construct (PTC) is required for power line facilities between 50 and 200 kV, new substations over 50 kV, or "upgraded" substations, as defined, except for projects covered by one of numerous exemptions specified in Section III(B), which are generally required to provide notice of exempt construction (NOC) and submit an advice letter with the Commission. Substation "modification" projects, defined as work at existing substations that do not increase the existing high-side voltage of the substation or go beyond the existing utility-owned parcel, and distribution line projects below 50 kV do not require a CPCN, PTC, or NOC. No requirements are specified for other electrical facilities, including energy storage facilities. Because G.O. 131-D does not require a CPCN, PTC, or NOC for energy storage projects, Commission approval and associated review by the Commission under the California Environmental Quality Act (CEQA) is not required for construction of the Moss Landing Energy Storage Project.<sup>29</sup>

Nonetheless, energy storage projects, including the Moss Landing Project, remain subject to the Commission's jurisdiction, as G.O. 131-D Section XIV makes clear. That section provides that "... local jurisdictions acting pursuant to local authority are preempted from

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<sup>29</sup> CEQA is triggered by a discretionary agency approval; if an agency is not issuing a discretionary permit or other approval, there is no CEQA obligation. (Pub. Res. Code, § 21080; see also 14 Cal. Code Regs. §§ 15002(i), 15040.) As noted below, the Moss Landing Energy Storage Project requires a discretionary coastal development permit from the County of Monterey, which must comply with CEQA in connection with that approval.

regulating electric power line projects, distribution lines, substations, or *electric facilities* constructed by public utilities subject to the Commission's jurisdiction. However, in locating such projects, the public utilities shall consult with local agencies regarding land use matters."<sup>30</sup> Moreover, if the public utility and local agency cannot resolve their differences, either party may notify the Commission, which must set a hearing within 30 days.<sup>31</sup> Consistent with these authorities, PG&E has consulted and will continue to consult with Monterey County, the local agency that would have land use approval authority over the project but for G.O. 131-D Section XIV. While the County has voiced no objection to the proposed project and its location, it would certainly be free to raise any concerns over land use issues to the Commission via the dispute resolution process specified in G.O. 131-D Section XIV(B).

The fact that the Moss Landing Energy Storage Project is proposed to be located within an existing substation parcel, and includes transformers designed to step up and step down power charged or discharged from the BESS, does not transform this *energy storage* project into a *substation* project for purposes of G.O. 131-D compliance. Rather, the inclusion of dedicated transformers as a necessary interconnection-related component of an energy storage facility is no different than the dedicated switchyards that are routinely constructed as part of new electric generation projects -- and the Commission has never found those *generation* projects, or their transformers and related switchyard components, to be subject to the *substation* project permit requirements under G.O. 131-D Section III(B).<sup>32</sup> Similarly, PG&E believes that the better reading of G.O.131-D is that an IOU's energy storage projects, wherever they are proposed to be sited, are among the unspecified other "electric facilities" referenced in G.O.131-D Section XIV. Treating them as such will help streamline utility-owned energy storage project permitting and development while still ensuring, through G.O.131-D's local consultation requirement and backstop dispute resolution process, that IOU energy storage facilities will be appropriately designed and sited.<sup>33</sup>

In addition to G.O.131-D compliance, achieved in this case through consultation with Monterey County over land use issues, PG&E will conduct an environmental assessment of the proposed project and its setting to determine whether any non-CPUC discretionary or ministerial permits are required. While this assessment is ongoing, PG&E has already

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<sup>30</sup> G.O. 131-D, Section XIV(B) (emphasis added).

<sup>31</sup> *Ibid.*

<sup>32</sup> See, e.g., D.06-11-048 (April 11, 2006) (granting CPCN for PG&E's proposed Humboldt Bay Power Plant Project), D.08-06-012 (June 12, 2008) (granting CPCN for PG&E's proposed Colusa Power Project).

<sup>33</sup> Assuming, *arguendo*, that part or all of the Moss Landing Project were properly considered a substation project subject to Section III(B)'s permitting requirements, it still would not require Commission approval under G.O. 131-D. As noted above, the Project would be located entirely within PG&E's existing utility-owned parcel and would not increase the current high-side voltage of PG&E's existing substation. As such, even if the Project were subject to Section III(B), it would be a "substation modification project" for which no permit or notice is required.

determined that the Moss Landing Energy Storage Project will require a discretionary coastal development permit (CDP). Monterey County implements an approved Coastal Program pursuant to state law, which is not preempted by the CPUC's authority over IOU electric construction projects. Therefore, PG&E must obtain a discretionary CDP from the County, which is subject to CEQA. Monterey County, as the CEQA lead agency, will determine the level of environmental review required in compliance with CEQA. At this time PG&E also expects that the Moss Landing Energy Storage Project will require one or more ministerial permits from local agencies. In all events, PG&E will not construct the project until it or its contractor has obtained all required permits.

## **IX. Cost Recovery**

Ordering Paragraph (OP) 15 of the Resolution authorizes PG&E to request Cost Allocation Mechanism (CAM) treatment for resources procured through the solicitation.<sup>34</sup> As noted in the Resolution, CAM treatment for these resources is justified pursuant to Public Utilities Code Sections<sup>35</sup> 365.1(c)(2)(A) and (B). Section 365.1(c)(2)(A) and (B) note that recovery of procurement costs that address and alleviate local reliability issues and are determined by the Commission to benefit all customers may be recovered from all customers. Section 365.1(c)(2)(C) provides that authorized CAM recovery shall be for the terms of the contracts, and the Commission has applied the same principle to utility-owned resources that are authorized for CAM recovery.<sup>36</sup>

The procurement proposed in this advice letter alleviates local reliability issues in specific sub-areas as described in the Resolution. Resources subject to CAM treatment allocate the net costs and benefits to all benefiting customers in PG&E's service territory, which include direct access and community choice aggregation customers for the duration of the contract.<sup>37</sup> As such, PG&E requests CAM treatment for any contracts resulting from this solicitation.

CAM-eligible resources are recorded and recovered through PG&E's New System Generation Balancing Account (NSGBA)<sup>38</sup> and New System Generation Charge (NSGC).

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<sup>34</sup> CAM was originally approved in D.06-07-029 and implemented in D.07-09-044 to allow LSEs in the IOU's service territory rights to the new generation capacity procured by the IOUs that can be applied toward each LSE's resource adequacy ("RA") requirements. Other modifications to D.06-07-029 were approved in D.07-11-051 and D.11-05-005.

<sup>35</sup> All subsequent references to codified sections are to the California Public Utilities Code, unless otherwise specified.

<sup>36</sup> D.11-05-005 at 16 (finding it reasonable to allow CAM recovery of utility-owned generation for as long as it meets CAM statutory requirements).

<sup>37</sup> D.06-07-029, as modified by D.11-05-005, approved CAM treatment for generation resources for the duration of the underlying contract.

<sup>38</sup> Electric Preliminary Statement Part FS.

PG&E will establish separate subaccounts in the NSGBA for each resource approved through this advice letter.<sup>39</sup>

In addition, consistent with D.15-11-041, which adopted a methodology for placing in-front-of-the-meter storage resources into CAM, the “net capacity cost” for each of the proposed energy storage resources would be determined as the costs resulting from charging each battery during the off-peak period netted against the revenues resulting from discharging that battery during peak periods during same 24-hour period to determine the net revenue received from the resource. Additionally, to the degree that the resources receive ancillary service revenues, net of any associated charges, the AS revenues would also be included in the net revenues. Thus, the actual net revenues received in the CAISO market would then be credited to the NSGBA, offsetting the actual resource costs. The net result of the entries in the NSGBA is that the net capacity cost of the resource is recovered through the NSGC.

The net capacity costs associated with these resources will be forecast as part of PG&E’s annual Energy Resource Recovery Account (ERRA) Forecast Proceeding and will be included with other CAM-eligible resources. Similar to other resources recovered through the NSGBA, actual costs and market revenues will be recorded in the NSGBA and the balance will be amortized in rates. The final NSGC will be consolidated with other electric rate changes as part of the Annual Electric True-up (AET) process.

#### **A. Cost Recovery Specific to the Utility-Owned Moss Landing Project**

PG&E is requesting approval of the Moss Landing Project, its associated capital and operations and maintenance (O&M) costs, and the resulting revenue requirement. As part of this approval, PG&E is seeking approval of the associated costs for the following Moss Landing Project components: (1) the Turnkey Engineering, Procurement and Construction (EPC) Agreement with Tesla for the construction of the battery energy storage system (BESS); (2) PG&E’s costs associated with the medium-voltage (MV) to high-voltage (HV) interconnection and related work; (3) PG&E’s costs for permitting, engineering, project management, communications/ metering-related activities, and project-related Allowance for Funds Used During Construction (AFUDC); (4) the 20-year LTPMA with Tesla to cover the BESS maintenance and performance guarantees; and (5) PG&E’s ongoing maintenance work to support the LTPMA and ensure effective ongoing operations of the Moss Landing Project, including the MV and HV equipment. Forecasts of these costs and a description of each of these cost categories can be found in Appendix I. The proposed battery storage facility life is 20 years, the same as proposed in the Llagas project in A.17-12-003.

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<sup>39</sup> PG&E proposes file a Tier 1 advice letter updating the NSGBA to reflect the new subaccounts for the resources approved through this advice letter.

PG&E proposes that beginning with the 2023 General Rate Case (GRC) cycle<sup>40</sup> the revenue requirement associated with the Moss Landing Project will be forecast as part of the GRC but transferred to the NSGBA for recovery through the NSGC. During the interim period, 2021 - 2022, PG&E proposes that the revenue requirement based on actual costs, up to the cost forecast presented in Appendix I, associated with the project be recorded in the NSGBA through the end of 2022. To the extent the actual capital expenditures and expenses are equal to or less than the approved forecast, PG&E requests it be authorized to recover, without further reasonableness review, the actual costs and associated revenue requirement. If the actual costs are less than the authorized costs, any authorized revenue requirement included in rates will be trued-up by recording the actual revenue requirement in the NSGBA.

In the case that actual expenditures for the Moss Landing Project exceed the approved cost forecast, PG&E requests it be authorized to seek recovery of the incremental costs above the approved cost forecast in the GRC or other appropriate proceeding, subject to a reasonableness review of those incremental costs. PG&E proposes to track these incremental costs in a memorandum account so that they may be recovered if approved by the Commission following the reasonableness review.

Recovery of the Moss Landing Project in the NSGC would begin once the resource becomes operational.<sup>41</sup> The forecasted revenue requirements for the years 2021 through 2022 are summarized in the following Section B and would be included as CAM-eligible resources as part of PG&E's annual ERRA Forecast proceeding.

## **B. Revenue Requirement Specific to the Moss Landing Project**

The results of operation model computes the annual revenues that are needed ("revenue requirement" or "RRQ") from customers to recover the cost of the Moss Landing Project. The model calculates the revenue requirement based primarily on a forecast of expense and capital costs. The calculations are based on traditional cost-of-service ratemaking methods, which are consistent with the methods that PG&E uses in its GRC applications, including its most recent 2017 GRC Application 15-09-001.

The model computes the revenue requirement by first converting the expense and capital inputs (capital expenditures) into intermediate values: capital additions, expense, depreciation, taxes and rate base. The model computes the RRQ using the following formula:

$$RRQ = Expense + Depreciation + Taxes + Rate\ of\ return * (Rate\ Base)$$

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<sup>40</sup> Although the Moss Landing Project is planned to go on-line on December 31, 2020, the revenue requirements associated with this project will not be included in PG&E's 2020 GRC request, which is expected to be filed September of 2018. PG&E therefore anticipates rolling the project into its 2023 GRC.

<sup>41</sup> Although the expected completion date is December 31, 2020, PG&E is assuming for purposes of cost recovery that the project goes online in 2021.

The final RRQ numbers include a small adjustment to include revenue fees and uncollectibles. Input parameters used for calculating taxes and rate of return are based on the most recent authorized amounts. The rate of return is based on the 2018 Cost of Capital approved in D.17-07-005. The federal income tax rate of 21% was used in accordance with the “Tax Cuts and Jobs Act” enacted on December 22, 2017. Depreciation input parameters are consistent with the 20-year depreciable life and the 5% depreciation rate proposed for the Llagas Project in PG&E’s 2016 Energy Storage Solicitation, A.17-12-003. The recorded revenue requirement will utilize updated parameters, as appropriate.

PG&E’s forecast of the 2021 and 2022 revenue requirements to support the Moss Landing Project is based on the information presented in this Advice Letter. For the purposes of the revenue requirement calculation, the operative date is assumed to be 1/1/2021. Based on these assumptions, PG&E shows the revenue requirements in the following table.

**2021-2022 REVENUE REQUIREMENT FORECAST  
(THOUSANDS OF DOLLARS)**

Line No.	Project Description	2021	2022	Total
1	Moss Landing Project	\$ 41,204	\$ 39,044	\$ 80,248

**X. Compliance with the Resolution**

PG&E’s LSA RFO and its resulting energy storage solutions meet the requirements and goals set forth in the Resolution as follows:<sup>42</sup>

**1. Pacific Gas and Electric Company is authorized to hold one or more competitive solicitation to address two local sub-area capacity deficiencies in the Pease and South Bay-Moss Landing subarea and manage a high voltage in the Bogue subarea.**

PG&E issued the Local Sub-Area RFO on February 28, 2018, to address the two local sub-area capacity deficiencies in the Pease and South Bay – Moss Landing sub-areas and the high voltage issue in the Bogue sub-area.

**2. If PG&E does not commence the solicitation authorized by this Resolution within 90 days of its effective date, PG&E is required to notify the Commission’s Executive Director in writing and include the justification.**

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<sup>42</sup> Resolution at 20-21 (OP 1-15).

PG&E issued its solicitation on February 28, 2018, less than 90 days from the Resolution's January 12, 2018 date of issuance.

**3. PG&E may solicit bids for energy storage and/or preferred resources, either individually or in an aggregation.**

PG&E's solicited offers specifically for energy storage in the Local Sub-Area RFO because of the requirement to issue a RFO in less than 90 days from the Resolutions date of issuance. PG&E will continue to engage with stakeholders to see if an additional solicitation is warranted that could include energy storage and preferred resources.

**4. PG&E is required to take into account the known cost and on-line dates of any new or planned transmission solutions that reduce or eliminate the need for RMR contracts or their extension, when it selects resources for procurement in this solicitation.**

As detailed more fully above and in Appendix K, PG&E has taken into account the planned transmission solutions. It found planned transmission solutions for the South Bay - Moss Landing local sub-area will eliminate the original local capacity area deficiency by the expected completion date of February 2019. Planned transmission solutions for the Pease and Bogue sub areas will reduce the local capacity needs by December 2020 and June 2022, respectively.

Given that additional gas-fired generation in these three local sub-areas are also expected to have difficulty making sufficient market revenue to support profitable operations, there is risk of additional retirements in the future, which would reduce available capacity to meet LCR need. The storage contracts presented in this AL will help mitigate the impacts of future retirements by adding capacity to the respective local sub-area.

**5. Resources procured pursuant to this solicitation must be on-line and operational on or before a date sufficient to ensure that one or more of the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed for any year from 2019 through 2022, if feasible and represent a reasonable cost savings to ratepayers.**

PG&E executed contracts for four storage projects, having expected on-line dates of 10/1/19, 12/1/20, 12/1/20 and 12/31/20. Based on PG&E's evaluation methodology the contracts executed in the LSA ES RFO represent a positive market value to PG&E's portfolio.

**6. Resources procured pursuant to this solicitation must be located within the relevant sub-area(s) and be interconnected at location(s) that will mitigate local capacity and voltage issues sufficient to reduce or eliminate the need for RMR contracts for the aforementioned plants.**

All storage projects procured in this RFO are located in, and will be interconnected within, the South Bay-Moss Landing sub area. Resources were not procured for the Pease and Bogue sub areas because transmission solutions are expected to alleviate the LCR need.

**7. Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts, with adjustments for contract terms such as contract length and expedited delivery date.**

As seen in Appendix G and H, the market valuations of the four storage projects are all positive.

**8. Any portfolio of resources selected and contracted with, including consideration of any new or planned transmission solutions that will reduce or eliminate the sub-area deficiencies, must be of sufficient capacity and attributes to alleviate the deficiencies identified.**

The approved transmission solutions eliminate the original deficiencies identified by the CAISO in each of the local sub-areas. The energy storage resources selected and contracted with add capacity to the constrained South Bay – Moss Landing local sub-area. Together they may alleviate the need for backstop procurement by the CAISO.

**9. PG&E is required to coordinate with the CAISO to ensure that the resources procured in this solicitation partially or wholly obviate the need for, or extension of, RMR contracts at question in this Resolution.**

The CAISO has provided a letter of support (see Appendix J) for the benefits of providing storage capacity in the South Bay – Moss Landing subarea.

**10. PG&E is required to indicate when seeking approval of the contracts whether the CAISO agrees that the resources procured in this solicitation partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts at question in this Resolution.**

The CAISO indicates that the planned transmission upgrades alleviate the immediate need that led to the RMR designations, however supports PG&E's procurement of energy storage resources and acknowledges the contribution that energy storage would provide to reduce the risk of future CAISO-forecasted deficiencies.

**11. PG&E may consider accelerating projects from its 2016 storage RFO, should those projects meet all other criteria of the solicitation ordered by this Resolution.**



As discussed in Section IV.D. above, only one project from the 2016 Energy Storage RFO is in a subarea applicable to the current RFO. PG&E decided it would not be cost effective to accelerate the schedule for the Llagas project.

**12. PG&E is required to hold at least one bidders' conference in advance of issuance of the request for offer (RFO).**

In line with PG&E's normal solicitation process, PG&E held a participant's webinar shortly after the RFO was launched on March 7, 2018.

**13. Pacific Gas and Electric Company may contract with any resource at reasonable cost, and file Tier 3 Advice Letters for approval of contracts resulting from this solicitation.**

PG&E is hereby submitting a Tier 3 Advice Letter for approval of contracts resulting from this solicitation.

**14. Pacific Gas and Electric Company shall take all reasonable steps to expedite the interconnection processes to allow the storage resource to connect to the grid.**

PG&E's RFO team members engaged in discussions with PG&E's interconnection group and with the CAISO regarding ways to expedite the interconnection process for all projects that succeed in the solicitation. PG&E will continue these discussions and take any appropriate measures to reasonably expedite the interconnection process subject to applicable CAISO tariffs.<sup>43</sup>

**15. Pacific Gas and Electric Company may request authorization to record procurement costs for procurement in the solicitation authorized by this Resolution in its Cost Allocation Mechanism account.**

PG&E is hereby requesting authorization to record procurement costs for procurement in the solicitation authorized by this Resolution in its CAM account.

**XI. Request for Commission Approval**

PG&E requests that the Commission issue a Resolution no later than 90 days from the submittal of this Advice Letter that contains the following findings, conclusions, and orders:

1. Approves the four storage projects and associated contracts resulting from its Local Sub Area RFO: Vistra Moss Landing (300 MW) ESRAA; esVolta – Hummingbird (75 MW) ESRAA; Micronoc – mNOC AERS (10 MW) BTM CSA; and the Moss Landing Project (182.5 MW).

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<sup>43</sup> CAISO Tariff Appendix DD 8.6

2. Finds that all procurement costs associated with the Vistra Moss Landing ESRAA, esVolta ESRAA, and Micronoc BTM CSA shall be recovered in rates via the Cost Allocation Mechanism (CAM) for the full term of the respective agreement and using the net cost calculation described in this Advice Letter.
3. Finds that the revenue requirement for the Moss Landing Project shall be recovered in rates via the CAM for the full useful life of the project using the net capacity cost calculation described in this Advice Letter.
4. Authorizes PG&E to record the revenue requirement based on actual costs up to the adopted cost forecast associated with the Moss Landing Project once the project achieves commercial operation to the NSGBA. Once included in the GRC, the revenue requirement associated with the Moss Landing Project will be forecast as part of the GRC but transferred to the NSGBA for recovery through the NSGC.
5. Authorizes PG&E to seek recovery of the Moss Landing Project's capital expenditures and expenses in excess of the authorized cost cap in PG&E's GRC or any other appropriate proceeding, subject to reasonableness review of the incremental costs.
6. Concludes that no certificate of public convenience and necessity, permit to construct, or notice of exempt construction, or associated CEQA analysis by the Commission, is required in connection with PG&E's Moss Landing Project pursuant to General Order 131-D.
7. Concludes that pursuant to General Order 131-D Section XIV(B), local jurisdictions acting pursuant to local authority are preempted from regulating the Moss Landing Project.
8. Finds that the Vistra Moss Landing ESRAA, esVolta ESRAA, Micronoc BTM CSA, and Moss Landing Project are eligible to meet the outstanding portion of PG&E's storage mandate obligation established by Assembly Bill 2514 as implemented by CPUC D.13-10-040 and qualify for LCR credits pursuant to D.13-02-015 and D.14-03-004.
9. Adopts the finding of fact and conclusion of law that PG&E complied with the Resolution in all other respects in carrying out its solicitation and executing the respective agreements.

## **XII. Confidentiality Treatment**

In support of this Advice Letter, PG&E has provided the confidential information listed below. This information is being submitted in the manner directed by Commission Decision (D.) 08-04-023 and the August 22, 2006, Administrative Law Judge's Ruling Clarifying Interim Procedures for Complying with D.06-06-066 to demonstrate the confidentiality of the material and to invoke the protection of confidential utility information provided under Public Utilities Code section 454.5(g) or the Investor Owned Utility Matrix,

Appendix 1 of D.06-06-066 and Appendix C of D.08-04-023. A separate Declaration Seeking Confidential Treatment is being submitted concurrently with this Advice Letter.

### **Confidential Appendices**

Appendix A: Dynegy – Vistra Energy Storage Resource Adequacy Agreement (ESRAA)  
Appendix B: esVolta – Hummingbird Energy Storage Resource Adequacy Agreement (ESRAA)  
Appendix C: Micronoc – mNOC AERS Behind the Retail Meter Capacity Storage Agreement  
Appendix D: Tesla – Moss Landing Engineering Procurement Construction (EPC) Agreement  
Appendix E: Tesla – Moss Landing Long-Term Performance and Maintenance Agreement (LTPMA)  
Appendix F1: Independent Evaluator (IE) Report (Confidential)  
Appendix G: Summary of Key 3<sup>rd</sup>-Party Owned Contract Terms  
Appendix H: Summary of Key EPC and LTPMA Contract Terms  
Appendix I: Utility Ownership Costs for Moss Landing Project

### **Public Appendices**

Appendix F2: Independent Evaluator Report (Public)  
Appendix J: CAISO Letter to PG&E Regarding Energy Storage Projects from LSA RFO  
Appendix K: Planned Transmission Projects  
Appendix L: Evaluation Methodology

### **XIII. Protests**

Anyone wishing to protest this submittal may do so by letter sent via U.S. mail, facsimile or E-mail, no later than July 19, 2018, which is 20 days after the date of this submittal. Protests must be submitted to:

CPUC Energy Division  
ED Tariff Unit  
505 Van Ness Avenue, 4<sup>th</sup> Floor  
San Francisco, California 94102

Facsimile: (415) 703-2200  
E-mail: EDTariffUnit@cpuc.ca.gov

Copies of protests also should be mailed to the attention of the Director, Energy Division, Room 4004, at the address shown above.

The protest shall also be sent to PG&E either via E-mail or U.S. mail (and by facsimile, if possible) at the address shown below on the same date it is mailed or delivered to the Commission:

Erik Jacobson  
Director, Regulatory Relations  
c/o Megan Lawson  
Pacific Gas and Electric Company  
77 Beale Street, Mail Code B13U  
P.O. Box 770000  
San Francisco, California 94177

Facsimile: (415) 973-3582  
E-mail: PGETariffs@pge.com

Any person (including individuals, groups, or organizations) may protest or respond to an advice letter (General Order 96-B, Section 7.4). The protest shall contain the following information: specification of the advice letter protested; grounds for the protest; supporting factual information or legal argument; name, telephone number, postal address, and (where appropriate) e-mail address of the protestant; and statement that the protest was sent to the utility no later than the day on which the protest was submitted to the reviewing Industry Division (General Order 96-B, Section 3.11).

#### **XIV. Effective Date**

PG&E requests that this Tier 3 advice submittal become effective upon Commission approval.

#### **XV. Notice**

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically and via U.S. mail to parties shown on the attached list and the parties on the service list for Service List: R.15-03-011, and R.17-09-020. Address changes to the General Order 96-B service list should be directed to PG&E at email address PGETariffs@pge.com. For changes to any other service list, please contact the Commission's Process Office at (415) 703-2021 or at Process\_Office@cpuc.ca.gov. Send all electronic approvals to PGETariffs@pge.com. Advice letter submittals can also be accessed electronically at: <http://www.pge.com/tariffs/>.

\_\_\_\_\_/S/

Erik Jacobson  
Director, Regulatory Relations

cc: Service Lists R.15-03-011, and R.17-09-020

# CALIFORNIA PUBLIC UTILITIES COMMISSION

## ADVICE LETTER SUBMITTAL SUMMARY ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No. **Pacific Gas and Electric Company (ID U39 E)**

Utility type:

☒ ELC

☐ GAS

☐ PLC

☐ HEAT

☐ WATER

Contact Person: Kingsley Cheng

Phone #: (415) 973-5265

E-mail: k2c0@pge.com and PGETariffs@pge.com

### EXPLANATION OF UTILITY TYPE

ELC = Electric

GAS = Gas

PLC = Pipeline

HEAT = Heat

WATER = Water

(Date Submitted/ Received Stamp by CPUC)

Advice Letter (AL) #: **5322-E**

**Tier: 3**

Subject of AL: **Energy Storage Contracts Resulting from PG&E's Local Sub-Area Request for Offers Per Resolution E-4909**

Keywords (choose from CPUC listing): Compliance, Agreements

AL submittal type: ☐ Monthly ☐ Quarterly ☐ Annual ☒ One-Time ☐ Other \_\_\_\_\_

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: E-4909

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: No

Summarize differences between the AL and the prior withdrawn or rejected AL: \_\_\_\_\_

Is AL requesting confidential treatment? If so, what information is the utility seeking confidential treatment for: Yes. See the attached matrix that identifies all of the confidential information.

Confidential information will be made available to those who have executed a nondisclosure agreement: ☒ Yes ☐ No

Name(s) and contact information of the person(s) who will provide the nondisclosure agreement and access to the confidential information: Marino Monardi, (415) 973-8573

Resolution Required? ☒ Yes ☐ No

Requested effective date: Upon Commission Approval

No. of tariff sheets: N/A

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: N/A

Service affected and changes proposed: N/A

Pending advice letters that revise the same tariff sheets: N/A

Protests, dispositions, and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

**California Public Utilities Commission**

**Energy Division**

**EDTariffUnit**

**505 Van Ness Ave., 4<sup>th</sup> Flr.**

**San Francisco, CA 94102**

**E-mail: EDTariffUnit@cpuc.ca.gov**

**Pacific Gas and Electric Company**

**Attn: Erik Jacobson**

**Director, Regulatory Relations**

**c/o Megan Lawson**

**77 Beale Street, Mail Code B13U**

**P.O. Box 770000**

**San Francisco, CA 94177**

**E-mail: PGETariffs@pge.com**

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

**PACIFIC GAS AND ELECTRIC COMPANY  
ADVICE LETTER FOR APPROVAL OF CONTRACTS  
RESULTING FROM ITS LOCAL SUB-AREA REQUEST  
FOR OFFERS PURSUANT TO RESOLUTION E-4909**

**DECLARATION OF MARINO MONARDI  
SEEKING CONFIDENTIAL TREATMENT  
FOR CERTAIN DATA AND INFORMATION  
CONTAINED IN PG&E'S ADVICE LETTER**

I, Marino Monardi, declare:

1. I am a Director in the Energy Procurement and Policy Organization at Pacific Gas and Electric Company (PG&E). In this position, I am responsible for procurement of various electric resources and products including energy storage and renewable energy. This declaration is based on my personal knowledge of PG&E's practices and my understanding of the Commission's decisions protecting the confidentiality of market-sensitive information.

2. Based on my knowledge and experience, and in accordance with the Decisions 06-06-066, 08-04-023, and relevant Commission rules, I make this declaration seeking confidential treatment for certain data and information contained in PG&E's Advice Letter pursuant to Resolution E-4909.

3. Attached to this declaration is a matrix identifying the data and information for which PG&E is seeking confidential treatment. The matrix specifies that the material PG&E is seeking to protect constitutes confidential market sensitive data and information covered by D.06-06-066, Appendix 1, and Public Utilities Code §454.5(G). The matrix also specifies why confidential protection is justified. Further, the data and information: (1) is not already public; and (2) cannot be aggregated, redacted, summarized or otherwise protected in a way that allows partial disclosure. By this reference, I am incorporating into this declaration all of the explanatory text that is pertinent to my testimony in the attached matrix.

I declare under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct. Executed on June 29, 2018 at San Francisco, California.

/s/

---

Marino Monardi

**PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)**

**ADVICE LETTER FOR APPROVAL OF CONTRACTS RESULTING FROM ITS  
LOCAL SUB-AREA REQUEST FOR OFFERS PURSUANT TO RESOLUTION E-4909**

JUNE 29, 2018

**IDENTIFICATION OF CONFIDENTIAL INFORMATION**

<b>Redaction Reference</b>	<b>Category from D.06-06-066, Appendix 1, or Separate Confidentiality Order That Data Corresponds To</b>	<b>PG&amp;E's Justification for Confidential Treatment</b>	<b>Length of Time</b>
<b>Confidential Appendices</b>			
Appendix A: Dynegy – Vistra ESRAA	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Energy Storage Resource Adequacy Agreement (ESRAA) Agreement presented in this appendix are generally confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.
Appendix B: esVolta – Hummingbird ESRAA	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Energy Storage Resource Adequacy Agreement (ESRAA) Agreement presented in this appendix are generally confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.
Appendix C: Micronoc – mNOC AERS BTM CSA	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA) Agreement presented in this appendix are general confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.



**PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)**

**ADVICE LETTER FOR APPROVAL OF CONTRACTS RESULTING FROM ITS  
LOCAL SUB-AREA REQUEST FOR OFFERS PURSUANT TO RESOLUTION E-4909**

**JUNE 29, 2018**

**IDENTIFICATION OF CONFIDENTIAL INFORMATION**

<b>Redaction Reference</b>	<b>Category from D.06-06-066, Appendix 1, or Separate Confidentiality Order That Data Corresponds To</b>	<b>PG&amp;E's Justification for Confidential Treatment</b>	<b>Length of Time</b>
Appendix D: Tesla – Moss Landing EPC	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Turnkey Engineering, Procurement and Construction (EPC) Agreement presented in this appendix are generally confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.
Appendix E: Tesla – Moss Landing LTPMA	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	The terms of the Long-Term Performance and Maintenance Agreement (LTPMA) presented in this appendix are generally confidential. The terms of this contract that are public pursuant to Item VII. B. are publicly disclosed in section V. Selected Energy Storage Projects and Planned Transmission Projects.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.

**PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)**

**ADVICE LETTER FOR APPROVAL OF CONTRACTS RESULTING FROM ITS  
LOCAL SUB-AREA REQUEST FOR OFFERS PURSUANT TO RESOLUTION E-4909**

**JUNE 29, 2018**

**IDENTIFICATION OF CONFIDENTIAL INFORMATION**

<b>Redaction Reference</b>	<b>Category from D.06-06-066, Appendix 1, or Separate Confidentiality Order That Data Corresponds To</b>	<b>PG&amp;E's Justification for Confidential Treatment</b>	<b>Length of Time</b>
Appendix F1: Independent Evaluator (IE) Report (Confidential)	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS));  Item VIII. B) Specific quantitative analysis involved in scoring and evaluation of participating bids.	The IE Report contains extensive discussion of the specific terms of the ES Contracts. All contract terms, except for the 8 contract characteristics noted as public in Matrix VII.B, are confidential.  The IE Report also contains information on the shortlist, which constitutes the confidential results of bid scoring and evaluation.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.  Information under Item VIII. B is confidential for three years from the date winning contracts are submitted for CPUC approval..
Appendix G: Summary of Key 3rd-Party Owned Contract Terms	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	Contract specific terms between PG&E and the counterparty and between the counterparty and suppliers are confidential terms as they are not identified as public by Matrix term VII.B.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.

**PACIFIC GAS AND ELECTRIC COMPANY (U 39 E)**

**ADVICE LETTER FOR APPROVAL OF CONTRACTS RESULTING FROM ITS  
LOCAL SUB-AREA REQUEST FOR OFFERS PURSUANT TO RESOLUTION E-4909**

**JUNE 29, 2018**

**IDENTIFICATION OF CONFIDENTIAL INFORMATION**

<b>Redaction Reference</b>	<b>Category from D.06-06-066, Appendix 1, or Separate Confidentiality Order That Data Corresponds To</b>	<b>PG&amp;E's Justification for Confidential Treatment</b>	<b>Length of Time</b>
Appendix H: Summary of Key EPC and LTPMA Contract Terms	Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)).	Contract specific terms between PG&E and the counterparty and between the counterparty and suppliers are confidential terms as they are not identified as public by Matrix term VII.B.	Contract documents and terms of contracts are confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.
Appendix I: Utility Ownership Costs for Moss Landing Project	Item II.B.1 (Utility-Retained Generation Cost Forecast); Item VII.B (Contracts and Power Purchase Agreements between utilities and non-Affiliated Third Parties (except RPS)); California Public Utilities Code Section 454.5(g); and/or California Government Code Section 6255(a).	This appendix provides detailed cost estimates for the proposed utility-owned Moss Landing Project, which include the costs of underlying contracts between PG&E and third-party contractors. Disclosure of these detailed costs could enable market participants to manipulate future solicitations for similar products and services, to the detriment of PG&E's customers. The public interest in maintaining the confidentiality of this data outweighs the benefit from general public disclosure since interested parties can gain access to the confidential data through standard Commission-approved processes.	Item II.B.1: Confidential for three years; Public by resource category (e.g. fossil, wind, solar, hydro-electric, etc.) after three years.  Item VII.B: Confidential for three years from the date that the contract states that deliveries are to begin, or until one year following expiration, whichever comes first.  Section 454.5(g): Indefinite.  Section 6255(a): Indefinite.

**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX A**  
**DYNEGY – VISTRA ENERGY STORAGE RESOURCE**  
**ADEQUACY AGREEMENT (ESRAA)**

**(CONFIDENTIAL IN ITS ENTIRETY)**

**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX B**  
**ESVOLTA – HUMMINGBIRD ENERGY STORAGE RESOURCE**  
**ADEQUACY AGREEMENT (ESRAA)**

**(CONFIDENTIAL IN ITS ENTIRETY)**

**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX C**  
**MICRONOC – MNOC AERS BEHIND THE RETAIL METER**  
**(BTM CSA)**

**(CONFIDENTIAL IN ITS ENTIRETY)**

**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX D**  
**TESLA – MOSS LANDING ENGINEERING, PROCUREMENT AND**  
**CONSTRUCTION (EPC) AGREEMENT**

**(CONFIDENTIAL IN ITS ENTIRETY)**

**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX E**  
**TESLA – MOSS LANDING LONG-TERM PERFORMANCE AND**  
**MAINTENANCE AGREEMENT (LTPMA)**

**(CONFIDENTIAL IN ITS ENTIRETY)**



**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX F2**  
**INDEPENDENT EVALUATOR REPORT**

**(PUBLIC)**

***Pacific Gas and Electric Company  
Energy Storage Request for Offers  
Confidential Version***

***Independent Evaluator Report on  
PG&E's Local Sub-Area Energy Storage Request for  
Offers Process***

***June 28, 2018***

***Prepared by  
Merrimack Energy Group, Inc.  
26 Shipway Place  
Charlestown, Mass. 02129***



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## **Appendices**

Appendix A: Summary Information for Third-Party Offers Received

Appendix B: Summary Information for Utility-Owned Offers Received

## **Attachments**

Attachment A: mNOC AERS, LLC Behind the Meter Capacity Storage Agreement

Attachment B: Hummingbird Energy Storage, LLC Energy Storage Resource Adequacy Agreement

Attachment C: Dynegy Marketing and Trade, LLC Energy Storage Resource Adequacy Agreement

Attachment D: Tesla Inc. EPC Agreement for Moss Landing Energy Storage Project

## **I. Introduction**

### **A. Overview of the 2018 Local Sub-Area Energy Storage Request for Offers**

On February 28, 2018, Pacific Gas & Electric Company (“PG&E” or “Company”) issued its 2018 Local Sub-Area Energy Storage Request for Offers (“LSA ES RFO” or “Solicitation Protocol”) to procure energy storage resources to meet local sub area reliability needs as required by California Public Utilities Commission (“CPUC”) Resolution E-4909 (the “Resolution”).<sup>1</sup> The Resolution ordered PG&E to hold a competitive solicitation within 90 days for energy storage and/or preferred resources to meet capacity and reliability needs in three local areas: Bogue, Pease and South Bay – Moss Landing (the “Local Areas”). Issuance of the 2018 Local Sub-Area Energy Storage RFO for energy storage only and for project online dates in 2018, 2019 and 2020 is designed to address the CPUC’s resolution.

As noted on the CPUC News Blog, any battery storage projects selected through this RFO would replace three Calpine fossil fuel plants (Feather River, Yuba, and Metcalf) that do not have long-term contracts with utilities but that have been identified by the CAISO as needed to serve local reliability needs. Calpine and the CAISO have requested that the Federal Energy Regulatory Commission approve the CAISO designation of the three plants as “must run” for reliability purposes (“RMR” or “Reliability Must-Run”), which would mean that the plants would get paid to operate on an expensive cost of service contract. The CPUC and PG&E have opposed this, in part because a lack of competition can lead to market distortions and unjust rates for power. The CPUC believes there are better alternatives, including battery storage. The CPUC proposal does not require PG&E to sign contracts; it requires the utility to ascertain whether there are competitive offers for battery storage, and if there are PG&E will execute contracts.

According to the Resolution, the Commission stated it was concerned about impacts to ratepayers if the RMR contracts are executed and if they are extended:

As discussed earlier in this Resolution, these contracts were developed outside of the normal resource adequacy process and the CAISO’s Capacity Procurement Mechanism (“CPM”) was not initiated. Lack of competition, with in this instance these RMR contracts, can lead to market distortions and unjust rates for power. It is because of this concern that the Commission is exercising its procurement authority with this Resolution to authorize PG&E to conduct a limited solicitation for resources that can effectively fill the local deficiencies and address issues identified by the CAISO. If contracted for, alternative resources could potentially be brought on line. These new resources could eliminate the need for the RMR contracts for the plants described in this Resolution, or renewal in subsequent years. In addition, these new resources would be subject to must offer obligations (“MOO”) in the wholesale energy markets. In contrast, RMR contracts cover the full cost of keeping the facility available, but the facility is only called upon to

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<sup>1</sup> Resolution E-4909 Authorizing PG&E to Procure Energy Storage or Preferred Resources to Address Local Deficiencies and Ensure Local Reliability (January 11, 2018).

serve load if the specific contingency occurs and is not subject to a MOO. In all other time periods, RMR designation can cause ongoing market distortions because it may serve as a disincentive to a plant from regular participation in the energy market (page 4-5).

According to the Resolution, PG&E is authorized to conduct one or more solicitations at its earliest opportunity. PG&E must coordinate with the CAISO in an effort to ensure that its proposed portfolio will contribute to reducing or eliminating the local sub-area deficiencies in the Pease and South Bay-Moss Landing sub-areas and high voltage in the Bogue sub-area. In any advice letter submission for approval of the solicitation results, PG&E must indicate whether the CAISO agrees that the proposed portfolio will reduce, or eliminate, the local sub-area deficiencies. PG&E is not required to execute any contracts if the solicitation does not yield resources at a reasonable cost and value as detailed below.

The important parameters for procurement of the resources as contained in the Resolution include:

1. PG&E is required to take into consideration any new or planned transmission solutions that reduce or eliminate the need for RMR contracts or their extension, when it selects resources for procurement in this solicitation;
2. PG&E may solicit bids for energy storage and/or preferred resources, either individually or in an aggregation;
3. PG&E may consider accelerating projects from its 2016 storage RFO, should those projects meet all other criteria of the solicitation ordered by this Resolution;
4. Resources procured pursuant to this solicitation must be both:
  - a. On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
  - b. Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;
5. Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions;

6. Any portfolio of resources selected and contracted with, including consideration of any new or planned transmission solutions that will reduce or eliminate the sub-area deficiencies, must be of sufficient capacity and attributes to alleviate the deficiencies identified;
7. PG&E is required to coordinate with the CAISO to ensure that the resources procured in this solicitation partially or wholly obviate the need for, or extension of, RMR contracts at question in this Resolution;
8. PG&E is required to indicate when seeking approval of the contracts whether the CAISO agrees that the resources procured in this solicitation partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts at questions in this Resolution;
9. PG&E is required to hold a bidder's conference in advance of the RFO.

In the Resolution, the Commission also clarified that the value of any negotiated RMR contract should be used as a metric to value other alternatives and if the RMR contracts offer the best ratepayer value, PG&E is not required to pursue other alternatives.

Pursuant to regulatory requirements of the CPUC, PG&E retained Merrimack Energy Group, Inc. ("Merrimack Energy") as the Independent Evaluator ("IE") for the 2018 LSA ES RFO procurement process.

This IE report is submitted in conformance with the requirements of the CPUC and is designed to be consistent with the requirements outlined in the CPUC's IE Report Template (Long Form), subject to adjustments in requirements to reflect the unique nature of this solicitation.

### **B. 2018 Local Sub-Area Energy Storage RFO Procurement Protocol**

On February 28, 2018 PG&E launched the 2018 Local Sub-Area Energy Storage Request for Offers and posted the Solicitation Protocol document on its website. In the 2018 Local Sub-Area ES RFO Protocol document, PG&E listed a number of requirements and preferences to inform prospective Participants of the requirements for competing in the procurement process. A summary of the key provisions of the Solicitation Protocol is provided in Table 1.

**Table 1: Provisions of the 2018 Local Sub-Area Energy Storage RFO Solicitation Protocol**

<b>2018 ES RFO Requirements or Characteristics</b>	<b>Description of Key Provisions</b>
Resource Needs	PG&E seeks new energy storage resources connected at the transmission, distribution or customer level within the local sub-

	<p>areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity and reactive power needs in Bogue and Pease and real power needs in the South Bay – Moss Landing area. Storage project online dates should be 2018, 2019 and 2020</p>
Objectives of RFO	<p>PG&amp;E is issuing this LSA ES RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. PG&amp;E's objective is to execute agreements substantially the same as the form agreements provided in this Solicitation.</p>
Proposed Schedule	<p>The Schedule contained in the 2018 LSA ES RFO Protocol document included the following key dates for the RFO:</p> <ul style="list-style-type: none"> <li>• February 28, 2018 – PG&amp;E issues the RFO;</li> <li>• March 7, 2018 - Participants Webinar;</li> <li>• March 28, 2018 – Deadline for PG&amp;E to receive offers by 1:00 PM PPT;</li> <li>• April 18, 2018 – PG&amp;E notifies Participants that their Offers will be included on a list of Offers for which PG&amp;E may seek to enter into or negotiate an Agreement related to the Offer (“Shortlist”);</li> <li>• April 20, 2018 – Participants notify PG&amp;E whether they accept Shortlist status and acknowledge acceptance of the Confidentiality Agreement;</li> <li>• June 28, 2018 – PG&amp;E submits Agreements for CPUC Approval.</li> </ul>
Agreement Types	<p>PG&amp;E is seeking both third-party owned and utility-owned projects. The Agreements for third-party owned projects are listed below as Nos. 1 and 2 and the Agreements for utility-owned projects are listed as Nos. 3 and 4.</p> <ol style="list-style-type: none"> <li>1. Energy Storage Resource Adequacy Agreement (ES RA Agreement);</li> <li>2. Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA);</li> <li>3. Engineering, Procurement and Construction (EPC) Agreement for Moss Landing</li> <li>4. Build Own Transfer (BOT) Agreement</li> </ol> <p>For both utility-owned agreements (EPC and BOT), PG&amp;E requires entering into long-term agreements to support the ongoing maintenance and performance of the energy storage system.</p>
Eligibility Requirements	<p>This solicitation is for energy storage only, and for project online dates in 2018, 2019, and 2020. Offers must meet the applicable specifications noted below:</p> <p><b><u>Project Size Requirements</u></b></p> <ul style="list-style-type: none"> <li>• Third Party-owned Offers at all connection levels</li> </ul>

	<p>must be at least 1 MW in size;</p> <ul style="list-style-type: none"> <li>• Offers at Moss Landing must be per the specifications below and BOT offers must be a minimum of 10 MW in size;</li> <li>• PG&amp;E will consider offers where multiple ES resources are aggregated to meet the minimum size;</li> <li>• For utility-owned options, project size requirements vary: <ul style="list-style-type: none"> <li>○ For BOT options, the minimum project size is 10 MW;</li> <li>○ For EPC options at Moss Landing, all Participants must propose a minimum size of a 195 MW BESS system.<sup>2</sup> Participants may also propose a 100 MW BESS system.</li> </ul> </li> </ul> <p><b><u>Site Control:</u></b></p> <ul style="list-style-type: none"> <li>• Participants must demonstrate site control for the Project referenced in their Offer at the time of Offer submission, except for Offers for the PG&amp;E ownership project at Moss Landing and BTM customer-connected projects.</li> </ul> <p><b><u>Performance and Operational Requirements:</u></b></p> <ul style="list-style-type: none"> <li>• Third Party-owned Offers must have a four (4) hour minimum discharge duration;</li> <li>• For PG&amp;E ownership projects, offers at the Moss Landing site must have a 4-hour discharge duration while a generic BOT option can offer any duration;</li> <li>• Offers including RA must meet the applicable CPUC requirements for duration and CAISO requirements for deliverability, as well as any other requirements that will enable PG&amp;E to receive all of the RA benefits associated with the Project;</li> <li>• All Offers must identify the amount of reactive power a project will be capable of providing if requested by the CAISO within the Voltage Services section of the Offer Form's operating characteristics tab.</li> </ul> <p><b><u>Electrical Interconnection Status:</u></b></p>
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<sup>2</sup> The original Protocol was posted on February 28, 2018. However, PG&E updated the Protocol and posted an updated version on March 9, 2018. One of the changes to the updated version was that PG&E revised the minimum size of the BESS system required for the EPC option from 205 MW to 195 MW. The 4-hour duration requirements remained the same.



	<ul style="list-style-type: none"> <li>• All Offers must be connected to one of the feeders or substations associated with the three local sub areas. Absent a Phase 1 (or equivalent) or later interconnection study or interconnection agreement, Participants will be asked to provide a not-to-exceed estimate of refundable Delivery Network Upgrade and Reliability Network Upgrade costs in the Offer Form. Sellers should be aware that PG&amp;E has the right to terminate the Agreement if such costs as demonstrated in any interconnection study or interconnection agreement exceed such estimate.</li> <li>• Third Party Agreements for Transmission or Distribution-Connected Projects: <ul style="list-style-type: none"> <li>○ At the time of Offer submittal, Participants must have Full Capacity Deliverability Status (FCDS) or have documentation showing that the Project is on track to receive FCDS by the committed online date. Participants must remain active in the applicable interconnection queue until the project's required network upgrades have been completed. At a minimum, projects, except BTM, must have an interconnection request that has been deemed complete and requested FCDS for the cluster window that closes on April 30, 2018.</li> </ul> </li> <li>• EPC at Moss Landing <ul style="list-style-type: none"> <li>○ Participants submitting Offers for Moss Landing EPC project do not need to establish a valid and active interconnection application by the time of Offer submittal;</li> </ul> </li> <li>• BOT Energy Storage at any location in local sub-areas <ul style="list-style-type: none"> <li>○ Participants submitting Offers for stand-alone utility-owned BOT Energy Storage projects will be responsible for all activities and costs associated with obtaining interconnection, including interconnection study costs, network upgrades, and interconnection facilities as determined via the relevant interconnection process. Participants must have completed a Phase 1 interconnection study (or equivalent – i.e.</li> </ul> </li> </ul>
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	<p>a system impact study) or have documentation showing that the project passed the Distribution Provider or CAISO Fast Track screens at the time of Offer submittal. Participants must remain active in the applicable interconnection queue until the Project's required network upgrades have been completed.</p>
Pricing	<p>Participants are required to provide a complete Offer package, and include pricing in their Offer Form depending on the Agreement type as described below:</p> <ol style="list-style-type: none"> <li>(1) BTM CSA: RA price in \$/kW-month and Variable O&amp;M (VOM) Price in \$/MWh;</li> <li>(2) ES RA: RA price in \$/kW-month;</li> <li>(3) Utility-Ownership: Purchase Price in total dollars and operations and maintenance ("O&amp;M") costs in \$/year.</li> </ol>
Evaluation Process/Evaluation of Offers Received	<p>PG&amp;E will evaluate Offers using quantitative and qualitative criteria. PG&amp;E's evaluation will apply "least-cost, best fit" principles, using quantitative and qualitative criteria to evaluate the submitted Offers. The RFO Protocol identifies and describes in detail the procedures for evaluation of offers, including a description of the Net Market Value and Portfolio Adjusted Value components. To evaluate Offers from a quantitative perspective, PG&amp;E indicates that the quantitative criteria will include Net Market Value (NMV) and Portfolio Adjusted Value ("PAV") components. NMV benefits include net energy, capacity and ancillary services value. NMV costs include the offered fixed and variable pricing under the applicable Agreement. PAV may include adjustments that are relevant to PG&amp;E's total energy portfolio, specifically for, but not limited to:</p> <ol style="list-style-type: none"> <li>(1) Transmission Network Upgrade Cost;</li> <li>(2) Increased System Efficiency;</li> <li>(3) Avoided Renewable Curtailment;</li> <li>(4) Delivery Period Adjustment.</li> </ol> <p>The final PAV value is equal to the Net Market Value (NMV) plus the four PAV components stated above. Shortlisting will be based on the final total PAV value.</p> <p>In addition, PG&amp;E will consider the following qualitative attributes:</p> <ul style="list-style-type: none"> <li>• Project Viability</li> <li>• Supply Chain Responsibility</li> <li>• Credit</li> <li>• Safety</li> </ul>

Offer Submittal Process	All Offers must be received by March 28, 2018 at 1:00 P.M. (PPT). All Offers must be submitted electronically through the PowerAdvocate Platform.
Allowable Offers	Participants may submit up to five (5) Offers per interconnection point. Participants may vary any attributes of the offer provided the total Offers submitted at a single interconnection point does not exceed this limit. Participants submitting Offers for third-party owned BTM Projects may submit up to 20 Offers per local sub-area. All BTM projects must be located within the Bogue, Pease and South Bay-Moss Landing local sub-areas.
Offer Package	<p>Offers must contain all required information and must be organized in accordance with the instructions listed in the RFO Protocol. Information required includes:</p> <ol style="list-style-type: none"> <li>1. Introductory Letter</li> <li>2. Offer Form – Appendix A</li> <li>3. Project Description – Appendix B1</li> <li>4. Site Control – Appendix B2</li> <li>5. Project Milestone Schedule – Appendix B3</li> <li>6. Experience Qualifications – Appendix B4</li> <li>7. Electric Interconnection – Appendix B5</li> <li>8. Organizational and Finance Information – Appendix B6</li> <li>9. Utility-Ownership Additional Information – Appendix B7</li> <li>10. FERC 717 Waiver – Appendix C</li> <li>11. Confidentiality Agreement – Appendix D</li> <li>12. Utility-Owned Moss Landing Substation EPC Project - Appendix E</li> <li>13. Energy Storage Resource Adequacy Agreement – Appendix F1</li> <li>14. Behind-the-Retail Meter Capacity Storage Agreement – Appendix F2</li> <li>15. Term Sheet for Utility Owned Engineering Procurement Construction Agreement – Appendix F3</li> <li>16. Term Sheet for Utility Owned Build Own Transfer Agreement – Appendix F4</li> <li>17. Term Sheet for Long-Term Performance and Maintenance Agreement – F5</li> </ol>
Credit	<p>Upon execution of an Agreement with PG&amp;E, the Participant must post collateral to PG&amp;E. Each of the Agreements requires that the Participant post collateral with PG&amp;E prior to and following commercial operation of the facility in varying amounts and form, as provided in the applicable Agreement.</p> <ul style="list-style-type: none"> <li>• For ES RA/BTM agreements, Project Development security is \$15/kW within 5 days of execution, and an additional \$45/kW within 5 days of CPUC Approval for a total of</li> </ul>

		<p>\$60/kW. Delivery term security is \$125/kW or 10% of the highest estimated capacity payments for any 36-month period, whichever is higher.</p> <ul style="list-style-type: none"> <li>For offers for utility ownership (EPC and BOT), Project Development security is \$15/kW at execution, and 15% of the purchase price within 10 days after CPUC approval. The Post Closing Collateral for Performance and Warranty Periods is an acceptable warranty by an issuer acceptable to PG&amp;E plus 10% of the purchase price for the duration of the warranty period.</li> </ul>
Shortlist Deposit	Offer	<p>If a Participant is notified that it is eligible for PG&amp;E's Shortlist and accepts the Shortlist position, then the Participant must post a deposit ("Shortlist Offer Deposit") in the amount of \$3/kW of Payment Quantity (as the term is defined in the form Agreements) or Guaranteed Dmax for each offer on the Shortlist on the 3rd business day after receiving such notice.</p>
CPUC Approval		<p>Whether an Agreement goes into effect or not is expressly conditioned on PG&amp;E's receipt of CPUC Approval, which is more specifically defined in each of the Agreements or Term Sheets. At a minimum, PG&amp;E will require a finding from the CPUC that PG&amp;E's entry into the Agreement satisfies PG&amp;E's Energy Storage compliance with the Resolution, that the terms are reasonable, and that PG&amp;E will recover the costs incurred under the Agreement in its rates. Additionally, most Agreements will be subject to a no-fault termination if CPUC Approval does not occur within a specified period, as set forth in each of the applicable Agreements. CPUC Approval typically requires the approval of the Agreement by the CPUC to be final and non-appealable without any modifications that are unacceptable to either of the parties.</p>

### C. Issues Addressed in This Report

This report addresses Merrimack Energy's assessment and conclusions regarding the following issues identified in the CPUC's IE Report Template:

1. Describe the role of the IE throughout the solicitation process;
2. How did the IOU conduct outreach to bidders? Was the solicitation robust?
3. Evaluate the administration of the solicitation process including the fairness of the investor-owned utility's ("IOU's") bid evaluation and selection process (i.e. quantitative and qualitative methodology used to evaluate and select offers, and consistency of evaluation and selection methods with criteria specified in bid documents, etc.);

4. Describe PG&E's Least Cost Best Fit ("LCBF") methodology for evaluating offers. Was the LCBF process fairly administered? Evaluate the strengths and weaknesses of the IOU's methodology;
5. Describe the applicable project specific negotiations. Highlight any areas of concern including unique terms and conditions;
6. If applicable, describe safeguards, code of conduct and methodologies employed by the IOU to compare affiliate bids or utility-owned generation ownership offers. If a utility selected an offer from an affiliate or an offer that would result in utility asset ownership, explain whether the IOU's selection of such offer was appropriate;
7. Do the contract(s) merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market?
8. Based on the complete bid process, was the RFO acceptable?

Given the number of contracts executed, PG&E and the IE held discussions with respect to the best approach for presenting the IE's findings regarding the overall 2018 LSA ES RFO solicitation process and assessment of contract negotiations and final contract execution. Similar to the approach used for 2016 ES RFO, it was agreed that organizationally it would be preferable to include the issues listed in point 5 above regarding the description of contract negotiations and point 7 regarding CPUC approval of the contract in a separate Attachment to this report on the 2018 LSA ES RFO solicitation process. Attachments A through D include a description and assessment of each of the four Energy Storage Agreement executed by PG&E through this 2018 LSA ES RFO.

## **II. Description of the Role of the IE**

### **A. Regulatory Requirements For the IE**

The requirements for participation by an IE in utility solicitations are outlined in CPUC Decisions ("D").04-12-048 (Findings of Fact 94-95, Ordering Paragraph 28), D.06-05-039 (Finding of Fact 20, Conclusion of Law 3, Ordering Paragraph 8) of the CPUC, D.09-06-050 and D.10-07-042.

The role of IEs in California IOU procurement processes has evolved over the past ten to twelve years. In D.04-12-048 (December 16, 2004), the CPUC required the use of an IE by investor-owned utilities (IOUs) in resource solicitations where there is an affiliated bidder or bidders, or where the utility proposed to build a project or where a bidder proposed to sell a project or build a project under a turnkey contract that would ultimately be owned by a utility. The CPUC generally endorsed the guidelines issued by the Federal

Energy Regulatory Commission (“FERC”) for independent evaluation where an affiliate of the purchaser is a bidder in a competitive solicitation, but stated that the role of the IE would not be to make binding decisions on behalf of the utilities or administer the entire process.<sup>3</sup> Instead, the IE would be consulted by the IOU, along with the Procurement Review Group (“PRG”) on the design, administration, and evaluation aspects of the Request for Proposals (“RFP”). The Decision identifies the technical expertise and experience of the IE with regard to industry contracts, quantitative evaluation methodologies, power market derivatives, and other aspects of power project development. From a process standpoint, the IOU could contract directly with the IE, in consultation with its PRG, but the IE would coordinate with the Energy Division.

In D.06-05-039 (May 25, 2006), the CPUC required each IOU to employ an IE regarding all RFPs issued pursuant to the RPS, regardless of whether there are any utility-owned or affiliate-owned projects under consideration. This was extended to any long-term contract for new generation in D.06-07-029 (July 21, 2006). In addition, the CPUC directed the IE for each RFP to provide separate reports (a preliminary report with the shortlist and final reports with IOU advice letters to approve contracts) on the entire bid, solicitation, evaluation and selection process, with the reports submitted to the utility, PRG, and CPUC and made available to the public (subject to confidential treatment of protected information). The IE would also make periodic presentations regarding its findings to the utility and the utility’s PRG consistent with preserving the independence of the IE by ensuring free and unfettered communication between the IE and the CPUC’s Energy Division, and an open, fair, and transparent process that the PRG could confirm.

In 2007, the use of an IE was required for any competitive solicitation seeking products for a term of more than three months in D.07-12-052 (December 21, 2007). Also, the process for retaining IEs was modified substantially, with IOUs developing a pool of qualified IEs, subject to feedback and any recommendations from the IOU’s PRG and the Energy Division, an internal review process for IE candidates, and final approval of IEs by the Energy Division.

In 2008, in D.08-11-008, the CPUC changed the minimum term requirement from three months to two years and reiterated that an IE must be utilized whenever an affiliate or utility bidder participates in the RFO, regardless of contract duration.

In D.09-06-050 issued on June 18, 2009 in Rulemaking 08-08-009, Order Instituting Rulemaking to Continue Implementation and Administration of California Renewable Portfolio Standard Program, the CPUC required that bilateral contracts should be reviewed according to the same processes and standards as contracts that come through a solicitation. This includes review by the utility’s PRG and its IE, including a report filed by the IE.

In D.10-07-042 issued on July 29, 2010, the Commission reaffirmed the role of the IE and required the Energy Division to revise the IE Template to ensure that the IEs focus

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<sup>3</sup> Decision 04-12-048 at 129-37. The FERC guidelines are set forth in Ameren Energy Generating Company, 108 FERC ¶ 61,081 (June 29, 2004).



on their core responsibility of evaluating whether an IOU conducted a well-designed, fair, and transparent RFO for the purpose of obtaining the lowest market prices for ratepayers, taking into account many factors (e.g. project viability, transmission access, etc.).

This IE report is submitted in conformance with the above requirements.

## **B. Description of Key IE Roles**

In compliance with the above requirements, PG&E selected Merrimack Energy to serve as IE for the 2018 LSA ES RFO in January 2018. The overall objective of the role of the IE is to ensure that the solicitation process is undertaken in a fair, consistent, unbiased, and objective manner and that the best resources are selected and acquired for the benefit of customers consistent with the solicitation requirements. This role generally involves a detailed review and assessment of the evaluation process and the results of the quantitative and qualitative analysis.

In addition to the requirements identified in CPUC Orders, the Scope of Work included in the Contract Work Authorization (“CWA”) between Merrimack Energy and PG&E clearly identifies the tasks to be performed by the IE. These include the following tasks:

- Advise on the consistency of solicitation activities with the CPUC’s procurement-related rules and procedures and PG&E’s Commission-approved procurement authority;
- Assist in the development, design, and review of the Request for Offers. Promptly submit any recommendations to PG&E and/or CPUC, consistent with the objective of ensuring a competitive, open and transparent process, and to ensure that the overall scope of the solicitation process is not unnecessarily broad or too narrow;
- Monitor all communications and/or negotiations between PG&E and counterparties, as required by the solicitation’s objectives as outlined in the solicitation Protocol and approved by the CPUC;
- Provide recommendations and reports, if required by PG&E and/or the CPUC, concerning the definition of products sought and price and non-price evaluation criteria; so that all aspects of the products are clearly understood, and all bidders may effectively respond to the solicitation, as applicable;
- Review the comprehensive quantitative and qualitative bid evaluation criteria and methodologies applied to any Local Sub-Area Energy Storage RFO Solicitation and assess whether these are applied to all bids in a fair and non-discriminatory manner. The Consultant will be provided access to PG&E’s personnel, modeling tools, and meeting documentation in order to credibly evaluate the bid evaluation and selection processes;
- Report on the outcome of a solicitation using the appropriate CPUC-approved Independent Evaluator Report Template, which may be amended from time to time, for inclusion in any Advice Letter, Application, and/or Quarterly Compliance Report filings;

- Monitor the solicitation, bilateral negotiation and/or contract amendment processes and promptly submit recommendations to PG&E's management to ensure that no bidder has an information advantage and that all bidders or counterparties, if applicable, receive access to relevant communications in a non-discriminatory manner. This task may include monitoring contract negotiations and/or keeping apprised of negotiation status and major issues;
- Provide presentations to PG&E's management, the Procurement Review Group (PRG), and the CPUC Energy Division (ED), if requested, regarding the Consultant's findings or status. Communicate periodically with the Energy Division ("ED") as a check on the Request for Offer (RFO) process;
- Provide a written assessment as to whether the solicitation, bilateral negotiation and/or contract amendment processes were open, transparent and fair, and whether any bidder received material information that gave them a competitive advantage or disadvantage relative to other bidders;
- Provide a final written assessment as to whether or not PG&E's evaluation criteria and methodologies were reasonable and appropriate and were applied in a fair and non-discriminatory manner for all offers received;
- Prepare or assist in the preparation of direct and/or rebuttal testimony, and participate as a witness or in an advisory capacity during administrative hearings, as required, before the CPUC and/or FERC in any associated proceedings;
- Perform other duties as may be further defined in subsequent relevant regulatory proceedings or required by PG&E's senior management.

### **C. Description of IE Oversight Activities**

As noted, Merrimack Energy was retained as the IE by PG&E in January 2018, prior to the development of the RFO documents and therefore, Merrimack Energy has had the opportunity to participate in and assess the development and implementation of the entire process from start to completion. In performing its oversight and evaluation role, the IE participated in and undertook a number of activities in connection with the solicitation process including providing comments on the protocol documents, monitoring communications between PG&E and the Participants, reviewing and commenting on internal RFO Evaluation Protocol documents, organizing and summarizing the offers received, reviewing the evaluation and selection process and results at each stage in the process, monitoring the status of short-listed offers, participating in calls with Participants after receipt of offers, communicating with PG&E's Project Manager, project team, and transactors on a regular basis to discuss RFO issues, participating in meetings with the PRG, PG&E's Evaluation Committee and PG&E's Advisory Committee, and monitoring the contract negotiation process with short-listed Participants.

For the 2018 LSA ES RFO, the role of the IE was complex since PG&E was seeking offers for third-party storage projects as well as an EPC contract for a project at a PG&E site in which PG&E would own the project. Because of the sensitivity associated with third-party and utility-owned options, PG&E established separate teams to review and evaluate the different types of offers, with one team focused on utility-owned options exclusively. While members of each team did not communicate on the evaluation of



offers for the RFO during the solicitation process, the IE was required to coordinate review and evaluation with both teams. In particular, the dual roles of the IE in coordinating with both groups were focused primarily on the review of the evaluation results and the contract negotiation process after shortlist selection.<sup>4</sup> The IE monitored contract negotiations associated with each type of contract/product. But given the nature of this solicitation was required to focus its efforts on monitoring negotiations of the EPC contract given the short timeframe for negotiations, the intensity of negotiations, the complexity of the process, and PG&E's intent to minimize negotiations of third-party offers.

This report provides an assessment and review of PG&E's 2018 LSA ES RFO procurement process from development of the RFO through execution of the final Agreements. The role of the IE is also discussed as it pertains to specific activities in Section IV of this report.

### **III. Did PG&E Do Adequate Outreach to Bidders and Was the Solicitation Robust?**

This section of the Report focuses on the adequacy of outreach activities of PG&E and the robustness of the response of bidders with regard to the solicitation process.

#### **A. Describe the IOU outreach to potential bidders (e.g., sufficient publicity, emails to expected interested firms)**

Outreach activities are important to the success of a competitive solicitation process. PG&E's outreach efforts targeted a large number of potential Participants based on PG&E's contact lists of energy companies and individuals. These efforts likely played a role in the robust response to the RFO in terms of number of Participants and specific offers or projects.

PG&E maintains a detailed list of potential Participants with nearly 2,800 contacts that serves as the database for Seller contact and outreach.<sup>5</sup> PG&E sent emails to all potential Participants on this list informing them of the 2018 LSA ES RFO process and the issuance of the 2018 LSA ES RFO. The list includes Diverse Suppliers that were also informed via email of the 2018 LSA ES RFO. PG&E notified contacts on the mailing list of the issuance of the 2018 LSA ES RFO and also provided several email notifications and updates to the email list during the solicitation process. In addition, the issuance of

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<sup>4</sup> The IE monitored contract negotiations for all shortlisted projects including third-party and utility-owned options. For offer evaluation purposes, the IE coordinated its efforts only with the offer evaluation team or "Solicitation team" since the Solicitation team conducted the evaluation of all offers submitted. The utility-ownership team was not involved in the quantitative evaluation of the offers submitted but did conduct a due diligence review including the project viability assessment.

<sup>5</sup> PG&E informed the IE that PG&E sent notification emails associated with issuance of the LSA ES RFO to 2,732 contacts.

the 2018 LSA ES RFO was highly publicized in the trade press based on the CPUC Resolution.

PG&E initiated a comprehensive process for communicating with bidders for the 2018 LSA ES RFO. PG&E again utilized the PowerAdvocate Platform as the means for Participants to submit their offers. Similar to the 2016 ES RFO, PG&E established two separate events on the PowerAdvocate Platform – one for Utility-Owned options and one for third-party options. In addition to establishing a mechanism for Participants to submit their offers to PG&E in a confidential manner, PG&E also used the Utility-Owned event to provide a significant number of technical and commercial/administrative files regarding the Moss Landing site and project that Participants could access. PG&E also established a section on its public website for distribution of information to prospective Participants and other interested parties. The public website also included contact information for PG&E should prospective Participants wish to ask any questions or request follow-up information.

The PG&E internal website contained all the pertinent solicitation documents, presentations for prospective bidders, schedule for the solicitation, CPUC Resolution and a list of questions and answers related to the solicitation. The following documents and information were included on the public website for Participant review and utilization:

- CPUC Resolution E-4909;
- Solicitation Schedule for the 2018 LSA ES RFO
- RFO Documents including the ES RFO Protocol and associated Appendices<sup>6</sup>
- Participants Webinar Presentation and attendees list.
- Power Advocate instructions
- Contact Information for PG&E and the IE
- Frequently Asked Questions
- Confidentiality Agreement
- Site visit information for the Moss Landing

A total of 17 questions and answers were posted on the website, including questions from the Participants Webinar and Frequently Asked Questions. The IE found the website easy to access and navigate. All documents associated with the 2018 ES RFO were included on the website and were easy to identify, access, and download.

**B. Identify Principles Used to Determine Adequate Robustness of a Solicitation (e.g. number of proposals submitted, number of MWhs associated with submitted proposals).**

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<sup>6</sup> The Appendices posted included the documents Participants must submit with their offers (i.e. Offer Form, Project Description, Site Control document, Project Milestone Schedule, Experience Qualification statement, Electric Interconnection documents, Organizational and Financial information and Confidentiality Agreement). Other Appendices included the various contracts for the products solicited, utility-ownership term sheets for the EPC contract agreement, Build, Own, Transfer agreement, and Long-Term Performance and Maintenance Agreement. Other documents such as Sample introductory letter, Letter of Credit, and list of eligible substations for interconnection location were also included.

With regard to assessing whether the response to the solicitation was adequately robust, there are several criteria to consider:

- Was the response to the solicitation commensurate with the level of outreach?
- Did the solicitation encourage a diverse response from Participants in terms of products requested, project structure, pricing options, etc?
- Was the response large with respect to the number of proposals and megawatts (“MW”) offered relative to the amount requested?
- Was the process a competitive process based on the amount of MW submitted by Bidders relative to the number of MW requested?
- Were the Solicitation Documents clear and concise such that Participants could clearly assess how to structure a competitive offer?

**C. Did the IOU Do Adequate Outreach? If Not, Explain in What Ways it Was Deficient**

There are several criteria generally applied for assessing the performance of the utility in its outreach and marketing activities:

- Did the utility contact a large number of prospective Participants?
- Were the utility’s outreach efforts active or passive?
- Did the utility adequately market the solicitation?
- Could prospective bidders easily access information about the RFP?
- Did any prospective bidders complain about the process or access to information?

As noted above, PG&E contacted a large number of prospective Participants to inform them of the issuance of the RFO. In addition, the RFO was highly publicized in the trade press based on the CPUC Resolution requirements. The outreach activities of PG&E can be classified as “active” given that emails about the solicitation process were directly sent to prospective Participants. In addition, PG&E held a Participants webinar to provide information on the solicitation process, and to allow the Participants to ask questions and seek information about the solicitation process.

#### **D. Was the Solicitation Adequately Robust**

The overall result of this outreach activity was a robust response from Participants. Offers were also received from a range of eligible Sellers who offered proposals for all products/contract structures requested at all desired locations.

A total of approximately 100 offer variations were received, which represented 29 projects from [REDACTED] counterparties. [REDACTED]

[REDACTED] Appendices A and B of this Report contain a list and summary of the Offers submitted. The IE found the response from the market to be robust and competitive for each product category, particularly given the short lead time allotted to submit offers.

In conclusion, the response of the market to PG&E's 2018 LSA ES RFO provides evidence that the outreach and Participant engagement activities of PG&E were effective, and Participants felt they had an adequate opportunity to receive a contract from the process.

#### **E. Did the IOUs Seek Adequate Feedback About the Bidding/Bid Evaluation Process From All Bidders After the Solicitation Was Complete?**

PG&E's project team members were involved in regular communications with prospective Participants, primarily after submission of the offers. Also, PG&E agreed to debrief Participants who submitted offers that were not selected about the general reasons for non-selection. The IE participated in calls with a number of Participants.

#### **F. Was the Outreach Sufficient and Materials Clear Such That the Bids Received Meet the Needs the Solicitation Was Intending to Fill?**

PG&E spent considerable time and effort in developing the Protocol Document and Offer Forms to ensure the documents were clear and concise. PG&E did update the 2018 LSA ES RFO Protocol prior to submission of Offers on March 28, 2018. With the exception of revising the minimum size for the Moss Landing EPC option from 205 MW to 195 MW, the updates were minor and should not have created any issues with regard to affecting the timing of offer submission by Participants to reflect any new information in their Offers. The IE had the opportunity to review of the 2018 LSA ES RFO Protocol document and Offer Forms, during the development of the Protocols and provided comments on the documents. The IE's comments were designed to ensure the information was consistent and clear to Participants.

Overall, the IE was of the opinion that the documents and follow-up information presented by PG&E were clear and concise and provided all Participants the opportunity to develop a complete and conforming Offer. The IE also felt that the documents and follow-up webinar provided detailed information for Participants to decide if they wanted to participate and to understand the requirements for competing. Prospective Participants

had multiple opportunities to ask questions and participate in interactive discussions with PG&E staff regarding the Offer Forms, Attachments and contracts.

The IE also found that PG&E's project team was particularly responsive to the needs of prospective Participants and also responded to questions in a timely and thorough manner.

#### **G. Any Other Relevant Information or Observations**

Most of the Participants provided reasonably complete proposals with a moderate amount of clarification questions or information requirements after submission. After submission of the Offers, PG&E's project team also worked diligently to ensure that the Participant Offer's conformed to the requirements of the RFO. Team members were in contact with the Participants after submission of the Offers. The IE participated in a number of calls with Participants after Offer submission for the purpose to either ensure the Offers were conforming, if possible. PG&E's project team made every attempt to allow Participants to cure any deficiencies and conform their offers to RFO requirements within reason and subject to RFO requirements. As a result, a number of Participants posted revised Offer Forms and Offer Structure letters to the PowerAdvocate Platform.

### **IV. Administration of the LSA ES RFO Solicitation Process**

In performing its oversight role, the IE participated in and undertook a number of activities in connection with the 2018 LSA ES RFO including providing comments on the RFO documents, participating in regularly scheduled conference calls with the PG&E project teams given the expedited nature of the solicitation, participating in discussions on the offer evaluation methodology and selection process, organizing and summarizing the offers received, reviewing and commenting on the evaluation and selection process and results at each step of the process, and participating in meetings with the CAM group and PRG

A list of the key milestone events which occurred during the solicitation process as well as the activities of the IE during the procurement process consistent with the important activities and milestones for the process are described below.

#### **Project Kick-off Meeting**

The PG&E and Merrimack Energy project teams held a kick-off meeting via conference call in early February 2018 to discuss the schedule for the RFO, evaluation methodology, and overall solicitation process. PG&E provided an overview of the expedited schedule for the project and provided a high-level discussion regarding the similarities and differences between this RFO and the 2016 Energy Storage RFO, for which Merrimack Energy served as IE. Merrimack Energy inquired about the contract structures that would be used and products solicited and also asked questions about the evaluation methodology and evaluation parameters based on the CPUC Resolution. PG&E also

asked the IE if the IE could identify any “lessons learned” from the implementation of other expedited Energy Storage RFOs for which Merrimack Energy served as IE.

PG&E suggested the Company and IE set up weekly conference calls to discuss any issues that may arise during the solicitation process, similar to the process adopted for the 2016 ES RFO that proved to be valuable for ensuring everyone was up-to-date with the process. After the call, PG&E also provided a draft copy of the LSA ES RFO Protocol for review and comment. The IE provided comments back shortly after receiving the document.

Based on the questions from the IE, PG&E noted that the contracts for third-party RA and BTM Agreements will be very similar to the agreements executed from the 2016 ES RFO. Given the timeframe allotted, PG&E’s objective was to allow no changes or minimum changes to the contracts given the recent Energy Storage Agreements executed.

After the meeting, Merrimack Energy prepared a list of follow-up questions and sent the questions to PG&E for comments. The parties subsequently held a call to discuss the questions and determine if the IE had any additional questions.

#### **CAM/PRG Meeting**

PG&E provided a presentation to the joint Cost Allocation Mechanism (CAM)/Procurement Review Group (PRG) on February 22, 2018 on the Local Sub-Area Request for Offers (RFO). PG&E provided an overview of CPUC Resolution E-4909, a description of the local sub-area needs for the Pease, Bogue, and South Bay-Moss Landing areas, an overview of the RFO and the RFO schedule. PG&E noted that the Resolution provided that PG&E may solicit offers for energy storage and/or preferred resources. PG&E informed the groups that it plans to launch two solicitations for resources in the sub-areas. Track 1, which is for energy storage resources will be launched on February 28, 2018. Track 2 would be for preferred resources (including energy storage) and would be launched later in 2018. PG&E indicated that consistent with the requirements of the Resolution it will continue to coordinate with CAISO to identify any transmission solutions or other options that may help mitigate the local sub-area deficiencies.

PG&E provided an assessment of the sub-area capacity deficiencies based on netting out resources that currently have RMR or CPM status. This would result in a deficiency of 29 MW in the Pease area and 893 MW in the South Bay – Moss Landing area. Resources required in the Bogue area would help solve the voltage problem in this area.

PG&E also identified that the allowable contract structures for this RFO would include third-party owned resources similar to PG&E’s 2016 ES RFO including Energy Storage RA Agreements for front-of-the-meter projects and BTM Capacity Storage Agreement for behind-the-meter projects. Utility-owned resources will also be eligible. PG&E is seeking offers for Engineering, Procurement, and Construction Agreement (“EPC”) for



its utility-provided site at Moss Landing and a Build-Own-Transfer (“BOT”) Agreement for projects at any site within the sub-areas.

### **Issuance of the LSA ES RFO**

PG&E launched its Local Sub-Area Energy Storage RFO on February 28, 2018 as identified. The RFO Protocol was subsequently revised and an updated version was posted on March 9, 2018.

### **Separate RFO Requirements/Webpages**

Similar to the 2016 Energy Storage RFO, PG&E is seeking both third-party options as well as utility-ownership options. PG&E has taken a similar approach in this RFO with regard to the establishment of separate teams for implementing the solicitation and separate bid events within the PowerAdvocate Platform. PG&E has established a specific team within its utility generation group to manage the interaction with bidders for the utility-owned component of the RFO. The team is responsible for conducting due diligence on the offers, managing the communications with bidders, and conducting the negotiations. Participants for utility-ownership options can access the specific event or webpage on PowerAdvocate associated with this product and can access documents and submit their offers via the specific event established for utility-ownership options. In addition, third-party bidders can access a separate event or webpage for their offers and will be able to access documents and submit their offers to the specific event. PG&E’s lead team for the solicitation will have access to both events. However, members of the utility-ownership team will have access only to the webpage established within PowerAdvocate for utility-ownership options. This separation is designed to maintain confidentiality of the bidder information by limiting access in PowerAdvocate and also serves to ensure that bidders for each event only have the information they require to complete their offers.

### **Participants and Offer Form Webinar**

PG&E held its Participants and Offer Form Webinar on March 7, 2018. The IE provided comments on the presentation slides and monitored the Webinar. Topics addressed at the Webinar included:

- Overview of Resolution E-4909 as the impetus for undertaking the RFO;
- Solicitation Overview including the products sought, Agreement options, and project schedule;
- Safety requirements;
- Interconnection information to be provided with the Offer (Appendix B5);
- Overview of the Energy Storage RA Agreement and BTM Capacity Storage Agreement;
- Overview of the Utility-Owned EPC project at Moss Landing substation;
- Utility-owned Build, Own, Transfer option;
- Description of the Evaluation Methodology;
- Offer submittal process and information requirements;

- Keys to a successful Offer;
- Description of the Offer Form; Offer Form Instructions; Offer Form validation; Participants project information.

For the previous two Energy Storage solicitations, PG&E held a separate Webinar devoted totally to review of the Offer Form. Given the timeframe for the solicitation, PG&E included a discussion regarding completion of the Offer Form as part of the Participants Webinar. However, PG&E did devote a considerable amount of time describing the Offer Form requirements

A total of 100 individuals attended the Participants Webinar, representing an estimated 62 companies.

### **Questions and Answers**

PG&E received a total of 17 questions and provided responses on its website for the RFO. The responses to the questions were grouped into the following categories:

- General (4 Q&As)
- Site Control (1)
- Interconnection (5)
- Evaluation (2)
- Utility-Owned projects (2)
- Offer Form (3)

### **Reviewed and Commented on Internal Evaluation Protocols and Evaluation Methodology**

The IE conducted reviews of drafts of the internal evaluation protocols and criteria to be used in the evaluation of offers once received. The IE discussed his comments with the Quantitative Evaluation (“Quant”) team at PG&E regarding the protocols. The internal evaluation protocols were completed in final form and sent to the IE prior to receipt of the offers.

The IE also coordinated with the Quant team to review the integration model, which was originally developed for the 2014 Energy Storage RFO but has now been used for three storage related solicitations. The integration model is a tool developed by PG&E which allows the IE to quickly review and evaluate the outputs and inputs for each offer by keying in the offer number. The integration model essentially pulls in and organizes all the input and output information for each offer and presents the output data in several forms, including total cost and benefits by year as well as the complete information and backup for each metric compiled. This tool greatly facilitated the IE review and assessment of the offers received.



*Receipt of Offers – March 28, 2018*

The deadline for PG&E to receive offers was March 28, 2018 at 1:00 pm PPT. Participants were required to submit all required forms and documents to the PowerAdvocate Platform. Upon receipt of offers on PowerAdvocate, the IE reviewed the offers and prepared a summary table which contained pricing, operational information, commercial and other pertinent information associated with each offer. As noted below, PG&E received a total of 100 offers including [REDACTED] offers from [REDACTED] Suppliers for the utility-ownership EPC option at the Moss Landing site, [REDACTED] offers from [REDACTED] Suppliers for a BOT option and [REDACTED] offers from [REDACTED] projects provided by [REDACTED] Suppliers for third-party RA and BTM offers.

Table 2 provides a list of all offers originally submitted by Participants for third-party offers. Table 3 provides a list of all offers originally submitted for utility-owned offers. The Comments column attempts to generally explain the characteristics of the offer variations in cases where a Participant proposes multiple offer variations.

Figure 1. The effect of the number of trials on the number of correct responses. The number of correct responses was significantly higher for the 10 trials condition than for the 5 trials condition. Error bars represent the standard error of the mean.

[REDACTED]

[REDACTED]

[REDACTED]

The IE and PG&E team also reviewed the offers for conformance with eligibility requirements and completeness of the offers. After review and discussions, it was determined that [REDACTED] of the third-party offers were conforming and [REDACTED] non-conforming. [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

For the utility-ownership options, [REDACTED]

[REDACTED]

#### **Evaluation of the Offers Submitted**

After submission and initial review of the offers, PG&E's evaluation team members reviewed the offers and organized the input data into a file to allow for review and evaluation of the offers received. The initial task involved review of the offers to ensure all the information required for the evaluation was provided and was consistent with the inputs necessary for bid evaluation. PG&E submitted emails for bidders with regard to clarifications or inconsistencies about their offers. PG&E identified the issue and allowed bidders the opportunity to cure and resubmit completed offers via the PowerAdvocate website when warranted. PG&E also held phone conversations with a few Participants who either provided inconsistent information or required clarification of their offers. The IE attended the majority of the calls with Participants.

Subsequent to this review, PG&E began to evaluate the offers and prepare evaluation sheets with the offer evaluation results. PG&E submitted initial evaluation output files to the IE at the project team meeting on April 9, 2018 as identified below. At the meeting, the PG&E project team walked through the preliminary results.

As evaluation results were updated, PG&E submitted additional output runs to the IE. The IE reviewed each successive output file submitted by PG&E and raised questions as required regarding the evaluation results.

Also, PG&E at the IE's request prepared an integration model for the IE which compiled the input and output data for each offer to allow the IE to review the results in detail. The IE utilized the integration model to assess the evaluation results for the higher ranked offers in each category.

### Meeting with PG&E Project Team

The IE and PG&E project team met at PG&E's offices on April 9, 2018 to review the initial bid evaluation results to inform shortlist selection and to review the classification of offers as conforming and non-conforming. In addition, given the expedited schedule, the IE proposed several additional topics for discussion including the schedule going forward, IE review of the revenue requirements model and assumptions, review of evaluation results using the integration model, contract negotiation teams, timing for shortlist selection, and status of meetings/coordination with the CAISO.

### CAM/PRG Meeting – April 16, 2018

A joint CAM/PRG meeting was held on April 16, 2018 at which PG&E provided the results of its evaluation of energy storage offers for the 2018 LSA ES RFO and recommended a shortlist of offers. PG&E provided an overview of the schedule of the solicitation going forward as well as an overview of CPUC Resolution E-4909.

[REDACTED]

[REDACTED]

[REDACTED]<sup>7</sup> [REDACTED]

[REDACTED]<sup>8</sup>

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

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[REDACTED]

[REDACTED]

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<sup>7</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

<sup>8</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**Shortlist Notification to Bidders**

Shortly after the PRG meeting, on April 18, 2018, PG&E notified the Participants that had projects selected for the shortlist as well as those who were not selected. PG&E identified any offers selected for the shortlist as well as those offers not selected. PG&E informed the selected shortlisted Participants that if they wished to continue to participate in the solicitation process they would have to respond via email to PG&E's notification

letter by April 20, 2018. For third-party options, PG&E's notification letter also identified the following requirements for continued participation:

- Submission of a Shortlist Offer Deposit in the amount of \$3/kW of the Payment Quantity by April 23, 2018;
- [REDACTED];
- Note that the Expected Initial Delivery Date must be no later than 2020 and the first day of the first showing month for which product is delivered;
- Acknowledge and accept PG&E's Confidentiality Agreement;
- Inform PG&E if the project has been or will be submitted in another solicitation with PG&E or another entity.

PG&E also informed shortlisted bidders via the Notification Letter that all shortlisted RFO participants are required to complete PG&E's safety registration and prequalification process with ISNetwork, PG&E's primary contractor safety management system, in order to be eligible for execution of an Agreement in the Local Sub-Area RFO. PG&E noted that all storage Sellers would be required to maintain an active ISNetwork subscription in compliance with PG&E's Contractor Safety Program during the Term of the Agreement. PG&E provided a phone number and email address for ISN to guide the participants.

[REDACTED]

PG&E also notified shortlisted Participants that if they decide to withdraw from the Solicitation they must provide PG&E five business days' notice that the Participants wishes to withdraw.

PG&E also submitted letter notifications to Participants who were not shortlisted and offered the opportunity for a de-briefing call with the counterparty.

PG&E followed up with shortlisted Participants the same day that notifications were issued to ensure the Participants had received their shortlist notifications, to inform Participants of the next steps in the process and to answer any questions from the shortlisted Participants. PG&E identified the PG&E primary contacts for the Participant and reminded the Participant that PG&E [REDACTED]

[REDACTED]. PG&E also provided the shortlisted Participants a clean version of the form agreement and requested the Participant to populate all fields necessary to incorporate all project specific information as specified in the shortlisted offer and return the Agreement as soon as

### **Due Diligence Process and Best and Final Offers for EPC Bidders**

Service	Percentage of Respondents
Health care services	92%
Food bank	88%
Financial counseling	75%
Job training	65%
Mental health services	60%
Substance abuse treatment	55%
Legal services	45%

\_\_\_\_\_

\_\_\_\_\_

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[REDACTED]

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[REDACTED]

*Communications with Shortlisted Third-Party Participants*

Shortly after the selection of the shortlist on April 18, 2018, PG&E initiated communications with the shortlisted third-party counterparties as previously noted. After PG&E submitted the notification letters to Participants, PG&E set up calls or meetings with each shortlisted Participant to discuss the offers. PG&E asked the Participants to populate the ESRAA or BTM agreement with their project specific information. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Table 5 provides a summary of the original and best and final pricing for each shortlisted project.

[REDACTED]

[REDACTED]



[REDACTED]

[REDACTED]

### *Project Team Meetings*

During the solicitations process the IE held weekly meetings with PG&E's transaction team to discuss the contract negotiation process and any issues which emerged during the solicitation process. The group also discussed any outstanding or emerging issues associated with the overall implementation of the evaluation and selection process. The meeting also identified any potential issues, possible revisions to the standard form agreements, and any revisions in pricing and value calculations.

### *Advisory Committee Meeting*

On May 16, 2018, the PG&E Solicitation team provided a presentation to its internal Advisory Committee to discuss the status of the solicitation and potential project selection. The team presented background information on the CPUC Resolution E-4909, its current perspective on the applicable local sub-area requirements, summary of PG&E's discussions with CAISO, feedback received from the CPUC, and the status of projects on the shortlist for each sub-area. The team also provided a list of the next steps and key dates.

[REDACTED]

[REDACTED]

[REDACTED]

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<sup>10</sup> [REDACTED]

[REDACTED]

**Revisions to the Shortlist**

During the shortlist evaluation and negotiation process, activities associated with a [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
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[REDACTED]

[REDACTED]

**PRG Notification**

On May 24, 2018 PG&E notified the Cost Allocation Mechanism/Procurement Review Group of the Offers for potential transactions from the 2018 Local Sub-Area Energy Storage Request for Offers. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

## **V. Appropriateness of the Local Sub-Area Energy Storage RFO Bid Evaluation and Selection Methodology and Design**

### **A. Identification of Principles for Evaluating PG&E's Bid Evaluation Methodology**

This section of the report addresses the principles and framework underlying the IE's review of PG&E's evaluation and selection methodology for the 2018 Local Sub-Area ES RFO solicitation process. One of the important questions in this regard is whether the bid evaluation and selection methodology was fair and appropriate for this type of solicitation. Key areas of inquiry by the IE and the underlying principles used by the IE to evaluate the methodology include the following:

- Were the procurement targets, products solicited, principles and objectives clearly defined in PG&E's 2018 Local Sub-Area ES RFO and other materials?
- Is the IOU bid evaluation based on those criteria specified in the bid documents? In cases where bid evaluation goes beyond the criteria specified in the bid documents, the IE should note the criteria and comment on the evaluation process.
- Do the IOU bid documents clearly define the type and characteristics of products desired and what information the bidder should provide to ensure that the utility can conduct its evaluation?
- Does the methodology identify how qualitative and quantitative measures were considered and were consistent with an overall metric?
- Are there differences in the evaluation method for different technologies that cannot be explained in a technology-neutral manner?
- Was the bid evaluation and selection process and criteria reasonably transparent such that Participants would have a reasonable indication as to how they would be evaluated and selected?
- Was the bid evaluation methodology consistent with CPUC direction?
- Was PG&E's bid evaluation based on and consistent with the information requested in the RFO to be submitted by Participants in their proposal documents?
- Were the bid evaluation criteria consistently applied to all offers?
- Does the quantitative evaluation methodology allow for consistent evaluation of bids of different sizes and in-service dates? Are there differences in the evaluation method for different technologies that cannot be explained in a technology-neutral manner?

- Did the bid evaluation criteria and evaluation process contain any undue or unreasonable bias that might influence project ranking and selection results or in any way favor affiliate bids?
- Was the 2018 Local Sub-Area ES RFO clear and concise to ensure that the information required by PG&E to conduct its evaluation was provided by project sponsors?
- Did the IOU bid evaluation criteria change after the bids were received? Explain the rationale for the changes.

In the view of the IE, the 2018 LSA ES RFO Solicitation Protocol Document and related Appendices provide a significant amount of information on which Participants can base their offers. The documents contain detailed information on the products sought, the information required of Participants for offer submission, contract provisions, evaluation criteria and a description of the evaluation methodology. In addition, PG&E held a Participants Webinar to further describe the evaluation methodology, evaluation criteria, information required of Participants, and guidance on how to complete the offer forms. Overall, the IE concludes that the products solicited, procurement targets, protocol information and quantitative and qualitative evaluation criteria were generally clearly defined and applied. PG&E generally followed its evaluation criteria and methodology in undertaking the evaluation of the offers. Furthermore, the methodologies applied to the different types of products were fair and reasonable and did not unduly bias any technologies or products. While PG&E did apply different evaluation methodologies and models (e.g. Revenue Requirements model for EPC options) to the various proposals or project structures sought, the methodologies applied were consistent with the project structure evaluated.

The IE found that the evaluation methodology and criteria were consistently applied to different products, technologies, different terms and start dates. The methodology had to address not only third-party energy storage agreements (i.e. Energy Storage Resource Adequacy and Behind-the-Retail Meter Capacity Storage Agreements) but utility ownership offers whereby PG&E would own and operate the project (i.e. EPC Agreement for Moss Landing and BOT Agreement for utility ownership). In such cases, PG&E clearly described the methodologies to be applied to each type of product in its evaluation protocols submitted to the IE and included all reasonable costs consistently in the evaluation. In addition, PG&E generally followed its evaluation criteria in undertaking the evaluation process.

To address the other issues identified, the IE will first present a detailed description of the bid evaluation methodology and process implemented by PG&E to undertake the evaluation. This includes both the quantitative and qualitative criteria used in the evaluation. Subsequently, the IE then discusses the strengths and weaknesses of the methodology relative to the issues identified above.

## **B. Overview Description of PG&E's Least Cost Best Fit ("LCBF") Evaluation Methodology Adjusted to Obtain a Mix of Attributes**

This section of the report provides an overall description of PG&E's LCBF bid evaluation methodology, procedures, and criteria applicable to the 2018 LSA ES RFO. The methodology selected is designed to generally conform to the Least Cost Best Fit ("LCBF") procedures applied in other solicitations. However, the methodology also needs to address the unique nature of Energy Storage resources and the eligible products/contract structures allowed. In particular, given the number of products/contract structures allowed and the technology options eligible, PG&E's evaluation protocols, methodology and criteria are very detailed and complex and are designed to address the nuances associated with the evaluation of each eligible contract type. For this report, the IE is providing a general summary of the overall methodology and criteria used in the evaluation in this section of the report. In addition to the general summary of the overall methodology, the IE report also describes the process used to evaluate the energy storage options for the Utility-Owned EPC Project option at the PG&E owned Moss Landing substation site, based on the different methodology and assumptions utilized.

The 2018 LSA ES RFO bid evaluation procedure and methodology was designed to include evaluation of both quantitative and qualitative attributes of each offer to assess its value to PG&E's customers and relative value in comparison to other proposals. This includes but is not limited to: Net Market Value (NMV), Portfolio-Adjusted Value (PAV), Project Viability, Supply Chain Responsibility, Credit, and Safety. Each of the above criteria has a corresponding internal protocol.<sup>11</sup> The evaluation procedure discussed below describes how to combine the criteria to determine the ranking and inform shortlist selection.

A Net Market Value assessment will be performed on all offers by first calculating each project's Net Market Value (NMV) and then making adjustments to account for their impact on PG&E's portfolio, yielding a list of offers ranked by Portfolio Adjusted Value (PAV). NMV and PAV will be measured in Present Value [REDACTED] and ranked from highest to lowest.

The following describes the general evaluation process flow envisioned by PG&E for undertaking the evaluation process once the Evaluation Team commenced formal reviews<sup>12</sup>:

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<sup>11</sup> PG&E has developed Internal Evaluation Protocols for each of the evaluation criteria listed in this section for the 2018 Local Sub-Area ES RFO. The Evaluation Protocols have been approved by PG&E's Steering Committee and are used as the basis for the evaluation process. The information contained in the Evaluation Protocols and described in general in the Local Sub-Area Energy Storage Solicitation Protocol document are summarized in the write-up in this section of the report.

<sup>12</sup> PG&E's Evaluation Teams reviewed the offers when received to ensure the Participants provided the requested information and to identify any inconsistencies in the offer forms and other offer information. In addition, the Evaluation Team also identified cases where the data appeared inconsistent or where further clarification of the information was required. In such cases, PG&E contacted the Participants to seek to clarify or correct the data prior to conducting the offer evaluation process.

1. All offers will be reviewed to determine whether or not they meet the applicable eligibility requirements for consideration in the RFO
2. All eligible offers will be run through the NMV and PAV valuation and adjustment models for an initial evaluation;<sup>13</sup>
  - Valuations will be updated when new information is received from Participants (i.e. updated pricing because of delayed interconnection studies, updated pricing offers based on a continuously competitive process, best and final pricing for the EPC shortlisted options).
3. Complete utility-ownership offers will be sent to the Utility Ownership Evaluation Team for an assessment of Project Viability;
4. Offers will be organized in groups by agreement type;
5. Offers will be ranked by PAV within the groups;
6. For Utility Ownership Offers, Project Viability scores will be applied and [REDACTED]
7. To develop the shortlist, PG&E will consider the following qualitative factors:
  - Contract term and Commercial Operation Date
  - Supply Chain Management (only Small Business Enterprise component)<sup>14</sup>

Based on these qualitative factors projects that may have a lower PAV result could be added to the shortlist to ensure there are a diverse number of technology types, counterparties, contract terms, and commercial operation dates to manage the risk of not having a diverse portfolio of projects to negotiate with, if applicable for this solicitation.

8. After shortlisting, the following additional criteria will be considered before executing an agreement:
  - NMV/PAV (to account for changes in value which might occur during negotiations);
  - Project Viability;
  - Credit;

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<sup>13</sup> PG&E's Storage Valuation Model was the primary tool used for undertaking the evaluation. The Storage Valuation model calculates the energy value, capacity value, ancillary service value, and the fixed and variable cost and PAV adjustments. For utility ownership options, PG&E uses an internal Revenue Requirements model to calculate annual revenue requirements to provide fixed cost inputs to the Storage Valuation Model. PG&E provided detailed documentation for the Storage Valuation Model to the IE along with the Revenue Requirements model used to calculate the annual revenue requirements for utility-owned offers.

<sup>14</sup> Based on these qualitative factors, projects that may have a lower PAV result could be added to the shortlist to ensure there are a diverse number of technology types, counterparties, contract terms, and commercial operation dates to manage the risks of not having a diverse portfolio of projects to negotiate with.

- Contract Modifications;
- Safety;
- Contract term and Commercial Operation Date<sup>15</sup>

### **C. Detailed Description of the Evaluation Process**

The following section of the report provides a more in-depth discussion of the components of the evaluation methodology and process and describes in general how the various storage offers would be evaluated. In addition, this section includes a description of the input assumptions utilized for evaluation purposes.

#### **PG&E Energy Storage Evaluation Methodology**

This section of the Report will present an overview of PG&E’s energy storage evaluation methodology, including a review and assessment of both the Net Market Value (“NMV”) and Portfolio Adjusted Value (“PAV”) metrics to be used to value and rank energy storage offers from a quantitative perspective. PG&E has developed energy storage evaluation models and methodologies that allow for the evaluation of the contract/product options solicited.

This section of the report will provide a high-level overview of the quantitative methodology used by PG&E to value storage options.

#### **Market Valuation Assessment**

PG&E’s evaluation methodology applies “Least-Cost, Best-Fit” principles, using quantitative and qualitative criteria to evaluate the submitted offers. From a quantitative perspective, PG&E considers both Net Market Value (NMV) and Portfolio Adjusted Value (PAV) criteria. The evaluation methodology applied by PG&E starts with the calculation of the Net Market Value for each storage offer submitted. NMV is used to value offers according to their “stand-alone” economic merits regardless of their use in any portfolio.

In the solicitation process, a Participant submits a storage offer for the particular contract or product type which details the costs and operational characteristics<sup>16</sup> of the energy storage facility. This information is provided on the Bid Forms included in the RFO package. These offers have to be evaluated and compared to one another. Market Valuation considers how a particular Offer’s costs compare to the market value of its

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<sup>15</sup> Another factor not listed above but which became an important criterion for shortlist selection was project location with specific sub-areas or interconnection location. [REDACTED]

<sup>16</sup> The operational characteristics requested from the bidders include: Design Dmax (MW), Design Dmin (MW), Design Discharge Duration, Design storage energy, Design Cmax (MW), Design Cmin (MW), Design charge duration (hours), Guaranteed efficiency, Ramp rates, Start-up times, and transition times from charge to discharge and vice versa, ancillary service capability, run time limitations, and daily constraints.



benefits. For each Offer, Net Market Value is calculated as the starting point of the evaluation. NMV is calculated based on several components as follows:

Net Market Value:  $NMV = E + A + C + (V + F)$  where

E = Energy Value

A = Ancillary Service (A/S) Value

C = Capacity Value

V = Variable Cost (negative)

F = Fixed Cost (negative)

The cost and market benefits associated with a particular Offer are to be included in Market Valuation. These costs and benefits in Market Valuation do not include portfolio costs, portfolio benefits, or desirability associated with a particular Offer's impact on PG&E's Service Area aggregate portfolio positions.



The [REDACTED] were used for evaluating and shortlisting the Offers received. The curves may be updated on a monthly basis post-shortlisting.

Offers are classified into four contract/product types:

- Energy Storage Resource Adequacy (ES RA) Agreement;
- Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA);
- Engineering, Procurement, and Construction (EPC) Agreement for Moss Landing Ownership, and
- Build, Own, Transfer (BOT) Agreement for Utility Ownership.

While PG&E applies similar NMV calculations for all the contract and product types listed above, there are several nuances for each agreement option that affects the application of the NMV methodology.<sup>17</sup>

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<sup>17</sup> For example, for ES RA offers, Energy Value, A/S Value and Variable Cost will all be zero. Only Capacity Value is calculated in the same way as for other third-party offers. BTM offers, on the other hand, include Energy Value, Variable Cost and Fixed Cost. Under the BTM offer, PG&E does not settle energy from the project with CAISO but receives the Energy Settlement value from the Seller. For BTM offers, Energy Value is the part of the Energy Settlement that is attributable to the largest energy price spreads corresponding with the ES duration multiplied with Payment Quantity.

## **Valuation Components**

An overall description of the methodology applied for calculating each component of NMV as described in the Protocol document is provided below. As a note, for the Energy Storage Resource Adequacy Agreement (ES RA), PG&E only purchases the capacity product from the Seller. [REDACTED]

Under the Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA), PG&E receives (1) the Energy Settlement and (2) the RA capacity from the Seller. [REDACTED]

Under the EPC Agreement for Moss Landing, the Energy Storage project is to be built to meet PG&E specifications, on PG&E-owned land within the Moss Landing substation. Since PG&E will own and operate the Energy Storage project participating in the CAISO markets, EPC Agreement Offers provide energy, A/S Value and Capacity Value.

Under a Build, Own and Transfer (BOT) Agreement for Utility Ownership, the project is constructed on a third-party-owned site and PG&E takes ownership of the Project once it has been constructed to the specifications in the BOT, is operational, and has satisfied certain tests.

The following sections describe in more detail how the costs and benefit values of each component are included for each Agreement type.

## **Energy Value**

Energy value captures the value associated with the electric energy price in the CAISO markets for each Offer over its delivery term. The payoff of energy storage is the spread between the revenue from discharge energy and cost of charge energy. For offers that provide energy value, the market value of energy will be computed from the appropriate price curves for the corresponding Trading Hub (NP15) adjusted for congestion and losses specific for the project location to account for the Location Marginal Price (“LMP”) at the specific project location.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**Ancillary Service (A/S) Value**

For Offers that provide PG&E the ability to schedule and receive CAISO market revenues for Ancillary Services in accordance with CAISO Tariff requirements, the incremental benefit of having Ancillary Service capability will be captured. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

### **Capacity Value**

Capacity value is the net present value of monthly capacity values across all months during the delivery period. [REDACTED]

The amount of NQC and EFC are determined by the particular asset operating characteristics as specified in its Offer. NQC for ES offers is, in general, based on the maximum discharge power that ES can continuously sustain for 4 hours in 3 consecutive days. EFC for Dispatchable ES offers will be determined based on the Appendix B of CPUC Decision 14-06-050 dated June 26, 2014. The calculations are implemented in the Offer Form.

### **Fixed Cost**

Fixed costs are determined by the net present value of monthly Contract Payments for Third-Party Owned projects or annual Revenue Requirements for Utility-Owned projects, and Administrative Costs, which accounts for PG&E's cost of contract management and resource scheduling if applicable. [REDACTED]

Fixed costs for a BTM CSA and ES RA Offers are calculated as the sum of Contract Payments and Administrative Costs. Monthly Contract Payments are equal to the product of monthly Payment Quantity times the monthly Contract Price. [REDACTED]

For BOT and EPC Offers, which will be owned by PG&E, annual fixed costs will be the annual revenue requirement (RRQ) as determined by the Revenue Requirements ("RRQ") model assuming standard cost-of-service ratemaking. The annual revenue requirements are thus calculated based on the formula:

$$R = E + D + T + kB$$

Where:

$R$  = Revenue Requirements in a specific year  
 $E$  = Expenses in a specific year       $D$  = Book Depreciation in a specific year  
 $T$  = Taxes paid in a specific year  
 $k$  = Rate of Return  
 $B$  = Rate base in a specific year

The revenue requirement in each year is the amount that the utility must collect from customers to recover its expenditures and earn its allowed rate of return.

### **Expenses**

Expenses are assumed to be recovered directly from customers in the year in which they occur. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

### **Portfolio Adjusted Value**

Portfolio Adjusted Value (“PAV”) is intended to represent the value of a resource or Offer in the context of PG&E’s bundled portfolio of resources. The calculation of PAV for PG&E’s 2018 Local Sub-Area Energy Storage RFO will use Portfolio Adjusted Value (“PAV”), which is NMV with four additional valuation components. The calculation of PG&E’s PAV for 2018 LSA RFO thereby makes explicit and systematic bundled-portfolio adjustments for: (1) Transmission Network Upgrade Costs; (2) Increased system efficiency; (3) Avoided Renewable Curtailments; (4) Delivery Period adjustments

Specifically,  $PAV = \text{Net Market Value plus}$

- PAV Transmission Network Upgrade Costs plus
- PAV Adjustment for Increased System Efficiency plus
- PAV Adjustment for Avoided Renewable Curtailment plus
- PAV Adjustment for Delivery Period

As previously noted, the starting point for calculating the value of each offer is the calculation of Net Market Value of each offer. Net Market Value components include the following: Cost, Energy, Ancillary Service (A/S) and Capacity. Each of these

components is measured in [REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

Each of the PAV adjustments is described below.

**Transmission Network Upgrade Cost Adders**

Transmission Network Upgrade (“TNU”) cost adders are calculated as the Present Value of the Revenue Requirement (“PVR”) of the refundable TNUs for each offered project. TNU cost adders include, as applicable, Reliability Network Upgrade (“RNU”) costs and either Deliverability Network Upgrade (“DNU”) or Local Deliverability Network Upgrade (“LDNU”) costs. TNU cost adders do not include Area Deliverability Network Upgrade costs because these are either (a) associated with satisfying a bulk need identified in the Transmission Planning Process (TPP) for a particular area, or (b) not refundable to the interconnection customer. The TNU cost adders for Behind-the-Retail-Meter projects are assumed to be zero because these projects are considered to not directly trigger TNUs.

Only the refundable portion of TNU costs are included in the adders because these costs are ultimately paid for by transmission rate-payers (after initially being funded by the interconnection customer). The non-refundable portion of the RNU cost is not included in the transmission adder because this portion is borne by the Seller (as the Interconnection Customer) and thus assumed to be reflected in the bid price for a project. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

The revenue requirements associated with the TNUs are [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED] For PG&E’s 2018 LSA RFO, only projects offering full capacity deliverability are eligible.

### **PAV Adjustment for Increased System Efficiency**

PAV Adjustment for Increased System Efficiency is intended to capture PG&E's Service Area's share of operational and economic efficiency in meeting loads gained through energy storage. Energy storage resources can provide flexibility to the system so that the rest of the generation can be run at less cost by helping to reduce the magnitude of evening ramp (by increasing generation whenever needed in high net load hours and increasing load during surplus generation or negative prices in low net load hours) so that other resources run more efficiently and at less cost. This results in reduced system costs (such as cost of a startup/shutdown, fuel, variable O&M and emissions).

There are differences in the system impacts depending on the operating parameters of Energy Storage (such as VOM, efficiency, operating constraints, etc). [REDACTED]

### **PAV Adjustment for Avoided RPS Curtailment**

The operation of the storage resource can reduce the frequency and magnitude of renewable energy curtailments. The avoided curtailment of RPS energy will allow LSEs in PG&E's service area to avoid procuring additional RECs to replace the curtailed energy. PAV Adjustment for Avoided RPS Curtailment is intended to capture the differences in the value in avoiding RPS curtailments by different hours of duration.

[REDACTED]

[REDACTED]

### **PAV Adjustment for Delivery Period**

The Delivery Period PAV adjustment is a way to standardize the valuation period for offers with different delivery terms and start date. The standardization will ensure a fair comparison of the full costs and benefits among all offers regardless of different delivery periods. [REDACTED]

[REDACTED]

[REDACTED]

### Final Portfolio-Adjusted Value

The calculation for Portfolio-Adjusted value is summarized below:

Intermediate PAV [REDACTED] = Net Market Value [REDACTED]  
[REDACTED]

+ PAV Transmission Network Upgrade Cost [REDACTED]  
+ PAV Adjustment for Increased System Efficiency [REDACTED]  
+ PAV Adjustment for Avoided Renewable Curtailment [REDACTED]

Intermediate PAV [REDACTED] and then added to  
PAV Delivery Period Adjustment [REDACTED] to obtain the PAV [REDACTED]  
[REDACTED]

Final PAV [REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]



[REDACTED]

### Input Assumptions

An important aspect of the offer evaluation process is the development of input assumptions to use in the evaluation of the Participant's pricing formulas and other evaluation parameters. PG&E's quantitative evaluation team prepared a presentation for the IE regarding a review of market prices for Storage RFO evaluations. The key input prices for the evaluation include the following components:

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

## Qualitative Factors

In addition to the quantitative factors previously discussed, PG&E proposed to evaluate each offer using qualitative criteria as well. For assessment of the qualitative criteria, PG&E proposed to use subject matter experts to review and evaluate the offers relative to their criteria of expertise. A brief description of the qualitative factors to be considered includes:

## Project Viability

Separate and distinct Project Viability criteria were developed by the evaluation team as well as the Utility-Owned team. The Utility-Owned team generally developed more detailed criteria and applied the +/0/- scoring mechanism for each individual criterion. Project viability means the likelihood that the project can be successfully developed and then provide the product and services required for the period stated in the Offer.

For the Utility-Ownership assessment, project viability means the likelihood that the development, construction and operation of the Project associated with an offer can satisfy the requirements of the Agreement. This assessment is based on a review of the history of the technology, constructability, Participant and contractors experience, operational history, portability, modularity, operation and maintenance complexity, and assessment of project schedule. The third-party resource team bases its assessment on a review of the status and plans for key project activities such as financing plan and experience, site access, permitting, engineering, procurement, construction, interconnection, environmental impact, participants experience and track record, project schedule/critical path, O&M plan, track record of technology and reliability and availability of equipment.

PG&E's intended objective was to develop a single composite score for Project Viability based on the status and plans for key project activities.

Overall, the evaluation was intended to rely on information provided in each Offer (i.e. Appendix A, Offer Form; Appendix B1, Project Description; Appendix B2, Site Control; Appendix B3, Project Milestone Schedule; Appendix B4, Experience Qualifications; Appendix B5, Electric Interconnection and Appendix B6, Organizational and Finance information. Additional information would be used as applicable.

Each Offer would receive a rating on a three-point scale of plus, zero, or minus (+/0/-). ■

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

[REDACTED]

The application of these criteria will generally be determined on a relative basis, with the value attributed to each project based on how it scores relative to other projects.

A sub-committee oversees the implementation of each respective protocol.

### **Credit**

PG&E may consider the Participant's capability to perform all of its financial and financing obligations under the Agreements. From a credit standpoint, PG&E may consider the Participant's ability and willingness to meet the credit requirements under the Agreements and PG&E's overall counterparty credit concentration with a Participant or its banks including any Participant affiliates.

[REDACTED]

In assessing the type and amount of security, PG&E is using the same three-point rating system as per other criteria of plus, zero and minus. [REDACTED]

### **Supply Chain Responsibility**

PG&E is committed to supply chain responsibility which includes supplier diversity, sustainability, and ethnical supply chain practices. PG&E may determine how an offer will assist PG&E in reaching enterprise-wide supply chain responsibility goals. The evaluation methodology will require review and analysis of the Participant's response to the Supply Chain Responsibility questions provided. Based on the results of the analysis, an Offer will receive a numerical score and converted to a (+), (0), or (-) rating.

## **Safety**

PG&E will seek information from Participants regarding the safety history and practices of the entities that will construct, operate, or maintain projects and safety information related to the technology for the project and project development.

## **D. Revisions to Bid Evaluation Criteria**

The CPUC IE Report Template requests the IE to address whether the bid evaluation criteria changed after the bids were received and to explain the rationale for the changes. In general, PG&E maintained the same proposed methodology as described in the ES RFO. The description of the evaluation criteria and methodology were fairly general in the ES RFO.

## **E. Evaluation of the Strengths and Weaknesses of PG&E's Methodology in This Solicitation**

PG&E has implemented a methodology for evaluating Energy Storage Offers received in response to the 2018 LSA ES RFO that includes a combination of existing methodologies used in previous solicitations as well as revisions to traditional methodologies to address the requirements of CPUC Resolution E-4909.<sup>18</sup> There have been several lessons learned from the implementation of the 2014 and 2016 ES RFO processes which highlight the strengths and weaknesses of the evaluation and ranking methodology.

### **Strengths of Evaluation and Ranking Methodology**

The following represents the IEs perspective regarding the strengths associated with the evaluation and ranking methodology implemented by PG&E for assessing energy storage Offers submitted into the ES RFO processes. These include:

- The methodology used by PG&E takes into consideration all reasonable costs and benefits associated with the various types of offers, project structures, and contract structures for the energy storage offers submitted;
- The overall evaluation methodology is capable of effectively and consistently evaluating a range of different types of resources, project structures with different terms, product sizes, and start dates, different generation profiles and operating parameters. The IE does not view the methodology as having a direct bias toward any product solicited in this RFO with respect to technology, operating characteristics, ownership structure, etc.;

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<sup>18</sup> Resolution E-4909 requires that resources procured in this solicitation (2018 LSA ES RFO) should be a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

- The models used by PG&E for undertaking the evaluation of the Energy Storage offers have been developed and utilized for two major energy storage solicitations. The models have been enhanced and improved based on lessons learned from recent solicitations. In addition, the models were validated internally by the Risk Group prior to evaluation of the offers for the 2014 and 2016 ES RFOs;
- PG&E has developed and maintains detailed documentation for each of the models used to evaluate Energy Storage projects. PG&E provided the documentation to the IE;
- To address the requirements included in the CPUC Resolution to compare Offer costs to the costs of the specific RMR contracts, [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]
- PG&E uses consistent input assumptions for undertaking the evaluation of all offers;
- At the request of Merrimack Energy during the development of PG&E's 2014 Energy Storage RFO, PG&E developed an internal integration model to compile all input and output data for each of the Offers and provides a detailed summary of the components of the costs and benefits for each Offer, on an annual basis including nominal and discounted dollars, and provides other pertinent data for each offer to allow the IE to undertake a detailed review of the evaluation results for each offer. This is a very valuable tool to allow the IE to easily and quickly assess the reasonableness of PG&E's evaluation results;
- The use of Portfolio Adjusted Value (PAV) as the basis for undertaking this evaluation represents a reasonable step in the evolution of PG&E's evaluation methodology since the methodology is intended to represent the value of a resource or Offer in the context of PG&E's portfolio. The PAV adjustments for several of the PAV factors are based on detailed evaluation results using sophisticated production cost modeling to generate estimates and research into factors that influence assessment of the PAV components;
- PG&E's proposed methodology is generally consistent with Least Cost Best Fit principles by incorporating quantitative and qualitative factors to determine a shortlist of projects;

- PG&E prepared detailed internal evaluation protocol documents that clearly described the evaluation methodologies and criteria, which facilitated review by the IE;
- The key inputs and assumptions (i.e. capacity price forward curve, discount rate, and forward curves for gas and power prices) were locked down prior to receipt of offers, which serves to minimize any potential evaluation bias;
- There was no evidence of any bias in the evaluation or favoritism in the treatment of any offer that would be owned by PG&E through an EPC or BOT;
- One of the weaknesses associated with the Least Cost Best Fit methodology has been the bias associated with [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] This approach is similar to approaches used by other utilities who use their Integrated Resource Planning methodologies in conjunction with an RFP process to evaluate and select resources;
- The results of the evaluation illustrated that [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] were selected based on economic rank illustrates that the evaluation methodology is generally fair and unbiased as well as being a very comprehensive evaluation process.

### **Weaknesses of the Evaluation and Ranking Methodology**

Since the initiation of the Energy Storage RFOs beginning with the 2014 ES RFO, PG&E has made continual strides toward improving its evaluation methodology and address weaknesses in the process. Any remaining weaknesses are associated with research and development of necessary information to continue to develop the necessary PAV adjustments and other information to provide for a more thorough evaluation process. The IE also believes that a more detailed qualitative evaluation process should take place for both utility-owned and third-party offers. The IE has observed that the utility-ownership team applies detailed quantitative and qualitative criteria in a more balanced approach to undertake evaluation of utility-owned offers, including conducting a detailed project viability assessment. We would suggest a similar approach be undertaken for both types of products.

## **G. Future LCBF Improvements**

There are several issues that should be considered as potential future improvements in the evaluation and ranking process. These include:

- The adjustment factors used in the Portfolio Adjusted Value methodology should be continually subject to review and possible revision and enhancement based on experience and judgment of PG&E Quantitative Analysis Group team members. These adjustors need to be reassessed over time as new information becomes available or as different Energy Storage solicitation processes are implemented, such as the 2018 LSA ES RFO, which may have unique requirements and timeframes that lead to different processes;

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED] More detailed scoring factors and scoring systems, such as scoring relative to the highest and lowest performance on a given factor, can be developed and fully disclosed in the RFP documentation. In this way, bidders' pre-bid efforts could be concentrated on qualitative factors important to PG&E. Furthermore, shortlisted bidders would be forewarned that they would be scored adversely if their contractual modifications stressed the time and resources of PG&E unnecessarily. Alternatively, PG&E could establish thresholds that all offers would have to meet. The IE would expect that as more new projects are proposed, qualitative criteria will be more important for screening out non-viable or risky projects;

- While it is challenging to undertake a reasonable project viability assessment for all offers submitted outside the general approach undertaken by PG&E to identify any potential fatal flaws, it may be worthwhile to include a more formal and detailed project viability assessment prior to shortlisting, particularly if a number of the projects selected through this solicitation fail to go forward;

## **H. Additional Information or Observations Regarding PG&E's Evaluation Methodology**

No additional information or observations are provided.

## **VI. Did PG&E Fairly Administer the Evaluation Process?**

### **A. Principles and Guidelines Used to Determine Fairness of Process**

In evaluating PG&E's performance in implementing the 2018 LSA ES RFO solicitation process, the IE has applied a number of principles and factors, which incorporate those suggested by the Commission's Energy Division in previous Templates as well as



additional principles that the IE has used in its oversight of other competitive bidding processes. These include:

- What qualitative and quantitative factors were used to evaluate offers?
- If applicable, were affiliate offers treated the same as non-affiliate offers?
- Were economic evaluations consistent across offers?
- Was there a reasonable justification for any fixed parameters that enter into the methodology?
- Were all Participants treated the same regardless of the identity of the Participants?
- Were Participants questions answered fairly and consistently and the answers made available to all?
- Did the utility ask for “clarifications” from Participants, and what was the effect, if any, of these clarifications?

As described in detail in the previous sections of this report, PG&E evaluated the offers received based on both quantitative and qualitative factors. However, while all offers were evaluated relative to the qualitative factors identified, [REDACTED]

The IE concluded that affiliate or utility ownership options were treated no differently than other offers by PG&E. In the opinion of the IE, PG&E assessed all offers in a similar manner although the components of the evaluation methodology and elements of the contract negotiation process varied appropriately by resource type and ownership structure. As previously noted, PG&E used reasonable methodologies for assessing each type of offer. In addition, PG&E created two separate transaction teams to lead the negotiation of third-party and utility-owned contracts, with both teams subject to Internal Confidentiality Protocol requirements. There were differences associated with contract negotiation in this 2018 LSA ES RFO attributed to the timing and resources sought. [REDACTED]

The IE felt that the economic evaluations were consistent across all types of offers, with the objective of the evaluation to assess the benefits and costs of each offer based on Net

Market Value and PAV metrics. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

PG&E's project team was very actively engaged in the process from the very beginning. This included responding to bidder questions and seeking clarification from Participants when required. With regard to Bidder questions, PG&E both responded to questions from Participants about the solicitation process and posted the appropriate responses for all Participants to review on its website. The IE was copied on all Questions and Responses to Participants. We found no cases where PG&E favored a specific Participant over another. PG&E responded consistently to all Participants throughout the process.

### **B. Description of IE Methodology Used to Evaluate Administration of PG&E's Solicitation Process, Notably the LCBF Process**

As previously discussed, the IE was actively involved in all phases of the process. The IE was copied on all emails exchanged between PG&E and Participants. The IE was also invited and attended many of the calls with Participants wherein PG&E sought to clarify any uncertainties about the offers or inconsistencies associated with submission of offer information.

The IE also compiled summaries of all offers and the results of the bid evaluation and was fully engaged in the process throughout the solicitation. In addition, the IE and PG&E evaluation and transaction teams held regular weekly conference calls to discuss the progress of the solicitation and any issues that arose during the process.

With regard to the quantitative evaluation, the IE held discussions with the quantitative evaluation team to discuss the bid evaluation methodology prior to submission of bids to ensure the IE had an understanding of the evaluation methodology and presentation of evaluation results. PG&E provided copies of the evaluation results generated by the quantitative evaluation team to the IE on multiple occasions during the evaluation process.

PG&E's approach, as noted previously, was to use different models to evaluate different types of products based on the same set of assumptions. PG&E provided the write-ups of the models and model documentation to the IE along with the internal evaluation protocols and criteria for quantitative and qualitative factors.

At the request of the IE, PG&E prepared an integration model for use by the IE to review and validate the results of PG&E's LCBF evaluation process.<sup>19</sup> The Integration Model provided input and output results for each offer by integrating several models and

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<sup>19</sup> PG&E had previously developed such a methodology for the CHP 2 and CHP 3 processes to allow Merrimack Energy to access all inputs and output results for each offer in an organized fashion to be able to verify the reasonableness of the offer evaluation results. Merrimack Energy requested expansion of the integration model for the first two Energy Storage solicitations. The model again used for this solicitation.

spreadsheets to organize all relevant data on a specific project/offer. The model allows the IE to enter the number of a specific offer in a specific cell in the workbook. Once the project number was entered, the integration model provided an array of information about each offer including the following data:



The integration model results allowed the IE to conduct a thorough review and assessment of the valuation results for each offer or a sample of offers. In addition, IE was able to use the integration model results to create portfolios of offers and assess the total notional value of the portfolio as well as NPV values other relevant information included in the model.

For evaluating the LCBF process, the IE initially reviewed the evaluation results included in the spreadsheets submitted by PG&E to the IE to assess whether there appeared to be any inconsistencies or unexplained outliers in the results. The spreadsheets prepared by PG&E included both an input file and an output file. The output file included Net Market Value by component as well as PAV value for all cost and benefit components.

After review of the bid evaluation methodology and testing of the results of the evaluation provided by PG&E, the IE concluded that the evaluation methodology was reasonable for this type of analysis and effectively evaluated offers with different products, terms, and contract structures. The IE found no evidence of undue bias in the evaluation methodology that favored affiliate or utility-owned offers relative to third-party offers as a result of review of the model operation and results.

Based on the IE's active involvement throughout the solicitation process, the IE concluded that PG&E reasonably followed the criteria outlined in the 2018 LSA ES RFO.

### **C. Identification of Non-Conforming Bids**

After the offers were received, the initial task undertaken by PG&E's project team was to review the offers to assess if the offers conformed to the eligibility provisions listed in the Protocol. Although PG&E's objective was to be more inclusive, PG&E did follow its eligibility and threshold requirements when classifying offers as non-conforming. As noted on page 24 of this report, ■ of the ■ third-party offers were non-conforming, while ■ of the ■ utility-owned offers were conforming.

### **D. Utility Evaluation and Outsourced Evaluation**

This section of the IE Template asks the IE to identify those parts of the process conducted by the utility, and to opine on how the parameters and inputs were used and whether they were reasonable. In addition, the Template asks the IE to identify any parts of the process that were outsourced to either the IE or a third party, what information did the utility communicate to that party and what controls did the utility exercise over the quality or specifics of the outsourced analysis.

In short, PG&E was primarily responsible for all aspects of the solicitation process, including all the evaluations of the offers received. The IE did not have any direct requirement to lead or conduct any specific aspect of the evaluation. Instead, the IE's role was to primarily review and assess whether the results of the analysis undertaken by PG&E were accurate and whether the process was fair and consistent for all Participants. The IE also provided his input to the various management committees at PG&E regarding his observations from the process.

The IE is not aware of PG&E outsourcing any aspects of the evaluation process to a third-party, although PG&E retained services of a third-party firm to assist it with the evaluation and negotiations of the EPC offers and contract.

### **E. Transmission Analysis Procedures**

One of the major revisions to the 2016 ES RFO was the requirement that Participants must complete a Phase I interconnection study or equivalent or have documentation showing that the project passed the Distribution provider or CAISO Fast Track screens at the time of Offer submittal. The initial interconnection cost information included in the Phase I study or better was used for purposes of assessing the transmission costs included in the evaluation results.<sup>20</sup>

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<sup>20</sup> The interconnection study generally includes cost for the interconnection facilities and Network upgrades (Reliability Network Upgrades, Local Delivery Network Upgrades and Area Delivery Network Upgrades).

PG&E eased the interconnection requirements for the 2018 LSA ES RFO. All offers were required to be connected to one of the feeders or substations associated with the three local sub areas. Absent a Phase 1 (or equivalent) or later interconnection study or interconnection agreement, Participants will be asked to provide a not-to exceed estimate of refundable Delivery Network Upgrade and Reliability Network Upgrade costs in the Offer Form. Sellers should be aware that PG&E has the right to terminate the Agreement if such costs as demonstrated in any interconnection study or interconnection agreement exceed such estimate. PG&E noted that all Sellers are required to be extremely proactive to complete the interconnection process with sufficient time to meet their committed online date.

PG&E did include Appendix B5 Project Interconnection and Transmission which requires the Participant to provide project information associated with their interconnection status, expected cost, ability to complete interconnection and achieve full deliverability status by COD and requests supplemental documents to support interconnection status and plans to expedite the interconnection process.

#### **F. Criteria or Analysis Used to Create the Short-List**

PG&E included a description of its offer evaluation methodology and approach in both the 2018 LSA ES RFO Protocol and the Participants Webinar presentation. PG&E noted its evaluation methodology will apply “least-cost, best-fit” principles, using quantitative and qualitative criteria to evaluate the submitted Offers. PG&E stated that the final PAV value is equal to the Net Market Value plus the four PAV components. [REDACTED]

#### **G. Offer Evaluation Results and Shortlist Assessment**

The offers received were evaluated based on the methodology described in the previous section of this report. [REDACTED]

[REDACTED]<sup>21</sup>

The bid evaluation output results prepared by PG&E included an evaluation of all eligible offers and alternatives ranked by PAV [REDACTED]

Once the rankings were completed, PG&E then went about selecting the shortlist of offers. The shortlisted categories or agreement types considered included the following:

[REDACTED]

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<sup>21</sup> [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

Projects were considered and selected based on a combination of value and PG&E's objective of procuring resources in the various sub-areas identified. For shortlist selection, [REDACTED]  
[REDACTED]

## **H. Conclusions Regarding Administration of the Bid Evaluation Process**

[REDACTED]  
[REDACTED]  
[REDACTED]

The IE has concluded that the bid evaluation process was fairly administered with respect to all Offers. The IE felt that PG&E's project team performed their function in communicating with Participants throughout the process in an exemplary manner, including responses to Participants questions prior to offer submission to assist Participants with questions about submission requirements, follow-up communications with Participants to clarify offer forms and information about each specific offer after submission and prior to evaluation, and with regard to follow-up conference calls with Participants that were not selected for a contract. PG&E generally provided thorough and informative responses to Participant questions and did so in a timely manner. In addition, the IE found PG&E to be very inclusive of all potential Participants.

The IE felt that PG&E's evaluation methodology was effective in evaluating a range of potential energy storage products and agreement structures in a consistent and fair manner. The fact that the evaluation results illustrated a mix of products in the rank order shows that the methodology is fair and unbiased. In addition, the quantitative evaluation methodology allowed for consistent evaluation of bids of different sizes and in-service dates and was designed to be technology neutral. The overall methodology had to address not only third-party energy storage options but also utility-owned options and did so in a consistent and comprehensive manner. The IE found that PG&E included all reasonable costs consistently in its evaluation and evaluated all the offers using a consistent set of inputs and assumptions.

## **I. Any Other Relevant Information**

None at this time.

## **VII. Code of Conduct/Internal Confidentiality Protocol**

For the 2018 Local Sub-Area Energy Storage RFO, PG&E made slight modifications to its existing Code of Conduct that was implemented in the two previous Energy Storage

RFOs. PG&E's objective was to update the Code of Conduct to make it more concise and understandable. The new document is now called an Internal Confidentiality Protocol. While the Local Sub-Area Energy Storage RFO seeks both offers by third-parties to provide energy storage projects and offers from EPC contractors for utility-owned energy storage facilities, PG&E is not submitting or reserving the right to submit its own bid into this RFO. Therefore, there are no PG&E employees involved in preparing bids for projects that would be owned by the utility. Instead, PG&E is seeking offers for either EPC or BOT options for projects that would be constructed by a third-party and owned by the utility. The utility-ownership team is responsible for developing the project specifications and contracts, conducting evaluation of the offers received, and negotiating the contracts with the selected Participant. The Internal Confidentiality Protocol is designed to ensure that an appropriate internal level of confidentiality of confidential RFO information is maintained. With this Confidentiality Protocol, PG&E is focusing on the type of information that PG&E employees must keep confidential in order to avoid external perceptions of unfair advantage to Utility-Owned Offers.<sup>22</sup> This Confidentiality Protocol shall be in place from March 28, 2018 until the date executed contracts are filed with the CPUC for approval.

This Section of the Report addresses the Internal Confidentiality Protocol implemented by PG&E to undertake the 2018 LSA ES RFO. The preparation of a Code of Conduct document is required by the CPUC for investor-owned utility ("IOU") participation in the IOU's own competitive procurement of electric energy resources. The CPUC's 2008 LTPP Decision (D.07-12-052) included several references with regard to the requirements for utilities to develop a Code of Conduct for solicitations seeking utility ownership options.<sup>23</sup> PG&E developed an Internal Confidentiality Protocol for this solicitation to ensure appropriate safeguards are in place to define the roles and responsibilities of the project teams and protect the confidentiality of sensitive confidential information. PG&E required all employees supporting the 2018 LSA ES RFO that requires use of Confidential RFO information to acknowledge the Confidentiality Protocol. According to the IE Report Template, two issues are to be addressed in this Section of the Report:

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<sup>22</sup> Examples of the type of information considered confidential RFO information includes: (1) Participant's confidential information as described in the RFO Protocol; (2) Internal Evaluation Protocols including quantitative models, scoring and selection criteria, actual input assumptions such as price curves; (3) Evaluation results and selection of Offers for the shortlist and execution, including deliberations and reasons for selections; and (4) Status of PG&E's negotiations with shortlisted Participants.

<sup>23</sup> On page 206 of D.07-12-052, the CPUC stated "As a precondition for conducting an RFO seeking utility ownership options, the IOU shall develop a strict code of conduct to be signed by any and all IOU personnel involved in the RFO process to prevent sharing of sensitive information between staff involved in developing utility bids and staff who create the bid evaluation criteria and select winning bids". On page 236 the CPUC stated "If a utility were soliciting turnkey bids or EPC contracts as well as PPAs in a given solicitation, the individuals performing the bid evaluation would have to be functionally separated from the individuals preparing the bids (or the cost estimates) for projects that would ultimately be utility-owned. Under this restriction, the employees developing the utility-owned project would be barred from access to any evaluation protocols, input assumptions, or bid information not made generally available to outside bidders."



**Describe the design and implementation of the required Code of Conduct used by the IOU to prevent sharing of sensitive information between staff working with developers who submitted UOG bids and staff who create the bid evaluation criteria and select winning bids.**

**Describe any violation(s) of that code**

As a precondition of holding a competitive solicitation in which offers resulting in partially or wholly utility-owned energy storage projects compete against third-party offers, a utility (in conjunction with the IE, PRG, and Energy Division Staff) must develop and adopt a strict Code of Conduct, to be signed by any and all IOU personnel in the RFO process, to prevent the sharing of sensitive information between staff involved in developing offers for utility-owned projects (“Ownership Employees”) and staff who evaluate and select the winning offers (“Solicitation Employees”).<sup>24</sup> PG&E’s Internal Confidentiality Protocol also includes a third category of employees referred to as Decision-Makers. These are employees who approve the selection of the offers submitted in response to PG&E’s ES RFO for PG&E’s shortlist of projects and/or final execution list. Only Decision-Makers and Solicitation Employees have full access to all confidential RFO information. However, all Utility Ownership employees, Decision-Makers, and Solicitation employees must keep confidential RFO information confidential.

As noted, the Internal Confidentiality Protocol was designed to maintain an appropriate internal level of confidentiality of Confidential RFO Information and to avoid external perceptions of unfair advantage of utility ownership offers. The Confidentiality Protocol is being adopted because PG&E is evaluating Utility-Owned and third-party off-take Offers in this LSA ES RFO, with both types of offers ultimately competing for selection by PG&E and CPUC approval. Some of the key elements of the Confidentiality Protocol include:

**A. Teams**

- Utility-Owned (UO) – Employees evaluating, selecting and negotiating Utility-Owned offers;
- Solicitation Employees – Employees (a) evaluating, selecting, and negotiating third-party offers, and (b) preparing information for Decision Makers, including evaluation and selection of offers;
- Decision Makers – Employees approving the selection of offers for shortlisting and/or final execution.<sup>25</sup>

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<sup>24</sup> For the Energy Storage Solicitation, the utility personnel involved in the evaluation and selection of offers submitted in response to PG&E’s Energy Storage RFO in order to enable PG&E to develop a shortlist of projects and/or its final execution list for the ES RFO shall be referred to as Energy Storage Solicitation Employees and the utility employees who establish the non-public requirements for, and evaluate the viability and cost of development, construction, and on-going operations associated with third party offers submitted in response to the Energy Storage RFO leading to utility ownership shall be referred to “Utility Ownership Employees”.

<sup>25</sup> In addition to the above teams, to evaluate offers teams may engage Subject Matter Experts (“SME”) from within PG&E to assist with the evaluation of Offers. Such SME’s are subject to this Confidentiality Protocol and shall review and evaluate Offers using and accessing the Confidential RFO information only



B. Confidential RFO Information includes:

- Participants confidential information;
- Internal Evaluation Protocols
- Evaluation results and selection of offers for shortlisting and execution; deliberations and reasons for selections;
- Status of PG&E's negotiations with shortlisted participants

C. Teams' Obligations to Confidential RFO Information

- Solicitation and Decision Maker team members shall not disclose or share Confidential RFO information; provided that,
- Utility-Ownership offer team members may use, have access to or knowledge of Confidential RFO information with respect to the Utility-owned offers only.

D. Functional Separation of Information and Teams:

- Confidential RFO information – to be kept functionally separate per team type such as locating the information electronically on separate shared drives or internal sites that can only be accessed by the respective team members. Confidential RFO information should not be emailed even internally;
- Employees – Physical separation of teams is not required. To evaluate offers teams may engage SMEs from other LOBs to assist with the evaluation of offers. Such SMEs are subject to this Protocol and shall review and evaluate offers using and accessing the Confidential RFO information only to the extent necessary to perform their review and evaluation.

E. Acknowledgement of Protocol – By employees actively participating in offer evaluation and/or selection process of offers in the RFO process through:

- Attendance at in-person training or meetings; or
- Written acknowledgement of training materials.

## **VIII. Treatment of Affiliate Bids and UOG Ownership Proposals**

The 2018 LSA ES RFO included several eligible options in which PG&E would own the project, including (1) EPC Agreement for Moss Landing and (2) Build, Own, Transfer Agreement. As a result, the IE Report Template requires the IE to address the following issues:

1. Describe other safeguards and methodologies implemented by the IOU including those stipulated in Commission decisions (e.g. D.04-12-048 and D.07-12-052) for head-to-head competition between utility ownership and independent ownership bids, to ensure that affiliate and UOG bids were analyzed and considered on as comparable a basis as possible to other bids,

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to the extent necessary to perform their review and evaluation for the respective team. Such SME's should not be conduits for Confidential RFO information.

that any negotiations with such bids' proponents were conducted as comparably as possible to negotiations with other proponents, and that the utility's final selections in such cases did not favor an affiliate or UOG bid.

2. Describe compliance with the safeguards
3. If a utility selected a bid from an affiliate or a bid that would result in utility asset ownerships, explain and analyze whether the IOU's selection of such bid(s) was appropriate.

In terms of the safeguards implemented, as noted in the previous section of the report, PG&E implemented an Internal Confidentiality Protocol which included detailed information regarding the roles and responsibilities of the various teams involved in the solicitation and the type of information considered confidential. As noted, PG&E formed two separate teams for the process. Employees who establish the requirements for, and evaluated the viability and costs of development, construction, and on-going operations associated with third-party offers leading to utility ownership are referred to as Ownership Employees while Employees who evaluate and select the shortlist and final offers for third-party owned projects are referred to as Solicitation employees.

In its Internal Confidentiality Protocol, PG&E also identified how during each step in the Energy Storage RFO process, Ownership Employees should perform different functions and be separated from Solicitation Employees involved in the evaluation of offers to avoid the sharing of sensitive information.

The roles of the above teams supporting the ownership options include the following:

- Prior to issuance of the RFO, the Ownership Employees at PG&E jointly developed the offer criteria for evaluation of these offers including product attributes, physical requirements, and security requirements for each utility-owned storage product;
- This team also maintained and implemented the utilities Revenue Requirements model used to undertake a portion of the cost assessment for the evaluation of utility-ownership options;
- The Utility-Ownership team reviewed the ownership offers received, identified any missing or incomplete information and conducted due diligence on the offers;
- The Utility-Ownership team also selected its own transactors for the utility-owned options that were shortlisted. During contract negotiations, the teams dealing with the Utility-Ownership and Third-Party RA or BTM offers were separate entities. The IE monitored negotiations undertaken by both groups. Essentially, the negotiations proceeded along different paths, albeit within the same or similar schedule for completion.

In summary, each team conducted its review, evaluation, and negotiation of contracts for shortlisted suppliers along separate tracks with different departments and employees undertaking the aspects of the evaluation and negotiations. From an evaluation perspective, the Utility Ownership team conducted its evaluation of the revenue requirements implications for each ownership option and provided the results to the

Quantitative Evaluation team who was responsible for incorporating this data in its overall evaluation of the offers which included other aspects of the quantitative evaluation including dispatching implications, operational impacts and PAV adjustments. Once the assessment was completed and offers were selected for the shortlist, contract negotiations proceeded down separate paths. The negotiation teams were diligent about ensuring that the process remained independent and the IE found no indication that the Utility Ownership negotiation team was aware of the activities of the other team. The view of the IE is that adequate safeguards were put in place to ensure that evaluation and negotiations of the different options were undertaken in a fair and comparable manner and were effectively maintained. We found no cases in which a utility-owned generation option was favored over a third-party RA or BTM Offer

As we have previously noted, Merrimack Energy as IE was sensitive to comparability issues regarding the treatment of utility-owned and third-party offers from the beginning of the process since we view fairness and comparability of treatment of these different resource options to be one of the more challenging issues associated with undertaking a fair and equitable evaluation and selection process. We have had meetings and discussions with PG&E prior to release of the past few Energy Storage RFOs to discuss comparability associated with both the evaluation methodology and contract provisions. We were satisfied that the evaluation methodology and contract provisions should ensure a fair and equitable process without the presence of bias for one type of resource over another.

[REDACTED]

## **IX. Was the RFO Acceptable**

1. Overall was the RFO conducted in a fair and competitive process, free of real or perceived conflict of interest?
2. Based on the complete bid process, should some component(s) be changed to ensure future RFOs are fairer or provide a more efficient, lower cost option?
3. Any other relevant information

The IE concludes that PG&E has implemented the 2018 LSA ES RFO in a fair and consistent manner, marked by an overall objective to maintain a reasonably transparent and competitive solicitation process designed to be inclusive for all Participants. PG&E worked closely with the Participants to ensure they fully understood the requirements of the process and were able to submit all the necessary information to allow for a thorough and consistent evaluation process. In addition, PG&E took important steps to ensure that no potential biases existed in the process associated with the ability of utility-owned options to compete with third-party RA and BTM options. PG&E implemented safeguards in the process designed to ensure that fairness in the process was maintained, such as development of an effective Internal Confidentiality Protocol, separation of the

Solicitation evaluation team and Utility-Ownership team, and the use of different transactors for each type of transaction with no knowledge of the other competitors.

As noted in this report, PG&E's outreach activities were designed to encourage a wide range of participants. PG&E's interaction with Participants before and following submission of offers to clarify offers submitted facilitated participation by a broader supplier base.

The IE was in general agreement with PG&E's overall shortlist selection. The IE generally agreed with PG&E's approach to select the shortlist given the nature of the solicitation. [REDACTED]

## **X. Conclusions and Recommendations**

### **A. Conclusions and Observations**

Merrimack Energy has the following conclusions and observations regarding the 2018 LSA ES RFO solicitation process based on its role of IE in this process:

1. PG&E generally implemented the 2018 ES RFO solicitation process consistent with CPUC Resolution E-4909. PG&E solicited Energy Storage offers for the three local areas in questions and sought to meet a near term need to ensure that RMR contracts in these sub-areas will not be renewed. [REDACTED]

[REDACTED] The IE understands that PG&E has attempted to coordinate its solicitation results with the CAISO in an attempt to ensure that its proposed portfolio will contribute to reducing or eliminating the local sub-area deficiencies in the Pease and South Bay – Moss Landing sub-areas and high voltage in the Bogue sub-area;

2. PG&E's 2018 LSA ES RFO resulted in a robust response from the market, particularly given the relatively short lead-time. PG&E received 100 offer variations, which represented [REDACTED] projects from [REDACTED] counterparties. There were [REDACTED] third-party offers for Energy Storage RA Agreements and Behind-the-Retail Meter Agreements as well as [REDACTED] offers for the EPC option at the Moss Landing site or BOT offers;
3. PG&E's outreach activities and interaction with Participants prior to and after submission of offers was designed to provide a significant base of information for Participants. This included holding a Participants and Offer Form Webinar for potential Participants as required by the Resolution, and direct interaction with Participants either through Q&As via the 2018 LSA Energy Storage website or direct contact via conference calls at the request of Participants. The IE participated in these communications and felt that all Participants were treated

fairly and equitably. In addition, PG&E sent emails to all contacts on its email list for solicitations, which totals nearly 2,800 contacts. Overall, PG&E's outreach activities were extensive;

4. PG&E developed the evaluation methodologies and process to reflect the products being solicited, similar to the "Least Cost Best Fit" methodology used for other recent Energy Storage RFOs. In addition, at the IE's request, PG&E prepared an integration model for use by the IE to review the results of the evaluation process. PG&E also has developed documentation for the models used in the solicitation process which helps an outsider better understand the operations and functions of the models;
5. Merrimack Energy, as Independent Evaluator in the process, was retained in the very early stages of the development of the solicitation documents and processes and had the opportunity to provide input into all aspects of the solicitation development and implementation process. The IE provided comments on the ES RFO Protocol documents, offer forms, and evaluation protocols and methodology;
6. The IE found the solicitation documents to be reasonably transparent and well-structured to allow potential Participants to effectively decide whether and how they wished to compete. The 2018 LSA ES RFO Solicitation documents clearly defined the procurement targets, products solicited, eligibility requirements, evaluation process and criteria, information required of Participants and company objectives;
7. PG&E undertook both a quantitative and qualitative evaluation of the offers submitted generally consistent with the evaluation process identified in the 2018 LSA ES RFO Solicitation Protocol and Bidders Conference presentation. The quantitative evaluation provided a rank order of offers based on the evaluation metric PAV [REDACTED]  
[REDACTED]  
[REDACTED] The final PAV costs reflect Net Market Value plus PAV adjustments as identified in the LSA ES RFO Solicitation Protocol;
8. Based on the evaluation process, PG&E selected an initial shortlist comprised of [REDACTED]  
[REDACTED]. There were no exceptions to the shortlist identified by the CAM/PRG;
9. The evaluation methodology allowed for a consistent evaluation of offers of different sizes, operating characteristics, in-service dates and terms. The methodology was also technology and contract structure neutral. PG&E made a revision to the evaluation methodology for this RFO which attempted to consistently evaluate shorter-term and longer-term options by adding a PAV

component called Delivery Period Adjustment. The Delivery Period PAV adjustment is a way to standardize the valuation period for offers with different delivery terms and start dates;

10. PG&E's final selection and negotiation of offers consisted of four projects totaling 567.5 MW. The selected offers included one EPC option for 182.5 MW at PG&E's Moss Landing site, two RA ES Agreements for a total of 375 MW, and one BTM option for 10 MW. Two of the projects selected are expected to be among the largest energy storage projects proposed to date for construction. [REDACTED]  
[REDACTED]  
[REDACTED]

11. The IE found no evidence of any preference toward any bidder or type of project, such as EPC option to be owned by PG&E. PG&E maintained the separation of teams associated with the utility-owned options.
12. The evaluation methodology resulted in the evaluation and selection of different types of project/contract structures with offers selected in [REDACTED]. The IE believes this demonstrates that the evaluation methodology is fair and unbiased and allows for a consistent evaluation of a range of product and contract types;
13. The IE concludes that the process was undertaken in a fair and equitable manner and all Participants were treated equally. The IE received no complaints or criticisms about the process;













***Pacific Gas and Electric Company***  
***2018 Local Sub-Area Energy Storage Request for Offers***  
***Independent Evaluator Report***  
***Confidential Version***

***Attachment A***

***Review of Behind the Retail Meter Capacity Storage  
Agreement with mNOC AERS, LLC Energy Storage  
Project***

***June, 2018***

***Prepared by***  
***Merrimack Energy Group, Inc.***  
***26 Shipway Place***  
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## I. Introduction

### A. Overview

Pacific Gas and Electric Company (“PG&E”) is seeking approval of a Behind the Retail Meter Capacity Storage Agreement (“BTM CSA”) with mNOC AERS, LLC (“mNOC AERS”), that will deploy a portfolio of “behind the meter” energy storage units at Customer sites located in the PG&E distribution areas identified in Appendix II-C of this BTM CSA. [REDACTED]. The project has a Design Dmax of 10 MW, with Storage Energy of 40 MWh and Discharge Duration of 4.0 hours. The project will be developed and owned by mNOC AERS, LLC.<sup>1</sup> The term of the BTM CSA will be 10 years commencing on the Initial Delivery Date (“IDD”), which is expected to be October 1, 2019.

MicroNOC is the project development, management, and operational entity that will secure contracts with BTM customers to deploy energy storage technologies and provide associated software and controls. MicroNOC, Inc. [REDACTED] to offer PG&E an aggregate Behind-the-Meter Battery (“BTM”) Energy Storage System (“ESS”) to be located in PG&E’s Sub-Area Moss Landing – South Bay (“MLSB”) or CAISO SubLaps PGSB. The BTM ESS project is designed and configured [REDACTED] with 4 hours duration offering total aggregated resources of 10 MW/40 MWh to meet resource adequacy requirements. [REDACTED]

The BTM CSA was executed by PG&E pursuant to the Company’s 2018 Local Sub-Area Energy Storage Request for Offers (“2018 LSA ES RFO” or “2018 Energy Storage RFO”). Through this RFO, PG&E is seeking to procure energy storage resources to meet local sub-area reliability needs as required by California Public Utilities Commission (“CPUC”) Resolution E-4909 (the “Resolution”). The CPUC issued Resolution E-4909 in response to the CAISO’s award of RMR contracts to three generators. The Resolution instructed PG&E to issue a Request for Offers (“RFO”) within 90 days for the procurement of energy storage and/or preferred resources, to address the deficiencies in the affected local sub-areas. PG&E could also explore potential transmission solutions. The Resolution also instructed PG&E to coordinate with the CAISO on whether PG&E’s proposed procurement and/or transmission solutions partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts in the identified local sub-areas.

In addition, the Resolution also established parameters to guide the procurement process and decisions regarding resource selection, including the following:

- Resources procured pursuant to this solicitation must be both:

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<sup>1</sup> [REDACTED]

- On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
- Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;
- Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

PG&E launched the 2018 LSA ES RFO on February 28, 2018 and received offers on March 28, 2018. PG&E executed four Agreements for energy storage products as a result of the solicitation, representing a total of 567.5 MW, including 10 MW of energy storage capacity services under the BTM CSA with mNOC AERS, LLC.

This Attachment A to the Independent Evaluator Report on PG&E’s 2018 LSA ES RFO process (“IE Report on 2018 LSA ES RFO”) focuses on the two sections of the CPUC IE Report Template associated with discussions of project-specific negotiations (Section E of the Report Template) and of the approval issue (Section H of the Report Template) – does the contract merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market? A separate Attachment is provided for each Contract executed by PG&E with the energy storage providers. Accordingly, the IE Report on PG&E’s LSA ES RFO will contain Attachment A through Attachment D, which addresses each contract executed through this solicitation.

## **II. Project Specific Contract Negotiations**

For reviewing and evaluating the performance of the utility with regard to specific contract negotiations, the IE has addressed the issues raised in the CPUC Independent Evaluator Report Template. These include:

1. Identify the principles the IE used to evaluate negotiations;
2. Using the above principles, evaluate the project specific negotiations. Highlight any issues of interest/concern including unique terms and conditions;
3. Was similar information/options made available to other bidders when appropriate (i.e. if a bidder was told to reduce its price, was the same information made available to others?);
4. Describe and explain any differences of opinion between the IE and utility. If resolved, describe the reasonableness of the outcome;

5. Any other information relevant to negotiations not asked above but important to understanding the IOU's process.

### **Principles Used to Evaluate Negotiations**

The general principles followed by the IE in evaluating contract negotiations include assurance that the risk allocation provisions in the contract are reasonably balanced between the counterparties and that the utility customers are not placed at undue risk as a result of the contracting process. The IE generally "monitors" but does not actively participate in the contract negotiation process but will identify issues to the utility transactors if negotiations are moving off track or there are potential biases or inconsistencies in the process. It has been the IE's experience in monitoring a number of negotiation processes that contract negotiations can divert off course but eventually return to a balance after contested provisions are resolved. We also attempt to ensure that similarly situated counterparties are treated the same or similarly and that all counterparties are provided with the same message. For example, PG&E has generally provided a clear message to counterparties to other solicitations (in addition to the ES RFO) that the process is a very competitive process with more projects shortlisted than PG&E intends to execute contracts for. As a result, counterparties should sharpen their pencils and price as competitively as possible.

However, given the lead times associated with completion of this RFO and the recently negotiated agreements resulting from the 2016 ES RFO process, PG&E essentially used the "standard" contracts<sup>2</sup> executed via the 2016 ES RFO as the starting point for this solicitation. [REDACTED]

### **Revisions to the Pro Forma Energy Storage Agreement**

Prior to issuing the 2018 LSA ES RFO, PG&E made several revisions to the pro forma BTM CSA to reflect updates since completion of the BTM CSA contract with Calstor LLC from the 2016 ES RFO. This section of the report provides the following Exhibit A-1, describing the important contract revisions incorporated into the pro forma BTM CSA relative to the Agreement executed between PG&E and Calstor LLC from the 2016 ES RFO, which was executed in November 2017. Exhibit A-1 addresses the changes to the BTM CSA. Many of the revisions reflect the CPUC Multiple-Use Application Decision.

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<sup>2</sup> [REDACTED]



**Exhibit A-1: Important Contract Revisions From 2016 BTM CSA Agreement**


<b>Provision/Purpose</b>	<b>Revisions</b>



### **Negotiation of the BTM CSA Contract with mNOC AERS, LLC**

The BTM CSA with mNOC AERS, LLC is for a collection of behind the meter storage units at retail Customers' sites in the South Bay-Moss Landing sub-area. Each unit will be a stand-alone lithium ion battery energy storage resource, comprised of complete balance of system devices containing DC battery packs, power electronics, thermal management and controls. The energy stored in the module(s) will then supply power to the inverter in a manner that optimizes equipment efficiency for the desired output. The system consists of total aggregate nameplate capacity of 10 MW and 40 MWh of stored energy with four hours duration.

The Delivery Term under this BTM CSA is for 10 years after the Initial Delivery Date (IDD). The Expected Initial Delivery Date is October 1, 2019.



**Exhibit A-2: Pricing Provisions in Original Offer**

Proposed Pricing	Summary of Offer of mNOC AERS, LLC

On April 16, 2018, PG&E held a CAM/PRG meeting to provide an update on the LSA Energy Storage RFO process and to present its proposed shortlisted projects.

[REDACTED]

Shortly after the CAM/PRG meeting, PG&E notified MicroNOC that its [REDACTED] offer had been selected for the shortlist and asked for the company to notify PG&E if they would accept their shortlist position. PG&E also provided the shortlisted Participants with a clean version of the form agreement and asked the Participants to populate all fields in the contract necessary to incorporate all project specific information. [REDACTED]

[REDACTED]

On April 19, 2018 MicroNOC sent a letter to PG&E [REDACTED]

[REDACTED]

On May 8, 2018 PG&E [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

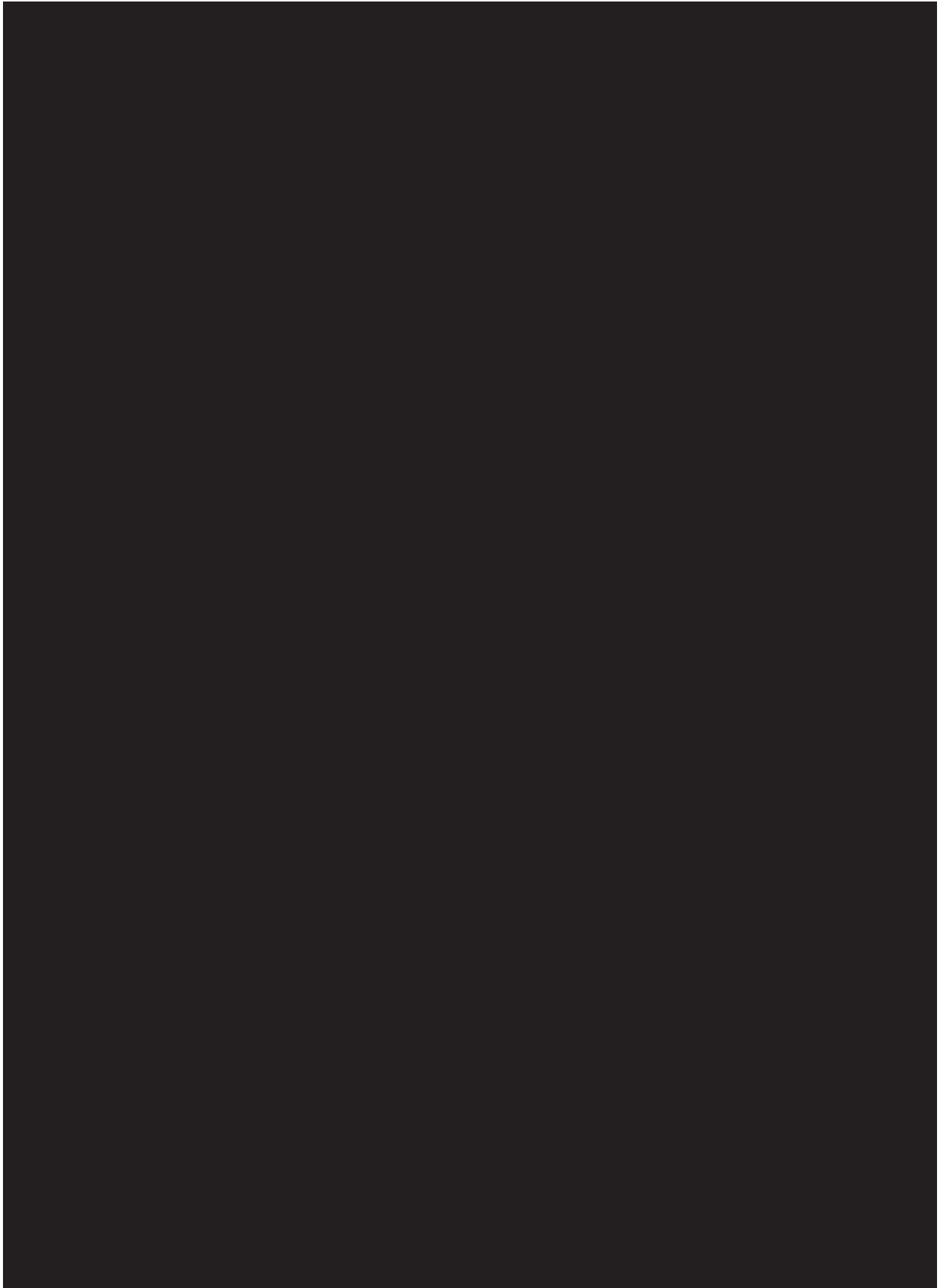
[REDACTED]



The key provisions of the final executed mNOC AERS LLC BTM CSA are summarized in Exhibit A-5.

**Exhibit A-5: Final Contract Key Provisions**

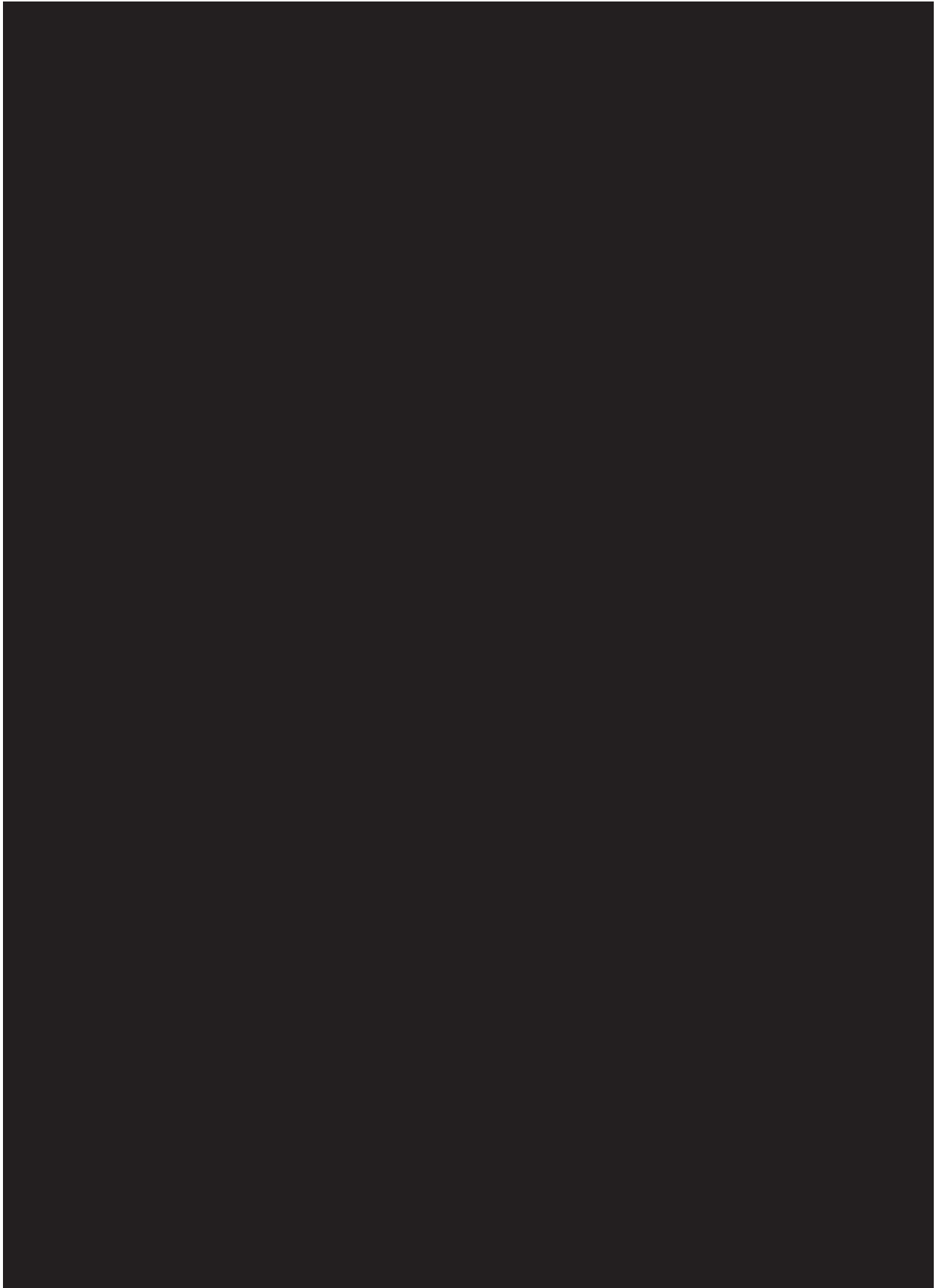
<b>Contract Provisions</b>	<b>Inclusion in Final mNOC AERS Contract</b>
Form of Agreement	Behind the Retail Meter Capacity Storage Agreement
	











[REDACTED]

[REDACTED]

In addition to the contract provisions described above, the BTM CSA also includes Appendix II, including II-C (a form which mNOC AERS shall complete when its Portfolio of Customers are known) and Appendix III which provide the Operational Characteristics of the BTM units mNOC AERS will supply to its retail customers. The information from Appendix II and III is summarized in Exhibit A-6 below

**Exhibit A-6: Summary of BTM CSA Appendix II and III for mNOC AERS, LLC**

Project Name	Micronoc 10 MW BTM Aggregate Energy Storage System
Technology Type	Lithium-Ion Batteries
Point of Interconnection	Aggregation of substations in South Bay – Moss Landing local sub-area as listed in Appendix XIII.
Electric Delivery Point	Sub-LAP(s) will be set forth in Appendix II-C as of the IDD
Existing Zone	NP-15
Design Capacity (Design Dmax)	10 MW
Discharge Duration	4.0 hours
Storage Energy (MWh)	40 MWh

### **III. Does the Contract Merit CPUC Approval**

#### **A. Introduction**

This section of the Report addresses the issue “Does the Contract merit CPUC approval and is the contract reasonably priced and does it reflect a functioning market? To address these questions the IE Report Template requires that the following issues be addressed.

1. Provide a discussion and observation for each category and describe the project’s ranking relative to other bids from the solicitation; and from an overall market perspective;
  - a. Contract price, including cost adders (transmission, credit, etc.)
  - b. Portfolio fit
  - c. Project viability
    - i. Technology
    - ii. Bidder experience (financing, construction, operation)
    - iii. Credit and collateral
    - iv. Permitting, site control and other site-related matters
    - v. Fuel status
    - vi. Transmission upgrades
  - d. Any other relevant factors
2. Based on the complete bid process:
  - a. Does the IOU contract reflect a functioning market?
  - b. Is the IOU contract the best overall offer received by the IOU?
3. Is the contract a reasonable method of achieving the need identified in the RFO?
4. If the contract does not directly reflect a product solicited and bid in an RFO, is the contract superior to the bids received or the products solicited in the RFO?
5. Based on your analysis of the RFO bids and the bid process, does the contract merit Commission approval? Explain

#### **B. Need for Procurement**

Through the 2018 LSA ES RFO, PG&E is seeking new energy storage resources connected at the transmission, distribution or customer level within the local sub-areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity needs in the South Bay – Moss Landing area and reactive power needs in Bogue and Pease. PG&E is issuing this RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. Any battery storage projects selected through this RFO could be used to replace three Calpine fossil fuel plants (Feather River, Yuba City, and Metcalf) that do not have long term contracts with utilities but that have been identified by the CAISO as needed to serve local reliability needs.

CPUC Resolution E-4909 also states that resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E,

previous solicitations in which PG&E has awarded contracts to similar resources, the cost of specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

Through this LSA ES RFO process, PG&E is proposing to procure 567.5 MW of energy storage capacity. The execution of this agreement with mNOC AERS LLC for 10 MW will provide approximately 1.76% of this total.

Chapter III Section (D) of the IE's Report on the 2018 LSA ES RFO process, provides ample evidence of the robustness of the response to this RFO, even in light of the short turnaround time for Participants to prepare their offers. As illustrated in this section of the report, PG&E received 100 offer variations from 29 projects and [REDACTED] counterparties. Appendix A and B of the IE Report on the 2018 LSA ES RFO provides a summary of the 100 offer variations received, including both offers for third-party owned Resource Adequacy ("RA") and Behind-the-Retail-Meter ("BTM") options, Utility-owned projects at the Moss Landing site, and [REDACTED] BOT options. The detailed evaluation conducted by PG&E is described primarily in Chapters IV and V of the 2018 IE LSA ES RFO Report, and that description confirms that the mNOC AERS LLC BTM storage project submitted by MicroNOC was selected for execution based on its competitiveness, and on the applicable evaluation criteria, compared to other competitive options. The mNOC AERS, LLC BTM CSA offer was [REDACTED]. The reasonableness of the mNOC AERS LLC BTM CSA from a viewpoint of its cost competitiveness, as well as the other evaluation criteria, is set forth in the next section of this Report.

### **C. Contract Pricing and Portfolio Fit**

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

The final BTM CSA is for a 10 MW, four-hour duration project.

[REDACTED]

[REDACTED]

The initial valuation results by cost and value component that corresponds to the shortlist results are listed in Exhibit A-8.

**Exhibit A-8: Valuation Results for Short Listed Offer**

Valuation Components	Levelized PAV [REDACTED] <sup>4</sup>
[REDACTED]	

<sup>4</sup> These results are presented in levelized [REDACTED] because this data was the starting point for the calculation of the selection metrics used by PG&E for shortlist rank and selection and represents consistent valuation results for net market value calculations and PAV adjustments.

<sup>5</sup> [REDACTED]

[REDACTED]

In response to a request by PG&E to shortlisted Participants for best and final pricing,

[REDACTED]

Exhibit A-9 includes the final evaluation results for MicroNOC’s shortlisted offer by component.

**Exhibit A-9: Final Valuation Results for MicroNOC Best and Final Offer**

Valuation Components	Levelized PAV	
[REDACTED]		

6 [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

#### **D. Project Viability**

##### **Project Scrutiny**

The LSA ES RFO requires the completion of detailed forms soliciting comprehensive information about the many project development and operational aspects of the projects offered. The responses by Participants with regard to the forms and the follow-up communications between the Participants and PG&E prior to and during negotiations cover topics ranging from manufacturing queues, to procurement experience, to permit requirements and lead times, to all aspects of the interconnection process. As a result, the

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<sup>7</sup> [REDACTED]



level of information about each project provided at the time of offer submittal as well as during the negotiation process provides a solid base of information for both the PG&E team and IE to assess project viability for each of the contracts executed.

### **Technology and Procurement Issues**

For the most popular and most commonly used commercially available technologies, such as lithium-ion batteries, with its current sub-chemistries, procurement skill and experience has become increasingly more important under current market conditions. As a result, the formal inquiries and follow-up questioning include attention on procurement track records and relationships, tender plans, if any, and the strength of the anticipated vendor teams.

A fundamental part of the LSA ES RFO inquiry is the collection of information on safety monitoring equipment, safety processes and safety protocols, including training and lessons learned. The review of technology also extends to the required licenses and patents, if any, and the plans to support operations and the associated performance guarantees with monitoring equipment and maintenance and operating contracts with original equipment manufacturing or other reputable vendors.

mNOC AERS will install lithium-ion battery solutions that are interconnected behind the customer meter at retail customer locations in the PG&E service territory. [REDACTED]

[REDACTED] While the individual energy storage systems will be sized to meet site specific requirements, a portfolio of different size units will be aggregated within the PG&E DLAP to meet CAISO and PG&E requirements. Projects could be managed from a Network Operations Center which provides real time remote monitoring, diagnostics, and troubleshooting capabilities. [REDACTED]

Each unit will be a stand-alone, lithium-ion battery-based energy storage system comprised of a complete balance of system devices containing DC battery packs, power electronics, thermal management and controls. The Lithium Ion battery technology has experienced rapid growth and improvement and is generally considered to be more advanced and mature than other storage technologies. The BTM installations contemplated here by mNOC AERS include [REDACTED]

[REDACTED]

mNOC AERS, LLC, a special purpose entity affiliated with MicroNOC, Inc. MicroNOC has installed a range of project sizes from 30kW to 1MW, totaling 6.12MW/8.76MWh of storage capacity.

### **Experience (Financing, construction, operation)**

The organization and expertise of the developer of the storage project are thoroughly vetted in the ES RFO process. Past projects of team members, the track record of the team obtaining financing or the presence of self-financing resources, the experience in developing and permitting sites to completion and the presence of, or ability to contract for, qualified suppliers, constructors and operators are all scrutinized.

MicroNOC Inc. will be the lead to develop, construct, operate and maintain the Energy Storage System (“ESS”) with [REDACTED] MicroNOC will procure the equipment and use its own Aggregated Energy Resources (AERS) intelligent control NOC software technology. [REDACTED] will provide the full wrap of bringing the project on line by the Guaranteed Initial Delivery Date as well as ensuring that the ESS provides the operational characteristics stated in the Agreement.

MicroNOC provided a list of projects it has installed of similar capacity and configuration as this proposal. MicroNOC identified 6.12 MW of installation at a number of facilities in the US and Korea.

MicroNOC states in the proposal that it has financed many of its projects over the last 10 years. MicroNOC has pre-arranged and secured funding for this project and does not need any government assistance or programs for the project to continue development.

### **Site Control and Other Site Issues, Permitting**

Given the nature of this product, site control is not relevant to the success of the solution. PG&E recognized the difference between product options in the questions related to BTM projects in Appendix B2, the Project Description document. PG&E asked BTM projects [REDACTED]

The project sites for this product are controlled by the retail customers that mNOC AERS plans to solicit. [REDACTED]

[REDACTED]. The IE finds no cause to question this assessment of the permits required and in general, the low risk of not obtaining them. In specific cases, it is conceivable that abutters could vigorously oppose the installation of batteries in the sizes needed and mNOC AERS could presumably manage that risk by finding a replacement customer.

### **Interconnection**

The review of interconnection starts with the Point of Interconnection and covers the full range of applications and studies required for the storage project to safely participate in the regional or local grid system. The status of the necessary CAISO processes is disclosed and information is obtained on the cluster analysis being done, where applicable, the Phase I and Phase II studies, the network and local upgrades and upgrade costs allocated to the storage project, the deliverability analysis and allocation and if available, chargeability studies which the storage project has obtained. [REDACTED]

[REDACTED]

[REDACTED]

### **Schedule**

Many, if not all, of the essential facts regarding the storage project, from the technology to the financing strength to the suitability of the site, determine whether the development team has a realistic chance of meeting the Expected Initial Delivery Date (“EIDD”) for the project. Whether the project can be relied upon to contribute to the storage objective will depend on an overall assessment of these essential project facts, not the least of which is the decision of the development team, curated by the PG&E staff, to pick an EIDD with sufficient lead time.

In this case, the EIDD is October 1, 2019. In light of the advanced factors supporting the project, including the resources, the “behind the meter” experience of MicroNOC, and [REDACTED], the mNOC AERS project is can reasonably be expected to meet its EIDD.

### **Conclusion**

Based on the foregoing, it appears to the IE that the mNOC AERS BTM Project should have a high probability of success for completing the project as required by the BTM CSA.

The project is being developed by an affiliate of an experienced project developer with a successful track record of bringing distributed projects to fruition. [REDACTED]

[REDACTED] The IE therefore recommends approval of the BTM CSA with mNOC AERS, LLC.

***Pacific Gas and Electric Company  
2018 Local Sub-Area Energy Storage Request for Offers***

***Independent Evaluator Report  
Confidential Version***

***Attachment B***

***Energy Storage Resource Adequacy Agreement with  
Hummingbird Energy Storage, LLC***

***June, 2018***

***Prepared by  
Merrimack Energy Group, Inc.  
26 Shipway Place  
Charlestown, Mass. 02129***



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## I. Introduction

### A. Overview

Pacific Gas and Electric Company (“PG&E”) is seeking approval of an Energy Storage Resource Adequacy Agreement (“ESRAA”) from the Hummingbird Energy Storage, LLC facility located in Morgan Hill, California. [REDACTED]

[REDACTED] The facility has a Design Dmax of 75 MW, with Storage Energy of 300 MWh and Discharge of 4.0 hours. Hummingbird Energy Storage is a transmission-connected project.

Hummingbird Energy Storage is a stand-alone lithium-ion battery-based energy storage system. The project will feature Powin Energy’s patented Battery Pack Operating System (bp-OS) that manages battery charge balancing in a manner tailored to utility-scale stationary assets. The project will be built and owned by Hummingbird Energy Storage, LLC.<sup>1</sup> The term of the ESRAA will be 15 years commencing on the Initial Delivery Date (“IDD”), which is expected to be December 1, 2020. The Delivery Point for the project is the Metcalf 115 kV substation, which is the physical point of interconnection to the CAISO grid.

The ESRAA was executed by PG&E pursuant to the Company’s 2018 Local Sub-Area Energy Storage Request for Offers (“2018 LSA ES RFO” or “2018 Energy Storage RFO”). Through this RFO, PG&E is seeking to procure energy storage resources to meet local sub-area reliability needs as required by California Public Utilities Commission (“CPUC”) Resolution E-4909 (the “Resolution”). The CPUC issued Resolution E-4909 in response to the CAISO’s award of RMR contracts to three generators. The Resolution instructed PG&E to issue a Request for Offers (“RFO”) within 90 days for the procurement of energy storage and/or preferred resources, to address the deficiencies in the affected local sub-areas. PG&E could also explore potential transmission solutions. The Resolution also instructed PG&E to coordinate with the CAISO on whether PG&E’s proposed procurement and/or transmission solutions partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts in the identified local sub-areas.

In addition, the Resolution also established parameters to guide the procurement process and decisions regarding resource selection, including the following:

- Resources procured pursuant to this solicitation must be both:
  - On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
  - Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;

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<sup>1</sup> [REDACTED]

- Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

PG&E launched the 2018 LSA ES RFO on February 28, 2018 and received offers on March 28, 2018. PG&E executed four Agreements for energy storage products as a result of the solicitation, representing a total of 567.5 MW, including 75 MW of energy storage capacity services under the ESRAA with Hummingbird Energy Storage, LLC.

This Attachment B to the Independent Evaluator Report on PG&E's 2018 LSA ES RFO process ("IE Report on 2018 LSA ES RFO") focuses on the two sections of the CPUC IE Report Template associated with discussions of project-specific negotiations (Section E of the Report Template) and of the approval issue (Section H of the Report Template) – does the contract merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market? A separate Attachment is provided for each Agreement executed by PG&E with the energy storage providers. Accordingly, the IE Report on PG&E's LSA ES RFO will contain Attachment A through Attachment D, which address each contract executed through this solicitation.

## **II. Project Specific Contract Negotiations**

For reviewing and evaluating the performance of the utility with regard to specific contract negotiations, the IE has addressed the issues raised in the CPUC Independent Evaluator Report Template. These include:

1. Identify the principles the IE used to evaluate negotiations;
2. Using the above principles, evaluate the project specific negotiations. Highlight any issues of interest/concern including unique terms and conditions;
3. Was similar information/options made available to other bidders when appropriate (i.e. if a bidder was told to reduce its price, was the same information made available to others?);
4. Describe and explain any differences of opinion between the IE and utility. If resolved, describe the reasonableness of the outcome;
5. Any other information relevant to negotiations not asked above but important to understanding the IOU's process.



## Principles Used to Evaluate Negotiations

The general principles followed by the IE in evaluating contract negotiations include assurance that the risk allocation provisions in the contract are reasonably balanced between the counterparties and that the utility customers are not placed at undue risk as a result of the contracting process. The IE generally “monitors” but does not actively participate in the contract negotiation process but will identify issues to the utility transactors if negotiations are moving off track or there are potential biases or inconsistencies in the process. It has been the IE’s experience in monitoring a number of negotiation processes that contract negotiations can divert off course but eventually return to a balance after contested provisions are resolved. The IE also attempts to ensure that similarly situated counterparties are treated the same or similarly and that all counterparties are provided with the same message. For example, PG&E has generally provided a clear message to counterparties to other solicitations (in addition to the Energy Storage RFOs) that the process is a very competitive process with more projects shortlisted than PG&E intends to execute contracts for. As a result, counterparties should sharpen their pencils and price as competitively as possible.

However, given the lead times associated with completion of this RFO and the recently negotiated agreements resulting from the 2016 ES RFO process, PG&E essentially used the “standard” contracts<sup>2</sup> executed via the 2016 ES RFO as the starting point for this solicitation. [REDACTED]

## Revisions to the Pro Forma Energy Storage Agreement

Prior to issuing the 2018 LSA ES RFO, PG&E made several revisions to the pro forma ESRAA agreement to reflect updates since completion of the contracts from the 2016 ES RFO. This section of the report provides the following Exhibit B-1, describing the important contract revisions incorporated into the pro forma ESRAA relative to the Agreements executed between PG&E and counterparties from the 2016 ES RFO, which were executed in November, 2017. Exhibit B-1 addresses the changes to the ESRAA that applies to all ESRAA agreements.

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<sup>2</sup> [REDACTED]

**Exhibit B-1: Important Contract Revisions From 2016 ES RFO Agreements**

Provision/Purpose	Revisions

[REDACTED]

### **Project Specific Negotiations of Contract with Hummingbird Energy Storage**

[REDACTED]

[REDACTED]

[REDACTED] A list

of the initial shortlisted offers is provided in Exhibit B-2.

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<sup>3</sup> [REDACTED]

[REDACTED]

[REDACTED]

Shortly after the CAM/PRG meeting, PG&E notified esVolta that its offer had been selected for the shortlist and asked for the company to notify PG&E if they would accept their shortlist position. PG&E also provided the shortlisted Participants with a clean version of the form agreement and asked the Participants to populate all fields in the contract necessary to incorporate all project specific information.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

The key provisions of the final executed Hummingbird Energy Storage, LLC ESRAA are summarized in Exhibit B-4.

**Exhibit B-4: Final Contract Key Provisions**

Contract Provisions	Inclusion in Final Contract
Form of Agreement	Energy Storage Resource Adequacy Agreement
[REDACTED]	

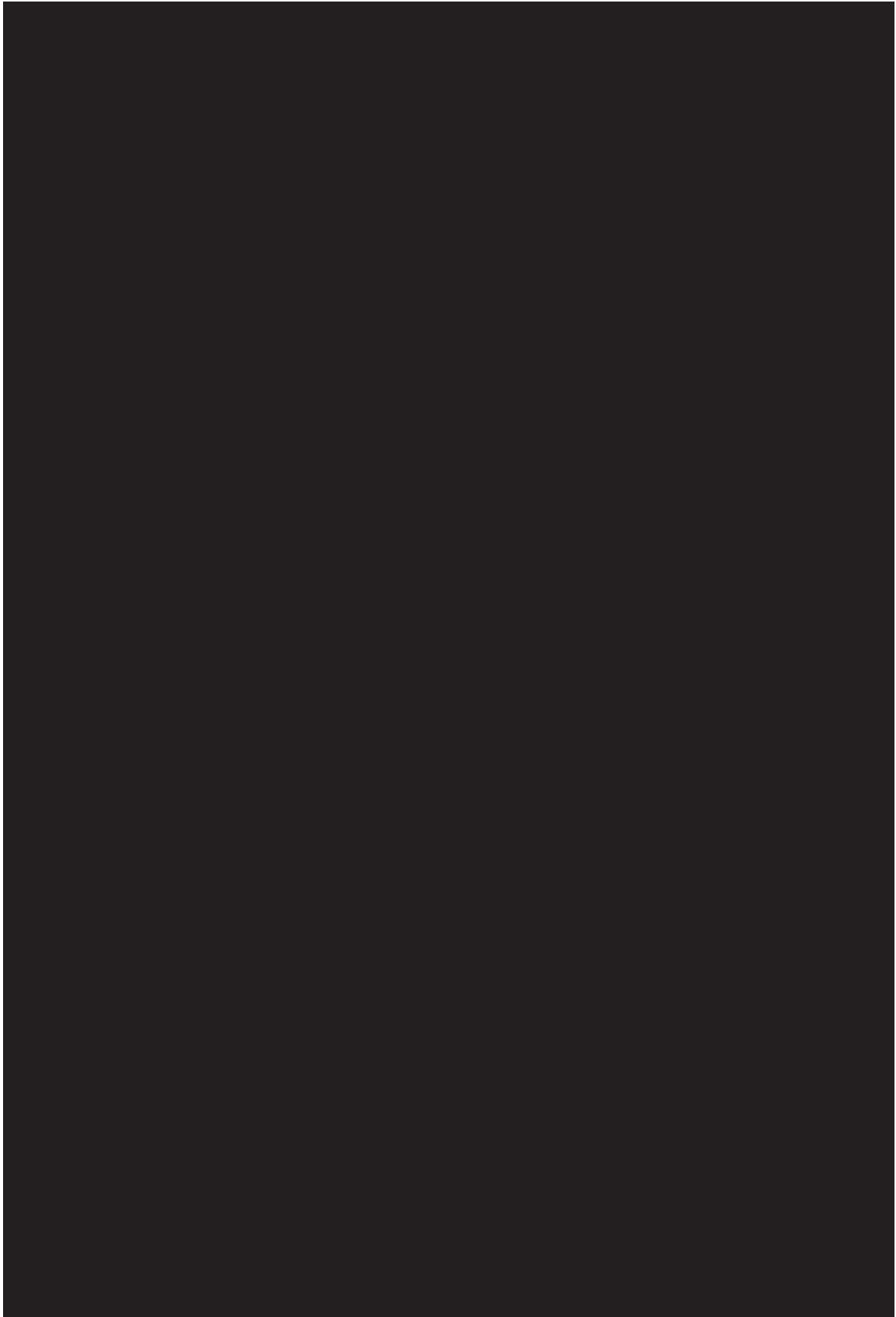














In addition to the contract provisions described above, the ESRAA also includes Appendix II and III which provide a description of the facility, unit, performance characteristics and operational limitations. The information from Appendix II is summarized in Exhibit B-5 below.

**Exhibit B-5: Summary of ESRAA Appendix II and III for Hummingbird Energy Storage, LLC**





### **III. Does the Contract Merit CPUC Approval**

#### **A. Introduction**

This section of the Report addresses the issue “Does the Contract merit CPUC approval and is the contract reasonably priced and does it reflect a functioning market? To address these questions the IE Report Template requires that the following issues be addressed.

1. Provide a discussion and observation for each category and describe the project’s ranking relative to other bids from the solicitation; and from an overall market perspective;
  - a. Contract price, including cost adders (transmission, credit, etc.)
  - b. Portfolio fit
  - c. Project viability
    - i. Technology
    - ii. Bidder experience (financing, construction, operation)
    - iii. Credit and collateral
    - iv. Permitting, site control and other site-related matters
    - v. Fuel status
    - vi. Transmission upgrades
  - d. Any other relevant factors
2. Based on the complete bid process:
  - a. Does the IOU contract reflect a functioning market?
  - b. Is the IOU contract the best overall offer received by the IOU?
3. Is the contract a reasonable method of achieving the need identified in the RFO?
4. If the contract does not directly reflect a product solicited and bid in an RFO, is the contract superior to the bids received or the products solicited in the RFO?
5. Based on your analysis of the RFO bids and the bid process, does the contract merit Commission approval? Explain

## **B. Need for Procurement**

Through the 2018 LSA ES RFO, PG&E seeks new energy storage resources connected at the transmission, distribution or customer level within the local sub-areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity needs in the South Bay – Moss Landing area and reactive power needs in Bogue and Pease. PG&E is issuing this RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. Any battery storage projects selected through this RFO could be used to replace three Calpine fossil fuel plants (Feather River, Yuba City, and Metcalf) that do not have long term contracts with utilities but that have been identified by the CAISO as need to serve local reliability needs.

CPUC Resolution E-4909 also states that resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

Through this LSA ES RFO process, PG&E is proposing to procure 567.5 MW of energy storage capacity. The execution of this agreement with Hummingbird Energy Storage for 75 MW will provide approximately 13.2% of this total.

Chapter III Section (D) of the IE’s Report on the 2018 LSA ES RFO process, provides ample evidence of the robustness of the response to this RFO, even in light of the short turnaround time for Participants to prepare their offers. As illustrated in this section of the report, PG&E received 100 offer variations from 29 projects and [REDACTED] counterparties. Appendix A and B of the IE Report on the 2018 LSA ES RFO provides a summary of the 100 offer variations received, including both offers for third-party owned Resource Adequacy (“RA”) and Behind-the-Retail-Meter (“BTM”) options and Utility-owned projects at the Moss Landing site. The detailed evaluation conducted by PG&E is described primarily in Chapters IV and V of the 2018 IE LSA ES RFO Report, and that description confirms that the Hummingbird Energy Storage Resource Adequacy Agreement submitted by esVolta was selected for execution based on its competitiveness, and on the applicable evaluation criteria, compared to the large number of similar lithium-ion battery ESRAA agreement options. The reasonableness of the Hummingbird Energy Storage ESRAA from a viewpoint of its cost competitiveness, as well as the other evaluation criteria, is set forth in the next section of this Report.

## **C. Contract Pricing and Portfolio Fit**

[REDACTED]

\_\_\_\_\_

[illegible]

4 [REDACTED]  
5 [REDACTED]  
6 [REDACTED]

Exhibit B-7 includes the final evaluation results for the Hummingbird Energy Storage, LLC project by component.

## Exhibit B-7: Final Valuation Results for Hummingbird Energy Storage Project

[illegible]


## **D. Project Viability**

### **Project Scrutiny**

The LSA ES RFO Protocol Offer Package requires Participants to complete and submit a number of documents pertaining to aspects of project development for their energy storage offers.<sup>9</sup> The Offer Package includes detailed forms soliciting comprehensive information about the many project development and operational aspects of the projects offered. PG&E relies on this information to conduct its own qualitative evaluation of the offers. In addition, for the Offer Package and related information, follow-up questioning during meetings and discussions with the Bidders covered topics ranging from project updates to manufacturing queues, procurement experience, permitting requirements and lead times, to all aspects of the interconnection process. As a result, the level of information about each project provided at the time of offer submittal as well as during follow-up discussions provide a solid base of information for both the PG&E team and IE to assess project viability for each of the contracts executed.

### **Technology and Procurement Issues**

For the most popular and most commonly used commercially available technologies, such as lithium-ion batteries, with its current sub-chemistries, procurement skill and experience has become increasingly more important under current market conditions. As a result, the formal inquiries and follow-up questioning include attention on procurement track records and relationships, tender plans, if any, and the strength of the anticipated vendor teams.

A fundamental part of the ES RFO inquiry is the collection of information on safety monitoring equipment, safety processes and safety protocols, including training and lessons learned. The review of technology also extends to the required licenses and patents, if any, and the plans to support operations and the associated performance guarantees with




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<sup>9</sup> Documents which Participants are required to provide with their offer include: (1) Appendix B1 – Project Description; (2) B2 – Site Control; (3) Project Milestone Schedule; (4) Experience Qualifications; (5) Electric Interconnection; and (6) Organization and Finance information.



monitoring equipment and maintenance and operating contracts with original equipment manufacturing or other reputable vendors.

The Hummingbird Storage project will be a stand-alone 75 MW, 300 MWh lithium-ion battery project to be located in Morgan Hill California, approximately 10 miles south of San Jose.



#### **Experience (Financing, construction, operation)**

The organization and expertise of the developer of the storage project are thoroughly vetted in the LSA ES RFO process. Past projects of team members, the track record of the team obtaining financing or the presence of self-financing resources, the experience in developing and permitting sites to completion and the presence of, or ability to contract for, qualified suppliers, constructors and operators are all scrutinized.

The Hummingbird Energy Storage project is owned by Hummingbird Energy Storage, LLC, a special purpose entity. This limited liability company will own 100% of the

proposed project and the project assets throughout the term of the ESRAA with PG&E. The project is being developed and managed by esVolta, LP. esVolta claims it is among the largest developers/owners/operators of utility-scale energy storage projects in North America, with a battery storage asset portfolio totaling 116 MWh including projects in operations and utility-contracted backlog. esVolta is sponsored by Powin Energy Corporation, a leading US manufacturer and integrator of energy storage systems, and Blue Sky Alternative Investments, a major international energy and infrastructure investor. Powin Energy is a publicly traded US based designer and manufacturer of lithium-ion storage solutions. Blue Sky is a private equity firm with \$3 billion of assets under management.<sup>10</sup>

According to the information provided by the Participant, the project team has two projects in operations: a 2 MW project (Millikan) that is providing services to SCE. The project was selected through the 2016 Aliso Canyon energy storage solicitation. A second project is for 8.8 MWs with IESO Ontario. [REDACTED]

[REDACTED] compared to the 75 MW facility it proposes to contract under the LSA ES RFO.

#### **Site Control and Other Site Issues, Permitting,**

Starting with site control status, the site-related information collected during the RFO process includes the full spectrum of possible federal, state and local permits, the bidder's experience in applying for and obtaining permits with sufficient lead time, and the range of impact analyses, such as hazardous waste and sensitive resource investigations, needed to assess the suitability of the site for energy storage use.

[REDACTED]

In terms of permitting, the Respondent states it [REDACTED]



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<sup>10</sup> A news release is included on Powin Energy's website that describes its relationship with the above parties. According to the press release, in December, 2017, Powin Energy sold its 110 MWh of storage assets and contracted pipeline to esVolta. esVolta recently received a large financial commitment from Blue Sky Alternative Investments LLC to accelerate its growth in the North American utility-scale energy storage market. Powin Energy will be esVolta's exclusive provider of energy storage systems through 2022. Powin Energy's business plan has long had the vision of transitioning the company out of the project development business and into being a fully dedicated energy storage systems and services provider.



## **Interconnection**

The review of interconnection starts with the Point of Interconnection and covers the full range of applications and studies required for the storage project to safely participate in the regional or local grid system. The status of the necessary CAISO processes are disclosed and information is obtained on the cluster analysis being done, where applicable, the Phase I and Phase II studies, the network and local upgrades and upgrade costs allocated to the storage project, the deliverability analysis and allocation and if available, chargeability studies which the storage project has obtained.



## **Schedule**

Many, if not all, of the essential facts regarding the storage project, from the technology to the financing strength to the suitability of the site, determine whether the development team has a realistic chance of meeting the Expected Initial Delivery Date (“EIDD”) for the project.

In this case, the EIDD is December 1, 2020. [REDACTED]

## **Conclusion**

Based on the foregoing, it appears to the IE that the Hummingbird Energy Storage Project should have a reasonable probability of success for completing the project as required by the ESRAA. [REDACTED]

[REDACTED] However, with these risks in mind, given the unique requirements of this solicitation, the IE does recommend approval of the ESRAA with Hummingbird Energy Storage given the need to move forward with new resources in the South Bay – Moss Landing area. [REDACTED]

***Pacific Gas and Electric Company  
2018 Local Sub-Area Energy Storage Request for Offers***

***Independent Evaluator Report  
Confidential Version***

***Attachment C***

***Energy Storage Resource Adequacy Agreement with  
Dynegy Marketing and Trade, LLC***

***June, 2018***

***Prepared by  
Merrimack Energy Group, Inc.  
26 Shipway Place  
Charlestown, Mass. 02129***



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## I. Introduction

### A. Overview

Pacific Gas and Electric Company (“PG&E”) is seeking approval of an Energy Storage Resource Adequacy Agreement (“ESRAA”) from the Moss Landing Energy Storage facility located in Moss Landing, California. [REDACTED]

[REDACTED]<sup>1</sup> The facility has a Design Dmax of 300 MW, with Storage Energy of 1,200 MWh and Discharge of 4.0 hours.<sup>2</sup> The Moss Landing Energy Storage project is a transmission-connected project.

The Moss Landing Energy Storage project is a stand-alone lithium-ion battery-based energy storage system. The project will utilize Tier 1 batteries. The project will be built at a brownfield existing power plant site located in Moss Landing, California. Vistra plans to interconnect using the recently retired Unit 6 interconnect location at the 500 kV substation adjacent to the facility.

[REDACTED]

[REDACTED]

The term of the ESRAA with Dynegy Marketing and Trade, LLC is for 20 years commencing on the Initial Delivery Date (“IDD”), which is expected to be December 1, 2020.

The ESRAA was executed by PG&E pursuant to the Company’s 2018 Local Sub-Area Energy Storage Request for Offers (“2018 LSA ES RFO” or “2018 Energy Storage RFO”). Through this RFO, PG&E is seeking to procure energy storage resources to meet local sub-

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<sup>1</sup> [REDACTED]

<sup>2</sup> This project will be one of the largest BESS systems in the world, if not the largest. Two projects, the Fluence 100 MW/400 MWh BESS project in Long Beach California along with the Tesla 100 MW BESS Hornsdale Power Reserve project in Australia claim to be the largest BESS projects. The largest BESS project under construction is a 200 MW/800 MWh project in China.

area reliability needs as required by California Public Utilities Commission (“CPUC”) Resolution E-4909 (the “Resolution”). The CPUC issued Resolution E-4909 in response to the CAISO’s award of RMR contracts to three generators. The Resolution instructed PG&E to issue a Request for Offers (“RFO”) within 90 days for the procurement of energy storage and/or preferred resources, to address the deficiencies in the affected local sub-areas. PG&E could also explore potential transmission solutions. The Resolution also instructed PG&E to coordinate with the CAISO on whether PG&E’s proposed procurement and/or transmission solutions partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts in the identified local sub-areas.

In addition, the Resolution also established parameters to guide the procurement process and decisions regarding resource selection, including the following:

- Resources procured pursuant to this solicitation must be both:
  - On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
  - Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;
- Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

PG&E launched the 2018 LSA ES RFO on February 28, 2018 and received offers on March 28, 2018. PG&E executed four Agreements for energy storage products as a result of the solicitation, representing a total of 567.5 MW, including 300 MW of energy storage capacity services under the ESRAA with Dynegy Marketing and Trade, LLC.

This Attachment C to the Independent Evaluator Report on PG&E’s 2018 LSA ES RFO process (“IE Report on 2018 LSA ES RFO”) focuses on the two sections of the CPUC IE Report Template associated with discussions of project-specific negotiations (Section E of the Report Template) and of the contract approval issue (Section H of the Report Template) – does the contract merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market? A separate Attachment is provided for each Agreement executed by PG&E with the energy storage providers. Accordingly, the IE Report on PG&E’s LSA ES RFO will contain Attachment A through Attachment D, which address each contract executed through this solicitation.



## II. Project Specific Contract Negotiations

For reviewing and evaluating the performance of the utility with regard to specific contract negotiations, the IE has addressed the issues raised in the CPUC Independent Evaluator Report Template. These include:

1. Identify the principles the IE used to evaluate negotiations;
2. Using the above principles, evaluate the project specific negotiations. Highlight any issues of interest/concern including unique terms and conditions;
3. Was similar information/options made available to other bidders when appropriate (i.e. if a bidder was told to reduce its price, was the same information made available to others?);
4. Describe and explain any differences of opinion between the IE and utility. If resolved, describe the reasonableness of the outcome;
5. Any other information relevant to negotiations not asked above but important to understanding the IOU's process.

### Principles Used to Evaluate Negotiations

The general principles followed by the IE in evaluating contract negotiations include assurance that the risk allocation provisions in the contract are reasonably balanced between the counterparties and that the utility customers are not placed at undue risk as a result of the contracting process. The IE generally “monitors” but does not actively participate in the contract negotiation process but will identify issues to the utility transactors if negotiations are moving off track or there are potential biases or inconsistencies in the process. It has been the IE's experience in monitoring a number of negotiation processes that contract negotiations can divert off course but eventually return to a balance after contested provisions are resolved. The IE also attempts to ensure that similarly situated counterparties are treated the same or similarly and that all counterparties are provided with the same message. For example, PG&E has generally provided a clear message to counterparties in other solicitations (in addition to the Energy Storage RFOs) that the process is a very competitive process with more projects shortlisted than PG&E intends to execute contracts for. As a result, counterparties should sharpen their pencils and price as competitively as possible.

However, given the lead times associated with completion of this RFO and the recently negotiated agreements resulting from the 2016 ES RFO process, PG&E essentially used the “standard” contracts<sup>3</sup> executed via the 2016 ES RFO as the starting point for this

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<sup>3</sup>

[REDACTED]

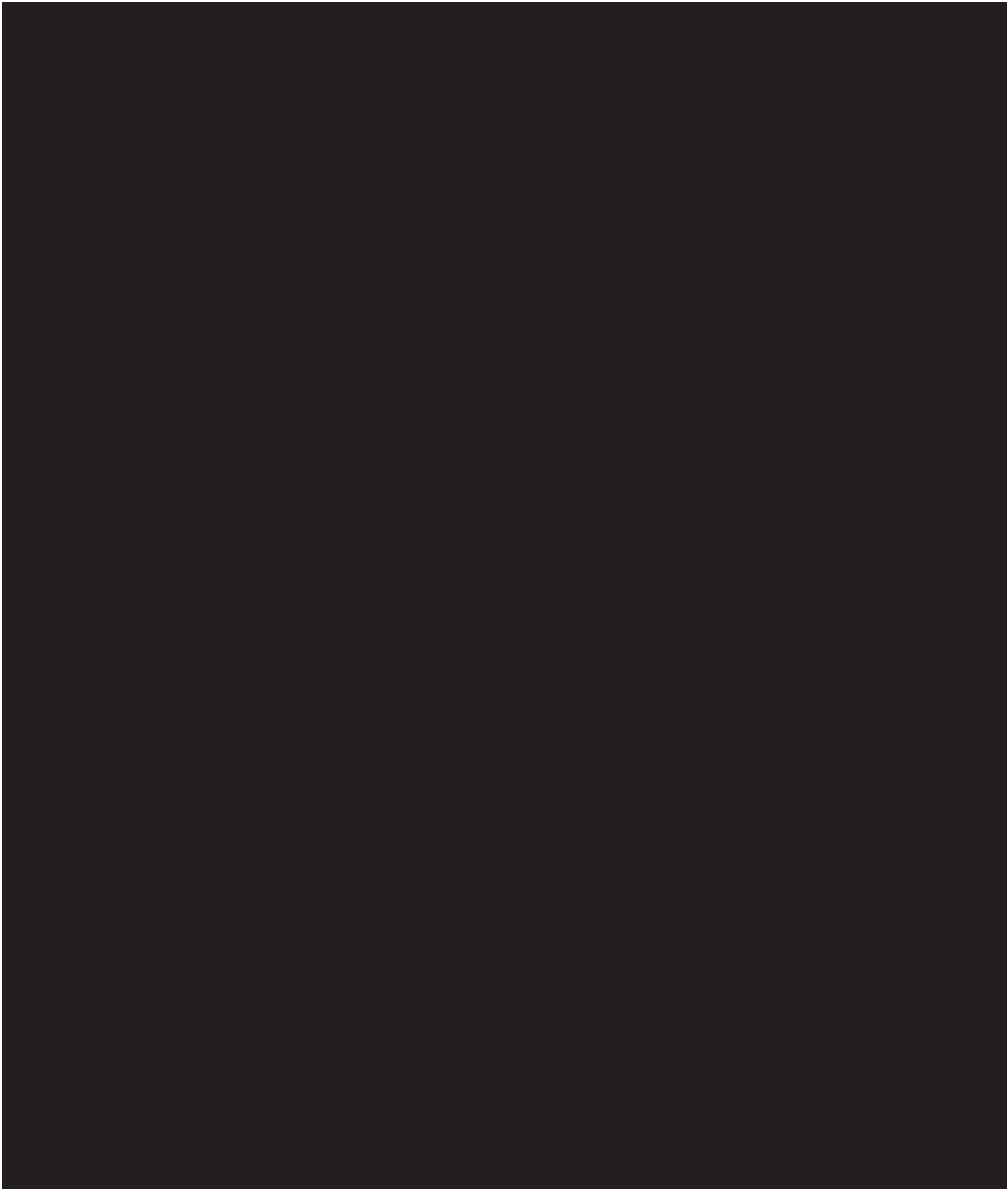
solicitation.

### **Revisions to the Pro Forma Energy Storage Agreement**

Prior to issuing the 2018 LSA ES RFO, PG&E made several revisions to the pro forma ESRAA agreement to reflect updates since completion of the contracts from the 2016 ES RFO. This section of the report provides the following Exhibit B-1, describing the important contract revisions incorporated into the pro forma ESRAA relative to the Agreements executed between PG&E and counterparties from the 2016 ES RFO, which were executed in November, 2017. Exhibit C-1 addresses the changes to the ESRAA that applies to all ESRAA agreements.

#### **Exhibit C-1: Important Contract Revisions From 2016 ES RFO Agreements**

<b>Provision/Purpose</b>	<b>Revisions</b>



**Project Specific Negotiations of Contract with Vistra Energy Storage**

[Redacted text block]

[Redacted text block]

[REDACTED]

[REDACTED]

[REDACTED]

A list of the initial shortlisted offers is provided in Exhibit C-2.

[REDACTED]

[REDACTED]

Shortly after the CAM/PRG meeting, PG&E notified Vistra Energy that its offer had been selected for the shortlist and asked for the company to notify PG&E if they would accept their shortlist position. PG&E also provided the shortlisted Participants with a clean version of the form agreement and asked the Participants to populate all fields in the contract necessary to incorporate all project specific information.

[REDACTED]

On May 8, 2018 PG&E

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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

[illegible]

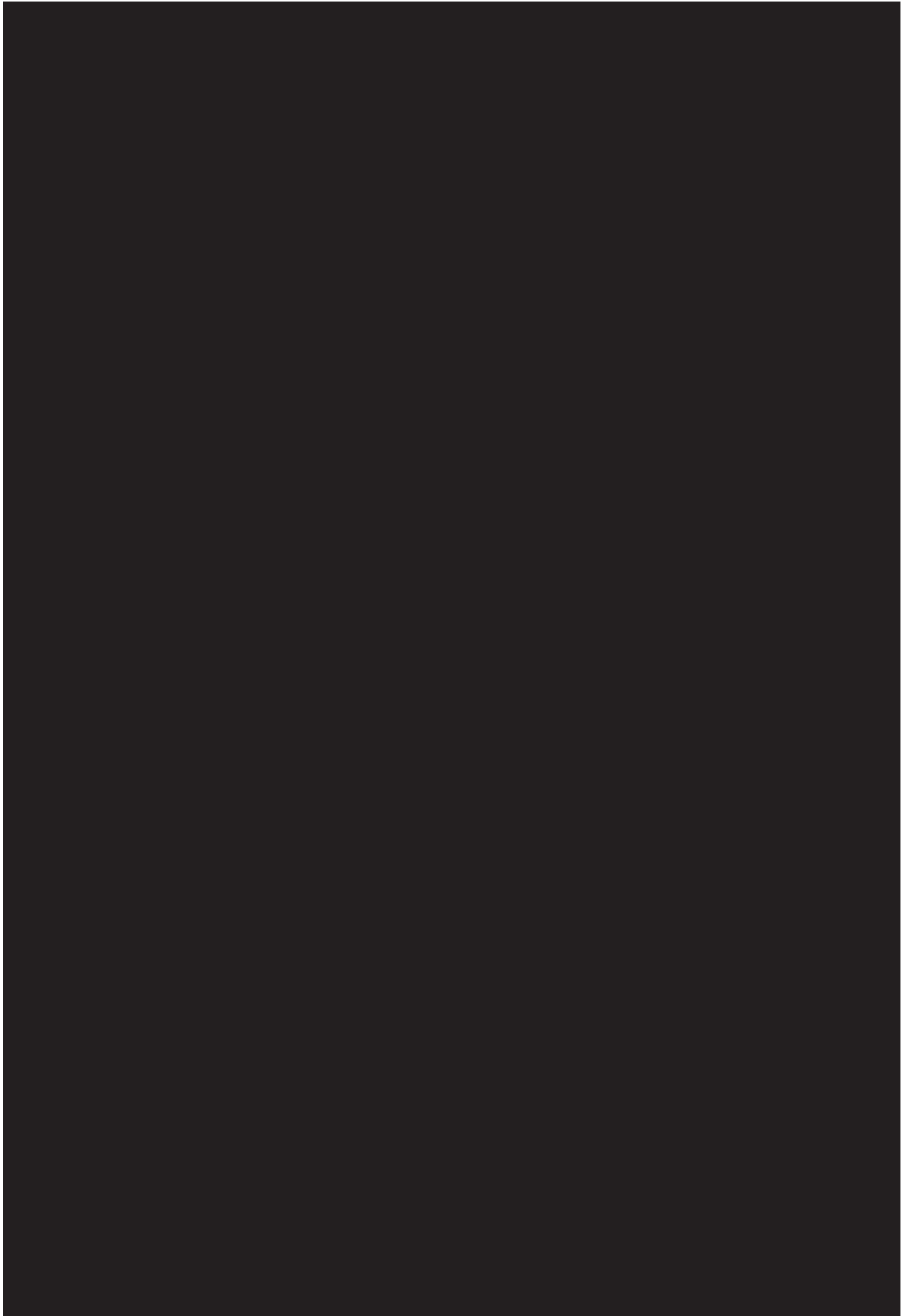
\_\_\_\_\_

The key provisions of the final executed Dynegy Marketing and Trade, LLC ESRAA are summarized in Exhibit C-4.

**Exhibit C-4: Final Contract Key Provisions**

Contract Provisions	Inclusion in Final Contract
Form of Agreement	Energy Storage Resource Adequacy Agreement
	













In addition to the contract provisions described above, the ESRAA also includes Appendix II and III which provide a description of the facility, unit, performance characteristics and operational limitations. The information from Appendix II and III is summarized in Exhibit C-5 below.

**Exhibit C-5: Summary of ESRAA Appendix II and III for Dynegy Marketing and Trade, LLC**

Project Name	Moss Landing Storage project



- c. Project viability
    - i. Technology
    - ii. Bidder experience (financing, construction, operation)
    - iii. Credit and collateral
    - iv. Permitting, site control and other site-related matters
    - v. Fuel status
    - vi. Transmission upgrades
  - d. Any other relevant factors
- 2. Based on the complete bid process:
  - a. Does the IOU contract reflect a functioning market?
  - b. Is the IOU contract the best overall offer received by the IOU?
- 3. Is the contract a reasonable method of achieving the need identified in the RFO?
- 4. If the contract does not directly reflect a product solicited and bid in an RFO, is the contract superior to the bids received or the products solicited in the RFO?
- 5. Based on your analysis of the RFO bids and the bid process, does the contract merit Commission approval? Explain

## **B. Need for Procurement**

Through the 2018 LSA ES RFO, PG&E is seeking new energy storage resources connected at the transmission, distribution or customer level within the local sub-areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity needs in the South Bay – Moss Landing area and reactive power needs in Bogue and Pease. PG&E is issuing this RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. Any battery storage projects selected through this RFO could be used to replace three Calpine fossil fuel plants (Feather River, Yuba City, and Metcalf) that do not have long term contracts with utilities but that have been identified by the CAISO as needed to serve local reliability needs.

CPUC Resolution E-4909 also states that resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

Through this LSA ES RFO process, PG&E is proposing to procure 567.5 MW of energy storage capacity. The execution of this agreement with Dynegy Marketing and Trade, LLC for 300 MW will provide approximately 53% of this total.

Chapter III Section (D) of the IE's Report on the 2018 LSA ES RFO process, provides ample evidence of the robustness of the response to this RFO, even in light of the short turnaround time for Participants to prepare their offers. As illustrated in this section of the report, PG&E received 100 offer variations from 29 projects and ■■■ counterparties. Appendix A and B of the IE Report on the 2018 LSA ES RFO provides a summary of the 100 offer variations received, including both offers for third-party owned Resource

Adequacy (“RA”) and Behind-the-Retail-Meter (“BTM”) options, Utility-owned projects at the Moss Landing site, and [REDACTED] BOT options. The detailed evaluation conducted by PG&E is described primarily in Chapters IV and V of the 2018 IE LSA ES RFO Report, and that description confirms that the Dynegy Marketing and Trade, LLC Energy Storage Resource Adequacy Agreement submitted by Vistra for the Moss Landing Storage project was selected for execution based on its competitiveness, and on the applicable evaluation criteria, compared to the large number of similar lithium-ion battery ESRAA agreement options. The reasonableness of the Dynegy Marketing and Trade, LLC ESRAA from a viewpoint of its cost competitiveness, as well as the other evaluation criteria, is set forth in the next section of this Report.

### C. Contract Pricing and Portfolio Fit

[REDACTED]

[REDACTED]

[REDACTED]

#### Exhibit C-6: Valuation Results for the Short-Listed Moss Landing Storage Project

Valuation Components	Levelized PAV
[REDACTED]	

Age group	Number of people
15-24	40,000
25-34	60,000
35-44	80,000
45-54	90,000
55-64	100,000
65-74	110,000
75+	120,000

Exhibit C-7 includes the final evaluation results for the Moss Landing Storage project by component.

Valuation Components	Levelized PAV

4		
5		
6		

7 [REDACTED]

[REDACTED]

8 [REDACTED]

[REDACTED]

#### **D. Project Viability**

##### **Project Scrutiny**

The LSA ES RFO Protocol Offer Package requires Participants to complete and submit a number of documents pertaining to aspects of project development for their energy storage offers.<sup>9</sup> The Offer Package includes detailed forms soliciting comprehensive information about the many project development and operational aspects of the projects offered. PG&E relies on this information to conduct its own qualitative evaluation of the offers. In addition, for the Offer Package and related information, follow-up questioning during meetings and discussions with the Bidders covered topics ranging from project updates to manufacturing queues, procurement experience, permitting requirements and lead times, to all aspects of the interconnection process. As a result, the level of information about each project

---

7 [REDACTED]

8 [REDACTED]

<sup>9</sup> Documents which Participants are required to provide with their offer include: (1) Appendix B1 – Project Description; (2) B2 – Site Control; (3) Project Milestone Schedule; (4) Experience Qualifications; (5) Electric Interconnection; and (6) Organization and Finance information.



provided at the time of offer submittal as well as during follow-up discussions provides a solid base of information for both the PG&E team and IE to assess project viability for each of the contracts executed.

### **Technology and Procurement Issues**

For the most popular and most commonly used commercially available technologies, such as lithium-ion batteries, with its current sub-chemistries, procurement skill and experience has become increasingly more important under current market conditions. As a result, the formal inquiries and follow-up questioning include attention on procurement track records and relationships, tender plans, if any, and the strength of the anticipated vendor teams.

A fundamental part of the LSA ES RFO inquiry is the collection of information on safety monitoring equipment, safety processes and safety protocols, including training and lessons learned. The review of technology also extends to the required licenses and patents, if any, and the plans to support operations and the associated performance guarantees with monitoring equipment and maintenance and operating contracts with original equipment manufacturing or other reputable vendors.

The Moss Landing Storage project will be a stand-alone 300 MW, 1,200 MWh lithium-ion battery project to be located in Moss Landing California.



### **Experience (Financing, construction, operation)**

The organization and expertise of the developer of the storage project are thoroughly vetted in the LSA ES RFO process. Past projects of team members, the track record of the team obtaining financing or the presence of self-financing resources, the experience in developing and permitting sites to completion and the presence of, or ability to contract for, qualified suppliers, constructors and operators are all scrutinized.

In terms of overall power project experience, Vistra touts its experience in its offer to PG&E. Vistra Energy states that it is a premier Texas-based energy company focused on the competitive energy and power generation markets through operation as the largest retailer and generator of electricity in the Texas market. Vistra's integrated portfolio of competitive business consists primarily of TXU Energy and Luminant. TXU Energy sells retail electricity and value-added services to approximately 1.7 million residential and business customers in Texas. Luminant generates and sells electricity and related products from a diverse fleet of generation facilities totaling approximately 13,600 MW of conventional generation in Texas and is a large purchaser of renewable power. In the past 10 years, Vistra has constructed 2,500 MW of power generation including 180 MW of solar energy scheduled to be completed in May 2018.

As noted, Vistra is currently in the process of merging with Dynegy to become the largest independent power producer in the US. Dynegy generates energy primarily in the Northeast, Mid-Atlantic, Midwest, Texas and California markets. Dynegy operates in 12 states and generates approximately 28,000 MW across 43 power plants. When the merger is complete, Vistra will operate over 42,000 MW of generation across the country.

In terms of experience with energy storage projects, it appears from the materials provided by Vistra, [REDACTED]

In terms of financing, Vistra stated in its offer that Vistra will be providing balance sheet financing for the Moss Landing Storage project. No external financial conditions or debt is required. Vistra has a corporate credit rating of Ba2/BB with a positive/stable outlook. Also, Vistra's senior debt was recently rated by S&P as BBB- (investment grade).

#### **Site Control and Other Site Issues, Permitting,**

Starting with site control status, the site-related information collected during the RFO process includes the full spectrum of possible federal, state and local permits, the bidder's experience in applying for and obtaining permits with sufficient lead time, and the range of impact analyses, such as hazardous waste and sensitive resource investigations, needed to assess the suitability of the site for energy storage use.

As noted, Vistra and Dynegy are in the process of merging. Vistra will then have full ownership of the Moss Landing site. [REDACTED]

In terms of permitting, the Respondent states that since all batteries will be [REDACTED]

### **Interconnection**

### **Schedule**

Many, if not all, of the essential facts regarding the storage project, from the technology to the financing strength to the suitability of the site, determine whether the development team has a realistic chance of meeting the Expected Initial Delivery Date (“EIDD”) for the project.

Although the EIDD is December 1, 2020, [REDACTED]

### **Conclusion**

Based on the foregoing, it appears to the IE that the Moss Landing Storage project should have a reasonable probability of success for completing the project as required by the ESRAA. [REDACTED]

[REDACTED] From a project development perspective, the Respondent indicated that it is prepared to construct the project using balance sheet financing. It is not certain how the impact of the acquisition of Dynegy, which was approved by FERC in April 2018, will impact the financial integrity of Vistra. Given the unique requirements of this solicitation, the IE does recommend

approval of the ESRAA with Dynegy Marketing and Trade, LLC given the need to move forward with new resources in the South Bay – Moss Landing area. [REDACTED]

***Pacific Gas and Electric Company  
Local Sub Area Energy Storage Request for Offers  
Confidential Version***

***Independent Evaluator Report  
On PG&E's 2018 Local Sub Area Energy Storage RFO***

***Attachment D***

***Review of Turnkey Engineering, Procurement and  
Construction Agreement for Moss Landing Energy  
Storage Project  
with associated  
Long-Term Performance and Maintenance Agreement  
by and between Tesla, Inc., as Contractor, and PG&E, as  
Owner***

***June 29, 2018***

***Prepared by  
Merrimack Energy Group, Inc.  
26 Shipway Place  
Charlestown, Mass. 02129***



## **Table of Contents**

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## I. Introduction

### Overview

Pacific Gas and Electric Company (“PG&E”) is seeking approval of an Engineering, Procurement and Construction Agreement (“EPC”) for a Local Sub-Area Energy Storage Project with Tesla, Inc. (“Tesla”) providing for, on a lump-sum, fixed price, turnkey basis, a new, fully operational, fully-permitted 182.5 MW<sup>1</sup> battery energy storage system to be engineered, procured, constructed, commissioned and successfully tested by Tesla, and interconnected at 115 kV by PG&E, on a portion of the PG&E-owned site where its 500/230/115 kV Moss Landing Substation is located. The substation site is at Highway 1 and Dolan Road, Moss Landing, Monterey County, California 95039.

The energy storage system will interconnect, as indicated, with PG&E’s 115 kV system at the Moss Landing substation<sup>2</sup>. In addition, upon the completion of the Project, by virtue of its ownership, the Moss Landing Energy Storage Project (“Tesla Moss Landing ES Project”) will provide Local Resource Adequacy credit to PG&E and will participate in the CAISO NP-15 markets<sup>3</sup>. Most significantly, pursuant to Resolution E-4909 of the California Public Utility Commission (“CPUC”) issued January 12, 2018, “Authorizing PG&E to Procure Energy Storage or Preferred Resources to Address Local Deficiencies and Ensure Local Reliability”, the Moss Landing Energy Storage Project will provide Local RA resources in the South Bay-Moss Landing sub-area and in so doing, contribute to mitigating the local capacity deficiency that exists in the subject sub-area when RMR and CPM resources are netted out. In short, the Moss Landing Energy Storage Project will contribute to the effort directed by the CPUC in Resolution E-4909 to eliminate or reduce reliance on such RMR resources in any year between 2019 and 2022.

The Tesla Moss Landing ES Project will have a Project Dmax of 184.3 MW in the PG&E-supplied medium voltage Switchgear and Discharge Duration of 4.0 hours, resulting in 737.2 MWh of Guaranteed Discharge Energy<sup>4</sup>.

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<sup>1</sup> The battery energy storage project will record different capacities at the meters located at different voltages. At the 115 kV high voltage interconnection, where the CAISO meter is located, the capacity will be 182.5 MW. At 21 kV, where the Tesla equipment will interconnect with the PG&E supplied switchgear, the capacity will register 184.3 MW. For EPC options at Moss Landing, all Participants had to propose a minimum size of a 195 MW BESS system. Participants could also propose a 100 MW BESS system. The 195 MW size was based on an estimate of the CAISO interconnection and no longer is an operative number.

<sup>2</sup> Moss Landing Battery Energy Storage System (BESS) is designed to be connected at the 115 kV level. The interconnection facility is designed as a single-bus-single-breaker (SBSB) and includes one (1) main line and three (3) transformer 115 kV circuit breakers, one (1) 115 kV Bus, three (3) 45/60/75MVA 115/21 kV Power Transformers each protected by a circuit breaker. Each Transformer will feed a 21 kV bus section. The three (3) 21 kV Bus sections will be connected via two (2) tie breakers. Each of the 21 kV bus sections will be designed as outdoor metalclad switchgears each with one (1) transformer LV breaker, one (1) collector bus and four (4) 21 kV breaker collector lines (Transformer/Inverter feeds).

<sup>3</sup> Market participation may vary from four-second frequency regulation to daily energy market bidding.

<sup>4</sup> See: Attachment 8 to the EPC. At 115 kV, the 182.5 MW Project will produce 730 MWh over its four-hour duration.

The Tesla Moss Landing ES Project will be built by Tesla and owned by PG&E pursuant to the terms of the EPC. The delivery point for the Project is on the Project Site where the new associated gen tie-line extending from the 115 kV Substation terminates at the new PG&E-furnished 115 kV bus which will be connected through three (3) new 115/21 kV transformers supplied by PG&E to three (3) new 21 kV buses each housed in a new switchgear building where medium voltage switchgear installed by PG&E connect to twelve (12) 21 kV collection circuits installed by Tesla. The facilities on the battery side of the medium voltage switchgear will be supplied and installed by Tesla.

The EPC and associated Long-Term Performance and Maintenance Agreement (“LTMPA”) [REDACTED] with Tesla. The EPC was executed by PG&E pursuant to the Company’s 2018 Local Sub-Area Energy Storage Request for Offers (“2018 LSA ES RFO” or “Solicitation Protocol”). Through this RFO, PG&E is seeking to procure energy storage resources to meet local sub-area reliability needs as required by California Public Utilities Commission (“CPUC”) Resolution E-4909 (the “Resolution”). The CPUC issued Resolution E-4909 in response to the CAISO’s award of RMR contracts to three generators. The Resolution instructed PG&E to issue a Request for Offers (“RFO”) within 90 days for the procurement of energy storage and/or preferred resources, to address the deficiencies in the affected local sub-areas. PG&E could also explore potential transmission solutions. The Resolution also instructed PG&E to coordinate with the CAISO on whether PG&E’s proposed procurement and/or transmission solutions partially or wholly eliminate the need for, or extension of, one or more of the RMR contracts in the identified local sub-areas.

In addition, the Resolution also established parameters to guide the procurement process and decisions regarding resource selection, including the following:

- Resources procured pursuant to this solicitation must be both:
  - On-line and operational on or before a date sufficient to ensure that the RMR contracts for the three plants – Metcalf Energy Center, Feather River Energy Center, and Yuba City Energy Center – will not be renewed in any year from 2019 through 2022;
  - Located within the relevant sub-area(s) and be interconnected at locations that will mitigate local capacity and voltage issues sufficient to obviate the need for RMR contracts for the aforementioned plants;
- Resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of the specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

PG&E launched the 2018 LSA ES RFO on February 28, 2018 and received offers on March 28, 2018. On April 16, 2018, PG&E presented its Shortlist for the review at a joint CAM/PRG meeting. PG&E has now executed four contracts for energy storage products



as a result of the solicitation, representing a total of 567.5 MW, including the 182.5<sup>5</sup> MW energy storage asset represented by the Tesla Moss Landing BESS Project.

This Attachment D to the Independent Evaluator Report on PG&E's 2018 Local Sub Area Energy Storage Request for Offers Process ("IE Report 2018 LSA ES RFO") focuses on the two sections of the CPUC IE Report Template associated with discussion of project-specific negotiations (Section E of the Report Template) and of the approval issue (Section H of the Report Template) – does the contract merit CPUC approval? Is the contract reasonably priced and does it reflect a functioning market? A separate Attachment is provided for each Contract executed by PG&E with the energy storage providers. Accordingly, the IE Report on PG&E's Local Sub Area ES RFO will contain Attachment A through Attachment D, which address each contract executed through this solicitation.

## **II. Project Specific Contract Negotiations**

For reviewing and evaluating the performance of the utility with regard to specific contract negotiations, the IE has addressed the issues raised in the CPUC Independent Evaluator Report Template<sup>6</sup>. These include:

1. Identify the principles the IE used to evaluate negotiations;
2. Using the above principles, evaluate the project specific negotiations. Highlight any issues of interest/concern including unique terms and conditions;
3. Was similar information/options made available to other bidders when appropriate (i.e. if a bidder was told to reduce its price, was the same information made available to others?);
4. Describe and explain any differences of opinion between the IE and utility. If resolved, describe the reasonableness of the outcome;
5. Any other information relevant to negotiations not asked above but important to understanding the IOU's process.

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<sup>5</sup> Measured at 115 kV.

<sup>6</sup> The requirements for participation by an IE in utility solicitations are outlined in CPUC Decisions ("D").04-12-048 (Findings of Fact 94-95, Ordering Paragraph 28), D.06-05-039 (Finding of Fact 20, Conclusion of Law 3, Ordering Paragraph 8) of the CPUC, D.09-06-050 and D.10-07-042. The role of IEs in California IOU procurement processes has evolved over the past ten to twelve years. In D.04-12-048 (December 16, 2004), the CPUC required the use of an IE by investor-owned utilities (IOUs) in resource solicitations where there is an affiliated bidder or bidders, or where the utility proposed to build a project or where a bidder proposed to sell a project or build a project under a turnkey contract that would ultimately be owned by a utility. The latter circumstance is the case with the Moss Landing BESS.

## **Principles Used to Evaluate Negotiations**

The general principles followed by the IE in evaluating contract negotiations include assurance that the risk allocation provisions in the contract are reasonably balanced between the counterparties and that the utility customers are not placed at undue risk as a result of the contracting process. The IE generally “monitors” but does not actively participate in the contract negotiation process. The IE will identify issues to the utility transaction teams if negotiations are moving off track or there are potential biases or inconsistencies in the process. It has been the IE’s experience in monitoring a number of negotiation processes that contract negotiations can divert off course but eventually return to a balance after contested provisions are resolved. We also attempt to ensure that similarly situated counterparties are treated the same or similarly and that all counterparties are provided with the same message<sup>7</sup>. For example, PG&E has generally provided a clear message to counterparties to other solicitations (in addition to the Local Sub Area ES RFO) that the process is a very competitive process with more projects shortlisted than PG&E intends to execute contracts for resources. As a result, counterparties should sharpen their pencils and price as competitively as possible. This message was clearly sent to all shortlisted Participants.

## **Key Negotiating Developments and Key Contractual Provisions of the Tesla – PG&E EPC for Local Sub Area Energy Storage at the Moss Landing Substation**



As a matter of overview, the IE sees the level of effort negotiating the final documentation as impressive, particularly considering the short amount of time available for the negotiations. This significant effort appropriately revealed the deep experience of the

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<sup>7</sup> Among the fairness precautions employed by PG&E is the separation of teams - - between those teams negotiating ES RA agreements, Behind-the-Meter (BTM) CSA contracts and other third-party ownership contracts and a single, separate team negotiating with EPC Participants and potentially with PSA Participants. In addition, within both the third-party ownership group and the utility ownership group, PG&E appeared to “script” its important messages to assure that all Participants were treated similarly and that issues common to all teams were treated the same. As indicated, the EPC negotiations were conducted by a single team which consistently stayed “on script” in delivering its near-uniform messages to the two shortlisted EPC Participants.

negotiating teams on both sides. The summary assessment of the end result of these efforts is that the resulting EPC and LTPMA contracts are good contracts, balanced, technically competent and suitable for use for constructing a utility project with guaranteed performance standards backed up by a long-term commitment from the original equipment supplier. Accordingly, these documents will likely serve as a basis for negotiating the terms for constructing and operating future utility-owned battery projects of this significant scale.

**Summary of the Tesla Negotiating Process (following April 16, 2018 Shortlisting):**

The 2018 LSA ES RFO received a robust response from Participants. Offers were also received from a range of eligible Participants. A total of approximately 100 offer variations were received, which represented 29 projects from [REDACTED] counterparties. There were [REDACTED] offers for the EPC option at the Moss Landing, [REDACTED] BOT offers and [REDACTED] third-party offers that included Energy Storage RA agreements and Behind-the-retail meter CSA. Appendices A and B of the IE 2018 LSA ES RFO Report contain a list and summary of the Offers submitted. The IE found the response from the market to be robust and competitive for each product category.

[REDACTED]

8

[REDACTED]

8

[REDACTED]<sup>9</sup>

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

<sup>9</sup> Exhibit D-1 is the same as Table 4 in the IE 2018 LSA ES RFO Report.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

---

<sup>10</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

### PG&E Notifications of Shortlist Development

On May 16, 2018, the PG&E Solicitation team provided a presentation to its internal Advisory Committee to discuss the status of the solicitation and potential project selection. PG&E's team provided an update to the group after the prior April 16, 2018 Shortlist review and presented a preferred portfolio of projects selected by the PG&E Energy Storage Advisory Committee.

The presentation summarized each selected project. The facts regarding the Tesla Moss Landing ES Project, as summarized on May 16, 2016, follow:

Counterparty Name	Tesla, Inc.
Project Name	Moss Landing Energy Storage
Technology	Lithium-Ion Technology
Zone/Delivery Point	South Bay – Moss Landing
Design Capacity	182.5 MW
Design Discharge Energy	730 MWh
Discharge Time	4.0 hours
Start Date/Term	Guaranteed Substantial Completion Date 12/31/2020, 20 years

[REDACTED]

The Solicitation team presentation also provided updated PAV values for the shortlisted projects based on the most recent offer pricing. Exhibit D-2, below, contains updated information on the valuation results for each of the shortlisted offers based on best and final pricing submitted by Participants.



### **PRG May 24, 2018 Notification**

On May 24, 2018 PG&E notified the Cost Allocation Mechanism/Procurement Review Group of the Offers for potential transactions from the 2018 Local Sub-Area Storage Request for Offers.

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<sup>12</sup> Exhibit D-2 is the same as Table 6 in the IE 2018 LSA ES RFO Report.

<sup>13</sup>

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**Exhibit D-4: Contract Price in Tesla Moss Landing BESS EPC**

EPC Contract Price	Potential Adjustments
[REDACTED]	

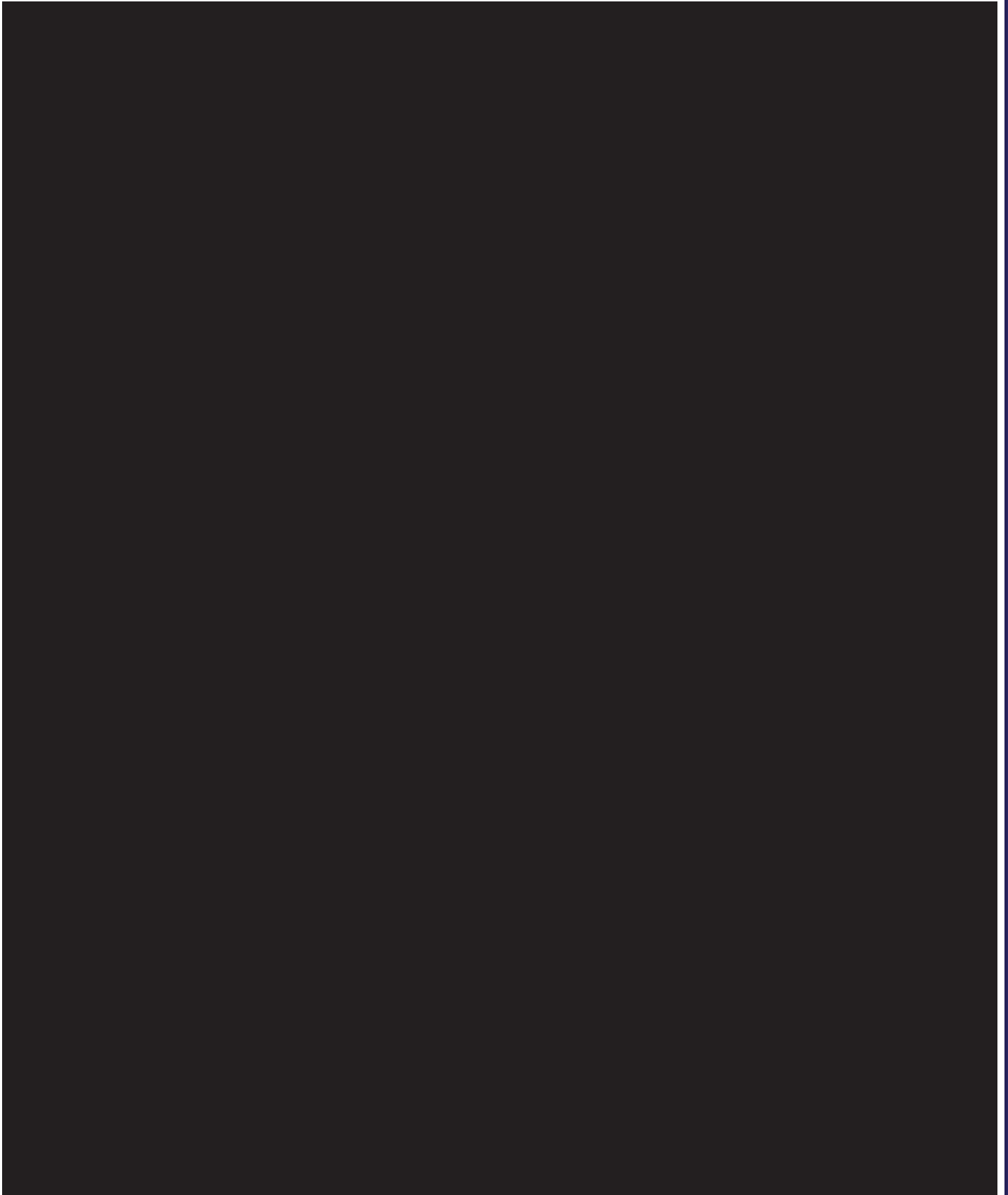
<sup>14</sup> Those results shown in Exhibit D-3, above, are the same as Table 7 in the IE 2018 LSA ES Report to which this report is Attachment D.

## Key Contractual Provisions of the Tesla – PG&E Engineering, Procurement and Construction Agreement (EPC)

The next section of this IE Report provides the following Exhibit D-5 which describes the key contract provisions contained in the Tesla Moss Landing BESS EPC. Exhibit D-5 is specific to the Tesla negotiations and presents or summarizes the issues considered to be key. Exhibit D-5 is appropriately detailed to demonstrate the complexity of the documentation and the extent of the negotiations which occurred between the end of April and the June execution date.

### Exhibit D-5: Tesla EPC - - Key Contract Provisions, as Revised

Contract Provisions	Inclusion in Final Contract
Form of Agreement	Engineering, Procurement and Construction Agreement for the Moss Landing Energy Storage Project

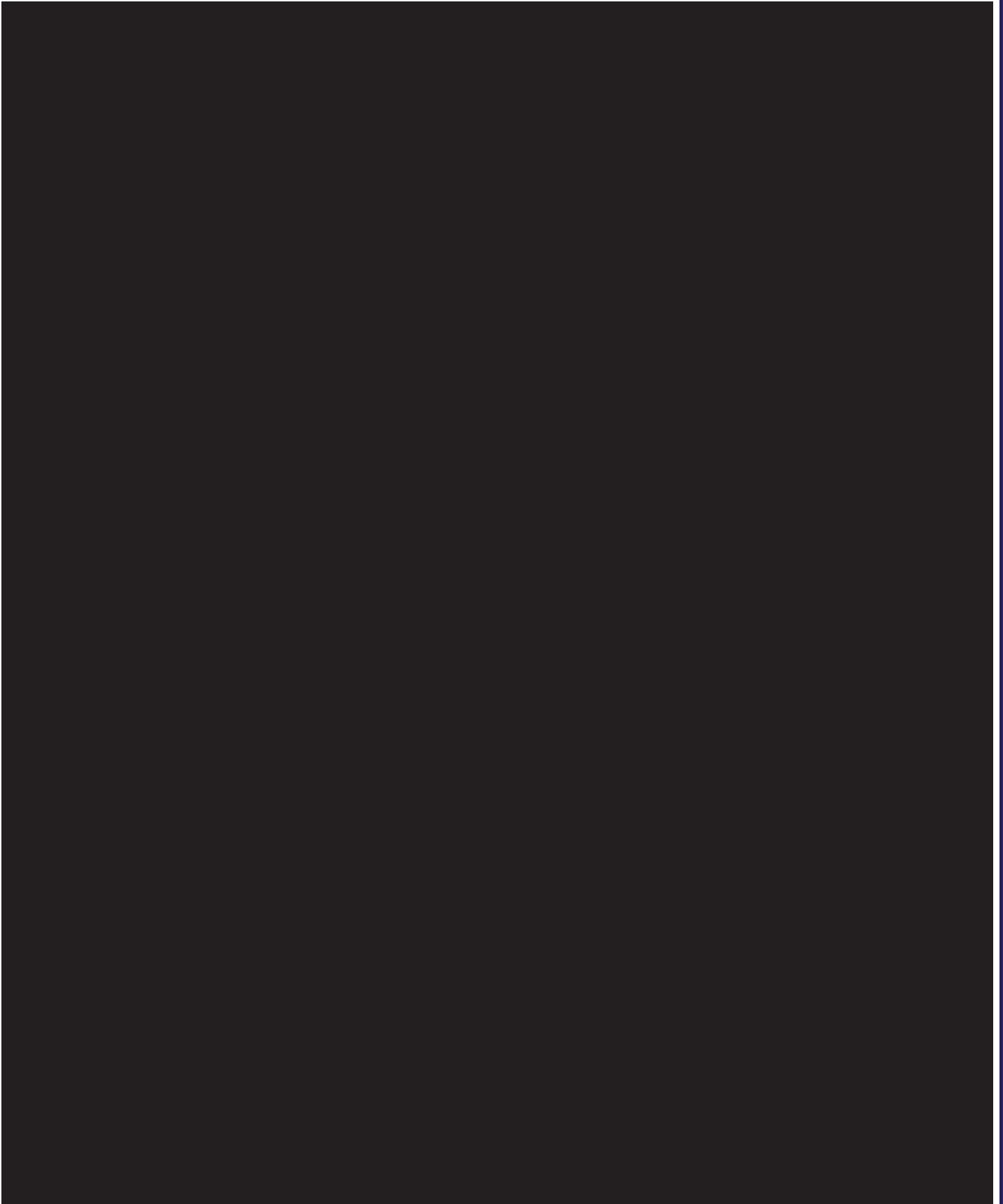




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<sup>15</sup> Owner shares responsibility for certain aspects of site preparation and investigation.














The IE and PG&E's negotiation team did not have any differences of opinion or issues associated with the negotiations. The IE felt both Tesla and PG&E were dedicated to the same end and both pursued the negotiations in a professional and responsive manner.

### **III. Does the Contract Merit CPUC Approval**

#### **A. Introduction**

This section of this Attachment F addresses the issue “Does the Contract merit CPUC approval and is the contract reasonably priced and does it reflect a functioning market? To address these questions the IE Report Template requires that the following issues be addressed.

1. Provide a discussion and observation for each category and describe the project’s ranking relative to other bids from the solicitation; and from an overall market perspective;
  - a. Contract price, including cost adders (transmission, credit, etc.)
  - b. Portfolio fit
  - c. Project viability
    - i. Technology
    - ii. Bidder experience (financing, construction, operation)
    - iii. Credit and collateral
    - iv. Permitting, site control and other site-related matters
    - v. Fuel status
    - vi. Transmission upgrades
  - d. Any other relevant factors
2. Based on the complete bid process:
  - a. Does the IOU contract reflect a functioning market?
  - b. Is the IOU contract the best overall offer received by the IOU?
3. Is the contract a reasonable method of achieving the need identified in the RFO?
4. If the contract does not directly reflect a product solicited and bid in an RFO, is the contract superior to the bids received or the products solicited in the RFO?
5. Based on your analysis of the RFO bids and the bid process, does the contract merit Commission approval? Explain

#### **B. Need for Procurement**

Through the 2018 LSA ES RFO, PG&E is seeking new energy storage resources connected at the transmission, distribution or customer level within the local sub-areas of Bogue, Pease and South Bay – Moss Landing to meet real power capacity needs in the South Bay – Moss Landing area and reactive power needs in Bogue and Pease. PG&E is issuing this RFO to procure energy storage resources to meet local capacity and local sub area reliability needs as required by CPUC Resolution E-4909. Any battery storage projects selected through this RFO could be used to replace three Calpine fossil fuel plants (Feather River, Yuba City, and Metcalf) that do not have long term contracts with utilities but that have been identified by the CAISO as needed to serve local reliability needs. Chapter I of the Independent Evaluator Report on PG&E’s 2018 Local Sub Area Energy Storage Request for Offers Process (“IE Report on the 2018 LSA ES RFO”) provides a summary of the requirements listed in CPUC Resolution E-4909.

CPUC Resolution E-4909 also states that resources procured in this solicitation should be at a reasonable cost to ratepayers, taking into consideration the cost and value to PG&E, previous solicitations in which PG&E has awarded contracts to similar resources, the cost of specific RMR contracts with adjustments for contract terms such as contract length and expedited delivery date, and the known or estimated cost and benefits associated with new and planned transmission solutions.

Through this LSA ES RFO process, PG&E is proposing to procure 567.5 MW of energy storage capacity. The execution of this agreement with Tesla, Inc. for 182.5 MW will provide approximately 32% of this total.

Chapter III Section (D) of the IE's Report on the 2018 LSA ES RFO process, provides ample evidence of the robustness of the response to this RFO, even in light of the short turnaround time for Participants to prepare their offers. As illustrated in this section of the report, PG&E received 100 offer variations from 29 projects and [REDACTED] counterparties. Appendix A and B of the IE Report on the 2018 LSA ES RFO provides a summary of the 100 offer variations received, including both offers for third-party owned Resource Adequacy ("RA") and Behind-the-Retail-Meter ("BTM") options, Utility-owned projects at the Moss Landing site, and [REDACTED] BOT options. The detailed evaluation conducted by PG&E is described primarily in Chapters IV and V of the 2018 IE LSA ES RFO Report, and that description confirms that the Tesla, Inc. EPC Agreement for the Moss Landing Storage project was selected for execution based on its competitiveness, and on the applicable evaluation criteria, compared to the large number of similar lithium-ion battery EPC agreement options. The reasonableness of the Tesla, Inc. EPC Agreement from a viewpoint of its cost competitiveness, as well as the other evaluation criteria, is set forth in the next section of this Report.

### **C. Contract Pricing and Portfolio Fit**

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**Exhibit D-6: Offer Valuation Results for the April 16, 2018 Short-listed Tesla Moss Landing Battery Energy Storage Project**

Valuation Components	Levelized PAV
[REDACTED]	

The final valuation results as provided to the CAM/PRG on May 24, 2018 are listed in Exhibit D-7.

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<sup>16</sup> [REDACTED]

<sup>17</sup> [REDACTED]

**Exhibit D-7: Final Valuation Results May 24, 2018 as provided to CAM/PRG for Tesla Moss Landing Battery Energy Storage Project**

[illegible]

\_\_\_\_\_

\_\_\_\_\_

18 [REDACTED]  
19 [REDACTED]  
[REDACTED]



## **D. Project Viability**

### **Experience**

Founded in 2003, Tesla currently has roughly 40,000 full time employees<sup>20</sup> engaged in manufacturing, engineering and other business functions. As its best-known business, Tesla has delivered over 300,000 Model S, Model X and Model 3 electric vehicles into world-wide markets<sup>21</sup>. Each vehicle is powered by a remotely managed and monitored mobile battery.<sup>22</sup> Since its founding, Tesla has also installed approximately 470 MWh of stationary energy storage systems around the world, supporting a wide range of applications including peak shaving, demand response, renewable-tied microgrids, and load management. Through its subsidiary, SolarCity, Tesla also installs solar panels in the residential market.

Planned for use in 2021 in the Moss Landing Energy Storage Project, the Tesla Powerpack Energy Storage System is currently produced at Tesla's well-publicized Gigafactory 1 in Sparks, Nevada. When fully completed, Tesla claims that Gigafactory 1 will be the largest and most advanced battery manufacturing facility in the world. The Gigafactory offers

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<sup>20</sup> Tesla announced on June 12, 2018 that it was cutting its workforce by 9% in order to restructure and improve profitability.

<sup>21</sup> Tesla delivered 101,312 Model S and Model X cars in 2017, a 33 percent rise over its 2016 figures. For the fourth quarter, Tesla reported 29,870 cars delivered. The Model S led with 15,200 customers, followed by the Model X at 13,120. The Model 3 tallied 1,550 deliveries in the fourth quarter of 2017. In April, 2018, Tesla announced its first quarter 2018 production and delivery numbers – confirming a record production of 34,494 vehicles, including an increase in Model 3 production, which accounted for about 10,000 of those vehicles in the first quarter of 2018.

<sup>22</sup> For charging its electric vehicles on the road, Tesla offers Supercharger stations in numerous U.S. locations.



Tesla the opportunity to achieve savings from scale in the material cost of energy storage systems.<sup>23</sup>

Tesla claims that it has deployed the more than 470 MWh energy storage systems across 19 countries which include the following similar projects to the Tesla Moss Landing BESS Project:

- South Australia- - this Australian Energy Storage is presently the world's largest lithium-ion battery project with 100MW/109MWh of capacity and energy constructed in less than 100 days in 2017;
- Southern California Edison - - The Aliso Canyon Energy Storage project is comprised of a 20MW/80MWh project. There are two physical connections to the SCE distribution network located near Mira Loma substation. SCE can control the battery as one 20 MW asset to participate into the day-ahead and real-time energy markets on CAISO;
- Kaua'i Island Utility Cooperative (KIUC) - - KIUC has signed a power purchase agreement (PPA) with Tesla (dba SolarCity) for electricity from the first utility-scale solar array and battery storage system designed to supply power to the grid in the evening, when demand is highest. Tesla believes the solar/battery project to be the first utility-scale system in the U.S. to provide dispatchable solar energy up to 52 MWh from its 13 MW capacity during four hours each day;
- Pacific Gas & Electric (PG&E) - - The Browns Valley Energy Storage is a 500kW/2MWh project that deploys Tesla's Powerpack units at an existing PG&E distribution substation to demonstrate the ability of a utility-operated energy storage asset to address capacity overloads on the distribution system and improve reliability;
- Pacific Gas & Electric (PG&E) - - The Llagas Energy Storage Project, expected by the end of 2021, will be a 20MW/80MWh project that deploys Tesla's Powerpack units at an existing PG&E-owned site adjacent to the PG&E Llagas substation to demonstrate the ability of a utility-operated energy storage asset to address capacity overloads on the distribution system and improve reliability by deferring the upgrade of transformers at the Llagas distribution substation;
- North Carolina Electric Cooperative (NCEMC) -- NCEMC is using a 1MWh Powerpack system to provide backup services as part of a microgrid on a remote North Carolina community called Ocracoke Island, served by Tideland EMC.

██ This is largely driven by the short construction period of the Project as well as the fact that Tesla

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<sup>23</sup> By 2020, Tesla says that the Gigafactory will output 50 GWh of battery packs annually (35 GWh of lithium ion cells), enough for 500,000 electric vehicles per year and large-scale deployment of grid-connected energy storage.

is also the manufacturer of the energy storage system and is entering into an EPC agreement [REDACTED]. Moreover, Tesla points out that it recently acquired SolarCity, an industry leader in raising funds for solar projects. Tesla claims that SolarCity's financial team has raised more than \$1.5 billion in project financing to date. The IE has no reason to doubt Tesla's past experience in financing projects supported by [REDACTED].

[REDACTED]

While a relatively new company among large scale manufacturers, Tesla has acquired substantial experience in a short period in the market for utility scale bulk battery projects. Modular open-air construction, of the type for which well-designed battery projects are suited, adds to Tesla's ability to scale its utility projects up to larger and larger sizes. The commitment to a massive manufacturing facility in nearby (tariff-free) Nevada adds further credibility to Tesla's skills in developing very large projects.

In the IE's view, based on its demonstrated experience and leadership skills, Tesla is likely to perform on the Moss Landing BESS Project. On the other side of the ledger, however, may lay Tesla's aggressive ambitions in all of its business initiatives. Accordingly, the balance Tesla management strikes between rapid market expansion - - particularly in the electric vehicle market - - and the timely acquisition of strategic resources may deserve monitoring by PG&E management.

### **Schedule**

The Tesla Moss Landing BESS EPC Project will be connected at 21 kV to the PG&E supplied switchgear on the site. [REDACTED]

[REDACTED] 24 [REDACTED]

Tesla does not need to acquire a project site since the Project is being built under the EPC on PG&E's land which is a part of the Moss Landing Substation. [REDACTED]

[REDACTED]

[REDACTED]

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<sup>24</sup> See: Footnote 2, above, for more details on the scope of PG&E's interconnection work.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

### **Technology**


As set forth in the EPC, this stand-alone lithium-ion battery project is presently planned to be comprised of the following major battery related components<sup>25</sup>:

- DC Battery Pack “Powerpack Units”, comprised of:

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<sup>25</sup>

[REDACTED]

- 
- DC cable harnesses between battery packs (to be installed at site)
  - Communication cable harnesses between battery packs (to be installed at site)
  - Bi-directional inverter
  - Site Master Controller (SMC)
  - Tesla Control and monitoring software

The Tesla Energy Powerpack System is a modular, fully integrated AC-coupled energy storage system. The system includes the rechargeable lithium-ion battery packs, Battery Management Systems (BMS), thermal management system, DC-DC converter, DC-AC grid-tied bidirectional inverter, Powerpack Controller, and firmware, which all work together as a single system. This single-source system, designed and manufactured by Tesla, allows for seamless power electronics integration and eliminates third-party component integration risk. Tesla's thermal management system uses liquid cooling at a pack level that touches each individual cell. This system enables an even temperature distribution across all cells within a given Powerpack. The Powerpack is designed with an enhanced safety architecture including electrical and mechanical protection measures at the cell, pod, and pack level. The Tesla inverter is capable of scaling from 50kVA to 650kVA with the use of self-contained inverter modules (called Powerstages).


In general, the Lithium Ion battery technology has experienced rapid growth and improvement and is generally considered to be more advanced and mature than other storage technologies. Tesla has shown that it has benefited from this maturity and that future improvements are likely to occur before equipment is manufactured for the 2020 Tesla Moss Landing BESS Project.


### **Site Control, Permits and Environmental Impacts**

#### Site Control:

Site control will not be an issue for Tesla since the site is owned by PG&E and use of the site is provided under, and subject to, the EPC.

#### Permits



The Project Site is adjacent to the Moss Landing Substation in an area of Moss Landing zoned heavy industrial (coastal zone) where mixed commercial and industrial uses are prevalent. 

[REDACTED] That  
Attachment is replicated herein as Exhibit D-8.

[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

In assessing the impacts that must be mitigated before permits can be issued, the particular site circumstances and the site history should be taken into account. It is not possible for even an expert in licensing to know with precision the outcome of any permit or license proceeding, however, in the IE's view, similar proceedings in the same setting with roughly similar impacts are likely to result in similar licensing outcomes. Therefore, it is important here to acknowledge that the Moss Landing BESS Project Site is a part of a heavily disturbed cluster of industrial properties with a long history of similar uses at or adjacent to the present Moss Landing Substation Site.

Starting in 1949, PG&E used the original land parcels for the construction of five generating units totaling 560 MW and remaining in operation from 1950 until 1995. In 1964, PG&E added units 6 and 7, each with 750 MW and a 500-foot stack. Selective catalytic reduction units were added to these 750 MW units in 1998 and the units remained in operation at lower and lower levels of use, consistent with the use of a summer season peaking facility, until the end of 2016. As of August 1 1998, when Duke Energy purchased the portion of the overall original site used for generation, the 239-acre purchase contained the five 1950 units, the two 1964 units, eight 225-foot exhaust stacks, nineteen fuel storage tanks and two seawater inlet and outfall structures. At the time of the Duke Energy purchase, PG&E retained the adjacent 500/230/115 kV Moss Landing Substation.

In 1999, Duke Energy commenced the permitting of a new Moss Landing Power Plant Project, replacing the existing units 1 through 5 (along with their associated eight stacks) with two new gas-fired combined cycle (GFCC) 530 MW units. Duke added SCR to units 6 and 7 in 1998 and demolished and removed the fuel storage tanks on the site. Both Monterey County and the California Energy Commission reviewed and approved the Duke Project. Construction was completed in 2002<sup>26</sup>.

This history is testimony not only to the heavy industrial use of the Moss Landing Power Plant Site but also to the extensive review that has been the precondition to allowing that heavy industrial use at the site to occur. Most recently, on two occasions in the last ten years, PG&E has developed and permitted improvements to the Moss Landing Substation. In 2011, as indicated above, an Amendment of the Moss Landing Power Plant Master Plan was needed. A Coastal Development Permit was required to allow expansion of the existing 115/230 kV system transformer banks, to permit the upgrade of certain lattice towers and to relocate certain telecommunications towers and test facilities. Also, a Coastal Development Permit was needed since the site had a positive archaeological report. Unlike 2011, when both a Combined Development Permit and a Coastal Development Permit were both needed, at the present time only a Coastal Development Permit is needed<sup>27</sup> since the footprint at the Project Site is not being expanded. An expansion would trigger an Amendment to the Moss Landing Power Plant Master Plan and call for a Combined Development Permit. Nonetheless, it is possible for the current application(s) that an Applicant Prepared Environmental Assessment (APEA) might comprehensively review the potential impacts and set forth Applicant Proposed Measures (APM) which will be incorporated into the project design to mitigate impacts.

This relevant recent experience, as indicated, included obtaining a Combined Development Permit (CDP), and a Coastal Development Permit, from the County of Monterey Zoning Administrator and the County of Monterey Planning Commission, respectively, for its 2011 and 2016 substation improvements<sup>28</sup>. The Moss Landing Substation Site, as

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<sup>26</sup> The Moss Landing Power Plant was transferred from Duke to LS Power Equity Partners in 2006 and was sold by LS Power to Dynegy in April, 2007.

<sup>27</sup> See: Attachment 19 to the EPC, reproduced above.

<sup>28</sup> In 2016, only a Coastal Development Permit was needed from the Zoning Administrator for the installation of security fencing and a concrete wall on a site with a positive archaeological report. PLN



indicated, has a zoning and land use designation of Heavy Industrial (Coastal Zone) and the existing substation use is consistent with that designation.

From that recent experience, PG&E has data on the geotechnical and environmental, biological and cultural resource conditions at the Moss Landing Substation Site. PG&E has knowledge of the resource areas expected to be impacted by the Tesla BESS Project<sup>29</sup>. PG&E is already working on any updated analyses<sup>30</sup>. PG&E has familiarity with the impact concerns of the permit officials reviewing the local permit applications as well as with the conditions and constraints that are likely to attach to the applicable permit(s). PG&E can be expected, as needed, to prepare studies and propose measures consistent with its prior experiences with the Moss Landing Substation Site.

With regard to those local officials, it is of equal significance that County of Monterey permit officials and consultants have the same recent experience as PG&E. In fact, it is by virtue of both the nature of their function and the prior development history of this cluster of parcels, including the development by Duke Energy on its parcels, that such officials know the impacts of, and the necessary conditions on, development at least as well as PG&E.

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150699, Resolution No. 16-014 (April 20, 2016) (adopting a Mitigated Negative Declaration that no substantial evidence existed that the project would have a significant effect on the environment and approving the Coastal Development Permit for security fencing being installed in the Coastal Zone.). In 2011, a Combined Development Permit was required due to the much more significant project undertaken at that time which expanded the footprint of the site. PLN 090274, Resolution No. 11-029, August 31, 2011. An Amendment of the Moss Landing Power Plant Master Plan was needed due to the expanded footprint. A Coastal Development Permit was required to allow expansion of the existing 115 kV system and the 230 kV system transformer banks and the upgrade of certain lattice towers and the relocation of certain telecommunications towers and test facilities. Also, a Coastal Development Permit was again needed since the site had a positive archaeological report. In 2011. An Applicant Prepared Environmental Assessment (APEA) comprehensively reviewed the potential impacts and set forth Applicant Proposed Measures (APM) incorporated into the project design to mitigate impacts.

<sup>29</sup> The Tesla BESS Project may be expected to demonstrate consistency with various applicable plans and policies, including the North County Land Use Plan (LUP) and the Monterey County Coastal Implementation Plan (CIP), in addition to consistency with the Zoning Ordinance (Title 20). The substation site is zoned HI (CZ) [heavy Industrial (Coastal Zone)]. The Tesla BESS Project is expected to be consistent, in these regards, with applicable LUP policies which require expansion within the existing bounds of a coastally dependent industrial facility before expansion outside the bounds may be considered. No expansion of the existing “facility” will be needed for the Tesla BESS Project.

<sup>30</sup> Pursuant to a Contract Work Authorization dated May 21, 2018, Kleinfelder Inc. delivered to PG&E the following report on the Moss Landing BESS Project Site, “GEOTECHNICAL INVESTIGATION REPORT, PG&E MOSS LANDING SUBSTATION BATTERY ENERGY STORAGE PROJECT, MOSS LANDING, CALIFORNIA”, PROJECT NO. 20190603.001A, dated June 1, 2018. As stated in its transmittal letter, Kleinfelder opines, “It is Kleinfelder’s professional opinion that the proposed site is geotechnically suitable for construction of the proposed project using conventional grading and shallow and deep foundation systems. The primary geotechnical design and construction issues associated with the project is the presence of cohesionless soils that may present caving concerns and difficult drilling conditions for drilled pier construction. Recommendations for design of foundations, site grading, and other geotechnical considerations are presented in this report. The recommendations presented in this report should be incorporated into project design and construction.” **See:** Attachment 14 to the EPC for the full Kleinfelder June 1, 2018 report.




### Impacts

As indicated above, the parties expect that resource impacts at this site in the coastal zone will be significant enough to call for at least one discretionary permit. The mixed industrial and commercial character of the surrounding area, however, and the long history up to the present time of obtaining the necessary permits to authorize those historical industrial uses, provide a reasonable basis for expecting that any significant impacts to sensitive resources will be mitigated through well-crafted permit conditions and will not create a barrier to obtaining the necessary permits<sup>31</sup>.

### **Conclusion on Viability**

Based on all of the foregoing factors, it appears to the IE that Tesla, in coordination with the Owner, PG&E, should have a high prospect for success in completing the Moss Landing BESS Project in general accordance with its EPC.

### **E. Project Contract Approval**

Selecting the Tesla Moss Landing BESS Project for the preferred portfolio added a utility-ownership option to the response of PG&E to the mandate of Resolution 4909. Through its ownership of the Moss Landing Project Site, its relative ease of the interconnection and the control it will have under the EPC agreement, PG&E should have a high degree of confidence that selection of this option will contribute to the effort to avoid future RMR contracts for the Calpine plants in question. 

 For these and the other reasons set forth in this Attachment D, the IE recommends Commission approval of the Moss Landing BESS EPC with Tesla.

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<sup>31</sup> How the conditions affect the actual timing of the construction and its overall duration are questions that cannot be known with precision. As a result, not only the counterparties but their regulators should be prepared to judge what timely performance is in a practical fashion.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX G**  
**SUMMARY OF KEY 3<sup>RD</sup>-PARTY OWNED CONTRACT TERMS**

**(CONFIDENTIAL IN ITS ENTIRETY)**

**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX H**  
**SUMMARY OF KEY EPC AND LTPMA CONTRACT TERMS**

**(CONFIDENTIAL IN ITS ENTIRETY)**



**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX I**  
**UTILITY OWNERSHIP COSTS FOR MOSS LANDING PROJECT**

**(CONFIDENTIAL IN ITS ENTIRETY)**

**PACIFIC GAS AND ELECTRIC COMPANY**

**APPENDIX J**

**CAISO LETTER TO PG&E REGARDING ENERGY STORAGE  
PROJECTS FROM LSA RFO**



Keith E. Casey, Ph.D.  
Vice President, Market & Infrastructure Development

May 21, 2018

Mr. Fong Wan  
SVP, Energy Policy & Procurement  
Pacific Gas & Electric Company  
77 Beale Street B32  
San Francisco, CA 94105

Dear Mr. Wan:

*Fong*

Through Resolution E-4909 (Resolution) issued on January 12, 2018, the California Public Utilities Commission (CPUC) ordered Pacific Gas and Electric Company (PG&E) to hold a competitive solicitation for energy storage and preferred resources to address two local sub-area deficiencies and to manage voltage issues in another sub-area.

The Resolution was largely in response to the ISO designating the Metcalf Energy Center, the Yuba City Energy Center and the Feather River Energy Center as reliability must-run resources, addressing the South Bay-Moss Landing sub-area deficiencies, the Pease sub-area deficiencies, and the Bogue area voltage control issues, respectively. The Resolution directed PG&E to “coordinate with the CAISO in an effort to ensure that its proposed portfolio will contribute to reducing or eliminating the local sub-area deficiencies in the Pease and South Bay-Moss Landing subareas and high voltage in the Bogue subarea.”

Since the CPUC issued the Resolution, the ISO finalized its 2017-2018 Transmission Plan, which identified mitigations either already underway or approved in the plan to address the specific needs that led to the reliability must-run designations. These mitigations consist of transmission upgrades which are expected to be in place for 2019 in the South Bay-Moss Landing area, but are still several years away from completion in the case of Pease and Bogue sub-areas.

The ISO supports the procurement of storage as a general matter and recognizes that energy storage can reduce the risk of future local capacity deficiencies in the event of generation retirement, especially in the South Bay-Moss landing sub-area. Beyond the local area needs, increasing storage capacity on the grid will provide flexible resources that can contribute to meeting the ever-growing ramping requirements on the ISO system, triggered by the growing fleet of grid-connected and behind-the-meter solar PV generation.

The ISO further notes that the Resolution anticipates that storage procured by PG&E in response to the Resolution will contribute to PG&E's overall storage mandate.

We look forward to working with PG&E in the future to validate the effectiveness of the resources ultimately procured, taking into account the location and volume of the resources given the characteristics necessary to meet local capacity needs and the changes to those characteristics as more preferred resources are relied upon.

Sincerely,

A handwritten signature in blue ink, appearing to read "Keith Casey", with a long horizontal flourish extending to the right.

Keith E. Casey, Ph.D.

Vice President

Market & Infrastructure Development

KEC/ds

**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX K**  
**PLANNED TRANSMISSION PROJECTS**

## **Appendix K: Planned Transmission Projects**

### **South Bay-Moss Landing Sub-Area**

PG&E is implementing the following transmission projects in the South Bay Moss Landing sub area:

1. Monta Vista-Ames 115 kV Path Closing
2. San Jose 'B'-Trimble 115 kV Line Limiting Facility Upgrade
3. San Jose 'B'-Trimble 115 kV Line Series Reactor
4. Moss Landing-Panoche 230 kV Path Upgrade

The Monta Vista-Ames 115 kilovolt (kV) Path project will reconnect the 115 kV lines from Mountain View and Whisman Substations into the 115 kV bus at Ames Substation. This project in effect will create another path for electric power to support the local sub-area particularly during emergency conditions. This project is part of the revised scope of the South of San Mateo Capacity Increase which was re-assessed by the CAISO as part of the 2017-2018 Transmission Planning Process (TPP) <sup>1</sup>. Design for this project is currently underway and the project is expected to be placed into service by February 2019.

The San Jose 'B'-Trimble 115 kV Line Limiting Facility Upgrade project will re-rate the San Jose 'B'-Trimble 115 kV Line to 4 ft/sec wind speed assumptions as well as upgrade any limiting substation equipment to achieve a summer emergency rating of 189 mega-volt ampere (MVA) in order to increase the load serving capability of the circuit. This project was identified and approved by the CAISO as part of the 2017-2018 TPP as a reliability upgrade<sup>2</sup>.

The San Jose 'B'-Trimble 115 kV Line Series Reactor project will install a 4-ohm series reactor at Trimble Substation on the termination of the Trimble – San Jose B 115 kV Line and upgrade line termination equipment and protection equipment at both Trimble and San Jose B Substations. Installation of the series reactor reduces the potential overload on this line during the identified emergency conditions. This project was approved by the CAISO as part of the 2017-2018 TPP as an economically driven upgrade<sup>3</sup>.

Design and procurement of material for the two above projects on the San Jose 'B'-Trimble 115 kV Line and associated substations is currently underway and the projects are expected to be placed into service by February 2019.

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<sup>1</sup> California ISO 2017-2018 Transmission Plan, Reliability Assessment section, Page 126, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

<sup>2</sup> California ISO 2017-2018 Transmission Plan, Transmission Project List section, Table 7.2-1, item 5, Page 334, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

<sup>3</sup> California ISO 2017-2018 Transmission Plan, Transmission Project List section, Table 7.2-3, item 1, Page 335, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

The Moss Landing-Panoche 230 kV Path Upgrade project will upgrade limiting substation equipment at Panoche and Coburn Substations and re-rate the five 230 kV lines from Moss Landing to Panoche to have a 4 ft/sec wind speed emergency rating of at least 400 MVA rating. These upgrades and re-rates mitigate the constraint identified by the CAISO on the Moss Landing-Las Aguilas 230 kV line and enables further import capability on this path during emergency conditions<sup>4</sup>. This project was identified and approved by the CAISO as part of the 2017-2018 TPP as an economically driven upgrade<sup>5</sup>. Design for this project is currently underway and the project is expected to be placed into service by December 2018.

The CAISO as part of its 2019 LCR analysis<sup>6</sup> shows that as PG&E completes the projects, the LCR need in the sub-area will be reduced by 568 MW.

### Pease Sub-Area

PG&E is implementing two transmission projects in the Pease sub area:

1. South of Palermo 115 kV Power Line Reinforcement (South of Palermo)
2. Pease 115/60 kV Transformer Addition

The South of Palermo project is a multi-segment effort to replace or upgrade conductor and structures along approximately 59.5 miles of line in Butte, Yuba, and Sutter counties. It was identified in the 2010-11 CAISO transmission plan and confirmed, after re-study, in the 2015 CAISO transmission plan as necessary for increased service reliability<sup>7</sup>. The Commission granted a permit to construct the South of Palermo Project<sup>8</sup> and construction is expected to begin in July 2018.

The Pease 115/60 kV Transformer Addition project will install a new 115/60 kV transformer rated at 200 MVA at Pease Substation and will also reconfigure the Pease 115 kV Bus to breaker and a half (BAAH) configuration. The project need for reliability and operational flexibility was reconfirmed in the CAISO 2017-2018 TPP<sup>9</sup>.

### Bogue Sub-Area

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<sup>4</sup> California ISO 2017-2018 Transmission Plan, Economic Planning Study section 4.9.4 South Bay-Moss Landing Sub-area Local Capacity Requirements, Summary of Results discussion, Page 262, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

<sup>5</sup> California ISO 2017-2018 Transmission Plan, Transmission Project List section, Table 7.2-3, item 2, Page 335, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

<sup>6</sup>CAISO, 2019 Local Capacity Technical Analysis Final Report (the 2019 LCR Report), South Bay-Moss Landing Sub-area section IV, page 42, [<http://www.caiso.com/Documents/Final2019LocalCapacityTechnicalReport.pdf>].

<sup>7</sup> California ISO 2017-2018 Transmission Plan, Reliability Assessment section, Page 83 and Transmission Project List section, Table 7.2-1, item 14, Page 332, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

<sup>8</sup> See D.18-05-014.

<sup>9</sup> California ISO 2017-2018 Transmission Plan, Reliability Assessment section, Page 117, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

PG&E is implementing two transmission projects in the Bogue sub area:

The Rio Oso 230/115 kV Transformer Upgrade project will replace the existing 230/115 kV Transformer Nos. 1 and 2 with two new 420 MVA, 230/115 kV three-phase, load-tap-changer (LTC) transformers at Rio Oso Substation. The project need was reconfirmed in the CAISO 2017-2018 TPP<sup>10</sup>.

The Rio Oso Area 230 kV Voltage Support involves installing a +200/-260 MVA Static Var Compensator (SVC) at Rio Oso 230 kV bus. As with the transformer project, the need for this project was validated by the CAISO as part of the 2017-2018 TPP<sup>11</sup>. Construction of both of these projects will be coordinated with other work at Rio Oso Substation and are expected to be put in-service by June 2022.

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<sup>10</sup> California ISO 2017-2018 Transmission Plan, Transmission Project List section, Table 7.1-1, item 58, Page 328, [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].

<sup>11</sup> California ISO 2017-2018 Transmission Plan, Reliability Assessment section, Page 118, and Transmission Project List section, Table 7.1-1, item 59, Page 328 [[http://www.caiso.com/Documents/BoardApproved-2017-2018\\_Transmission\\_Plan.pdf](http://www.caiso.com/Documents/BoardApproved-2017-2018_Transmission_Plan.pdf)].



**PACIFIC GAS AND ELECTRIC COMPANY**  
**APPENDIX L**  
**EVALUATION METHODOLOGY**

## Appendix L: Evaluation Methodology

PG&E's quantitative evaluation criteria included Net Market Value (NMV) and Portfolio Adjusted Value (PAV)<sup>1</sup>. PG&E's evaluation also included qualitative criteria. These criteria are listed below:

### Quantitative Criteria

1. NMV
  - a. Benefits (Energy, Ancillary Services, Capacity)
  - b. Fixed and Variable Costs
2. PAV
  - a. Transmission Network Upgrade Cost
  - b. Increased System Efficiency for Fossil Generation
  - c. Avoided Renewable Curtailment
  - d. Delivery Period

### Qualitative Criteria

1. Project Viability
2. Supply Chain Responsibility
3. Credit
4. Safety

Evaluation of the offers included the above criteria. For each of the criteria, a team of subject matter experts was formed to perform the evaluation. The evaluation teams consisted of PG&E employees. The teams met periodically to review progress and exchange information.

PG&E applied the quantitative and qualitative criteria to each conforming offer or offer variation as follows:

**TABLE L-1  
EVALUATION CRITERIA, SCORING UNIT, AND APPLICATION**

Line No.	Evaluation Criteria	Scoring Unit	Application
1	Net Market Value	\$/kW	Shortlist Development
2	Portfolio Adjusted Value	\$/kW	Shortlist Development
3	Project Viability	+, 0, -	Post Shortlist Development
4	Supply Chain Responsibility	Required <sup>(a)</sup>	Informational Only
5	Credit	+, 0, -	Post Shortlist Development
9	Safety	Required <sup>(a)</sup>	Post Shortlist Development

(a) Additional requirements were imposed on participants to be added to the shortlist, or will be required during performance of the contract.

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<sup>1</sup> NMV and PAV used to establish the shortlist, reflect PG&E's estimates of market forward prices as of March 2018. However, market conditions continue to evolve.

## 1. Net Market Value

NMV compares an offer's market value—energy, ancillary services (A/S) and capacity—to its costs. NMV was calculated for each offer as follows:

$$\text{NMV} = (\text{E} + \text{A} + \text{C}) - (\text{V} + \text{F})$$

Where:

E = Energy Value

A = Ancillary Services Value

C = Capacity Value

V = Variable Cost

F = Fixed Cost

PG&E solicited the four agreement types below:

- Energy Storage Resource Adequacy Agreement (ES RAA);
- Behind-the-Retail Meter Capacity Storage Agreement (BTM CSA);
- Engineering, Procurement, and Construction (EPC) Agreement for Moss Landing Ownership, and
- Build, Own, Transfer (BOT) Agreement for Utility Ownership.

For both utility-owned agreements (EPC and BOT), PG&E required entering into the Long-Term Performance and Maintenance Agreement (LTPMA) to support the ongoing maintenance and performance of the energy storage system.

The NMV calculations were applied consistently for all the agreement types listed above, with variations depending on agreement option. Sections 1.a to 1.e below describe the NMV calculations component by component, detailing the variations by agreement type.

### a. Energy Value (E)

Energy value captures the value associated with the electric energy price in the CAISO markets for each offer over its delivery term. For utility-owned projects, PG&E assessed the market value of the energy deliveries for each offer using a charging and discharging time series based on operational limitations specified in the offer over its delivery term, assuming no provision of A/S<sup>2</sup>. PG&E included the cost of charging energy (grid energy used to charge energy storage) in the energy value.

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<sup>2</sup> A/S provision is the amount of AS provided. In this instance it is zero.

For third-party-owned ESRAAs, energy value is not relevant and is zeroed out. For third-party-owned BTM CSAs, the energy value is the energy settlement, net of variable operations and maintenance (VOM) cost, as those terms are defined in the BTM CSAs, which PG&E received from the third party.

The market value of the energy is computed from the appropriate price curves for the North of Path 15 (NP15) trading hub — adjusted for the congestion and losses at the offered project's specific location. To this end, Locational Marginal Price (LMP) multipliers are used to incorporate congestion and losses specific for the location, and thereby value the project's contribution to transmission congestion relief.

**b. Ancillary Services Value (A)**

For utility-ownership offers, PG&E will have the ability to schedule and receive CAISO market revenues for A/S, as defined under and in accordance with CAISO tariff requirements, and the incremental benefit of having A/S capability was captured based on a time series of charging, discharging and A/S provision obtained for the offer over its delivery term. Regarding A/S provision, PG&E took into account the impact of the shallowness of the A/S market on the A/S awards.

The A/S value for ESRAAs and BTM CSAs are zeroed because PG&E does not settle A/S awards from the project with CAISO, nor receive any A/S settlements from the Seller.

**c. Capacity Value (C)**

The value of Resource Adequacy (RA) capacity associated with each offer (utility-ownership, or third-party ES-RAA or BTM CSA) was calculated as the sum of the value of Local Sub-Area (LSA) capacity and the value of Flexible RA capacity provided by (a) the offered monthly quantity of Net Qualifying Capacity (NQC) and (b) the Effective Flexible Capacity (EFC) of the ES resource, respectively.

Resources that were expected to be found fully deliverable by the CAISO were attributed the full Local Sub-Area capacity values for their projected NQCs. To the extent that an offer could provide flexible RA, the EFC that was expected to count towards the must-offer obligation for flexible RA was valued at the projected monthly price for flexible RA, and added to the capacity value.

**d. Variable Cost (V)**

When applicable, variable cost for an offer was calculated as the sum of hourly variable payments. For utility-ownership offers, hourly variable payments were based on the VOM price multiplied by the discharge time series obtained in the offer. Variable cost did not include the market costs for charging energy because this value was included in the energy value (See Section a). For ESRAAs, the variable cost is zero. For BTM CSAs, the hourly variable cost was calculated as the projected VOM in the energy settlement when applicable.

**e. Fixed Cost (F)**

Fixed cost for a utility-ownership offer was calculated as the sum of administrative cost and present value of annual revenue requirements (PVRR) calculated by PG&E's RRQ model using the offer's price and PG&E's cost under the EPC and LPTMA. The main components of the revenue requirements are depreciation, return on rate base, taxes, and expenses.

Fixed cost for a third-party-owned ESRAA or BTM CSA was calculated as the sum of administrative cost and projected monthly fixed payments. Monthly fixed payments were based on the Payment Quantity Price (\$/kilowatt-month) and the monthly Payment Quantity specified in the offer.

The administrative cost is an annual fixed overhead cost (independent of the size of the project, but dependent on the use case of the project) representing the cost of managing the contract plus the cost of scheduling into CAISO markets.

**2. Portfolio Adjusted Value**

After determining the NMV for an offer, PG&E calculated the PAV to derive the value of that offer from the perspective of PG&E's portfolio, not just from the market perspective. PAV included adjustments to the NMV based on: (1) transmission network upgrade costs, (2) increased system efficiency for fossil generation, (3) avoided renewable curtailment, and (4) delivery period.

**a. Transmission Network Upgrade Cost**

Transmission availability and transmission-related costs are part of an offer's PAV. For all offers that submit a Phase I interconnection study to CAISO, PG&E used the latest CAISO tariff rules and independent study results conducted as part of the feasibility study to determine the transmission network upgrade cost adder. For all offers that do not submit a Phase I interconnection study, PG&E used the total cost provided by the participant in the offer form. Network upgrades include all facilities

necessary to: (i) reinforce the transmission system after the point where a project's electricity first interconnects with and enters the utility's transmission grid; and (ii) transmit or deliver the full amount of generation to or from the project. Transmission cost adders reflect the reimbursed portion of the cost of potential network upgrades borne by customers.

**b. Increased Efficiency for Fossil Generation**

Energy storage has the potential for allowing fossil generation to run with fewer start-ups and to operate more efficiently. Such increased efficiency could reduce the overall generation cost of the resources in PG&E's service area in such components as start-up, fuel, greenhouse gas and VOM costs. PG&E estimated the avoided generation costs to the resource portfolio of PG&E's service area. Such avoided costs differed among offers due to the variation in characteristics of the offers.

**c. Avoided Renewable Curtailment**

Higher penetration of renewable energy increases the likelihood of curtailment. Storage can help reduce the curtailment of intermittent generation, benefiting customers by increasing total generation from the renewable portfolio that contributes to meeting Renewables Portfolio Standard (RPS) requirements and thus reducing RPS procurement costs. PG&E estimated this reduction in RPS procurement costs by multiplying an estimated future value of Renewable Energy Credits (RECs) by a reduction in RPS curtailment obtained using the same methodology as applied above to increased efficiency.

**d. Delivery Period**

Offers can have different delivery periods due to differences in term and start dates that affect the comparability of offers. PG&E adopts a standardized delivery period to analyze all offers. PG&E estimates the cost and benefits of each offer over the standardized delivery period based on each offer's characteristics, PG&E's projected portfolio need, and expected market conditions.

**3. Project Viability**

Project viability means the likelihood that the project under an offer can be successfully developed and then provides the product and services for the period stated in the offer.

As indicated in Table L-1 above, PG&E assessed each project's viability and assigned a score of +, 0, or -. This assessment was based on a review of the status and plans for key project activities (e.g., financing, site access,

permitting, engineering, procurement, construction, interconnection, start-up and testing, operations, fuel supply, charging capability, etc.). While not required, PG&E considered any independent engineer's report that evaluated a project's charging capability.

#### **4. Supply Chain Responsibility**

PG&E may consider participant's status as a Small Business Administration self-certified small business. PG&E is committed to supply chain responsibility which includes supplier diversity, sustainability and ethical supply chain practices. The Supplier Diversity Program, launched in 1981, aims to provide diverse suppliers with economic opportunities to supply products and services. The Supplier Sustainability Program, launched in 2007, encourages supplier responsibility, excellence and innovation.

Promoting an ethical supply chain means that health and safety, labor issues and human rights, ethical business conduct and conflicts of interest are important considerations in supplier selection. Additional information on PG&E's Supply Chain Responsibility and Diversity Program can be found at [www.pge.com/supplychainresponsibility](http://www.pge.com/supplychainresponsibility).

#### **5. Credit**

PG&E considered the participant's capability to perform all its financial and financing obligations under the agreements and PG&E's overall credit concentration with the participant or its banks, including any of participant's affiliates. Offers were assigned a score of +, 0 or - based on creditworthiness and overall credit concentration.

#### **6. Safety**

For each offer, PG&E required information from the offering party regarding the safety history and practices of the entities that would construct, operate, own or maintain the projects, and safety information related to the technology for the project.

**PG&E Gas and Electric  
Advice Filing List  
General Order 96-B, Section IV**

AT&T	Downey & Brand	Pioneer Community Energy
Albion Power Company	Ellison Schneider & Harris LLP	Praxair
Alcantar & Kahl LLP	Energy Management Service	Regulatory & Cogeneration Service, Inc.
Anderson & Poole	Evaluation + Strategy for Social Innovation	SCD Energy Solutions
Atlas ReFuel	GenOn Energy, Inc.	SCE
BART	Goodin, MacBride, Squeri, Schlotz & Ritchie	SDG&E and SoCalGas
Barkovich & Yap, Inc.	Green Charge Networks	SPURR
Braun Blaising Smith Wynne P.C.	Green Power Institute	San Francisco Water Power and Sewer
CalCom Solar	Hanna & Morton	Seattle City Light
California Cotton Ginners & Growers Assn	ICF	Sempra Utilities
California Energy Commission	International Power Technology	Southern California Edison Company
California Public Utilities Commission	Intestate Gas Services, Inc.	Southern California Gas Company
California State Association of Counties	Kelly Group	Spark Energy
Calpine	Ken Bohn Consulting	Sun Light & Power
Casner, Steve	Keyes & Fox LLP	Sunshine Design
Cenergy Power	Leviton Manufacturing Co., Inc.	Tecogen, Inc.
Center for Biological Diversity	Linde	TerraVerde Renewable Partners
City of Palo Alto	Los Angeles County Integrated Waste Management Task Force	Tiger Natural Gas, Inc.
City of San Jose	Los Angeles Dept of Water & Power	TransCanada
Clean Power Research	MRW & Associates	Troutman Sanders LLP
Coast Economic Consulting	Manatt Phelps Phillips	Utility Cost Management
Commercial Energy	Marin Energy Authority	Utility Power Solutions
County of Tehama - Department of Public Works	McKenzie & Associates	Utility Specialists
Crossborder Energy	Modesto Irrigation District	Verizon
Crown Road Energy, LLC	Morgan Stanley	Water and Energy Consulting
Davis Wright Tremaine LLP	NLine Energy, Inc.	Wellhead Electric Company
Day Carter Murphy	NRG Solar	Western Manufactured Housing Communities Association (WMA)
Dept of General Services	Office of Ratepayer Advocates	Yep Energy
Don Pickett & Associates, Inc.	OnGrid Solar	
Douglass & Liddell	Pacific Gas and Electric Company	