

Decision **PROPOSED DECISION OF COMMISSIONER PETERMAN** (Mailed  
9/3/2013)

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

Order Instituting Rulemaking Pursuant to  
Assembly Bill 2514 to Consider the  
Adoption of Procurement Targets for  
Viable and Cost-Effective Energy Storage  
Systems

Rulemaking 10-12-007  
(Filed December 16, 2010)

**DECISION ADOPTING ENERGY STORAGE PROCUREMENT FRAMEWORK  
AND DESIGN PROGRAM**

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Appendix A - Energy Storage Procurement Framework and Design Program

**DECISION ADOPTING ENERGY STORAGE  
PROCUREMENT FRAMEWORK AND DESIGN PROGRAM**

**1. Summary**

This decision establishes the policies and mechanisms for procurement of electric energy storage pursuant to Assembly Bill 2514 (Pub. Util. Code § 2836 *et seq.*). The Energy Storage Procurement Framework and Design Program, which can be found in Appendix A of this decision, establishes the program for procurement of energy storage and includes:

1. Procurement targets for each of the investor-owned utilities and procurement requirements for other load serving entities;
2. Mechanisms to procure storage and means to adjust the targets, as necessary; and
3. Program evaluation criteria.

This decision establishes a target of 1,325 megawatts (MW) of energy storage to be procured by Pacific Gas and Electric Company, Southern California Edison Company and San Diego Gas & Electric Company by 2020, with installations required no later than the end of 2024, and sets a schedule for procurement of energy storage. The decision directs these utilities to file separate procurement applications containing a proposal for their first energy storage procurement period by March 1, 2014.

This decision further establishes a target for community choice aggregators and electric service providers to procure energy storage equal to 1 percent of their annual 2020 peak load by 2020 with installation no later than 2024, consistent with the requirements for the utilities. Starting on January 1, 2016, and every two years thereafter, community choice aggregators and electric service providers shall file a Tier 2 Advice Letter demonstrating their compliance

towards meeting this target and describing their methodologies for cost-effective projects.

Rulemaking 10-12-007 is closed.

## **2. Background**

On December 16, 2010, the Commission opened Rulemaking (R.) 10-12-007 to implement the provisions of Assembly Bill (AB) 2514 (Stats. 2010, ch. 469).<sup>1</sup> Pursuant to Section 2836, the Commission shall determine appropriate targets, if any, for each Load-Serving Entity (LSE) as defined by Section 380(j) to procure viable and cost-effective energy storage systems and sets dates for any targets deemed appropriate to be achieved. In a Scoping Ruling and Memo (Scoping Memo) issued on May 11, 2011, the Assigned Commissioner determined that this proceeding would be divided into two phases.

On August 2, 2012, the Commission issued Decision (D.) 12-08-016, which addressed issues identified in the first phase of this proceeding.

Decision 12-08-16 adopted the Energy Storage Framework Staff Proposal (Staff Proposal) proposed by the Commission's Energy Division staff. The adopted Staff Proposal included an analysis framework and a plan for developing policies and guidelines pertaining to energy storage. In D.12-08-016, the Commission also adopted an energy storage "end use" framework, which identified 20 types of storage depending on its application and use in the "value chain" (e.g., Customer, Transmission/Distribution, Generation, ISO/Market). The end uses were then combined into four basic "scenarios" for further analysis in Phase 2 of this proceeding: generator-sited storage, bulk "generation," distributed storage and demand side management. Finally, D.12-08-016

<sup>1</sup> Pub. Util. Code Section 2836 *et seq.* Unless otherwise stated, all statutory references are to the Public Utilities Code.

identified four major objectives that Phase 2 would focus on: roadmap, regulatory framework, cost-effectiveness, and procurement objectives.<sup>2</sup>

A prehearing conference (PHC) for Phase 2 was held on September 4, 2012. Prior to the PHC, a workshop was held on August 20, 2012 for parties to discuss the basic scenarios identified in D.12-08-016 and to identify any material issues of fact that would require evidentiary hearings. The Phase 2 Scoping Memo and Ruling was issued on October 1, 2012. Based on comments made at the PHC and August 20 workshop, Phase 2 would consider the following for each of the issues identified in the Staff Proposal:

1. Cost Effectiveness
2. Market Needs
3. Barriers
4. Ownership model
5. Procurement target, if any

As part of the evaluation of the various use-case scenarios, Phase 2 would take into account related activities in other Commission proceedings, including Resource Adequacy (RA), Long-Term Procurement Planning (LTPP), and the Renewables Portfolio Standard (RPS) Program,<sup>3</sup> so that there was a consistent and coordinated overall policy with respect to procurement of storage and how it is counted for resource adequacy purposes.<sup>4</sup>

Between September 2012 and June 2013, Energy Division staff conducted the following workshops to review storage as it relates to the LTPP proceeding, cost-effectiveness, use-case development, and procurement policy options:

<sup>2</sup> *Decision Adopting Proposed Framework for Analyzing Energy Storage Needs (D.12-08-016)*, Appendix A, Energy Storage Framework Staff Proposal, at 22.

<sup>3</sup> See R.11-10-023 (Resource Adequacy), R.12-03-014 (Long-Term Procurement Planning) and R.11-05-005 (Renewables Portfolio Standard Program).

<sup>4</sup> Phase 2 Scoping Memo at 3.

- ; September 7, 2012 – Joint workshop with LTPP proceeding on how storage would be included in a utility’s procurement program.
- ; September 24, 2012 – Cost/Benefit models.
- ; October 16, 2012 – Use case development.
- ; December 3, 2012 – Use case development.
- ; December 4, 2012 – Policy options.
- ; January 14, 2013 – Procurement policy options.
- ; March 25, 2013 – Cost effectiveness.
- ; June 21, 2013 – Cost effectiveness.

On January 4, 2013, Energy Division Staff served an interim report (Staff Interim Report) on use cases and policy options. Staff, working in collaboration with stakeholders, developed and introduced seven (7) use-case documents, which illustrated how energy storage could be deployed on the utility grid and described operational requirements and potential benefits that could be associated with each use. The Staff Interim Report and use-case documents were entered into the record on January 18, 2013, and parties were provided an opportunity to file comments and replies on this report. In its comments, SCE requested evidentiary hearings. This request was denied by an ALJ Ruling issued on February 28, 2013, which found that the issues raised by SCE were outside the scope of Phase 2.

In evaluating the cost effectiveness of energy storage, this proceeding applied methodologies developed by the Electric Power Research Institute (EPRI) and by DNV KEMA Energy & Sustainability (DNV KEMA). Although neither methodology is adopted in this proceeding nor applied to any specific energy storage project at this time, they were informative in demonstrating the types of costs and benefits that need to be considered when assessing the cost effectiveness of storage. The study reports prepared by EPRI and DNV KEMA

based on their respective methodologies/models were subsequently entered into the record on July 8, 2013. Parties were provided an opportunity to comment on these reports as part of comments to an Assigned Commissioner's Ruling issued on June 10, 2013.

### **3. Assigned Commissioner's Ruling Proposing Procurement Targets and Mechanisms**

In an Assigned Commissioner's Ruling (ACR) issued on June 10, 2013, Commissioner Peterman presented a straw proposal with potential procurement targets for load-serving entities to procure viable and cost-effective energy storage systems from among emerging storage technologies, as well as companion policies to encourage the cost-effective deployment of energy storage consistent with AB 2514 (Proposed Plan). The Proposed Plan set out a proposal for planning, procurement, and evaluation of energy storage and its emerging role within the electric system.

The Proposed Plan was issued against the backdrop of the overall objectives for energy storage articulated in AB 2514. As stated in the ACR:

Energy storage has the potential to transform how the California electric system is conceived, designed, and operated. In so doing, energy storage has the potential to offer services needed as California seeks to maximize the value of its generation and transmission investments: optimizing the grid to avoid or defer investments in new fossil-power plants, integrating renewable power, and minimizing greenhouse emissions.<sup>5</sup>

Although the Proposed Plan suggested procurement targets through 2020, the long-term goal would be to eliminate targets when the storage market is more mature, sustainable, and able to compete to provide services alongside other types of resources.

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<sup>5</sup> ACR at 2.

The Proposed Plan referred to the market barriers hindering broader adoption of emerging storage technologies and market transformation that were identified in D.12-08-016:

1. Lack of definitive operational needs;
2. Lack of cohesive regulatory framework;
3. Evolving markets and market product definition;
4. Resource Adequacy accounting;
5. Lack of cost-effectiveness evaluation methods;
6. Lack of cost transparency and price signals (wholesale and retail);
7. Lack of commercial operating experience; and
8. Further define the energy storage interconnection process.<sup>6</sup>

With the goal of market transformation, the Proposed Plan set procurement targets for energy storage for the three investor-owned utilities – Southern California Edison Company (SCE), Pacific Gas and Electric Company (PG&E) and San Diego Gas & Electric Company (SDG&E)<sup>7</sup> – equaling 1,325 megawatts (MW) to be procured by 2020. The Proposed Plan contained a reverse auction mechanism to implement the targets and a requirement to include energy storage mechanisms in distribution system planning.

The ACR solicited comments on all aspects of the Proposed Plan including the overall storage procurement framework; program design; program implementation; program evaluation; and coordination with other proceedings. Additionally, an All-Party Meeting was held on June 25, 2013 for comments on the Proposed Plan.

<sup>6</sup> See, *Decision for Adopting Proposed Framework for Analyzing Energy Storage Needs* (D.12-08-016) at 10-21.

<sup>7</sup> SCE, PG&E and SDG&E are collectively referred to as the IOUs or utilities.

Opening Comments were filed on July 3, 2013.<sup>8</sup> Reply Comments were filed by on July 19, 2013.<sup>9</sup>

#### 4. Energy Storage Procurement Framework and Design

AB 2514 has tasked us with evaluating whether to establish a new procurement program. In doing so, we must consider how this energy resource fits into California's overall energy objectives and our existing procurement programs and policies. The Proposed Plan contained in the ACR provides a starting point for us to consider the appropriate policies for procurement of energy storage systems. As such, it serves as the basis for the Energy Storage Procurement Framework and Design Program (Storage Framework) we adopt

<sup>8</sup> Opening Comments were filed by: SCE; PG&E; SDG&E; jointly by the Alliance of Retail Energy Marketers, Sam's West Inc. and Walmart Stores, Inc. (AREM); Marin Energy Authority (MEA); Shell Energy North America L.P. (Shell Energy); the Division of Ratepayer Advocates (DRA); The Utility Reform Network (TURN); the California Energy Storage Alliance (CESA); Electricity Storage Association (ESA); 1Energy Systems Inc.; Alton Energy Inc.; Beacon Power LLC; Brookfield Renewable Power Inc. (Brookfield); Eagle Crest Energy Company (Eagle Crest); EDF Renewable Energy Inc. (EDF Renewable); ENBALA Power Networks; Federal Executive Agencies (FEA); Gravity Power LLC; California Hydrogen Business Council (CHBC); Megawatt Storage Farms, Inc.; Nevada Hydro Company; Pilot Power Group, Inc.; Primus Power Corporation; SolarReserve; Sunverge Energy, Inc.; TAS Energy; the Interstate Renewable Energy Council (IREC); Independent Energy Producers (IEP); jointly by the Large Scale Solar Association and Solar Energy Industry Association (Joint Solar); California Wind Association (CalWEA); Calpine Corporation; Center for Energy Efficiency and Renewable Technologies (CEERT); Clean Coalition; Friends of the Earth; Green Power Institute (GPI); jointly by Sierra Club and the California Environmental Justice Association (Sierra/CEJA); the California Independent System Operator (CAISO); BrightSource Energy, Inc.; Public Utility District No. 1 of Snohomish County (Snohomish PUD); Consumer Federation of California (CFC); Energy Producers and Users Coalition (EPUC); jointly by STEM Inc. and SolarCity (STEM); and Jack Ellis.

<sup>9</sup> Reply Comments were filed by SCE; PG&E; SDG&E; AREM; MEA; DRA; TURN; CESA; ESA; Duke Energy Corporation; EDF Renewable; MegaWatt Storage; Pilot Power; SolarReserve; TAS Energy; Calpine Corporation (Calpine); CEERT; Clean Coalition; Friends of the Earth; GPI; Sierra/CEJA; CFC; EnerNOC, Inc.; STEM; and Silicon Valley Leadership Group.

today. The Storage Framework, found in Appendix A of this decision, takes into consideration parties' comments on the Proposed Plan. We believe the policies we adopt today will encourage the development and integration of cost-effective energy storage systems in California's electric system in the future.

This decision adopts, with modifications, the Proposed Plan. In certain areas, the decision has adopted, without any modification, the procedures set forth in the Proposed Plan. To the extent those areas were not the subject of dispute by parties, we do not discuss them herein.

#### **4.1. Guiding Principles**

The Proposed Plan set forth the following guiding principles, consistent with AB 2514,<sup>10</sup> for the Commission's energy storage procurement policy:

- 1) The optimization of the grid, including peak reduction, contribution to reliability needs, or deferment of transmission and distribution upgrade investments;
- 2) The integration of renewable energy; and
- 3) The reduction of greenhouse gas emissions to 80 percent below 1990 levels by 2050, per California goals.<sup>11</sup>

We find these guiding principles to be reasonable. The guiding principles are contained in Section 1 of the Storage Framework.

<sup>10</sup> See Pub. Util. Code Section 2836(a)(3).

<sup>11</sup> The Global Warming Solutions Act of 2006 (AB 32 requires California to reduce greenhouse emissions to 1990 levels by 2020. Cal. Health & Safety Code Section 38500 *et seq.* Executive Order S-3-05 (Governor Schwarzenegger, 2005) states an additional goal of reducing greenhouse emissions to 80 percent below 1990 levels by 2050.

#### 4.2. Loading Order

In 2005, the Energy Action Plan<sup>12</sup> established a “Loading Order” which prioritized the order in which energy resources are procured. Energy efficiency, demand response, renewable and clean distributed resources are considered “preferred resources” in the Loading Order.

The ACR found it unnecessary to formally revise the Loading Order to include energy storage, noting that since the proposal prioritizes energy storage that optimizes grid operations and acts to reduce greenhouse gas emissions, energy storage fits within the spirit of the Loading Order.<sup>13</sup>

CESA disagrees with this determination and recommends that this proceeding expressly determine that energy storage is implicit in the Loading Order categories at the same level as energy efficiency and demand response when performing grid services. CESA contends that while the Commission cannot change the Loading Order by itself, it can state how it intends to interpret the Loading Order as it relates to energy storage insofar as the exercise of its own jurisdiction is concerned. Both ESA and TAS Energy support this position.

Several parties agree that there should be no change in the Loading Order. CEERT contends “the Loading Order was developed by the joint agencies, including the Commission and California Energy Commission, and not subject

<sup>12</sup> The Energy Action Plan, created in 2003 and subsequently updated in 2005 and 2008 by the Commission and California Energy Commission, lays out a single, unified approach to meeting California’s energy needs by focusing on energy efficiency, demand response, and renewable energy.

<sup>13</sup> *Assigned Commissioner's Ruling Proposing Storage Procurement Targets and Mechanisms and Noticing All-Party Meeting* (ACR), issued June 10, 2013, at 21.

to change by ruling of one Commissioner.”<sup>14</sup> Megawatt Storage Farms reminds parties that the Commission had reached a similar conclusion in D.13-02-015.<sup>15</sup>

Consistent with D.13-05-015, we agree that the Loading Order should not be revised.

#### **4.3. Clarification of Use-Case Buckets**

The Proposed Plan allocated the procurement targets for each utility among three categories, which were termed “use-case buckets.” The three use-case buckets were transmission-connected, distribution-connected, and customer-side applications.

In comments, many parties ask for clarification on whether the term “use-case buckets” refers to “application” or “interconnection” on the grid. ESA states that “the transmission and distribution categories can be misinterpreted to apply only to applications that perform a transmission function or a distribution function, and not generation functions as was included in the proceeding’s use case definitions.”<sup>16</sup> Similarly, MEA notes that benefits attributable to grid functionality may differ from the specific point of interconnection. Thus, it believes that the Commission’s definition of the use buckets will determine cost recovery and cost allocation.<sup>17</sup> Calpine echoes this argument, proposing that the buckets “differentiate between the functions of different resources, particularly with respect to the potential for utility-owned resources.”<sup>18</sup> GPI also asserts that “the driving factors behind the use cases is applications, and that dividing targets

<sup>14</sup> CEERT’s Opening Comments on ACR at 2.

<sup>15</sup> See Megawatt Storage Farms’s Reply Comments on ACR at 18; see also, D.13-02-015 at 17 (“We do not intend to unilaterally reconsider the multi-agency Energy Action Plan in this decision; certainly we cannot authorize a statute here.”).

<sup>16</sup> ESA’s Reply Comments on ACR at 4.

<sup>17</sup> MEA’s Reply Comments on ACR at 5.

<sup>18</sup> Calpine’s Opening Comments on ACR at 7.

among transmission, distribution, and customer categories does not really ensure a diversity of technologies or applications for storage systems.”<sup>19</sup>

CAISO also asks that the Commission “clarify that the ‘transmission’ and ‘distribution’ buckets refer only to the point of grid interconnection and not potential functions of storage.”<sup>20</sup> Based on its belief that the buckets refer to the point of grid interconnection, CAISO advocates that the Commission “focus on operational characteristics of storage technologies and not particular categories of use or technologies alone.”<sup>21</sup>

We agree with the CAISO that we should view the use-case buckets in a manner that develops market participation. We believe that focusing on a storage system’s point of interconnection, rather than the type of function, will allow for multiple ownership models. Further, this focus will provide the IOUs flexibility on breaking down their procurement targets by functions depending on their needs. Finally, this approach would prevent market power concerns since it does not give preference to one technology over another. Thus, in the Storage Framework, we utilize the term “Grid Domain” to identify the different points of interconnection to the electric grid.

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<sup>19</sup> GPI’s Reply Comments on ACR at 3.

<sup>20</sup> CAISO’s Opening Comments on ACR at 3.

<sup>21</sup> CAISO’s Opening Comments on ACR at 3.

By way of illustration, Table 1 below maps the storage use-cases to grid domain.

**Table 1**

<b>STORAGE GRID DOMAINS</b> (Grid Interconnection Point)	<b>REGULATORY FUNCTION</b>	<b>USE-CASE EXAMPLES</b>
<b>Transmission-Connected</b>	Generation/Market	<b>(Co-Located Energy Storage)</b> Concentrated Solar Power, Wind + Energy Storage, Gas Fired Generation + Thermal Energy Storage
		<b>(Stand-Alone Energy Storage)</b> Ancillary Services, Peaker, Load Following
	Transmission Reliability (FERC)	Voltage Support
<b>Distribution-Connected</b>	Distribution Reliability	Substation Energy Storage (Deferral)
	Generation/Market	Distributed Generation + Energy Storage
	Dual-Use (Reliability & Market)	Distributed Peaker
<b>Behind-the-Meter</b>	Customer-Sited Storage	Bill Mgt/Permanent Load Shifting, Power Quality, Electric Vehicle Charging

#### 4.4. Procurement Targets and Solicitation Schedule

##### 4.4.1. Proposed

The Proposed Plan set energy storage procurement targets expressed in MW for each IOU. The proposed procurement targets for PG&E, SCE and SDG&E allocated among the grid domains (points of grid interconnection): transmission-connected, distribution-connected, and customer-side applications are presented in Table 2 below.

**Table 2**

**Proposed Energy Storage Procurement Targets (in MW)<sup>22</sup>**

<b>Storage Grid Domain Point of Interconnection</b>	<b>2014</b>	<b>2016</b>	<b>2018</b>	<b>2020</b>	<b>Total</b>
<b>Southern California Edison</b>					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
<b>Subtotal SCE</b>	<b>90</b>	<b>120</b>	<b>160</b>	<b>210</b>	<b>580</b>
<b>Pacific Gas and Electric</b>					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
<b>Subtotal PG&amp;E</b>	<b>90</b>	<b>120</b>	<b>160</b>	<b>210</b>	<b>580</b>
<b>San Diego Gas &amp; Electric</b>					
Transmission	10	15	22	33	80
Distribution	7	10	15	23	55
Customer	3	5	8	14	30
<b>Subtotal SDG&amp;E</b>	<b>20</b>	<b>30</b>	<b>45</b>	<b>70</b>	<b>165</b>
<b>Total - all 3 utilities</b>	<b>200</b>	<b>270</b>	<b>365</b>	<b>490</b>	<b>1,325</b>

The target represented the number of MW of storage capacity that each utility would solicit. Further, these targets were subject to certain flexibility, as

<sup>22</sup> ACR at 8.

the IOUs would be permitted to defer procurement targets from one solicitation period to the next, as further described in Section 4.6 below.

The proposal would have the targets set to be met with solicitations every two years through 2020, with targets increasing over time. The Proposed Plan noted that this graduated approach would allow market participants and the LSEs to develop the energy storage market in an educated manner, as well as provide for potential for cost reductions over time. The proposed targets for the first solicitation reflected a level slightly above the storage projects that are currently planned, authorized for procurement, or in development by California utilities.

Under the Proposed Plan, the first solicitation would occur on June 1, 2014. Winning projects would be given a reasonable amount of time in which to be constructed and interconnected. It was not required that these winning projects be operational before the next solicitation would take place.

#### **4.4.2. Parties' Comments**

The proposed targets have been met with mixed responses. SCE warns that the targets are very aggressive and will come at a high cost to California ratepayers, especially if they are poorly designed and the pathway is too rigid. SCE advises that the Commission should remain flexible by periodically revisiting the targets and the pace of procurement.<sup>23</sup> Similarly, PG&E argues that the energy storage procurement targets should be shifted, so that less is required in 2014 and 2016, and correspondingly more is required in 2018 and

<sup>23</sup> SCE's Opening Comments on ACR at 2.

2020.<sup>24</sup> PG&E believes that, consistent with its experience in the RPS Program, the cost of storage projects will decrease as storage technologies evolve.

SDG&E puts forth various arguments in opposition to the proposed procurement targets. First, SDG&E contends that the timeline and level of the targets are arbitrary. As support, it maintains that technical analysis from this proceeding does not justify the proposed level of procurement targets. Second, SDG&E argues that any procurement targets should be related to a specific need or solve a specific problem. SDG&E contends that there has been no examination as to what level of distribution level, transmission level and customer level energy storage would be beneficial to each utility or local area within a utility's service area.<sup>25</sup> Finally, SDG&E maintains that if procurement targets are adopted, these targets should not be in place until 2020 because energy storage systems are not mature enough to have specific interim targets before then.

Other parties also maintain that it is premature to mandate targets. MEA expressed concern regarding the lack of data related to performance and cost-effectiveness on all identified use cases and warns about pursuing "storage for storage's sake."<sup>26</sup> Similarly, DRA states that the Commission should not adopt targets without further analysis of whether storage is the only option to service grid functions.<sup>27</sup> Pilot Power shares the same views but suggests that the numbers be revisited in two years to see if they are justified.<sup>28</sup>

<sup>24</sup> PG&E recommends that its 2014 target be reduced from 90 MW to 50 MW, that its 2016 target be reduced from 120 to 60 MW, that its 2018 target be increased from 160 MW to 220 MW, and that its 2020 target be increased from 210 MW to 250 MW. (PG&E's Opening Comments on ACR at 1-2.)

<sup>25</sup> SDG&E's Opening Comments on ACR at 4.

<sup>26</sup> MEA's Opening Comments on ACR at 3.

<sup>27</sup> DRA's Opening Comments on ACR at 1.

<sup>28</sup> Pilot Power's Opening Comments on ACR at 6.

Other parties maintain that it is inappropriate to set targets at this time because there is no demonstrated need for additional resources. CalWEA notes that other Commission proceedings have not identified a need for integration until 2020 and concludes that “[if] there is no need, by definition it is not possible to cost-effectively satisfy that need with additional (un-needed) resources.”<sup>29</sup> CEERT proposes that procurement targets should not be established until energy storage technology eligibility and cost effectiveness have been determined.<sup>30</sup> Jack Ellis asserts that procurement targets are unnecessary and that developers and sponsors of storage projects should be free to develop projects that they wish since cost effectiveness analyses suggest benefit/cost ratios greater than 1 for a variety of applications.<sup>31</sup> AReM believes that the picking and choosing of winners could be more effectively managed through competitive markets rather than government mandates.<sup>32</sup>

If targets are adopted, a number of parties suggested different approaches to implement them. For example, Primus Power proposes that the Commission consider making targets cumulative by year (e.g. 2014, 2016, 2018, and 2020) for each IOU versus the current proposal. It believes that utilities should be able to adjust targets based on need rather than deferring existing targets. Furthermore, Primus Power favors less prescription for transmission, distribution, and behind-the meter connected storage classifications after the 2014 round of solicitations. It contends that continuous evaluation of need and technology readiness is necessary to adjust targets after 2014.<sup>33</sup> IEP expresses a similar view and states that procurement targets should not be based on “arbitrary percentage

<sup>29</sup> CalWEA’s Opening Comments on ACR at 3.

<sup>30</sup> CEERT’s Opening Comments on ACR at 6.

<sup>31</sup> Jack Ellis’s Opening Comments on ACR page 7.

<sup>32</sup> AReM’s Opening Comments on ACR at 3-4.

<sup>33</sup> Primus Power’s Opening Comments on ACR at 4.

increases” but should be adjusted upward and downward based on experience, i.e. the number of cost effective, viable projects in a prior auction.<sup>34</sup>

EPUC believes that more modest targets will prevent the procurement of costly and infeasible storage projects. It notes that the Commission could increase the targets over time.<sup>35</sup> TURN also suggests a more modest approach. It notes that storage technologies haven’t been perceived as a cost-effective means to meet customer demand. Therefore, TURN suggests that the Commission raise the amount of such procurement the IOUs may seek to defer.<sup>36</sup>

IREC emphasizes that the value of storage is dependent on the physical location of the facility, so suitable locations should be chosen based on needs in a specific location.<sup>37</sup> It also suggests shifting targets among the categories so that distribution-interconnected storage would be increased, and the amount of transmission-interconnected storage decreased.<sup>38</sup>

CESA and Sierra/CEJA favor retaining existing targets or even increasing them. CESA recommends that the overall procurement target be expanded to 4,325 MW by 2020, with the additional 3,000 MW added onto the transmission procurement grid domain for the 2020 procurement cycle and pumped storage included as an eligible storage resource. CESA notes that expansion of the overall procurement target is integral to ensuring grid stability and reliability, especially with upcoming retirement of once through cooling (“OTC”) and the permanent closure of the San Onofre Nuclear Generating Station (“SONGS”). Sierra/CEJA claim that procurement targets need to be expanded to at least 3,000 MW with the increases primarily on the customer and distribution side. They refer to

<sup>34</sup> IEP’s Opening Comments on ACR at 5.

<sup>35</sup> EPUC’s Opening Comments on ACR at 1.

<sup>36</sup> TURN’s Opening Comments on ACR at 1.

<sup>37</sup> IREC’s Opening Comments on ACR at 2.

<sup>38</sup> IREC’s Opening Comments on ACR at 6-7.

Decision Authorizing Long-Term Procurement for Local Capacity Requirements (D.13-02-015) issued in the LTPP proceeding, which states that “[under] California Governor Brown’s June 2010 Clean Energy Jobs Plan, approximately 3,000 MW of energy storage would be added to the grid to meet peak demand and support renewable generation.”<sup>39</sup> Sierra/CEJA justify their arguments for increased targets based on “market transformation” arguments and believe that such targets will help establish a market, promote innovation, and potentially create numerous benefits from learning-induced cost reductions.

Friends of the Earth echo Sierra/CEJA’s arguments, noting: “It took a mandate to make the progress that has been achieved under the leadership of the Commission in advancing the deployment of renewables.” It further argues that the procurement targets should be required or mandatory in order “to assure the realization of the principles” articulated in AB 2514.<sup>40</sup>

CESA and Duke, among others, urge that the Commission consider employing some mechanism to ensure that storage is not only procured, but actually installed. Duke argues that imposing not only a procurement obligation, but also an installment obligation, would provide IOUs with incentives to procure “viable” energy storage, rather than just the least expensive.<sup>41</sup>

Most parties, including PG&E, SCE, SDG&E, MEA, TURN, CESA, Pilot Power, Megawatt Storage, IEP, Sierra/CEJA, and CFC, favor allowing the IOUs to carry over procurement volumes from one year to the next. However, they have suggested a variety of approaches on how this should be achieved. For example, DRA proposes that if energy storage procurement exceeds the total target or the targets of the three categories set for that year, the excess should

<sup>39</sup> Sierra/CEJA’s Opening Comments on ACR at 12 (citing D.13-02-015 at 60 (slip op.)).

<sup>40</sup> Friends of the Earth’s Opening Comments on ACR at 3.

<sup>41</sup> Duke Energy’s Reply Comments on ACR at 4.

count toward the following year's requirements, with a corresponding reduction in the target the following year.<sup>42</sup> TURN agrees and notes that in those instances where "one or more proposals appear to offer a very competitive cost solution, the IOUs should be allowed to exceed their procurement targets in a given year."<sup>43</sup> IEP presents a still different approach, proposing that the procurement targets be adjusted upwards or downwards based on experience. By example, it proposes that in instances where the procurement target is not met in any solicitation period, the procurement target for the next solicitation "should be adjusted downward to reflect that storage technologies have not yet evolved commercially to levels that can support a higher procurement target." Similarly, if storage resources were found to be viable and cost-effective, the procurement target could be increased.<sup>44</sup>

#### **4.4.3. Discussion**

As summarized above, many parties believe that it is inappropriate or premature to set targets at this time and advocate that the targets be delayed until many unanswered questions could be addressed. Most appreciate the desire to make rapid progress towards the goal of market transformation but question the program details pertaining how to determine the volume of targets and the timing of them. However, while there were recommendations for more "modest" targets, parties did not provide specific proposals for less aggressive overall targets.

As explained below, we find that the procurement target levels set forth in the Proposed Plan are appropriate. However, we believe that the initial procurement cycle should be held on December 1, 2014, rather than June 1, 2014.

<sup>42</sup> PG&E's Opening Comments on ACR at 6.

<sup>43</sup> TURN's Opening Comments on ACR at 3.

<sup>44</sup> IEP's Opening Comments on ACR at 5.

### Market Need for Storage

AB 2514 is silent on any requirement to conduct or apply a system need determination as a basis for procurement targets. As such, we are not prevented from establishing procurement targets, based on our expertise and authority, in the absence of a system needs determination. Based on AB 2514, as well as our overall energy policy, we find that it is reasonable to establish procurement targets to encourage the development and deployment of new energy storage technologies.

Section 2836.2 provides specific guidance with regard to the criteria to be used for establishing energy storage procurement targets:

In adopting and reevaluating appropriate energy storage system procurement targets and policies pursuant to subdivision (a) of Section 2836, the commission shall do all of the following:

- (a) Consider existing operational data and results of testing and trial pilot projects from existing energy storage facilities.
- (b) Consider available information from the California Independent System Operator derived from California Independent System Operator testing and evaluation procedures.
- (c) Consider the integration of energy storage technologies with other programs, including demand-side management or other means of achieving the purposes identified in Section 2837 that will result in the most efficient use of generation resources and cost-effective energy efficient grid integration and management.
- (d) Ensure that the energy storage system procurement targets and policies that are established are technologically viable and cost effective.

The Use Case approach addressed Market Need in terms of: a) defining the utility system functions that were applicable to each of the specific storage applications for the Use Case; b) describing the objectives of using energy storage in that circumstance; c) setting operational and technical requirements for storage to provide the stated function; d) assessing appropriate storage technologies in likely configurations; and e) listing alternative technologies that could potentially meet the function.

To the extent that a storage device or technology is able to demonstrate it can meet the operational requirements, and provide benefits over its projected life, it could be considered having met a defined market need.

#### Differentiating Market Need or Policy Need from System Need

System need determinations are required in CPUC generation resource procurement proceedings, such as LTPP. The 2010 Procurement Policy Manual<sup>45</sup> describes a “system need determination” for generation resources in this manner:

The Commission may designate an IOU to procure new system generation within its distribution service territory, based on a Commission approved need determination. The need determination shall be based on the CEC’s IEPR load forecast and a PRM (the current PRM is 15-17%) using the CEC’s base forecast under baseline (1-in-2) temperature conditions (pursuant to D.04-12-048 and D.07-12-052 at 20.)

In other policy areas promoting preferred resources, such as renewables, the California Solar Initiative and demand response, the Commission has not set targets based on a system need determination, but rather administratively determined procurement requirements to meet public policy objectives. To the extent that energy storage is treated akin to a “preferred resource,” as it has been

<sup>45</sup> This manual is Attachment 1 to an ALJ Ruling issued on June 2, 2010, in the 2010 LTPP Proceeding (R.10-05-006).

designated in D.13-02-015, the Commission has clear precedent to administratively establish storage procurement targets without a system needs determination.

In addition to these precedents, we have considered the criteria articulated in Section 2836.2 in determining the procurement targets adopted today. We have examined through workshops existing energy storage projects, reviewed the available information from CAISO, considered the integration of energy storage technologies with other programs, and proposed targets that we believe would allow for procurement of technologically viable and cost effective storage projects. We adopt the targets presented in Table 2, since they strike a balance between both achieving realistic targets in fulfillment of approved principles and minimizing costs with proper planning and safeguards.

We agree with parties that being overly prescriptive in a nascent market may have some unintended market consequences. Consequently, we find that it is reasonable to adopt a broad framework initially and add additional details later, if necessary, as more experience is gained and lessons can be applied.

#### Procurement Application Schedule and Process

The first procurement period would be held in 2014. Given the uncertainty in the marketplace and the need to allow time to address any issues associated with the initial implementation of the Storage Framework, the first procurement cycle, including first competitive solicitation, will occur on December 1, 2014. This will provide the IOUs sufficient time to establish the solicitation in coordination with their procurement obligations in other proceedings (such as the RPS Program) and allow Energy Division staff sufficient time to develop and implement pre-solicitation activities. This will also provide the IOUs time to

determine whether they would seek to meet their procurement targets through a single competitive solicitation or through multiple solicitations.

After the December 1, 2014, additional procurement cycles, including solicitation(s), will be held biennially, in 2016, 2018, and 2020. We believe that scheduling solicitations in this manner will allow the IOUs to refine their approach prior to conducting another round of solicitations. In addition, as more technologies become viable, this schedule would allow these storage providers to enter the procurement arena at a time that is appropriate for each technology. Finally, we note that in addition to adjustments of the procurement targets based on market experience, we will also consider adjusting procurement targets to reflect need determinations in the LTPP proceeding and as part of our regular evaluation of energy storage procurement targets and policies.

Section 3.d. of the Storage Framework sets forth the requirements for the procurement application. The procurement targets set for 2014, 2016, 2018 and 2020 represent the number of MW pending contract, under contract, or installed after the end of those procurement cycles.<sup>46</sup> However, by no later than the end of 2024, the IOUs must have the full 1,325 MW installed. An IOU may seek to defer up to 80 percent of MWs to later procurement periods based on a showing that it cannot procure enough operationally or economically viable projects to meet the targets within a given period. The requirements also allow for the banking of MW, in that over-procurement in one target year may be used to reduce the target in the following procurement period. By providing this flexibility, the requirements balance the need for energy storage developers to have sufficient lead time to become operational with the IOUs' need to have these systems on-line in a reasonable period of time. Thus, we are balancing flexibility in

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<sup>46</sup> See Appendix A, Section 2.

roughly the next decade with an absolute installation requirement no later than the end of 2024.

#### Post Solicitation Period Review

Each IOU should employ an Independent Evaluator to assess the competitiveness and integrity of its solicitation. The Independent Evaluator shall submit a Post-Solicitation Report containing, at a minimum, the number of solicitations held, an evaluation of the fairness of the IOUs offering and selection process, an assessment of project-specific negotiations, an analysis of the RFP offers, offer process, and an analysis of the overall market, whether the contract merits Commission approval.

After the first procurement period in December 2014, Energy Division will assess best practices and challenges within the procurement process and recommend, if needed, adjustments to the procurement process in the context of an appropriate proceeding (rulemaking or otherwise) available during that time period. It is premature to anticipate what the precise nature of these changes will be. However, we believe that the timing of the solicitations will allow sufficient time for this review.

### **4.5. Adjustments to Targets**

#### **4.5.1. Proposed**

The Proposed Plan proposed the following projects that shall be counted toward each utility's procurement targets, as follows:

#### All IOUs:

Commission-approved incentive payments for advanced energy storage systems within the SGIP, presently approved for up to 35 MW of advanced energy storage projects statewide.<sup>47</sup>

<sup>47</sup> See <http://www.cpuc.ca.gov/PUC/energy/DistGen/sgip/>.

Projects installed as part of Commission-approved incentive payments for the investor-owned utility permanent load shifting (PLS) programs, presently authorized for approximately \$32 million in funding statewide.<sup>48</sup>

SCE:

At least 50 MW of energy storage, and the energy storage portion of any other generation resources that are procured consistent with the Commission's recent authorization within the LTPP proceeding to meet local reliability needs in the Western Los Angeles basin.<sup>49</sup>

The 8 MW Tehachapi Wind Energy Storage Project to be installed in the Tehachapi renewable resource area.<sup>50</sup>

The Department of Defense vehicle-to-grid electric fleet project at the Los Angeles Air Force Base.<sup>51</sup>

PG&E:

The Commission-approved power purchase agreement between PG&E and Rice Solar for a solar thermal generation project paired with molten salt storage.<sup>52</sup>

SDG&E:

The Borrego Springs microgrid project, undertaken as part of SDG&E's smart grid deployment plan.<sup>53</sup>

Up to 44.6 MW of distribution system storage recently approved in D.13-05-010 concerning the General Rate Case (GRC) applications of SDG&E and Southern California Gas Company.

<sup>48</sup> Resolution E-4586, issued May 9, 2013.

<sup>49</sup> See Decision (D.) 13-02-015.

<sup>50</sup> Comments of SCE on the Energy Storage Phase 2 Interim Staff Report and Energy Storage Workshops, filed February 4, 2013, at 3.

<sup>51</sup> Comments of SCE on the Energy Storage Phase 2 Interim Staff Report and Energy Storage Workshops, filed February 4, 2013, at 3-4.

<sup>52</sup> Res. E-4545, January 24, 2013.

<sup>53</sup> See Annual Status Report of San Diego Gas & Electric Company for Smart Grid Deployments and Investments, filed October 1, 2012 in R.08-12-009.

The Proposed Plan further proposes that any project listed above that a utility counts toward its procurement target may not, and need not, be bid into the final approved solicitation process. Finally, the Proposed Plan would only count any PIER- or EPIC-funded projects toward the procurement targets if it met certain requirements.

#### **4.5.2. Parties' Comments**

In response to the ACR's question pertaining to what "counts" toward the procurement targets, and on what basis, most parties agree that all projects, even if procured through other Commission proceedings, should count.<sup>54</sup> MEA requests that the Commission "clarify how it will determine which projects counts toward the proposed projects, including how to treat storage projects in the planned, authorized, or developed phases."<sup>55</sup> Still some other parties stated which specific projects in various stages of development should be included or excluded.<sup>56</sup>

PG&E requests that, in addition to its power purchase contract with Rice Solar, two existing pilot projects – the Vaca-Dixon Battery Project and the Yerba Buena Battery Project – should count towards its procurement targets once they have transitioned into operations.<sup>57</sup> PG&E states that, under its contract with the CEC and EPRI, these pilot projects "provid[e] reliability support for the distribution function and [provide] ancillary services to the California Independent System Operator (CAISO) markets."<sup>58</sup> It notes that once the pilot

<sup>54</sup> See, e.g., SCE's Opening Comments on ACR at 3; PG&E's Opening Comments on ACR at 14.

<sup>55</sup> MEA's Opening Comments on ACR at 6.

<sup>56</sup> See, e.g., IEP's Opening Comments on ACR at 7-8; Sierra/CEJA's Opening Comments on ACR at 20; Jack Ellis's Opening Comments on ACR at 12.

<sup>57</sup> PG&E's Opening Comments on ACR at 10.

<sup>58</sup> PG&E's Opening Comments on ACR at 10.

projects are completed, these two battery projects will be available for commercial use and integrated into the grid.

Probably the most controversial aspect of what should count is whether pumped storage should be included or excluded. The Proposed Plan would exclude pumped storage. Many parties expressed strong views regarding this determination. IEP asserts that this proposed exclusion of pumped storage “may be inconsistent with statutory language because pumped storage may meet the statutory definition of an energy storage system.”<sup>59</sup>

CESA is concerned that excluding pumped storage could unintentionally put the eligibility of other storage technologies, such as Compressed Air Energy Storage (CAES), liquid air energy storage (LAES), hydrogen energy storage, large scale battery storage, or thermal energy storage projects in question. Therefore, it requests that the Commission clarify that all energy solutions would be eligible to participate in the Storage Framework.<sup>60</sup>

Only a few parties endorse the exclusion of pumped storage from the roster of acceptable end use applications. Sierra/CEJA believe pumped storage should be excluded because it has been on the existing grid for a long time and because it faces a different set of barriers than emerging storage technologies.<sup>61</sup> DRA contends that in order to accommodate pumped storage, the Commission would likely need to increase the procurement targets to over 4,000 MW. DRA believes that this would likely be very costly to ratepayers and triple the costs.<sup>62</sup> Therefore, DRA concludes that only large-scale pumped storage should be excluded. It believes that “[l]arge-scale projects should compete outside the set targets with other resources to fulfill needs identified/adopted in other

<sup>59</sup> IEP’s Opening Comments on ACR at 8.

<sup>60</sup> CESA’s Opening Comments on ACR at 3.

<sup>61</sup> Sierra Club/CEJA’s Opening Comments on ACR at 26.

<sup>62</sup> DRA’s Reply Comments on ACR at 4.

proceedings such as Long-Term Procurement Proceeding (LTPP) or Resource Adequacy (RA).”<sup>63</sup>

Many parties, such as SCE, SDG&E, DRA, CESA, and IEP, agree that PIER- and EPIC-funded projects should count toward a utility’s target when installation is complete, subject to the rules and requirements that govern participation in those wholesale (CAISO) or retail markets. CESA also mentions that the projects could also count if the LSE is an equity partner in the project and the project has a life of 10 years or more.<sup>64</sup> However, Megawatt Storage contends that PIER and EPIC-funded projects “should be excluded” but fails to explain why.<sup>65</sup> CESA argues that the various energy storage targets should be reduced proportionately to the benefits already provided by the PIER-and EPIC-funded [Energy Storage].<sup>66</sup>

#### 4.5.3. Discussion

##### Existing Energy Storage Projects

Based on the definitions accepted under the use cases and Section 2835(a), we find that all of the storage projects identified in the Proposed Plan should be counted towards the IOUs’ procurement targets provided that they meet the following requirements:

1. The project demonstrates its ability to meet one or more of the following purposes: grid optimization, integration of renewable energy, or reduction of greenhouse gas emissions.
2. The project is under contract or was installed after January 1, 2010.
3. The project is operational by no later than the end of 2024.

<sup>63</sup> DRA’s Reply Comments on ACR at 4.

<sup>64</sup> CESA’s Opening Comments on ACR at 15.

<sup>65</sup> Megawatt Storage’s Opening Comments on ACR at 7.

<sup>66</sup> MEA’s Opening Comments on ACR at 7.

Other IOU storage projects that were not identified in the Proposed Plan, such as PG&E's Vaca-Dixon Battery Project and Yerba Buena Battery Project, should also count towards the IOU's procurement targets once they have reached commercial operation and meet the three requirements above. Similarly, energy storage capacity that could be obtained from plug-in vehicles and programs/systems that utilize electric vehicles for grid services (Vehicle to Grid) could count towards procurement targets.

We further emphasize that since the objective of AB 2514 is to increase the use of energy storage systems, and not to identify existing energy storage systems, we do not believe it would be reasonable to count projects that were in existence prior to January 1, 2010 towards the procurement targets. This limitation is consistent with Section 2835(c), which defines a new energy storage system as a "system that is installed and first becomes operational after January 1, 2010."

#### Projects Funded From Third Parties

Eligible energy storage projects receiving funding from third parties, such as PIER and EPIC, may also count toward the procurement targets if the three conditions specified above are met. Additionally, a load-serving entity subject to AB 2514 must be a financial partner in the project.

#### Projects Authorized in Other Commission Proceedings

As discussed above, there are a number of proceedings that have storage applications that may be applied towards meeting the procurement targets established in this decision. Indeed, the Proposed Plan was issued prior to two important procurement and planning efforts within the Resource Adequacy (RA) and LTPP proceedings. Within the RA proceeding, parties have been evaluating a new flexible RA capacity product. Many parties in that proceeding have

included energy storage among the desired resources to provide such flexibility, if proper RA valuation of qualifying capacity for energy storage can be derived. Therefore, efforts to define flexible capacity needs and providing a means for energy storage to help meet those needs will be an important aspect of ensuring energy market reliability in the future.

Within the LTPP proceeding, the Commission is presently conducting an evaluation of system need, which is anticipated to be completed in early 2014, and has added a new track, to consider the local reliability impacts of a potential long-term outage at the San Onofre Nuclear Power Station (SONGS).<sup>67</sup> The procurement targets and the schedule for solicitations proposed here are not presently tied to need determinations within the LTPP proceeding. Instead, in the near term, we view the Storage Framework adopted herein as moving in parallel with the ongoing LTPP evaluations of need – system and local, and with the new consideration of the outage at SONGS. In the longer term, we expect that any procurement of energy storage will be increasingly tied to need determinations within the LTPP proceeding.

The developments underway in the RA and LTPP proceedings alone suggest that there will be procurement of energy storage projects outside of the Storage Framework. Therefore, we will allow storage projects authorized in other Commission proceedings to count towards meeting the overall procurement targets if they meet the requirements listed above. The IOUs may count storage projects authorized in other Commission proceedings towards meeting their interim procurement targets once the contract for that project is approved by the Commission. However, projects procured pursuant to any

<sup>67</sup> See, R.12-03-014, *Revised Scoping Ruling and Memo of the Assigned Commissioner and Administrative Law Judge*, issued May 21, 2013, at 3-4.

other Commission authorization in other proceedings may not be bid into the competitive solicitations under the Storage Framework.

#### Large-Scale Pumped Storage Projects

As noted above, there was considerable discussion over the Proposed Plan's exclusion of large-scale pumped storage projects towards meeting the procurement targets. We are sympathetic to parties' arguments that pumped storage complies with storage definitions under AB 2514. However, the sheer size of pumped storage projects would dwarf other smaller, emerging technologies; and as such, would inhibit the fulfillment of market transformation goals. The majority of pumped storage projects are 500 MW and over, which means a single project could be used to reach each target within a utility territory. Therefore, we find it is appropriate to exclude large-scale pumped storage projects from the procurement mechanism outlined in this decision. Accordingly, large-scale pumped storage projects greater than 50 MW will not be eligible to bid into solicitations offered under the Storage Framework.

In comments on the Proposed Decision, some parties have alleged that the exclusion of large-scale pumped storage projects is contrary to the plain terms of AB 2514.<sup>68</sup> These parties contend that since large-scale pumped hydro meets the definition of eligible energy storage system under Section 2835 and AB 2514 does not specify any size limitations, the Commission improperly imposed a size limitation. Brookfield further argues that excluding large-scale pumped storage projects means that the Commission is favoring certain energy storage technologies over others.<sup>69</sup>

<sup>68</sup> See, CEERT's Opening Comments on Proposed Decision at 5-10; Brookfield's Opening Comments on Proposed Decision at 2-4.

<sup>69</sup> Brookfield's Opening Comments on Proposed Decision at 2.

We find these arguments to be incorrect. Section 2836(a) allows the Commission to “consider a variety of possible policies to encourage the cost-effective deployment of energy storage systems.” The definition of energy storage system under Section 2835(a) encompasses a variety of technologies, not just pumped storage. This language clearly indicates that the Legislature intended to encourage a broad range of energy storage technologies. In order to do so, we must adopt policies and procedures that would provide opportunities for the cost-effective deployment of all types of energy storage technologies. In order to achieve this, however, there must be a limit on the size of pumped hydro storage systems eligible to participate in the particular mechanisms outlined in this decision.

As discussed above, the sheer size of large-scale pumped storage systems could prevent the procurement of other storage technologies. Such an outcome would be contrary to the intent of AB 2514. Accordingly, as permitted under AB 2514, we have adopted a policy to limit the size of pumped storage projects that are eligible to participate in the Storage Framework.

In addition, AB 2514 does not specify the means by which the Commission should achieve the storage targets, if any, that we adopt.

We emphasize that our decision to limit the size of pumped storage projects in the decision is not to discourage large-scale pumped storage projects. On the contrary, these types of projects offer similar benefits as all of the as all of the emerging storage technologies targeted by this program; it is simply their scale that is inappropriate for inclusion here. We strongly encourage the utilities to explore opportunities to partner with developers to install large-scale pumped storage projects where they make sense within the other general procurement efforts underway in the context of the LTPP proceeding or elsewhere.

Commission staff [mayshall](#) hold a workshop to further explore the operational characteristics and uses for pumped storage projects.

In particular, we encourage the utilities to consider pumped storage projects in all-source solicitations for new resources, and see no reason why the evaluation metrics and protocols developed in the context of the Storage Framework designed in this decision cannot be used as a basis to evaluate pumped storage projects in other proceedings or solicitations. We encourage the utilities to do so.

We also note that pumped storage provides many benefits and that exclusion of pumped storage projects 50 MW or greater from this program does not preclude their participation in other procurement programs designed to provide benefits to the system; we simply will not count the MW towards the achievement of the target adopted here. We will also continue to track the development of pumped storage technologies over 50 MW in size, and may consider including them in the Storage Framework in the future.

#### **4.6. Flexibility Among Grid Domains and Use-Cases**

As discussed in Section 4.4 above, the procurement targets for each IOU is allocated among the three grid domains: transmission, distribution and customer-sited. The ACR asked parties to comment whether, and to what extent utilities should be permitted flexibility in procuring among these three categories of energy storage within one solicitation, and whether a minimum amount in each category should be targeted.

##### **4.6.1. Parties' Comments**

Parties argue that if the targets are allocated among the grid domains, then flexibility should be allowed. SCE argues that the proposed allocations should be considered as guidance only and that utilities “have the flexibility among the

[grid domains] to focus investments where ratepayers value is greatest.<sup>70</sup>

Similarly, SDG&E argues that “procurement targets [ ] should be based on an overall target for energy storage systems” and that the “IOUs should have more flexibility as to when and where the storage is added to the system.”<sup>71</sup>

DRA recommends that utilities should have flexibility depending on an identified need<sup>72</sup> and TURN believes that some flexibility would improve the storage benefits, both with regard to minimizing customer costs and identifying the “best” storage resources.<sup>73</sup> Megawatt Storage argues that it is “administratively confusing” to have no flexibility. As such, it prefers that there be no allocation among the grid domains at all.<sup>74</sup>

A few parties commented on whether there should be a minimum level of procurement within each grid domain. PG&E maintains there should be no minimum level since: “[t]he cost-effectiveness/cost containment off-ramps in the ACR provide the appropriate vehicle for a utility to inform the Commission if the utility believes it cannot or should not meet the established target for one or more use-case buckets.”<sup>75</sup> CESA cautions that too much latitude in shifting across the categories would create substantial risk by undermining the willingness of entities to invest in the market given all of the uncertainties.<sup>76</sup>

CFC urges that “[a] minimum in each [grid domain] should be added in later auctions, perhaps 2016, once the market grows and more energy storage technology options become available.”<sup>77</sup>

<sup>70</sup> SCE’s Opening Comments on ACR at 14.

<sup>71</sup> SDG&E’s Opening Comments on ACR at 15.

<sup>72</sup> DRA’s Opening Comments on ACR at 7.

<sup>73</sup> TURN’s Opening Comments on ACR at 3.

<sup>74</sup> Megawatt Storage’s Opening Comments on ACR at 8.

<sup>75</sup> PG&E’s Opening Comments on ACR page 15.

<sup>76</sup> CESA’s Opening Comments on ACR page 17.

<sup>77</sup> CFC’s Opening Comments on ACR page 5.

Beacon Power advocates the creation of sub-buckets such as “ancillary services” and “load duration” in the transmission category.<sup>78</sup> In contrast, others, such as SCE, argue that narrowly-defined buckets, combined with limited flexibility, would “drive up costs by forcing utilities to procure suboptimal storage configurations.”<sup>79</sup>

#### **4.6.2. Discussion**

We agree with SCE and other parties that there should be flexibility among all three points of interconnection to maximize and balance both developer and ratepayer value. We are persuaded by arguments that overly prescriptive targets, without any necessary adjustments, would ultimately drive up ratepayer costs and hamper the development of necessary market experience that would eventually drive other needed adjustments. Adhering to strict targets or “carve outs” may inappropriately or unfairly advantage or disadvantage specific participants. For this reason, we do not find it appropriate to establish “sub-buckets” such as “ancillary services” and “load duration.” Such sub-buckets are not compatible with market transformation goals based on technology neutral procurement.

In view of the above, Section 2.c. of the Storage Framework allows for flexibility among grid domain categories, subject to certain requirements. These requirements would allow for up to 80% of MW to be shifted between the Transmission and Distribution (T&D) domains, but we approve no shifting of MW between the Customer domain and the T&D domains.

<sup>78</sup> Beacon Power’s Opening Comments on ACR pages 4-5.

<sup>79</sup> SCE’s Reply Comments on ACR page 10.

## 4.7. Deferment of Procurement Targets

### 4.7.1. Proposed

To provide for cost containment, the Proposed Plan allowed each IOU to defer a declining percentage of its procurement targets upon an affirmative showing, such as unreasonableness of costs or the lack of a competitive number of bids in the energy storage auction. Under the Proposed Plan, an IOU would be permitted to defer from up to 40 percent of its 2014 procurement target with such a showing, from up to 30 percent of its 2016 procurement target with such a showing, and from up to 20 percent of its 2018 and 2020 procurement targets with such a showing.<sup>80</sup>

The ACR asked parties to comment on the appropriate “off-ramps” for relief from procuring up to each target and what metrics should be used to evaluate the appropriateness of the off ramps.

### 4.7.2. Parties’ Comments

Most parties support the concept of deferring procurement. SCE contends that deferment is warranted “if the net cost appears too high.”<sup>81</sup> PG&E agrees with this conclusion but states that a utility should be allowed to defer its procurement target if the responses do not meet identified needs set out by solicitation protocols, or if there is suspected market manipulation.<sup>82</sup> SDG&E agrees with both of the cost and lack of competitive bids arguments.<sup>83</sup>

Consumer advocates express similar views. DRA advocates that the IOUs be relieved from procurement “when they can show storage was not cost-effective, viable, or useful to meet an identified need.”<sup>84</sup> However, TURN

<sup>80</sup> ACR at 19.

<sup>81</sup> SCE’s Opening Comments on ACR at 15.

<sup>82</sup> PG&E’s Opening Comments on ACR at 6.

<sup>83</sup> SDG&E’s Opening Comments on ACR at 16.

<sup>84</sup> DRA’s Opening Comments on ACR at 7.

believes there is a risk that the deferment percentages are not sufficient and may result in “limited flexibility should the storage market not develop as the Ruling (and many other parties) hopes.”<sup>85</sup> Other parties, including IEP, Joint Solar, and Calpine argue that the IOUs should be allowed to defer procurement based on cost effectiveness purposes. Calpine further elaborates that “IOUs and LSEs should be allowed to rely on and justify their own input assumptions, particularly with respect to the cost of specific projects.”<sup>86</sup>

Some parties argue that excessive flexibility is harmful. CESA asserts that excessive flexibility in undercutting targets could “raise ratepayer costs and create unintended consequences of higher prices and more “off ramping.”<sup>87</sup> CESA further argues that the utilities should not be allowed to defer any portion of their procurement target due to the lack of a competitive number of bids in the energy storage auction, or other showing. It believes that if deferment were allowed, it could “raise ratepayer costs and create unintended consequences of higher prices and more ‘off ramping’ than further reduce deployment of energy storage installation and related attainment of system goals.”<sup>88</sup>

Clean Coalition is less favorable about the concept of deferring a portion of the IOU’s procurement target. It warns that when utilities have been offered discretion, they have generally procured “less than the targets – sometimes significantly less.” Consequently, it is concerned that the proposal would lead to a similar less than optimal response with respect to actual energy storage procurement.<sup>89</sup> CEERT asserts that allowing an off-ramp at this point “is like putting the cart-before-the-horse, placing eligibility and cost-effectiveness as

<sup>85</sup> TURN’s Opening Comments on ACR at 4.

<sup>86</sup> Calpine’s Opening Comments on ACR at 78.

<sup>87</sup> CESA’s Opening Comments on ACR at 18-19.

<sup>88</sup> CESA’s Opening Comments on ACR at 18-19.

<sup>89</sup> Clean Coalition’s Opening Comments on ACR at 6.

after-the-fact conditions or considerations in creating procurement targets.”<sup>90</sup> CFC states that off-ramps would not be needed “assuming this proceeding results in a successful system which encourages viable, cost effective energy storage.”<sup>91</sup>

#### 4.7.3. Discussion

Consistent with AB 2514’s stated goal to promote viable and cost effective energy storage applications, we believe that it is important that the Storage Framework include cost containment strategies that protect ratepayers. We agree with parties’ comments that there are different reasons to support deferring a portion of an IOU’s procurement target. We are not persuaded by CESA’s arguments that allowing for flexibility would be harmful. CESA’s position does not allow for a “safety valve” if costs are excessive or if market opportunities are not robust enough. We find that such a position is not acceptable or reasonable. New programs must have some protections in case the adopted rules are not working as they were originally intended.

In this decision, we adopt a program that balances ratepayer protection with the promotion of new energy storage technologies. If the utilities can demonstrate that they have not received bids that are economically or operationally viable, or have not received sufficient bids to meet their procurement targets, they will be allowed to defer up to 80 percent of their procurement target to a later procurement period. At the same time, there shall be a minimum level of procurement for each solicitation period to ensure that energy storage is included in a utility’s resource portfolio.

Section 3.e. of the Storage Framework establishes the requirements that must be met before an IOU may defer up to 80 percent of its procurements

<sup>90</sup> CEERT’s Opening Comments on ACR at 4.

<sup>91</sup> CFC’s Opening Comments on ACR page 6.

targets. We emphasize that the IOU shall bear the burden of making a showing that such relief is appropriate.

We remind the IOUs that while we may grant a request to defer a portion of their procurement targets, we expect that the overall procurement goal of 1,325 MW will be installed by 2024.

#### **4.8. Procurement of Energy Storage by Electric Service Providers and Customer Choice Aggregators**

##### **4.8.1. Proposed**

AB 2514 applies to all load serving entities. As such, we need to also consider storage procurement targets for Electric Service Providers (ESPs) and Community Choice Aggregators (CCAs). The Proposed Plan did not recommend specific targets for ESPs and CCAs, but rather proposed that any procurement targets could be met by either: a) paying their share of energy storage procurement costs to utilities through the Cost Allocation Mechanism (CAM), and/or b) procuring energy storage projects on their own, commensurate with their load share.<sup>92</sup>

##### **4.8.2. Parties' Comments**

Parties widely vary in views on this issue. SDG&E advocates that the utilities "own and operate the energy storage systems for ESPs and CCAs customers and assess the costs through a cost allocation mechanism on a non-bypassable basis."<sup>93</sup> SCE proposes guidelines that it believes will ensure that customers of ESPs and CCAs fairly contribute to paying the costs of storage that benefit all customers. SCE identifies these costs as:

- a. Distribution Reliability Storage – Should be owned and operated by IOUs as a component of their distribution

<sup>92</sup> ACR at 15.

<sup>93</sup> SDG&E's Opening Comments on ACR at 17.

- system. Costs should be allocated to all benefiting customers (unbundled and bundled) through existing distribution wires charges along with other distribution costs.
- b. BTM [Behind-The-Meter] Storage – Should be available to all utility customers and the costs should be allocated to all customers through existing distribution charges similar to EE, DR, or SGIP Programs.
  - c. The Net Cost of Transmission or Generation/Market Function Storage – Should be appropriately allocated to all benefiting customers (unbundled and bundled).<sup>94</sup>

TURN believes that “customers of ESPs and CCAs must share in the net benefits or costs – whether positive or negative – of storage procurement.”<sup>95</sup> While it believes that either option proposed in the Proposed Plan would achieve this goal, TURN cautions that it would be difficult to define and verify what an “equivalent amount of storage” is for an ESP or CCA given the wide variety of technologies and uses. Therefore, TURN concludes that the CAM may be a more reliable mechanism for allocating costs among bundled and unbundled customers.<sup>96</sup>

PG&E, on the other hand, recommends that “ESP and CCA be required to purchase energy storage projects commensurate with their load share just as they must meet their own load RPS amounts.”<sup>97</sup> MEA believes that applying CAM to energy storage procurement should not be pursued, as it is inappropriate, legally questionable, and extremely complex.<sup>98</sup> MEA also advocates that energy storage procurement targets assigned to a CCA must be

<sup>94</sup> SCE’s Opening Comments on ACR at 17.

<sup>95</sup> TURN’s Opening Comments on ACR at 5.

<sup>96</sup> TURN’s Opening Comments on ACR at 5.

<sup>97</sup> PG&E’s Opening Comments on ACR at 16.

<sup>98</sup> MEA’s Opening Comments on ACR at 9.

relevant to the generation-only services that the CCA provides.<sup>99</sup> Shell believes that ESPs and CCAs should not be required to purchase storage for the IOU's transmission/distribution function and have the option to include procurement to meet the generation- and customer-function as part of their overall procurement portfolio strategy.<sup>100</sup>

AReM also objects to having the IOUs procure energy storage on behalf of ESPs and recovering those costs through a CAM. It argues that "if the Commission adopts energy storage procurement targets for ESPs, the Direct Access Parties support the option by which ESPs will procure to meet a 'commensurate' target and oppose the option of having the utilities procure on behalf of ESPs and assessing the costs of that procurement on the ESPs' customers."<sup>101</sup>

#### **4.8.3. Discussion**

We agree that ESPs and CCAs should be required to purchase energy storage projects commensurate with their load share. However, rather than set interim targets allocated among the storage grid domains, as we have done for the IOUs, we will make a simpler requirement for ESPs and CCAs for this program. We set the procurement target for ESPs and CCAs to procure energy storage commensurate with 1% of their 2020 annual peak load with a requirement for project installation no later than the end of 2024, consistent with the requirement for IOUs. We acknowledge that the target we set for ESPs and CCAs is slightly lower than the percentage target we have adopted for the IOUs. However, we believe that a lower percentage target is warranted since all customers, including those of ESPs and CCAs, will be required to pay certain

<sup>99</sup> MEA's Opening Comments on ACR at 4.

<sup>100</sup> Shell's Opening Comments on ACR at 9-10.

<sup>101</sup> AReM's Opening Comments on ACR at 4-5.

non-bypassable charges that may be used by the IOUs to develop energy storage systems. Further, customers of ESPs and CCAs will also pay for any energy storage systems procured for the IOU's distribution system as part of their distribution charges.<sup>102</sup> Since some portion of the IOUs' energy storage procurement costs will be recovered from ESP and CCA customers, we find that a 1% target for ESPs and CCAs to be reasonable.

We shall allow ESPs and CCAs to meet their procurement target in any configuration or use-case category they choose that is relevant to their customer base and responsibilities. For example, it may not make sense, in most cases, for them to procure distribution-interconnected storage, since they do not manage the distribution grid. However, storage co-located with generation and/or customer-sited storage may be more logical for ESPs and/or CCAs to procure. Further, we shall allow customer-sited or customer-owned energy storage to count towards the 1% target. These projects, however, will only be counted if they are installed after January 1, 2010.

The ESPs and CCAs shall demonstrate their compliance with meeting their target through the filing of a Tier 2 Advice Letter which shall list the energy storage procurement contracts they have entered into (including technology and number of MW and MWh), duration of the contracts, and the percentage of the ESP/CCA's peak load provided by energy storage. In this Tier 2 Advice Letter, ESPs and CCAs will also provide a description of its methodology for measuring cost-effective projects.

Although we do not require ESPs and CCAs to meet this procurement target under contract until 2020, with installation and operation by the end of 2024, we do not want them to delay procurement until that time. Therefore, ESPs

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<sup>102</sup> See SCE's Opening comments on ACR at 17.

and CCAs shall file the Tier 2 Advice Letters starting January 1, 2016, and every two years thereafter until 2024. This will allow us to assess the progress of ESPs and CCAs towards meeting their procurement target. If an ESP or CCA does not meet its procurement target by 2020, it should explain why it could not do so. Depending on the explanation provided, we shall consider whether the target date for that ESP or CCA should be extended.

While we set the procurement target for ESPs and CCAs to procure energy storage equal to 1 percent of their 2020 annual peak load by 2020 with the projects online and delivering no later than the end of 2024, we remind them that, consistent with our prior decisions, departing load customers remain responsible for any costs associated with energy storage procured on their behalf at the time they were bundled service customers.<sup>103</sup> These costs (and the associated load), however, shall not be counted towards meeting the CCA or ESP's 1 percent procurement target.

#### **4.9. Utility-Owned versus Third Party Storage**

##### **4.9.1. Proposed**

The Proposed Plan recommends that each utility may meet up to fifty percent of its distribution system procurement target through utility-owned energy storage.<sup>104</sup> The utility would be permitted to propose the energy storage asset within its applicable GRC proceeding, but must make a showing of cost-effectiveness and viability. The Proposed Plan further suggests that if an IOU was proposing utility-owned storage, it would simultaneously offer a

<sup>103</sup> See, e.g., *Decision on Non-Bypassable Charges for New World Generation and Related Issues* (D.08-09-012).

<sup>104</sup> Pub. Util. Code § 2835(a)(2)(B) (procurement targets may be met by energy storage systems owned by a load-serving entity, publicly owned utility, customer-owned storage, third-party owned storage, or joint ownership by two or more such entities).

procurement opportunity for third-party owned storage through competitive solicitation. Additionally, the Proposed Plan recommends that any storage asset approved within a GRC proceeding would be ineligible to participate in competitive solicitations for third-party owned storage.

Finally, the Proposed Plan recommends that if a utility-owned energy storage asset received funding under local, state, or federal public program, only the expenditures not publicly funded may be proposed for rate recovery.

#### **4.9.2. Parties' Comments**

There is a wide range of opinion on whether utilities should own up to 100% of distribution and/or transmission level storage. SDG&E contends that the IOUs should be able to own up to 100% of distribution and transmission level storage by procuring energy storage directly via a competitive request for proposals.<sup>105</sup> It emphasizes that this is necessary because the utility has the responsibility for planning and operating the distribution system. "Based on the nature of these applications, the energy provided by the energy storage system must be delivered in a timely fashion, in specific locations, with sub-second control and with a high level of certainty." Consequently, it believes that relying on third party storage could lead to significant reliability issues.<sup>106</sup>

SCE agrees with SDG&E that third parties should not own storage assets serving a distribution reliability function. Nonetheless, SCE concedes that "even if the utility owns and operates the storage device, the underlying technology, equipment, and installation services will be acquired competitively, thus advancing the desired market transformation goals."<sup>107</sup> PG&E maintains that the

<sup>105</sup> SDG&E's Opening Comments on ACR at 6.

<sup>106</sup> SDG&E's Reply Comments on ACR at 6-7.

<sup>107</sup> SCE's Opening Comments on ACR at 9-10.

Commission has “not evaluated the broader implications of changing the utility ownership model for distribution facilities, and in any event third-party ownership of distribution facilities is unlawful under Public Utilities Code 399.2(a)(2).”<sup>108</sup>

IREC concludes that, based on the location-specific nature of many of the energy storage services, it may not make sense for third parties to own any of the energy storage systems to be procured on the distribution system.<sup>109</sup> Friends of the Earth echo IREC’s conclusion that third parties should not own or operate storage facilities that are located on a utility’s distribution system.<sup>110</sup>

CESA disagrees with these arguments and contends that utilities should be limited to proposing up to fifty percent of their distribution use-case category target as utility-owned energy storage.<sup>111</sup> It urges that there must be a balance between utility-owned storage, customer-owned storage and third-party owned resources.<sup>112</sup>

IEP asserts that “third-party ownership can provide cost-effective and viable resources, whether interconnected at the distribution or transmission level.” Indeed, it believes that there are only narrow circumstances, associated with reliability-driven projects, where utility-owned storage would be preferred. It further concludes that “[o]nly certain types of storage applications, e.g., those that address operational functions of the distribution system that demonstrably cannot be provided by third parties, should be considered for utility ownership.”<sup>113</sup>

<sup>108</sup> PG&E’s Reply Comments on ACR at 6-7.

<sup>109</sup> IREC’s Opening Comments on ACR at 8.

<sup>110</sup> Friends of the Earth’s Opening Comments on ACR at 7.

<sup>111</sup> CESA’s Opening Comments on ACR at 9.

<sup>112</sup> CESA’s Reply Comments on ACR at 9-10.

<sup>113</sup> IEP’s Opening Comments on ACR at 6.

In its Reply Comments, CESA also urges the Commission to consider a diverse mix of ownership models, as “this will encourage competition, innovation in contracting mechanisms and greater affordability.”<sup>114</sup> It argues that allowing utilities to own 100% of energy storage resources at any level (i.e. transmission and distribution level) should be expressly rejected.<sup>115</sup>

#### 4.9.3. Discussion

As determined in D.12-08-016, the definition of energy storage system utilized in this proceeding is the one articulated in Section 2835(a).<sup>116</sup> This definition is intended to embrace a mix of ownership models and contribute to a diverse portfolio that can encourage competition, innovation, partnerships, and affordability. It is true that LSEs, given their statutory responsibility, have proven experience, capability, and history, to ensure reliability goals are met. However, as we have seen with specific opportunities such as “distributed peaker” projects or transmission upgrades within FERC jurisdiction, there is room to allow for different types of economic or policy driven storage projects that meet different needs, cost requirements, and other criteria. Therefore, we do not believe it makes sense to allow 100% utility ownership in T & D without first determining which specific applications or circumstances are best suited for utility ownership versus third-party providers.

In light of the above, we find that the utility ownership of storage projects should not exceed 50 percent of all storage across all three grid domains at this time. In other words, utilities may own no more than half of all of the storage projects they propose to count toward the MW target, regardless of whether it is

<sup>114</sup> CESA’s Reply Comments on ACR at 9-10.

<sup>115</sup> CESA’s Reply Comments on ACR at 9-10.

<sup>116</sup> *Decision Adopting Proposed Framework for Analyzing Energy Storage Needs* (D.12-08-016) at 28.

interconnected at the transmission or distribution level, or on the customer side of the meter. We believe that setting this limit will ensure that any viable market options are not preempted.

We shall allow the IOU to procure utility-owned energy storage systems either through the Storage Framework or as authorized in other Commission proceedings. Utility-owned energy storage systems shall be subject to the same evaluation criteria and must meet the same requirements as third-party storage systems.<sup>117</sup>

Although we allow utility ownership of energy storage systems, we believe that the primary means for procuring energy storage systems should be through competitive solicitations. Thus, an IOU proposing utility-owned storage in any grid domain shall pursue a competitive process consistent with LTPP processes outlined in D.07-12-052. Applications for approval of utility-owned energy storage systems procured outside of the RFO process shall be evaluated on a case-by-case basis. In the application the IOU must make a showing that holding a competitive RFO is infeasible. These circumstances may include market power mitigation, reliability, preferred resources, and expansion of existing facilities.

#### **4.10. Procurement Mechanism for Transmission and Distribution Storage**

##### **4.10.1. Proposed**

The Proposed Plan recommends that the utilities hold a reverse auction, similar to the Commission's Renewables Auction Mechanism (RAM), to procure third-party owned energy storage to meet the procurement targets.<sup>118</sup> The key components of this approach are that projects bid and be paid their costs as bid,

<sup>117</sup> See, e.g., Appendix A, Section 3.d.

<sup>118</sup> See

<http://www.cpuc.ca.gov/PUC/energy/Renewables/hot/Renewable+Auction+Mechanism.htm> for information on the RAM program.

over the life of the contract. It was anticipated that over time, winning bid prices would be adjusted as the IOUs learn more about the projects, as the storage market develops, and in response to changes in storage needs.

#### 4.10.2. Parties' Comments

Parties are almost universally opposed to the use of the RAM. Most parties argue that the range of products and services that can be provided by energy storage are too broad for a RAM type solicitation and advocate other procurement mechanisms that they believe would be more suitable. SCE believes that that Commission should not “presume that the RAM contract [for renewables] will work for new technologies and new companies entering the new market.”<sup>119</sup> PG&E argues that “RAM is not well suited for evaluating and contracting with the wide variety of storage projects that may bid into the storage solicitation, given that the projects can be expected to be based on various technologies and be in various states of commercial readiness.”<sup>120</sup> Similarly, SDG&E believes the RAM’s procedural mechanisms may be appropriate for standardized and commercial technology, such as renewable generation, but not for emerging technologies, such as energy storage.<sup>121</sup>

In general, parties suggest that energy storage should be procured through a more all-purpose solicitation. CESA further identifies other procurement mechanisms that utilities can use to better account for benefit streams. These include:

1. all-source request for offers (“RFOs”) which can account for full resource characteristics and capabilities;
2. bilateral contracting methods where RFOs are infeasible;

<sup>119</sup> SCE’s Opening Comments on ACR at 10-11.

<sup>120</sup> PG&E’s Opening Comments on ACR at 6.

<sup>121</sup> SDG&E’s Opening Comments on ACR at 6.

3. standard offer contracts where specific benefit streams are contracted from third parties or customer-owned generation (e.g. resource adequacy capacity); and
4. expansion of all source and renewables RFOs to incorporate and fairly evaluate energy storage resources, including through existing proceedings.<sup>122</sup>

Other parties opposed to the RAM promote other approaches. For example, Primus Power advocates a feed-in tariff structure, Joint Solar Parties recommend RFOs, and Clean Coalition proposes full cost and value pricing. In addition to RFOs, CFC suggests “tolling agreements” which it defines as “any temporary contract between the permanent owner of an asset and another agent that allows that agent to claim ownership and management of the output, allowing the agent to ‘rent’ the asset from the owner.”<sup>123</sup>

#### 4.10.3. Discussion

We agree with parties that the RAM is not the appropriate mechanism for the procurement of energy storage. Energy storage has multiple attributes and functions that cross the spectrum of wholesale and retail markets and transmission & distribution grid services. As such, a RAM-type solicitation, which seeks to obtain the lowest cost for ratepayers, may not be able to properly evaluate projects due to the variety of functions and markets served. Rather, we are persuaded by parties’ comments that competitive solicitations involving RFOs are the best mechanism to meet the varying definitions and use cases of storage in a changing technology environment.<sup>124</sup>

<sup>122</sup> CESA’s Opening Comments on ACR at 9.

<sup>123</sup> CFC’s Reply Comments on ACR at 3.

<sup>124</sup> For more information about various procurement mechanisms, please see the CPUC 2010 Rule Book, which has some standard definitions, with reference to seminal and relevant details pertaining to how the Commission has implemented them.

RFOs involve a public request to buy or sell a product or service through a structured process. The advantage of an RFO is that it enables the utilities to tailor a “targeted” request to reflect their specific resource needs and criteria. We agree with PG&E’s recommendation that the utilities “should be allowed to negotiate PPA terms individually with counterparties based upon each project’s specific attributes.”<sup>125</sup> Thus, we do not require the IOUs to develop standard contracts at this time.

We do not agree with those parties that advocate assigning a public value to an agreed upon list of benefits, as this would be contrary to D.06-06-066, our primary decision on confidentiality. Providing valuation information to competitive developers may invite “gaming” of the solicitation. To the extent parties believe certain values are important, they can structure the values into the solicitation design. Accordingly, there is no standard value that is appropriate for all storage technologies, or even for the three grid domains.

We also do not encourage utilities to negotiate bilateral contracts or “one offs” with counterparties to procure energy storage systems outside of an RFO process involving third party-owned storage systems. Bilateral contracts do not have a process with as much transparency as the RFO process. However, bilateral contracts for energy storage systems approved in other Commission proceedings may be counted towards meeting the IOU’s procurement targets provided they meet the requirements specified in Section 4.5.3 of this decision.

We acknowledge that, in some instances involving distribution-connected storage, beyond distribution reliability applications, utility-owned storage may be allowable to facilitate preferred resources (e.g., intermittent) and for reliability purposes outside of a competitive solicitation. Accordingly, as noted earlier,

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<sup>125</sup> PG&E’s Reply Comments on ACR at 14.

procurement of energy storage in these instances outside of a competitive solicitation can be considered on a case-by-case basis.

Based on the above, each IOU is directed to file an application on or before March 1, 2014 that will contain proposals as needed to address specifics applicable to different grid domains, use-cases, or ownership scenarios for the first procurement period, including the first competitive solicitation (RFO) involving third party-owned storage. For all subsequent procurement periods, the IOU shall file its procurement application biennially thereafter in 2016, 2018, and 2020. Section 3.d. of the Storage Framework lists the minimum information that must be included in the application. As we have previously discussed, all third-party owned energy storage resources as defined under Section 2835(a), except for large-scale pumped storage, would be eligible to bid into the RFO. The first solicitation should be scheduled for no later than December 1, 2014.

Finally, a project will be bid in and evaluated based upon the net cost to ratepayers. Where a third-party owned energy storage system has received funds from a local, state, or federal publicly-funded program, the level and source of funding shall be identified and the full cost of the project, including publicly-funded costs, provided. Rate recovery shall be authorized only for that portion of net costs that is not publicly funded and found to be reasonable.

#### **4.11. Procurement of Customer-Side Storage**

##### **4.11.1. Parties' Comments**

PG&E advocates that existing demand-side management (DSM) and customer-side storage programs, such as the Self-Generation Incentive Program (SGIP) and Permanent Load Shifting (PLS) Program, should count toward any customer storage target.<sup>126</sup> PG&E therefore recommends that the Commission

<sup>126</sup> PG&E's Opening Comments on ACR at 3-4.

policies and programs adopted in this proceeding are not intended “to stop or duplicate the development of energy storage programs as components of DSM programs such as SGIP or Demand Response (DR) programs.”<sup>127</sup>

MEA observes that CCAs serve predominantly residential customers, so any customer-side applications should focus on this market segment. Both SDG&E and Sunverge argue there is a need to redesign residential rate structures so that residential customers can realize the benefits of energy storage. Based on these arguments, MEA states that it does not believe that customer-side energy storage is currently cost effective.<sup>128</sup>

IREC and Clean Coalition recommend eliminating or reducing the MW target for customer-side procurement. Jack Ellis argues that customer-side procurement “should be excluded unless the sponsor or developer can demonstrate before and after deployment that the project will be operated for the benefit of the grid and just for the benefit of the customer that owns it.”<sup>129</sup> Pilot Power recommends that a procurement targets should only be established for Transmission and Distribution functions.

STEM presents another point of view and “urges the Commission to increase customer-side procurement.”<sup>130</sup> PG&E challenges STEM’s proposal, asserting that there is “no evidence to [STEM’s] claim that grid challenges originate at the edge of the network.”<sup>131</sup> PG&E claims that if storage is location-dependent, it may end up servicing the needs of the customer, and not that of the grid.

<sup>127</sup> PG&E’s Opening Comments on ACR at 3-4.

<sup>128</sup> MEA’s Reply Comments on ACR at 7.

<sup>129</sup> Jack Ellis’s Opening Comments on ACR at 12.

<sup>130</sup> STEM’s Opening Comments on ACR at 6.

<sup>131</sup> PG&E’s Reply Comments on ACR at 10.

#### **4.11.2. Discussion**

We are persuaded by PG&E's arguments that customer-side storage targets may be fulfilled through existing proceedings, such as the 2015 demand response application, the distributed generation/California Solar Initiative rulemaking, and alternative-fueled vehicle rulemaking.<sup>132</sup> All of these proceedings have their own standards that are being used to develop and implement programs.

We note that the SGIP legislation will sunset in 2016. Therefore, there will be a need to explore various policies and programs that allow the LSEs to meet customer side targets after that date. We believe it is premature to open a rulemaking to examine these issues at this time. However, these issues and other storage-related issues will be addressed in a future rulemaking.

Further, although residential rate design, net energy metering program, and storage interconnection processes are outside the scope of this proceeding, outcomes from these proceedings may facilitate the development of innovative strategies on the customer side of the meter.

We recognize that there may be beneficial applications of utility-owned or utility-contracted energy storage projects behind the meter. Therefore, we will not preclude utility ownership or contracts of customer-side storage.

#### **4.12. Cost Effectiveness**

##### **4.12.1. Proposal**

The Proposed Plan recommends that each IOU, when presenting its solicitation results to the Commission, should also include cost-effectiveness analysis utilizing the EPRI and DNV KEMA models for all bids received, to

<sup>132</sup> PG&E's Reply Comments on ACR at 11.

provide a consistent basis for comparison across utilities, bids, and use cases.<sup>133</sup>

The ACR asked parties to comment on how the preliminary results of these cost-effectiveness models should be applied to the question of setting procurement targets and, based on preliminary results, whether the utilities should set a cost cap for offers to be submitted in 2014.

#### **4.12.2. Parties' Comments**

In response to the ACR questions, many parties note the Commission has expended much effort to assess existing cost-effectiveness models and that significant progress has been achieved by the Commission, IOUs, and third parties on this topic. However, most parties agree that much more work needs to be done to understand the impacts of preliminary results of cost-effective models for setting any operational procurement targets. Consequently, parties contend that the EPRI and DNV KEMA models are not yet ready to be used to justify operational deployments.

Numerous parties offer comments supporting this position. SCE notes that “[t]he cost effectiveness models considered thus far in this proceeding are preliminary and illustrative.”<sup>134</sup> PG&E agrees with SCE and notes that “many of the input assumptions may not be accurate and do not have a broad consensus of stakeholders participating in this proceeding.”<sup>135</sup> DRA also concludes that “[t]he EPRI and [DNV] KEMA models are not mature enough, and have not been scrutinized sufficiently, to be used for setting targets or to serve as the only tool the IOUs rely upon to decide whether to procure cost-effective storage.”<sup>136</sup> DRA

<sup>133</sup> ACR at 19.

<sup>134</sup> SCE's Opening Comments on ACR at 22.

<sup>135</sup> PG&E's Opening Comments on ACR at 17.

<sup>136</sup> DRA's Opening Comments on ACR at 8.

agrees that the IOUs should be allowed to propose their own methods to for demonstrating cost-effectiveness.<sup>137</sup>

TURN states that rather than rely on the EPRI or DNV KEMA models, the Commission look to the “commercially binding offers submitted by storage providers in response to utility auctions” to determine cost-effectiveness.<sup>138</sup> IEP also does not support the two cost-effectiveness models. Rather, IEP recommends building a storage procurement model based on the viability and cost-effectiveness of storage resources that emerge from the sequential solicitations.<sup>139</sup>

Various parties also challenge the accuracy of the models. EPUC notes that both the EPRI and DNV KEMA studies “admit[ ] that the final analysis depends on a number of sensitivities and inputs that cannot be accurately reflected in their model.”<sup>140</sup> Calpine also challenges the EPRI and DNV KEMA models on the grounds that they “are based on a series of overly optimistic assumptions.”<sup>141</sup>

Other parties advocate other means to determine cost-effectiveness. Sierra/CEJA urge the Commission to “make a finding that the procurement targets met the cost effectiveness of AB 2514.”<sup>142</sup> Clean Coalition advocates a “Full Cost and Value Accounting Approach” which would calculate standard value pricing numbers that would be available for each service that storage technologies provide. Clean Coalition states that under its proposed approach, developers would bid their projects based on standard value pricing, which are deemed to be cost-effective.<sup>143</sup> IEP proposes that the Commission “compare

<sup>137</sup> DRA’s Opening Comments on ACR at 8.

<sup>138</sup> TURN’s Opening Comments on ACR at 5.

<sup>139</sup> IEP’s Opening Comments on ACR at 12

<sup>140</sup> EPUC’s Opening Comments on ACR at 8.

<sup>141</sup> Calpine’s Opening Comments on ACR at 2-4.

<sup>142</sup> Sierra Club/CEJA’s Opening Comments on ACR at 30.

<sup>143</sup> Clean Coalition’s Opening Comments on ACR at 12.

viable storage with viable alternatives on a range of measures, including grid reliability, avoided curtailment, capacity value, and ancillary services value.”<sup>144</sup>

Most parties oppose imposing a cost cap. SCE states that it does not support a cost cap for individual offers. It argues that “[g]iven the diverse array of storage technologies, applications and benefits, it would be impossible to develop a single number that would appropriately apply.”<sup>145</sup> PG&E agrees with SCE, noting that any cost ramps could be a leading mechanism to check costs.<sup>146</sup> MEA contends that a cost cap “would create artificial influences that would inhibit communication of true costs within the Energy Storage market.”<sup>147</sup> In a similar vein, CESA argues that it is more important to consider the net benefits provided by resources than to set cost caps.<sup>148</sup> TURN does not think that cost caps are necessary if IOUs have greater flexibility in storage procurement.<sup>149</sup> DRA thinks that if cost caps are imposed, then they should be applied at the program level to ensure market discipline.<sup>150</sup> Megawatt Storage argues that “there is no testimony, evidence or analysis that can be used to set a cap.”<sup>151</sup>

#### 4.12.3. Discussion

AB 2514 requires that energy storage targets and procurements must be “viable and cost-effective.” To that end, we have devoted a great deal of attention and effort into formulating a cost-effectiveness approach that would be sufficient to meet Section 2836.2(d).

<sup>144</sup> IEP’s Opening Comments on ACR at 2.

<sup>145</sup> SCE’s Opening Comments on ACR at 23.

<sup>146</sup> PG&E’s Opening Comments on ACR at 19.

<sup>147</sup> MEA’s Opening Comments on ACR at 11.

<sup>148</sup> CESA’s Opening Comments on ACR at 22.

<sup>149</sup> TURN’s Opening Comments on ACR at 6.

<sup>150</sup> DRA’s Opening Comments on ACR at 6.

<sup>151</sup> Megawatt Storage’s Opening Comments on ACR at 9.

We agree with parties that any actual finding of cost-effectiveness should only be done in a utility application for approval of storage contracts or rate-based additions, where there is a specific project and actual project inputs. Moreover, based on parties' comments, we find that the EPRI and DNV KEMA models should not be required by the Commission as the sole methodologies for assessing cost effectiveness at this point. As such, we shall allow the IOUs to propose their own methodology to evaluate the cost and benefits of bids. However, the IOUs shall assess the full range of benefits and costs identified in the use-case framework and the EPRI and DNV KEMA reports submitted in this proceeding. In addition, while we allow different evaluation protocols by utility, the IOUs shall confer with Energy Division Staff to develop a consistent evaluation protocol to be used for benchmarking and general reporting purposes. Energy Division staff may hold a public workshop to discuss the consistent evaluation protocol with stakeholders before the IOUs file their procurement applications.

Finally, we agree with SCE that a cost cap is not necessary. The Storage Framework includes provisions for flexibility among the grid domains.<sup>152</sup> Additionally, the IOUs are able to defer up to 80 percent of their procurement targets under certain circumstances.<sup>153</sup> We believe that these provisions will ensure the reasonableness of costs for energy storage.

#### **4.13. Confidentiality Provisions**

##### **4.13.1. Proposed**

The Proposed Plan recommends that all data related to all bids, both successful and unsuccessful, in each auction be considered non-confidential,

<sup>152</sup> See Storage Framework, Section 2.c.

<sup>153</sup> See Storage Framework, Section 3.e.

except for cost data, which would be confidential for one year following Commission approval of a storage power/services purchase agreement.<sup>154</sup>

#### 4.13.2. Parties' Comments

SCE opposes the proposed confidentiality provisions. It contends the rules, as proposed, are inconsistent with the requirements of D.06-06-066, *Interim Opinion Implementing Senate Bill No. 1488, Relating to Confidentiality of Electric Procurement Data Submitted to the Commission*. SCE further states that since these requirements were developed pursuant to SB 1488, "should not be revised on an ad hoc basis in separate, stand-alone proceedings."<sup>155</sup> PG&E agrees with SCE's position and asserts that if the proposed rules are adopted, it "might inhibit parties' willingness to participate in an energy storage RFO, and thereby adversely affect the competitiveness of the RFO results."<sup>156</sup> PG&E suggests that all offer data and pricing associated with the solicitations to meet the storage targets should be confidential for three years.

In contrast to SCE and PG&E, Sierra/CEJA asked for full transparency of data, arguing that this would "provide the most data to ensure a full evaluation of the potential benefits and costs of future storage projects; a one year confidentiality requirement will merely delay this needed analysis."<sup>157</sup> Sierra/CEJA further maintain that certain data, such as cost-effectiveness, operational data, and greenhouse gas impacts, need to be non-confidential in order to satisfy the goal of AB 2514 and remove additional barriers to storage procurement.<sup>158</sup>

<sup>154</sup> ACR at 20.

<sup>155</sup> SCE's Opening Comments on ACR at 24.

<sup>156</sup> PG&E's Opening Comments on ACR at 9-10.

<sup>157</sup> Sierra/CEJA's Opening Comments on ACR at 31.

<sup>158</sup> Sierra/CEJA's Reply Comments on ACR at 16-17.

#### 4.13.3. Discussion

Based on parties' comments, we are persuaded that the confidentiality rules in the Storage Framework should be consistent with the confidentiality requirements set forth in D.06-06-066. That decision established a matrix that identified various types of utility data and the extent and duration to which that data would receive confidential treatment.<sup>159</sup> Although storage is not specifically identified in Appendix 1 of that decision, we are not persuaded that it is unique enough to warrant differential treatment of its data compared to other technologies and applications being procured by utilities at this time. Nonetheless, we believe that it is important to balance the need to preserve a competitive RFO process with providing procurement information would assist in the expansion of the storage market. Therefore, the treatment of procurement data of bids and contracts under the Storage Framework shall be governed by D.06-06-006 or any subsequent Commission decision addressing confidentiality issues, if D.06-06-006 is updated at some point in the future. However, all information that is afforded confidential treatment shall become public three years after the date the contract is approved by the Commission, unless an earlier date is specified in the IOU Matrix.<sup>160</sup>

We further note that the confidentiality provisions shall also apply to information submitted by the ESPs and CCAs in their biennial Tier 2 Advice Letter filings. All submitted data shall be handled in a manner consistent with Appendix 2 of D.06-06-066 or any subsequent applicable Commission decision on the confidentiality of procurement data. However, all information that is

<sup>159</sup> See, *Interim Opinion Implementing Senate Bill No. 1488, Relating to Confidentiality of Electric Procurement Data Submitted to the Commission* (D.06-06-066) at Appendix 1 (IOU Matrix).

<sup>160</sup> See, D.06-06-066, Appendix 1.

afforded confidential treatment shall become public three years after the date it is submitted to the Commission unless an earlier date is specified.<sup>161</sup>

#### 4.14. Program Evaluation

Section 2836(b)(3) requires that we conduct a comprehensive evaluation of the Storage Framework by no later than 2016, and every three years thereafter.

At a minimum, we believe our evaluation process should investigate and assess the following:

1. Whether the energy storage procured pursuant to this proposal meets the stated purposes of optimizing the grid, integrating renewables, and/or reducing greenhouse gas emissions;
2. Progress toward market transformation;
3. Learning from collection, analysis, and reporting of energy storage operational data; and
4. Learning from collection, analysis, and reporting of the cost-effectiveness of the energy storage systems procured, with attention to data confidentiality.
5. Best practices for the safe operation of energy storage technologies.

The IOUs shall collectively fund an annual budget of approximately \$500,000 from all ratepayers, to be reimbursed to the Commission through the regular budget process, to allow Commission staff to oversee the evaluation and analysis of the program and to hire consultants for this purpose. The expectation is for Commission staff to be able to commence evaluation efforts by late 2014 or early 2015. The costs of the \$500,000 budget shall be shared by the IOUs according to their proportional share of peak load, and collectable from ratepayers starting in 2015 (such that the maximum budget available for evaluation is \$500,000 per year for 6 years, or \$3 million, unless modified).

<sup>161</sup> See, D.06-06-066, Appendix 2.

## 5. Coordination with Other Proceedings

As noted in the ACR, it is important that there be coordination among the various proceedings addressing issues relevant to energy storage. In addition to this proceeding, other Commission proceedings that consider or have an impact on procurement of energy storage include LTPP, RPS, RA, SGIP, the California Solar Initiative, demand side management and electric vehicles. It is our intention that these proceedings will all run in parallel and collectively “count” towards our energy storage procurement targets.

We note that there has been coordination between Commission Staff in these various proceedings to ensure consistency in the treatment of energy storage and to reduce market barriers. We expect that this coordination shall continue in order to accommodate changing environmental conditions including new supply/demand balance, promote market transformation, and further reduce market barriers. These individual proceedings and related public forums continue to provide the best platforms for dealing with critical storage issues as they arise.

We further emphasize that all of the rules and requirements established in the above-mentioned proceedings shall apply to energy storage. For example, the CEC *RPS Eligibility Guidebook (7th ed. April 2013)*, contains a relevant discussion about RPS eligibility for storage.<sup>162</sup> Any improvements to “Least-Cost-Best-Fit” Criteria used to evaluate contracts for RPS eligible procurement, as they apply to storage attributes, will be accomplished through the RPS proceeding.

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<sup>162</sup> Refer to 64.

<http://www.energy.ca.gov/2013publications/CEC-300-2013-005/CEC-300-2013-005-ED7-CMF.pdf>.

**6. Rulings on Motions**

The assigned ALJ has ruled on various motions in this proceeding through electronic (email) rulings. This decision confirms those electronic rulings. Any outstanding motions not yet ruled on are hereby deemed denied.

**7. Comments on Proposed Decision**

The proposed decision of Commissioner Peterman in this matter was mailed to the parties in accordance with Section 311 of the Public Utilities Code and comments were allowed under Rule 14.3 of the commission's Rules of Practice and Procedure. Comments were filed on September 23, 2013 by PG&E, SCE, SDG&E, DRA, TURN, MEA, AReM, Shell Energy, Snohomish PUD, CESA, CalWEA, EPUC, Brookfield, Alton Energy, EDF Renewable, IEP, Eagle Crest, Large Scale Solar Association, CHBC, Calpine, STEM, CEERT, Clean Coalition, IREC, CFC, Sierra/CEJA and GPI. Reply comments were filed on September 30, 2013 by PG&E, SCE, DRA, MEA, AReM, Shell Energy, CESA, Clean Coalition, Calpine, STEM, CEERT, Clean Coalition, CFC, Sierra/CEJA, Alton Energy, City and County of San Francisco, and TAS Energy.

The decision has been revised, as necessary, in response to comments. Among others, we have made the following clarifications and substantive revisions:

1. The policies for ESPs and CCAs have been revised as follows:
  - a. The biennial compliance filing has been changed from a Tier 3 Advice Letter to a Tier 2 Advice Letter.
  - b. In addition to demonstrating their compliance towards meeting the targets, the Tier 2 Advice Letter will include a description of their methodologies for cost-effective projects.
  - b. The ESPs and CCAs may count customer-sited or customer-owned energy storage systems installed after January 1, 2010 towards meeting their procurement target.

- c. The Commission may extend the procurement target date beyond 2020 if an ESP or CCA does not meet its procurement target with signed contracts by that date and projects installed and delivering by the end of 2024.
  - d. Clarifies that the confidentiality provisions in D.06-06-066 apply to the compliance filings.
2. The time for an IOU to seek deferral of its procurement target has been revised. An IOU may now file a Tier 3 Advice Letter requesting deferral to within three months after receipt of bids in response to its RFO.
3. Clarifies that the biennial procurement targets represent the number of MW pending contract, under contract, or installed by 2020. Notes, however, that the requirement is to have the IOUs meet the overall installed capacity of 1,325 MW installed and delivering by the end of 2024.
4. Specifies the requirements that must be met before the IOUs may count existing storage projects, storage projects authorized in other Commission proceedings, storage projects receiving public- or other third party sources of funding towards meeting their interim procurement targets.
5. Specifies that pumped storage projects larger than 50 MW should be evaluated by utilities in their generation solicitations for new capacity in other proceedings.
6. The IOUs shall be allowed to apply over-procurement of MW in one target year to reduce the target in the next target year.
7. Clarifies that the IOU may meet its procurement targets in any target year through one or multiple competitive solicitations.
8. Clarifies the circumstances under which utility-owned storage and bilateral contracts shall be allowed.
9. No longer requires the IOUs to file a Tier 3 Advice Letter setting out the contracts for the winning energy storage bids, and instead states that, in its

approval of the procurement applications, the Commission will provide additional direction on the process the IOUs shall use to request approval for the winning bids.

10. Notes that procurement of customer-side storage after SGIP sunsets and other storage-related issues will be addressed in a future rulemaking.

11. Revises the dates for the IOUs to file their first procurement applications from January 1, 2014 to March 1, 2014.

12. Clarifies that a consistent evaluation protocol will be used for benchmarking and general reporting purposes, in addition to allowing utility-specific proprietary evaluation protocols.

13. Energy Division staff may hold a public workshop to discuss the consistent evaluation protocol with stakeholders before the IOUs file their procurement applications ~~and 2)~~.

14. Commission Staff shall hold a public workshop to further explore the operational characteristics and uses for pumped storage projects.

Appendix A, the Storage Framework, has been revised as well to reflect the changes in the body of the decision.

## **8. Assignment of Proceeding**

Commissioner Carla Peterman is the assigned Commissioner, and Amy Yip-Kikugawa and Colette Kersten are the assigned Administrative Law Judges in this proceeding.

## **9. Findings of Fact**

1. Assembly Bill 2514 directs the Commission to open a proceeding to determine appropriate targets, if any, for each load-serving entity to procure viable and cost-effective energy storage systems.

2. The Commission's energy storage procurement policy is guided by AB 2514.
3. The first Phase of the proceeding was resolved in Decision (D.) 12-08-016, which adopted the Energy Storage Framework Staff Proposal.
4. A June 10, 2013, Assigned Commissioner's Ruling (ACR) presented a straw proposal for energy storage procurement targets and mechanisms.
5. The straw proposal contained in the June 10 ACR serves as the basis for the Energy Storage Procurement Framework and Design Program.
6. The Energy Action Plan established a "loading order" which prioritized the order in which energy resources are procured.
7. The procurement targets set for PG&E, SCE and SDG&E are within three specific grid domains - transmission-connected, distribution-connected, and customer-side applications.
8. Pub. Util. Code Section 2836.2 provides specific guidance with regard to the criteria to be used for establishing energy storage procurement targets.
9. The procurement targets may be changed to reflect determinations in other Commission proceedings.
10. The SGIP sunsets in 2016. Therefore, procurement of customer-side storage after this date has not been fully defined in this grid domain.
11. PG&E, SCE and SDG&E currently have a number of energy storage projects either installed or under contract.
12. Pumped storage projects offer similar potential benefits as all of the emerging storage technologies targeted by this program.
13. The majority of pumped storage projects are 500 MW or over.
14. A single pumped storage project could account for the entire procurement target within a utility territory.

15. The sheer size of a large-scale pumped storage project would dwarf other smaller, emerging technologies and could inhibit the fulfillment of market transformation goals.

16. Commission staff ~~may~~shall hold a workshop to further explore the operational characteristics and uses for pumped storage projects.

17. AB 2514 requires that energy storage systems procured be viable and cost effective.

18. Section 2836(a) allows the Commission “to consider a variety of possible policies to encourage the cost-effective deployment of energy storage systems.”

19. Energy Division staff may hold a public workshop to discuss the consistent evaluation protocol with stakeholders before the IOUs file their procurement applications.

20. AB 2514 applies to all load serving entities. This would include electric service providers and community choice aggregators.

21. The definition of energy storage system embraces a mix of ownership models.

22. A reverse auction mechanism is more appropriate for procuring standardized energy products and services in a commercially mature market.

23. Energy storage has multiple attributes and functions that cross the spectrum of wholesale and retail markets and transmission & distribution services.

24. An RFO enables the utility to tailor a solicitation to reflect specific resource needs and criteria.

25. Bilateral contracts do not provide the same level as transparency as the RFO process.

**10. Conclusions of Law**

1. Since this proceeding does not involve any material disputed issues of fact, evidentiary hearings are not necessary.
2. Consistent with D.13-05-015, the Loading Order should not be revised.
3. It is appropriate to define storage procurement targets based on the level of grid interconnection and not on potential functions of storage resources.
4. AB 2514 is silent on any requirement to conduct or apply a system need determination as a basis for storage procurement targets.
5. It is reasonable to set procurement targets to encourage the development and deployment of new energy storage technologies.
6. Prior precedent supports the setting of storage procurement targets without a system needs determination.
7. It would be reasonable to set the first solicitation to occur on March 1, 2014, with solicitations held biennially thereafter in 2016, 2018 and 2020.
8. It is appropriate to include certain utility projects, as identified in this decision, towards meeting the utility's procurement target.
9. Consistent with the intent of AB 2514 to procure a wide range of storage technologies, it is reasonable to exclude pumped storage projects larger than 50 MW from participating in the Energy Storage Procurement Framework and Design Program. However, pumped storage projects larger than 50 MW should be evaluated by utilities in their generation solicitations for new capacity in other proceedings.
10. It is reasonable to include any PIER- or EPIC- funded projects toward the procurement targets under certain conditions.

11. It is reasonable to include energy storage procured via bilateral contracts in another proceeding (and in compliance with requirements of that proceeding) under certain conditions.

26. The utilities should be provided flexibility among the grid domains, subject to certain requirements.

27. It is reasonable to develop cost containment strategies that protect ratepayers.

28. The utilities should be allowed, under certain circumstances, to defer up to 80 percent of their procurement target and should bear the burden of making a showing that deferral is appropriate.

29. ESPs and CCAs should have targets to purchase energy storage projects equal to 1% of their 2020 annual peak load by 2020, with installation and operation of the projects required by the end of 2024.

30. It is premature to allow 100% utility ownership in transmission and distribution-connected storage until it is determined what narrow applications are best suited for utility ownership versus third-party ownership.

31. It is reasonable to limit utility ownership of storage systems to 50% across grid domains.

32. Utility-owned storage should be evaluated on a case-by-case basis across grid domains consistent with existing LTPP processes.

33. Energy storage systems should be procured under a competitive solicitation for offers involving RFO(s) for third-party owned or -aggregated resources or other processes authorized by the Commission appropriate for utility- or customer-owned assets

34. PG&E, SCE and SDG&E should be directed to file a procurement application on or before March 1, 2014 that would contain a proposal for the first energy storage procurement cycle, including the first competitive solicitation.

35. Customer-side storage may be fulfilled through existing programs, such as SGIP and PLS, as well as other mechanisms including but not limited to those funding programs that provide grid services (Vehicle to Grid) from electric vehicles.

36. Any actual finding of cost-effectiveness should only be done for a specific project, based on actual project inputs.

37. Each utility should be allowed to propose its own methodology to evaluate the costs and benefits of bids and evaluate the full range of benefit and costs identified for energy storage in the use-cases.

38. The IOUs should also be required to utilize a consistent evaluation protocol for assessing bids to provide a consistent comparison across utilities, bids and use-cases.

39. The IOUs should confer with Energy Division to establish the consistent evaluation protocols for assessing bids for benchmarking and general reporting purposes prior to the filing of any application.

40. Allowing the utilities to request deferment of a portion of their procurement targets and flexibility in shifting procurement among grid targets eliminates the need to set a cost cap on storage procurement contracts.

41. It is reasonable to require the utilities to contract for their storage targets by no later than 2020, with installation and operation of a total of 1,325 MW across all utilities installed and operational by no later than the end of 2024.

42. The confidentiality of utility procurement data and information submitted by ESPs and CCAs should be subject to the confidentiality requirements contained in D.06-06-066.

43. The utilities should be required to provide a post-solicitation report and submit contracts for approval within 12 months after the solicitation date.

44. There should be a comprehensive evaluation of the Energy Storage Procurement Framework and Design Program by no later than 2016, and once every three years thereafter.

45. The Energy Storage Procurement Framework and Design Program, found as Appendix A of this decision, should be adopted.

46. This proceeding should be closed.

## **O R D E R**

### **IT IS ORDERED** that:

1. The Energy Storage Procurement Framework and Design Program attached as Appendix A to this decision, is adopted.

2. All Load Serving Entities shall comply with the Energy Storage Procurement Framework and Design Program.

3. On or before March 1, 2014, Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall file a procurement application containing a proposal for procuring energy storage resources, as described in Section 3.d. of Appendix A of this decision. The solicitation shall occur no later than December 1, 2014.

4. For future biennial energy storage procurement periods in 2016, 2018 and 2020, Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall file a procurement application, as

described in 3.d of Appendix A of this decision, with any proposed modifications based on data and experiences from previous procurement periods.

5. Community Choice Aggregators and Electric Service Providers shall file a Tier 2 Advice Letter starting January 1, 2016 and every two years thereafter until 2024 to report their progress in procuring 1% of their 2020 annual peak load from energy storage projects under contract by 2020 and describe its methodology for measuring cost-effective projects. Projects are required to be installed and delivering by no later than the end of 2024.

6. Energy Division will conduct a comprehensive evaluation of the Energy Storage Procurement Framework and Design Program by no later than 2016 and submit a report to the Commission.

7. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall collectively fund an annual budget of \$500,000 from all ratepayers, to be reimbursed to the Commission through the regular budget process, to allow Commission staff to oversee evaluation and analysis of the program and hire consultants for this purpose.

8. Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Edison Company shall employ an Independent Evaluator to assess the competitiveness and integrity of its energy storage solicitation. The independent evaluator's report shall be submitted as part of the utility's filing requesting approval of contracts resulting from the solicitations.

9. Within 180 days of the effective date of this decision, Commission staff shall conduct a public workshop to further explore the operational characteristics and uses for pumped storage projects.

10. 9. Rulemaking 10-12-007 is closed.

This order is effective today.

Dated \_\_\_\_\_, at San Francisco, California.

## APPENDIX A

## Energy Storage Procurement Framework and Design Program

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**1) Guiding Principles and Policy**

Consistent with AB 2514,<sup>163</sup> the Commission's energy storage procurement policy is guided by three purposes:

- 1) The optimization of the grid, including peak reduction, contribution to reliability needs, or deferment of transmission and distribution upgrade investments;
- 2) The integration of renewable energy; and
- 3) The reduction of greenhouse gas emissions to 80 percent below 1990 levels by 2050, per California's goals.<sup>164</sup>

While energy storage may serve additional purposes within California's energy supply, the Commission has applied these three overarching purposes in setting procurement targets, designing procurement, and evaluating progress.

**2) Energy Storage Procurement Targets****a) Procurement Targets for the Utilities**

Southern California Edison Company, Pacific Gas and Electric Company, and San Diego Gas & Electric Company shall procure (i.e., pending contract, under contract, or installed) 1,325 MW of energy storage by 2020 with the requirement that the overall procurement goal of 1,325 MWs will be installed and delivering to the grid by no later than the end of 2024, where MW represents the peak power capacity of the storage resource in terms of the maximum discharge rate. The following procurement targets allocated to each of the investor-owned utilities (IOUs) are as follows:

**Energy Storage Procurement Targets (in MW)**

<b>Storage Grid Domain</b>	<b>2014</b>	<b>2016</b>	<b>2018</b>	<b>2020</b>	<b>Total</b>
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<sup>163</sup> See Pub. Util. Code § 2835(a)(3).

<sup>164</sup> The Global Warming Solutions Act of 2006 (Assembly Bill 32) requires California to reduce greenhouse gas emissions to 1990 levels by 2020. Cal. Health & Safety Code § 38500 *et seq.* Executive Order S-3-05 (Gov. Schwarzenegger, 2005) states an additional goal of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.

<b>(Point of Interconnection)</b>					
<b>Southern California Edison</b>					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
<b>Subtotal SCE</b>	<b>90</b>	<b>120</b>	<b>160</b>	<b>210</b>	<b>580</b>
<b>Pacific Gas and Electric</b>					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
<b>Subtotal PG&amp;E</b>	<b>90</b>	<b>120</b>	<b>160</b>	<b>210</b>	<b>580</b>
<b>San Diego Gas &amp; Electric</b>					
Transmission	10	15	22	33	80
Distribution	7	10	15	23	55
Customer	3	5	8	14	30
<b>Subtotal SDG&amp;E</b>	<b>20</b>	<b>30</b>	<b>45</b>	<b>70</b>	<b>165</b>
<b>Total - all 3 utilities</b>	<b>200</b>	<b>270</b>	<b>365</b>	<b>490</b>	<b>1,325</b>

**b) Procurement Targets for Electric Service Providers and Customer Choice Aggregators**

Electric service providers (ESPs) and community choice aggregators (CCAs) shall procure 1 percent of their annual peak load by 2020.

Starting on January 1, 2016, and every two years thereafter, each ESP and CCA shall file a Tier 2 Advice Letter which shall list the energy storage procurement contracts they have entered into (including technology and number of MW & MWh), duration of the contracts, and the percentage of the ESP/CCA's peak load provided by energy storage. An ESP or CCA may include customer-sited or customer-owned energy storage systems towards meeting their procurement target, provided the energy storage system is installed after January 1, 2010.

**c) Flexibility within Procurement Targets**

The IOUs are allowed discretion in shifting MWs between transmission and distribution storage grid domains as needed subject to the following limitations:

1. Up to 80% of MWs assigned to the transmission and distribution grid domains could be shifted to the other domain without a showing. Although no showing is required, the shifting is still subject to other restrictions described in Section 3, "Energy Storage Procurement Program Design", below.
2. No shifting of procurement target MWs is allowed into or out of the customer-side domain.
3. No portion of the procurement targets can be traded among the IOUs.

However, customer-sited and customer-owned energy storage systems may be counted toward the IOU's procurement target, provided that the energy storage system is installed after January 1, 2010.

**d) Adjustments to Procurement Targets**

Existing energy storage projects may be applied against an IOU's procurement targets if:

1. The project is installed and first becomes operational after January 1, 2010.
2. The project demonstrates its ability to meet one or more of the following purposes: grid optimization, integration of renewable energy, or reduction of greenhouse gas emissions.
3. The project will be operational by no later than the end of 2024.
4. For pumped hydro systems, the system is not more than 50 MW in size.

Energy storage projects procured in other Commission proceedings, such as Long-Term Procurement Planning or the Renewables Portfolio Standard Program, with contracts approved by the Commission, may be applied against an IOU's procurement target provided these energy storage projects meet the requirements listed above.

An energy storage project procured pursuant to a procurement application discussed below may be counted toward the procurement targets if it meets the requirements specified above and has either a Commission approved contract or a utility negotiated contract pending Commission approval.

Energy storage projects receiving funding from third parties, such as PIER- and EPIC, may count toward procurement targets provided these energy storage projects meet the requirements listed above.

A utility-owned storage project authorized by the Commission may be counted once a specific procurement commitment is made by the IOU, such as a purchase order for equipment or contract for buildout.

The IOUs, ESPs and CCAs may count customer-sited or customer-owned energy storage systems towards meeting their procurement targets provided the systems meet the requirements listed above. Additionally, with respect to a particular biennial procurement target, customer-side storage projects expected to be installed by customers (under available incentive programs up to the point of filing the application discussed below for the next procurement cycle) may be counted against that biennial target.

If the amount of energy storage procured by an IOU exceeds its biennial procurement target, the IOU may reduce its next biennial target by the excess amount.

An IOU seeking an adjustment to its procurement target shall make its request as part of its biennial procurement application discussed below. An ESP or CCA seeking an adjustment to its procurement target shall make its request as part of its biennial compliance Advice Letter filing.

### **3) Energy Storage Procurement Program Design**

#### **a) Procurement Schedule**

The IOUs shall procure energy storage through competitive solicitations involving RFO(s) for third party-owned or -aggregated resources, or other processes authorized by the Commission appropriate for utility- or customer-owned storage projects. Storage projects involving distribution reliability applications shall be procured via existing processes used by IOUs for other distribution reliability utility assets. The first competitive solicitation involving third party owned storage shall be held in 2014, with additional solicitations biennially thereafter, in 2016, 2018, and 2020.

The initial competitive solicitation shall be scheduled for no later than December 1, 2014, and every two years thereafter, subject to the procurement application discussed below. If an IOU believes that more than one competitive solicitation is needed to meet its biennial procurement target, it should note the various solicitations, and the associated date(s), in its application.

#### **b) Procurement Eligibility**

All energy storage resources as defined by Pub. Util. Code § 2835(a), except for pumped storage resources over 50 MW, are eligible to bid into the energy storage solicitations. Energy storage that could be obtained from plug-in electric vehicles and programs/systems that utilize electric vehicles for grid services (Vehicle to Grid), could count for procurement projects.

Existing storage projects or other storage resources procured pursuant to Commission authorizations in other proceedings that a utility counts toward its storage procurement target may not be bid into the competitive solicitations.

**c) Project Ownership & Market Concentration Limits**

When procuring energy storage systems, the utilities shall consider all forms of resource ownership (utility-owned, third-party owned, customer-owned, joint ownership), including entering into contracts with customer-sited storage resources directly or via aggregation by third-parties.

The IOUs may own storage assets in all three storage grid domains. However, each IOU may procure utility-owned storage resources only up to 50 percent of the cumulative procurement targets across all three grid domains. The utility may propose the utility-owned energy storage asset within its applicable GRC proceeding, or the procurement application discussed below. The utility must make a showing of cost-effectiveness and viability within the applicable proceeding using the same evaluation methodology described in Section 3.d. below.

An IOU proposing utility-owned storage in any grid domain, except for projects that involve distribution reliability applications, for special circumstances similar to those described in D.07-12-052<sup>165</sup>, shall pursue a competitive process consistent or comparable to the process described in D.07-12-052. That is, the IOU should request in its application to hold a competitive RFO for turnkey project development of the resource under a Purchase and Sale Agreement (PSA). If a competitive solicitation for a PSA contract to build the utility-owned project is not appropriate, the IOU should explain in its application why this is the case and propose with an Engineering,

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<sup>165</sup> D.07-12-052 at 211-212.

Procurement, and Construction (EPC), straight utility build project approach, or other approach, depending on the circumstances.

Where an energy storage system has been funded in part by a local, state, or federal public program, only the expenditures not publicly funded may be proposed for rate recovery by the IOUs. However, the project will be bid in and be evaluated based upon its full cost after any public funding, but rate recovery shall be authorized only for the portion of the cost that is not publicly funded.

**d) Procurement Application**

On or before March 1, 2014, and biennially thereafter in 2016, 2018, and 2020, each IOU shall file a procurement application containing proposals for energy storage procurement, as needed to address specifics applicable to different grid domains, use cases or ownership scenario, with any proposed modifications based on data and experiences from previous procurement cycles.

The procurement application shall include, at a minimum:

- An updated table with estimates for biennial procurement targets for each storage grid domain from current year to 2020 adjusted to account for:
  - any offsets expected to be claimed by the IOU as credits, against the procurement targets applicable at the time of the application for storage resources procured pursuant to Commission authorizations in any proceeding in accordance with the guidelines in Section 2.d above (resulting in a reduction in target),
  - any deferments of procurement targets authorized by the Commission in prior procurement cycles as discussed in the “Deferment” section below (resulting in an increase in target),
  - any excess procurement in the prior procurement cycle or shortfall resulting from contract rejections, contract cancellations, or less than expected installations of customer-owned projects since the

last procurement cycle (resulting in a reduction or increase in target), and

- any shifting of MW between the transmission and distribution grid domains planned by the IOU (resulting in an increase or a reduction of target in those domains);
- Reference to 1) needs study by the California Independent System Operator for the IOU's system, local, and flexible needs, if available, or 2) upgrade needs identified in the IOU's transmission or distribution planning studies;
- A list of all applicable rules and statutes impacting the procurement plan;
- An explanation of the type of storage resources and the associated MW quantities the IOU intends to procure, categorized by grid domains and use cases;
- A detailed description of how the IOU intends to procure resources specifying the structure of any RFO or alternative procurement processes and related timelines;
- Operational requirements, to be applied either to all projects or separately with respect to transmission, distribution, and customer-sited storage. The requirements shall include, at a minimum:
  - Grid optimization services specific to the operational needs of the load-serving entity, such as any service intended to contribute to reliability needs, or defer transmission and distribution upgrade investments;
  - Attributes or services intended to integrate renewable energy;
  - Greenhouse gas emissions-reducing attributes, such as permanent load shifting away from greenhouse gas emitting fossil generation or reduction of demand for peak electrical generation using fossil fuels;

- A proposed methodology for an analysis that evaluates bids on cost and fit submitted in a solicitation that draws on:
  - The full range of benefits and costs identified in the use case framework developed and the EPRI and DNV KEMA reports submitted in this proceeding;<sup>166</sup>
  - An optional utility-specific proprietary evaluation protocol; and
  - An evaluation protocol consistent across the IOUs that includes a consistent set of assumptions and methods for valuing storage benefits, such as market services and avoided costs, and estimating project costs that allow adjustments for utility-specific factors (such as location, portfolio, cost of capital, etc.) and utility-specific modeling tools based outputs affecting valuation as appropriate to provide a consistent basis for comparison across utilities, bids, and use cases. The consistent evaluation protocol shall be developed by the IOUs through joint consultation between the IOUs and the Commission Staff prior to the filing of the application and referenced in that application;
- Proposed storage equipment/power/services purchase agreements for successful bids involving third party-owned or -aggregated projects;
- A report on all storage resources procured to date in all Commission proceedings. In the report, the IOUs are directed to identify the type of storage technology, the capacity of the projects (in MW & MWh), the location of the project (city and zip code level if public), the proceeding in which it is procured, and the procurement mechanism (e.g., RFO, RAM, SGIP, etc.), applicable storage grid domain, status of the project (CPUC approval, construction stage), estimated online date, expected operational life, primary and secondary applications of the project,

<sup>166</sup> The EPRI and DNV KEMA energy storage cost-effectiveness reports are available here: <http://www.cpuc.ca.gov/PUC/energy/electric/storage.htm>.

technology manufacturer and project owner & operator. Energy Division may provide additional direction on changes in the required content and format of the reports as needed; and

- Request for cost-recovery authorization as appropriate.

Following Commission review and approval of the energy storage procurement application, the IOUs shall then hold a competitive solicitation by issuing an RFO for energy storage resources.

**e) Deferment of Procurement Targets**

Each IOU may request a deferment of up to 80 percent of its procurement targets with an affirmative showing of unreasonableness of cost based on the approved evaluation methodology or the lack of operationally viable number of bids in the energy storage solicitation.

Each IOU would have the burden to show that a deferment of its procurement target is warranted. To request Commission approval for deferment, the IOU shall file a Tier 3 Advice Letter within three months after receipt of bids in response to its RFO. If the request is granted, the procurement target for the next solicitation shall be increased to include the deferred amount.

**f) Independent Evaluator**

Each IOU shall employ an independent evaluator (IE) to assess the competitiveness and integrity of its solicitation and to prepare a post-solicitation report.

The IE report shall include, at a minimum, an evaluation of the fairness of the IOUs solicitation and bid selection process, an assessment of project-specific negotiations, an analysis of the RFO bids, bid evaluation process (including valuation tools), an analysis of the overall market, and whether the contracts merit Commission approval. The report shall also include project characteristics such as technology, location, project size, online date and project viability. The

report shall be served to the service list of the energy storage proceeding active at the time. Energy Division may provide additional direction on the reports as needed.

The IOU shall submit the IE's report as part of its filing requesting approval of contracts resulting from the solicitation as discussed in Section 3.h. below.

**g) Procurement Review Group**

Each IOU shall be required to present the design of each solicitation plan and the results of each solicitation to its Procurement Review Group, including the evaluation methodology applied to the bids received in response to the RFO.

**h) Commission Approval of Procurement Contracts**

Following each solicitation, the IOUs shall negotiate signed contracts within one year of the solicitation, contingent on Commission approval. In its approval of the procurement applications, the Commission will provide additional direction on the process the IOUs shall use to request approval for the winning energy storage bids. As directed by the Commission, each IOU shall file an application or Tier 3 Advice Letter setting out the contracts for the winning bids for Commission approval. The IOUs shall submit the IE's report as part of this filing.

The filing shall be limited to only those contracts that are consistent with the terms of the decision approving the procurement application. Approval for non-conforming contracts shall be sought by IOUs via submission of applications.

The filing shall be submitted no later one year from the date of the solicitation.

**i) Treatment of Solicitation and Contract Data**

IOUs

All data related to all bids in each solicitation shall be handled in a manner consistent with D.06-06-066 or any subsequent applicable Commission decision on the confidentiality of procurement data. However, all information that is afforded confidential treatment shall become public three years after the date the contract is approved by the Commission, unless an earlier date is specified in the IOU Matrix.

#### ESPs and CCAs

All submitted data shall be handled in a manner consistent with D.06-06-066 or any subsequent applicable Commission decision on the confidentiality of procurement data. However, all information that is afforded confidential treatment shall become public three years after the date it is submitted to the Commission, unless an earlier date is specified in the ESP Matrix.

#### **4) Energy Storage Procurement Program Evaluation**

Energy Division shall conduct a comprehensive evaluation of the program no later than 2016 and at least once every three years thereafter through 2022. Based on the findings of the evaluation, the Commission may make adjustments to the program if needed.

The program evaluation shall assess the following:

- a. Whether the energy storage resources procured by IOUs meets the stated purposes of optimizing the grid, integrating renewables, and/or reducing greenhouse gas emissions;
- b. Progress toward market transformation;
- c. Learning from collection, analysis, and reporting of energy storage operational data; and

- d. Learning from collection, analysis, and reporting of the cost-effectiveness of the energy storage systems procured, with attention to data confidentiality.
- e. Best practices for the safe operation of energy storage technologies.

The utilities shall collectively fund an annual budget of approximately \$500,000 from all ratepayers, to be reimbursed to the Commission through the regular budget process, to allow Commission staff to oversee evaluation and analysis of the program and hire consultants for this purpose. The expectation is for Commission staff to be able to commence evaluation efforts by late 2014 or early 2015. The costs of the \$500,000 budget shall be shared by the IOUs according to their proportional share of peak load, and collectable from ratepayers starting in 2015 (such that the maximum budget available for evaluation is \$500,000 per year for 6 years, or \$3 million, unless modified).

**(END OF APPENDIX)**

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