

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

Application of Pacific Gas and Electric Company (U 39-E) for Approval of Demand Response Programs, Pilots and Budgets for 2012-2014.	Application 11-03-001 (Filed March 1, 2011)
Application of San Diego Gas & Electric Company (U902M) for Approval of Demand Response Programs and Budgets for Years 2012-2014.	Application 11-03-002 (Filed March 1, 2011)
Application of Southern California Edison Company (U338E) for Approval of Demand Response Programs, Activities and Budgets for 2012-2014.	Application 11-03-003 (Filed March 1, 2011)

OPENING BRIEF OF THE CALIFORNIA ENERGY STORAGE ALLIANCE

Donald C. Liddell
DOUGLASS & LIDDELL
2928 2nd Avenue
San Diego, California 92103
Telephone: (619) 993-9096
Facsimile: (619) 296-4662
Email: liddell@energyattorney.com

Counsel for the
CALIFORNIA ENERGY STORAGE ALLIANCE

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OPENING BRIEF OF THE CALIFORNIA ENERGY STORAGE ALLIANCE

Pursuant to Rule 13.11 of the Rules of Practice and Procedure of the California Public Utilities Commission (“Commission”), the *Joint Assigned Commissioner and Administrative Law Judge’s Scoping Order and Memo* of Assigned Commissioner Michael R. Peevey and Administrative Law Judge Kelly A. Hymes, issued May 13, 2010 (“Scoping Order”), and *Administrative Law Judge’s Ruling Providing Guidance for Briefs*, issued by Administrative Law Judge Kelly A. Hymes, on August 1, 2011 (“Briefing Ruling”), the California Energy Storage Alliance (“CESA”)¹ respectfully submits this opening brief regarding the investor-owned utility applications captioned above (“Applications”) with respect to the approval of each

¹ The California Energy Storage Alliance consists of A123 Systems, Altairano, Applied Intellectual Capital/East Penn Manufacturing Co., Inc., Beacon Power Corporation, CALMAC, Chevron Energy Solutions, Debenham Energy, Deeya Energy, Enersys, EnerVault, Exide Technologies, Fluidic Energy, General Compression, Greensmith Energy Management Systems, HDR, Inc., Ice Energy, International Battery, Inc., LG Chem, LightSail Energy, Inc., MEMC/SunEdison, Powergetics, Primus Power, Prudent Energy, RedFlow, RES Americas, Saft America, Inc., Samsung SDI, SANYO, Seo, Sharp Labs of America, Silent Power, Sumitomo Electric, Suntech, SunPower, Sunverge, SustainX, Xtreme Power, and Younicos. The views expressed in these Comments are those of CESA, and do not necessarily reflect the views of all of the individual CESA member companies. <http://www.storagealliance.org>.

utility's demand response ("DR") program, pilot and budget. This opening brief is organized in a manner intended to comply with the Briefing Ruling. Although this opening brief does not offer comments on all issues, CESA reserves the right to comment on additional issues in its planned reply brief.

I. INTRODUCTION.

CESA's participation in this consolidated proceeding is focused exclusively on why and how the Commission should direct Pacific Gas and Electric Company ("PG&E"), Southern California Edison Company ("SCE") and San Diego Gas & Electric Company ("SDG&E") (collectively the "Utilities"), to revise and resubmit their Applications to substantially increase the scope of their programs and the amount of their budgets targeted to promote Permanent Load Shifting ("PLS"). The record in this proceeding viewed as a whole, including CESA's prepared written testimony and written comments submitted by CESA, together with the prepared written testimony and comments submitted by CALMAC Manufacturing Corporation ("CALMAC") and Ice Energy, Inc., ("Ice Energy") makes an unassailable case for the Commission to immediately order the Utilities to expand and accelerate implementation of their PLS programs.

The *Statewide Joint IOU Study of Permanent Load Shifting* ("PLS Study")² that the Utilities were ordered to prepare by the Commission in D.09-08-027³ establishes a solid framework for recommending substantial increases in statewide deployment of cost-effective PLS by the Utilities. Unfortunately, in their Applications, the Utilities propose to continue existing small PLS incentive programs with a modest total budget of approximately \$32.3 million over three years. It is clear, however, that the overarching public policies involved dictate a pressing need for demand response ("DR") that is integrated with all of the other forward-looking elements of California's energy policy.⁴ In CESA's view, the Commission should therefore order the Utilities to submit revised Applications as detailed below. The findings in the PLS Study, together with the record in this proceeding, supports a total statewide

² *Joint IOU Study of Permanent Load Shifting*, submitted to the Commission on December 1, 2010 ("PLS Study").

³ *Decision Adopting Demand Response Activities and Budgets for 2009 through 2011*, issued August 20, 2009.

⁴ In 2003, the Commission, the California Energy Commission (CEC), and the California Power Authority adopted an Energy Action Plan that articulated a single, unified approach to meeting California's electricity and natural gas needs. In 2005, the CEC and the Commission adopted a second plan, Energy Action Plan II, to reflect the policy changes and actions of the ensuing two years. At the beginning of 2008, the two state agencies prepared an "update" that examined the state's ongoing actions in the context of global climate change. More information can be found at: <http://www.cpuc.ca.gov/PUC/energy/resources/Energy+Action+Plan/>

budget for PLS of approximately \$120 million over a three year period with higher incentives per kW based on the technology type.

The Scoping Memo for this proceeding⁵ states that “. . . the proceeding will look at the evolving nature of DR and the impact of its evolution on these current and future applications. The proceeding will determine the adequacy of the DR programs, looking at whether existing and proposed programs and pilots are sufficient to meet California energy goals in light of the changing nature of the energy grid and the 33% renewables requirement. The review will address specific activities including PLS. . . .”⁶

The PLS programs of the Utilities must be evaluated in the context of California’s urgent need for all applications of energy storage, of which PLS is a strategically vital part.⁷ It is not sound public policy for the Commission to repeatedly urge the Utilities to greatly expand their PLS programs, only to allow the Utilities to downplay the value to California of grid-wide deployment of PLS and other storage technologies, including efficiency and reliability of the grid, in addition to peak load reduction.⁸ As more fully discussed in this opening brief, the Commission cannot afford to miss the one-time opportunity presented by this proceeding – at this time - to move the Utilities in the right direction regarding PLS.

California’s policy regarding the vital role of energy storage technologies as a class has changed dramatically since the Commission issued its August 2009 decision on the utilities’ DR programs for the years 2009-2011.⁹ Most prominently, the Commission has opened a new rulemaking proceeding in December 2010 pursuant to Assembly Bill (“AB”) 2514. (“Energy Storage OIR”)¹⁰ PLS is cited as one important example of the energy storage procurement guidance that the Energy Storage OIR will address on both the utility and the customer side of the meter. PLS will remain important in that proceeding as it unfolds over the next few years, and immediately within the scope of this proceeding as it relates to customer-oriented DR programs.

⁵ *Joint Assigned Commissioner and Administrative Law Judge’s Ruling and Scoping Memo*, issued May 13, 2011.

⁶ *Id.*, p. 8.

⁷ *See generally*, *Governor Brown’s Clean Jobs Plan*, June 15, 2010.

⁸ *Order Adopting Changes to 2007 Utility Demand Response Programs*, D.06-11-049, issued November 30, 2006, p. 46.

⁹ *See*, footnote 4, *infra*.

¹⁰ *See*, *Order Instituting Rulemaking Pursuant to Assembly Bill 2514 to Consider the Adoption of Procurement Targets for Viable and Cost-Effective Energy Storage Systems*, R.10-12-007, issued December 16, 2010.

II. THE PLS PROGRAMS PROPOSED IN THE APPLICATIONS DO NOT COMPLY WITH THE COMMISSION'S REQUIREMENTS, ARE UNREASONABLY SMALL IN TOTAL SIZE AND INCENTIVE LEVELS, AND WILL NOT MEET CALIFORNIA'S FUTURE NEEDS.

The Utilities have, of course, proposed to carry forward small existing PLS programs essentially unchanged as part of their Applications, but the Applications are all woefully deficient because they do not comply with the original intent of the Commission,¹¹ or D.09-08-027 and subsequent detailed program guidance provided by the Commission since then.¹²

A. The Applications Do Not Comply with the Commission's Requirements.

As previously indicated, in August 2009 the Commission specifically ordered the Utilities in D.09-08-027 ordered to proceed as follows:

“Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company shall work with parties to examine ways of expanding the availability of permanent load shifting. This study shall include discussion of a standard offer proposal that could apply generally to any permanent load shifting technologies including, but not limited to, thermal energy storage. This study should also consider other ways of encouraging permanent load shifting, including modifications to time of use rates or another RFP process. This report shall contain a summary of permanent load shifting standard offers available throughout the United States, as well as an evaluation of what incentive payment would be appropriate for a future standard offer. Each of the utilities shall provide its report to the Director of the Energy Division no later than December 1, 2010, and shall provide copies to the most recent service list in this proceeding. In addition, the utilities shall post these reports on a publicly available web site.” (Ordering Paragraph 32, p. 216).

Since then the Utilities have performed the work and delivered the PLS Study as ordered by the Commission and the PLS Study has been entered into the record in this proceeding. and the Commission has provided both general and very specific program guidance to the Utilities that is not reflected adequately in any of the Applications. For example, the Utilities were reminded of the purpose of the PLS Study by an ALJ's Ruling issued in August 2010 “The utilities' 2012-2014 Applications shall contain proposals to *expand the use of permanent load shifting* that are informed by the December 2010 study, and should include discussion of the most effective ways to encourage an increase in cost effective permanent load shifting, for

¹¹ See, Resolution No. E-4098, issued July 30, 2007.

¹² See, Administrative Law Judge's Ruling Providing Guidance for the 2012-2014 Demand Response Applications, issued August 27, 2010; Administrative Law Judge's Ruling Providing Further Guidance for Permanent Load Shifting Activities in the 2012-2014 Demand Response Applications, issued April 29, 2011.

example through dynamic rates, future RFPs, or standard offer contracts.”¹³ (ALJ’s Ruling, August 27, 2010, p. 17). As detailed below, the Applications do not comply with the Commission’s Decision 09-08-027 (“D.09-08-027”) or subsequent specific program guidance at all.

B. The Applications Propose PLS Programs That Are Unreasonably Small In Scope and Budget.

The PLS Report, instructs the Utilities that their PLS programs should conform to the following basic principles and parameters described in detail below. CESA supports the alternative PLS programs proposed by CALMAC and Ice Energy in their respective prepared written testimony because they both will help meet California’s future needs, for PLS specifically and for DR in general. Unlike the PLS programs proposed by the Utilities, they are each consistent with the goals of the PLS program. Properly designed, PLS programs should minimize transaction cost for all stakeholders while allowing for individual utility flexibility, and support many types of energy storage technologies to participate in the PLS program, as well as thermal energy storage.

The following program guidelines would apply to all PLS systems owned/operated by end use customers and/or third parties.

1. PLS Program Categories.

The PLS Study recommended a standard offer across the Utilities broken down into two distinct categories of technologies.¹⁴

“Divide PLS Program into at least two categories based on technology; one for mature large scale PLS, and one for emerging PLS technologies, with different program designs and goals.

- “Mature: Large scale PLS deployment that minimizes ratepayer incentives and provides thermal-based solutions
- Emerging: Market transformation for storage with focus on integration with renewable resources and energy efficiency”

CESA generally agrees with the PLS Study’s recommendations for a breakdown of technology categories to reflect the degree to which the PLS products are technologically mature

¹³ *ALJ’s Ruling Providing Guidance further 2012-2014 Demand Response Applications, Infra*, p. 17.

¹⁴ *PLS Study*, p. 15.

or technologically emerging. For clarity, CESA also notes importantly that there is also a related, but different, distinction between mature and emerging PLS *markets* that also needs to be taken into account, even for technologically mature PLS products. CESA recommends that the following clarification be made to the definitions of these categories:

- Technologically Mature: *Thermal-based* storage that performs PLS deployment that minimizes ratepayer incentives and provides thermal-based solutions. Thermal-based solutions in turn need to be categorized as to whether they are manufactured, small-scale products (the market for which is still emerging and requires market transformational activities).
- Technologically Emerging: Market transformation for *non-thermal based* storage with focus on integration with renewable resources and energy efficiency. This category would include electricity energy storage that can be used to shift load.

2. Incentive Levels.

CESA agrees in general with the avoided cost ranges laid out in the PLS Study's results. Based on a cost-effectiveness framework appropriate for load shifting, the lifecycle value of the avoided cost benefits of PLS technologies was estimated to be between \$500/peak kW and \$2,500/peak kW, assuming a 15 year project life. Since PLS solutions are geared toward avoiding costly peaking generation and transmission and distribution assets and energy storage technologies can be designed for much longer life-times than 15 years, CESA recommends that the avoided costs the Commission should consider are the estimated avoided cost benefits for a 30 year project life, which is in the range of \$650/peak kW to \$3,250/peak kW depending on the number of hours the PLS system can shift load and what hour(s) the shifting occurs¹⁵.

CESA also generally agrees with the incentive levels and structures recommended within the PLS Study, particularly those recommendations that specify what level of incentive is required to stimulate adoption by end users by creating a sufficiently attractive economic value proposition, while again noting that a distinction needs to be made regarding the maturity of the particular PLS market, not just the PLS technology.

“The required incentive levels for the thermal storage simulations range from about \$100 to 1,000/kW to achieve a 5 year payback for the end user and approximately \$860 to \$1,800/kW to achieve a 3 year payback. The battery

¹⁵ These avoided cost benefits are based on a 30-year project life estimate. Decreasing project life to 15 years would decrease lifecycle avoided cost benefits by approximately 30%, to \$500-\$2,500 per peak kW

simulations’ required incentive levels ranging from \$1,100 (5 year payback) to over \$5,000 (3 year payback) to achieve required customer investment payback levels. It is important to note that the battery simulations were performed for only two different battery technologies among a wide range of possible battery technologies.” E3 report page 11)

Based on these cost-effectiveness findings, the study found that a PLS program could be designed so that it would be “ratepayer neutral.” Using a “generic tariff” to model ratepayer neutral incentive levels, the PLS Study found that ratepayer neutral incentives could be as much as \$200-\$800/kW, depending on the number of hours shifted. Using actual utility tariffs, the upper end of this range can increase to as much as \$1,610/kW.

Ratepayer neutral incentive levels would apply to the mature thermal technology category. As indicated within the end-customer analysis of the PLS study, incentive levels closer to \$2,000/kW would be needed to encourage adoption of smaller, emerging PLS technology category to ensure a sufficient economic value proposition for end use customer adoption¹⁶ Sufficient incentive levels were also a key “best practices” finding of the E3 report based on numerous interviews of PLS programs around the country:

“Programs that do not provide an adequate up front incentive will struggle to attract customers, particularly in today’s challenging economic climate.” (page 12)

CESA’s proposed increased incentive levels for emerging energy storage technologies represents a modest premium that is justified in light of the value in providing a meaningful incentive for these PLS types and California’s broad policy goals with respect to energy storage.

3. Size of Budget.

CESA has recommended PLS budget sizing should be focused on levels that can encourage stakeholder participation and achieve market transformation for PLS technologies by implementing two properly designed incentive programs, each sized at approximately \$60 million: (a) a mature PLS program providing rate payer neutral incentives to encourage deployment of technologically mature permanent load shifting technologies, and (b) an emerging, market transformational PLS program to encourage technologically emerging PLS technologies (e.g. chemical or mechanical electric energy storage) and other emerging market PLS technologies (e.g. small-scale thermalenergy storage). The Commission should support

¹⁶ PLS Study, p.11.

CESA's proposed budget of \$120 million, as it represents approximately a three-fold increase of the prior PLS *pilot* budget, a *very reasonable* increase in light of the requirements of the original decision ordering the utilities to increase PLS in California.

Current proposed budgets by the IOUs are woefully inadequate in that they are of the same size/magnitude as the original PLS pilots. While CESA applauds SCE's proposal to create an emerging category of PLS funding, clearly, with SCE's proposed budget of \$3 million can hardly be considered market transformational. That would equate to a mere \$1 million per year. This magnitude of funding will not encourage energy storage stakeholders to invest the time and money required to build up a successful PLS business in California, particularly if the program was solely offered in a single utility service territory.

As filed, all of the Applications regarding PLS fall substantially short of the consistently stated intent of the Commission to expand and diversify PLS program offerings, and of the appropriate and cost-effective contribution that PLS can make to the California electricity grid. That unfortunate shortcoming is clearly and forcefully informed by the PLS Study. For the reasons explained below, the Commission should therefore direct the Utilities to submit, by a date certain, revised Applications that approximate \$120 million in aggregate.¹⁷ Further, given that ratepayer neutral incentives will be provided for a significant portion of the PLS incentive (technologically mature large thermal), and only a most additional premium needs to be provided to encourage small thermal and non thermal storage, the benefits of this program toward achieving California's many energy policy goals far outweighs its cost.

"There can be no doubt that since 2007 the Commission has viewed PLS as anything *but* a pilot for years.¹⁸ Yet, the budgets proposed in the three Applications are the *same magnitude as the current PLS program budgets*. Maintaining the *status quo* will not advance the Commission's goals for PLS, much less for peak demand reduction, least-cost resource procurement, taking advantage of all cost-effective demand-side measures, renewable energy integration, or energy storage deployment."¹⁹

¹⁷ See, *Response of the California Energy Storage Alliance to Applications for Approval of Demand Response Programs, Pilots And Budgets for 2012-2014*, Filed April 4, 2011, p. 2.

¹⁸ *Op cit*, footnote 13: "In various filings and discussions, the utilities refer to their permanent load shifting programs as pilots. Pilot programs are generally designed to test technologies or answer questions about the uses and applications of those technologies. In the case of the permanent load shifting activities, however, it is not clear what aspects of the technologies are being tested or what questions are being explored. For this reason, we consider the permanent load shifting activities discussed in this section to be programs, not pilots." (p. 149).

¹⁹ *Id.* p. 4.

4. Program Structure and Uniformity.

CESA supports a uniform program across the Utilities. Program uniformity will assist with significant reductions in transaction cost and overhead that can be saved if the Utilities standardize their PLS programs. Program uniformity, especially in favor of a ‘standard offer’ was a key stakeholder consensus finding (page 13).

Consensus Stakeholder feedback:

Lack of consistent, transparent rate structures that promote PLS are an impediment
A standard offer is preferable to an RFP, as it more easily encourages technology neutrality, and participation by smaller stakeholders
Incentive levels need to take into account all project and market entry costs, deliver 3-5 year payback and should be technology neutral.
Consistency in programs across IOU service territories is important
Program complexity adds costs and discourages market participation
Lack of education/training about PLS technologies — their design, implementation and operation — is a severe challenge

Standardizing core aspects of the PLS program in several dimensions will facilitate market entry by PLS providers and reduce the overall cost of administration and implementation for all. CESA argues that program uniformity should include these primary principles:

- Rejection of any energy neutrality requirements
- Program simplicity and consistency
- Consistency in electric rates

An approach that neither favors nor disfavors specific energy storage technologies over others is essential to promoting a diverse array of potential PLS applications. “Round-trip” energy efficiency is a key component of the project’s value proposition – if technologies are not sufficiently efficient, they will not deliver a robust enough return for investors. There are many variables that contribute to the overall cost effectiveness of a technology, and energy efficiency is just one of them. Other, more critical variables include overall capital expense and maintenance cost over time. There certainly is no need to set round-trip energy efficiency requirements that can preclude promising energy storage technologies from participating in the

PLS program.

Program simplicity and consistency across utility service territories is critical to minimizing transaction cost and to developing best practices in program administration. Using a customized approach for each of the Utilities has apparently had unnecessary negative impacts on the overall cost-effectiveness of PLS programs implemented by the Utilities to date. The wide variation in program rules across utility service territories requires market participants to replicate their sales, marketing and business development approach in each utility service territory, driving up the cost to do business. A good example of the benefits that come with a common format-type incentive program is the highly successful California Solar Initiative (“CSI”) program.²⁰

“[We] note that the Commission has pursued a sound policy of requiring standardization of cost-effectiveness methodologies across various Commission-approved incentive programs. Accordingly, within a single program, such as PLS, as with other forms of energy storage, at a minimum the program scope and substance should strive for consistency across the Utilities. This recommendation specifically holds true for PLS because a thorough analysis has been undertaken by the Utilities, at the Commissions direction, that has resulted in a broad general consensus on assumptions and recommendations.”²¹

The Commission should require essentially the same type of program uniformity for the PLS program that it has developed using lessons learned over time with the CSI program. PLS program components that should be consistent across IOU service territories include the following:

- Technology eligibility
- Incentive structure (\$/kW or \$/kWh, payment terms, timing and requirements)
- Measurement and verification requirements
- Criteria for program success
- Application process/rules
- Reporting (both in terms of project performance as well as program performance)

There maybe, however, reasonable differences between utility service territories that reflect differences in load shapes and electric tariffs – thus each utility may have different dollar

²⁰ See, the Commission’s web site:

²¹ Response of the California Storage Alliance to Applications for Approval of Demand Response Programs, Pilots And Budgets for 2012-2014, Filed April 4, 2011 (p. 2)

levels of incentive, but all should follow the same basic PLS program framework.

The final principle of electric rate consistency is critical for large-scale PLS deployment and is required across all utility service territories. Consistent electric tariff structures that promote shifting of demand and consumption by providing a consistent differential between peak and off-peak rates over a number of years are absolutely key to greater PLS project deployment. For projects to be economically viable, such differentials must be financeable, for at least a 10-15 year period. Consistent, financeable differentials between peak and off peak also provide built-in an incentive for PLS technologies to perform as specified, since cash flows and savings will only be realized if peak electricity is actually shifted.

CESA also agrees with the E3 report's program design best practices, summarized below:
(page 16-17)

“In addition, a number of best practices were observed from the pilots and other PLS programs nationwide that are worth considering for California. The following summary of the PLS program design recommendations should be considered:

- Divide PLS Program into at least two categories based on technology; one for mature large scale PLS, and one for emerging PLS technologies, with different program designs and goals.
 - Mature: Large scale PLS deployment that minimizes ratepayer incentives and provides thermal-based solutions
 - Emerging: Market transformation for storage with focus on integration with renewable resources and energy efficiency
- Program design should address each of the three stages of the PLS system deployment through incentives, reports, or EM&V, to increase the quality of the deployed PLS systems. These include;
 - (1) feasibility and design of PLS systems,
 - (2) quality control of construction and post-construction performance testing, and
 - (3) persistence of PLS operations.
- Provide consistent and predictable bill savings to encourage long term customer investment in PLS technology, that
 - Provides a financeable level of long-term rate stability to encourage the initial capital outlay in a PLS system. This can be done with a separate PLS rate, or by a “guarantee” of minimum

on- to off-peak rate differentials or “grandfathering” existing TOU rates

- Offers a “super off-peak” rate to encourage charging after midnight or 2 a.m. when the over generation problem is expected to be the worst and energy has the lowest cost, and
- Encourage sustained PLS performance using performance-based incentives and regular EM&V;
 - Performance-based incentives could be achieved through one of two approaches depending on technologies;
 - A “PLS-specific” tariff with TOU rate differentials provides some incentive to operate the PLS system well, and does not require a specific baseline development. This approach is more suitable for thermal storage.
 - A standard offer model based on an energy payment (\$/kWh shifted) provides a direct performance-based incentive, but would require strict guidelines for calculating baselines for thermal or process shifting PLS technologies. Therefore, this approach is easier to provide to electrical battery systems. This approach also reduces potential for “gaming” with battery systems (where batteries are used for non-PLS purposes such as for providing uninterruptible power supply).
 - Both incentive approaches should be coupled with an EM&V requirement to provide an “operations report” and operational data of the system and the whole customer load.
 - Incentives and incentive structure influence directly influence PLS design and operations so it is important to provide incentives consistent with program goals
 - Simplicity and transparency of the performance metrics are critical to minimizing program cost and encouraging customer adoption.”

C. The Alternative PLS Programs Proposed By CALMAC and Ice Energy Are Reasonable.

As the Utilities freely acknowledge, the PLS Study provides an excellent blueprint, or framework, for developing and implementing PLS programs that will serve the purpose intended by the Commission. The PLS programs proposed by CALMAC and Ice Energy – both widely acknowledge leaders in the thermal storage industry - are informed by actual project experience in California and thus provide all of the specific program design elements needed for the Utilities

to immediately adopt them as their own by order of the Commission.

1. CALMAC believes that a successful PLS program must include the following features:

- A PLS program must have a simple application and implementation process. Programs that require significantly more time to prepare, approve and implement than conventional standard design practices will cause owners and or designers not to take advantage of the programs because the process will increase costs and add time requirements to the design process.

- A PLS program must focus on shifting demand (other programs focus on energy efficiency)

- Focus on shifting kW (demand), no kWh (energy) component

- Previous studies have shown that using nighttime generation typically uses less source fuel.

- Specify a 4 to 8 hour time period for loads to be shifted that will have the best impact for the grid.

- Largest kW shifted in the specified time frame is the basis of the incentive.

- Load shifting incentives based upon \$ per ton or \$ per kW

- Cooling tower kW should be included in the load shifted for water cooled applications.

- Regulatory oversight to help insure proper operation and utility verification” (pp. 8-9).

- A PLS program should include a \$2,500 incentive for a project feasibility study. CALMAC believes that this study will move the market by increasing the understanding of storage design and ultimately lower the design costs over time.

- A PLS Program should include storage equipment parts and labor warranties that are at least five years in duration. CALMAC believes that is the ratepayers are going to provide some of the investment in these systems, that manufacturers must build them to operate trouble free. Providing five-year warranties is much longer than standard HVAC equipment warranties.

- Measurement and verification should focus on kW shifted by confirming chiller (and cooling tower if applicable) kW that is displaced by the use of energy storage during

the time period specified for a peak design day.

- “In order for a PLS program to be successful, it must be sufficiently funded and “evergreen” so that analyzing and designing buildings with TES where appropriate becomes a natural part of the design process rather than the exception. As energy storage design becomes mainstream costs will go down. However, without adequate funding the program will not achieve the expected results and TES projects will always be abnormal, requiring higher costs.” (p. 16).

“Based on CALMAC’s knowledge of the HVAC market, market acceptance of energy storage, the electricity rates in California, and our experience with building owners and designers, a reasonable incentive would be \$1,200 -\$1500 per kW shifted from the peak electric rate period. The other utility PLS-type programs mentioned in this testimony are successful and have lower incentives because (i) they have overcome some the initial market barriers that new systems must overcome, (ii) they have different electrical rates and different professional and local labor rates, and (iii) they may have opportunities for additional revenue streams from wholesale market opportunities. Incentives that are lower than \$1200 - \$1500 per kW will not drive the market to install load-shifting equipment, especially in the private sector where the economic hurdles (Internal Rate of Return or payback) are more stringent. ” (p. 17).

“When considering the appropriate incentive levels it is worthwhile to compare the incentive levels to the value of a peak kW of demand. What is the cost to California of a new peak kW in terms of generation, transmission and distribution? What about other societal costs? In the “Statewide Joint IOU Study of Permanent Load Shifting” produced for the Commission in this proceeding the costs of an avoided kW were reported to be as high as \$2,500 per kW. For a six-hour shift of peak demand the avoided costs were estimated to be about \$2,000 per kW. In either case an incentive to shift peak loads of \$1,000 per kW is significantly cheaper than other alternatives.” (p. 17).

“Incentive payments should be split into three parts – \$2,500 for application and feasibility, 1/2 of the total when the energy storage tanks are delivered, and the remainder to be paid upon successful commissioning.” (p. 19).

2. Ice Energy.

Ice Energy believes that a successful PLS program must include the following features:

- The Utilities should offer \$2,000/kW for PLS technologies such as small-

scale ice storage that can maintain its cost-effectiveness at that level. This calculation is based upon the very thorough cost effectiveness analysis Ice Energy conducted of its PLS technology, utilizing the E3 DR Reporting Template and using many of the same assumptions developed by SCE and the other Utilities for the evaluation of their DR programs. Ice Energy found that its PLS resource passes a 1.0 TRC benefit/cost ratio assuming incentive levels of \$2,000/kW.

- There is a cost-effective PLS resource in, for example, SCE’s service territory that calls for an incentive budget of at least \$60 million over the 2012-2014 period, and perhaps considerably more than that. This calculation is based upon the experience of Ice Energy with other (municipally owned) southern California electric utilities.

- PLS cost effectiveness is a function of the specific characteristics of each individual PLS technology. The technical and contractual performance of individual PLS offerings should be considered when setting incentive levels such that the maximum cost-effective incentive level for a specific PLS technology can be offered to the customer or vendor.

- Per kilowatt PLS incentives that are based on generic or other inappropriate assumptions (e.g. tariffs, product lifetime, etc.) may be too low and thus will reduce PLS program participation as well as increase the per-unit cost of the PLS program.

- Significant PLS program cost savings from reduced administrative costs are attainable if a Utility increases the available funding and proposed size of its PLS program enrollment.

- PLS systems can, and should, be effectively and cost-effectively deployed if owned by utilities and help California achieve its PLS goals. Accordingly the Utilities should directly competitively procure PLS resources (that would then be utility-owned).

D. PLS Program: Meeting Future Needs.

The CALMAC and Ice Energy alternative PLS proposals are both fully responsive to the direction provided in D.09-08-027, the recommendation included in the PLS Study, and specific guidance provided by the Commission. In addition to DR, PLS programs with the features described here will help meet the needs of at least the following specific California programs and policies: Energy Efficiency, Renewables Performance Standard, Resource Adequacy.

1. Integration.

The Ice Energy proposal encapsulates the future oriented nature of PLS: “PLS programs can and should be more actively integrated with other DSM programs – most notably energy

efficiency - for two very important reasons. One, as established by the Commission with adoption of D.08-09-040, issued September 18, 19 2008, the “California Energy Efficiency Strategic Plan” in R.08-07-011, together with a recent update of the Plan in the “California Energy Efficiency Strategic Plan January 21 2011 Update”, the integration of DSM programs is a key goal of the Commission: “The CPUC should integrate the DSM programs within its jurisdiction...in order to enable offerings of integrated packages that will maximize savings and efficiencies of utility program overhead.” (“California Energy Efficiency Strategic Plan: January 2011 Update”, page 67.). . . Two, optimally integrating certain PLS technologies, such as ISAC, with related energy efficiency efforts can lead to very significantly enhanced end results – both for PLS and for energy efficiency – *and* substantially lowered costs due to various synergies and economies.” (p. 6).

2. Competitive Solicitations.

PLS systems do not necessarily need to be owned only by host customers or third parties. PLS can also be effectively deployed if owned by utilities, or if the services of customer-side-of-the-meter projects are purchased by utilities. Broadening the diversity of ownership model and market approach will help California achieve its PLS goals. Thus, CESA recommends that the Commission also order the Utilities to issue a Request for Offers or some comparable form of competitive solicitation process for PLS *on the utility side of the meter*.²² “Accordingly, CESA recommends that the Commission immediately order the utilities to submit applications, outside of this proceeding, to allow them to issue requests for proposals to solicit competitive proposals for all forms of energy storage projects and any ownership model.” (p. 2).²³

The Utilities’ proposed budgets are insufficient to achieve economies of scale for emerging PLS technologies identified in the PLS Study. The PLS Study says that utility-ownership reduces costs through increased purchase volume. It is acknowledged that focused customer targeting, marketing, and capture can be more efficient and cost-effective given a utility’s knowledge base of its own customers. In the future, utility-ownership could also eliminate the capital investment hurdle and TOU rate change risks compared with customer-owned business models.

²² See, e.g. *Southern California Public Power Authority Request for Proposals for Renewable Energy Projects*, April 2010.

²³ *Opening Comments of the California Energy Storage Alliance on Proposed Decision of ALJ Hecht*, filed July 20, 2009 in A.08-06-001.

While the utilities do not propose utility ownership programs, an expanded emerging technology program that includes a market transformation component would help achieve economies of scale.²⁴ Such programs, a customer side of the meter program *and* a PLS owned by utilities on either the customer or the utility side of the meter could co-exist. The key to building any healthy market is diversity, not only in technologies/solutions but also in approach to market. In the case of PLS, that means diversity in ownership model. A healthy PLS market in California will help to ensure greater system efficiency, reliability and lower rates for consumers

III. CONCLUSION.

For all of the reasons discussed in this opening brief, the Utilities should be ordered by the Commission to revise and resubmit their PLS proposals to comport with program design features and qualities detailed here.

Respectfully submitted,



Donald C. Liddell
DOUGLASS & LIDDELL
Email: liddell@energyattorney.com

Counsel for the
CALIFORNIA ENERGY STORAGE ALLIANCE

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²⁴ *PLS Study*, p. 112.