

PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE
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September 5, 2013

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Southern California Edison Company
2244 Walnut Grove Avenue
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Subject: Staff Disposition of PG&E Advice Letter 4239-E, SDG&E Advice Letter 2489-E, and SCE Advice Letter 2913-E on the Statewide Permanent Load Shifting Program Design Proposal.

Dear Mr. Cherry and Ms. Caulson, and Scott-Kakures:

The Energy Division approves PG&E Advice Letter 4239-E, SDG&E Advice Letter 2489-E, and SCE Advice Letter 2913-E with an effective date of June 12, 2013. Energy Division has analyzed the joint protest filed by the Association of California Water Agencies (ACWA) and Rural California Water Association (RCWA) and the utilities' joint response to the protest. Energy Division has determined that the aforementioned advice letter filings are in compliance with Commission Resolution E-4586 and therefore the protest from ACWA/RCWA is rejected.

In D.12-04-045, the utilities were directed to finalize a Permanent Load Shifting (PLS) statewide program design and rules, and to submit a final proposal, including budgets and revised cost-effectiveness analysis, via a Tier 2 advice letter.

The utilities submitted the Tier 2 advice letters¹ on January 14, 2013, and the program design in those filings was approved by the Commission with modifications via Resolution E-4586 on May 9, 2013.

¹ PG&E Advice Letter 4177-E, SDG&E Advice Letter 2445-E, and SCE Advice Letter 2837-E.

Mr. Cherry & Ms. Caulson and Scott-Kakures
September 5, 2013
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The program modifications included a revision to the incentives amount offered by SDG&E, a revision to the project incentive cap offered by SDG&E, and revisions to the energy efficiency requirements of the program for all utilities. The utilities were directed by the resolution to submit Tier 1 advice letters that demonstrated compliance with the resolution's directives, and those advice letters are the subject of this letter.

On June 26, 2013, ACWA and RCWA filed a joint protest to the Tier 1 advice letters, and the utilities provided a joint reply to the protest on July 10, 2013. The details of the protest, the reply and Energy Division's conclusions are in Attachment A of this letter.

Please contact Bruce Kaneshiro at the Energy Division at bsk@cpuc.ca.gov if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "ER", with a long horizontal flourish extending to the right.

Edward Randolph
Director, Energy Division
California Public Utilities Commission

cc: Lon W. House, Energy Advisor for ACWA and RCWA
Leslie Stark, SCE

ATTACHMENT A

Summary of ACWA/RCWA Protest, Utilities' Response and Energy Division Conclusions

ACWA/RCWA's Protest: Broaden the PLS program to include Water Storage

ACWA/RCWA states that water storage is a form of Permanent Load Shifting and can potentially provide substantial peak load reduction (500 MWs) if additional water storage facilities can be constructed. ACWA/RCWA argues that the utilities' statewide PLS program should be broadened to include water storage as an eligible technology. By including water storage as an eligible technology, water agencies would have access to the incentives offered by the program (\$875 per kW) and that would encourage the construction of more water storage facilities.

Utility Response: ACWA/RCWA's Protest Introduces New Issues

The utilities state that the ACWA/RCWA protest introduces new issues not relevant to the utilities' compliance with Resolution E-4586. The utilities note that ACWA/RCWA had many opportunities to raise its concern in the formal proceeding when the Commission directed the utilities to develop a statewide PLS program, but failed to do so until now.

Additionally, the utilities note that if the statewide PLS program were re-purposed to include water storage, the utilities would be required to re-litigate the program cost-effectiveness and verification procedures to include water storage.

The utilities suggest that Energy Division's Water-Energy Nexus Project Coordination Group, where the cost effectiveness of cross-funding demand side programs by water and electric utilities is being addressed, is a better forum for ACWA/RCWA's concerns.

Energy Division Conclusion:

Energy Division agrees with the utilities that the ACWA/RCWA protest raises new policy issues that are not appropriate at this juncture of the regulatory process. The purpose of the utilities' advice letter filings is to demonstrate compliance with the program modifications adopted in Commission Resolution E-4586. Energy Division concludes that the advice letter filings comply with the resolution, and are therefore approved.

Broadening the purpose of the statewide PLS program to include water storage, as suggested in ACWA/RCWA's protest, is a significant program design change that was not previously vetted or adopted by the Commission during the formal proceeding or in Commission Resolution E-4586. Among the policy considerations that would have to be analyzed by the Commission are: the ability/potential of water storage to serve the need for energy storage at various locations on the grid, as well as the cost-effectiveness of water storage compared to thermal storage, including the appropriate incentive amount for water-storage technologies. The cost-effectiveness analysis of PLS in the proceeding and in the program advice letter filing was focused entirely on mature thermal energy storage. The Commission has no data to assess the cost-effectiveness of water storage, and hence is unable to determine at this juncture an appropriate incentive level for it. To assume that the \$875 per kW incentive approved in Resolution E-4586 is appropriate for water storage would be arbitrary and not be based on any data or analysis before the Commission. \$875 per kW for water storage could be either too high (thereby exceeding the benefits it provides to utility ratepayers) or too low (thereby limiting its potential to deliver benefits for ratepayers). A variable incentive structure (depending on the particular technology) could be a consideration for future PLS program modifications. Also, water storage is unique from thermal energy storage in that it provides a concurrent benefit for water operators and users. It may therefore have the potential to become self-sustaining, and could be weaned from electric ratepayer subsidies (ie, a diminishing incentive may be justified). These complex policy considerations for water storage would need data, analysis and the participation of stakeholders in a formal Commission proceeding to be fully understood and sufficiently vetted.

June 12, 2013

ADVICE 2913-E
(Southern California Edison Company – U 338-E)

ADVICE 4239-E
(Pacific Gas and Electric Company – U 39-E)

ADVICE 2489-E
(San Diego Gas & Electric Company – U 902-E)

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA
ENERGY DIVISION

SUBJECT: Statewide Permanent Load Shifting Program Design Proposal
With Revised Energy Efficiency Requirements, Incentive
Levels and Cap

PURPOSE

In compliance with Ordering Paragraph (OP) 6 of Resolution E-4586 (Resolution), Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE) (jointly, “the Utilities”) hereby submit for filing modifications to the statewide Permanent Load Shifting (PLS) program design proposal. Revised energy efficiency requirements, incentive levels, and project cost cap are included per the Resolution. The revised statewide PLS program design is detailed in Attachment A and is attached hereto.

BACKGROUND

PLS can help reduce system peak load by shifting electricity use from on-peak to off-peak periods on a recurring basis. Shifting daily loads benefits the electricity grid and distribution systems. PLS often involves storing energy produced during off-peak hours to support load during peak periods when energy use is typically high.

As part of the 2006-2008 Demand Response Application (A.)05-06-006, et al., the California Public Utilities Commission (Commission or CPUC), on November 30, 2006, issued Decision (D.)06-11-049, Order Adopting Changes to 2007 Utility Demand

Response Programs. This Decision, among other things, ordered the Utilities to pursue Request for Proposals and bilateral arrangements for PLS to promote system reliability during the summer peak demand periods. A PLS pilot was approved for all the Utilities from 2008-2011. As the Utilities ran their pilots, the Commission issued D.09-08-027 in 2009 directing the Utilities to work with parties to examine ways of expanding the availability of PLS. The study was to consider other ways of encouraging PLS, as well as an evaluation of what incentive payment would be appropriate for a future standard offer. In November 2010, a Statewide PLS Study, authored by Energy + Environmental Economics and StateGen, provided information to the Utilities for use in preparing a proposed PLS program.

In compliance with D.12-04-045, the Utilities worked collaboratively to develop and propose a standardized, statewide PLS program. As part of the PLS program design process, the Utilities incorporated the findings from the Statewide PLS Study into the program design of the 2012-2014 PLS program.

On July 30, 2012, the Utilities submitted a joint PLS program design proposal to the Commission Energy Division Staff (Staff). The Commission Staff sought feedback from interested parties by facilitating a PLS Workshop that was held on September 18, 2012 at the CPUC. As a result of the PLS Workshop and the comments received from interested parties, the Staff provided the Utilities with program design feedback on November 13, 2012. The Utilities incorporated the Staff's feedback into the program design proposal which was submitted in a joint Tier 2 advice letter on January 14, 2013.¹

On May 9, 2013, Resolution E-4586 adopted the PLS program rules, budget, and implementation details proposed by the Utilities, with modifications. The modifications are incorporated in the statewide PLS program design attached hereto as Attachment A.

ENERGY EFFICIENCY REQUIREMENTS

Customers investing in a thermal energy storage (TES) system can benefit from transferring demand and energy consumption out of the most costly periods of the day to help achieve large bill savings. The PLS program supports customers addressing energy efficiency benefits as part of their TES system design, where applicable. For all TES technologies, customers will be required to address the following energy efficiency requirement in their feasibility study:

- For existing facilities and new construction, customers will be required to meet equipment Title 24 energy efficiency standards. Customers will be required to address equipment and overall TES equipment efficiency during the TES design phase.

¹ SCE Advice 2837-E, PG&E Advice 4177-E, and SDG&E Advice 2445-E were approved effective January 14, 2013 per Resolution E-4586, issued on May 13, 2013.

INCENTIVES

Customers will be able to reserve incentives for PLS projects on a first-come, first-served basis, as long as funding is available. The incentive levels are based on Staff's Feedback on Recommended Changes described in the Resolution to adopt a standardized PLS incentive level across the Utilities.² Recommended levels give preference to stimulate market adoption over cost-effectiveness considerations.

The table below shows the incentive levels per designed kW shift from each utility:

Incentive Amounts by Utility

	PG&E (\$/kW)	SCE (\$/kW)	SDG&E (\$/kW)
Thermal Energy Storage	\$875	\$875	\$875

PROJECT COST CAP

To allow for different types of technologies and customer types to participate in this program, projects will be subjected to an incentive cap. These caps are represented by each utility in the table below. A customer is eligible to receive PLS incentives from multiple utilities, subject to the respective utilities' per Single-Customer incentive cap, but a project/premises can only receive a PLS incentive from one utility.

Incentive Cap per Single-Customer^a by Utility

Utility	Incentive Budget	Maximum Single-Customer Incentive^b
PG&E	\$13,500,000	\$1,500,000
SCE	\$12,690,000	\$1,500,000
SDG&E	\$ 2,235,000	\$1,500,000

^a *Single-Customer identified per Tax ID.*

^b *Each utility has the right to exceed the Incentive Cap per Single-Customer on a case by case basis.*

TIER DESIGNATION

Pursuant to Resolution E-4586 OP 6, this advice letter is submitted with a Tier 1 designation.

² Energy Division Feedback on Recommended Changes to Joint-IOU Proposal for PLS Program, submitted in response to D.12-04-045, November 9, 2012.

EFFECTIVE DATE

This advice filing will become effective on June 12, 2013, the same day as filed.

NOTICE

Anyone wishing to protest this advice filing may do so by letter via U.S. Mail, facsimile, or electronically, any of which must be received no later than 20 days after the date of this advice filing. Protests should be mailed to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, California 94102
E-mail: EDTariffUnit@cpuc.ca.gov

Copies should also be mailed to the attention of the Director, Energy Division, Room 4004 (same address above).

In addition, protests and all other correspondence regarding this advice letter should also be sent by letter and transmitted via facsimile or electronically to the attention of:

Megan Scott-Kakures
Vice President, Regulatory Operations
Southern California Edison Company
2244 Walnut Grove Avenue
Rosemead, California 91770
Facsimile: (626) 302-4829
E-mail: AdviceTariffManager@sce.com

Leslie E. Starck
Senior Vice President, Regulatory Policy & Affairs
c/o Karyn Gansecki
Southern California Edison Company
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San Francisco, California 94102
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Megan Caulson
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San Diego Gas & Electric Company
8330 Century Park Court, Room 32C
San Diego, California 92123-1548
Facsimile: (858) 654-1879
E-mail: MCaulson@semprautilities.com

There are no restrictions on who may file a protest, but the protest shall set forth specifically the grounds upon which it is based and shall be submitted expeditiously.

In accordance with Section 4 of General Order (GO) 96-B, SCE is serving copies of this advice filing to the interested parties shown on the attached GO 96-B service list and A.11-03-001 et al. Address change requests to the GO 96-B service list should be directed by electronic mail to AdviceTariffManager@sce.com or at (626) 302-2930. For changes to all other service lists, please contact the Commission's Process Office at (415) 703-2021 or by electronic mail at Process_Office@cpuc.ca.gov.

Further, in accordance with Public Utilities Code Section 491, notice to the public is hereby given by filing and keeping the advice filing at SCE's corporate headquarters. To view other SCE advice letters filed with the Commission, log on to SCE's web site at <https://www.sce.com/wps/portal/home/regulatory/advice-letters>.

For questions, please contact Amy Liu at (626) 302-4019 or by electronic mail at Amy.Liu@sce.com.

Southern California Edison Company

Megan Scott-Kakures

MSK:al:sq
Enclosures

CALIFORNIA PUBLIC UTILITIES COMMISSION

ADVICE LETTER FILING SUMMARY ENERGY UTILITY

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

Company name/CPUC Utility No.: Southern California Edison Company (U 338-E)

Utility type:

ELC GAS
 PLC HEAT WATER

Contact Person: Darrah Morgan

Phone #: (626) 302-2086

E-mail: Darrah.Morgan@sce.com

E-mail Disposition Notice to: AdviceTariffManager@sce.com

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas
 PLC = Pipeline HEAT = Heat WATER = Water

(Date Filed/ Received Stamp by CPUC)

Advice Letter (AL) #: 2913-E et al. Tier Designation: 1

Subject of AL: Statewide Permanent Load Shifting Program Design Proposal With Revised Energy Efficiency Requirements, Incentive Levels and Cap

Keywords (choose from CPUC listing): Compliance

AL filing type: Monthly Quarterly Annual One-Time Other

If AL filed in compliance with a Commission order, indicate relevant Decision/Resolution #:

E-4586

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: _____

Summarize differences between the AL and the prior withdrawn or rejected AL: _____

Confidential treatment requested? Yes No

If yes, specification of confidential information:

Confidential information will be made available to appropriate parties who execute a nondisclosure agreement.

Name and contact information to request nondisclosure agreement/access to confidential information:

Resolution Required? Yes No

Requested effective date: 6/12/13 No. of tariff sheets: -0-

Estimated system annual revenue effect: (%): _____

Estimated system average rate effect (%): _____

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

Tariff schedules affected: None

Service affected and changes proposed¹: _____

Pending advice letters that revise the same tariff sheets: _____

¹ Discuss in AL if more space is needed.

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

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, California 94102
E-mail: EDTariffUnit@cpuc.ca.gov

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Southern California Edison Company
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Leslie E. Starck
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Attachment A

2012-2014 Permanent Load Shifting Program Design Proposal

Jointly proposed by: Pacific Gas and Electric (PG&E), San Diego Gas & Electric (SDG&E), and Southern California Edison Company (SCE)

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1. **Purpose**

In compliance with Ordering Paragraph 62 of Decision 12-04-045, Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE) (jointly, “the Utilities”) submit this joint Permanent Load Shifting program design and updated cost-effectiveness analysis to the California Public Utilities Commission (CPUC).

2. **Background**

Permanent Load Shifting (PLS) can help reduce system peak load by shifting electricity use from on-peak to off-peak periods on a recurring basis. Shifting daily loads benefits the grid and distribution systems. PLS often involves storing energy produced during off-peak hours to support load during peak periods when energy use is typically high.

As part of the 2006-2008 Demand Response Application (A.) 05-06-006, et. al. the Commission, on November 30, 2006, issued Decision (D.) 06-11-049, Order Adopting Changes to 2007 Utility Demand Response Programs. This Decision, among other things, ordered the Utilities to pursue Request for Proposals and bilateral arrangements for PLS to promote system reliability during the summer peak demand periods. A four-year PLS pilot was approved for all the Utilities from 2008-2011. As the Utilities ran their pilots, the Commission issued D.09-08-027 in 2009 directing the Utilities to work with parties to examine ways of expanding the availability of PLS. The study was to consider other ways of encouraging PLS, as well as an evaluation of what incentive payment would be appropriate for a future standard offer. In November 2010, a Statewide PLS Study, authored by Energy + Environmental Economics and StrateGen, provided information to the Joint Utilities for use in preparing a proposed PLS program.

In compliance with D.12-04-045, the Utilities worked collaboratively to develop and propose a standardized, statewide PLS program. As part of the PLS program design process, the Utilities incorporated the findings from the Statewide PLS Study into the program design of the 2012-2014 PLS Program.

On July 30, 2012, the Utilities submitted a joint PLS program design proposal to Commission Staff. The Commission Staff sought feedback from interested parties by facilitating a PLS Workshop that was held on September 18, 2012 at the CPUC. As a result of the PLS Workshop and comments received from interested parties, Energy Division provided the IOUs program design feedback on November 13, 2012. On January 14, 2013, the IOUs submitted a Tier 2 Advice Letter as ordered from D.12-04-045, OP 63.

On May 13, 2013, Commission Resolution E-4586 was issued that adopted the PLS program rules, budget and implementation details with modifications that are being incorporated in this Tier 1 Advice Letter.

3. **Program Overview**

This Statewide PLS Program is designed to help customers shift electricity use by offering a one-time upfront incentive, based on designed kW shift to offset initial

investments in a mature thermal energy storage (TES) system. Customers will be required to shift energy usage during the summer peak hours as defined by each utility. Providing an incentive to invest in a PLS technology helps the utilities reduce the need for peak generation investments, reduce the likelihood of shortages during peak periods, and lower system costs overall by reducing the need for peaking units.

Time-of-use (TOU) rates further encourage PLS because customers can reduce their energy bills by shifting cooling load from peak periods when rates are higher to off-peak periods when rates are lower. Transferring demand and energy consumptions out of the most costly periods of the day can help achieve bill savings.

4. Eligibility Requirements

Eligibility for participation in the 2012-2014 PLS program will be based on the customer meeting all the following customer eligibility and equipment requirements.

4.1 Customer Eligibility Requirements

- a. All electric customers of the Utilities, including industrial, commercial, agriculture, residential, Community Choice Aggregation (CCA), and Direct Access (DA) customers, are eligible to apply for the PLS Program.
- b. TOU rates provide incentive to reduce on-peak electrical demand and peak usage through the utilization of a TES system during peak hours. Customers who receive incentives under this program will be required to be on a TOU rate for a minimum of 5 years (starting once the customer receives the incentive). PLS customers will be allowed to change TOU rates if a better rate becomes available within the 5 year commitment period so long as they are in compliance with Rule 12. Refer to Table 1 for defined summer months and peak hours by utility.
- c. This program requires that the customer operate the TES system during the summer on-peak hours on a weekday basis. It is expected for some customers to see benefits of running the system outside the summer months and will be encouraged to do so if customer savings can be realized.

**Table 1
PLS Summer Months and Peak Hours by Utility**

Utility	Summer Months	Peak Hours
PG&E	May 1 – October 31	12pm - 6pm
SCE	June 1 – September 30	12pm - 6pm
SDG&E	May 1 – October 31	11am – 6pm

- d. There is no minimum shift requirement set for this program.

- e. To allow for different types of technologies and customer types to participate in this program, each project will be subjected to an incentive cap. These caps are represented by each utility in Table 2. A customer is eligible to receive PLS incentives from multiple utilities, subject to the respective utilities' per project incentive cap, but a project/premises can only receive a PLS incentive from only one utility.

Table 2
Incentive Cap per project by Utility

Utility	Incentive Budget	Maximum Single-Customer Incentive*
PG&E	\$13,500,000	\$1,500,000
SCE	\$12,690,000	\$1,500,000
SDG&E	\$2,235,000	\$1,500,000

**Each utility has the right to exceed the Incentive Cap per Single-Customer on a case by case basis*

4.2 Equipment Eligibility Requirements

The utilities will only provide incentives for mature TES technology under the PLS program. Eligible mature TES technologies will be required to have a proven track record within the marketplace. The following equipment requirements must be met for eligibility purposes:

- a. TES control system shall be fully automated providing integrated operation of the TES and site normal cooling system.
- b. The following types of mature TES systems are eligible for this program:
 - o Chilled water or other fluid;
 - o Ice-on-coil (external melt);
 - o Ice-on-coil (internal melt);
 - o Encapsulated Ice or Phase Change Material;
 - o Ice Harvester/Chiller;
 - o Ice Slurry; and
 - o Integrated Direct Expansion Packaged Units with Ice-on-Coil
 - o TES system types not listed above will be reviewed on a case by case basis during the application process.
- c. All equipment must be installed within 18 months of reservation of the customer's incentive. Extensions may be provided on a case by case basis.
- d. All equipment eligible for incentives must be new with the exception of refurbished TES tanks.
- e. The TES system must be installed at the customer premises.

- f. All TES equipment receiving incentives must be installed and functioning for a minimum of 5 years post-installation.
- g. All installed equipment applying for incentives must pass Title 24 standards, if applicable.
- h. Vendor must provide their customer with a 5-year warranty of the installed TES system. This includes replacement of equipment for manufacturer defects or breakdown of the equipment with proper usage of the system.
- i. TES equipment eligibility for this program is subject to the approval of the Utilities.

4.3 Ineligible for PLS Incentives

Fuel switching, adjustment of controls, shifting achieved by best practices commissioning will not be considered for PLS incentives. The Utilities may, at any time, determine project eligibility and requirements for PLS incentives on a case by case basis.

5. Energy Efficiency Requirements

Customers investing in a TES system can benefit from transferring demand and energy consumptions out of the most costly periods of the day to help achieve bill savings. Customers can increase their savings through the installation of energy efficient TES equipment. The PLS program supports customers addressing energy efficiency benefits as part of their TES system design, where applicable. For all TES technologies, Customers will be required to address the following energy efficiency requirement in their feasibility study:

- All thermal energy storage technologies will be required to meet current building codes for existing and new construction. Customers will be required to address equipment and overall TES system efficiency during the TES design phase.

6. Incentives

Upon meeting all customer and equipment eligibility requirements, the customer or the customer's designee shall be eligible for a one-time incentive per designed kW shift. Full payment of the approved incentives for each project will be made once the TES system installation is complete. A TES system is considered "complete" when it is completely installed, interconnected, and capable of shifting cooling load in the manner and in the amounts for which it was designed. A Commissioning Report, as described in Section 8.1 of this proposal, must be submitted by the customer and approved by the utility before installation is considered complete.

Customers will be able to reserve incentives for PLS projects on a first-come, first served basis, as long as funding is available. The incentive levels are based on Energy Division's Feedback on Recommended Changes described in Resolution E-4586 to adopt a standardized PLS incentive level across Utilities. Recommended levels give preference to stimulate market adoption over cost-effectiveness considerations. Table 3 below shows the incentive levels per designed kW shift from each utility:

**Table 3
Incentive Amounts by Utility**

	PG&E (\$/kW)	SCE (\$/kW)	SDG&E (\$/kW)
Thermal Energy Storage	\$875	\$875	\$875

6.1 Project Cost Cap

The PLS incentive will not exceed 50% of the total eligible project cost and is also subject to the incentive cap per project as shown in Table 2. The customer’s incentive amount will be the lesser of the incentive reservation amount calculated from the system-design (refer to Section 7.4) or 50% of the actual final installed total equipment cost.

Eligible project costs may be reduced for incentives or rebates received through other programs available from the utility. For example, if a customer receives energy efficiency credit/rebates for the install of a new chiller, the 50% cap will apply to project costs net of the other program credits/rebates.

PLS program will not provide incentives to customers that have received additional TES incentives from other utility funded programs.

A project cost cap has been put in place in order to allow customers to recover their remaining project costs through the TOU rates as they run their systems. The cap will also prevent customers from designing an oversized system, assuming that there is no need for the extra capacity. Holding the customer responsible for some costs of the project will make them more inclined to run their system and be involved in the overall design stage of their TES.

6.2 Eligible Project Costs

All equipment, labor and services directly related to providing the permanent load shift are eligible for incentives under the PLS program. The following items may be included as part of the project costs towards installing a TES system:

- a. Labor Costs
 - o Commissioning report costs
 - o Installation costs
- b. Feasibility Study Cost
- c. Equipment Costs
 - o Thermal Energy Storage and all materials directly related to the installation of a TES system
 - o Instrumentation Costs (i.e. Energy Management System, Monitoring Devices)
- d. Training costs for operating the TES system and monitoring devices as described in Section 7 of this proposal.

- e. Miscellaneous (i.e. tractor rental, earthquake cement)
- f. Ultimately, the utility will maintain the discretion to determine which costs are eligible to receive incentives
- g. Sales tax, freight and travel are not eligible for incentives and should not be included as part of the project costs.

Incentives will only be paid out for qualifying completed projects.

6.3 Incentive Payout

Customers will be issued qualified incentive payout after the TES system has been installed and has passed all the necessary commissioning requirements and receives final approval from the utility. (Refer to Section 8.1 for commissioning report requirements).

Customers will have the option to receive a portion of their incentives for approved projects ahead of installation. Customers can receive 25% of the cost of a feasibility study, to a maximum of \$10,000, once the project has been approved by the utility and the customer commits to proceed with the proposed project. Customers will be able to recover the remaining cost of their feasibility study (subject to the 50% project cap) and other project costs post-installation. Post-installation payment will be the balance of the qualifying incentive amount, net of payments already distributed.

7. Incentive Calculations and Requirements

7.1 PLS TES Technology Incentive Process

Applicants will be eligible for incentive payment once they have met all of the programs requirements and have completed the high-level incentive/application process described below. The IOUs may determine the applicability of any program requirement for any application:

1. Complete and submit a PLS incentive application
2. Submit project Feasibility Study within 4 months of applying for the program incentive (minimum requirements for study provided in section 7.2)
3. Utility–commissioned engineer reviews application and the feasibility study
4. Incentive reservation amount is determined based on designed shift (see Table 3)
5. Customer commits to incentive program through a contract
6. [Optional] Customer eligible to receive some incentive payment for feasibility study costs (see section 6.3)
7. Customer installs all necessary equipment for PLS
8. Customer submits commissioning report and final project invoices
9. Post-install verification completed by Utility-commissioned engineer
10. Remaining program incentives are paid

7.2 Feasibility Study Requirements

An engineering-quality feasibility study will be required for all customers applying for this program. This study is to provide an evaluation of the technical feasibility and economic viability of installing a new TES system at the customer site. The study is to be completed by a professional mechanical engineer, licensed and registered in the State of California.

Submitting a feasibility study does not guarantee a customer incentives under the PLS program.

The following are the Utilities' minimum requirements that should be included in each feasibility study:

1. *Engineering Requirements and Administration (provided by the engineering firm completing the feasibility study)*
 - a. Study must be completed by a Licensed California Professional Engineer (PE)
 - b. The engineer will need to certify all design calculations and sign and stamp the study (PE stamp)
 - c. Engineer contact information
 - d. Site map and review
 - e. Executive summary to be provided by engineering firm. Must include the following:
 - Evaluation of customer's ability to maintain system
 - Engineers recommendation of the best course of action and feasibility of the customer investing in a TES system
2. *Customer Site Information*
 - a. Business description
 - b. Customer information
 - Service account address
 - Utility electric rate schedule
 - Listing of existing affected buildings and a description of its usage
 - Site map
3. *Energy Models*
 - a. Energy models of a customer's cooling load for an entire year will be required, which will include the hourly thermal cooling load profile for a 24 hour period for January through December based on expected operating schedule. Actual sub-metered cooling load data can be submitted if available, subject to approval by the Utility. Customers can work with their utility on a case by case basis to determine

if the 12 month cooling load requirement can be reduced if it is not necessary for the design and use of their TES system.

- b. Energy models must come from a program that is:
 - Compliant with ASHRAE Standard 140
 - Non-proprietary
 - Acceptable to the Utility-commissioned engineer approving the feasibility study
 - Examples of acceptable energy model programs include eQuest and EnergyPro
 - c. The models must include:
 - Cooling load in tons without the TES system
 - Outdoor air temperature
 - Site Utility load (by the meter)
 - Total chiller plant power
 - List of all equipment in the chiller plant pre-installation of any new cooling equipment
4. *TES System Design*
- a. System description – this includes on-peak max power load for the plant by operating equipment. Load should be included for all equipment that will be turned on and off for on-peak load shifting
 - b. Estimate of kW to be shifted on design day
 - c. Proposed operating strategies
 - d. Itemized equipment listing
 - e. Designed system capacity in ton-hours
 - f. Maintenance strategy plan
 - g. Commissioning plan of the TES system
 - h. Energy Efficiency analysis (refer to section 3)
5. *Monitoring Plan*
- a. Instrument list to complete functional tests and M&V with point names and specs
 - b. One line schematic diagram with sensor placement
 - c. Strategy for developing the baseline chilled water plant energy use
6. *Costs and Paybacks*
- a. Estimated itemized costs of equipment, labor, training, feasibility study and other miscellaneous costs
 - Provide guidelines for estimated costs
 - b. TOU rate benefit analysis
 - c. Economic analysis

- Net cost
- Annual operating costs
- Costs and benefit analysis
- Payback period
- Cash flow
- Rate of return
- Incentive calculations - PLS and other applicable incentives

7.3 Maximum Incentive Reservation

Customers will not be allowed to reserve incentives beyond their before-installation summer maximum on-peak cooling demand as determined by computer simulation/energy modeling-software programs such as eQuest or EnergyPro. The summer max on-peak cooling demand will be determined by the maximum on-peak cooling need simulated by an approved energy model program. This will prevent incentivizing over-sized TES system designs.

7.4 Calculating the Incentive Reservation

Energy simulation models, provided by software programs such as eQuest and/or EnergyPro, will be required to model a customer's cooling load for an entire year without a load-shifting system. Both retrofit and new construction customers will be subjected to the energy modeling process unless utility approved usage data is available.

The load reduction calculation will be based on approved simulated software energy models used for the system design rather than actual performance of the TES system post-installation.

Energy models will be used to determine a customer's cooling load profile over a year (8,760 hours). From the profile, the day with the greatest total cooling load in the summer on-peak hours will be identified. The capacity of the TES system will be applied to the on-peak period for that maximum cooling load day. The incentive will be based on the cooling tonnage (ton) shifted from the peak hour on that day. A conversion factor will be used to convert the cooling load shift tons to electricity load shift (kW). This methodology will be adopted for both full and partial storage systems.

The conversion factor is based on Title 24 average efficiency of water and air cooling chillers (including reciprocating, rotary screw and centrifugal type chillers). Refer to Table 112-D of the 2008 California Building Energy Efficiency Standards for the Coefficient of Performance (COP) efficiency levels by equipment type.¹ A conversion factor of 0.7kW/ton will be applied to water cooling chillers and 1.2kW/ton will be applied to air cooling chillers. Note that the 0.7 kW/ton and 1.2kW/ton conversion

¹ <http://www.energy.ca.gov/2008publications/CEC-400-2008-001/CEC-400-2008-001-CMF.PDF>

factors are an average calculation of the chiller types converted to an average kw/ton using the following recognized conversion equation:

$$\text{kW/ton} = 12 / (\text{Coefficient of Performance} \times 3.412)$$

Upon completion of all requirements, customers will be entitled to the *lesser* of their calculated reserved kW shifted incentive or 50% of their verified total project cost. A customer's incentive reservation will not incorporate the 50% project cost cap, but the cap will be enforced to the invoice amount provided to the utility subject to approval.

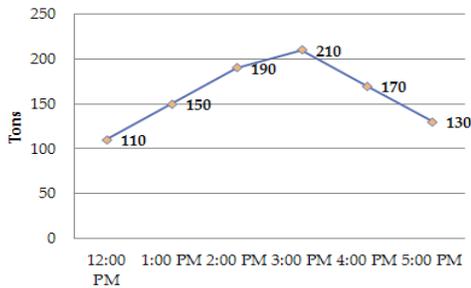
Incentive Reservation Calculation Example (for illustration purposes only):

Example:

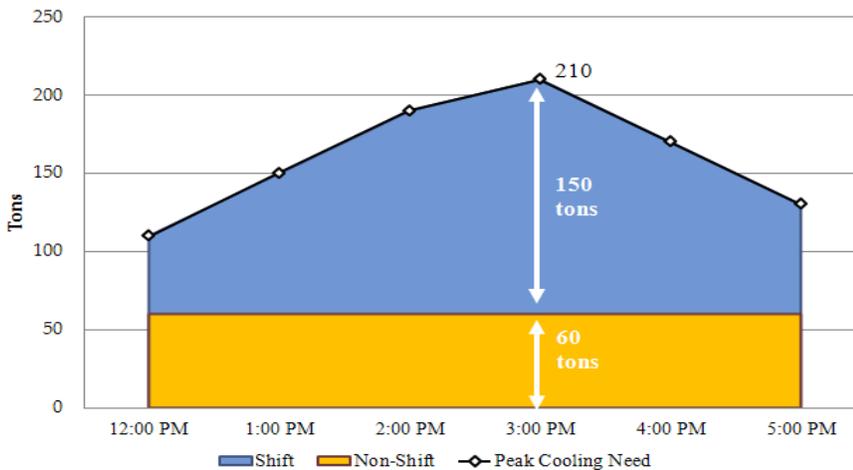
- TES Storage Tank Capacity = **600 ton-hours**
- Projected System Cost = **\$120,000**
- Modeled Peak Cooling Need:

Inferred from the model:

- Max Summer On-Peak Cooling Demand = **210 tons**
- Total Peak Cooling Demand = **960 ton-hours**



Total Peak Cooling Demand



Eligible customer incentive is the lower of:



In the above example the customer would be eligible for a \$60,000 incentive.

8. **Post-Install Verification**

Once the customer has installed the TES system, the customer will be required to submit all project invoices to be reviewed by a utility-commissioned engineer. The engineer will perform a post-install verification which will include a general site inspection, review of a commissioning report of the TES system, and verification of eligible project costs.

8.1 **Comparison and Commissioning Report Requirements**

The customer is required to submit to their utility a commissioning report that affirms all necessary equipment, piping, controls and measurement and verification instrumentation has been installed properly, functionally tested and ready for operation. This report is to be provided to the utility before a site inspection. Incentives will not be released to the customer until a site inspection and commissioning report has been approved by the utility.

Below are the minimum commissioning report requirements:

1. Documentation of installed system equipment. This includes schematic diagrams of equipment configurations and pictures of existing chillers, cooling towers and valve actuators and new TES tank, charge/discharge piping and valve actuators
2. Delivery of design intent documentation as demonstrated in the feasibility study
3. Documentation of actual installed plant sequence of operations
4. Modes of operation – control sequences such as charge, charge and chill, discharge, discharge and chill, off, and any seasonal changes
5. Documentation of adequate thermal capacity
6. Complete and submit CEC T24 Thermal Energy Storage functional test results (Functional Test Requirements to be provided during implementation of program).

7. TES entering temperature at which it reaches full charge. TES leaving fluid temperature set point
8. Documentation that M&V instrumentation (temperature sensors, flow meters and watt-hour meters) are installed and working properly and data is being gathered at the proper intervals.

A customer installing different equipment than what was originally proposed in the feasibility study will be required to provide an addendum to the feasibility study with the corrected installed equipment. Final incentive calculations will be based on the cooling capacity of installed equipment.

8.2 Penalty Structure

A customer that receives a PLS incentive will be contractually obligated to operate the TES load shifting equipment for 5 years from the date of installation signoff by the utility.

The customer agrees that the IOU can request a refund of the incentive if for any reason the customer removes the equipment during the first 5 years of operation, terminates service prematurely or does not operate the system as contracted.

9. **Monitoring for Measurement and Verification**

Customers will be required to install measurement and verification (M&V) instrumentation. This requirement will allow the utilities to conduct data analysis on cooling-load-shift performance and provide data for load impact evaluation. These monitoring devices also enable customers to optimize operation of their TES system.

The devices will monitor and record at least 3 months of the following data pre-install and continue post-install for the duration of the customer's PLS contract:

- Outdoor ambient temperature
- Electric demand (kW) of all chilled water plant equipment (all plant chillers, pumps and cooling tower fans)
- Chilled water return temperature
- Chilled water supply temperature
- Chilled water flow rate

Utilities may waive the pre-install monitoring requirements on a case by case basis.

Customers will be required to confirm functionality of their M&V devices in their commissioning report.

Approved monitoring equipment devices can be included in the overall project cost. Customers will be required to submit quarterly data to the utility providing the above requirements in this section.

10. Evaluation Measurement and Verification

D.08-04-050 requires annual ex ante load impact evaluation for all programs that have been adopted by the Commission and annual ex post evaluations of all programs that were in operation during the prior year. Statewide ex ante evaluations of the PLS program will be first filed on April 1, 2013 and each year thereafter. Ex post annual statewide Evaluation Measurement and Verification (EM&V) studies will commence once a full summer season of performance and usage data is available for a sufficient installation base of participating customers. Effective and efficient EM&V is dependent upon approval of the proposed collection of performance data from the M&V instrumentation (see section 9 above). This data will be analyzed to create customer-specific cooling demand models. These models will be compared to reference load models of alternate (non-TES) systems to determine peak load shift and total energy shifted from on-peak periods. Load impact evaluations will be overseen by the Statewide Demand Response Measurement and Evaluation Committee and the Load Impact Estimation Protocols for Demand Response will inform and provide guidance for PLS EM&V methodology.

As part of the Demand Response Measurement and Evaluation Committee (DRMEC) Process Evaluation Plan PY 2012-2014, DRMEC recommends conducting a statewide process evaluation of the PLS program to understand the efficacy of the newly redesigned program (from the original pilot programs during 2008-2011). While it is clear that a process evaluation will be both appropriate and necessary, a more detailed research plan for this evaluation cannot be developed until the program design is finalized.

The IOUs have agreed that after this program has launched, there will be opportunities to gain a better understanding of what aspects of the program design work and which do not work to make changes to future phases of program implementation.

11. Program Modification Process

A PLS Working Team will be established with representation from the IOUs and the Commission to develop the necessary program modification guidelines which prescribes the requirements, process and schedule for evaluation of modification requests. The working team will meet at least twice a year once the program has been implemented. These efforts will continue through 2013.

The program modification process will mirror the current Self-Generation Incentive Program Modification process with the steps outlined below:

1. Applicant Contacts Program Administrator
2. Proposal Distribution to Working Group
3. Proposal Presentation to Working Group
4. Working Group Recommendations
5. Applicant Comments to Recommendations
6. Submission of Working Group Recommendations to CPUC
7. Public Comment and CPUC Decision
8. Program Modification Implementation

**PG&E Gas and Electric
Advice Filing List
General Order 96-B, Section IV**

1st Light Energy	Douglass & Liddell	Occidental Energy Marketing, Inc.
AT&T	Downey & Brand	OnGrid Solar
Alcantar & Kahl LLP	Ellison Schneider & Harris LLP	Pacific Gas and Electric Company
Anderson & Poole	G. A. Krause & Assoc.	Praxair
BART	GenOn Energy Inc.	Regulatory & Cogeneration Service, Inc.
Barkovich & Yap, Inc.	GenOn Energy, Inc.	SCD Energy Solutions
Bartle Wells Associates	Goodin, MacBride, Squeri, Schlotz & Ritchie	SCE
Bear Valley Electric Service	Green Power Institute	SDG&E and SoCalGas
Braun Blaising McLaughlin, P.C.	Hanna & Morton	SPURR
CENERGY POWER	In House Energy	San Francisco Public Utilities Commission
California Cotton Ginners & Growers Assn	International Power Technology	Seattle City Light
California Energy Commission	Intestate Gas Services, Inc.	Sempra Utilities
California Public Utilities Commission	Kelly Group	SoCalGas
Calpine	Linde	Southern California Edison Company
Casner, Steve	Los Angeles Dept of Water & Power	Spark Energy
Center for Biological Diversity	MAC Lighting Consulting	Sun Light & Power
City of Palo Alto	MRW & Associates	Sunshine Design
City of San Jose	Manatt Phelps Phillips	Tecogen, Inc.
Clean Power	Marin Energy Authority	Tiger Natural Gas, Inc.
Coast Economic Consulting	McKenna Long & Aldridge LLP	TransCanada
Commercial Energy	McKenzie & Associates	Utility Cost Management
County of Tehama - Department of Public Works	Modesto Irrigation District	Utility Power Solutions
Crossborder Energy	Morgan Stanley	Utility Specialists
Davis Wright Tremaine LLP	NLine Energy, Inc.	Verizon
Day Carter Murphy	NRG Solar	Water and Energy Consulting
Defense Energy Support Center	Nexant, Inc.	Wellhead Electric Company
Dept of General Services	North America Power Partners	Western Manufactured Housing Communities Association (WMA)