

Permanent Load Shifting (PLS)

Program Handbook

Utility Administrator:

San Diego Gas & Electric®

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1. Program Description

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 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.

SDG&E's PLS program provides financial incentives to qualifying participants for the installation and operation of Thermal Energy Storage (TES) systems. Qualified customers may receive reimbursements of up to \$875 per kW of verified cooling load shift. Customers with high on-peak cooling loads are the best candidates for PLS.

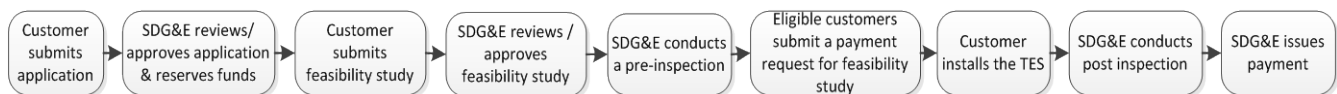
2. Eligibility

Permanent Load Shift Program incentives are open to all customers in San Diego Gas & Electric's territory. To participate you must:

- Be a Bundled Service, Direct Access, Community Choice Aggregation customer;
- Be billed on an SDG&E Time-of-Use (TOU) rate schedule
- Have an SDG&E Smart Meter or an approved interval meter
- Customers are required to operate their 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.

3. Incentive Process

The chart below provides a high level process flow for the Permanent Load Shift Program.



4. Incentives

San Diego Gas & Electric offers customers incentives for the purchase and installation of Thermal Energy Storage (TES) systems. The most common thermal storage media is water or ice. Qualifying equipment includes but is not limited to:

- Chilled water or other fluid;
- Ice-on-coil (external melt);

- Ice-on-coil (internal melt);
- Encapsulated Ice or Phase Change Material;
- Ice Harvester/Chiller;
- Ice Slurry; and
- Integrated Direct Expansion Packaged Units with Ice-on-Coil.

The customer must install all equipment within 18 months of reservation for incentive. An incentive payment is subject to post-install Inspection where a verification of the cooling load shift capability and functionality of the system is performed. Upon request, reservations may be extended at the sole discretion of SDG&E.

During the approved reservation period, SDG&E may request the customer provide proof of progress toward completing its project. Failure to demonstrate adequate performance towards completion of a project for which a reservation was approved may result in forfeiture of the reservation. SDG&E also reserves the right to modify or reject any reservation request that, in SDG&E's sole judgment, fails to meet the requirements of the program.

Proof of TES system purchase and installation is required to be eligible for PLS incentives, including, if applicable, proof of payment of third-party installation, receipts, invoices, credit card statements or other documentary proof. If applicable, for proof of payment of third-party installation, SDG&E requires an itemized invoice from the third-party installation contractor that clearly breaks down each item of labor and material (if any) that was invoiced by the third-party contractor for the installation of the qualifying TES technology, and proof of payment of the invoiced costs.

SDG&E will include reasonable in-house labor costs and related expenses associated with installation of qualifying equipment. Reimbursable in-house costs shall be limited to labor and other expenses directly incurred for design, engineering, and installation activities, and shall not include indirect labor or overhead costs. SDG&E reserves the right to consult with one or more qualified third parties of its own choosing to determine the reasonableness of any in-house related expenses.

5. Incentive calculation

The cooling load shift calculation will be based on approved simulated software energy models used for the TES system design in the customer's Feasibility Study and the verified cooling load shift during the post-install inspection. 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 calculation method is applied for both full and partial storage systems. A conversion factor of 0.7 kW/ton will be applied to water cooling chillers and 1.2 kW/ton will be applied to air cooling chillers. Customers will be entitled to the lesser of their calculated load shift incentive or 50% of their verified total project cost.

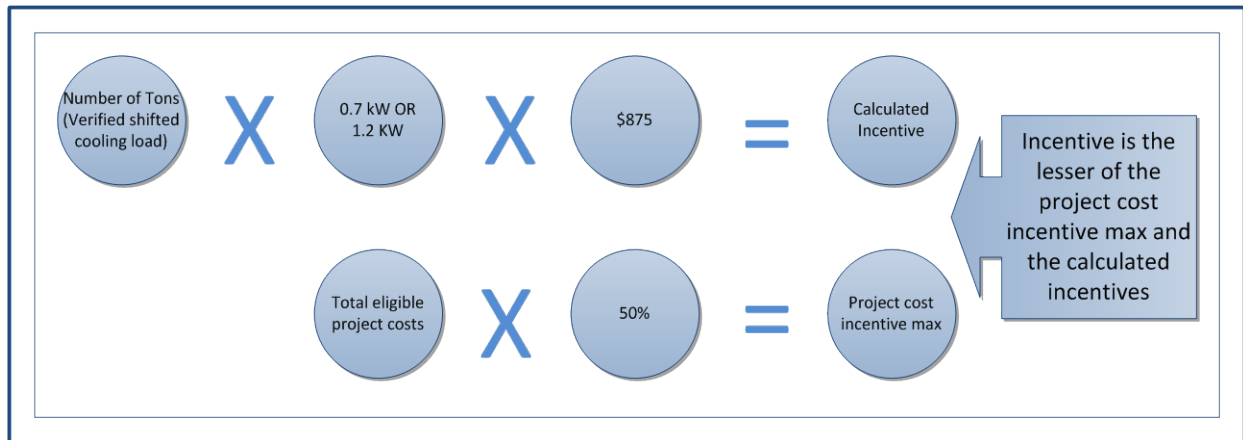


Figure 1 – Incentive calculation

6. Equipment requirement

The TES systems must meet the following requirements to qualify for incentives:

- Commercially available and have a proven track record in the marketplace
- Fully automated providing integrated operation of the TES and site normal cooling system
- Installed within 18 months of SDG&E approval of reservation of
- New with the exception of refurbished TES tanks
- Installed at the Customer premises
- Installed and functioning for a minimum of 5 years post-installation at the Customer premises
- Meet current building codes for existing and new construction
- Have a five-year warranty from the TES vendor. This includes replacement of equipment for manufacturer defects or breakdown of the equipment with proper usage of the system
- All equipment must be installed by appropriately licensed contractor, where applicable, and have obtained all required permits for the installation

7. Monitoring Requirements

Customer will be required to monitor, record, and submit five-minute trend data of its TES system to allow SDG&E to conduct data analysis on cooling-load-shift performance and load impact evaluation.

8. Penalties

If the customer fails to comply with any PLS incentive requirement, SDG&E may seek a refund for a portion or all of the incentive. The customer will be solely responsible for paying the refund to SDG&E even if the technology incentive has been released to an Authorized Third Party. SDG&E has no right or obligation to seek the refund from the Authorized Third Party to who you have released the incentive payment. SDG&E is not responsible for resolving disputes between the customer and the Third Party.

9. Additional resources

Please visit us at SDGE.com/PLS, call SDG&E Demand Response programs at 866-377-4735 or email us at drp@Semprautilities.com

The PLS Incentives program is effective from August 12, 2013 until December 31, 2014 or until funding is depleted, whichever comes first. The Program may be modified without prior notice. Information in this document may be superseded at any time, without prior notification.

Appendix A – Feasibility Study Minimum 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.

Customers are required to address equipment and overall TES system efficiency during the Feasibility Study. Customer's Feasibility Study at least must include the following:

Table of Contents

1. Cover Page	<ul style="list-style-type: none"> • Customer Name, Customer Address, Service Account Number • 3rd Party Info (Name, Address) • Date 	<ul style="list-style-type: none"> • TES concept-level sitting plan • TES sizing calculations including air handling & pumping systems • TES operating peak-day load profile • TES off-peak operating strategies
2. Executive Summary	<ul style="list-style-type: none"> • Project Background Summary • Project Scope Summary • Facility Load Summary • TES Load Summary • Reduction and Savings Summary 	7. Estimated Demand Reduction and Energy Use
3. Project Background	<ul style="list-style-type: none"> • Project Description • Facility Specifications 	<ul style="list-style-type: none"> • TES demand reduction • TES energy use vs. existing system
4. Existing HVAC systems	Existing HVAC description	8. Energy Efficiency Information
5. Existing (and Future) Current and Electric Loads using approved compute modeling programs and provide outputs as follows:	<ul style="list-style-type: none"> • Total Facility Annual Load Profile (Per hour)* • Annual Cooling Load Profile (Per hour) * • Summer Peak Days Load Profile (hr.) 	<ul style="list-style-type: none"> • TES Summer average kWh per ton-hr. comparison vs. existing system • TES Annual average kWh per ton-hr. comparison vs. existing system • TES air handling & pumping system efficiencies vs. existing system • TES Title 24 analysis
6. Thermal Energy Storage Options	<ul style="list-style-type: none"> • TES required scenarios (Full vs. Partial, Ice vs. Water) • Additional TES Options (if available) • TES system schematics • TES control schematics 	9. Operations and Maintenance
		<ul style="list-style-type: none"> • Operations Instructions • Maintenance Instructions
		10. Economic Analysis
		<ul style="list-style-type: none"> • Equipment costs • Installation costs • Annual operating costs • Savings from off-peak cooling – rate analysis savings • Net customer cost, simple payback, cash flow, rate of return (annual)
		11. Recommendations
		12. Appendices

*Meter data preferred

Appendix B – Commissioning Report minimum requirements

1. Documentation of all installed TES system equipment (can include pictures of chillers, cooling towers, TES tanks, valves and actuators, and any other equipment relevant to in the TES system);
2. Documentation of installed TES system sequence of operations;
3. Documentation that storage thermal capacity (ton-hrs.) meets design requirements.
4. Documentation that chilled water plant controls and Measure and Verification instrumentation (temperature sensors, flow meters and watt-hour meters) are installed and working properly and data is being gathered at the proper intervals. This could include pictures of the instruments and screen captures of graphics where this data is displayed once the sensors were made fully operational.
5. Demonstration that the system is shifting load as per design using at least 15 minute trend data of plant power and building load and supply and return temperatures during tank discharge
6. Copy of sensor calibration report (if available);
7. Verification that the system is shifting using trend data, building load, and supply and return temperatures during tank discharge;
8. Documentation that as-built system control drawings and complete Operation and Maintenance manuals are provided to the owner;
9. Verification that maintenance personnel are properly trained and understand the functionality of the system and the “Emergency Charge” mode of operation.
10. Copy of TES System Acceptance Form (as specified in Title 24Standards).*
11. Copy of the Functional Testing (as specified in Title 24 Standards).
12. Copy of the signed Certification Statement (as specified in Title 24).

* It is recommended to follow ANSI/ASHRAE 150 Standard for testing the performance of cool storage systems in addition to verifying Title 24 Standards.