

Department of General Services' Biennial Report for Energy Efficiency in Public Buildings, as of March 2013

**Energy Conservation in Public Buildings
Government Code Sections 15814.22 and 15814.28**

Background

Government Code (GC) Section 15814.22 requires the Department of General Services (DGS) to develop a multiyear plan to evaluate and implement all practicable and cost effective energy efficiency measures in state facilities. This section also directs DGS to coordinate implementation efforts and make recommendations to the Governor and the Legislature to achieve energy efficiency goals for state facilities.

This report on energy efficiencies in state facilities must be submitted to the Governor and the Legislature on a biennial basis. GC Section 15814.28 requires the report be submitted March 1.

Required elements of the report are detailed in GC Section 15814.28:

- (a) The progress made toward implementing energy efficiency measures in state facilities.
- (b) The most common energy efficiency measures being implemented.
- (c) The obstacles preventing further implementation of energy efficiency measures.
- (d) How current efforts and ideas can be incorporated into the Governor's five-year infrastructure plan described in GC Section 13102.

Despite a lack of available funding specifically designated for energy efficiency projects, DGS continues to lead the state's efforts to meet the energy efficiency standards initially set in Executive Order (EO) S-20-04. These standards were rescinded and replaced by Governor Brown's EO B-18-12 and are defined in greater detail in the Green Building Action Plan (GBAP). Standards required in EO B-18-12 and outlined in the GBAP encompass:

- Greenhouse Gas Emissions
- On-Site Renewable Energy Goals
- Building Commissioning
- Indoor Environmental Quality
- Electric Vehicle Charging Stations
- Financing
- Energy
- Building Design and Construction
- Existing Buildings
- Water Efficiency and Conservation
- Environmentally Preferable Purchasing
- Monitoring and Executive Order Oversight

Government Code Section 15814.28(a): The Progress Made Toward Implementing Energy Efficiency Measures in State Facilities

The information provided on the following pages demonstrates progress made to date in the energy efficiency categories specified in EO B-18-12. Excerpts and summations of the EO and GBAP are shown in italics.

Greenhouse Gas (GHG) Emissions

Reduce entity-wide greenhouse gas emissions by 10 percent by 2015 and 20 percent by 2020, measured against a 2010 baseline.

GHG emission reductions are achieved through improved building performance, vehicle fleet performance and utilization, fuel types and use, as well as tenant conservation measures. Currently, some state agencies have been using registries, including The Climate Registry to calculate, verify, and publicly report greenhouse gas emissions. While DGS has consistently reported GHG emissions the past six years and seen reductions most of those years, statewide data is still too incomplete to draw any conclusions or accurately assess progress.

The California Environmental Protection Agency is currently developing a structure, process, and policies for ongoing monitoring and reporting of GHG emissions, that should be completed in 2013.

Energy

New state buildings and major renovations beginning after 2025 will be constructed as Zero Net Energyⁱ (ZNE) facilities. Fifty percent of new facilities will be ZNE beginning after 2020. State agencies will seek to achieve a 50 percent ZNE portfolio based on square footage for state owned facilities by 2025.

The state shall identify at least three buildings by January 1, 2013, to pursue as ZNE pilot projects. These shall include at least one new building to be designed and constructed, one major renovation, and one existing building. DGS will phase in the ZNE concept into building design after conducting pilot projects.

DGS representatives attended several educational seminars and stakeholder meetings with the California Energy Commission and the California Public Utilities Commission in preparation of incorporating ZNE into the building design process. In September 2012, DGS held a workshop with 21 of the Executive Branch departments that operate buildings, as well as utilities, private sector architects, and engineers. The workshop covered the definitions and concepts of ZNE, as well as case studies of completed projects. In October 2012, DGS requested that departments nominate buildings for the Pilot Program and received a total of twenty facility nominations. In January 2013, after analysis of the nominations and concurrence by the Governor's Office, 14 projects were identified as potential candidates for inclusion in the ZNE Pilot Program. These

candidates include new buildings, major renovations, and existing buildingsⁱⁱ that will remain occupied during the upgrades.

In March 2013, DGS hosted a joint agency meeting to discuss the ZNE definitions, status of the Pilot Program, and implementation. The meeting was attended by members of the Governor's Office, the Office of Planning and Research, the California Public Utilities Commission, the California Energy Commission, the New Buildings Institute, and DGS.

The next steps in implementing the Pilot Program are to identify financing strategies, including any available utility incentives; obtain the necessary architectural and engineering expertise; define cost effective measures and best practices, and obtain the necessary approvals.

Leasing

New and renegotiated state building leases will reduce energy and resource use to the extent possible and economically feasible. EO B-18-12 directs DGS and other state agencies to seek out office space leases that allow sub-meters to capture and enter use data into the Energy Star Portfolio Managerⁱⁱⁱ system.

The state routinely enters into leases for eight years or longer, and can only renegotiate existing lease terms or relocate to other facilities as leases expire. Consequently, progress in shifting the state's lease portfolio to more energy efficient buildings is limited by these time constraints.

The Energy Star Portfolio Manager collects and compares energy and water efficiency data for use in reporting and analysis. Leadership in Energy and Environmental Design (LEED)^{iv} certification encompasses a broader array of resources, measures, and required actions in its designations. The DGS has been requiring LEED-certifications for many leased office spaces for several years, and current leases include 50 LEED certified leased spaces or buildings. Currently, 16 percent of state leased buildings area is LEED certified.

Reduce Grid-Based Energy Purchases

Continue to take measures to reduce grid-based energy purchases for state-owned buildings by at least 20 percent by 2018, compared to a 2003 baseline, and reduce other non-building, grid-based retail energy purchases by 20 percent by 2018, compared to a 2003 baseline.

In partnership with other state agencies, DGS is taking steps to reduce grid-based energy purchases through multiple approaches, including the introduction of the Zero Net Energy Pilot Program, developing standards for building operations, formulating policies for plug loads^v, LEED construction methods, on-site renewable energy sources^{vi}, commissioning^{vii}, energy efficiency retrofit projects, and demand response^{viii} programs.

DGS is leading the gathering and benchmarking of energy use for all state facilities under the Executive Branch to track state progress toward meeting the energy targets established in EO B-18-12. Statewide total energy use on Executive Branch state-owned buildings has been reduced 6.3 percent between 2003 through 2010. DGS is also actively working to reduce its overall energy use in DGS-operated facilities, and has already reduced its overall energy use by 6.8 percent (through 2011), even though its total building portfolio has grown 16 percent during the same period.

Demand Response Programs

Participate in Demand Response Programs to obtain financial benefits for reducing peak electrical loads when called upon, in a cost effective manner that does not affect operations.

DGS regularly examines numerous demand response programs offered by local utilities to analyze the functional impacts to the building and the financial advantages provided, if any. When an actual demand response event is called by the California Independent System Operator, DGS is notified automatically and coordinates with the respective utility.

DGS is conducting a study of Automated Demand Response in the San Diego area. Through an incentive-funded pilot program with the San Diego Gas & Electric (SDG&E)^{ix} utility, Monitoring Based Commissioning^x (MBCx) is being considered for the Caltrans District 11 Building, the Mission Valley State Office Building, and the San Diego State Office Building. Automated Demand Response is one of the components of the pilot program. Phase I of the MBCx program, which consisted of an assessment and study, has been completed. Phase II awaits funding for the contracting of a commissioning agent and the purchase and installation of hardware, software and devices.

DGS will soon complete the Smart Grid Investment Grant project,^{xi} which is a partnership with the Sacramento Municipal Utility District (SMUD) to upgrade the Energy Management Control Systems in nine DGS-operated, downtown Sacramento office buildings. These nine buildings are all served by the newly constructed, state-of-the-art Central Utility Plant. In part, the partnership requires DGS to make these buildings capable of receiving and responding to Automated Demand Response signals from the SMUD network. SMUD is still in the process of developing the rates, demand reduction requirements, and other details of its Automated Demand Response Program. However, once this is complete and an Automated Demand Response participant agreement is reached, DGS will be able to curb energy usage in these nine buildings automatically during the peak times when SMUD determines such action is necessary.

DGS is also enrolled in the Pacific Gas & Electric (PG&E) Peak Day Pricing Program^{xii} for the Public Utilities Commission building in San Francisco, and participates in the Southern California Edison Demand Bidding Program^{xiii} at the Santa Ana State Office Building.

On-Site Renewable Energy Goals

New or major renovations of state buildings larger than 10,000 square feet shall use clean, on-site power generation such as solar photovoltaic, solar thermal and wind power generation, and clean back-up power supplies, if economically feasible.

Because of a lack of funds for new construction and major renovations, DGS has developed a solar photovoltaic energy program that allows state facilities to procure electricity from onsite generation through Power Purchase Agreements (PPAs) to meet the state's renewable energy goals. Companies receive a no-cost lease from state facilities through which they install, own and maintain solar equipment. The state does not invest any funding in the actual PPA installation. In return, the state facility agrees to purchase all of the electricity the equipment generates for 20 years at a rate that is lower than the rate the facility currently pays its utility.

SOLAR INSTALLATIONS	INSTALLED	AWAITING FINAL CONTRACT
Number of Facilities	15	11
Megawatt Production	20.6	22.0

In addition to the systems installed or awaiting final contract, DGS intends to release several solar energy projects in 2013. DGS is also in the process of determining potential sites for a wind energy program and intends to release request for proposals for the appropriate sites.

Building Design and Construction

New and major renovated state buildings and build-to-suit leases larger than 10,000 square feet shall obtain LEED "Silver" certification or higher.

LEED - New Construction:

Prior to 2005, five new buildings were built to LEED criteria as pilot efforts. Since 2005, the Real Estate Services Division of DGS and state agencies have been designing and constructing buildings that meet LEED criteria. All new building construction or major renovations larger than 10,000 square feet will meet criteria to be certified as LEED Silver or higher. However, because of the state's prolonged budgetary challenges, little new construction has been authorized in recent years.

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LEED Certifications of Executive Branch and Leased Buildings and Spaces

LEED Rating	# of projects certified (current leases)	Sq. Feet	# of projects certified (state-owned buildings)	Sq. Feet	# of projects certified (Total Combined)	Total Combined Sq. feet
LEED-NC	16	455,930	34	6,186,223	50	6,642,153
LEED-EBOM	14	2,128,772	36	9,618,957	40	11,747,729
LEED-CI	19	980,835	2	890,400	21	1,871,235
LEED-CS	1	60,989	0	0	1	60,989
TOTALS	50	3,626,526	62	16,695,580	*112	20,322,106

Key: NC = New Construction; EBOM = Existing Building Operations & Maintenance; CI = Commercial Interiors; CS = Core & Shell.

* 13 buildings have more than one type of LEED certifications (e.g., NC, EBOM)

LEED Certifications by Level

LEED Designation	Certifications	Sq. Feet
Platinum	5	
Gold	36	
Silver	60	
Certified	11	
Total Certification	*112	20,322,106
Total Buildings	*97	15,527,408

*97 total buildings (15,527,408 sq. ft.) have been LEED Certified, including 13 buildings with more than one type of certification (e.g. NC, EBOM)

Existing Buildings

All existing state buildings over 50,000 square feet shall complete LEED-Existing Building (EB) certification by December 31, 2015 (including meeting an Energy Star rating of 75, or alternate energy standard established by the California Energy Commission), to the maximum extent that is cost-effective.

LEED – Existing Buildings

From 2005 through 2009, DGS LEED certifications utilized reduced pricing agreed upon through an MOU with the United States Green Building Council (USGBC), the developers of the LEED building rating system. During this time, the DGS registered its entire existing building portfolio at a significant cost savings. DGS is now moving toward participation in the USGBC's volume certification program for its remaining existing building portfolio. This will result in further savings on DGS LEED certifications. Currently, 59 percent of DGS's owned building portfolio area is LEED certified. DGS-owned building certifications comprise 82 percent of total Executive Branch state-owned

LEED certified building area. DGS projects that approximately 11 percent of total existing Executive Branch, state-owned building area is LEED certified.

Energy Star

Currently, DGS has 106 Energy Star Rated Leased Buildings totaling 1,603,571 square feet. Energy Star uses a rating system with a scale ranging from 1–100. A rating of 50 indicates average energy performance, while a rating of 75 or better indicates top performance. The average rating for all DGS Energy Star rated leased buildings is 89.

Based on specific building information, such as size, location, number of occupants, number of PCs, etc., the rating system estimates how much energy the building would use if it were the best performing, the worst performing, and every level in between. The system then compares the actual energy data entered to the estimate to determine building rank relative to its peers.

Energy Efficiency Retrofits

Public Law 111-5, the American Recovery and Reinvestment Act of 2009 (ARRA), provided funds to the United States Department of Energy to make allocations to its existing programs. On June 25, 2009, the California Energy Commission, in its role as the State Energy Office in California, received \$226,093,000 and subsequent legislation added Sections 25470 through 25474 to the Public Resources Code, allocating \$25,000,000 to create the Energy Efficient State Property Revolving Fund (Loan Fund).

Under the terms of the statute, DGS administers the Loan Fund to finance energy efficient retrofits at state facilities. To date, DGS has issued 12 loans totaling \$24,731,876 to nine departments, funding 70 projects at over 400 buildings that will save participating state agencies approximately 28 million kilowatt-hours and 800,000 therms annually.

Two annual repayments have occurred, returning nearly \$7 million to the fund. The Loan Fund also received an augmentation of \$2.7 million in additional funds from the California Energy Commission. Currently, the fund has approximately \$9 million available for allocation and efforts are currently underway to issue solicitations for projects, and allocate those funds to projects by mid-2013.

Building Commissioning

New and existing buildings shall incorporate building commissioning to facilitate improved and efficient building operation.

Practices for New Building commissioning are well established and being followed. All new building projects are commissioned, since this is a requirement of both LEED certification, as well as the California Green Building Code (CALGreen). For Existing Building commissioning, DGS along with the California Energy Commission and other state agencies are establishing threshold targets based on building type and use.

DGS is working with PG&E to obtain incentive funding for a third-party Monitoring Based Building Commissioning consultant, EnerNoc. SDG&E has agreed to fund investigation studies with Enovity for CalTrans District 11, Mission Valley, and San Diego state office buildings. The initial investigations by SDG&E and Enovity are complete and DGS is reviewing the recommendations.

Indoor Environmental Quality

Implement relevant and feasible voluntary measures from Divisions A4.5 and A5.5 of the California Green Building Standards Code, to ensure healthy indoor environments for occupants.

DGS is coordinating the development of existing building policies and guidelines that will be implemented into the State Administrative Manual (SAM) through Management Memos by July 1, 2013. Among these policy areas is Indoor Environmental Quality, which is being led by the Air Resources Board and the Department of Public Health.

Water Efficiency and Conservation

Reduce water use at facilities by 10 percent by 2015 and 20 percent by 2020, as compared to a 2010 baseline.

DGS assisted the Department of Water Resources in the establishment of guidelines that meet the requirements of EO B-18-12. Departments were instructed to collect data to establish the 2010 baseline, against which water conservation will be measured. Water efficiency is among the categories for existing building policies and guidelines under development to be added to the SAM by July 1, 2013.

Electric Vehicle Charging Stations

Identify and pursue opportunities to provide electric vehicle charging stations, and accommodate future charging infrastructure demand, at employee parking facilities in new and existing buildings. DGS along with other agencies and outside entities, shall develop an electric vehicle charging infrastructure plan.

Charger Installations

DGS enrolled in the Charge Point America Program, which is funded with the U.S. Department of Energy's ARRA and California Energy Commission's (CEC) AB 118 grant programs. Under these programs, DGS benefited from state and federal grants and installed a total of 65 new Level II Electric Vehicle Charging Stations at six DGS parking garages in Sacramento, as well as the East-End Complex, the Attorney General Building, and the Franchise Tax Board Building.

DGS is currently in preliminary discussions with the CEC on a potential interagency agreement to help fund further expansion of the DGS charger network across the state.

Contracts

In an effort to assist other state agencies interested in purchasing electric vehicle charging stations, DGS Procurement Division has created a statewide cooperative agreement using an existing Los Angeles County electric charger contract. A DGS leveraged charger contract is currently under development. DGS has also added three electric vehicles (Ford Focus, Nissan Leaf and Toyota Rav-4), and two plug-in hybrid electric vehicles (Chevrolet Volt and Toyota Prius) to the state's motor vehicle contract for 2013.

Policies

DGS is currently directing an interagency team that is developing a management memo to provide state agencies with guidelines on how to install workplace charging. Several meetings have already occurred with stakeholders such as the utility companies and state agencies and the draft policy is anticipated in July 2013.

DGS also participates in recurring interagency meetings with the Governor's Office and other agencies to report on progress toward implementing the comprehensive 2012 Zero-Emission Vehicle (ZEV) Action Plan accompanying Executive Order B-16-125. DGS issued management memo 13-04 that requires state agencies to develop a 3-year plan for the purchasing of ZEVs, including the requisite electric vehicle charging systems necessary at state parking facilities to support the ZEV fleet. The vision is to leverage most fleet charging stations with workplace charging needs to more rapidly expand the state's electric vehicle charging network at its parking facilities through shared use.

Environmentally Preferable Purchasing

Purchase and use environmentally preferable products that have a lesser or reduced effect on human health and the environment when compared with competing goods that serve the same purpose, perform well, and are cost effective, as per Public Contract Code Section 12400.

DGS' Procurement Division has provided Environmentally Preferable Purchasing (EPP) training to state agency buyers and has presented at external events such as the California Green Summit and the Sacramento Area Regional Technology Alliance CleanStart Showcase to promote EPP to interested stakeholders.

Additionally, the Buying Green Website was developed by the EPP to provide an online guide that encompasses up-to-date buying tips, technical specifications, and statewide contracts. It provides access to laws, regulations and standards that shape procurement, and directs buyers to green Leveraged Procurement Agreements.

The EPP has developed or facilitated purchasing specifications that include EPP certifications, techniques, and requirements to drive the procurement of safer and less toxic products, as well as energy efficient products. Examples include:

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- Compact fluorescent lamps with reduced mercury levels that are below regulatory standards and are also low energy usage (Energy Star certified).
- Specifications for Personal Computer Goods that include requirements for enhanced energy efficiency and are also cost effective.
- Procurement evaluation methodology (Enhanced Efficiency Costing Methodology) to highlight vehicles with better SMOG and GHG profiles to support the implementation of Executive Order B-16-12. The development of the methodology was a coordinated effort by DGS, Air Resources Board, CalRecycle, and the Department of Toxic Substances Control.
- Specifications for procurement of exterior recycled paint to require volatile organic compound levels below existing regulatory thresholds and support the Governor's Executive Order B-18-12 provisions to increase use of recycled paint.
- Specifications for LED Roadway Lighting. These LED luminaires replace less energy efficient highway roadway lighting.

Financing

Identify and pursue available financing and project delivery mechanisms to achieve energy efficiency goals set forth in B-18-12 and the Green Building Action Plan.

For Energy Retrofit Projects, there are multiple financing opportunities available through Investor-Owned Utility On-Bill Financing, the Energy Efficient State Property Revolving Fund, and the California Energy Commission's Energy Conservation Assistance Account. DGS is currently developing financing through the Golden State Marketplace (GS \$Mart)^{xiv} and directly with the Energy Service Companies contracted to do the project.

Refer to Government Code Section 15814.28 (c) for information on financing of energy efficiency projects and programs.

Monitoring and Executive Order Oversight

Measure, monitor, report and oversee progress on measures set forth in B-18-12 and the Green Building Action Plan.

DGS led the development of EO B-18-12, and works closely with the Governor's Office to coordinate executive oversight and implementation of the EO. This includes the formation and leadership of two interagency oversight groups that meet regularly to oversee progress on the EO and to coordinate its implementation:

- Sustainability Task Force – This executive-level, interagency oversight Task Force meets quarterly to monitor and oversee progress on EO B-18-12 and other green initiatives. More than 20 state agencies and departments participate in the group, and all meetings are held in the Governor's Office.

- Sustainable Building Working Group – This implementation-level working group meets monthly in the Governor’s Office to coordinate statewide efforts to implement the Green Building Action Plan to accompany EO B-18-12. More than 20 departments and agencies participate.

Related to these efforts, DGS formed 12 focus groups consisting of more than 50 subject matter experts from 20 different state agencies, to develop existing building policies and guidelines for incorporation in the SAM. DGS is coordinating this overall effort, which will produce building policies by July 1, 2013.

Government Code Section 15814.28(b): The Most Common Energy Efficiency Measures Being Implemented

Under the American Recovery and Reinvestment Act (ARRA) of 2009, funding was made available for State Energy Programs (SEP). One of the program areas that the ARRA legislation encouraged was the creation of long term funding mechanisms such as revolving loan funds (RLF) to extend the impact of the ARRA funds. DGS received funds totaling \$25 million and a subsequent augmentation of \$2.7 million (refer to the Energy Efficiency Retrofits section on page 6 of this report). DGS began to evaluate and disburse funds for this program as of 2010.

Lighting upgrades, implemented in 90 percent of the Loan Fund projects to date, are by far the most common energy efficiency measure. Lighting retrofits typically generate significant savings at a low cost for implementation. The second most common measures are the installation of energy management systems and heating, ventilation, and air conditioning (HVAC) upgrades, which took place at 67 percent of the projects. While energy management systems do not always result in savings, most HVAC improvements generate savings in both electricity and gas usage, making them very cost-effective. Equipment replacements occurred in only 20 percent of the projects. Replacement measures are usually costly, and frequently do not generate a large amount of savings, so they generally occur only when they can be bundled with other measures, like lighting upgrades, that have a low cost but produce substantial savings to shorten their payback term.

Revolving Loan Fund Measures, As of March 2013

Energy Measure	Number	Construction Contract Cost	kWh (Annual Savings)	THERMS (Annual Savings)	Dollars (Annual Savings)	Simple Payback (Years)
Lighting Upgrades	64	\$9,693,890	12,570,290	0	\$1,518,177	6.39
Energy Mgmt Systems	46	\$960,072	2,190,874	61,468	\$247,930	3.87
HVAC Upgrades	41	\$6,726,224	13,493,330	159,804	\$1,388,258	4.85
Equipment Replacements	15	\$5,701,377	1,448,112	607,240	\$664,792	8.58

Government Code Section 15814.28(c): The Obstacles Preventing Further Implementation of Energy Efficiency Measures

The greatest obstacle to implementing energy efficiency measures is a lack of funding. The prolonged economic downturn has greatly impacted the availability of General Fund allocations to projects that are critical to the function of state programs.

Without sufficient funds available for critical program funding, there will not be funds available to implement energy efficiency measures out of the General Fund. For this reason, DGS has searched for alternative sources of funding to implement energy efficiency projects. Funding these projects is necessary as the state is losing money through inefficient building systems that generate needlessly high utility bills.

Several potential funding alternatives are available for energy retrofits at state facilities; however, all of them have limitations, as described below.

- **Loans** – The Department of Finance (DOF) authorized the use of GS \$Mart financing for energy retrofits, but the bond financing of many state facilities allows for only non-securitized loans, and those are not available at attractive rates in today's distressed financial market. In addition, to secure a loan, a prospective borrower must have a completely developed project, and such a proposal is impossible to produce without finds for project designs (investment-grade energy audits).
- **Bonds** – Currently, no bond programs offer funds for energy efficiency projects. A plan to reinstitute bonding authority for energy efficiency projects must address difficulties associated with the use of avoided costs to support revenue bonds. This complication affects any project that will repay project debt through energy savings. Another consideration for bonding authority is the need for some mechanism to limit the timing of the bond sale and the approval and implementation of projects. This restriction is necessary because many energy projects, especially those including information technology elements, can become outdated during a loan bond sale process.
- **California Energy Commission Energy Conservation Assistance Account Program** – These low-interest loans are available only to cities, counties, public schools and colleges, public hospitals and care institutions. Most state agencies are not eligible for loans under this program. Like other funding mechanisms, these loans require a significant upfront outlay of resources for project development.
- **Utilities Incentives** – Utility incentives can offset varying percentages of energy efficiency project cost, but state departments must have funding available to cover the implementation or purchase expense. Utilities typically do not issue rebates or incentives until after project implementation. Departments are still responsible for the portion of the project that the incentives do not cover.

- **Utility On-Bill Financing** – The investor-owned utilities offer loans with no fees or loan costs and zero percent interest for customers to make energy improvements and then repay the loan through their monthly utility bills. These loans appear attractive, but they present some problems to the state because the utilities reserve the right to adjust the amount they will loan until the completed project undergoes a stringent verification of savings. The amount of the savings, not the cost of the project, determines the loan amount. This arrangement presents some contracting difficulties.
- **ARRA Loan Fund** – The revolving nature of the aforementioned Loan Fund will supply capital for loans every year when loan recipients make their annual payments. As noted above, the entire \$25 million has been allocated and is scheduled to produce approximately \$3 million in available capital this year. Each year, the fund will increase incrementally, but not at a rate sufficient to meet the need for energy improvements in state facilities.
- **Power Purchase Agreements** – DGS is using Power Purchase Agreements (PPAs) to install solar photovoltaic arrays at state facilities, whereby a private entity provides capital, constructs, owns and operates a generation project on state property and sells all the power to the state. The price for the power purchased through the PPA is at or below utility rates so the net effect of the project is positive for the state facility. DGS anticipates expanding the PPA model to other generation and co-generation technologies. PPAs are also under consideration for energy efficiency projects, possibly in combination with on-site generation, but only after the resolution of several problems, including:
 - Many state facilities are tax exempt, bond funded facilities, and Internal Revenue Service tax laws currently inhibit implementation of PPA projects at these facilities.
 - If labor agreements reveal that PPAs are replacing state workers, state departments would be unable to agree to the PPA.
 - If energy savings, or avoided cost, will provide the funds to make PPA payments, the state will need a mechanism that allows for the calculation of the actual cost avoidance. This calculation can be very complicated because it involves comparing the PPA cost to what the department would pay if they had not implemented the energy efficiency measures. To derive that figure, the calculation must account for many variables, such as time-of-use rates, temperature extremes, and occupancy fluctuations. The state does not currently possess the resources necessary to perform this function.

Government Code Section 15814.28(d): How Current Efforts and Ideas Can be Incorporated into the Governor’s Five-Year Infrastructure Plan Described in Government Code Section 13102

DGS incorporates current efforts and ideas into the Governor's five-year infrastructure plan on a continuous basis. DGS contribution to the Governor's plan derives from the projects the department will be working on in the upcoming years. These projects come into existence through Capital Outlay Budget Change Proposals, which receive approval from the directors of DGS and DOF, the Legislature, and ultimately the Governor when he signs the Budget Act.

When preparing a Capital Outlay Budget Change Proposal, DGS must demonstrate that the proposed project is in accordance with statutes and directives that guide the planning and development of state office spaces. These mandates include, but are not limited to, the following:

Government Code Sections 4217.10-4217.18 - Energy Conservation Contracts
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=04001-05000&file=4217.10-4217.18>

Government Code Sections 14660-14684.1 - State Property
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=14001-15000&file=14660-14684.1>

Government Code Sections 14710-14713 - State Building Energy Retrofits
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=14001-15000&file=14710-14713>

Government Code Sections 15808-15812 - State Building Construction General Powers
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=15001-16000&file=15808-15812>

Government Code Sections 15814.10-15814.28 - Energy Conservation in Public Buildings
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=15001-16000&file=15814.10-15814.28>

Government Code Sections 15814.30-15814.40 - Energy Efficiency in Public Buildings
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=15001-16000&file=15814.30-15814.40>

Government Code Sections 65041-65049 - Statewide Environmental Goals and Policy Report
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=65001-66000&file=65041-65049>

Public Utilities Code Section 388 - State Agencies
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=puc&group=00001-01000&file=388>

Public Resources Code Sections 25000-25009 - Energy Conservation and Development, Chapter 1: Title and General Provisions

<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=24001-25000&file=25000-25009>

Public Resources Code Sections 25410-25422 - Energy Conservation Assistance
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=25001-26000&file=25410-25422>

Public Resources Code Sections 25470-25474 - Energy Efficient State Property Revolving Fund
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=25001-26000&file=25470-25474>

Public Resources Code Sections 25695-25697 - Energy Technology and Energy Conservation
<http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=25001-26000&file=25695-25697>

EO W-18-91 directs the state to consolidate its operations in joint-use facilities where possible and feasible.

EO W-83-94 requires state agencies to maintain five-year Energy Management Plans.

EO D-16-00 establishes a state sustainable building goal to site, design, deconstruct, construct, renovate, operate and maintain state buildings that are models of energy, water, and materials efficiency.

EO D-46-01 and Management Memo 01-18 provide DGS direction on locating state-owned and leased state offices to promote smart growth policies.

EO S-20-04 (rescinded and replaced by EO B-18-12) called for the state to take the lead in designing, building, and operating its buildings to make them resource and energy efficient buildings and directs the state to reduce its grid-based energy purchases for state-owned buildings by 20 percent by 2015.

EO B-16-12 requires that California's state vehicle fleet increase the number of its zero-emission vehicles through the normal course of fleet replacement.

EO B-18-12 and the accompanying Green Building Action Plan details specific goals, schedules and measures to be instituted in the design and operations of state-owned buildings. The measures are intended to reduce greenhouse gas emissions, cut retail energy purchases, increase on-site renewable energy, and requires more energy efficient building design, increases water efficiency and includes electric vehicle charging.

ⁱ A Zero Net Energy (ZNE) facility which generates as much energy as it consumes, depending on the metrics and definition used. Existing buildings will use measures to move towards ZNE by use of best practices and on-site renewable energy sources. Major building renovations will reach ZNE status by incorporating newer, more energy efficient systems, using best practices and on-site renewable energy sources. New construction will be built based on extensive building modeling, LEED standards, use of best practices, and on-site renewable energy sources.

ⁱⁱ Zero Net Energy modifications under the Major renovations category includes the closure of a building or facility to allow the work to be completed. Modifications to Existing Buildings allows the building or facility to remain open for business as the modifications are being made.

ⁱⁱⁱ Energy Star Portfolio Manager is an interactive energy management tool that allows users to track and assess energy and water consumption across their entire portfolio of buildings in a secure online environment. Whether they own, manage, or hold properties for investment, Portfolio Manager can help users set investment priorities, identify under-performing buildings, verify efficiency improvements, and receive Environmental Protection Agency recognition for superior energy performance.

http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager.

^{iv} LEED (Leadership in Energy and Environmental Design) provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions. The U.S. Green Building Council oversees LEED. The LEED ascending scale is certified, silver, gold and platinum, depending on the level of achievement.

^v Plug loads typically include office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance, and other energy uses. http://en.wikipedia.org/wiki/Plug_load

^{vi} On-site renewable energy sources such as solar or wind can power a building while reducing reliance on fossil fuels and minimizing emissions of carbon dioxide and other greenhouse gases that contribute to global warming. <http://www.nrdc.org/enterprise/greeningadvisor/en-generation.asp>

^{vii} Building Commissioning ensures that facilities are built as planned and operate in the safest and most energy efficient manner possible.

<http://www.epa.gov/oaintrnt/energy/commissioning.htm>

^{viii} Demand response can be interpreted as incentives designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized.

^{ix} The Automated Demand Response Program (Auto-DR) utilizes communications technology to send businesses demand response signals and to implement load reductions automatically through facility control systems. Customers are provided with funds to pre-program energy management and control systems. During times of high electricity demand or emergencies, utility companies send an automated signal to these systems which initiates a series of pre-programmed and pre-authorized demand reduction strategies via the internet.

<http://www.sdge.com/automated-demand-response-program>

^x Monitoring-Based Commissioning allows building management staff to ensure that their facility is running properly by utilizing meter data to decipher if or when something goes wrong or energy usage does not match up to previously set baselines. <http://www.enernoc.com/our-resources/term-pages/712-what-is-monitoring-based-or-persistent-commissioning>

^{xi} Sacramento Municipal Utility District's (SMUD) Smart Sacramento Project involves system-wide deployment of an advanced metering system integrated with existing enterprise and information technology systems.

[http://en.openei.org/wiki/Sacramento Municipal Utility District Smart Grid Project](http://en.openei.org/wiki/Sacramento_Municipal_UTILITY_District_Smart_Grid_Project)

^{xii} Peak Day Pricing (PDP) is a new pricing plan in response to a statewide initiative led by the California Public Utilities Commission (CPUC) for the reduction of peak energy demand. The goal is to help stabilize the grid to avoid power interruptions, reduce power plant load capacity during high demand periods, and reduce greenhouse gases as a result of energy use. PDP encourages customers to conserve energy when the grid is at or near capacity by rewarding customers who are able to reduce and/or shift their energy use to non-peak periods.

<http://www.pge.com/mybusiness/energysavingsrebates/timevaryingpricing/peakdaypricing/>

^{xiii} Southern California Edison's (SCE) Demand Bidding Program (DBP) is a year-round, flexible, Internet-based bidding program that offers business customers credits for voluntarily reducing power when a DBP event is called.

[https://www.sce.com/wps/wcm/connect/96702c0a-c759-4efe-b302-f874e4407c32/090217 Demand Bidding Fact Sheet.pdf?MOD=AJPERES](https://www.sce.com/wps/wcm/connect/96702c0a-c759-4efe-b302-f874e4407c32/090217_Demand_Bidding_Fact_Sheet.pdf?MOD=AJPERES)

^{xiv} GS \$Mart is California's award-winning, innovative concept for government financing. This financial marketplace is designed to facilitate State of California and local government installment or lease purchases, and meets all requirements of a competitively bid process.

<http://www.dgs.ca.gov/pd/Programs/StateFinancialMarketplace/GSMart.aspx>