



American Recovery and Reinvestment Act of 2009

The American Recovery and Reinvestment Act of 2009 (ARRA) provided \$787 billion in new spending and tax incentives to create new jobs, jumpstart the flagging economy, and invest in long-term growth. California was awarded nearly \$5 billion to foster energy efficiency, support the domestic renewable energy industry, modernize the electric transmission grid, and increase the use of alternative transportation fuels and vehicles. The California Energy Commission received and administered \$314.5 million in ARRA funds supporting energy efficiency, renewable energy projects, consumer rebates, and energy assurance planning through the following four programs:

- State Energy Program
- State Energy Efficient Appliance Rebate Program (Cash for Appliances)
- Energy Efficiency and Conservation Block Grant Program
- Energy Assurance Planning Program

This portfolio of programs was intended to create jobs while achieving a balanced emphasis on both immediate upgrade projects and on sustained market transformation. These programs provided comprehensive energy efficiency retrofits to existing buildings, developed renewable energy resources, replaced inefficient appliances, brought clean energy manufacturing to the State, and developed the skilled workforce needed to support each of these activities. Such transformative efforts generate long-term benefits that can be difficult to quantify and will grow over decades into the future.

Also, the Energy Commission provided \$18.7 million from its Public Interest Energy Research (PIER) Program to cost-share research that helped leverage more than \$515 million in ARRA funding and about \$908 million in private investments. Furthermore, the Energy Commission allocated \$36.5 million from the Alternative and Renewable Fuel and Vehicle Technology Program to leverage an additional \$105.3 million in federal stimulus funding.

State Energy Program

The Energy Commission was awarded \$226.1 million in stimulus funds to administer the State Energy Program (SEP). The Energy Commission invested the funds in innovative market transformation pilot programs, including promoting the "whole building" approach to existing buildings energy efficiency upgrades; promoting innovative financing options for different sectors; coordinating workforce, education, and training programs with statewide partners; and installing targeted energy efficiency measures in public and commercial buildings. These funds were offered primarily through competitive solicitations to local jurisdictions, state agencies, nonprofits, and other organizations to preserve and create jobs, increase energy efficiency and renewable generation to reduce costs for consumers, and reduce reliance on imported energy. The ARRA-SEP funds were distributed through six subprograms:



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1. California Comprehensive Residential Retrofit (CCRR)
2. Clean Energy Business Finance Program (CEBFP)
3. Clean Energy Workforce Training Program (CEWTP)
4. Energy Conservation Assistance Act (ECAA)
5. Energy Efficient State Property Revolving Loan Program (DGS)
6. Municipal and Commercial Building Targeted Measure Retrofit (MCR)

Although the SEP closed on April 30, 2012, the benefits of the pilot programs initiated by the Energy Commission will be realized for decades to come. Many of the pilot programs were sustained with funding approved by the California Public Utilities Commission (CPUC) and implemented by utilities and local governments. Californians will benefit from saving more than \$30 million in annual energy bills as a result of energy efficiency improvements made under the pilot programs. These savings are the result of reducing consumption by nearly 190 million kilowatt hours (kWh) of electricity and about 4 million therms of natural gas each year. The Energy Commission administered the entire program at a relatively small 4.2 percent cost. Some programs used revolving loan funds and will continue to save energy as new projects are implemented.

The Energy Commission's SEP program portfolio succeeded in meeting the U.S. Department of Energy's (U.S. DOE) SEP Recovery Act Cost test threshold¹ for the portfolio as a whole, vigorously pursuing market transformation initiatives that are designed to achieve long-term changes to the structure and function of the market and the behavior of market participants. It also achieved high results on short-term cost-effectiveness tests for programs in the portfolio that primarily pursued immediate investments in known opportunities for building upgrades.² Below is a description of the benefits of each of the six ARRA-SEP subprograms.

California Comprehensive Residential Retrofit

The California Comprehensive Residential Retrofit (CCRR) Program received more than \$83 million in ARRA-SEP funding that went to various subrecipients, and more than \$14 million in Energy Efficiency Conservation and Block Grant (EECBG) funding that went to three large local governments (Los Angeles County, San Diego County, and City of Fresno). Further, the U.S. DOE gave \$30 million in direct block grants known as the Better Buildings Neighborhood Program to Los Angeles County, which passed funds through to Alameda, Sacramento, San

¹ The overall portfolio (not individual programs) should achieve annual savings of at least 10 MM BTUs per \$1,000 of SEP expenditures to be considered cost-effective.

² Gaffney, Kathleen. (DNV KEMA Energy & Sustainability). 2014. *Evaluation of the California Energy Commission's American Recovery and Reinvestment Act Programs: Combined Evaluation Report*. California Energy Commission. Publication Number: CEC-400-2014-011.



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Diego, San Francisco, and Sonoma Counties.³ CCRR was launched statewide in March 2011 as an unprecedented collaboration among the Energy Commission, CPUC, utilities, local governments, nongovernmental organizations, and the private sector. The Energy Commission awarded grants to develop innovative pilot programs, create tools and protocols needed for energy efficiency upgrades to existing buildings, and undertake a comprehensive, statewide, targeted outreach and education campaign. Using utility ratepayer funds, the CPUC administered \$102 million to provide homeowner rebates of up to \$4,500, as well as additional administrative and marketing funds. Program results are summarized in **Table 1**.

The amount of electricity saved as result of CCRR is equivalent to the electricity consumed in more than 2,900 homes annually, assuming the average California home uses 7.2 megawatt hours (MWh) per year. The amount of natural gas saved is equivalent to providing natural gas to about 3,150 homes, assuming the average California home consumes 400 therms per year.

Although federal ARRA funds ended in April 2012, the CCRR pilot programs continue with support of local governments and rebates from utility partners and remain the most ambitious energy efficiency program of its kind in the country, steadily transforming California's energy efficiency market. Since May 2012, San Francisco Bay Area and Los Angeles counties continue to be funded as Regional Energy Networks (RENs) through the CPUC to run local Energy Upgrade California™ Home Upgrade Programs as BayREN and The Energy Network in Los Angeles; and an additional 4,000 energy upgrade projects have been completed through the continuation of the program. Post ARRA, the CPUC has also funded the Statewide Energy Upgrade California Marketing, Education & Outreach Program, which has become a centralized hub for energy management tools for single-family, multifamily, and small commercial existing buildings, providing tools and tips to managing existing buildings energy use and savings.

³ <http://energy.gov/eere/better-buildings-neighborhood-program/better-buildings-neighborhood-program-partners>.



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Table 1: Data on Energy California Comprehensive Residential Retrofit
Includes Programs Funded by State Energy Program and Three Energy Efficiency and Conservation Block Grants

Total Number of Energy Assessments Conducted	Number of Upgrades Completed	Estimated Annual Electricity Savings (million kWh)	Estimated Annual Natural Gas Savings (million therms)	Estimated Annual Electricity Generation From Solar Installations (million kWh)	Estimated Annual Energy Cost Savings From Energy Efficiency*
11,869 single-family 15,057 multifamily (161 properties) Total: 29,926 units	8,115 single-family 5,703 multifamily (104 properties) Total: 13,818 units	21.2	1.26	3.2	\$4.0 million

Source: DNV KEMA

* Assumes 2012 average retail electricity and natural gas cost of \$0.15 per kWh and \$0.67 per therm, respectively.

Notes:

- **Single-Family Whole House Upgrades:** Data are from Energy Commission ARRA subrecipients: Local Government Commission (LGC) for Energy Upgrade California™ Statewide Program, Association of Bay Area Governments (ABAG) for Retrofit Bay Area; Sacramento Municipal Utility District (SMUD) for Home Performance Program, CRHMFA Homebuyers Fund (CHF) for Moderate Income Sustainable Technology Program, City of Fresno for Fresno Regional Comprehensive Residential Retrofit Program, Los Angeles County for Retrofit Los Angeles, and County of San Diego for Energy Upgrade California™ in San Diego County.
- **Multifamily Upgrades:** Data are from Energy Commission ARRA subrecipients: SMUD for Energy Upgrade California™ Multifamily Program, County of San Diego Energy Upgrade California™ Multifamily Program, and from multifamily upgrade pilot programs offered in the Bay Area, Los Angeles County, and Marin County, where data were available.
- **Method:** Subrecipients used EnergyPro software to estimate energy savings for single-family and multifamily upgrades.

Moving forward, the continuing CCRR programs will help Californians save energy in their homes, and not just through whole-home projects. Whole-home projects are extremely beneficial to households who make them, but they're not ideal for everyone. For example, homeowners who have exceptionally efficient homes may now be ready for solar panels to offset their energy usage. Others may wish to make a few smaller improvements every year, rather than multiple large improvements at one time. The whole-house program has been revised to make it more inclusive by allowing a flexible path of fewer measures and a plan to complete a whole-house upgrade to achieve incremental energy savings over time. The



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program continues to offer the Advanced⁴ and Basic⁵ path programs. Revised programs launched in October 2013.

Clean Energy Business Finance Program

The Clean Energy Business Finance Program (CEFPF) provided \$18.9 million in ARRA-funded loans to California businesses. Eligible projects used loan funds to purchase and install manufacturing equipment to produce renewable energy products. The California Legislature gave the Energy Commission authority to create a revolving loan fund, so loan repayments are returned to the Energy Commission for future use.

Clean Energy Workforce Training Program

The Clean Energy Workforce Training Program (CEWTP) received \$18.9 million in ARRA funds. This program created the largest state-sponsored green workforce development effort to prepare people for clean energy jobs. CEWTP activities were designed to target and address the specific needs of underrepresented groups such as females, younger workers, less educated workers, veterans, and the chronically unemployed. The training program was a joint undertaking of the Energy Commission, the California Employment Development Department (EDD), the California Workforce Investment Board (CWIB), and the Employment Training Panel (ETP). The CEWTP exceeded its enrollment targets: 9,244 individuals enrolled in at least one of the training activities, representing 116 percent of the goal, and 7,438 individuals completed the training, representing 101 percent of the goal. As a result of CEWTP, EDD placed 3,030 trainees in either unsubsidized employment or a training-related job, and the ETP upgraded the skills of the 3,166 already employed participants.

A successful element of the CEWTP is that it used labor market studies to focus the training on the needs of the green market. Training topics included heating, ventilation, and air conditioning (HVAC); lighting; insulation; roofing; solar technologies; building performance services; and building envelope technologies. Another unique feature of the CEWTP is that it delivered standardized, certified training to ensure a high level of quality and consistency. The high-quality training increased the likelihood of sustained participation of trainees in the clean energy industry. Certification training was offered by nearly all program implementers and aided recruitment, retention, and job placement efforts. EDD trainees attained more than 3,500 industry-recognized certifications, representing 112 percent of the program goal. While ETP preferred training that leads directly to a certificate of competency, ETP subcontractors did not have explicit goals pertaining to certifications and, consequently, were not required to track this information. However, 40 percent of participants surveyed indicated that they obtained certificates.

4 By working with a knowledgeable participating contractor, an Advanced Home Upgrade is customized to the home and the homeowners' needs. Homeowners can receive incentives of up to \$4,500.

5 The Basic Home Upgrade requires installing three or more upgrades from a flexible menu of options. Homeowners can receive rebates and incentives of up to \$2,500.



Energy Conservation Assistance Account

The Energy Commission supplemented the Energy Conservation Assistance Act account (ECAA) with \$19.6 million in ARRA funds. This low-interest loan program funded a variety of energy efficiency and renewable generation projects, including upgrades of lighting, HVAC, and water management systems, and installation of photovoltaic generation systems. The ECAA-ARRA program targeted cities, counties, and special districts. Program results are summarized in **Table 2**.

Table 2: Data on ECAA-ARRA (Net Savings⁶)

Number of Loans	Annual Electricity Savings (Million kWh)	Annual Natural Gas Savings (Million therms)	Estimated Annual Electricity Generation From Solar Installations (million kWh)	Annual Energy Cost Savings From Energy Efficiency*
33	16.2	0.004	1.1	\$2.4 million

Source: DNV KEMA

* Assumes 2012 average retail electricity and natural gas cost of \$0.15 per kWh and \$0.67 per therm, respectively.

Projects funded from the ECCA-ARRA program and administered by the Energy Commission saved electricity equivalent to the amount consumed in about 2,250 homes annually.

Energy Efficient State Property Revolving Fund Loan Program

The Energy Efficient State Building Revolving Fund loan program, administered by the Department of General Services (DGS), received \$27.6 million in ARRA funds. The partnership with DGS leveraged the ARRA funds in the state’s first revolving loan program to implement energy-efficiency projects in state-owned buildings. This program allows state agencies to lead by example when it comes to implementing energy efficiency in existing state-owned buildings and furthers Governor Brown’s initiative to green state buildings, which saves taxpayer dollars (EO B-18-12). Recipient agencies are able to repay the loan from their energy efficiency savings. Program results are summarized in **Table 3**.

⁶ Net savings are gross savings adjusted downward to account for people who would have implemented the projects even without the ARRA funding (free riders).



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Table 3: Verified Data on Energy Efficient State Property Revolving Fund (Net Savings)

Number of Retrofitted State-Owned Properties*	Annual Electricity Savings (million kWh)	Annual Natural Gas Savings (million therms)	Annual Energy Cost Savings**
70 projects (more than 400 buildings)	29.7	1.43	\$5.4 million

Source: DNV KEMA and data from Department of General Services

*The data include nine departments receiving 12 loans. Department of General Services, Energy Efficient State Property Revolving Fund Annual Legislative Report, January 1, 2013, <http://www.dgs.ca.gov/ola/home/2013Reports.aspx>.

** Assumes 2012 average retail electricity and natural gas cost of \$0.15 per kWh and \$0.67 per therm, respectively.

Projects funded with the Energy Efficient State Property Revolving Fund saved enough electricity to serve more than 4,100 homes annually. The amount of natural gas saved is equivalent to providing natural gas for about 3,600 homes.

Municipal and Commercial Building Retrofit

In response to the funding provided through ARRA, the Energy Commission designed and administered the Municipal and Commercial Building Targeted Measure Retrofit Program (MCR). This program was designed to install targeted, high-impact energy efficiency measures in nonresidential buildings across California. A primary goal of the programs was to help develop a self-sustaining market for these technologies. It built upon the PIER Technology Demonstration Program, in which the successful deployment of several lighting and HVAC measures had saved at least half of the energy used by the technologies they replaced. Program results are summarized in **Table 4**. The efficiency gains from MCR resulted in electricity savings equivalent to the use in more than 11,900 homes annually and natural gas savings equivalent to serving nearly 2,400 homes annually.



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Table 4: Data on Municipal and Commercial Retrofits Program (Net Savings)

	Total Number of Energy Assessments Conducted	Number of Upgrades Completed	Estimated Annual Electricity Savings (million kWh)	Estimated Annual Natural Gas Savings (million therms)	Estimated Annual Energy Cost Savings*
Targeted Commercial Upgrades	8,020	7,417	85.8	0.95	\$13.5 million

Source: DNV KEMA

* Assumes 2012 average retail electricity and natural gas cost of \$0.15 per kWh and \$0.67 per therm, respectively.

Notes:

- **Targeted Commercial Upgrades:** Data are from Energy Commission ARRA subrecipients: Energy Solutions for Energy Technology Assistance Program, Quantum Energy Services and Technologies for Oakland Shines, and Portland Energy Conservation, Inc. for EnergySmart Jobs.
- **Method:** Engineering estimates were used to estimate commercial upgrades.

State Energy Efficient Appliance Rebate Program (Cash for Appliances)

The California Cash for Appliances Rebate Program administered \$35.2 million in ARRA funds to encourage Californians to replace and recycle their old, inefficient appliances with new, highly energy-efficient models. Further, the Cash for Appliances program was designed to advance the market adoption of appliances with high tier efficiencies that exceeded current standards. For example, in some cases the Cash for Appliances program eligibility criteria exceeded national ENERGY STAR® minimum standards and California Title 20 Appliance Standards. Examples include the “Consortium for Energy Efficiency Tier 2 or greater” efficiency criteria for clothes washers and refrigerators. Also, the efficiency levels of some of the appliances promoted through the California Cash for Appliances rebate program exceed the requirements of the programs administered by California’s investor-owned utilities.

To encourage statewide participation, 182 California retailers, businesses, and utilities partnered with the Energy Commission and provided more than \$5.5 million for in-kind services to promote the program. The program encouraged the replacement of more than 178,000 appliances, water heaters, and heating and cooling systems with energy-efficient models as summarized in **Table 5**. For this program, electricity and natural gas savings are combined as “energy savings” and put in terms of British thermal units (BTUs), as shown in **Table 6**.



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Table 5: Data on Energy-Efficient Appliance Rebate Program

Rebates by Category	Number of Appliances
Clothes Washers	88,449
Refrigerators	62,791
Dishwashers	8,613
Room Air Conditioners	399
Freezers	346
HVAC—Central	9,099
HVAC—Gas Furnace	7,539
HVAC—Heat Pumps	854
HVAC—Boilers	13
Water Heaters—Solar	52
Water Heaters—Electric Heat Pump	30
Water Heaters—Gas Storage	5

Source: U.S. Department of Energy

Table 6: Savings From Energy-Efficient Appliance Rebate Program

	Estimated Annual Energy Savings (Billions of BTUs)
Major Appliances	103
HVAC	87
Water Heaters	1
All Products	191

Source: U.S. Department of Energy

Energy Efficiency Conservation and Block Grant



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The Energy Efficiency Conservation and Block Grant (EECBG) Program received \$49.6 million in ARRA funds. The program focused on projects that delivered lasting financial benefits to consumers and the economy through direct funding allocations to eligible cities and counties. Local governments concentrated on energy efficiency projects that reduced energy costs, greenhouse gas and criteria pollutant emissions, and total energy use. The bulk of EECBG funding went to small local governments, but more than \$14 million was provided to three large local governments (Los Angeles County, San Diego County, and City of Fresno) to launch residential-focused pilot programs. These partners leveraged program funds against the ARRA-SEP funds, utility rebate funds, and local direct U.S. DOE grants through the Better Buildings Neighborhood Program. (See CCRR section for more details.) EECBG Small Cities and Counties Program results are summarized in **Table 7**. The results of the residential upgrade pilot projects that received EECBG funding are included in **Table 1** and are not included in **Table 7**. The efficiency gains from EECBG Small Cities and Counties Program resulted in electricity savings equivalent to the use in nearly 4,700 homes annually. It resulted in natural gas savings equivalent to serving more than 400 homes annually.

Table 7: Data on Energy Efficiency and Conservation Block Grants – Phase I and II (Net Savings)

Number of Jurisdictions That Received Block Grants	Number of Lighting and Control System Projects	Number of HVAC Projects	Number of Other Projects	Annual Electricity Savings (million kWh)	Annual Natural Gas Savings (million therms)	Annual Energy Cost Savings*
Phase I – 193						
Phase II – 11	257	123	70	33.6	0..175	\$5.2 million
Total: 204						

Source: DNV KEMA

* Assumes 2012 average retail electricity and natural gas cost of \$0.15 per kWh and \$0.67 per therm, respectively.

Energy Assurance Planning

The Energy Assurance Planning Program provided \$3.6 million in ARRA funds to state agencies and local governments to improve their emergency preparedness plans and ensure electricity grid resiliency regionally. Working with multiple local jurisdictions, a monitoring process was developed to track the duration, response, restoration, and recovery time of energy supply disruptions.

Energy Commission's Leverage of ARRA Funding

To help California companies secure federal stimulus funding and accelerate California's research agenda, the Energy Commission made significant funds available from both the PIER and Alternative and Renewable Fuel and Vehicle Technology Programs as matching funds to



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California applicants in federal grant/loan solicitations. The Energy Commission provided roughly \$18.7 million in cost-share funding from its PIER Program to help leverage more than \$515 million in ARRA funding from the U.S. DOE and about \$908 million in private investments to support smart grid, energy efficiency, and renewable research efforts in California. In addition, the Energy Commission allocated \$36.5 million from the Alternative and Renewable Fuel and Vehicle Technology Program to fund nine projects and leverage an additional \$105.3 million in federal stimulus funding. For more than 10 years, the PIER Program has funded energy research, development, and demonstration projects that are in the public interest but not adequately funded by competitive or regulated markets.

Thirty-one California-based projects were selected to receive PIER cost-share funding. Awardees include 17 smart grid projects and 14 energy efficiency and renewable energy projects. Both applicants and the U.S. DOE commented that the cost-share support offered by PIER made project applications more credible and more likely to be selected for ARRA funding.

Additional References:

The Energy Commission's home page for ARRA programs is located at <http://www.energy.ca.gov/recovery/>

For more information on Energy Upgrade California, visit <https://energyupgradeca.org/overview>

For additional details for the Department of General Service's energy efficiency program, see <http://www.dgs.ca.gov/resd/Programs/greenbuilding.aspx>

Information on California's Local Energy Assurance Planning (CaLEAP) can be found at <http://www.caleap.org/>

Additional information about the Energy Commission's ARRA efforts is available at <http://www.energy.ca.gov/2010publications/CEC-100-2010-001/CEC-100-2010-001-CMF.PDF>

Sources:

Gaffney, Kathleen. (DNV KEMA Energy & Sustainability). 2014. ***Evaluation of the California Energy Commission's American Recovery and Reinvestment Act Programs: Combined Evaluation Report***. California Energy Commission. Publication Number: CEC-400-2014-011.

Table 1: Metoyer, Jarred, Kathleen Gaffney, Brad Hoover, and Stephanie Yang. (DNV KEMA Energy & Sustainability). 2014. ***Evaluation of the California Comprehensive Residential Retrofit Programs***. California Energy Commission. Publication Number: CEC-400-2014-014.



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Department of General Services, **Energy Efficient State Property Revolving Fund Annual Legislative Report**, January 1, 2013, <http://www.dgs.ca.gov/ola/home/2013Reports.aspx>

Table 2: Gaffney, Kathleen, Julia Vetromile, Stephanie Yang. (DNV KEMA Energy & Sustainability). 2013. **Impact Evaluation Report of the Energy Efficiency Financing Program**. California Energy Commission. Publication Number: CEC-400-2014-013.

Table 3: Gaffney, Kathleen, Julia Vetromile, and Stephanie Yang. (DNV KEMA Energy & Sustainability). 2013. **Evaluation of the Energy Efficient State Property Revolving Loan Fund Program**. California Energy Commission. Publication Number: CEC-400-2013-012.

Table 4: Murray, Rachel, Kathleen Gaffney, Jon Vencil. (DNV KEMA Energy & Sustainability). 2013. **Evaluation of the Municipal and Commercial Targeted Measure Retrofit Program**. California Energy Commission. CEC-400-2014-017.

Tables 5 and 6: http://www.cash4appliances.org/consumers/Summary_of_rebate_results.pdf

Table 7: Gaffney, Kathleen, Julia Vetromile, and Stephanie Yang. (DNV KEMA Energy and Sustainability). 2013. **Impact Evaluation Report for Energy Efficiency and Conservation Block Grant Small Cities and Counties Program**. California Energy Commission. Publication Number: CEC-400-2014-015.

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Next update:

None anticipated