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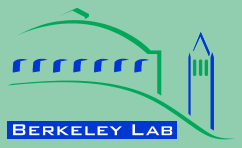

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Interactions between Energy Efficiency Programs funded under the Recovery Act and Utility Customer-Funded Energy Efficiency Programs

Technical Appendix

Charles A. Goldman, Elizabeth Stuart, Ian Hoffman, Merrian C. Fuller and Megan A. Billingsley

Environmental Energy Technologies Division

March 2011

The work described in this report was funded by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy, Weatherization and Intergovernmental Program and the Permitting, Siting and Analysis Division of the Office of Electricity Delivery and Energy Reliability under Contract No. DE-AC02-05CH11231.

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Technical Appendix

Prepared for the
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy and
Office of Electricity Delivery and Energy Reliability

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Acronyms and Abbreviations

ARRA	American Recovery and Reinvestment Act
ACEEE	American Council for an Energy Efficient Economy
Btu	British thermal unit
CEE	Consortium for Energy Efficiency
DOE	U.S. Department of Energy
EE	energy efficiency
EECBG	Energy Efficiency and Conservation Block Grants
EERE	(DOE Office of) Energy Efficiency and Renewable Energy
EIA	Energy Information Administration
HVAC	heating, ventilation, air conditioning
IOU	Investor-owned utility
LBNL	Lawrence Berkeley National Laboratory
NYSERDA	New York Energy Research and Development Authority
OE	(DOE Office of) Electricity Delivery and Energy Reliability
PBF	Public Benefit Fund
PSC	Public Service Commission
PUC	Public Utilities Commission
RAP	Regulatory Assistance Project
RESNET	Residential Energy Services Network (RESNET)
SEEARP	State Energy Efficient Appliance Rebate Program
SEO	State Energy Office
SEP	State Energy Program
SBC	System Benefits Charge
WAP	Weatherization Assistance Program

Case Studies Introduction

Under the American Reinvestment and Recovery Act (ARRA), the U.S. Department of Energy has provided states with funding via a variety of programs. This study focuses on a selected set of ARRA-funded programs administered by state energy offices: the State Energy Program (SEP) formula grants, the Energy Efficiency and Conservation Block Grant (EECBG) funds administered directly by states, and the State Energy Efficient Appliance Rebate Program (SEEARP). These programs serve markets also typically served by utility customer-funded energy efficiency programs (e.g., residential, commercial/industrial, institutional). We exclude the low income Weatherization Assistance Program from this study for several reasons: 1) while ARRA has provided a large increase in funding for low income weatherization, states have had long-running low income weatherization programs and the funding does not represent the introduction of new programs; 2) other studies are being conducted in this area, including a Weatherization Assistance Program ARRA-period evaluation currently being done by Oak Ridge National Laboratory; and 3) resource constraints for this study.

We observe interactions between these selected ARRA programs and a selected set of energy efficiency and renewable programs paid for by utility customers (i.e., ratepayers)[1] in the residential and commercial/industrial/institutional market sectors. In our quantitative analysis, it is important to note that we are comparing multi-year budgets for selected ARRA programs that are exclusively or largely funding energy efficiency activities with annual 2010 budgets for utility customer-funded energy efficiency programs.[2]

This Technical Appendix is comprised of a series of twelve case studies of states with a high potential for interaction between utility customer-funded programs and ARRA-funded energy efficiency programs. We chose states that met our selection thresholds for several criteria:

- Significant amount of utility customer funding for energy efficiency per capita;
- Program administrator model diversity;
- Geographic diversity; and
- Diversity of utility customer program funding status: states with long-running, mature utility customer-funded energy efficiency programs (leaders) and states with programs that have been implemented more recently or are ramping up (up-and-comers).

Each case study is organized as follows:

- Section one provides case study highlights and an overview of the state's utility customer-funded energy efficiency landscape including the number and types of utilities, the regulatory environment, energy efficiency budget, historical background, and brief overview of the state energy office's recent energy efficiency activity.

[1] Throughout this report we will refer to ratepayer-funded programs as programs funded by utility customers.
[2] Where we compare budgets for utility customer-funded energy efficiency with ARRA funding, we exclude load management and low-income weatherization program funding from the utility program budgets in order to facilitate more consistent comparisons with the selected ARRA programs.

- Section two summarizes budgets and descriptions of selected ARRA-funded programs in the state (SEP, EECBG and SEEARP). SEP programs are grouped into four program types in order to facilitate comparison with similar uses of funds by utility customer programs: 1) energy efficiency programs (programs directly involved in implementing and promoting EE in buildings); 2) renewable energy programs (programs funding renewable energy development and installations); 3) cross-cutting programs (programs which fund both EE and RE, and programs that promote EE but which are not directly related to EE projects in buildings (e.g., energy codes, marketing, workforce development); and 4) other programs (programs not specifically related to EE in buildings such as transportation, utility reliability planning).

- Section three compares funding levels for energy efficiency activities in the selected ARRA programs and utility customer-funded energy efficiency programs and describes various types of observed interactions between the ARRA programs and utility customer-funded energy efficiency and renewable energy programs. This section also provides examples of the impacts of interactions between program administrators have had on program planning, program design and implementation, policy issues and potential long term benefits of the ARRA programs.

The full report that this Technical Appendix accompanies is available here:
http://eetd.lbl.gov/EAP/EMP/ee-pubs.html

California

Highlights of Interaction between ARRA and Utility Customer-funded Programs:

- The California Energy Commission (CEC) took utility customer-funded energy efficiency programs into account in planning, designing and implementing its own programs.

- Coordination on program planning between the CEC and the California Public Utilities Commission (CPUC) – overseers respectively of ARRA-funded and utility customer-funded program design and spending – has been uneven and generally modest. Coordination has increased over time.

- The threat to Property Assessed Clean Energy (PACE) by the Federal Housing Finance Agency freed up SEP funds for additional energy efficiency policy and program planning, including development of a statewide coordinated whole house retrofit program, branded Energy Upgrade California (EUC).

- The challenges of coordinating California's efficiency programs stemmed partly from strained staff and partly from the high profile of energy efficiency policy in a state where more than one entity has overlapping responsibility for administering and overseeing energy efficiency.

1. Landscape of Utility Customer Programs

California has led the nation in utility customer-funded energy efficiency programs since the late 1970s. Two energy crises – in oil markets in the 1970s and early 80s and in electricity markets in 2000-2001 – fueled the state's drive for energy efficiency, initially through state-mandated appliance and building standards. Decoupling and shareholder incentives were put in place in the 1990s. Utility customer-supported programs began in the 1980s and were reinforced in 1998 with restructuring and establishment of programs funded by system benefits charges (SBC) on customers of the state's four investor-owned electric and gas utilities (IOUs). The IOUs operate their own efficiency programs funded through the SBC as well as other rate components (e.g. procurement related costs), overseen by the CPUC and subject to a long-term statewide strategic efficiency plan and some of the most rigorous EM&V requirements in the nation. Public power entities administer their own efficiency programs that are funded through similar charges (see **Table 1**).

Table 1. California: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	Energy efficiency programs largely occur at the four IOUs (PG&E, SCE, SCG, and SDG&E), and two large municipal utilities (SMUD and LADWP). There are other small IOUs and a large number of smaller municipals, coops, tribes and irrigation districts. Utilities administer their own programs funded by a system benefits charge (SBC).

Technical Appendix: Interactions between Energy Efficiency Programs funded under the Recovery Act and Utility Customer-funded Energy Efficiency Programs

EERS status	The CPUC and the CEC have a joint Energy Action Plan calling for procurement of 90% of maximum achievable energy efficiency by 2013, broken down by utility. The CPUC independently sets savings goals – recently, about 1% of forecast electricity sales per year – and utilities must identify means for meeting those goals in their 10-year procurement plans, submitted to the CPUC every two years. The Energy Commission reviews the triennial plans and annual reports of public-power entities and makes recommendations to the utility, the administration, and the legislature.
Utility customer program funding history	IOU programs funded by utility customers started in the early 1980s. Many municipal utilities and other public power entities added in the 2000s.
Utility customer-funded budget for EE	2010 electric and gas EE budget (including low-income): $1.2 billion; $40.20 per capita. In 2009, electric EE program expenditures were 2.75% of electric utility retail sales revenues.
Regulatory and Business Model	**EE Program Administrator**: IOUs run their own energy efficiency programs, covering about 70% of the state's consumers, with oversight from the state Public Utilities Commission, including program and budget approval in three-year cycles. Municipal utilities run their own, with monitoring from the CEC. **Cost recovery:** With decoupling, net revenue is guaranteed, regardless of sales. Revenue requirements are set in rate cases and trued up annually. Funding beyond an SBC comes from utility procurement budgets, and IOUs can ask for more to meet unanticipated demand or use a higher incentive for customer participation. **Utility performance structure:** For the 2006-2008 program period, IOUs faced a 'risk/reward incentive mechanism' that most recently has allowed incentive payments for 7% of system savings if an IOU exceeds 85% of CPUC goals, coupled with penalties for falling below those goals. Incentives and penalties are capped at $450 million collectively. **EM&V:** The CPUC's Energy Division oversees teams of consultants for the technical work. Funded at 4% of program costs in the 2010-2012 program cycle. **Decoupling:** All IOUs fully decoupled since 1992.
Utility customer program objectives	SB 1037 (2005) places energy efficiency first in the California's loading order for public- and investor-owned utilities. The state energy action plan calls for procurement of 90% of maximum achievable energy efficiency by 2013, broken down by utility. The CPUC in recent years has set savings goals at about 1% of forecast electricity sales per year.
SEO energy activity background	The California Energy Commission, unlike most other state energy offices, conducts formal rulemakings and pioneered the state's earlier energy efficiency programs in appliance, equipment and building standards, all updated regularly. The CEC also monitors utility customer efficiency programs among public-power utilities. A 2009 law (AB758) requires the CEC to develop and implement a comprehensive retrofit program for residential and commercial buildings.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. California: Selected ARRA Energy Efficiency Programs

California has been awarded more than $770 million for selected ARRA-funded energy efficiency programs. About 40% is administered by the California Energy Commission (CEC); the remaining $459.3 million is administered by more than 270 cities, counties and tribes. Of the funds administered directly by the CEC, about 73% is from the State Energy Program, about 15% is from an Energy Efficiency and Conservation Block Grant (EECBG), about 11% is allocated from the State Energy Efficient Appliance Rebate Program (see **Table 2**).

Table 2. California: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program Formula Grant - program $ administered by CEC	$226.1	Residential and commercial retrofits; state government energy efficiency revolving loans; low-interest energy conservation loans; clean-energy business financing
EECBG Formula Grant - program $ administered by CEC	$49.6	Land-use planning, energy efficiency and conservation study to support CEC EE program delivery; small city and county grant program.
EECBG Formula Grant - program $ administered directly by large cities and counties	$305.6	Some combined with SEP funds and utility customer-funded utility rebates in a statewide residential and commercial retrofit program; otherwise primarily retrofits of local government buildings and more efficient street lighting.
EECBG Competitive Grants (”BetterBuildings”) - program $ administered by grant awardees, e.g., cities, community partnerships	$153.7	Some combined with SEP and utility customer funds for statewide retrofits, as above; others for local government buildings, more efficient street lighting; renewable energy deployments; loan funds; studies and planning .
State Energy Efficient Appliance Rebate Program - program $ administered by CEC	$35.3	Rebates offered on top of utility incentives funded by utility customers.
Total	**$770.8**	

The CEC budgeted about half its SEP money for local government-administered residential retrofits, commercial retrofits, and local energy improvement financing. The remaining half of the state’s SEP money was divided among a “clean energy” workforce training program; low interest loans to state and local governments to retrofit municipal buildings; and a “clean energy finance” program for the expansion or construction of new clean tech manufacturing facilities. Much of the California’s SEP grant dollars eventually were folded into a residential and commercial retrofit program that as of late fall 2010 was still evolving in the details of implementation (see **Table 3**).

This program grew out of plans by local governments and regional entities in the Sacramento, Bay Area, Los Angeles County, San Diego and North Coast regions to combine a portion of their EECBG funds with some of the CEC's SEP funds to establish PACE financing districts. These programs and districts were intended to leverage IOU incentives funded by utility customers. Three California localities had piloted PACE financing with some success. But through the spring and summer of 2010, federal home loan regulators were critical of PACE as risky for banks and discouraged lending in PACE districts. California's then-Attorney General Jerry Brown sued the federal home loan entities over the decision, but the federal action dissuaded California and most of its localities from putting the Recovery Act funds into PACE. Local and state entities in California had to shift from PACE-oriented retrofit programs to approaches with other sources of financing and a greater reliance on IOU rebates for retrofits.

The utilities and energy commission worked separately on whole home retrofit programs in the spring and summer of 2009. In September 2009, the CPUC required the IOUs to initiate a statewide whole house retrofit program and allotted $113 million in utility customer funds across the four IOUs for the program. The IOUs asked for time to devise a statewide program.

The Energy Commission meanwhile designed its ARRA-funded residential retrofit initiative as a collection of regional whole house programs with such components as marketing and outreach, workforce training and support, facilitation of retrofit financing, and co-funding of incentives. Local and regional entities applying for CEC sub-grants were encouraged to collaborate with the utility whole house retrofit programs and national programs such as Home Performance with ENERGY STAR.

During this early period, cooperation and collaboration between the two commissions was modest. CEC staffers indicated that they were dealing with multiple ARRA requirements and responsibilities, including drawing up guidelines for competitive sub-grants; issuing and evaluating proposals that exceeded available funds and solicitation; and drawing up contracts with the winning regions and local governments. CEC staffers often had to set aside their routine duties in order to handle ARRA-related responsibilities.

The CEC also offered a competitive solicitation for municipal and commercial retrofits that specifically used best practices identified in CEC research and showed significant innovation. Three implementation outfits won awards for ambitious retrofits of, for example, parking garages, municipal buildings and commercial buildings in downtown Oakland and lighting retrofits in large grocery stores.

Key goals of Energy Upgrade California include improving the energy efficiency of over 100,000 single family homes across the state and boosting creation and retention of jobs in the state's beleaguered construction industry. Consistent with state energy policy, projects taking advantage of financing associated with Recovery Act funds must exhaust cost effective energy efficiency measures before adding onsite renewable generation. Future phases are intended to address multifamily energy efficiency improvements and additional commercial projects.

Table 3. California: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Energy Efficient State Property Revolving Loan Program	$25	• CA Department of General Services (DGS) manages the fund under an interagency agreement. • DGS to identify buildings for efficiency improvements.
Energy Conservation Assistance Act Low-Interest Loans	$25	• Loans to local governments, often as a financing supplement to EECBG grants and utility rebates for energy efficiency retrofit and renewable energy projects.
Energy Efficiency Programs: Comprehensive Residential Retrofits	$50	• For single family homes and multifamily buildings. Measures are expected to vary from changing out light bulbs to deeper comprehensive whole house retrofits. • Intended to bring together regional groups of local governments, utilities, community colleges, national and state energy and affordable housing programs, and private and public energy and building contracting experts.
Energy Efficiency Programs: Municipal and Commercial Targeted Retrofits	$30	• Proposals using CEC-identified best practices in innovative ways were selected in a competitive solicitation. • Intended to persuade building owners of multiple benefits: energy savings, comfort, lease rates, etc. • Training workers to perform onsite assessments of potential energy savings and to install equipment, via partnerships with community colleges and other organizations.
Energy Efficiency Programs: Energy Upgrade California (EUC)	$33	• A statewide online, one stop clearinghouse for information on building retrofit incentives, financing, and qualified contractors. • Other marketing and outreach support for EUC.
Cross-cutting and Other Programs		
Clean Energy Business Finance Program (cross-cutting)	$31	• Loans for businesses – especially manufacturers – to upgrade their energy-related equipment or install renewable energy.
Clean Energy Workforce Training (cross-cutting)	$20	• Operated under an Interagency Agreement with the state's Employment Development Department and Employment Training Panel. • SEP funds combined with appropriations, other state dollars and private matching dollars. • Funds awarded to local workforce investment boards, community colleges, local trade organization, labor unions or training providers. • Training in energy efficiency, water efficiency, clean transportation, and renewable energy.
EM&V contract and program administrative support (cross-cutting)	$12	• Awarded two contracts to perform EM&V and auditing services.
Total	**$226**	

Source: DOE (2009), interviews.

3. Interactions between Utility Customer-funded Programs and ARRA-funded Programs

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($250.7 million) that will be expended over three years equal about 21% of the 2010 budget (~$1.2 billion) for utility customer-funded energy efficiency programs (see **Figure 1** and **Figure 2**).

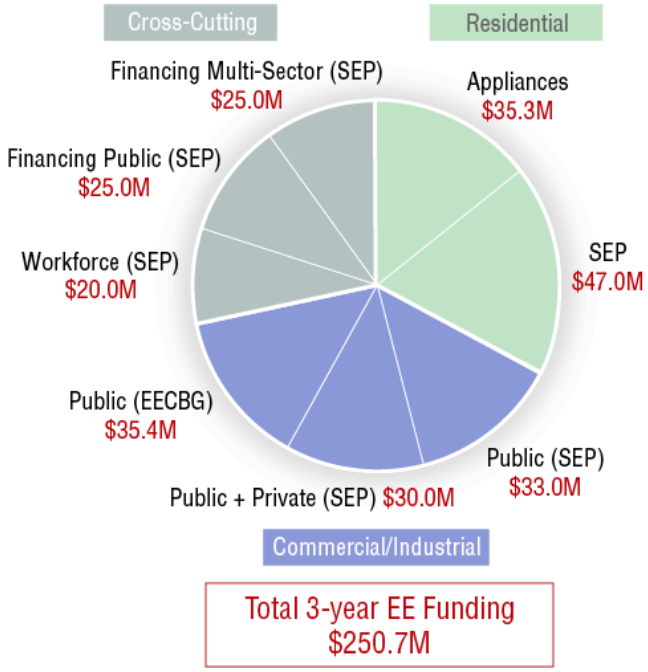

Figure 1. California EE program funds in selected ARRA programs by program type and market sector*

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" include programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. "EE program funds" do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

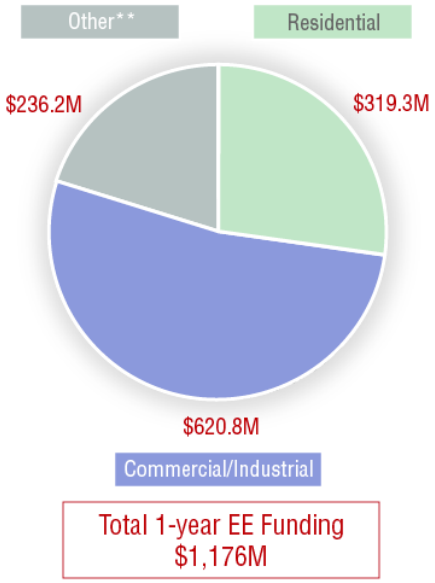

Figure 2. California 2010 utility customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector (e.g., administration, planning, codes, R&D, education and training, agriculture; can also include program budgets and EM&V not allocable by sector).

Early concern that ARRA-funded programs would complicate attribution of savings for utilities

In this early period, the CEC made proposals to the CPUC and IOUs on a joint appliance rebate program, with enhanced rebates funded by the ARRA's State Energy Efficient Appliance Rebate program. But after extensive discussions, utility efficiency managers decided against participating. The IOUs already had approved and launched their own programs and did not want to change course. Managers at the IOUs were concerned about uncertainty over the application of the Recovery Act's statutory requirements. The CPUC staff and IOU officials also were worried that new rebates would distort the appliance market and create confusion on two fronts: consumers not knowing who was offering what rebates, and also efficiency program managers and overseers not knowing exactly how to assign credit for savings. As a result, the CEC decided to run its own appliance rebate program.

Prospects for collaboration rise with perception of mutual benefit and reassurances on attribution

In early 2010, the CEC made competitive awards for regional retrofit programs, as mentioned above. At that point, CEC and CPUC staffers understood that a single, statewide brand and coordinated marketing campaign would be valuable – and that failing to have a joint program could impair both. The collaboration began informally through staff-level contacts and grew. In the spring, the two agencies, SEP local government sub-recipients, and the IOUs agreed on the name and brand Energy Upgrade California (EUC). The CPUC agreed to make Energy Upgrade

California into part of its residential portfolio, and the IOUs adopted this name and brand for their incentives in their whole house retrofit program once it was rolled out.[3]

SEP-funded local government regions are to use a significant portion of their ARRA dollars to provide marketing and outreach to encourage their residents to undertake retrofits using incentives provided by the IOUs for whole house retrofits. Local governments in other SEP-funded regions such as Los Angeles and Sacramento counties are also providing local incentives. In addition, CPUC staff helped ensure IOU cooperation with the CEC and the state and regional residential retrofit workforce development entities. Energy Upgrade California (EUC) marks the coordination of multiple funding sources: SEP funding; utility customer-funded rebates from the IOUs; EECBG formula and BetterBuildings grant funding; and local government funding and staff resources.

Energy Upgrade California now has a common glossary for all participating entities, including contractors – energy audits are "assessments" and retrofits are "energy upgrades." Additional state-level coordination was extended in the spring of 2010 to evaluation, measurement and verification; protocols for audits, safety and quality assurance and quality control, and marketing campaigns. In early 2011, a new EUC management structure was put in place, with a steering committee, a coordinating group, and a technical advisory committee. Members include the CEC, CPUC, IOUs, and SEP and EECBG recipients.

CEC staffers say coordination and partnership with the IOUs is critical to meet the DOE requirement of sustainability. The CEC expects the utilities to be the future implementers of the comprehensive residential and commercial retrofit programs mandated by AB758 programs. The CEC sees Energy Upgrade California as a vehicle for meeting the law's requirements.

Prospects for continued utility customer and taxpayer support for the programs are uncertain after March and June 2012, when the ARRA funding ends for SEP and EECBG grants respectively. The CEC has talked of using its own energy resources funds to continue support for the most productive of the ARRA-funded elements of the statewide retrofit program. CEC staff also has talked of proposing that utilities add a financing component as part of their ongoing whole home programs, after the ARRA funds end. PUC officials would have to approve using utility customer funds to assume support of current ARRA-funded program components in the 2012 program cycle, once the ARRA funding ends. So far, no request is before the commission.

Multiple objectives in ARRA-funded portfolio: speed, short-term economic development, and market transformation

The Energy Commission designed several programs for quick economic impacts, including its appliance program and grants or memoranda of understanding for retrofits of state and local public-sector buildings. One formula grant program for smaller cities and counties allowed their choice of installing pre-selected measures, undertaking a project supported by engineering

[3] A unified brand also helped foster cooperation between Southern California Edison and Southern California Gas, an electric IOU and a gas IOU, so that they could offer joint incentives to consumers.

analysis or setting up a financing program for efficiency improvements to buildings – all aimed primarily at backlogged retrofits at government buildings.

The CEC devoted about a third of its ARRA energy funds to projects deemed likely to have more sustainable, market transforming impacts, such as building or supporting the retrofit industry. For example, the CEC devoted money to training new clean energy sector workers and to presenting all market incentives to consumers statewide through the statewide web portal. The CEC sees these elements of its ARRA-funded portfolio as reducing information and infrastructure barriers to market expansion.

3.1 Program Design and Implementation Impacts

Representatives from CEC management indicated that considerable effort was made to engage the PUC, its staff and the large utilities. Most parties agree this effort came chiefly in the design and implementation phase, after the CEC's ARRA-funded programs were defined.

State goes solo with its own appliance program to limited success

The CEC's appliance rebate program was strategically aimed at high-efficiency appliances with low market penetration, such as air conditioners and refrigerators that exceeded ENERGY STAR standards. By then, federally funded appliance rebate programs in many other states were turning out to be heavily subscribed and quickly ended. Consumers reserved generous rebates and camped outside stores to snap up white goods, furnaces and other products.

California began laying media groundwork for its "Cash for Appliances" in March and launched the program on Earth Day – April 22, 2010. While other states allowed consumers to reserve rebates, the CEC chose to require mail-in rebates. To ensure that consumers and retailers could monitor the availability of funds, the CEC posted a rebate tracker on its website. The initial rebate offering was planned to last only a month with what the CEC hoped would be feverish sales and robust consumer response. Consumer response turned out instead to be modest. By mid-May 2010, as the scheduled end of the program approached, applications were in hand for about 18% of the rebate money. The CEC attributes the slow customer uptake to economic uncertainties and challenges in stocking a sufficient number of high-efficiency appliances. Rather than stop the program and re-start it at a later date, the CEC extended the program, expanded the list of eligible appliances, and worked with manufacturers and retailers to address supply chain issues.

ARRA-funded programs undergo repeated revision after loss of the PACE option

On July 6, 2010, the Federal Home Finance Administration issued guidance that discouraged lenders from making mortgage loans in PACE districts. With the prospects for PACE dimming, state officials including the head of the California's recovery board cautioned the CEC that its $30 million in funding for municipal financing of retrofits could be reclaimed by the federal government. In August 2010, the CEC cancelled the five contracts that were planned for the support of local municipal financing programs and sought alternatives that still could support financing for building retrofits. The CEC re-allocated the $30 million to other Energy Upgrade

California (EUC) purposes, and then brought other ARRA-funded programs under the same umbrella, such as $20 million for workforce development. The Energy Commission contracted with the Local Government Commission (LGC) for $33 million to administer multiple ARRA-funded components of EUC. These included retrofit financing; a statewide web portal for informing consumers about retrofit resources; quality assurance; workforce development; regional coordination among 30 counties; branding; and education, marketing and outreach. EUC was delayed when a local government that did not make the final awards sued the CEC. But the program is being launched now and marks one of the nation's most ambitious examples of full collaboration across multiple agencies, levels of government and private-sector entities – with funding from utility customer billings, ARRA SEP and EECBG grants, and local government resources. Whether the outcome will match the intent and whether the parties see continued mutual benefit in collaboration remains to be seen.

3.2 Policy Issues

Attribution of Savings

CEC and CPUC staff realized early on in the Energy Upgrade California collaboration that determining attribution among EUC activities would be difficult and time consuming. One IOU had operated a pilot whole house program, but collectively the IOUs did not have sufficient experience with such programs to provide a baseline. The IOUs also argued that apportioning savings by the relative contribution of rebates alone would not fully credit the utilities for their other, supporting efforts in marketing, outreach and worker training. The CEC recommended all savings from retrofits associated with the IOU programs be counted toward IOU targets, regardless of the extent to which participation was increased as a result of such ARRA-funded program elements as marketing and workforce development. In a memo advising the utilities commission, CPUC staff came to the similar conclusion and suggested a dual approach. "For the purpose of counting savings towards meeting CPUC-adopted energy savings goals, which are measured on a 'gross savings' basis, staff suggests it is not necessary to distinguish the influence of ARRA programs and funding," the memo stated. But staff also suggested adding questions to consumer surveys to determine the ARRA influence and avoiding double counting of savings in the state's load forecast.

Strained staff sharply limited in ability to coordinate and reshape programs in mid-stream

As in many states, California has partially addressed its significant budget deficit with hiring freezes and mandatory furloughs of CEC employees. The two commissions had tight budgets and hefty staff workloads before the ARRA programs were announced. The CPUC for example has comprehensive oversight authority over energy efficiency programs but very limited staff watching over the residential portfolio. As noted earlier, CEC staff set aside regular duties to expedite programming of the ARRA funds.

4. Lasting Impacts

Revolving loan funds expected to last

The state's revolving loan funds for retrofits of government and manufacturing facilities (the Energy Efficient State Property Revolving Loan Program, the 1% loan program for government buildings and the Clean Energy Business Loan Program) are expected to continue providing financing well beyond the ARRA timeframe.

Longevity of the ARRA-funded retrofit program uncertain but key features may persist

State and utility officials offer mixed views of the future for Energy Upgrade California once the ARRA funds are exhausted. CEC officials say they expect the workforce standards and quality assurance/quality control protocols will continue to have value and be used.

In addition, the training partnerships and programs developed under the Clean Energy Workforce Training Program have potential to last. For example, one college is expected to share the curriculum developed under Clean Energy Workforce Training Program with regional community colleges. Another community college has adopted the CETWP curriculum into a regular course offering for a building energy efficiency certificate.

Several parties said the more novel features of Energy Upgrade California, if they prove productive and cost effective, may be adopted or adapted in any continuing residential retrofit program. The web portal is one example. It is intended as a one-stop-shop financial clearinghouse for retrofit financing, incentives and connection to contractors or other providers. But the portal was not publicly available as of February 2010, and there are differing opinions on whether and when the portal will deliver the full measure of access for all Californians as billed.

The involvement of local governments in retrofits could be fleeting, but many energy officials in California argue that those governments are becoming engaged in energy efficiency, partly out of interest in increasing property values from a more energy efficient housing stock. Likewise, the ARRA-funded retrofit program compelled local governments and IOUs to work together on the finer details of program design, presentation and delivery. The CEC and utility officials said they expected those working relationships to outlast ARRA funding.

Interviewees:
Gene Rodrigues, Director, Energy Efficiency Programs, Southern California Edison
Jeff Gleeson, Director, Residential Efficiency Programs, Pacific Gas & Electric
Panama Bartholomy, Advisor to CEC Chairman Karen Douglas
Martha Brook, Municipal and Commercial Program Manager, CEC
Dian Grueneich, Commissioner, CPUC
Michael Wheeler, Advisor to Commissioner Grueneich
Jeanne Clinton, Energy Efficiency Programs Director, CPUC
Cathleen Fogel, Residential Programs Manager, CPUC

Colorado

Highlights of Interaction between ARRA and Utility Customer-funded Programs:

- The Colorado Governor's Energy Office, the state energy office (SEO), developed a relatively wide variety of ARRA energy efficiency and renewable energy programs, designed to reach all sectors across all parts of the state. The SEO's commercial energy efficiency activities largely complement utility customer-funded programs. A number of residential rebates and grant programs served the same markets as existing utility customer-funded programs in some areas, with the intent of enhancing existing incentives where they were modest in order to boost the market. The SEO created a cap formula whereby customers would not be able to receive more than 40% of the equipment or measure cost, inclusive of all combined rebates (e.g., tax incentive, utility incentive), and adjusted its own incentives downward in cases where customers qualified for more than one incentive. The SEO developed a tracking system and required all recipients of ARRA funds to disclose all funding sources for projects in order for the SEO to adjust its incentives.

- The SEO and utilities undertook months of discussion regarding attribution of savings for projects that receive funding from more than one source. The SEO and municipal and electric cooperative utilities came to agreement that the utilities may claim all of the savings for a project that combines incentives; the SEO as well will claim all of the savings for its reporting to DOE. The SEO, the Colorado Public Utilities Commission, and IOUs have informally agreed that investor-owned utilities (IOUs) will claim all savings for deemed measures.

- The SEO is leveraging EECBG funds to ramp up energy efficiency programs in rural areas in two key ways: 1) The SEO hired 19 local Community Energy Coordinators (CECs) in rural regions throughout the state. These coordinators were people well-connected with the local communities who, with training and guidance from the SEO, developed an energy efficiency and renewable energy strategies and related action plans for the community which will provide a roadmap during and beyond the ARRA funding period; 2) The SEO issued a proposal to communities and utility providers in the non-entitled communities to partner with the SEO to create new energy efficiency programs in their communities. The SEO offered to reserve a matching amount of its EECBG pass-through funds to funds provided by communities. The SEO also offered to administer and implement the new energy efficiency programs, facilitated by the community energy coordinators.

- The SEO is using over 25% of SEP funds ($12 million) to create a direct lending program using the state's expertise in lending through the Colorado Housing and Finance Authority. The SEO will seek private investment with the intention of providing a long-term source of financing for clean energy manufacturers and larger energy efficiency projects, as well as a potential sustained revenue source for the SEO.

1. Landscape of Utility Customer-funded Programs

Colorado has 57 electric utilities in the state. The four investor-owned-utilities (1 large electric, 1 small electric and two small gas utilities) are regulated by the Colorado Public Utilities Commission (utilities commission). The largest investor-owned-utility (IOU), Xcel Energy/Public Service of Colorado (Xcel/PSCo), accounts for approximately 55% of the electric load of the state and has administered energy efficiency programs for over 10 years. Energy efficiency programs at the IOUs have been ramping up significantly since the passage of a statewide EERS in 2007; all utilities in the state are required to reduce energy use and emissions, though the bulk of the burden rests with the electric IOUs. Several of the municipal electric utilities and rural electric cooperatives have begun implementing energy efficiency programs in recent years (see **Table 4**).

Table 4. Colorado: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	Four regulated IOUs in state: 1 large electric, 1 small electric and 2 small gas utilities. The 54 small utilities (e.g., municipal, rural and cooperatives) serve ~ 40% of state load.
EERS status	In 2007 the utilities commission set energy savings goals for all utilities and incentives for IOUs. Xcel/PSCo and Black Hills targets are 0.53% of energy sales in 2009, increasing to 11.5% cumulative by 2020. Municipal, rural and cooperative utilities are also required to reduce emissions.
Utility customer program funding history	Xcel has been administering EE for a number of years; IOU programs are ramping up quickly since the 2007 passage of legislation mandating all regulated utilities offer demand side management programs; mandated reporting began in 2009. EERS established in 2007; Small but growing number of rural electric cooperatives and municipal utility EE programs.
Utility customer-funded budget for EE	2010 electric and gas budget (including low-income): $83.1 million; $16.50 per capita. 2009 electric EE program expenditures as a % of electric utility retail sales revenues: 0.93%.
Regulatory and Business Model	**EE Program Administrator**: Utilities **Utility incentives structure:** Performance incentive allows the two IOUs a profit on demand side management (DSM) expenditures for achieving minimum of 80% of savings goal in a year; capped at 20% of DSM expenditures. **Decoupling**: None for electric; gas utilities only.
Utility customer program objectives	Least cost resource plan required by the utilities commission. For decoupled gas companies, objectives include societal benefits.
SEO energy activity background	SEO has administered energy efficiency programs for several years, even prior to mandated DSM programs for IOUs. Pre-ARRA, the Governor initiated climate action plan and legislation to establish the Clean Energy Fund in 2007. The initiative died with the recession, but was used as a basis for ARRA plans.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. Colorado: Selected ARRA Energy Programs

Colorado has been awarded over $126 million for selected ARRA programs, of which roughly $63 million (about 50%) is administered directly by the Governor's Energy Office, the state energy office (SEO) for various programs, $33.2 million (26%) is administered directly by 31 Colorado counties, cities and tribes through the Energy Efficiency and Conservation Block Grants (EECBG) program (formula grants), and $30 million (about 24%) is administered through a multi-agency partnership for EECBG competitive grants, also known as the BetterBuildings program.

Of the funds administered directly by the SEO, $48.6 million (77%) is for the State Energy Program (SEP), $9.6 million (15%) is Energy Efficiency and Conservation Block Grant (EECBG) funds and $4.74 million (8%) is for the State Energy Efficiency Appliance Program (see **Table 5**).

Table 5. Colorado: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program Formula Grant - program $ administered by state agency	$48.6	Reach all sectors, all parts of the state.
EECBG Formula Grant - program $ administered by state	$9.6	Communities that provided own funds received matching amount from state to create strategies and residential, public and commercial building energy efficiency programs; the SEO essentially designing and administering the local programs. Remaining funds granted on first come, first served basis to communities, residents and businesses.
EECBG Formula Grant – program $ administered directly by 31 cities, counties and tribes	$33.2	
EECBG Competitive Grant (BetterBuildings Program) - program $ administered by grant awardees, e.g., cities, community partnerships	$25	Partnership of Boulder, Denver, and Garfield Counties, the SEO and Xcel Energy for residential and commercial energy efficiency retrofits in urban, suburban and rural areas.
EECBG Competitive Grant (BetterBuildings Program) - program $ administered by grant awardees, e.g., cities, community partnerships	$5	Partnership of Eagle, Gunnison, and Pitkin Counties for residential and commercial energy efficiency retrofits in mountain areas.
State Energy Efficiency Appliance Rebate Program - program $ administered by state	$4.74	Largely targets water heaters and furnaces to complement utility programs.
Total	**$126.14**	

The SEO created 15 programs for ARRA SEP formula grants, applying a broad multi-sector approach to reach residential, small and large commercial and public facilities and "main street" small communities across the state with grants, rebates, technical assistance, training and financing programs. Approximately 23% of SEP funding is going to energy efficiency programs,

21% targets renewable energy and more than 55% is allotted to cross-cutting programs including revolving loan funds (see Table 3).

As part of an effort to overcome information barriers, the SEO developed a comprehensive central website, www.RechargeColorado.com, which provides an easy-to-use tool to find technical assistance, contractors, and all incentives (e.g. rebates, tax credits) available within any particular utility service area. Since its launch in April 2010, the website has maintained an average of 36,000 site visits per month. In addition, the site has over 15,000 active Energy Action Plan account users. The website is supported by an ongoing statewide outreach campaign and a marketing grant program with over 30 grantees implementing community level outreach programs statewide.

The state energy office has designated nearly 15% of SEP funding ($7.2 million) for expanding an existing solar rebates program to territories not served by the IOUs, $4 million to energy efficiency and renewable energy projects in public buildings, and over $5 million for technical assistance to businesses and public sector entities for leveraging private funding and for increasing capability and institutional knowledge (e.g., design assistance for high performance new construction, workforce training, creation of energy management plans, and assistance with performance contracting).

The SEO is allocating over 26% of its total SEP funding to financing programs which will be administered through the Colorado Housing and Finance Authority (CHFA). Of this, $1 million will augment the existing loan loss reserve fund for CHFA's Colorado Credit Reserve program, which provides financing for energy efficiency projects for small commercial entities. Previously the fund provided a 5% loan loss ratio; the SEP funding is intended to bring that to a 15% ratio in order to make the fund more attractive to private investors. The SEO has allocated $12 million to create its own direct lending program for energy efficiency projects in non-residential buildings and for loans to manufacturers of renewable energy technology and components to boost development of the clean tech sector. CHFA will act as fiscal agent, underwriter and loan servicer (see **Table 6**).

Table 6. Colorado: Summary of ARRA-funded SEP programs

SEP Formula Grant Program Type	Amount (million$)	Program Description
Energy Efficiency Programs		
Residential energy efficiency - existing homes	$3.2	• Rebates include appliances, heating equipment, envelope measures, audits; old equipment must be recycled. Augments/coordinates with Appliance Rebates.
Residential energy efficiency - new homes	$1.0	• ENERGY STAR Mortgage pilot, technical assistance, rebates, trainings.
Residential energy efficiency - energy codes	$1.5	• Local energy codes implementation support and training.
Commercial energy efficiency - existing buildings	$3.6	• Technical assistance with performance contracting for public facilities and K-12 • Small/medium Commercial/Industrial rebates.
Commercial energy efficiency - high performance new construction	$2.4	• Technical assistance and training to support energy efficient new construction for local and

			state public entities.
Renewable Energy Programs			
	Renewable energy rebates and grants	$7.3	• Expansion of existing SEO renewable rebate program. Includes 16 technologies and reaches residential, commercial, industrial and utility-scale market sectors.
	Renewable energy - program consulting	$1.8	• Form Renewable Energy Development Team (REDT) and employ additional program consultants to assist with RE project review and development, consult on codes, land use policies, financing, institutional capacity building and other areas.
	Renewable energy - education and outreach	$0.5	• Includes public education, RE workforce training, statewide distributed generation potential study.
	Colorado Center for Renewable Energy and Economic Development (CREED)	$0.6	• Partnership between Colorado and NREL for RE technology commercialization.
Cross-Cutting and Other Programs			
	Financing Programs (cross-cutting)	$13.0	• $1 million to augment loan loss reserve fund for existing Colorado Credit Reserve program which targets EE projects for small commercial entities. • $12 million to create direct lending program for energy efficiency projects in non-residential buildings (loans of $100,000-$500,000) and for clean tech manufacturing firms.
	New Energy Economy Development (NEED) (cross-cutting)	$4.0	• Expands existing competitive grants program for renewable energy and energy efficiency projects in final stages of development. Grantees include industrial and public facilities.
	Public Education (cross-cutting)	$5.0	• Includes Recharge Colorado website (comprehensive rebate, financing and assistance information for customers, service providers), and engagement of local champions throughout the state.
	Utilities and Transmission (other)	$1.2	• Resource planning and integrating EE and RE into aggregate electrical load.
	Greening Government (other)	$0.7	• Multiple strategies to lead by example and meet goals for waste diversion and petroleum, energy, paper, greenhouse gasses and water conservation. • Includes facilitating performance contracts, increasing fleet efficiency and developing materials management program.
	Administration (other)	$3.0	
Total		**$49**	

Source: DOE (2009), interviews.

Colorado is focusing its use of EECBG funds to ramp up energy efficiency activities in rural areas, where there have been few or no energy efficiency programs. The SEO allocated $2.2 million to hire 19 regional coordinators for the duration of the SEP performance period to provide technical assistance, including energy efficiency program administration, to entitled and non-entitled local communities receiving EECBG funds. For the 60% of its EECBG funds to be re-granted, the SEO issued a proposal to all communities and utility providers in the non-entitled

communities to partner with the SEO on creating new rebate programs in their communities. The SEO offered to match funds provided by a community (e.g., ARRA funds matched to utility customer funds or other community funds). The SEO also offered to administer and implement the programs, facilitated by the community energy coordinators. The Colorado SEO is also combining some EECGB funding with SEEARP funds to expand rebates for heating equipment, a market that has not been addressed by existing utility customer-funded programs.

3. Interactions between Utility Customer-funded Programs and Selected ARRA-funded Programs

The current landscape of rebate programs for energy efficiency and renewable energy in Colorado is complex. Both the IOUs and the non-regulated utilities offer myriad utility incentives, many of which serve similar markets as the set of the SEO's SEP residential, and commercial rebate programs as well as the Appliances Rebate Program and EECBG projects. In some utility service areas where Xcel has longer-running, more robust program offerings, ARRA funds are relatively small compared to utility spending for EE. In other areas of the state however, where few energy efficiency programs existed, the impact of ARRA funds may be much more pronounced.

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($37.9 million) that will be expended over three years equal 50% of the 2010 budget ($75.8 million) for utility customer-funded energy efficiency programs (see **Figure 3** and **Figure 4**).

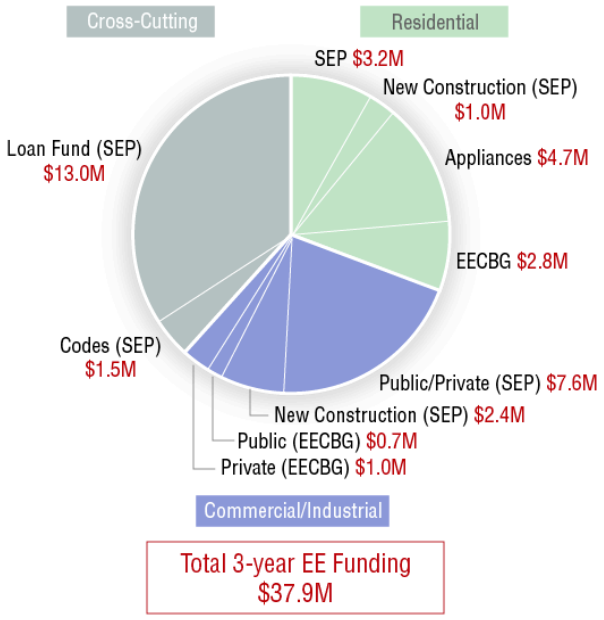

Figure 3. Colorado EE program funds in selected ARRA programs by program type and market sector*

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects,

where the RE funding could not be disaggregated. "EE program funds" do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

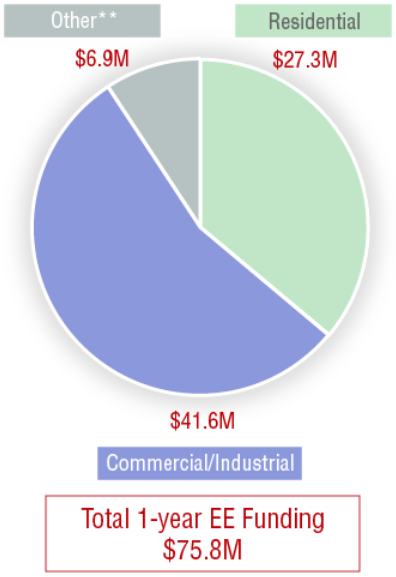

Figure 4. Colorado 2010 utility customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, (e.g. administration, planning, codes, R&D, education and training, agriculture); can also include program budgets and EM&V not allocable by sector.

3.1 Program Planning Impact

SEO adjusting incentives to compensate for existing EE program rebates

A number of the SEO's ARRA-funded programs provide rebates and incentives which can be combined with incentives offered by utilities (e.g., rebates for energy efficient equipment in residences and commercial buildings and for solar and wind installations). After developing its ARRA plans, the SEO consulted with most of the utilities in the state in order to determine a formula for adjusting the ARRA rebate or grant amount downward, according to the amount of other available incentives, in cases where customers receive multiple financial incentives (e.g., tax incentive, utility rebate, SEO rebate). Customers are required to cover some of the project costs. The total incentive cap per project (inclusive of utility, SEO and tax incentives) is set at 40% of the cost of the measure or project. The SEO's portion of that is capped at 30% of the total allowable incentive level. In some cases where a utility rebate already hits the 40% incentive cap, the SEO offers no rebate at all.[4]

In some cases where the utility offered what the SEO assessed was a modest incentive, the SEO doubled the incentive. For example, in Denver, a typical residential insulation project costs $800 to $2,000. Xcel offers a $300 insulation rebate. In this case, the SEO also provides up to $300, adjusting as necessary not to exceed the 40% cap for combined incentives. The SEO is tracking

[4] Customers of Xcel Energy and Black Hills are ineligible for the ARRA-funded renewable energy rebates due to existing incentives offered by the two IOUs.

all rebate and grant projects funded by ARRA and requires applicants to disclose all funding sources so it has the needed information to adjust ARRA grants or rebates when necessary.

Utilities proposed maintaining energy efficiency programs at current levels until impact of ARRA funds can be assessed

A representative of the Colorado Public Utilities Commission reports that investor-owned utilities which filed their 2011 demand side management (DSM) plans in June 2010, requested that their 2009-2010 plans be allowed to be extended into 2011, essentially 'freezing' the current slate of programs and funding levels, with the expectation that the bulk of ARRA funding would be expended by summer of 2011.

3.2 Program Design and Implementation Impact

ARRA funds used to ramp up EE in rural areas

The SEO is using $2.2 million in EECBG funding to ramp up energy efficiency programs and build local capacity in rural areas that had previously had little or no energy efficiency activity. The SEO hired 19 community energy coordinators for the duration of the ARRA performance period. The coordinators are people who live and work in the mountain and rural areas of Colorado, and who are already well-connected to the local communities. The coordinators are working with non-entitled communities that are receiving funds re-granted through the state. For the 60% of EECBG funds to be re-granted, the SEO issued a proposal to all communities and utility providers in the non-entitled communities to partner with the SEO on creating new rebate programs in their communities. The SEO offered to reserve funds provided by a community (e.g., ARRA funds matched to utility customer funds or other community funds). The SEO also offered to administer and implement the programs, facilitated by the community energy coordinators who will work and coordinate with municipal utilities and rural cooperatives in their communities. The SEO hopes that municipal utilities and rural cooperatives will be the future funding sources for continuing to ramp up energy efficiency throughout the state; working with them effectively will be a key element to extending the impact of ARRA programs long term.

3.3 Policy Issues

Attribution of savings

Because Colorado investor-owned utilities receive performance incentives based on savings achieved, determining the proportion of savings attributable to the utilities vs. ARRA and other funds in projects relying on multiple incentives has been the topic of a number of stakeholder meetings (e.g., utilities, SEO, commission). Attribution is also an issue for the municipal and cooperative utilities because those utilities have no standardized reporting mechanism other than what is required by their local funding entity (e.g., municipality or owners).

After 6 months of conversations and negotiation, the SEO and municipal and rural cooperatives utilities came to agreement that for any given project where there was an existing utility

incentive program, the utility would be able to report all of the savings garnered by the project to their governing entity; the SEO funding portion would not reduce savings claimed by the utility. However, the SEO will also report 100% of the deemed savings to DOE for ARRA reporting purposes. In these cases, the ARRA money is allowing utilities to meet their savings targets faster using additional taxpayer funds rather than using utility customer funds alone.

As of August 2010, a representative of the utilities commission reported that so far there had been no commission rulings in regard to savings attribution for the IOUs. There was also no indication that utilities incorporated potential or actual impacts from ARRA in new energy efficiency program plans submitted to the utilities commission in June 2010. However a representative of an IOU reported that the SEO, utilities commission, and IOUs have informally agreed that IOUs will claim all savings for deemed measures for both 2010 and 2011 program years. For custom projects with longer-term savings, the utility will account for additional funds from ARRA and tax incentives in the cost-benefit analysis.

4. Lasting Impacts

ARRA funds allow SEO to establish direct lending program; may provide long term funds

The SEO intends to attract additional private capital into its direct lending program, with the intention of creating a long term source of financing for energy efficiency projects and potentially a sustained source of revenue for the SEO.

ARRA funds intended to build long term energy efficiency capability

Each Community Energy Coordinator (CEC), in conjunction community stakeholders, developed an energy efficiency and renewable energy strategy and related action plans with the guidance of the SEO. The strategy provides a road map for the community beyond the ARRA funding. The training provided to the CEC by the SEO will ensure that the CEC and the community stakeholder group have a level of energy efficiency and renewable energy literacy necessary to sustain the programs. The SEO is working to establish a continued source of funding the CECs through foundations, utility partnerships, and other grants.

Interviewees:
Seth Portner, Deputy Director, Colorado Governor's Energy Office (GEO)
Danielle Vaughan, Renewable Energy Program Associate, GEO
Matt Futch, Utility Program Manager, GEO
Angie Fyfe, Program Manager, GEO
Thad Kurowski, Residential Program Associate, GEO
Brett Johnson, Finance Manager, GEO
Joel Asrael, Commercial Buildings Program Manager, GEO
Jeffrey Ackermann, Section Chief, Research and Emerging Issues, Colorado Public Utilities Commission
Paul Caldera, Commission's Trial Staff, Colorado Public Utilities Commission
Suzanne Doyle, Xcel Energy
Peter Narog, Xcel Energy

Florida

Highlights of Interaction between ARRA and Utility Customer-funded Programs:

- The state energy office (SEO), the Florida Energy & Climate Commission, developed its slate of ARRA programs with substantial input from utilities, with the intention to largely complement utility customer-funded programs and help spur long term energy efficiency activity in the state. Utilities provided substantial input into the now-completed $15 million SEP residential HVAC program.

- As of September 2010, discussions about attribution issues in regard to ARRA programs are in very early stages between the utilities and the SEO. In order to facilitate savings reporting for both parties, utilities are recommending that the SEO rely on the established deemed savings approaches used in utility customer-funded energy efficiency programs.

1. Landscape of Utility Customer-funded Programs

Fifty-seven electric and gas utilities operate in Florida. The five investor-owned utilities (IOUs) are regulated by the Florida Public Service Commission (utilities commission) and serve about 66% of the state's customers. Florida's 33 municipal electric utilities serve about 25% of the population. Florida utilities have a long history of energy efficiency programs, starting in 1980 with the passage of the Florida Energy Efficiency and Conservation Act (FEECA) which required Florida utilities to implement cost effective energy efficiency programs and to conduct energy audits. Over the years, the bulk of activity has been in load management although funding devoted to energy efficiency programs has increased in recent years. In December 2009, the utilities commission set goals for its electric utilities at 3.5% cumulative energy savings over 10 years (see **Table 7**).

Table 7. Florida: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	5 regulated electric IOUs (66% of electric accounts in state); 4 regulated gas companies; 33 municipally owned electric systems, 18 rural electric cooperatives.
EERS status	In December 2009, the utilities commission set modest demand and energy goals for its electric utilities which will result in approximately 3.5% cumulative energy savings over 10 years.
Utility customer program funding history	Florida utilities have conducted energy efficiency programs since the 1980 Florida Energy Efficiency and Conservation Act directed utilities to implement cost effective energy efficiency programs.
Utility customer-funded budget for EE	2010 electric and gas budget (including low-income): $129.8 million (CEE 2010); $6.90 per capita. 2009 electric EE program spending as a % of electric utility retail sales revenue: 0.52%.
Regulatory and Business Model	**EE Program Administrator**: Utilities **Cost recovery:** Utilities recover reasonable expenses, including customer incentives, through surcharges to customer bills. The utilities commission annually determines an energy conservation cost recovery factor to be applied to bills during the next year. **Utility incentive structure:** None in place though HB 7135 authorizes the commission to provide financial rewards and penalties

	and to allow an investor-owned utility to earn an additional return on equity for exceeding conservation goals. **Decoupling:** None. In 2008, the FPSC determined that existing cost recovery clauses made decoupling unnecessary.
Utility customer program objectives	Energy efficiency as a resource for meeting state's energy needs.
SEO energy activity background	In 2007-2008 the governor created the Governor's Action Team on Energy and Climate Change. Over the course of a year the team developed a set of recommendations, which was used as a basis for ARRA programs. The Florida Energy & Climate Commission, legislated in 2008 and housed in Executive Office of the Governor, is the primary organization for state energy and climate change programs and policies.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. Florida: Selected ARRA Energy Programs

Florida has been awarded approximately $310.5 million for selected ARRA programs, of which about $172 million (~55%) is administered directly by the Energy & Climate Commission, the state energy office (SEO), and roughly $138 million (~45%) is administered directly by 84 cities, counties and tribes through the EECBG program.

Of the funds administered directly by the SEO, $124.3 million (72%) is for the State Energy Program, $30.4 million (18%) is for EECBG and $17.6 million (10%) is allocated to the State Energy Efficient Appliance Rebate Program (see **Table 8**).

Table 8. Florida: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program Formula Grant - program $ administered by the SEO	$ 124.3	Diverse set of programs with strong emphasis on economic development and financing for clean tech, solar PV and residential HVAC/geothermal.
EECBG Formula Grant - program $ administered by the SEO	$ 30.4	Diverse set of programs includes energy efficiency in state facilities, energy codes compliance and training, and rebates for plug-in hybrid electric vehicle conversions.
EECBG Formula Grant - program $ administered directly by 84 cities, counties and tribes	$ 138.24	
EECBG Competitive Grants (BetterBuildings) - program $ administered by grant awardees, e.g., cities, community partnerships	$ 0	
State Energy Efficient Appliance Rebate Program - program $ administered by the SEO	$ 17.59	Program completed. Strategy included "limited time offer" approach to generate urgency. Cross-marketed and coordinated with utility rebates.
Total	**$ 310.52**	

Technical Appendix: Interactions between Energy Efficiency Programs funded under the Recovery Act and Utility Customer-funded Energy Efficiency Programs

The SEO is creating nine programs for the 2009 State Energy Program (SEP) formula grants in a diverse portfolio with a strong emphasis on financing for emerging clean technology firms as well as on residential HVAC and solar PV. About 42% of SEP funding is allocated to energy efficiency programs, 23% is being directed to renewable energy programs and over 35% targets cross-cutting programs including a grant program for either renewable energy or energy efficiency projects that had applied for SEO funding prior to ARRA (see **Table 3**).

The state's original SEP application included two revolving loan programs. However after receiving very limited response to a Request for Proposals for third party program implementation, the SEO cancelled that program and monies were redistributed to new or other programs. Two programs were still in development as of September 2010. The largest program ($36 million; 29% of SEP funds) supplements an existing program (The Florida Opportunity Fund) in order to provide business development financing for companies in clean tech industries which support Florida's energy efficiency and renewable energy goals (see **Table 9**).

Table 9. Florida: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Florida Residential Retrofits	$8	The Residential Retrofit program has recently been modified to be a Residential HVAC and Geothermal Rebate Program. The revised program will offer rebates to residential homeowners to replace an old inefficient HVAC system with an HVAC or geothermal system that meets the Federal Energy Tax Credits criteria and ducting system tested to have no greater than 15% leakage to the outside.
Clean Energy Grant Program	$10	Grants to promote energy efficiency and renewable energy for public (e.g., Florida governments that did not receive direct EECBG funding, educational institutions), nonprofit and agricultural entities.
Energy Efficiency Conservation Grants	$13.8	Program in development.
Future Rebates	$13	Programs in development.
Renewable Energy Programs		
Solar for Schools and Shelters	$10	Installation of PV system backups on disaster relief shelters throughout state; integrates educational component and teacher workshops as well as operation and maintenance workshops for energy and facilities managers.
Solar Energy Rebate Program	$21.4	Extension of Florida's existing popular residential and commercial solar rebate program to accommodate large waiting list.
Compressed Natural Gas (CNG) Fleet Fueling Facilities – Matching Grant	$4	Matching grant of 50% to nonprofits and 25% to for-profit companies (e.g., utilities, businesses, school districts, municipalities) for installation of CNG fuel tanks and pumps.
Cross-cutting and Other Programs		
Shovel Ready Energy Project Grants (cross-cutting)	$8	Matching grants for competitively selected renewable energy and energy efficiency technologies projects from the FY2008-2009 grant

			applications.
	Energy Opportunity Fund (other)	$36.1	Enterprise Florida, the state's public/private economic development partner was directed by legislation to create the Florida Opportunity Fund, a not-for-profit corporation, to increase availability of capital for emerging companies in the state. Fund activities will include deploying leveraged capital to build a pipeline of businesses that will contribute to the State's energy and environmental goals.
	Total	**$124.3**	

Source: DOE (2009), interviews.

Florida is applying the EECBG funds that it will not re-grant to non-entitled communities to a diverse set of initiatives including energy efficiency in state buildings, data centers energy efficiency, plug-in hybrid vehicle conversion rebates and energy code compliance and training to support new energy codes enacted in 2009. Pass-through funds to communities are largely being used for building energy efficiency measures; two sub-grantee communities have set up community-wide revolving loans to work in conjunction with utility customer-funded incentives.

3. Interactions between Utility customer-funded Programs and Selected ARRA-funded Programs

The SEO's slate of ARRA programs was developed with utility input and designed largely to complement utility customer programs. A representative from one of the state's IOUs reported that most municipalities receiving either direct or re-granted EECBG funds consulted with utilities to optimize leveraging of utility customer incentives and to align appliance efficiency requirements. Given that Florida's utilities provide significant funding for energy efficiency in the residential and commercial/industrial sector, as well as some solar rebate programs, there are several key areas ripe for interaction, including the completed State Energy Efficient Appliance Rebate Program, the completed residential HVAC program, the Clean Energy Grant program, and EECBG efficiency projects in local communities and at state facilities.

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($94.4 million) that will be expended over 3 years equal approximately 75% of the 2010 budget ($126.7 million) for utility customer-funded energy efficiency programs (see **Figure 5** and **Figure 6**).

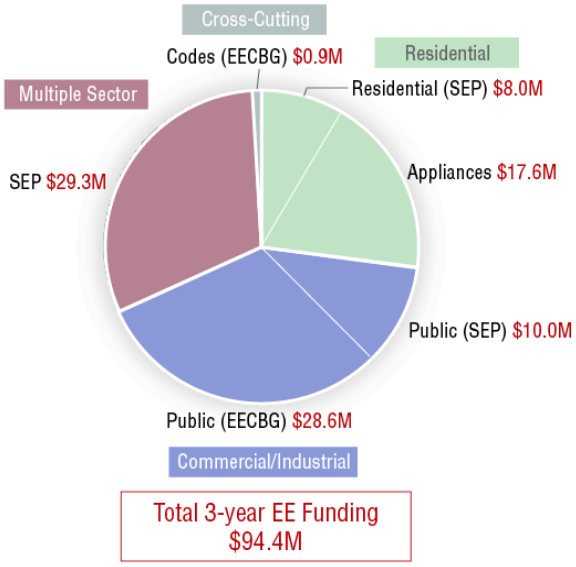

Figure 5. Florida EE program funds in selected ARRA programs by program type and market sector*

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. “EE program funds” do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

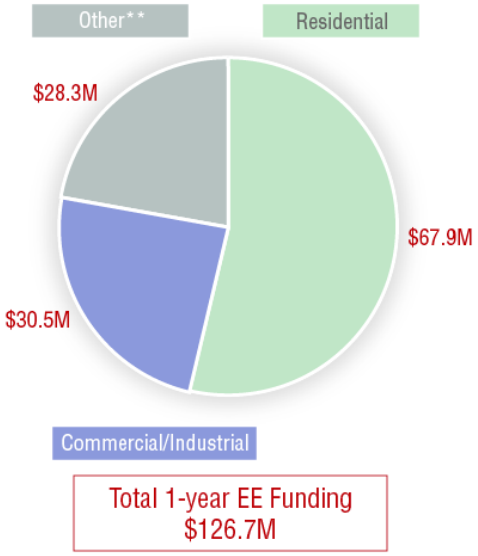

Figure 6. Florida 2010 utility customer-funded EE program budget*

* Excludes load management and low income weatherization programs

** "Other" includes items not allocated by sector, (e.g. administration, planning, codes, R&D, education and training, agriculture); can also include program budgets and EM&V not allocable by sector.

3.1 Program Planning Impact

Concern about the potential for a short-term bottleneck in well-trained, experienced contractors

The SEO solicited input from all Florida utilities in regard to the Residential HVAC and Geothermal Rebate program and reported receiving supportive comments from all that responded. The newly-designed program, which ran from August 30, 2010 through September 30, 2010, offered rebates for replacing old inefficient HVAC systems with systems that met the Federal Energy Tax Credits criteria and for having their ducting system tested and improved to no greater than 15% leakage to the outside. Most of the utility customer-funded residential programs offer some combination of insulation, duct/air sealing and central air conditioning rebates as well.

A representative from one of the state's IOUs indicated that utilities are working with the state to implement training programs to provide the cadre of well-trained contractors and Home Energy Rating System (HERS) raters needed for the state's program. There is some concern on the utility side that ARRA incentives that were added on top of existing HVAC and duct rebates will cause a dramatic increase in utility program uptake, and potentially result in a shortage of experienced, well-trained contractors, especially given the short time frame in which ARRA programs must be implemented.[5]

Anticipation that ARRA will generate additional program uptake; may impact future planning

A utility representative reported that participation in their heat pump rebate program increased by 250% due to federal and state tax credits. The utility was bracing for additional update from ARRA monies, which was just starting to enter the market as of August 2010. The utility plans to assess how much the tax credit and ARRA funds will shift the market when it plans budgets in the next program planning cycle.

3.2 Program Design and Implementation Impact

ARRA funds spur utility program expansion

Florida's completed State Energy Efficient Appliance Rebate program, which paid for 20% of an appliance purchase, was designed with utility input. For the most part, the ARRA appliance program avoided duplicating utility offerings, but it did overlap with several municipal utility programs. While utility customer-funded appliance incentive levels vary across the state, they are typically set at modest levels, and combined with the ARRA Appliance rebates equaled less than 50% of the total purchase price of the appliance. The affected utilities were enthusiastic about the increased uptake and took measures to sustain the impact of ARRA infusion. For example, after the state's appliance rebate program ended, the City of Tallahassee municipal utility doubled its

[5] Utility respondent indicated that a shortage of properly trained contractors and lack of mechanism for directing consumers to qualified providers could potentially result in poor quality work and customers spending much of the rebate funds on re-doing HERS inspections.

own incentive amounts to approximate the federal program impact in order to maintain the same level of customer interest and momentum.

3.3 Policy Issues

Attribution

Utilities and the SEO are currently in discussion about attribution issues emerging from the completed Appliances Rebate program in regard to impact from tax credits. In cases where customers combined utility customer-funded incentives and tax credits for appliances, utilities are planning not to apportion savings attribution, but instead to claim credit for the full savings from the measure, regardless of whether the customer leveraged a tax incentive. As of September 2010, discussions about attribution issues in regard to ARRA programs are in very early stages between the utilities and the SEO. In order to facilitate savings reporting for both parties, utilities are recommending that the SEO rely on the established deemed savings approaches used by utility customer-funded programs. The SEO plans to use the ENERGY STAR energy savings calculator for the appliance program, and acknowledges that it will be difficult to separate ARRA-funded savings from the utilities' conservation efforts. The result may be that utilities will be allowed to claim energy savings benefits that were induced by ARRA funds.

Interviewees:
Mark Futrell, Division of Regulatory Analysis, Florida Public Service Commission
Alexander Mack, Florida Energy and Climate Commission, Executive Office of the Governor
Bill Simpson, Progress Energy

Hawaii

Highlights of Interaction between ARRA and Utility Customer-funded Programs:

- Tight spending deadlines and desire for immediate employment impact persuaded the Hawaii's state energy office and the Public Utilities Commission (PUC) to harness existing energy efficiency programs and third party administration for "quick hits" with ARRA spending on larger rebates and other added incentives.

- Initially, Hawaii's PUC worried that beefing up energy efficiency programs with the federal money would disrupt markets and potentially end up costing utility customers more for the state's new third party administrator to meet its own savings targets. But Hawaii policy actors settled on extending existing rebates in time or adding a new appliance, and the ARRA-boosted programs sparked a "fire sale" in refrigerators and solar hot-water heaters.

- The SEO also piloted experimental ventures that used some ARRA funds for projects deemed too risky or unlikely to pass a cost effectiveness test for utility customer support. At least two or more of these ARRA-driven projects are deemed likely to outlast the grants and may be adopted for future utility customer funding. All three players – PUC, SEO and third party administrator – expect joint projects in the future will be easier.

1. Landscape of Utility Customer Programs

With an isolated electric power system and an extraordinary reliance on imported oil for generation, Hawaii has the highest average retail rates in the nation, more than double the U.S. average. A single investor-owned utility, Hawaiian Electric Company (HECO) and its subsidiaries serve more than 95% of Hawaii's load; Kauai Island Utility Cooperative serves Kauai. HECO ran utility customer-funded energy efficiency programs until July 2009, when a non-utility administrator (R.W. Beck, a subsidiary of SAIC) took over administration after winning a competitive solicitation issued by the Hawaii Public Utilities Commission. R.W. BECK signed a contract with the PUC to administer energy efficiency programs for four years and now operates as Hawaii Energy, with an approved budget of $19.3 million in 2010. Overseers of the efficiency and renewable energy programs cite rate impacts on lower income consumers and small business as a common and powerful motivator. HECO works exclusively on load management. The Kauai cooperative offers appliance rebates (see **Table 10**).

Table 10. Hawaii: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	One IOU, which has two subsidiaries, and one coop. A third party administrator, R.W. BECK, runs energy efficiency programs as Hawaii Energy, funded by a system benefits charge (SBC).
EERS status	With the 2009 Clean Energy Omnibus Act, Hawaii has both a statutory EEPS and an RPS with combined targets for 70% "clean energy" by 2030. Energy savings as an eligible RPS resource for reaching 15% by 2015, after which all targets – 25% by 2020 and 40% by 2030 – must be met by renewable energy. The EEPS

	mandate a savings target of 4300 GWh by 2030 (or about 40% of 2007 retail sales), though savings arising from offsetting renewable generation can count toward the EEPS. The PUC by law may revise the energy efficiency goal in 2013 and every five years thereafter.
Utility customer funding history	Until 2009, HECO and subsidiaries Hawaii Electric Light Co. (HELCO) and Maui Electric Co. (MECO) administered all energy efficiency programs using a DSM fee collected from consumers. An additional PBF was instituted by law in 2006. Since July 2009, HECO and HELCO collect the PBF for funding Hawaii Energy, the third party administrator. Kauai uses its DSM charge to fund its own EE programs.
Utility customer-funded budget for EE	2010 electric and gas budget (including low-income): $19.3 million; $14.2 per capita. 2009 electric EE program spending as a % of electric utility sales revenue: 1.08%.
Regulatory and Business Model	**EE Program Administrator**: Hawaii Energy, operated by SAIC subsidiary R.W. BECK, administers EE on Hawaii, Maui and Oahu islands; Kauai Island Utility Coop handles its own EE programs. **Cost recovery:** HECO and other utilities with the exception of the Kauai coop collect a PBF for funding Hawaii Energy through a fiscal agent. Kauai uses its DSM charge to fund its own EE programs. **Utility/third party performance structure:** Hawaii Energy receives a performance payment of $700,000 if it hits several EE targets and up to $133,000 if it exceeds those targets. **Decoupling:** Under PUC consideration.
Utility customer program objectives	Third party administrator will pursue "cost effective" energy efficiency; PUC is moving toward a "Clean Energy Scenario Planning Framework" with a 20-year planning horizon and five-year action plans. Utilities would have to identify geographic areas where the value of DSM and DG is higher than strictly utility service.
SEO energy activity background	The SEO is part of HI Dept. of Business, Economic Development & Tourism. Its director sits on the PUC's technical advisory board and the office is an intervener in PUC proceedings of interest.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. Hawaii: Selected ARRA Energy Programs

Hawaii has been awarded more than $43 million for selected ARRA programs, of which about $36 million (~87%) is administered directly by state energy office (SEO) staff within Hawaii's Department of Business, Economic Development and Tourism (DBEDT) within the state's Economic Development Department, and roughly $6.4 (~13%) is administered by four cities and counties through the EECBG program.

Of the funds administered directly by the SEO, $25.9 million (71%) is for the State Energy Program, $9.5 million (26%) is for EECBG and $1.2 million (3.2%) is allocated to the State Energy Efficient Appliance Rebate Program (see **Table 11**).

Table 11. Hawaii: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program Formula Grant - program $ administered by state (DBEDT)	$ 25.9	Diverse programs with emphasis on rebates for EE appliances and solar hot

		water heaters; benchmarking of energy use in a hotel district; exploration of seawater AC for hotels; retrofits for government and nonprofit buildings; renewable resource characterization and permitting; and studies related to an undersea power cable for carrying wind-generated power to a neighboring island.
EECBG Formula Grant - program $ administered by state (DBEDT)	$9.6	• Administer EECBG Funds. • Install renewable energy on government buildings in downtown Honolulu. • Efficiency retrofits and renewable energy installations for residents on Department of Hawaii Home Lands-managed native lands. • Retrofits for state, local, nonprofit structures on Kauai. • Loan-loss reserve fund for financing measures in multiple programs. • Support for the development of Property Assessed Clean Energy districts in any HI county.
EECBG Formula Grant - program $ administered directly by four counties.	$ 6.4	
EECBG Competitive Grants (BetterBuildings)	$ 0	
State Energy Efficient Appliance Rebate Program - program $ administered by state (DBEDT) but deployed by Hawaii Energy, the PUC's third party EE administrator.	$ 1.24	Program completed. Strategy included ENERGY STAR refrigerator and dishwasher rebates and a refrigerator turn-in program – all coordinated with the PUC and third party EE administrator.
Total	**$ 43**	

The Hawaii State Energy Office divided its SEP and appliance grant money between support for renewable energy development and investments in energy efficiency. The SEO directed most of its SEP energy efficiency investments into joint programs with the state's PUC and third party EE administrator, R.W. BECK. For example, joint energy efficiency programs included more than $1 million for an increase in existing refrigerator rebates as well as a multi-island refrigerator recycling program, mandatory for recipients of the fridge rebate. The state's community development agency is working with Hawaii Energy to provide about $3 million for $750 rebates and an interest rate buy down for solar hot water heaters. The SEO also funded a $250,000 pilot consumer feedback program designed by OPOWER and administered by R.W. BECK to inform 15,000 utility customers about their energy consumption relative to neighbors. Other SEP-funded energy efficiency projects include retrofits of government and nonprofit buildings; benchmarking energy consumption in hotels; and studying the feasibility of seawater air-conditioning for a hotel district (see **Table 12**).

Table 12. Hawaii: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Government and Residential Efficiency Program	$7	• Upgrades of equipment, lighting and building envelop, as well as installation of advanced metering devices, up to 25% of cost atop other incentives. • Includes new behavioral feedback program ($0.24M) which PUC and third party anticipate expanding if savings are proven.
High-Performance Buildings Program	$1	Technical support for building owners to retrofit or design to ENERGY STAR standards or, for government buildings to reflect leadership by example, LEED Silver.
Hospitality Energy efficiency Program	$0.3	Feasibility study and preliminary identification of NEPA, ESA issues for creating a deep sea-water air conditioning/chilled-water loop system for a hotel district. Goal is attracting private financing.
Renewable Energy Programs		
Acceleration of Privately Funded Energy Projects	$5	Creation of a renewable energy project within DBEDT as a single information repository on Hawaii's renewable resources; development history; and assistance with permitting.
Solar Hot-Water Loan Interest Buydown	$1.5	• Up to a 6% interest buydown for recipients – equivalent to delivering zero-interest financing – up to $1,000. • Initially shared funding, with 75% ARRA funds to 25% utility customer funds, going to 100% ARRA funds when utility customer budget runs out.
Solar Hot-Water Heater Rebate	$1.5	• Continues $750 rebates for equipment that consistently is popular among Hawaiians.
Direct Funding of Renewable Energy Projects	$2.2	Additional support for renewable energy-related projects, including an undersea cable to carry wind power.
Cross-cutting and Other Programs		
Clean Energy Policy	$1.2	Support for DBEDT's energy resources coordinator to formulate a Clean Energy Initiative to meet statutory requirements for HI to satisfy 70% of demand through demand-side management and renewable energy by 2030.
Transportation Energy Efficiency Program	$5.3	Conversion of state, local and volunteer private fleets to non-petroleum fuels.
Administration	$1	
Total	**$26**	

Source: DOE (2009), interviews.

3. Interactions between Utility Customer-funded Programs and ARRA funded programs

The SEO approached BECK and then the Hawaii Public Utilities Commission about using Hawaii Energy and its programs as a vehicle for spending ARRA money with an eye toward

speed and efficiency. Hawaii Energy staff responded with a proposed list of programs, and the SEO agreed to a few and added its own. Utilities were not part of the negotiations. The parties came to negotiations over the ARRA funds from different perspectives. The PUC has a formalized culture of rulemakings and public comment periods; the contract for the new third party administrator had just been signed with BECK, and the ARRA funding would require revisions and a memorandum of understanding. The SEO faced tight federal deadlines for spending ARRA grants. It took lengthy negotiations and redrafting to bring $3 million in new and expanded programs under BECK's contract. Hawaii Energy ended up taking on administration of five such programs.

If we compare the selected ARRA budgets that Hawaii has directed toward energy efficiency measures over multiple years to a single year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($18.6 million) that will be expended over three years are about equal to the 2010 budget ($18.9 million) for utility customer-funded energy efficiency programs (see **Figure 7** and **Figure 8**).

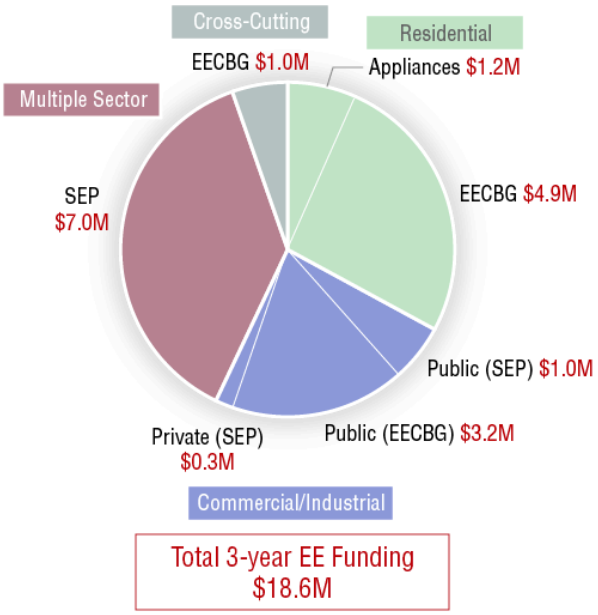

Figure 7. Hawaii EE program funds in selected ARRA programs by program type and market sector*

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. "EE program funds" do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

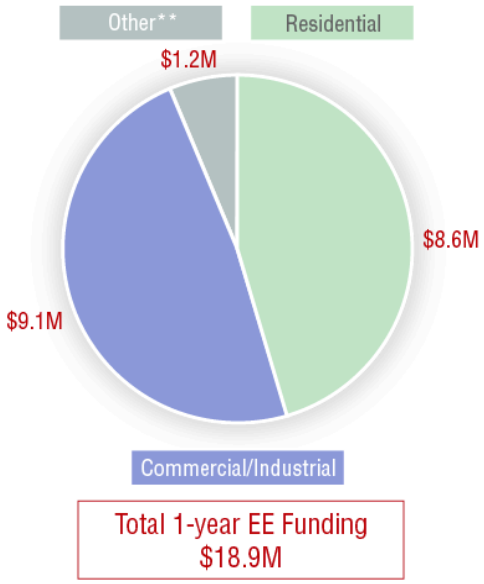

Figure 8. Hawaii 2010 Utility Customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, (e.g. administration, planning, codes, R&D, education and training, agriculture); can also include program budgets and EM&V not allocable by sector.

Emphasis on Speed and Economic Development

The SEO wanted quick economic stimulus, with a minimum of administrative burdens and state procurement rules to slow program spending. Hawaii Energy and the PUC already had a contract signed, staff hired and programs designed. Refrigerator programs were not viewed as delivering much energy savings for the investment but the SEO convinced the PUC of the economic benefit to appliance retailers. The parties agreed to divide the funds proportionately among the islands.

Concern about ARRA funding warping the EE market

Initially, PUC personnel worried that the new, ARRA-bolstered programs would disrupt the marketplace and perhaps make it difficult for the third party administrator to meet its own targets. But state energy officials were interested in rebating refrigerators, an appliance on which Hawaii Energy did not offer rebates. Utility commission staff figured the refrigerator market was saturated from earlier utility rebates. But when big-box retailers ran with the moderate, ARRA-funded refrigerator rebates ($250), hundreds of people lined up as early as 5:30 a.m. About 8,000 refrigerators were sold, most of them within two weeks. The federal appliance money lasted a few days, and the SEO and Hawaii Energy quickly added SEP grant funds so that consumers bent on new refrigerators didn’t get left out.

3.1 Program Planning Impacts

ARRA funds spur utility customer program expansion, new programs and greater savings

All parties in Hawaii agreed that the ARRA funds produced significant energy savings. All point to the refrigerator rebate/recycling program as a prime example. Utility-run appliance programs in the past had offered refrigerator rebates, but the energy savings were unclear. One study showed that Hawaiians, partly because of remoteness, kept the old refrigerators, sometimes three or four per home. As a result, utility rebates often had the unintended effect of increasing system load or eating away at savings from other on-site efficiency or renewable generation measures.

The PUC and the SEO decided to issue rebates only to consumers who turned in an old refrigerator for recycling, and the agencies helped develop recycling stations on all of the islands. During the fridge rebate bonanza, the largest of those recycling stations alone reported accepting and recycling at least 250 older, less efficient refrigerators each day, with higher numbers on weekends. All parties agreed the recycling requirement produced real and additional energy savings. All components were recycled, and refrigerants were tanked for resale to the automotive supply market. Hawaii officials say the appliance recycling centers are expected to outlast the ARRA grants.

The PUC already had a popular solar hot water heater rebate program, and that's where concern over cannibalization of demand was sharpest. The parties agreed to start up the state's ARRA-funded program once Hawaii Energy expended its utility customer-funded budget for solar hot-water heater rebates, partly to leave R.W. BECK's program intact and partly to avoid running afoul of the federal prohibition against supplanting routine, committed spending with ARRA dollars. The program will continue with ARRA-funded rebates and the additional feature of an interest rate buy down that delivers low cost financing for homeowners.
If the buy down produces significant additional uptake, Hawaii Energy and the PUC say it probably would become part of the regular utility customer-funded offerings.

The SEO also launched a behavioral feedback experiment through Hawaii Energy and subcontractor OPOWER. Using bill data provided by HECO through Hawaii Energy, OPOWER will try persuading customers to use less electricity by comparing their consumption to neighbors and peers. The pilot is aimed at 15,000 electricity consumers, and if those consumers demonstrably use less electricity, Hawaii Energy officials say they plan to include a continuation or expansion of the pilot in its next program proposal to the PUC.

3.2 Program Design and Implementation Impacts

R.W. BECK had been in place barely three months as Hawaii's third party administrator for energy efficiency, with a clearly defined budget and program plan approved by the state PUC, when the state energy office appeared with ideas for ARRA-funded programs. Lengthy negotiations ensued over defining the new ARRA programs, coordinating them with approved programs and amending BECK's contract to administer both.

3.3 Policy Issues

Attribution

The PUC and the SEP agreed that Hawaii Energy would receive credit for energy savings associated with joint programs in proportion to its funding contribution. The state's ARRA-funded rebates for ENERGY STAR-certified refrigerators added $200 to the utility customer-funded rebate of $50, so BECK as the third party administrator could take credit for 20% of the net independently verified energy savings on each refrigerator.

4. Lasting Impacts

Experimental ARRA programs evaluated for future utility customer support

The PUC and the third party administrator say at least two ARRA programs, if they produce validated savings, probably would be added to the roster of utility customer-supported efficiency programs. One is the behavioral feedback program operated by contractor OPOWER for letting consumers know how their consumption compares to neighbors or other peers. The other is the interest rate buy down for solar hot water heaters.

PUC officials are also interested in using the results of the SEO's project to benchmark energy use in hotels. Hotels account for a majority of Hawaii's commercial electricity use, which in turn is about half of total electricity consumption. PUC officials said they probably would not have undertaken the benchmarking project on their own but hope that it will identify opportunities for targeted hotel retrofits that would produce cost effective savings.

Interviewees:
Ted Peck, Hawaii State Energy Office
Ray Starling, Program Administrator, Hawaii Energy
John Cole, Hawaii Public Utilities Commissioner
Jim Flanagan, PUC Contract Manager, Hawaii Energy
Alan Hee, HECO

Maine

Highlights of Interaction between ARRA and Utility Customer-funded Programs:

- Efficiency Maine Trust has leveraged its unique position as both the administrator of ARRA programs and the state's third party electric energy efficiency (EE) program administrator to closely coordinate ARRA and utility customer-funded programs.

- The state's ARRA strategy targets the bulk of funding toward residential and commercial building efficiency which complements existing electric utility customer programs by introducing support for new "fuel neutral" measures. About 80% of Maine's households rely on oil for heating and few buildings in the state are heated by electricity, so envelope measures and many heating equipment measures have not been eligible under electric energy efficiency program guidelines because they do not contribute enough to electricity savings to pass cost effectiveness tests.

- ARRA efforts also involve coordination with local EECBG recipients to design programs in order to avoid duplication of state-level incentives.

- The new ARRA-funded "fuel neutral" programs will likely be used to evaluate the feasibility of implementing a new system benefit charge (SBC), on heating oil/fossil fuels to fund related efficiency measures in order to help meet state goals to reduce dependency on fossil fuels.

1. Landscape of Utility Customer-funded Programs

The Maine Public Utilities Commission regulates the three investor-owned electric utilities (IOUs) and three gas utilities in the state, and approves the Triennial Plan of the Efficiency Maine Trust, the state's third party energy efficiency program administrator. Efficiency Maine Trust staff designs and administers electric energy efficiency programs and utilizes sub-contractors to implement and evaluate the programs. The three electric IOUs serve nearly all of the customers in the state.

In 2002, legislation established Efficiency Maine, a statewide energy efficiency program, as a division of the Maine Public Utilities Commission, funded by a system benefits charge (SBC) in transmission and distribution utilities' rates. In 2009 legislation spun the program off as a component unit of state government, Efficiency Maine Trust, and set aggressive new goals to cut Maine's dependence on fossil fuels: weatherize all Maine homes and half of Maine businesses by 2030, and cut 30% of electricity, 30% of natural gas, and 20% of heating fuels use by 2020. Legislation passed in March 2010 calls for Efficiency Maine Trust to capture all cost effective electric and natural gas energy efficiency. In 2008 utility customer-funded efficiency programs spent 0.81% of electric utility retail sales revenue on electric energy efficiency programs (CEE 2010; EIA 2010). Stakeholders in Maine have begun debating implementation of a new public benefit fund on heating fuel and fossil fuels, but with the infusion of ARRA funds the discussions have been put on hold until 2011 (see **Table 13**).

Table 13. Maine: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	3 electric IOUs, 3 gas IOUs. The three electric IOUs serve nearly all customers in the state.
Energy Efficiency Resource Standard (EERS) status	None in place or proposed.
Utility customer funding history	System benefits charge for energy efficiency established in 1998 administered by State Planning Office, utilities and the Public Utilities Commission. In 2002 authority to implement EE programs transferred to Efficiency Maine, a division of the Maine Public Utilities commission. In 2009, Efficiency Maine Trust was spun off as a component unit of state government. In 2010, the Public Utilities Commission approved Efficiency Maine Trust's first triennial (2010-2013) program plan.
Utility customer-funded budget for EE	2010 electric and gas budget (including low-income): $14.6 million; $11.00 per capita. 2009 electric EE program spending as a % of electric utility retail sales revenue: 0.84%.
Regulatory and Business Model	**EE Program Administrator:** Third party for statewide programs **Incentives Structure:** No performance incentives in place. Programs must be cost effective at portfolio level; measure net savings, using a modified TRC cost effectiveness test or a "non-quantifiable cost effectiveness test." **Decoupling:** None in place.
Utility customer program objectives	Loading order that requires procurement of energy efficiency before any other traditional resource.
SEO energy activity background	In 2009, the Governor's Office of Energy Independence and Security set a goal of weatherizing 100 percent of homes and half of businesses by 2030. Efficiency Maine Trust is both the third party energy efficiency program administrator and administrator of ARRA funds for the state.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. Maine: Selected ARRA Energy Programs

Maine has been awarded approximately $73.3 million for selected ARRA programs, of which nearly $68 million (approximately 93%) is administered directly by Efficiency Maine Trust, as authorized by the Governor's Office of Energy Independence and Security, including $30 million for a "BetterBuildings" (formerly Retrofit Ramp-Up) grant, one of 25 such grants awarded to states and local community partnerships. Roughly $5.4 million of Maine's selected ARRA program funding (~7%) is administered directly by 25 cities, counties and tribes through the EECBG program.

Of the funds administered directly by Efficiency Maine Trust, about $27 million (almost 40%) is under the State Energy Program, $9.6 million (14%) is the EECBG formula grant, $30 million (44%) is for the EECBG competitive grant (a.k.a. the BetterBuildings program) and $1.26 million (about 2%) is allocated to the State Energy Efficient Appliance Rebate Program (see **Table 14**).

Table 14. Maine: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program Formula Grant - program $ administered by state	$27	Key programs focus on "fuel-neutral" measures (e.g., insulation) to capture fossil fuel energy savings and complement electric utility customer-funded programs, plus numerous small programs reaching markets and sectors across state.
EECBG Formula Grant - program $ administered by state	$ 9.6	All non pass-through funds used to augment funding for two SEP programs: Solar & Wind rebates ($0.5M) and Large Project Impact Fund Grants ($3.1M).
EECBG Formula Grant - program $ administered directly by 22 cities, counties and tribes.	$ 5.4	
EECBG Competitive Grants (BetterBuildings program) - $ administered by grant awardees, e.g., states, cities, community partnerships	$ 30	Establishes the Property Assessed Clean Energy (PACE) initiative and the Home Energy Savings Loan program, which is a statewide revolving loan fund for residents to finance retrofits.
State Energy Efficiency Appliance Rebate Program - program $ administered by state	$ 1.26	Targets fossil fuel heating equipment (furnaces, boilers and water heaters) to complement existing electric programs. Modest rebate levels resulted in slow steady uptake. Must self-certify disposal of the replaced unit.
Total	**$ 73.26**	

Efficiency Maine created 19 programs for the 2009 State Energy Program (SEP) formula grants, focusing 73% of SEP funding on grants and loan funds for energy efficiency measures in buildings across the non-public sectors (residential, small and large commercial and industrial facilities), with 22% of funding going to several cross-cutting activities and other programs (e.g., codes, workforce development, transportation), and 5% of funding going to three small renewable energy programs. Efficiency Maine formulated its SEP portfolio around two key strategies in support of the state's goals to reduce dependence on fossil fuels and to weatherize all Maine homes and half of the state's businesses by 2030: 1) reach all sectors with a broad array of programs, and; 2) complement existing utility customer-funded activities by addressing fuel neutral measures and by offering other programs not served by existing programs (e.g., industrial retro-commissioning). In contrast to many other states, the ARRA-funded programs developed by Efficiency Maine did not target public building retrofits. However some of the EECBG program funds which Efficiency Maine re-granted to smaller communities involve energy conservation measures in public buildings.

The state's largest SEP program ($9.2 million, 34% of SEP funding) is the Weatherization and Training Program, which targets non-low income residences and expands the existing Maine Home Performance program in several ways. For the first time, the program is able to offer numerous "fuel neutral" measures (e.g., high efficiency furnaces, insulation) which were not

previously funded under the electric-only efficiency programs, as such measures in oil heated homes did not garner enough electricity savings to meet cost effectiveness constraints. The funding increases the number of rebates and provides greater incentive levels for greater efficiency (e.g., $2,500 for 25% reduction in home heating and hot water costs until August 31, 2010, then $1,500 thereafter, and up to $3,000 for achieving a 50% reduction), encouraging customers to act quickly by offering significantly higher incentives for a limited time. In addition, the program allocates $400,000 for expanding its capacity to train certified auditors and installers (see **Table 15**).

Table 15. Maine: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Weatherization and Training Program	$9.2	Expands Maine Home Performance program for non-low income residences and adds fuel-neutral measures (e.g. envelope measures for homes heated with oil). Provides incentives and involves partnering with the Maine State Housing Authority (MSHA) and financial institutions to promote weatherization loans. Expands weatherization professional training included in the program.
Large Project Impact Fund Competitive Grants	$4.45	Competitive grant program which funds large EE and RE projects for large industrial facilities (average grant $150,000). Funding pool includes $3M from EECBG and $3M from RGGI and leverages more than $70M in private investment.
Retro-commissioning of Control Systems	$0.5	Grants of up to $100,000 for retro-commissioning of control systems for large non-residential entities.
Audit Services Program	$0.9	Expands existing 'walk-through' audit program for small businesses and adds new comprehensive "scoping audits" available to businesses of all sizes, for which costs will be rebated to customers who implement recommended measures.
Commercial Project Grants	$2	Grants for EE and RE measures at non-industrial commercial facilities; eligible measures may involve any fuel source.
Commercial New Construction Efficient Design Program	$1.45	Funds existing Efficiency Maine program which had not been fully implemented due to budget limitations; provides financial incentives and energy engineering assistance.
Measurement and Verification	$0.45	EM&V for Residential Weatherization and Efficiency program and all of the Commercial grant programs.
Energy Efficiency Revolving Loan Program	$0.76	Expands existing revolving loan program for small businesses to increase available funds and reduce interest rate. Designed to complement audit program.
Renewable Energy Programs		
Anenometer Loan Program	$0.2	Expands the existing Anemometer Loan Program and funds new wind website which provides technical information on wind data and resources to assist wind developers and businesses.

	Renewable Resource Fund	$0.45	Expands existing grant fund for schools and communities (funded through electric customer voluntary contributions). In partnership with Maine Technology Institute, supports renewable resource demonstration projects.
	Solar and Wind Rebate Program	$1	Incentives for residential and commercial customers to install renewable energy systems.
Cross-cutting and Other Programs			
	Building Codes and Standards	$0.50	Jumpstarts efforts to amend Maine energy codes and provides training for code inspection and enforcement.
	Thermal Efficiency Standards	$0.26	Conducts outreach to keep local code officers updated on changes in the code.
	Building Operator Certification	$0.2	Offers tuition-discounted training to facility managers on how to properly operate, maintain and improve the energy efficiency of their building.
	Training Scholarship Program	$0.2	Works with the Department of Labor to provide scholarships for energy efficiency and renewable energy training courses and programs.
	Workforce Development	$1.6	Works with four community colleges to develop renewable energy and energy efficiency curriculum and incorporate into their course offerings.
	Marketing	1.1	Expands Efficiency Maine public information and marketing efforts, including new fuel-neutral campaigns.
	Traffic Management	$0.7	Works with Maine Department of Transportation to assist municipalities in the adoption of improved traffic management practices and installation of LED traffic signals.
	Inter-governmental Coordination and Outreach	$0.1	Works with the Office of Energy Independence and Security to add capacity to coordinate federal, state, and local programs, track projects and optimize assistance for Maine businesses, nonprofits and government entities.
	Program Management	$1.23	Hiring of 5 temporary staff for SEP and EECBG programs to assist during height of program work.
	Total	**$27.25**	

Source: DOE (2009), interviews.

Efficiency Maine allocated the 31% ($3 million) of its EECBG funding that was not required to be passed through to non-entitlement communities toward two Large Industrial Project Impact Fund Competitive Grants projects with the remainder going to Municipal Re-grant Projects and administrative costs.

3. Interactions between Utility Customer-funded Programs and ARRA-funded Programs

The existing landscape of utility customer-funded energy efficiency programs in Maine consists mostly of Efficiency Maine's robust residential and commercial electricity efficiency offerings (e.g., rebates for lighting, electric appliances and equipment), plus a few small gas efficiency programs. Efficiency Maine Trust has leveraged its position as both the administrator of ARRA

programs and the state's third party electric energy efficiency program administrator to coordinate the interaction of ARRA and utility customer-funded programs and design ARRA programs to complement existing electric efficiency programs, with an emphasis on measures which reduce fossil fuel usage in buildings. There were some areas of potential overlap including in the commercial/industrial sector and at the local level with EECBG-funded projects and programs, which the SEO addressed through coordination.

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds (about $32.7 million) that will be expended over three years equal 272% of the 2010 budget ($12 million, excluding low-income) for utility customer-funded energy efficiency programs (see **Figure 9** and **Figure 10**).

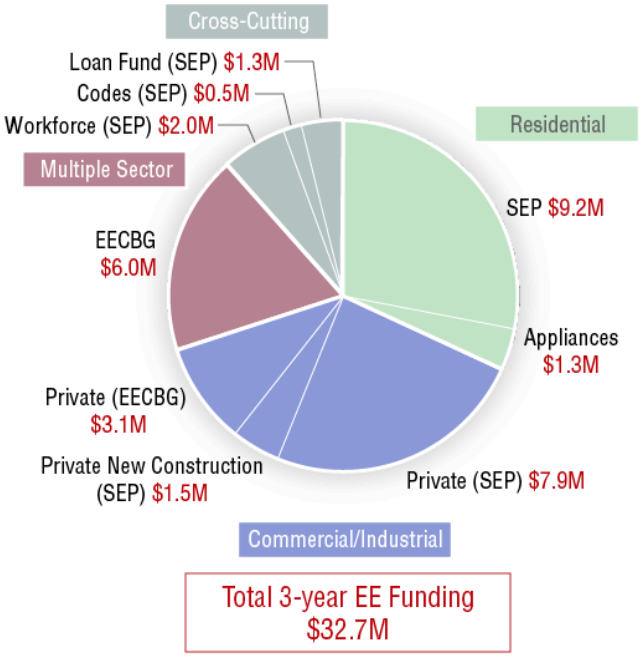

Figure 9. Maine EE program funds in selected ARRA programs by program type and market sector*

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. "EE program funds" do not include renewable energy, transportation and other programs that are not directly related to EE in buildings. While BetterBuildings funds, administered by Efficiency Maine Trust, represent a significant statewide funding impact, for consistency with other states, we exclude inclusion of BetterBuildings funds in the comparison with utility customer-funded budgets.

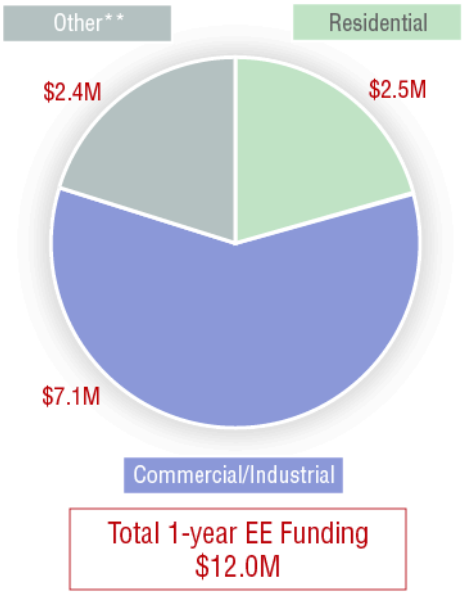

Figure 10. Maine 2010 utility customer-funded EE program budget *
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, e.g. administration, planning, codes, R&D, education and training, agriculture; can also include program budgets and EM&V not allocable by sector.

3.1 Program Planning Impact

Complementary ARRA programs used to expand efficiency to new measures and jumpstart "fuel neutral" efficiency efforts

Maine's existing utility customer-funded programs are funded by an SBC on customer electric bills and have focused on electric energy efficiency (e.g., CFLs, appliances). However 80% of Maine's households rely on oil for heating and few buildings in the state are heated by electricity, so envelope measures and most heating equipment measures have not been eligible under electric programs because they do not contribute to electricity savings. Through the $9.2 million Weatherization and Training SEP Program, Efficiency Maine Trust is using ARRA funds to complement existing offerings, by providing new incentives for "fuel neutral" measures (e.g., oil and gas furnaces and boilers, building insulation and air sealing) for the first time.

Maine's ARRA-funded appliance rebate program also complements utility customer programs by targeting fossil fuel heating equipment (e.g., oil and gas furnaces), which previously had not been eligible under the SBC-funded electric efficiency rebate programs.

Coordination to avoid program duplication at the local level and jumpstart complementary local financing program

One of the regional applicants for the state's pass-through EECBG funds proposed a large residential retrofit program which would have offered rebates that were redundant with Maine's SEP Weatherization and Training program. The application met all the granting criteria and the

applicant had enthusiastic support from its community members; however Efficiency Maine Trust wanted to avoid a situation in which one region of the state had more generous rebates than other regions. Upon awarding the funds, Efficiency Maine Trust negotiated with the grantees to redesign the program to complement the statewide program, while keeping the local program true to its original intention and level of citizen engagement. The local community is now developing a revolving loan fund and local training program to support implementation of the statewide home performance program. Efficiency Maine Trust continues to assist with its development and expects the program to be a success.

Large slate of programs is challenging when staff is limited

Given a small staff size and a hiring freeze, the creation of so many programs in an attempt to reach all sectors was a challenging approach. Efficiency Maine Trust staff reflected that it may have been more advantageous to concentrate activity in a few high-payoff areas such as the commercial/industrial sector. Staff also indicated that while the organization is very experienced with developing and implementing energy efficiency programs, it had little experience with being a grant making organization and had a challenging ramp-up learning the ins and outs of administering a large number of grants.

3.2 Program Design and Implementation Impact

Selectively awarding or adjusting grants to avoid 'double dipping'

Entities that submit proposals for the SEP Large Project Impact Fund Competitive Grants cannot receive incentives for measures also covered under the Business Incentives program for the same measures (e.g., qualified electrical measures). Projects eligible for both programs will first be funded by the Business Incentives program, and the amount will be deducted from the SEP grant. As a result, Efficiency Maine Trust will be able to more easily apportion savings attribution between the two programs.

Coordinating to layer incentives in order to encourage deeper home retrofits

Efficiency Maine Trust is coordinating with one small gas company with 26,000 customers to encourage the gas utility customers to combine multiple incentives for envelop measures and gas heating systems with the gas program's own rebates and the federal tax credit in order to increase program participation and garner deeper energy savings. Home performance projects may layer the gas utility rebate (up to $5,000), with the SEP incentive (up to $3,000) and the federal tax credit ($1,500) for a total rebated amount of up to $9,500.

ARRA funds boost utility customer-funded program

The SEP Commercial New Construction program augments funding of the existing Efficiency Maine Trust program, allowing it to be fully implemented, which would not have been possible without the ARRA funds.

3.3 Policy Issues

ARRA-funded program may inform expansion of utility customer funding

The Weatherization and Training Program's new "fuel neutral" measures are likely to be used as a test case in evaluating cost effectiveness and feasibility of implementing a new SBC on heating oil/fossil fuels to fund related energy efficiency efforts.

Attribution

Maine's ARRA programs largely avoid attribution issues by implementing complementary programs and reducing or disallowing incentives in cases where there is potential redundancy or overlap. In cases where a project utilizes financial incentives from both ARRA and utility customer monies, Efficiency Maine Trust will track the portions of a project funded by each source. Although Efficiency Maine Trust does not receive performance incentives for energy savings, it tracks savings attribution in order to calculate the cost effectiveness of its utility customer-funded programs. It has conducted a similar practice in cases where industrial customers bid efficiency into the ISO-New England forward capacity markets; Efficiency Maine Trust claims all credit for the portion of the projects it funds. In addition they pay for projects based on a milestone schedule, holding back the final 10% until completion and verification.

4. Lasting Impacts

ARRA funds support training of the contractor network to help drive demand for retrofits

In addition to energy codes updates and enforcement and general workforce development efforts which are intended to have sustained impact, Efficiency Maine Trust has designed the training component of the SEP Weatherization program to help continue moving the state toward its aggressive energy goals after the ARRA performance period. Since the state does not have the means to pay for weatherization of all 500,000 homes, the Weatherization and Training program is laying groundwork for market transformation by preparing home audit and installation professionals to be effective marketers, salespeople and advocates for energy efficient home performance, in addition to providing technical skills training.

ARRA funds establish large revolving loan fund

The BetterBuildings EECBG competitive grant will establish a revolving loan fund, which will provide long term financing for residential weatherization and energy efficiency upgrades for all fuels, supporting utility customer-funded rebate programs and leveraging Efficiency Maine Trust's established network of partners and delivery channels.

Interviewees:
Michael Barden, Grants Administrator, Efficiency Maine Trust
Elizabeth Crabtree, Business Programs Manager, Efficiency Maine Trust
John Brautigam, Director, Energy Programs Division, Maine Public Utilities Commission
Denis Bergeron, Director of Energy Programs, Maine Public Utilities Commission

Massachusetts

Highlights of Interaction between ARRA and Utility Customer Programs:

- The state energy office (SEO), the Massachusetts Department of Energy Resources, created its SEP, EECBG and State Energy Efficient Appliance Rebate programs (SEEARP) to largely complement utility programs by targeting measures not offered by utility programs (e.g., EECBG funding thermal measures for oil-heated buildings not addressed in existing electric efficiency programs, SEP projects which target deep retrofits outside the scope of utility programs, not allowing double-dipping with Commonwealth Solar rebate program, etc). The Appliance Rebates Program complemented utility offerings on refrigerators and freezers by providing incentives to purchase the most efficient models available in the program.

- With the elimination of PACE financing as a scalable option for funding energy efficiency, the SEO is now developing a financing program intended to be replicable nationwide. The financing program will seed a loan loss reserve fund, and leverage private funding as well as energy efficiency program funding to provide 0% loans, initially in the residential market and potentially across multiple market sectors (residential, commercial/industrial, public). The program will be integrated with the existing energy efficiency program infrastructure and may allow for on-bill repayment.

- The SEO is directing the majority of its SEP monies (64%) toward grants and financing for energy efficiency measures in non-residential buildings. About 43% of SEP funds are directed toward public facilities for energy efficiency and renewable energy projects to support the governor's "Leading by Example" goals. The state has a long history of performance contracting in state and municipal facilities. ARRA funding enabled the Leading by Example Program to accelerate a pipeline of $200 million in energy efficiency projects.

1. Landscape of Utility Customer Programs

The Massachusetts Department of Public Utilities (the state's utilities commission) regulates the four investor-owned electric distribution companies, four investor-owned gas-only utilities and four of the 40 municipal natural gas utilities that operate in the state. Massachusetts has no electric cooperatives. In addition, Cape Light Compact, an inter-municipal regional energy services organization, supplies electricity and administers the regional energy efficiency programs for Cape Cod and Martha's Vineyard. The two largest investor-owned utilities (IOUs) (NSTAR and National Grid) serve the majority of gas and electric customers in the state.

Massachusetts has a long history of implementing energy efficiency programs for all sectors, funded by a system benefits charge (SBC) on utility customer electric bills. Natural gas utilities have offered energy efficiency programs since the 1980s. The 2008 Green Communities Act set aggressive new renewable portfolio standards and energy savings targets, requiring the state's IOUs and the Cape Light Compact to create energy efficiency programs that acquire all available energy efficiency that is cost effective or which costs less than new generation. The Act requires

utilities to file plans every three years and authorizes the Department of Public Utilities to approve energy efficiency plans, budgets and cost recovery. It also established the Energy Efficiency Advisory Council (EEAC) which will review the efficiency plans and work with utilities to evaluate the programs over the next several years. The utilities commission sets targets to implement the all cost effective energy efficiency statute. Goals include increasing annual electricity savings to 2.4% of retail sales per year and gas savings to 1.15% annually by 2012. For comparison, 2008 electricity savings as a percent of electricity sales was about 0.69% (ACEEE 2010). The Green Communities Act also provided final legislative approval for Massachusetts' participation in the Regional Greenhouse Gas Initiative (RGGI), which provides revenue for energy efficiency programs.

The state's energy efficiency programs are marketed to the public through Mass Save®, a statewide umbrella branding initiative sponsored by Massachusetts' gas and electric utilities and energy efficiency service providers, working in conjunction with the SEO. The current 3 year slate of energy efficiency programs will receive funding from a variety of sources, including emissions allowance trading programs (e.g., RGGI) and system benefit surcharges on utility customer electric bills. Renewable energy incentive programs are funded in part by alternative compliance payments generated by the Renewable Portfolio Standard, and the Renewable Energy Trust Fund, which is supported by a charge on customer electric bills (see **Table 16**).

Table 16. Massachusetts: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	The utilities commission regulates and approves energy efficiency plans for 4 electric IOUs (3 electric and gas), 4 gas-only IOUs, one regional supplier and 4 of the 40 municipals.
EERS status	Green Communities Act (July 2008) requires acquisition of all cost effective energy efficiency that costs less than new energy supply as first priority resource.
Utility customer funding history	Long history of EE programs. 2008 Green Communities Act calls for utilities to achieve all cost effective energy efficiency; increases savings targets.
Utility customer-funded budget for EE	2010 electric and gas energy efficiency budget (including low-income): $357.1 million; $54.50 per capita. 2009 electric EE program spending as a % of electric utility retail sales revenue: 2.14%.
Regulatory and Business Model	**EE Program Administrator:** Utilities, with 3rd party implementation contractors. **Utility Incentives Structure:** Utilities report both gross and net savings. Shareholder incentive provides bonus of ~5% of energy efficiency program costs for meeting goals. **Decoupling:** Statutory provisions allow decoupling. Utilities will be required to include decoupling proposals in rate cases; full decoupling expected by 2012.
Utility customer program objectives	Resource acquisition: all cost effective energy efficiency that costs less than new energy supply as first priority resource. The utilities commission approved utility EE plans that include goals of increasing annual electricity savings to 2.4% per year and 1.15% annual natural gas savings by 2012.
SEO energy activity	The mission of the Department of Energy Resources (DOER)

background	includes achieving all cost effective energy efficiencies, maximizing greener energy resources and spurring employment in the clean energy industry. The SEO leads efforts to meet the Governor's goals for higher efficiency standards in state buildings and achieving zero net energy in new residential and commercial construction by 2030, in conjunction with working to meet requirements of the 2008 Global Warming Solutions Act which requires reduction of greenhouse gas emissions of 80% below 1990 levels by 2050.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. Massachusetts: Selected ARRA Energy Programs

Massachusetts has been awarded approximately $104 million for selected ARRA programs, of which just over $75.89 million (nearly 73%) is administered directly by the state energy office (SEO), the Department of Energy Resources, through the SEP, Appliance Rebates Program and EECBG program. $28 million of Massachusetts' selected ARRA program funding (37%) is administered directly by 45 entitled cities, counties and tribes through the EECBG program. Of the funds administered by the SEO, $54.9 million (~72%) is for the State Energy Program (SEP), $14.75 million (19.5%) is for the EECBG formula grant and $6.24 million (8%) is allocated to the State Energy Efficient Appliance Rebate Program (see **Table 17**).

Table 17. Massachusetts: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program (SEP) Formula Grant - program $ administered by state	$ 54.9	Focus on energy efficiency and renewable energy implementation in buildings through grants and incentives, plus a zero-interest financing program. Funds target public buildings, with significant funds going to non-residential private buildings as well.
EECBG Formula Grant - program $ administered by state	$ 14.75	83% of funding passed through to local "shovel-ready" EE and RE projects. EE projects strictly limited to thermal measures for oil-heated buildings, which complement electric utility programs, or performance contracts that leverage additional capital. RE projects cannot receive both EECBG and Solar Stimulus rebates.
EECBG Formula Grant - program $ administered directly by 45 entitled cities, counties and tribes	$ 28.33	
EECBG Competitive Grants ("BetterBuildings") - program $ administered by grant awardees, e.g., states, cities, community partnerships	$ 5	City of Lowell award for energy efficiency compatible historic preservation.
State Energy Efficient Appliance Rebate Program - program $ administered by state	$ 6.24	Generous incentives and limited time offering designed to create rapid uptake and immediate economic impact.

Total	**$109.22**	

The Massachusetts SEO created three primary program areas for its 2009 State Energy Program (SEP) formula grants, directing $21.4 million ($39% of SEP funds) to grants for high performance buildings and a multiple sector financing program, $18.5 million ($34% of SEP funds) to solar PV installations on public and private buildings, and $15 million (27% of SEP funds), toward facilitating energy efficiency in state buildings.

The SEO formulated its ARRA plans with input from energy efficiency program administrators and developed a slate of programs designed to complement existing utility customer-funded programs. The SEP portfolio has four key strategic focuses: 1) provide grants for expansion of efficiency programs' deep retrofits in public and private buildings, funding measures which reach beyond utility program offerings; 2) augment the existing statewide solar program, providing a funding bridge to accommodate wait-listed demand in both the public and private sector; 3) create a new energy efficiency financing program available across market sectors which is replicable across 50 states; and 4) fund building envelope efficiency measures in oil-heated buildings, which are not provided by existing utility customer-funded programs.

The SEP High Performance Buildings comprises two key initiatives. Approximately $16 million has been awarded to 11 projects in public and private buildings largely for deep energy retrofit building improvements that are outside the scope of the existing utility energy efficiency program. The second initiative focuses on the demonstration of new mechanical heating and cooling systems, programs for replacing low-efficiency residential boilers, and outreach/mobilization efforts focused on enrolling buildings across all sectors into existing statewide energy efficiency programs.

The SEO allocated $4 million to the new Massachusetts financing program, intended to be available for various types of loans across market sectors. The program is designed to be a scalable model replicable in all 50 states. The SEP funding will seed a $4 million loan loss reserve fund and program management, and will leverage private capital at an expected ratio of 10 to 1. The program will utilize and leverage energy efficiency program funds (e.g., utility customer dollars, RGGI funds) to buy down the interest rate to 0% for participants and coordinate with incentives to reduce the principal. The program will be integrated with Mass Save®, and may provide for repayment of loans through participants' electric utility bills.

The SEO has a long history of performance contracting in state facilities. In support of the governor's goals for significantly increasing energy efficiency and reducing greenhouse gas emissions in state buildings, the SEP Lead By Example program allocated $3.3 million to the Division of Capital Asset Management for increased staff and contractors, hired for the duration of the ARRA performance period, to accelerate completion of an existing pipeline of $200 million in state building energy efficiency projects. Some projects will employ performance contracts; however the state also intends to develop internal capacity for implementing and financing projects. ARRA funds will enable the state to initiate more projects in 2 years than it has had the resources to implement over the last 20 years.

The SEO is also directing $10 million to the implementation of a large multi-building energy management system, by which the state expects to ultimately save millions of dollars in energy costs per year. This system is intended to result in access to real time, building-level energy use data for over 17 million square feet of state buildings, allowing for better prioritization of energy efficiency funds and assisting facility managers with the day-to-day management of energy use across campuses and facilities.

The SEP Solar Stimulus rebate program provided a bridge between the end of the existing Commonwealth Solar Stimulus Rebate Program and the launch of solar carve-out of the Renewable Portfolio Standard (RPS) – the long term market-based approach to enabling the growth of solar in Massachusetts The Solar Stimulus rebate program is administered by the Massachusetts Clean Energy Center. The earlier rebate program had been funded through a renewable energy charge. ARRA funds provided $8 million in rebates for solar installations. In addition, $8.7 million was awarded in ARRA grants to fund 37 solar projects at public facilities (see **Table 18**).

Table 18. Massachusetts: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
High Performance Buildings	$21.4	1. $16.25 million in grants for energy efficiency and clean energy projects in public and private buildings, plus community-based programs; most projects are EE, a small number involve geothermal or biofuel systems; 2. $4 million for Energy Efficiency Loan Fund to seed a loan loss reserve fund; 3. Remaining funds will support administration.
Lead by Example - State buildings	$15	1. $3.3 million awarded to Massachusetts Division of Capital Asset Management to leverage the Commonwealth Clean Energy Investments Fund. Provides project management resources to accelerate completion of an existing $200 million pipeline of projects in various stages of shovel-readiness for energy efficiency and renewable energy projects in public buildings; 2. $10 million for an enterprise-wide energy management system; 3. Remaining funds will support administration.
Renewable Energy Programs		
Solar Stimulus	$18.5	1. Technical assistance for PV systems on public facilities with intention of generating up to 8 MW; 2. Augment Commonwealth Solar rebate program: $8M to residential and commercial buildings; $8.7M to public buildings.
Total	**$54.9**	

Source: DOE (2009), interviews.

The SEO allocated 83% of its $14.75 million EECBG formula funds to non-entitled communities for competitively bid grants for energy efficiency and solar PV projects; 50% are energy

efficiency projects and 50% are renewable energy projects. Energy efficiency projects were limited to thermal measures in oil-heated buildings in order to complement existing utility customer-funded programs and to performance contracts that leveraged additional capital. Solar PV projects funded by EECBG for more than 67% of their project cost were not eligible for rebates under the Solar Stimulus rebate program or for credits from the solar RPS program.

The SEO's additional EECBG activities include energy codes training for building inspectors ($175,000), funding for owner's agents to assist municipalities with performance contracts and solar PV power purchase agreements ($825,000), and development of a web-based system for local municipalities to use to track energy use and energy savings ($690,000).

Cape Light Compact administered the State Energy Efficient Appliance Rebate Program (SEEARP); customers accessed information and applications through the Mass Save website. The SEO restricted the ARRA program to appliances that far exceeded ENERGY STAR, and with the exception of refrigerators and freezers, offered rebates on appliances not included in utility rebate programs. The SEO set its appliance rebates at generous levels, compared to other states, and offered the rebates for a limited time, in order to generate a sense of urgency and drive a high level of visibility for the program. Consumers reserved $5.4 million in rebates and $2.7 million in waitlist spaces in the first 3 hours of the program on April 22, 2010. Due to the high demand, and large number of applicants that were waitlisted, the SEO promised to honor all of the waitlist reservations.

3. Interactions between Utility Customer-funded Programs and ARRA-funded Programs

Massachusetts' existing robust set of efficiency programs expanded significantly with the passage of the Green Communities Act in 2008. By law, all IOUs and the Cape Light Compact offer energy efficiency programs which are marketed through Mass Save and overseen by the utilities commission. In addition, the Massachusetts Municipal Wholesale Electric Company (MMWEC) administers energy efficiency programs through the Home Energy Loss Prevention Services (HELPS) Program for 17 municipal utilities in Massachusetts. A number of other municipal electric companies sponsor efficiency programs either self-administered or run by Energy New England.

The Massachusetts SEO developed its programs with input from utilities resulting in a portfolio that almost exclusively complements the existing utility energy efficiency programs. Massachusetts' SEEARP was administered by Cape Light Compact through Mass Save® alongside utility rebate programs, with only the refrigerator and freezer rebates shared.

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($50.4 million) that will be expended over three years equal 16% of the 2010 budget ($306.5 million) for utility customer-funded energy efficiency programs (see **Figure 11** and **Figure 12**).

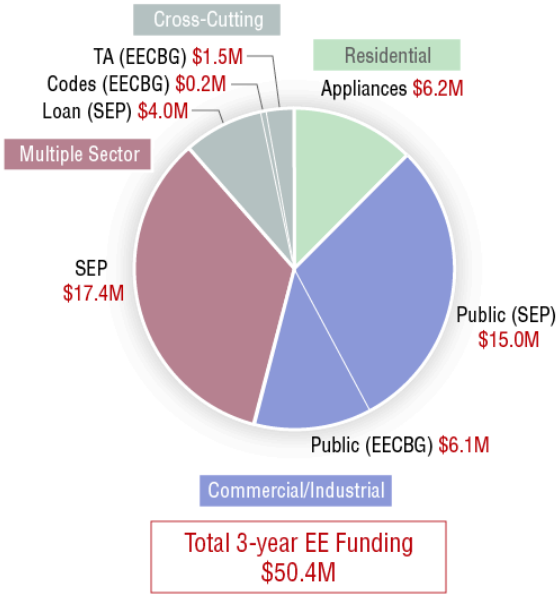

Figure 11. Massachusetts EE program funds in selected ARRA programs by program type and market sector*

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. “EE program funds” do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

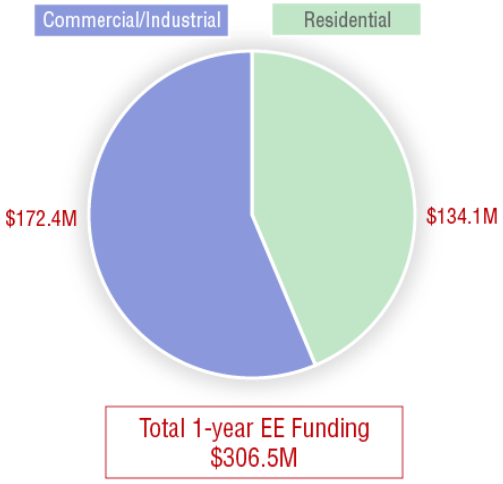

Figure 12. Massachusetts 2010 utility customer-funded EE program budget*

* Excludes load management and low income weatherization programs

** "Other" includes items not allocated by sector, e.g. administration, planning, codes, R&D, education and training, agriculture; can also include program budgets and EM&V not allocable by sector.

3.1 Program Design and Implementation Impact

ARRA funds complement utility customer-funded programs by targeting deep retrofits in commercial and multifamily residences

Grants under the SEP High Performance Buildings program were awarded to projects which demonstrated significant savings beyond what could be provided through the existing utility energy efficiency programs. For example, the SEO awarded $4.4 million to a tenants' organization for a deep retrofit of a 192-unit multifamily complex of four buildings, which will include extensive building envelope measures. The High Performance Building Grants were also available to buildings that may have opted out of the utility customer-funded programs in favor of self-directed efficiency efforts.

ARRA funds complement utility customer-funded programs by targeting measures for oil-heated buildings

The Massachusetts Oil Heat Council and Conservation Services Group utilized a $1.7 million grant through the SEP High Performance Buildings Program to administer the first comprehensive oil-heat energy efficiency program in Massachusetts. The program will provide services and rebates for inefficient oil boilers and heaters owned by moderate income families ineligible for low income fuel subsidies. The program will also improve energy efficiency at oil-heated homes, which comprise 40 percent of the state's residences but have no access to existing energy efficiency programs. This comprehensive pilot program could provide a model for similar efforts in the future. In addition, funds re-granted to non-entitled communities through the EECBG program for energy efficiency projects included thermal measures (e.g., insulation, windows, duct sealing) in oil-heated buildings in order to complement existing electric utility customer programs and garner energy savings not reached by utility customer programs.

ARRA funds complement utility customer-funded programs by not allowing double-dipping of solar rebates

Solar PV projects receiving funds granted to non-entitled communities through the EECBG program, were not allowed to also receive rebates through the Commonwealth Solar Rebate program, in order to encourage wider distribution of funds for a larger number of PV installations.

ARRA funds allow acceleration of energy efficiency projects at state buildings; intended to expand culture of aggressive energy efficiency at state facilities

Funding to be used for staffing and consultants to assess, plan, and execute energy efficiency and renewable energy projects at state buildings. The state will initiate more projects in the next two years than in the past 20.

3.2 Policy Issues

Attribution of Savings

Both representatives from the utilities commission and SEO report that for projects in which utilities provide rebates to SEP or EECBG grant recipients, utilities are allowed to claim the savings from that measure or project toward their goals. Under the existing utility-administered energy efficiency programs, regardless of how much funding was provided by the customer, if a customer utilizes a utility rebate, the utility may count the savings from that measure toward its savings target.

4. Lasting Impacts

ARRA funds seed unique financing program that leverages both private funding and energy efficiency program funds

The elimination of PACE financing as a near-term scalable option for funding energy efficiency was a factor in driving the SEO to develop a financing program, seeding the program with $4 million in SEP funding for a loan loss reserve fund and program management. The program will involve close collaboration with utilities and contractors statewide. The program offers streamlined access to low-interest financing for residents in need of immediate equipment repairs; contractors will use it as a 'gateway' for inducing appropriate customers to rolling over that loan into the state's existing zero-interest HEAT loan program which is specifically for whole home energy performance work. Utility customer funds will be leveraged to buy down the loan interest rate in addition to providing rebates to be used in conjunction with the financing, and the new program will be integrated with Mass Save and other avenues.

ARRA funds increased scale of state retrofit projects; provides support for new financing

The availability of ARRA funds boosted the SEO's ability to make the case to the state's Executive Office for Administration and Finance to set up the CEIP financing program to scale up the existing Leading by Example Program. The program will issue project financing through state bonds at the state bond rate, which is significantly lower than what private entities (e.g., ESCOs) could obtain. Agencies will pay back the bond principal and interest out of energy savings. The loans have the full credit of the state behind the bonds and do not count against the state's bond cap or impact the bond rating.

Interviewees:
Frank Gorke, Massachusetts Department of Energy Resources (DOER)
Vivek Mohta, Massachusetts DOER
Tom Darling, Clean Energy Fellow, DOER
Eric Friedman, Director, Leading by Example Program, DOER
Meg Lusardi, Deputy Director, Green Communities Division, DOER
Erin Malone, Economist, Massachusetts Department of Public Utilities
Michael McAteer, C/I Energy Efficiency Program Manager, National Grid
Mike Sherman, Navigant Consulting

Michigan

Highlights of Interaction between ARRA and Utility Customer Programs:

- Utility energy efficiency programs have recently been re-established in Michigan in order to comply with a recently-adopted Energy Efficiency Resource Standard. The Michigan Department of Energy, Labor and Economic Growth, the state energy office (SEO), designed its ARRA portfolio largely to complement the nascent utility programs and provide support for meeting the state's aggressive energy efficiency goals.

- After early grant applications suggested that significant investment in the private sector may offer highest job growth and energy savings impact, the SEO shifted $13 million (~15% of SEP funds) out of state building energy efficiency programs and into private sector programs. More than half of SEP funding now supports diversification of Michigan's manufacturing base into clean energy industries.

- ARRA funds are enabling utility participation in collaborative pilot programs that will enable greater uptake of utility programs and inform the design of future utility customer-funded programs, without having to meet utility cost effectiveness constraints. The Michigan BetterBuildings Initiative involves extensive utility, SEO and multi-agency collaboration to roll out a residential neighborhood 'sweep' pilot and provides funding to augment an existing credit enhancement/loan loss reserve fund.

1. Landscape of Utility Customer Programs

The Michigan Public Service Commission, the state's utilities commission, regulates the nine electric investor-owned utilities (IOUs), six natural gas public utilities, and ten of the twelve electric cooperative utilities in the state. The 44 municipal electric utilities are not regulated by the utilities commission.

Michigan utilities offered energy efficiency programs in the 1980s and early 1990s until 1995, when energy efficiency programs were discontinued as the state underwent electric restructuring. In October 2008, the Clean, Renewable, and Efficient Energy Act (S.B. 213, known as Public Act 295) established an energy efficiency resource standard (known in Michigan as an "energy optimization savings standard") requiring all electric providers, including municipal and cooperative electric utilities and rate-regulated natural gas utilities, to set annual targets and file energy optimization plans with the utilities commission, which has the authority to approve or reject. Michigan's goals increase from 0.3% of electricity sales in 2009 (the first year of the new programs) to 1% of annual total sales by 2012 (0.75% for natural gas utilities), continuing at 1% annually thereafter. Utilities may receive incentives for exceeding these savings goals. The legislation allows multiple options for program administration, including administration by the utility provider, joint administration with other providers, administration by a state agency or administration by a competitively-selected nonprofit organization.

In order to ramp up quickly, many utilities are relying on third party providers to implement and/or administer collective programs. For example, eleven IOUs and cooperatives are

coordinating program administration and implementation efforts under the name Efficiency United, and another team of twelve electric cooperatives and municipal electric utilities are coordinating as well; both are using the same third party provider for some programs.

Program spending for each utility is capped at 1% of total sales revenues in 2010, 1.5% in 2011, and 2% in 2012 and each year thereafter. The 2010 electric and gas utility energy optimization program budgets total $103 million (see **Table 19**).

Table 19. Michigan: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	9 electric IOUs, 6 natural gas utilities, and 10 of 12 electric cooperatives are regulated by Michigan Public Utilities Commission. 44 municipal electric utilities.
EERS status	Legislation enacted in October 2008. Targets ramp from 0.3% of electricity sales in 2009 to 1% of annual total sales by 2012 (0.75% for natural gas utilities), continuing at 1% annually through 2016.
Utility customer funding history	Current programs established in 2009.
Utility customer-funded budget for EE	2010 electric and gas EE budget (including low-income): $103 million; $10.40 per capita. 2009 electric EE program spending as a % of electric utility sales revenue: 0.46%.
Regulatory and Business Model	**EE Program Administrator:** Utilities, with third party implementers and/or program administrators **Funding:** Surcharge on customer utility bills starting July 1, 2009. Residential accounts based on kilowatt-hour use; non-residential customers pay flat monthly per meter charge. **Utility Incentives Structure:** Utilities may request that energy efficiency program costs be capitalized and earn normal rate of return. Performance incentive for exceeding the annual energy savings target is based on gross savings for 2009 program year; may use net savings in future years (not determined yet). **Decoupling:** No provision for electric decoupling. Natural gas utilities may request decoupling mechanism as long as they are spending at least 0.5% of total revenues on energy efficiency programs.
Utility customer program objectives	Resource acquisition; delay need to build new electric generation.
SEO energy activity background	Under the State of Michigan Department of Energy, Labor and Economic Growth, the Bureau of Energy Systems promotes energy efficiency and renewable energy resource development to Michigan's residents, businesses and public institutions. The Bureau administers Michigan's SEP, EECBG and State Energy Efficient Appliance Rebate (SEEARP) programs.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. Michigan: Selected ARRA Energy Programs

Michigan has been awarded approximately $199.3 million for selected ARRA programs, of which just over $141 million (nearly 71%) is administered directly by the Department of Energy, Labor and Economic Growth, the state energy office (SEO). This funding includes $30 million

for the Michigan BetterBuildings Initiative, one of 35 EECBG "BetterBuildings" competitive grants awarded to states and local community partnerships nationwide. Just over $58 million of Michigan's selected ARRA program funding (~29%) is administered directly by 66 entitlement cities, counties and tribes through the EECBG program.

Of the $141 million in funds administered by the SEO, 58% is for the State Energy Program (SEP), 14% is for the EECBG formula grant, 21% is for the "Michigan BetterBuildings Initiative" and 6.8% is allocated to the State Energy Efficient Appliance Rebate Program (SEEARP) (see **Table 20**).

Table 20. Michigan: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program (SEP) Formula Grant - program $ administered by state	$82.04	Bulk of funding supports diversification of suppliers and manufacturers into renewable energy sector and energy efficiency measures in public buildings.
EECBG Formula Grant - program $ administered by state	$ 19.6	
EECBG Formula Grant - program $ administered directly by 66 entitled cities, counties and tribes.	$ 58.1	Grants for a diverse mix of activities (e.g, energy strategy development, non-motorized roadways, local residential energy efficiency programs); bulk of funds go to energy efficiency in public buildings.
EECBG Competitive Grants ("BetterBuildings") - program $ administered by grant awardees, e.g., states, cities, community partnerships	$ 30.0	The BetterBuildings for Michigan initiative targets homes and businesses via neighborhood "sweeps" and will provide financial incentives and affordable loans through the existing Michigan Saves financing program.
State Energy Efficient Appliance Rebate Program - program $ administered by state	$ 9.6	1/3 of funds target fossil fuel heating equipment to complement existing electric programs. 2/3 of funds provide modest rebate levels for "white goods" which can be combined with utility incentives.
Total	**$ 199.34**	

The Michigan SEO created 11 programs for the 2009 State Energy Program (SEP) formula grants, directing 55% ($45.2 million) of SEP funds toward cross-cutting activities (e.g., clean tech manufacturing sector development and revolving loan funds), 39.3% of funding ($32 million) toward energy efficiency in state-owned buildings, and 5.7% ($4.7 million) toward renewables programs in the public sector.

The SEO solicited significant input from utilities and designed a slate of ARRA programs which help meet two key objectives: (1) garner significant job creation and energy savings, and (2) complement and raise awareness about the nascent utility efficiency programs in order to support the state's aggressive new energy efficiency goals. Michigan's largest single ARRA SEP program ($30.5 million, 37% of SEP funds), the Clean Energy Advanced Manufacturing

(CEAM) program, provides combination grant and loan packages for small and medium-sized enterprises to support their diversification into renewable energy and energy efficiency manufacturing.

The state's original SEP plan allocated a total of $57 million (over 69% of SEP funding) for energy efficiency and renewable energy programs for public facilities, however after reviewing early funding applications the SEO reduced the public sector programs by about $13 million, to $39.5 million for energy efficiency and $4.6 million for renewables, and increased the CEAM program budget. The SEO reports that many of the early public building applications targeted short payback measures (e.g. lighting retrofits). After reviewing the first applications for the Clean Energy Advanced Manufacturing, the SEO determined that it could create more jobs and garner more energy savings by directing more funding into the private sector. The SEO also refocused the public building efficiency program to prioritize longer payback measures (e.g., boilers, renewable systems) when evaluating grant applications. The SEP public sector energy efficiency activities also include nearly $6 million for leveraging performance contracts in state facilities (see **Table 21**).

Table 21. Michigan: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Energy Efficiency and Retrofits in state-owned Buildings	$24.33	Grants for energy efficiency measures in state buildings.
Energy Services Contracts	$5.93	Grants to buy down energy efficiency performance contracts in state buildings.
Energy Audits	$1.94	Expands existing Retired Engineer Technical Assistance Program (RETAP) program to provide free non-residential energy audits.
Michigan Energy Efficiency Network	$0.18	Public education and outreach, developing contractor network.
Renewable Energy Programs		
Renewable Energy in state-owned Buildings	$4.21	Grants for renewable energy projects in state buildings.
AgriEnergy Program	$0.3	Grants for bioenergy technology demonstration projects.
Advancing Wind	$0.15	Grants for installation of wind potential measurement equipment on public facilities.
Cross-cutting and Other Programs		
Clean Energy Advanced Manufacturing (other)	$30.5	Combination grant and loan packages to promote private industry diversification into the energy efficiency and renewable energy sectors.
Energy Revolving Loan – Public Sector (cross-cutting)	$5	Revolving loan fund for energy efficiency and renewable energy projects for public entities (e.g. schools, government).
Energy Revolving Loan – Private Sector (cross-cutting)	$5	Revolving loan fund for energy efficiency and renewable energy projects for private non-residential entities.
Technology Demonstrations (cross-cutting)	$1.5	Grants to small businesses for projects that demonstrate innovative renewable energy and energy efficient technologies not yet widely adopted

			in Michigan.
	Administration (other)	$3	Administration, evaluation and reporting.
	Total	**$82.04**	

Source: DOE (2009), interviews.

The $30 million EECBG competitive grant award to the BetterBuildings for Michigan Initiative pilot program will fund outreach to homes and small businesses via targeted neighborhood "sweeps," provide on-the-spot direct install measures (e.g., CFLs, thermostats) at no cost to residents, provide financial incentives for tiered levels of retrofit intensity and affordable loans to cover the remaining cost of projects through the existing Michigan Saves financing program. BetterBuildings for Michigan is a collaboration of state and local governments, two electric IOUs, educational and public organizations and private financing partners. $10 million of the grant will augment the $6.5 million Michigan Saves loan loss reserve fund. The utilities' role is twofold: 1) conduct initial outreach and utilize knowledge about its customers to recommend which neighborhoods may be most effective to target, and 2) provide rebates for customers that will augment rebates provided by ARRA funds and other partner agencies.

The SEO allocated 79% of its $19.6 million EECBG formula funds to 125 non-entitled Michigan communities for grants going to a diverse mix of activities (e.g., energy strategy development, renewable energy, non-motorized roadways, local residential energy efficiency programs), with a majority of projects funding various energy efficiency measures in public buildings.

The SEO made 10% of its EECBG funds ($1.9 million) available to both non-entitled and entitled communities for LED demonstration grants (e.g., street parking, exterior lighting) to demonstrate market demand and encourage growth of Michigan's LED manufacturing base. ARRA funds pay 90% of technology costs; grantees pay 10% of equipment cost plus all labor and installation costs. The LED program has begun to demonstrate significant demand and market pull; the program garnered 5 times as many applications as were possible to fund, and the SEO reports that Michigan-based LED manufacturers and distributors are competing aggressively to supply the projects.

3. Interactions between Utility Customer-funded Programs and Selected ARRA-funded Programs

Michigan re-established utility customer-funded energy efficiency programs in 2009, along with aggressive energy efficiency savings targets. All electric providers, including municipal utilities and cooperatives, as well as regulated gas utilities offer customer energy optimization incentive programs, which range from a few residential appliance rebates offered by some small cooperatives, to robust portfolios of electric and gas efficiency for residential, low-income, commercial and industrial sectors offered by the large IOUs. The SEO developed its ARRA programs with input from utilities and the commission in order to complement and support the nascent utility programs in achieving savings targets. The SEO explicitly intended to make sure both sets of incentives worked synergistically to increase customer awareness about the new utility incentive programs.

Two markets served by complementary ARRA incentives and existing utility customer incentives are the residential appliance market and the commercial/industrial sector, where state

buildings that receive ARRA grants for efficiency projects are also eligible for custom and prescriptive commercial/industrial (C/I) rebates offered by the IOUs. The BetterBuildings for Michigan initiative will combine financial incentives from various entities including the SEO, public agencies (e.g., Weatherization), local governments, financing partners and the two largest IOUs in the state, so explicit coordination is required.

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($72.9 million) that will be expended over three years equal 80% of the 2010 budget ($90.8 million) for utility customer-funded energy efficiency programs (see **Figure 13** and **Figure 14**).

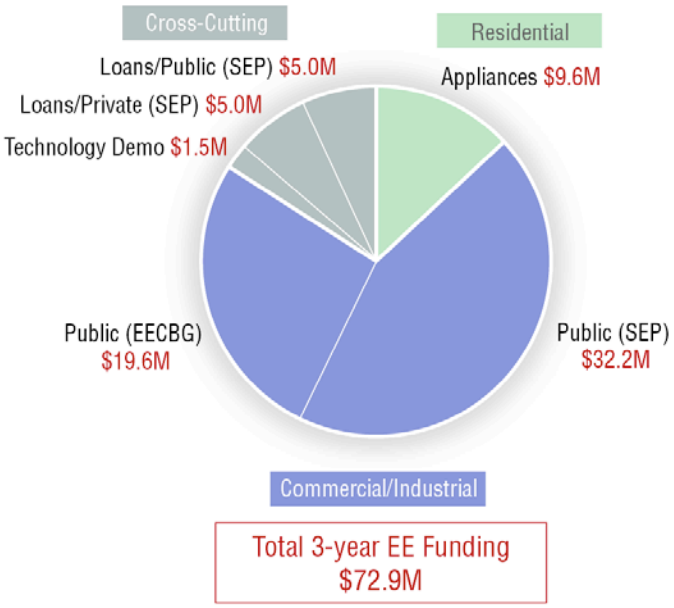

Figure 13. Michigan EE program funds in selected ARRA programs by program type and market sector*

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. “EE program funds” do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

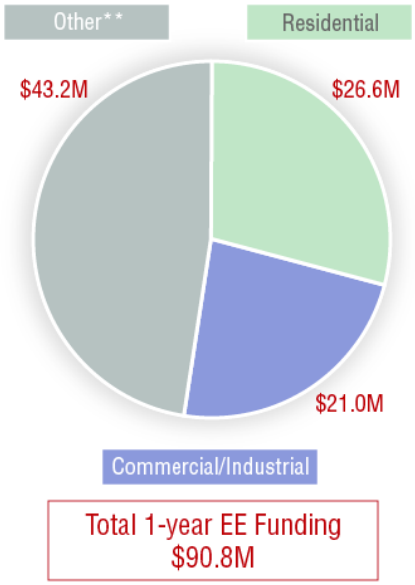

Figure 14. Michigan 2010 utility customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, e.g. administration, planning, codes, R&D, education and training, agriculture; can also include program budgets and EM&V not allocable by sector.

3.1 Program Design and Implementation Impact

ARRA rebates may set expectations that utility customer-funded programs cannot sustain

Two representatives from IOUs expressed some concern that the high level of ARRA rebates may set consumer expectations that are not achievable by utilities. For example, the ARRA program is funding refrigerator rebates, but utilities may not be able to sustain these programs (in part due to cost effectiveness tests that their programs must meet).

3.2 Impacts on Program Design

ARRA Appliance Rebate funds used to complement utility customer-funded programs

The SEO directed 1/3 of its SEEARP funds (~$3.2 million) largely toward equipment fueled by propane and fuel oil (e.g., $500 for high-efficiency propane or oil furnaces and water heaters) and solar hot water heaters (up to 25% of cost) which were not being funded under the existing electric and gas EE programs. The SEEARP rebates also included $300 rebates for high efficiency natural gas water heaters, which overlaps with gas water heater rebates of $35-$150 offered by several of Michigan's IOUs.

Modest levels of ARRA SEEARP funds used to complement and supplement utility customer-funded "white goods" rebates

The SEO used the remaining 2/3 of its SEEARP funds to provide modest levels of rebates for three different appliances ($25 for ENERGY STAR dishwashers or $50 for higher CEE tier 3

efficiency; $50 for ENERGY STAR refrigerators or $100 for tier 3; and $50 for ENERGY STAR clothes washers). Thus far there is minimal overlap with utility programs, which offer a $50 rebate for ENERGY STAR clothes washers. The SEO reports achieving their desired slow and steady uptake of the appliance rebate program whose deliberate pace has allowed awareness of both the ARRA and new utility rebates to spread and grow for several months before exhaustion of the ARRA funds.

ARRA programs extend exhausted utility funds

DTE Energy (DTE) expects funding of its popular HVAC program to be exhausted by fall 2010. The SEO is using SEEARP funding to focus on propane customers, to complement electric utility programs. Once the utility program funding is exhausted, DTE will work with the state to help them fund incremental natural gas and propane, by linking the utility's trade allies with the SEO to help promote the products that qualify for the rebates.

Utility provides technical assistance to local ARRA grantees to support its EERS targets

In communities that won LED Demonstration grants and where DTE owns the street lighting system, DTE will garner significant savings from LED upgrades to be counted toward its mandated targets. DTE Energy proactively assisted local communities in its territory develop strong grant applications for the LED Demonstration EECBG program. DTE developed a core grant proposal template, which was distributed to communities that they could customize for their specific proposals.

ARRA funds were used to launch a targeted residential retrofit pilot (BetterBuildings for Michigan) which may inform the future design of utility programs

DTE expects to gain knowledge about effective levels and mix of incentives through the Better Buildings for Michigan program in order to better tailor programs in the future for its customers and their housing stock.

ARRA program leverages utility knowledge about its customers

Each of the two utilities' roles in BetterBuildings for Michigan will include applying knowledge about their customers to recommend which neighborhoods will be most effective to target. In addition, DTE is conducting a preliminary outreach program, which comprises quick walkthrough/consultations, direct install of "low hanging" measures (e.g., CFLs, thermostats) and giving residents ideas about what they can do to save energy. This outreach has two key purposes: 1) identify neighborhoods that may have the best potential for the program, and 2) learn more about finding the right mix of direct install measures to garner the most (deemed) savings.

3.3 Policy Issues

Attribution

Utility representatives report that attribution agreements for projects funded by both ARRA and utility customer dollars (e.g., appliance rebates) have not been negotiated or agreed to as of September 2010. Utilities assume that in cases where rebates may be combined for the same measure (e.g., clothes washers) the utility will take credit for all the savings for that appliance.

A representative of the utilities commission indicated that utility programs are required to be evaluated in a way that approximates attributable savings, but not necessarily tied to the apportionment of the funding sources. However, many details about savings evaluation (including whether the utility energy efficiency programs will ultimately rely on measuring net or gross savings) have not yet been agreed to or finalized.

4. Lasting Impacts

ARRA funds used to diversify state's existing manufacturing base into clean energy industry provide multiple benefits.

The Clean Energy Advanced Manufacturing (CEAM) program provides combination grant and loan packages to small and medium businesses (500 or fewer employees) that are well-positioned to diversify their operations into high-growth clean energy industries, but are unable to obtain financing in the current tight credit market. The SEO has announced awards of the full $30.5 million in grants and loans to nineteen Michigan companies for manufacture of a wide range of clean energy technology and components (e.g., wind towers, wind turbine blades, solar combiner boxes, surface finishing technology which reduces wear on metal parts, PCB-free LED lighting panels, efficient commercial window framing, PV solar shingles). The SEO also indicated that some CEAM awardees have begun to form complementary partnerships, an unintended benefit of the program.

ARRA programs require public facility grantees to submit maintenance plans and augment grant programs with training to insure optimal energy savings

After the SEO's first round of grants to public buildings, the SEO SEP program staff made on-site inspections and discovered that many buildings were not being properly maintained. Thereafter the SEO required state facility applicants to include preventative maintenance plans in grant applications for EE retrofit projects. A portion of SEP funds for energy efficiency in state buildings will be directed into state agency workshops and training, in collaboration associations (e.g., building trades, boiler operators) to support the preventative maintenance plans and optimize energy savings.

ARRA programs boost potentially long-running financing program.

As it expands under BetterBuildings for Michigan, Michigan Saves staff is working to cultivate a secondary market, including developing a new loan product that meets certain conforming

product specifications (e.g., interest rate, credit score), in order to keep the loan program viable beyond the ARRA performance period.

ARRA funds effectively act as utility bill arrears prevention program

An IOU representative reports a high level of uncollectable accounts in its territory. By coordinating with ARRA programs and targeting efforts to promote its own rebates in conjunction with ARRA rebates to high-use customers who are technically above the low income-qualified level but still struggling financially, the utility expects customer energy bills to be reduced significantly, to a threshold where customers can afford to pay, thus potentially reducing the number of accounts in arrears.

Interviewees:
Amy Butler, Bureau Director, Bureau of Energy Systems, Michigan Department of Energy, Labor and Economic Growth (DELEG)
Robert Jackson, Green Practices, Bureau of Energy Systems, DELEG
Jan Patrick, Conservation Section Manager, DELEG
John Sarver, Consumer Education Programs Manager, DELEG
Greg White, Commissioner, Michigan Public Service Commission
Emmett Romain, Manager of Energy Optimization, DTE Energy
Teri Van Sumeren, Manager of energy Efficiency Solutions, CMS Energy

Minnesota

Highlights of Interaction between ARRA and Utility Customer Programs:

- The State Energy Office (SEO) resides in the Minnesota Office of Energy Security. In 2009 it created a broad slate of ARRA programs in response to a legislative directive. Many of the programs serve the same markets as the robust set of existing utility energy efficiency programs. Some of the SEO's programs were specifically designed to combine ARRA-funded financial incentives with utility program funds to help the utilities meet aggressive energy savings goals. Over 60% of SEP funds are directed toward energy efficiency across sectors, 20% target public building retrofits, and 19% of SEP funds are going to various local and statewide residential retrofit programs.

- The SEO, which also approves utility customer-funded energy efficiency programs and savings claims, known as the Conservation Improvement Program (CIP), reports that utilities are struggling to get savings from industrial customers. The industrial sector accounts for 50%-75% of savings in some utilities' portfolios. In 2009 the SEO approved new plans from Xcel Energy and CenterPoint Energy which targeted higher rebate levels for most of their portfolio, to help increase participation levels. To further support garnering industrial energy savings, the SEO directed over 20% of its SEP ARRA funding to industrial energy efficiency programs.

- In regard to attribution of savings, the SEO indicated that it is considering taking a case-by-case approach (i.e., there are cases in which apportionment/divided attribution makes sense and cases in which it does not). In many instances where both ARRA and utility rebates are combined, the SEO is allowing the utility to count all of the energy savings of the measure or project. A methodology has not been determined and much of the work in regard to attribution will occur after program results come in.

- The SEP program's inclusion of a significant amount of funding for renewables was driven by the legislature's interest in leveraging solar's high public profile and a desire to boost economic development and market transformation to support the state's nascent solar manufacturing industry.

- The SEO worked with some utilities to accelerate planned refrigerator and freezer recycling programs to coincide with ARRA.

1. Landscape of Utility Customer Programs

Over 175 electric and gas companies operate in Minnesota. The five electric IOUs and 6 gas IOUs are regulated by the Minnesota Public Utilities Commission (utilities commission) and serve almost 60% of the state's customers. The 50 rural electric cooperatives serve almost 30% of the state's electric customers. Minnesota has a long record of energy efficiency; robust programs (all under the moniker of CIP) have been offered by both investor-owned and publicly owned utilities for well over twenty-five years. The Minnesota Office of Energy Security is the state energy office (SEO) and also the agency that analyzes utility program energy savings

attribution and performance and allows or denies utility savings claims. Once utility results have been reviewed, they are submitted to the utilities commission for approval on cost recovery and any associated shareholder performance incentive.

In 2007, the Minnesota legislature passed the Next Generation Energy Act (the "Act"). Among its provisions, the Act sets energy-saving goals for all utilities of 1.5% of retail sales in 2010 and each subsequent year. For many rural cooperatives and small munis, the 1.5% per year savings goal will be a significant increase from previous years' savings achievements. The commission has developed criteria and standards for decoupling pilot projects and recently ordered all utilities to file non-binding notices of intent to file decoupling pilot plans by June 1, 2010. All pilot proposals are due by December 30, 2011 (see **Table 22**).

Table 22. Minnesota: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	5 electric IOUs, 6 natural gas IOUs, 126 distribution electric municipal utilities, 31 distribution gas utilities, 50 rural electric cooperatives, and 6 municipal power agencies which provide the municipal utilities with electric generation and transmission services.
EERS status	1.5% of retail sales annually for all utilities including co-ops, starting in 2010.
Utility customer funding history	25+ years of robust utility customer-funded efficiency programs. EERS legislation enacted in 2007; effective in 2010.
Utility customer-funded budget for EE	2010 electric and gas EE budget (including low-income): $130.2 million: $24.5 per capita. 2009 electric EE program spending as a % of electric utility sales revenue: 1.48%.
Regulatory and Business Model	**EE Program Administrator:** Utilities **Funding:** 2007 EERS legislation set percentage of Retail Sales Goals for each utility; varies by utility **Utility Incentives Structure**: New voluntary "shared savings" model adopted in 2010. Percentage of net benefits returned on investment is set individually for each utility; measured by Utility Cost effectiveness Test. **Decoupling:** Utilities filed intent to file decoupling pilot plans (June 2010).
Utility customer program objectives	EE as a resource. Achieve EERS through direct (e.g., EE programs, rate designs) and indirect (e.g., codes, appliance standards) methods.
SEO energy activity background	Office of Energy Security, Minnesota Department of Commerce analyzes and approves utility energy efficiency savings results and cost recovery claims in addition to administering the state's SEP, EECBG and Appliance Rebates ARRA programs.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. Minnesota: Selected ARRA Energy Programs

The state of Minnesota has been awarded over $97.6 million for selected ARRA programs, of which $69.8 million (~71%) is administered directly by the Minnesota Department of Commerce Office of Energy Security, the state energy office (SEO). About $27.8 million of Minnesota's selected ARRA program funding is administered directly by 39 cities, counties and tribes through the EECBG program.

Of the funds administered directly by the Minnesota SEO, about $54.2 million (~78%) goes to the State Energy Program, $10.6 million (~15%) is EECBG formula grant monies and $5 million (~7%) is allocated to the State Energy Efficient Appliance Rebate Program (see **Table 23**).

Table 23. Minnesota: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program (SEP) Formula Grant - program $ administered by state	$54.17	Broad array of programs: about 2/3 of funds to EE across sectors; 1/3 to RE and training, outreach, economic development
EECBG Formula Grant - program $ administered by state	$ 10.64	
EECBG Formula Grant - program $ administered directly by 39 cities, counties and tribes.	$ 27.84	Non pass-through funds supplement two SEP programs
EECBG Competitive Grants ("BetterBuildings") - program $ administered by grant awardees, e.g., states, cities, community partnerships	$ 0	
State Energy Efficient Appliance Rebate Program - program $ administered by state	$ 5.01	Rebate levels set much higher than typical utility levels to encourage trading up to most efficient appliances possible; tied into refrigerator recycling rebates offered by other entities
Total	**$ 97.66**	

The SEO created 20 programs and sub-programs for its 2009 State Energy Program (SEP) formula grants, focusing over 61% of its SEP funding on energy efficiency across all sectors. About 22% of SEP funds targeted renewable energy projects across sectors and about 16% of funds were allocated to cross-cutting programs (e.g., workforce development, public outreach, clean tech sector development).

The programs required passage of authorizing legislation as defined in chapter 138 of Minnesota session law, and were developed through a lengthy public process, which balanced input from numerous committees with the key goal of the state legislature to reach every sector with both energy efficiency and renewable energy activities. The SEP program's significant funding for solar and other renewables was driven by the legislature's interest in leveraging solar's high public profile and a desire to support the state's nascent solar manufacturing industry.

Since submitting the initial SEP application, the SEO has shifted some funding which was originally slated for public buildings to commercial/industrial projects, including increasing the Emerging Renewable Energy Industries Grants by $2 million, because the economically-challenged public sector in Minnesota provided a lower than expected response to grants that offered to offset 50% or even 75% of project costs (see **Table 24**).

Table 24. Minnesota: Summary of Selected ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Public Buildings Energy Efficiency Program	$11.74	Grants for retrofits in existing public buildings: $6.822 M to state buildings; $4.915M to local governments and schools.
Project Reenergize	$3	In coordination with Builders Association of MN, targets deep residential retrofits with envelope and heating rebates of up to $4,000 to homes under 3,000 ft^2. Rebates were fully committed by March 2010. Results: Average project cost $13,700. For every $1 in rebates, customers spent $5 on EE and other upgrades.
Energy Savers Rebate	$5.7	Residential rebates and loans to households with income <$93,000. Loan fund supplements existing MN Housing Finance Agency (MHFA) loan products. Work must be financed through MFHA lending network. As of March 19, 2010, rebate funds were fully reserved.
Duluth EE Program	$1.5	Grant to City of Duluth to implement local residential weatherization program.
Small City EE Demonstration Program	$0.1	Grant to City of Park Rapids for residential EE demonstration project.
Saint Paul Port Authority Trillion Btu Program	$5	Commercial/industrial energy efficiency revolving loan program administered by St. Paul Port Authority in coordination with Xcel Energy.
Commercial & Industrial - Energy Efficiency Grants	$6.2	Grants for energy C/I efficiency projects.
Renewable Energy Programs		
School/Local Government Renewable Grants	$4.3	Grants to schools and local units of government for small scale solar, wind, ground-source heat pumps and combined heat and power installations.
Solar Cities	$2.85	Grants to develop solar initiatives to two cities selected as US DOE “Solar Cities.” $1.5M to City of St. Paul; $1.35M to City of Minneapolis. Projects will leverage Xcel Energy’s long-running utility customer-funded Renewable Development Fund.
Residential and Small Business Renewable Energy Rebates	$4.81	Rebates to homeowners and businesses up to 20 full-time employees. $2.9M for solar rebates, $1.46M for ground source heat pumps, $450,000 for small wind rebates.
Industrial – Large Renewables Feasibility Grant	$0.15	One or more grants to determine the technical and economic feasibility of implementation of large-scale renewable energy project(s).
Emerging Renewable Energy Industries Grants	$4.18	Economic development grants to new or existing manufacturers of renewable energy, energy storage and/or ground-source heat pump systems.
Cross-cutting and Other Programs		
Information and Outreach (cross-cutting)	$1.3	Conduct outreach services through the SEO Energy Information Center and provide grants for the broadcast of energy information through a variety of strategies. Sub-programs: General ($575K),

			Residential ($250K), Technology Transfer ($475K).
	Training and Data (cross-cutting)	$2.33	Funds training programs for energy professionals (e.g., auditors, energy managers, contractors, building operators, architects, engineers, building inspectors. Also funds data systems for energy savings reporting and tracking purposes.
	Conservation Improvement Program Utility Coordination	$0.1	Provides staff to coordinate with utilities to optimize leveraging of non-ARRA funds.
	Program Administration	$0.91	
	Total	**$54.17**	

Source: DOE (2009), interviews.

Minnesota is directing its non pass-through EECBG funds to local government energy efficiency projects, providing up to 100% of project costs.

3. Interactions between Utility Customer-funded Programs and Selected ARRA-funded Programs

The landscape of utility customer-funded energy efficiency programs in Minnesota is complex. Both the IOUs and publicly-owned utilities offer dozens of electric and gas energy efficiency programs across all sectors, many of which potentially overlap with the state's SEP residential rebate programs and grant projects for buildings in the public and commercial/industrial sectors. Xcel Energy also launched its new "Solar Rewards" program in 2010, which also has the potential to interact with the state's ARRA-funded solar programs.

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($51.3 million) that will be expended over three years equal 42% of the 2010 budget ($122.9 million) for utility customer-funded energy efficiency programs (see **Figure 15** and **Figure 16**).

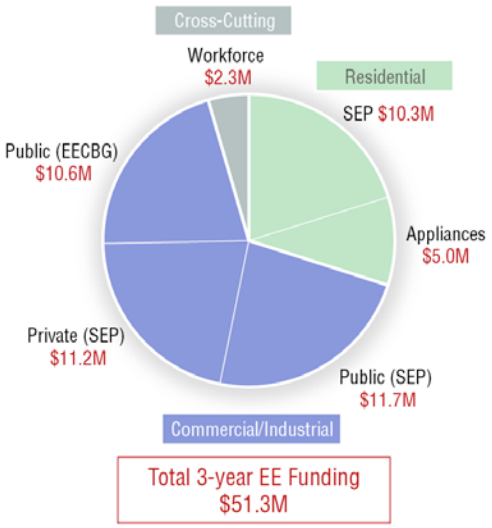

Figure 15. Minnesota EE program funds in selected ARRA programs by program type and market sector*

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. “EE program funds” do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

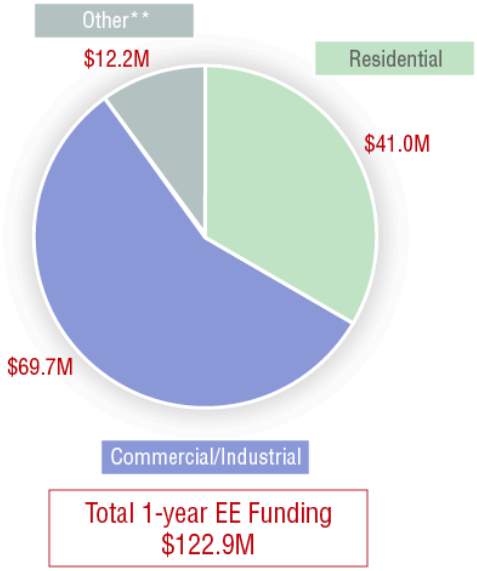

Figure 16. Minnesota 2010 utility customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, e.g. administration, planning, codes, R&D, education and training, agriculture; can also include program budgets and EM&V not allocable by sector.

3.1 Program Planning Impact

ARRA programs designed to help utilities achieve energy savings targets.

Some ARRA programs, particularly in the residential sector, were designed to be combined with utility programs to help the utilities meet aggressive energy savings goals. Where customers combined incentives in the residential programs, the SEO will allow utilities to claim all savings achieved by those measures or projects.

ARRA funds nudged faster development of utility appliance recycling programs

The SEO worked with utilities to accelerate planned refrigerator and freezer recycling programs to coincide with ARRA.

Newly increased incentives for utility customer-funded programs were retained

The SEO approved and retained higher incentive levels for utility customer-funded energy efficiency targeted at industrial facilities despite the infusion of ARRA funds, which they viewed as short-lived.

3.2 Program Design and Implementation Impact

ARRA-funded appliance rebate program designed to complement utility appliance efficiency program resulted in increased uptake in the utility program

The SEO offered a split rebate on refrigerators and freezers: consumers received 50% of the rebate amount to offset purchase of a new appliance, and 50% of the rebate for recycling the old appliance, which could be done through utilities, solid waste recyclers or retailers. Through the program marketing, the SEO encouraged customers to piggy back its appliance incentives with utility incentives. This synergy appears to have worked as intended. A representative of Xcel Energy reports a significant increase in uptake on its refrigerator recycling program as a result, which helped the utility meet its goals for that program faster. A representative of Great River Energy, which provides wholesale electric service and energy efficiency programs to 28 electric co-ops, reports that appliance rebates were 11% greater in 2010 than in 2009, presumably buoyed by ARRA rebates.

ARRA application process and reporting requirements may have deterred businesses from applying for funding

Small- to mid-sized businesses often use consultants to help them develop energy efficiency projects and garner project funding from various sources. A representative of Minnesota Power reports that a number of such consultants stated they are avoiding stimulus grant applications so they are not in a situation in which a client spends a lot of money for an unsuccessful grant application. The utility's small- and medium-sized business customers generally do not have resources for a costly competitive bid process and/or time consuming reporting requirements.

3.3 Policy Issues

Attribution

The SEO, which approves the utilities' cost effectiveness and savings claims, reports they see cases in which apportionment/divided attribution makes sense and cases in which it doesn't. As of September 2010, the SEO had not yet decided on an attribution methodology and will fully address the topic after program results come in. A representative of the SEO indicated that they will be unlikely to reduce savings reported by utilities due to ARRA impacts. If that were to happen, they would need to also consider reducing utility claimed savings that which may have been driven by tax credits.

For the ARRA residential rebate programs, in cases where a utility rebate is leveraged, the SEO allows the utility to count all of the savings for the measure they rebatesd. A representative from Great River Energy, which serves 28 electric co-ops, says the co-ops will claim all savings for any projects that combines incentives, for both commercial/industrial and residential programs.

4. Lasting Impacts

ARRA funds contribute to clean tech sector development and reinvigoration of manufacturing base

The SEP Emerging Renewable Energy Industries Grants program is intended to support long-term growth of Minnesota's emerging clean tech manufacturing base by providing direct funding to new and existing Minnesota-based manufacturers of renewable energy, energy storage and/or ground-source heat pump systems.

ARRA funds enlist Port Authority to administer new commercial/industrial energy efficiency revolving loan program in collaboration with utility

The SEO provided $5 million in SEP funds to the Saint Paul Port Authority to create a revolving loan fund for financing energy efficiency in commercial and industrial businesses. The Trillion BTU Program also incorporates funds and collaboration from Xcel Energy and local economic development agencies, among other partners. The program provides businesses with energy audits fully paid for by Xcel (utility customer energy efficiency program funds). Facilities then undergo engineering studies; the business pays 25% of engineering costs and Xcel covers the other 75%. 100% of the identified energy improvements are then financed by the Port Authority revolving loan fund and by rebates from Xcel. The loans are essentially repaid out of savings; payments are structured to be less than the expected energy savings, thus the projects can provide an immediate positive cash flow without the business using any of its own capital.

The program is making steady progress toward building a diverse portfolio of projects (e.g., foundries, hospitals, large office towers), which is expected to reach approximately $11 million in projects ($5 million in loans leveraged by matching loan participation by local agencies, and by utility rebates).

Interviewees:
Jeremy DeFiebre, SEP/EECBG Program Supervisor, Minnesota Office of Energy Security (OES)
Jeffrey Haase, Demand Efficiency Program Supervisor, OES
Janet Streff, Manager, State Energy Office, OES
Michelle Gransee-Bowman, Training Coordinator, OES
Pete Klein, St. Paul Port Authority
Tina Koecher, Minnesota Power
Bridget McLaughlin, Xcel Energy
Tom Sagstetter, Great River Energy

New York

Highlights of Interaction between ARRA and Utility Customer Funded Programs:

- New York is a study in contrasts: separation of most ARRA- and utility customer-funded efficiency programs, yet integration with at least one utility and other parties on residential and commercial retrofits.

- New York's SEO and third party administrator, NYSERDA, used several of the governor's policy planks on energy efficiency as starting points in program planning and design.

- NYSERDA took utility customer programs into account and divided its ARRA offerings among traditional programs, large-scale re-granting, and ventures into new or experimental territory, such as transportation efficiency and on-bill financing.

- NYSERDA is a large, capable organization that combines the roles of SEO and third party administrator. With the exception of the BetterBuildings competitive EECBG grant, the agency did not engage in formal coordination with external parties because of concern over customer confusion and uncertainty over an open regulatory proceeding on utility-administered efficiency programs.

1. Landscape of Utility Customer-funded Programs

New York is a mature model for third party administration of efficiency programs, with the recent addition of utility administration of programs in their own territories. Utility customer support for energy efficiency in New York began in the 1980s.Those programs were consolidated with restructuring in the late 1990s. A state-created energy research corporation, the New York State Energy Research and Development Authority (NYSERDA), was named third party administrator of energy efficiency programs serving most of the states in 1998. In 2008, Consolidated Edison obtained approval from the New York Public Services Commission to offer its own efficiency programs. In 2009, after state adoption of aggressive energy efficiency resource standards, the PSC allowed all major utilities to offer a full suite of efficiency programs. The state's major gas and electric utilities and NYSERDA formed the Energy Efficiency Program Administrators Collaborative (EEPAC), which has served primarily as an information exchange and only recently as a collaborative venue for New York's many program administrators (see **Table 25**).

Table 25. New York: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	Six large electricity IOUs, some also selling natural gas; two gas-only utilities; two large public utilities, the New York Power Authority and the Long Island Power Authority, which is a large municipal utility, and about 50 other municipal utilities and cooperatives. The New York State Energy Research and Development Authority operates statewide energy efficiency programs as a third party administrator. The two power authorities

	and all large state-regulated utilities also administer their own efficiency programs. All are funded by a system benefits change.
EERS status	In 2007, the NY Public Services Commission began design of an electric and natural gas Energy Efficiency Portfolio Standard (EEPS), with EE targets similar to the state's RPS. A 2008 PSC order sets a target of 15% reduction from projected consumption in 2015.
Utility customer funding history	In 1996, the New York PSC established a system benefits charge (SBC), set funding levels in 1998 and entered into an agreement with NYSERDA to be the third party program administrator. The SBC is earmarked for demand-side management, energy-related R&D and low income energy-assistance programs. In 2008, the utilities commission ordered utilities to increase the PBC for support of their own programs and "fast-tracked" NYSERDA programs.
Utility customer-funded budget for EE	2010 gas and electric budget (including low income programs): $671.2 million; $34.60 per capita. 2009 electric EE program spending as a % of electric utility sales revenue: 1.74%
Regulatory and Business Model	State law requires investment in all cost effective energy efficiency. Cost effectiveness is established by screening portfolios and individual measures then applying a Total Resource Cost test. **EE Program Administrator**: NYSERDA, a state-created public benefits corporation, started running programs funded by utility customers in 1998. The NYPA and LIPA run their own PBC efficiency programs and coordinate "where practicable" with NYSERDA. As part of an EEPS proceeding in 2008, the NY PSC ordered IOUs to propose their own energy efficiency programs, so that IOU and NYSERDA programs now co-exist in the same utility territories as complements. **Cost recovery:** Revenue requirements are set in rate cases and trued up annually. **Utility/third party performance structure:** IOU rewards for meeting the goal of 15% demand reduction from 2015 BAU are set at $26.9 million, divided by each utility's share of the goal. NYSERDA goal is set separately. **EM&V:** Handled by independent evaluators using net savings. **Decoupling:** Utilities commission opened a decoupling proceeding in 2003 and while the commission never has issued a final order, it has encouraged utilities to file, and has approved, decoupling mechanisms.
Utility customer program objectives	
SEO energy activity background	NYSERDA serves multiple roles – state energy office, third party energy efficiency administrator, energy R&D contractor, etc.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. New York: Selected ARRA Energy Programs

New York was awarded nearly $360 million for selected ARRA efficiency programs. More than 67% is administered by NYSERDA; the remaining $115.6 million administered directly by larger cities, counties and tribes. Of the funds administered directly by NYSERDA, about 34% is for the State Energy Program, about 19.5% is for EECBG, about 5.2% is allocated from the State

Energy Efficient Appliance Rebate Program (SEEARP), and less than 1% is for energy-assurance planning (see **Table 26**).

Table 26. New York: Summary of selected ARRA-funded programs

Program	Amount (millions)	Strategy
State Energy Program Formula Grant - program $ administered by NYSERDA	$123.1	• Municipal, universities/colleges, schools, hospitals and not-for-profit Clean fleets program for conversions to low-GHG, non-petroleum fuels
EECBG Formula Grant - program $ administered by NYSERDA	$30	• About 80% sub granted to small cities and towns for a variety of energy efficiency and DG activities. Most earmarked for equipment and lighting upgrades or street-lighting improvements • Remaining 20% added to the SEP allocation for developing and implementing more stringent building energy codes and training local inspectors in enforcement
EECBG Formula Grant - program $ administered directly by large cities and counties.	$145.6	• Retrofits of homes, businesses, local government buildings and more efficient street lighting
EECBG Competitive Grants (BetterBuildings) - program $ administered by grant awardees, e.g., cities, community partnerships	$40	• State's original plans for funding PACE programs hampered by federal action • NYSERDA joining with New York City, multiple towns on Long Island and in Westchester County and the utility National Grid in a large, statewide residential retrofit program; • Funding shared between a state BetterBuildings grant, a $80.8 NYC EECBG grant, RGGI funding of $112 million for Green Jobs-Green New York program. Goals for GJGNY over the next three years include more than 100,000 energy audits and 55,000 jobs completed in residential and commercial buildings
State Energy Efficient Appliance Rebate Program - program $ administered by NYSERDA	$ 18.7	• Generous rebates on multiple ENERGY STAR appliances • Funds expended in about three months
State and Local Energy Assurance	$2	• For enhancing state, local coordination in energy emergencies and drawing up "energy assurance" plans
Total	**$359.4**	

NYSERDA carefully considered utility customer-funded efficiency programs in planning and designing its Recovery Act-funded programs though the agency but did not engage utilities during the planning phase. The New York governor's office solicited ideas statewide on using the ARRA funds and, based on thousands of replies decided to target the MUSH market – Municipalities, Universities/Colleges, Schools and Hospitals – and not-for-profits, including

churches, for efficiency and renewable energy improvements. All but one NYSERDA program funded by Recovery Act SEP dollars are aimed predominantly at this market.

NYSERDA put the largest share of its SEP money into sub-grants to this market, covering as much as 100% of project costs for everything from HVAC or boiler replacements to more comprehensive retrofits to rooftop PV installations. Grant awards were prioritized by geography, job creation and the resources of the recipients. Priority also was given to the most cost effective efficiency measures based on DOE guidance – at least 10 million source Btus saved annually for every $1,000. Grantees were encouraged to combine the Recovery Act money with other sources of funding but could not combine the grants with utility customer-funded rebates.

NYSERDA also ventured into non-traditional territory: transportation through alternative-fuel vehicles and fueling infrastructure. Plans call for hospitals, not-for-profits and other institutional-sector entities to compete for funding to cover up to 75% of the incremental cost of leasing, converting or purchasing vehicles, charging stations or refueling stations. The agency has committed to weaning at least eight fleets of all weights off petroleum-based fuels.

Following on Gov. David Patterson's promise to make New York commercial and residential codes among the nation's most stringent and aggressively enforced, NYSERDA and the New York Department of State are working on promulgation and implementation of the new codes and training for thousands of local inspectors who enforce the code in cities and counties.

The authority's renewable grant program has several components, including encouraging PV contractors to compete to provide installations at the lowest cost through a reverse auction. Program managers say the result has been a nearly $1 per watt drop in installed costs (see **Table 27**).

Table 27. New York: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Energy Efficiency Program for Municipalities, Schools, Hospitals, Public Colleges and Universities, and Non-Profits	$82.6	• Sub-grants for energy efficiency or renewable-energy improvements
Renewable Energy Programs		
Renewable Energy Program	$31	• NYSERDA and LIPA to arrange power purchase agreements and share interconnection costs for large, multi-MW PV in load pockets • Solicit bids for capacity-based incentives for blocks of small- and mid-sized PV installations • Cost sharing on all RPS-eligible technologies with local governments, hospitals, public-education entities, not-for-profits
Cross-cutting and other programs		
New York Energy Codes	$4.8	• For implementing a new, more stringent Energy Conservation and Construction Code • NYSERDA and NY Department of State to work with building industry and code officials in

			1,600 local governments toward at least 90% compliance • Other funding for working with local code officials comes from EECBG funds
	Clean Fleet Program	$4.6	• Aimed at local governments, public educational entities, hospitals and not-for-profits • Technical assistance and cost share on leases or purchases of non-petroleum vehicles and recharging or refueling stations
	Total	**$123**	

Source: DOE (2009), interviews.

3. Interactions between Utility Customer-funded and ARRA-funded Programs

New York presents a study in contrasts – total separation of ARRA and utility customer funds in all SEP-funded programs, but innovative combinations of ARRA-funded financing with BetterBuildings retrofit programs also supported by EECBG, regional cap-and-trade allowance revenue, and utility rebates.

During the rollout of the NYSERDA's ARRA "Great Appliance Swap-Out", staffers say they reached out on several occasions to utilities and other stakeholders to discuss the pending program. In particular, NYSERDA staffers say they met with the Long Island Power Authority (LIPA) and the New York Power Authority (NYPA), the state's two largest public power entities, to discuss the State Energy Efficient Appliance Rebate Program (SEEARP) and possible conflicts with existing programs. NYSERDA also presented an overview of the SEEARP program and its plans to municipal utilities and cooperatives. Later conference calls offered more information and updates on program progress. Utility representatives recall less consultation and opportunity for joint programs.

Regardless, NYSERDA separated its ARRA appliance and equipment rebating from its own utility customer-funded rebates and other incentives. The decision was driven by concerns over customer confusion and difficult or ambiguous attribution. Consumers were compelled to choose between NYSERDA's ARRA-funded rebates and utility customer-funded rebates or other incentives offered. The decision to keep utility customer- and Recovery Act-funded programs separate was driven partly by the desire for speed and autonomy. NYSERDA staff saw value in having a single organization in charge of design and implementation, rather than allowing veto power to other entities. The separation of the funding streams was also driven by uncertainty over the outcome of an open regulatory proceeding regarding the role of utilities in administering their own efficiency programs.

Nonetheless, partnerships between NYSERDA and various municipality programs represent some of the more tightly coordinated uses of multiple funding sources seen nationally. NYSERDA spread a $40 million EECBG BetterBuildings grant among several projects in which the money was combined with CO_2 allowance revenue from the Regional Greenhouse Gas Initiative, the Northeast's cap-and-trade program, and in one experimental case also with utility customer-funded utility rebates.

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($136.1 million) that will be expended over three years equal 22% of the 2010 budget ($620.8 million) for utility customer-funded energy efficiency programs (see **Figure 17**and **Figure 18**).

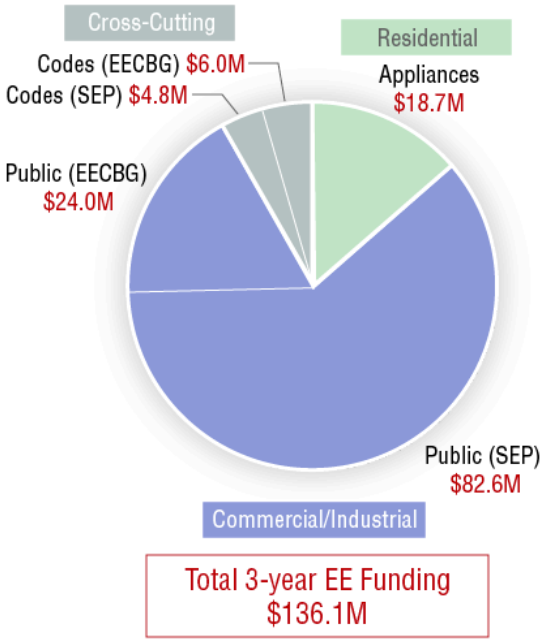

Figure 17. New York EE program funds in selected ARRA programs by program type and market sector

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. “EE program funds” do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

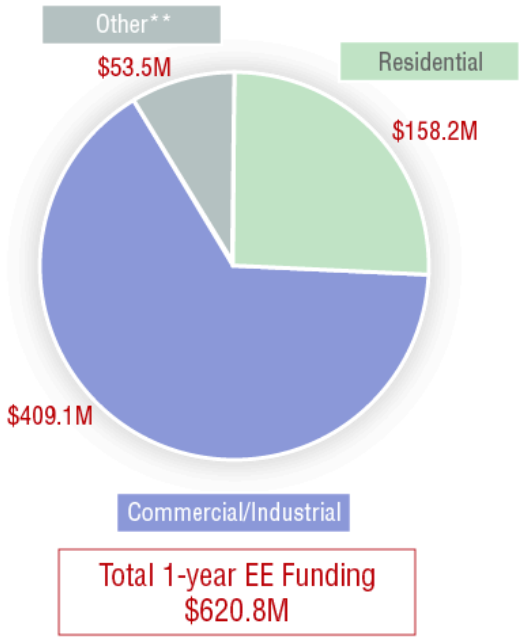

Figure 18. New York 2010 utility customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, (e.g. administration, planning, codes, R&D, education and training, agriculture); can also include program budgets and EM&V not allocable by sector.

3.1 Program Planning Impact

In designing ARRA-funded programs, NYSERDA was influenced by the state's and governor's energy efficiency policy objectives and priorities, an informal survey of constituents, and a desire for experimentation with new program models. NYSERDA originally steered clear of investing ARRA funds in residential programs, according to staff, because DOE guidance on statutory requirements was still in flux. Thousands of ideas for using the ARRA funds flowed into Albany, and the governor's office already was making a push for improved energy efficiency in schools and public buildings. With pressing deadlines, NYSERDA issued program opportunity notices for re-granting both SEP and EECBG funds and ushered hundreds of grants to MUSH and not-for-profit entities.

Original plans under the BetterBuildings award for grants to localities for setting up PACE programs had to be revised after federal mortgage regulators raised concerns about PACE. NYSERDA rapidly reprogrammed the money into financing for residential and commercial retrofit programs with New York City and regional coalitions with multiple sources of funding, including utility customer funds for energy efficiency.

3.2 Program Design and Implementation Impact

State fields ARRA-funded rebates and moves appliances quickly

To avoid confusion over attribution of utility customer- and ARRA-funded appliance rebates, NYSERDA limited consumers to ARRA rebates alone. This arrangement required tracking of processed rebates by both NYSERDA and a utility as insurance against consumer double dipping. At least one utility advised consumers that they needed to make a choice – either take NYSERDA's ARRA-funded grants and rebates or take the offerings of utility-administered programs.

BetterBuildings-funded programs reprogrammed on the fly as PACE collapses

When PACE financing was threatened, NYSERDA officials quickly refocused its efforts around establishing a revolving loan fund to originate unsecured residential and small commercial loans. Joining with New York City in commercial retrofits and with several coalitions of towns in residential retrofits presented NYSERDA with the skeleton of a statewide retrofit program and a chance to explore innovative financing mechanisms that were an unlikely fit for utility administered efficiency programs funded by customer charges. This statewide retrofit program is the vehicle for Green Jobs-Green New York (GJGNY), a legislative mandate for aggressive building retrofits statewide. NYSERDA is the lead agency for designing and implementing GJGNY, and the program is designed to capitalize on NYSERDA's successful Home Performance with ENERGY STAR (HPwES) program.

Launched in November 2010, GJGNY provides free and low-cost energy assessments, building energy upgrades, low-cost financing and workforce training. NYSERDA also is planning to offer grants to municipalities that those municipalities can use to establish their own revolving loan fund or return to NYSERDA for reformulation into a revolving loan fund for unsecured financing. The residential loans adopt certain PACE-like features, with long repayment terms (up to 15 years) and low interest rates (3.99%), with participating consumers able to drop interest by 50 basis points if they agree to automatic payment by bank account. The low-interest rate is made available through the use of the state's Qualified Energy Conservation Bond (QECB) allocation of approximately $20 million, which has grown to $25 million with municipalities agreeing to have NYSERDA administer the funds on their behalf. After the QECB allocation is exhausted NYSERDA expects the interest rate for unsecured residential loans will be 5.99% or 5.49% with consumer agreement to autopay from a bank account. In this way, participants in Green Jobs-Green New York will be able to take advantage of NYSERDA ARRA-funded financing and utility administered rebates statewide.

3.3 Policy Issues

Attribution

New York's approach to attribution – isolating certain programs so as to minimize the issue – works as a temporary solution, but its suitability for an enlarged and longer running federal-state-third party-local partnership on energy efficiency is not clear.

4. Lasting Impacts

Revolving loan funds expected to last

The state's GJGNY revolving loan fund, supplemented by QECB funds and loan loss reserve funds from BetterBuildings, is expected to leverage five to 10 times the original loan given careful management of costs and interest rates.

Features and insights from the ARRA-funded retrofit program may persist, such as expanded workforce development programs and insights from different models for marketing and outreach, could outlast the program and be adapted for future utility customer programs. NYSERDA supports state legislation that would require all New York utilities to offer on-bill financing programs, assuming the experiment with National Grid's billing system makes on-bill financing easy and attractive as an alternative or complement to utility customer funded rebates.

Interviewees:
John Ahearn, NYSERDA residential programs staff
Ruth Horton, ARRA programs manager, NYSERDA
Dan Zaweski, Vice President for Energy Efficiency and Distributed Generation, Long Island Power Authority
Rebecca Craft, Director of Energy Efficiency, Consolidated Edison Company of New York

North Carolina

Highlights of Interaction between ARRA and Utility Customer Programs:

- The North Carolina State Energy Office (SEO) developed a relatively large number of energy efficiency and renewable energy programs designed to jumpstart energy efficiency and renewable energy activity in sectors across the state. A number of these programs intentionally reached into market segments that were not covered by utility energy efficiency programs (e.g., new construction of multifamily and manufactured housing), while some programs were created with the intention of piggybacking on top of the new utility rebates in order to garner consumer interest and boost the market.

- The SEO engaged utilities for input into its ARRA plans early in their development. However, because the utility programs were nascent, and there were no statewide programs (e.g., each utility offered its own set of programs), initially the SEO was not able to coordinate with utility programs on a statewide basis. Later in the development of ARRA plans, the SEO consulted with utilities to get guidance on fleshing out the SEP residential program.

- About 67% of the SEO's EECBG funding and nearly 50% of SEP monies target public and commercial energy efficiency in the form of grants, rebates or revolving loans, including supplementing an existing commercial/industrial technical assistance program.

1. Landscape of Utility Customer Programs

North Carolina has over 100 electric and gas utilities. The North Carolina Utilities Commission (NCUC) regulates three investor-owned electric utilities (IOUs), 4 small gas companies and 2 university electric systems. The 3 IOUs (Dominion Resources, Duke Energy Carolinas, and Progress Energy) serve approximately 85% of the customer accounts in the state. In February 2008 the NCUC issued final rules to implement 2007 legislation (Senate Bill 3) for North Carolina's renewable energy and energy efficiency portfolio standard (REEPS). In 2008 North Carolina utilities spent a modest 0.1% of electric utility retail sales revenue on electric energy efficiency programs (CEE 2010; EIA 2010). Under the REEPS, electric utilities (IOUs, municipal and cooperatives) must obtain combined renewable energy power and energy efficiency savings of 3% of prior-year electricity sales in 2012. Targets increase to 6% of prior-year electricity sales in 2015 and to 12.5% in 2021 and thereafter. Utilities were required to submit their annual REEPS compliance plans as part of their Integrated Resource Planning filings in September of each year.

Utility customer-funded energy efficiency has begun to increase in recent years. In 2008 the Consortium for Energy Efficiency (CEE) reported that North Carolina had small programs, but no program spending data available; for 2010, the state's utilities reported a total budget of $46.5 million. Beginning in 2009, funding for natural gas efficiency programs is embedded in rates. The rider will be reconciled annually based upon the utilities' actual costs and revenues. Duke Energy Carolinas' Save-A-Watt program was approved by regulators for implementation starting January 2010. The program calls for reducing customer energy demand by 2% over the next four

years and sets a target of reducing demand by as much as 8% by 2020. It allows for some recovery of revenue loss due to customer energy use reduction. The Commission also recently approved a limited-time lost revenue adjustment mechanism (expires in 2012) for Progress Energy Carolinas (see **Table 28)**.

Table 28. North Carolina: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	3 regulated electric IOUs (85% of electric accounts in state); 4 regulated gas companies; 72 municipally owned electric systems, 27 nonprofit electric cooperatives and 6 university electric systems.
EERS status	REEPS enacted in 2008 requires utilities to obtain renewable energy power and energy efficiency savings of 3% of prior-year electricity sales in 2012, increasing to 12.5% in 2020 and beyond. Duke's negotiated energy efficiency goal is to achieve annual incremental reductions of 1% of 2009 sales by 2015.
Utility customer funding history	North Carolina utilities began implementing full-scale energy efficiency programs within the last 3 years.
Utility customer-funded budget for EE	2010 electric and gas EE budget (including low-income): $46.5 million; $4.90 per capita. 2009 electric EE program spending as a % of electric utility sales revenue: 0.15%.
Regulatory and Business Model	**EE Program Administrator:** Utilities **Cost recovery:** Costs recovered through capped rate rider, based on utility investment. **Utility incentives structure:** Lost revenue adjustment approved for Duke Energy Carolinas Save-A-Watt program and Progress Energy Carolinas with annual true-ups. **Decoupling:** Natural gas utilities implement revenue-per-customer decoupling with semi-annual adjustments.
Utility customer program objectives	Resource acquisition. IRPs must include assessment of demand side management (DSM) and energy efficiency.
SEO energy activity background	In 2009 Governor Purdue announced an energy reform plan that establishes the Department of Commerce as the hub for state energy policy and programs and involved relocating the State Energy Office from the Department of Administration and the state weatherization program from the Department of Health and Human Services to the Department of Commerce.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010); Office of Governor Bev Perdue.

2. North Carolina: Selected ARRA Energy Programs

North Carolina has been awarded approximately $168 million for selected ARRA programs, of which nearly $106 million (about 72%) is administered directly by the State Energy Office (SEO) for various programs, and $37.3 million (22%) is administered directly by 33 North Carolina counties, cities and tribes through the Energy Efficiency and Conservation Block Grants (EECBG) program (formula grants).

Of the funds administered directly by the SEO, about 71% is for the State Energy Program (SEP) formula grant, 20% is allocated for Energy Efficiency and Conservation Block Grant (EECBG) funds and 9% is for the State Energy Efficient Appliance Rebate program (see **Table 29**).

Table 29. North Carolina: Summary of selected ARRA-funded programs

Program	Amount (million$)	Approach
SEP Formula Grant - program $ administered by state energy office	$ 76	Comprehensive approach to reach all sectors and parts of the state with energy efficiency and renewable energy programs.
EECBG Formula Grant - program $ administered by state energy office	$ 20.9	60% funds competitive pass-through grants to non-entitled communities for EE in buildings in all sectors (residential, C/I, nonprofit, public); 34% funds EE and renewable energy for public schools, community colleges and other local authorities.
EECBG Formula Grant - program $ administered directly by 33 cities, counties and tribes	$ 37.3	
EECBG Competitive Grants (BetterBuildings) - program $ administered by grant awardees, e.g., cities, community partnerships	$ 25	$20M to SEEA for 12-city consortium that includes Chapel Hill and Carborro. Also, $5 M to Greensboro. NC.
State Energy Efficient Appliance Rebate Program - program $ administered by state	$ 8.85	Created robust online system easily accessible by merchants; rebates provided at point of sale, no reservations required. Rebated 15% of retail price, and worked with retail merchants association and utilities to cross-promote and offer additional merchant discounts.
Total	**$168.1**	

The North Carolina SEO created 13 programs for the 2009 State Energy Program (SEP) formula grants, allocating 36% of SEP funds toward cross-cutting programs including over $11 million for workforce development, $3.2 million for a revolving loan fund for EE and RE projects, and $10 million in grants to support small business growth in the clean technology sector. 33% of the SEP budget is funding energy efficiency across a broad range of markets and sectors including existing homes, new manufactured housing, commercial, nonprofit and public sector buildings, and in “main street” small communities across the state and just over 6% of the SEP budget provides grants for renewable energy projects in public and private commercial and industrial buildings (see **Table 30**).

Table 30. North Carolina: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Energy Savings for Small Business and Industry	$9.3	• Technical assistance and competitive grants for energy efficiency projects at businesses and industries previously identified through audits and

			new projects identified through RPP process. • Recipients may also qualify for financing through the Energy Loan Fund.
	Energy Efficiency Audits and Implementation in Existing Homes	$0.6	• Rebates to offset partial cost of comprehensive home energy audits, and grants for installation of audit recommendations.
	Energy Efficiency Upgrade Grants	$11.7	• Grants for energy efficiency upgrades at state agencies, universities and community colleges previously identified through audits but not funded. • Recipients may also qualify for financing through the Energy Loan Fund.
	Energy Efficiency for Cities, Counties and Schools	$4.51	• Energy efficiency upgrades in public buildings.
	Energy Efficiency Projects	$1.2	• Energy efficiency upgrades to NC Biofuels Center and NC Biotechnology Center; includes educational components.
	Appliance Rebates	$2	• Augments SEEARP funding to meet high demand for the program.
	Promoting Energy Efficiency in New Affordable Housing Units	$3.7	• Expands existing efforts to promote EE in qualified new single family and multifamily residences. • Increases the manufacturing and retail availability of ENERGY STAR-labeled manufactured homes. • Provides training in building science and Home Performance with ENERGY STAR to manufacturers.
Renewable Energy Programs			
	Statewide Alternative and Renewable Energy Innovations Program	$1.5	• Statewide competitive grants for alternative and renewable energy installations in public and private organizations (e.g., local infrastructure for plug-in and alternative fuel vehicles, biofuels development, and large-scale renewable energy projects).
	Biofuels Center of North Carolina	$0.4	• Biofuels public information program.
	Ocean Wind Energy Analysis	$0.3	• Ocean wind energy feasibility assessment.
	Commercial Renewable Energy System Incentives	$4.1	• Competitive grants (up to 25% of project costs, $100,000 maximum per project) to industrial and commercial facilities for renewable electricity systems, e.g., solar, wind, hydropower, geothermal and biomass.
Cross-cutting and Other Programs			
	Energy Investment Revolving Loan Fund (cross-cutting)	$3.2	• New revolving loan fund providing no- and low-interest loans to businesses, nonprofit organizations, local governments, K-12 schools, community colleges, state agencies and universities for EE and RE projects.
	Continuing Education for Residential and Commercial Building Code Inspectors (cross-cutting)	$0.5	• Continuing education for building inspectors in all 100 counties.
	Target Main Street Communities	$2.5	• Competitive grants for EE and RE measures in

	(cross-cutting)		small community main street businesses.
	Workforce Development Initiative (cross-cutting)	$11.6	• Multi-pronged program working through community college and university systems and workforce development agencies.
	North Carolina Green Business Fund (other)	$10	• Supplements existing NCGBF which awards grants to small businesses (< 100 employees) for growth in clean technology and green building.
	Developing Energy Assessments and Strategic Energy Plans - Public and Educational Sector (other)	$3.7	• Provides technical assistance to local entities, (e.g., colleges, schools and local governments), to develop strategic energy plans.
	Administration/Other	$5.2	
	Total	**$76**	

Source: DOE (2009), interviews.

The North Carolina SEO is dividing its EECBG funds among four key initiatives: sub-grants to local governments ($7.15 million) and to public education organizations ($6.3 million) for facilities energy efficiency upgrades; transportation energy efficiency ($2.5 million), and methane capture projects ($2.5 million).

The SEO leveraged SEP and EECBG funds in several ways. To help smaller communities make best use of EECBG funds, the SEO contracted with 37 local firms to provide technical assistance through the SEP "Main Street" program. The SEO required EECBG sub-grant applicants to develop a strategic energy plan. The SEP Strategic Energy Plans program sent specialists to work with EECBG sub-grant applicants to develop road maps and skills to continue energy efficiency work beyond ARRA, whether or not the organization received a grant. Eligible grantees under the SEP Energy Savings for Small Business and Industry Program were also allowed to pair grants with loans from the revolving Energy Loan Fund.

3. Interactions between Utility Customer-funded Programs and Selected ARRA-funded Programs

North Carolina's utility energy efficiency programs are new but are ramping up quickly. At least a dozen utilities, including the largest IOUs offer residential and commercial energy efficiency rebate programs for existing buildings and several utilities offer ENERGY STAR New Home rebate programs. The North Carolina SEO consulted fairly extensively with utilities early on in the ARRA program design process. The state created programs to reach a broad array of sectors, including a focus on small business and industrial facilities, and created a number of SEP programs designed specifically to stack with existing incentives offered both by utility customer programs and manufacturer discounts, in order to provide a large boost to the market, particularly in the case of the State Energy Efficient Appliance Rebate Program (SEEARP).

Two of the state's ARRA programs, Energy Efficiency Audits and Implementation in Existing Homes ($7.5 million) and SEEARP ($8.85 million), provide complementary incentives to the customer base served by utility residential rebate programs. Five of the state's ARRA programs, totaling $21.6 million, potentially serve similar customers as Duke Energy and Progress Energy's utilities' Commercial and Industrial rebate programs: 1) The Energy Savings for Small Business (SEP), 2) Industry and Energy Efficiency Upgrade Grants for Public Facilities (SEP), 3) the Target Main Street Communities (SEP), and 4) a portion of the EECBG initiative that sub-

grants funds to local authorities and educational institutions for EE and RE measures in buildings.

If we compare the selected ARRA budgets directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($73.5 million) that will be expended over three years equal 175% of the 2010 budget ($42 million) for utility customer-funded energy efficiency programs (see **Figure 19** and **Figure 20**).

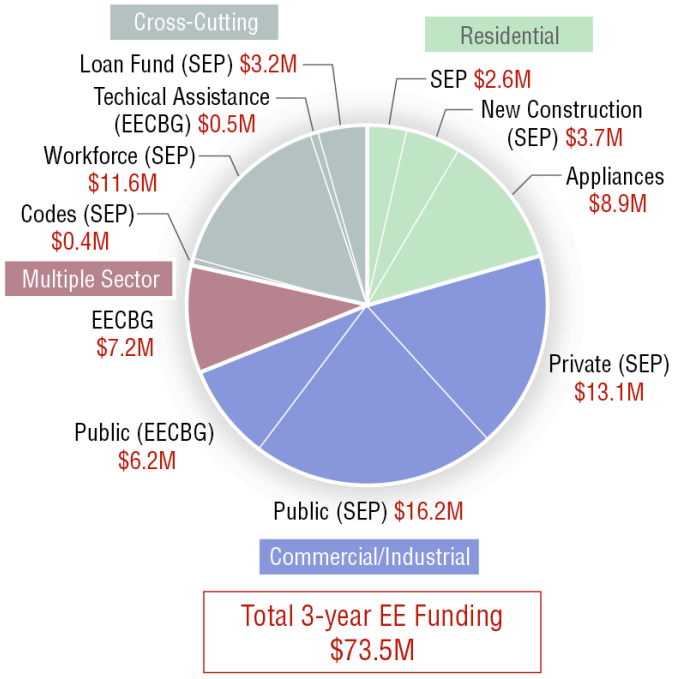

Figure 19. North Carolina EE program funds in selected ARRA programs by program type and market sector

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. “EE program funds” do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

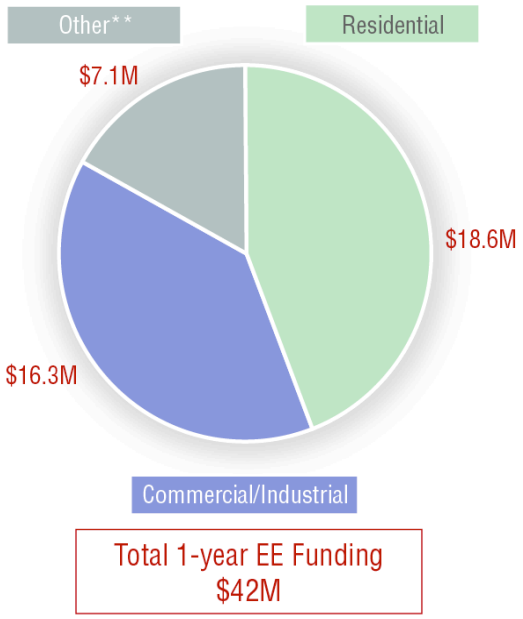

Figure 20. North Carolina 2010 utility customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, e.g. administration, planning, codes, R&D, education and training, agriculture; can also include program budgets and EM&V not allocable by sector.

3.1 Program Design and Implementation Impact

SEO adjusting ARRA incentives to coordinate with utility customer incentives

The SEO developed its ARRA plans with input from various stakeholders including utilities and the Southeast Energy Efficiency Alliance (SEEA). The state's intention was to coordinate with utilities and leverage utility customer funds and to avoid interfering with or flooding the nascent utility programs in North Carolina. In cases where customers are eligible for both the utility and the SEO incentive (e.g., SEO residential incentives and the Progress Energy residential program), the SEO adjusts the incentive it provides to insure reimbursement is below 100% of project costs. North Carolina's ARRA appliance program offered incentives set at relatively modest levels (15% of retail price). The SEO's SEEARP rebates potentially offered rebates that could be piggy-backed with utility rebates for heat pumps and air conditioners, but for the most part did not duplicate utility offerings.

3.2 Impacts on Program Design

ARRA programs complement utility programs by supporting measures and activities that may not meet utility cost effectiveness test

A number of North Carolina's ARRA programs have been able to provide incentives for measures that utilities had expressed interest in pursuing but were not able to do so because those measures did not pass cost effectiveness tests used in North Carolina. ARRA funds also have supported education and training efforts to develop a well-trained contractor workforce to serve

the relatively new utility energy efficiency programs in the state (e.g., residential duct sealing and HVAC tune-ups).

SEO consulted utilities on program design; residential program received significant input

The SEO engaged utilities for input into its ARRA plans early in their development. Because the utility programs were nascent, the SEO was not initially able to use utility programs as a model. Later in the development of ARRA plans, the SEO consulted with utilities to get guidance on fleshing out the SEP residential program.

3.3 Policy Issues

Attribution

The SEO reports that where a utility contributes utility customer funds to a measure or project, even where they are combined with ARRA incentives, the utility is allowed to claim all of the energy savings garnered by that project toward its mandated targets.

However, details about how attribution will be handled in their cost effectiveness calculations have not yet been finalized. A representative from an investor-owned utility anticipates the potential for issues if it is determined that savings attribution must be apportioned between the utility and other funding sources. Current rules require utilities to measure cost effectiveness of the programs based on the Utility Cost Test. In measures or projects involving combined incentives, if only a portion a portion of the deemed or verifiable savings are allowed to attributed to the utility, the result could be reduced cost effectiveness for the utility customer-funded program (e.g., fewer savings attributable to the utility investment).

4. Lasting Impact

ARRA funds support market transformation of energy efficiency for affordable housing

The SEO designated two key partners (Appalachian State University Energy Center in Boone and the Systems Building Research Alliance, a nonprofit consortium of electric utilities and major manufactured and modular home building companies) to lead efforts for the Energy Efficiency in New Affordable Housing Units program. The program is intended to demonstrate to builders and homeowners that energy improvements make the homes more attractive to buyers and result in long-term energy savings. Appalachian State University will apply $2.6 million to focus on site-built single-family and multifamily home energy efficiency improvements, with a target of improving nearly 2,500 single-family homes and 480 multifamily units. Systems Building Research Alliance will direct $1.1 million toward improving efficiency in 1,700 manufactured homes.

The program will also provide marketing support for the homebuilder sector as well as training for affordable residential homebuilders, providing instruction in building science and Home Performance with ENERGY STAR. The SEO intends that the new knowledge and expertise will demonstrate to manufacturers the benefits of energy efficiency, and demonstrate that meeting the

ENERGY STAR standards is not difficult, thus fostering continuation and acceptance of energy efficiency practices in the homebuilder industry.

ARRA funds jumpstart energy code compliance

Currently in North Carolina there is no certification for energy code inspection. The new energy codes education program will add energy training to the skill set for code inspectors across the state (e.g., safety, fire, mechanical, plumbing), with the intention of making energy codes a part of all home inspections. The SEO put out a RFP for a third party implementation contractor to develop and manage the programs.

Interviewees:
Ward Lenz, Director, Energy Division, North Carolina Department of Commerce
Richard Self, Energy Division, North Carolina Department of Commerce
Larry Shirley, Director, Green Economy, North Carolina Department of Commerce
Glenn Mauney, Carolinas Energy Policy Manager, North Carolina Energy Policy Council Representative of Duke Energy

Oregon

Highlights of Interaction between ARRA and Utility Customer Programs:

- ARRA programs administered by the Oregon Department of Energy, the state energy office (SEO) largely complement utility customer-funded programs. A representative of the Energy Trust of Oregon, administrator of utility customer-funded energy efficiency programs, was quite supportive of the SEO's approach to creating its ARRA programs. The bulk of SEP funds will target energy efficiency and renewable energy projects in buildings – largely for public entities, with some programs slated for the residential and private commercial sectors as well.

- Several of the SEO's ARRA programs are targeted toward measures and sectors not served by the utility customer-funded programs (e.g., heating equipment for low income households, woodstoves in rural areas).

- There is potential for public entities, residences or businesses to combine ARRA funds with utility customer rebates. The SEO attempts to ensure that participants do not receive more than 100% of project cost from all sources and is tracking every project funded by ARRA in order to provide transparency about the proportion of projects funded by the different sources, including the myriad tax credits available on Oregon. The SEO has conveyed to Energy Trust of Oregon (ETO) that they will make this information available for ETO's use in determining appropriate attribution proportions.

- Energy Trust of Oregon is developing an attribution methodology that bases attribution of energy savings not on the percentage of project funding, but on a determination of whether the ETO incentive was a critical contributing factor to the project. Since ETO does not receive performance incentives for meeting savings target, precise determination of savings attribution is less of an issue in Oregon than it may be in other states.

1. Landscape of Utility Customer Programs

Oregon has 40 electric and gas utilities in the state. The Oregon Public Utility Commission (OPUC) regulates three investor-owned electric utilities (IOUs) and three natural gas utilities. Two large IOUs, Portland General Electric (PGE) and PacifiCorp, provide service to ~70% of the electric customer accounts in the state. Bonneville Power Authority (BPA), a federal power marketing agency, serves 36 electric cooperatives, municipal electric utilities and public utility districts in the state.

The OPUC began requiring Oregon utilities to offer residential weatherization assistance in 1981, and in 1989 it required utilities to consider energy efficiency as a resource in integrated resource planning. The Energy Trust of Oregon (ETO), a nonprofit organization established in 2002, designs and administers most of the natural gas and electric energy efficiency programs, utilizing third party implementation contractors. The ETO also runs renewable energy programs for small-scale systems. Consumer-owned utilities run their own programs. The OPUC sets annual electric and gas efficiency targets for ETO. A public purpose charge, effective in 2002,

supports ETO's electric programs as well as electric low income programs provided by Oregon Housing and Community Services. Additional funding for electric efficiency is provided under the provisions of SB838, with the amount of savings determined through integrated resource planning, and the budgets established through Energy Trust negotiations with the electric utilities. Gas efficiency funding is provided to the Energy Trust under provisions of decoupling agreements with two out of three of Oregon's gas utilities, with savings targets determined through integrated resource planning and budgets negotiated with the gas utilities. Oregon's Renewable Portfolio Standard law in 2007 allows electric utilities to file for incremental funding for additional cost effective energy efficiency. Retail electricity consumers whose load is greater than 1 average megawatt are excluded from these charges and cannot directly benefit from any of the funded programs (see **Table 31**).

Table 31. Oregon: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	3 electric IOUs, 3 natural gas utilities, 12 municipal electric utilities, 19 cooperative electric utilities, 6 PUDs and one federal agency.
EERS status	Updated IRP guidelines in 2007 require electric IOUs to include in their IRP action plans all best cost/risk portfolio conservation resources. ETO electric goals: 0.8 % of 2009 electric sales in 2010, ramping to 1% in 2013 and 2014. Gas goals: 0.2 percent of 2007 natural gas sales to 0.4 percent in 2014. Goals contingent on funding increases.
Utility customer funding history	Oregon utilities have conducted energy efficiency assistance since required by OPUC in 1981. Since the establishment of Energy Trust of Oregon in 2002, the state has quickly and steadily increased energy efficiency spending and savings.
Utility customer-funded budget for EE	2010 electric and gas budget (including low income): $118.3 million; $30.90 per capita. 2009 electric EE program spending as a % of electric utility sales revenue: 1.97%.
Regulatory and Business Model	**EE Program Administrator:** Third party for the two largest IOUs **Funding:** Public purpose charge on utility customer electric bills and surcharges on gas bills. **Utility Incentives:** No performance incentives in place for utilities or third party administrator. **Decoupling:** Partial decoupling for natural gas; PGE implements per-customer decoupling ("Sales Normalization Adjustment") for residential and small business customers.
Utility customer program objectives	Best cost/lowest risk conservations resources for meeting projected resource needs.
SEO energy activity background	The Oregon Department of Energy (the SEO) also administers the state's myriad energy-related tax incentives (e.g. the Business Energy Tax Credit, Renewable Energy Tax Credit, the Biomass Producer or Collector Credit).

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010).

2. Oregon: Selected ARRA Energy Programs

Oregon has been awarded approximately $100 million for selected ARRA programs, of which about $55 million (~55%) is administered directly by the Oregon Department of Energy, the state energy office (SEO) and roughly $25 million (~25%) is administered directly by 34 cities,

counties and tribes through the EECBG program. $20 million (20%) has been awarded to Oregon Clean Energy Works through the EECBG competitive grants (known as the "BetterBuildings" program).

Of the funds administered directly by the SEO, $42.2 million (76%) is for the State Energy Program, $9.6 million (17%) is for EECBG and $3.6 million (6.5%) is allocated to the State Energy Efficient Appliance Rebate Program (see **Table 32**).

Table 32. Oregon: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program Formula Grant - program $ administered by state	$42.2	"Targeted multi-sector." Small set of programs targeting weatherization, energy efficient building systems and equipment and small-scale renewable energy systems (e.g., solar, biomass), in public and private buildings across markets and sectors.
EECBG Formula Grant - program $ administered by state	$ 9.6	Exclusively targets public building energy retrofits. Also sets up $1.1M revolving loan for residential retrofits and $1.4M community sustainability behavioral pilot programs.
EECBG Formula Grant - program $ administered directly by 33 cities, counties and tribes.	$ 25	
EECBG Competitive Grants (BetterBuildings) - program $ administered by grant awardees, e.g., cities, community partnerships	$ 20	Oregon Clean Energy Trust statewide low-interest financing program with on-bill repayment mechanism. Details to be determined. Utilities sought as partners; may attempt to leverage utility customer funds.
State Energy Efficient Appliance Rebate Program - program $ administered by state	$ 3.6	First round targeted markets not served by utility customer programs; provided low income homeowners of up to a 70% rebate (maximum $2,000) for ENERGY STAR heat pumps and furnaces. Second round launched July 2010 expanded the program to include appliances (e.g., refrigerators, dishwashers).
Total	**$ 100.4**	

The SEO created 3 primary programs for the 2009 State Energy Program (SEP) formula grants, targeting energy efficiency as well as small renewable generation (solar, biomass, geothermal and hydropower) in buildings across public, residential, commercial, industrial and agricultural sectors. The largest program (80% of SEP funds, at $33.66 million), originally slated solely for public building retrofits, now includes sub-programs that address weatherization and other efficiency measures for commercial and residential buildings, including $11 million for projects in schools (see **Table 33**).

Table 33. Oregon: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Energy Efficiency Programs		
Deployment of Innovative Energy Efficiency and Renewable Energy Projects/Programs/Initiatives	$33.66	Originally targeting public buildings; the program expanded to include residential and commercial EE and small-scale RE. Sub-programs include supplementing an existing program to replace inefficient wood-burning stoves, and residential weatherization for homes not in the historical register.
Deployment of Innovative Energy Efficiency - Industry	$4.66	Industrial sub-program funds energy efficiency retrofits for existing industrial buildings and processes. In one sub-program the SEO will partner with the Oregon Department of Agriculture to provide financial incentives for purchase and installation of energy efficient irrigation and pump systems and equipment. ARRA funds may be used in conjunction with Business Energy Tax Credits and other state tax credits.
Renewable Energy Programs		
Deployment of Renewable Energy Projects - Biomass	$3.0	The program funds various types of private biomass projects including biomass feedstock assessment, biomass collection and processing programs, biomass fuel manufacturing (pellets) and installation of biomass boilers.
Cross-cutting and Other Programs		
Transportation	0.863	Transportation efficiency programs.
Total	**$42.18**	

Source: DOE (2009).

The SEO is focusing its use of its EECBG funds on competitive state and municipal public building retrofit grants ($8.4 million) but is also setting up a $1.1 million revolving loan fund for residential retrofits and will provide utilities $1.4 million for behavior-focused transportation and community sustainability pilot programs.

3. Interactions between Utility Customer-funded Programs and ARRA-funded Programs

The current landscape of programs promoting energy efficiency and renewable energy in Oregon is very robust. The Energy Trust of Oregon offers a comprehensive portfolio of efficiency programs for residential and non-residential markets for customers of the largest utilities. Other utilities offer programs directly to their customers. The SEO also provides generous tax credits to businesses and residents for energy efficiency and actively promotes combining tax credits with other incentives. For example, the Business Energy Tax Credit provides 35% of the eligible project costs (the incremental cost of the project that is beyond standard practice). ETO takes into account any state or federal incentives in determining its portfolio of incentives. While the SEO has designed its slate of ARRA programs largely to complement and leverage existing programs, there remain significant opportunities for receiving multiple incentives for a particular measure or project, including with the SEO's multi-sector SEP program and EECBG-funded public building retrofits.

If we compare the selected ARRA budgets administered by the SEO directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($35 million) that will be expended over three years equal 30% of the 2010 budget ($114.9 million) for utility customer-funded energy efficiency programs (see **Figure 21**and **Figure 22**).

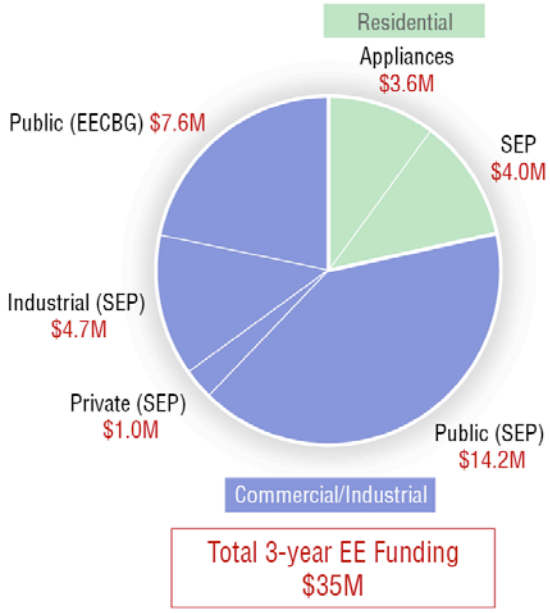

Figure 21. Oregon EE program funds in selected ARRA programs by program type and market sector

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. “EE program funds” do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

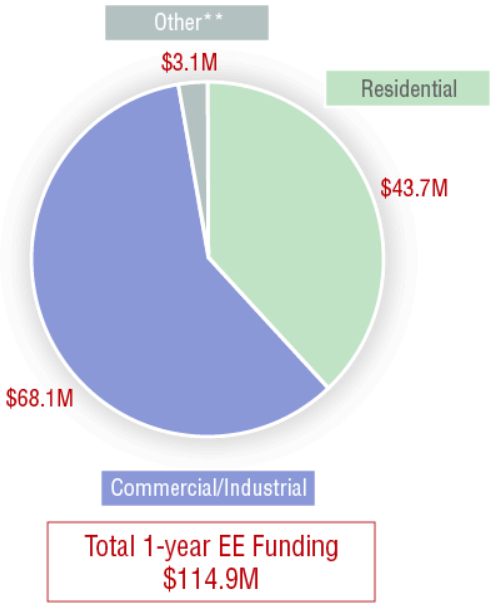

Figure 22. Oregon 2010 utility customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, e.g. administration, planning, codes, R&D, education and training, agriculture; can also include program budgets and EM&V not allocable by sector.

3.1 Program Planning Impact

ARRA programs developed to complement utility customer-funded programs

Oregon DOE worked closely with Energy Trust of Oregon and utilities around the state in order to develop ARRA programs that complemented and supported the mature set of utility customer-funded programs, including targeting of markets underserved by utility customer programs and addressing large backlogged projects in public buildings that will provide significant energy and cost savings for many years.

One example is the Oregon State Energy Efficient Appliance Rebate Program (SEEARP). The first round of the program applied long-established successful efficiency measures to challenged communities that had not previously been reached by utility customer-funded rebate programs. In partnership with the housing department and Community Action Partners, SEEARP was entirely focused on low income homeowners and provided 70% rebate (up to $2,000) for ENERGY STAR heat pumps and furnaces. The Low Income Home Energy Assistance Program (LIHEAP) funded another 30% in order to provide new equipment for no cost to low income residents. The program was also designed to complement Oregon's tax incentive programs, by reaching this population that normally cannot take advantage of tax credits.

3.2 Program Design and Implementation Impact

SEO adjusted awards to compensate for multiple incentive sources

Every project funded by SEO ARRA dollars requires the applicant to reveal all additional funding sources (e.g., utility incentives and tax credits). The SEO created a comprehensive database to track all of the projects receiving ARRA SEP, EECBG and Appliance Rebate funding, including each project's funding sources. Before granting an award, the SEO adjusts funding to assure that no project receives total funding for more than 100% of the energy efficiency measure costs. 25% of funding is held back until all project costs, funding sources and energy savings are fully verified. There's a 'loading order' for disallowing incentives; the tax credit will be removed first if combined ARRA and utility customer funding approaches 100%; if the project is covered 100% through ARRA and other incentives, it will not receive a business energy tax credit.

ARRA appliance program complements utility customer-funded programs

In designing its appliance rebate program, the SEO looked for markets not served by the utility customer-funded programs, and decided to focus the first phase of the program on heating equipment for low income populations, in partnership with Oregon Housing and Community Services (OHCS). The SEO Appliance Rebate funds provided rebates of a maximum of 70% to qualified homeowners to replace heating systems; OHCS provided the other 30%.

ARRA funds leveraged through inter-department collaboration address multiple needs and reach population not served by electric utility customer-funded programs

In one example of collaboration, the SEO is providing SEP funding to the Department of Environmental Quality (DEQ) for its wood stove replacement program, designed to improve the air quality in communities which rely largely on wood stove heat, by providing incentives to residents for upgrading to higher efficiency, lower polluting stoves. DEQ had a planned program in place, but no funding to implement it. The SEO saw this collaboration as an opportunity to address needs of both agencies with one program.

Installing equipment that meets the EPA standard qualifies an applicant for tax credits; however applicants must install equipment that meets the DEQ program's significantly higher standard in order to qualify for the ARRA market rate rebate: $500 for wood stove to wood stove replacement; $750 for replacing wood stove with pellet stove; $1,000 for replacing wood stove with other heating equipment (e.g., gas furnace, heat pump). Low income households can qualify up to $5,000 to cover the complete cost of equipment and installation.

The program complements Energy Trust of Oregon's electric utility customer-funded programs, which do not provide incentives for non-electric equipment such as wood stoves. While most program applicants are expected to replace the old wood stove with a new wood stove, there is some possibility that residents may install heat pumps, in which case they may be eligible for a utility customer-funded incentive. The SEO has set rebate levels at modest levels with the intention that a participant cannot receive more than 100% of the equipment cost even when

combining multiple incentives. The first phase of the program will be rolled out to three counties; program managers will then assess the demand and potentially re-design elements of the program if needed.

Other ARRA-funded programs, such as the irrigation energy efficiency program in collaboration with the Oregon Department of Agriculture, will leverage ETO resources and incentives as well.

3.3 Policy Issues

Savings Attribution

The SEO is tracking the various funding sources for every project receiving ARRA funds through the application process, in order to provide full transparency about what proportion of projects were funded by the different sources. The SEO has conveyed to Energy Trust of Oregon (ETO) that they will make this information available for ETO's use in determining appropriate attribution proportions.

Energy Trust of Oregon is developing a methodology that bases savings attribution not on the percentage of project funding, but on whether the ETO incentive was a critical contributing factor to the project. Since ETO does not receive a performance incentive for meeting savings targets, exact determination of attribution is less of an issue in Oregon than it may be in other states.

Interviewees:
Paul Egbert, ARRA Project Manager, Oregon Department of Energy (ODOE)
Rebecca Sherman, Wood Stoves Program Manager, ODOE
Fred Gordon, Director of Planning and Evaluation, Energy Trust of Oregon
Derek Smith, Program Manager, Clean Energy Works Oregon
Lisa Schwartz, Regulatory Assistance Project

Wisconsin

Highlights of Interaction between ARRA and Utility Customer Programs:

- Wisconsin state officials took existing utility customer efficiency programs into account and invested all but about 5% of the state's ARRA allocations elsewhere, largely in a loan pool targeted at creating and retaining manufacturing jobs.

- Economic recovery and development dominated state objectives for ARRA spending, and some immediate economic benefit was obvious to all actors in state energy policy

- Federal grants for appliance rebates went straight to Wisconsin's third party, non-profit administrator of utility customer-funded efficiency programs where enhanced rebates elicited a year's worth of appliance sales in about four months.

- Most local governments used their ARRA grants for retrofitting or upgrading their own buildings and streetlights, but several created new residential retrofit programs and investigated power and fuel sources as close as the neighboring dairy farm.

1. Landscape of Utility Customer Programs

The Public Service Commission (PSC) of Wisconsin regulates five large investor-owned electric or combined electricity/gas utilities and more than a half dozen smaller utilities, some predominantly serving neighboring states. More than 30 cooperatives and public power utilities (primarily municipal utilities) also serve the state. The PSC also oversees a third party, non-profit energy efficiency administrator, Wisconsin Energy Conservation Corporation (WECC),[6] and by law approves a quadrennial efficiency plan with set targets and budget. Utilities collect a system benefits charge (SBC) of 1.2% of revenues to fund statewide energy efficiency programs as well as their own. WECC operates under contract to a council comprised of the utilities. The programs themselves operate under an umbrella brand, Focus on Energy that dominates the state's electric energy efficiency market. The state PSC also allows IOUs to run their own efficiency programs. Three IOUs have their own programs. We Energies has substantial, voluntary demand-side offerings in energy efficiency and load management. Alliant Energy also has an industrial and commercial efficiency program, funded in 2011 at $20 million, for cost-sharing on energy upgrades at commercial and industrial facilities.

State law ranks "cost effective and technically feasible" energy efficiency as Wisconsin's top priority for meeting energy demand. Until 2000, utilities administered energy efficiency programs. From 2000 to 2007, utilities funded the programs, but the state Department of Administration handled program administration. In 2006, lawmakers passed Act 141, which set a new, higher public benefits charge, directed that utilities hire a third party administrator and required the PSC to set efficiency goals and priorities every four years for statewide programs.

[6] Wisconsin recently rebid its contract for third-party administration of its utility customer-funded energy efficiency programs. The new administrator, The Shaw Group, is a for-profit entity and will take over after a transition period.

The law called for the PSC to contract with an independent evaluator to validate savings (see **Table 34**).

Table 34. Wisconsin: Summary of utility customer-funded programs

Feature	Summary
Utility landscape	Five investor-owned utilities serve about 75% of the customers in the state. The remainder is served by nearly 103 private and public entities, chiefly smaller investor owned gas and electric companies, electric cooperatives and municipal utilities.
EERS status	Pending. The Governor's Task Force on Global Warming has recommended EE targets of 2% of annual retail electricity sales. The PSC has decided to use the task force's levels for electricity and gas sales.
Utility customer funding history	In the 1980s and 90s, the PSC ordered larger utilities to promote energy efficiency and renewable energy, augmenting a statutory mandate to spend at least 0.5% of annual revenues on those programs. 1999 Wisconsin Act 9 required utilities to collect a public benefits charge from consumers to fund statewide programs administered by the state Department of Administration (DOA). These programs were marketed under the name Focus on Energy. In 2001, the non-profit Wisconsin Energy Conservation Corporation (WECC) was awarded the program administrator contract for the residential and renewable Focus on Energy programs; and the Milwaukee School of Engineering was selected as the administrator for the business programs (commercial and industrial). In 2004, the business program Administrator contract was rebid. WECC was awarded the contract and therefore became the single Focus on Energy program administrator. Three of the five major utilities continue to administer demand-side and renewable programs, with cost recovery as approved by the PSC. Wisconsin Act 141, signed in 2006, required statewide efficiency and renewable programs to span the residential, commercial, agricultural, institutional and industrial sectors. The act transferred oversight of statewide energy efficiency and renewable programs to the PSC and required the utilities to contract with a program administrator(s), making the selection on a competitive basis. Since 2007, WECC has had the utilities' contract for administering statewide efficiency and renewable energy programs. All municipal utilities and half of the state's cooperative have joined the Focus on Energy program. All told, more than 98% of the state's electricity and gas consumers pay public benefits charges and support the Focus program.
Utility customer-funded budget for EE	2010 electric and gas budget (including low-income): 157.1 million; $27.60 per capita. 2009 electric EE program spending as a % of electric utility sales revenue: 1.54%.
Regulatory and Business Model	**EE Program Administrator:** Third party for statewide programs **Funding:** A public benefits charge on utility customer bills.. **Utility Incentives Structure:** No performance incentives in place. **Decoupling:** Wisconsin Public Service Corporation is operating a decoupling pilot.
Utility customer program objectives	Contractual goals are slightly less than 1% electricity. If WECC met 110% of those, the administrator and its subcontractors shared in a performance bonus.
SEO energy activity background	The Governor's Office of Energy Independence in 2007 took over from DOA as the state energy office (SEO). The office has funded

	pilot energy-reduction programs in select towns; helped cities and agricultural entities investigate bioenergy; and encouraged the availability of E85 pumps at fueling stations statewide. OEI also is lead agency in pursuing the governor's "25-by-25" goal – 25% of electricity and 25% of transportation fuels supplied by renewable sources by 2025.

Source: ACEEE (2010); CEE (2010), EIA (2010); RAP (2010); U.S. Census Bureau (2010); WECC; Wisconsin Legislative Counsel.

2. Wisconsin: Selected ARRA Energy Programs

Grant awards to Wisconsin governments and tribes total $99.3 million for selected ARRA programs. About $55.5 million (56%) went to the State Energy Program operated through the Governor's Office of Energy Independence, the state energy office (SEO). The SEO turned a $5.4 million federal grant from the State Energy Efficient Appliance Rebate Program directly over to WECC, the third party energy efficiency administrator, with input on what appliances should qualify. A little more than $38.4 million came to Wisconsin as energy efficiency community block grants (EECBG), with two thirds directed to larger cities and counties and about a third for the state itself and small local governments (see **Table 35**).

Table 35. Wisconsin: Summary of selected ARRA-funded programs

Program	Amount (million$)	Strategy
State Energy Program Formula Grant - program $ administered by state	$55.49	Clean Energy Manufacturing grants and loans to industry for expanding factories for energy efficiency and renewable-energy components; retooling for EE/RE manufacturing; or installing energy efficiency and renewable-energy measures at industrial facilities.
EECBG Formula Grant - program $ administered by state	$11.74	
EECBG Formula Grant - program $ administered directly by 22 cities, counties and tribes.	$26.7	Primarily energy efficiency improvements for government buildings and feasibility studies for using dairy waste and other biomass for methane production or electricity generation.
Appliance Rebate Program - program $ administered by third party energy efficiency administrator	$5.4	Targets fossil fuel heating equipment to complement existing electric programs. Modest rebate levels resulted in slow steady uptake.
Total	**$99.3**	

Wisconsin's Office of Energy Independence put all of its State Energy Program formula grant dollars into a revolving loan fund for three types of economic aid to manufacturers, mostly covered under the umbrella objective of "job creation and retention through clean energy technology." Industries may apply for low-interest loans to improve the energy efficiency of existing manufacturing, to boost employment related to production of energy efficiency or renewable-energy products, or to retool existing facilities for the production of those goods. Examples so far include siphoning off waste methane from a cheese plant for generating process

heat; refurbishing a former auto-parts maker into a manufacturer of components for wind turbines; and increasing production at a photovoltaic module manufacturer.

All state-administered EECBG money was sub-granted to energy retrofits of local, state and tribal government buildings and improving the efficiency of local street lighting. Larger cities used their local EECBG grants for a variety of purposes that included residential and small business retrofits and feasibility studies for biopower plants. Wisconsin has more than a million dairy cows.

As mentioned above, all federal appliance money went to the Focus on Energy program for new or enlarged rebates on most appliances appearing on the ENERGY STAR list or meeting higher efficiency standards (see **Table 36**).

Table 36. Wisconsin: Summary of ARRA-funded SEP programs

SEP Formula Grant Sub-programs	Amount (million$)	Program Description
Revolving Loan Funds - Energy Efficiency Projects		
Job Creation and Retention Through Energy Efficiency and Renewable Energy	$17.92	Low-interest loans for upgrades of existing manufacturing facilities with more efficient equipment or renewable generation (e.g., combined heat & power systems, motor replacements, biodigesters for agricultural producers or processors, such as the cheese industry).
Revolving Loan Funds - Clean Tech Sector Development		
Clean Energy Technology Manufacturing	$17.92	Slated for low-interest loans to enhance output and employment at existing clean tech manufacturers. Wisconsin has major developers and suppliers of lithium-ion automobile batteries (Johnson Controls International); LED lighting (Ruud); low-emissivity windows; bio-digesters; wind and solar components.
Clean Energy Supply Chain	$17.92	Low-interest loans for retooling Wisconsin's other heavy manufacturers for production of clean tech products, including components of energy efficiency and renewable-energy systems.
Other		
Administration	$1.74	The remaining $1+ million is budgeted for salaries and other administrative overhead.
Total	**$55.5**	

Source: DOE (2009), interviews.

3. Interactions between Utility Customer-funded Programs and ARRA-funded Programs

State officials took utility customer programs into account in designing ARRA-funded programs and intentionally steered most of the federal grant money into new, non-utility customer-funded programs. Coordination between state ARRA programs and utility customer programs was strong on appliance and equipment rebates, Focus staff provided some technical assistance from Focus staff to entities seeking ARRA funding. If we compare the selected ARRA budgets administered by the SEO directed toward energy efficiency measures over multiple years to one year of utility customer-funded energy efficiency programs, we observe that total selected ARRA program funds ($35.1 million) that will be expended over three years equal 32% of the 2010 budget ($109.5 million) for utility customer-funded energy efficiency programs (see **Figure 23** and **Figure 24**).

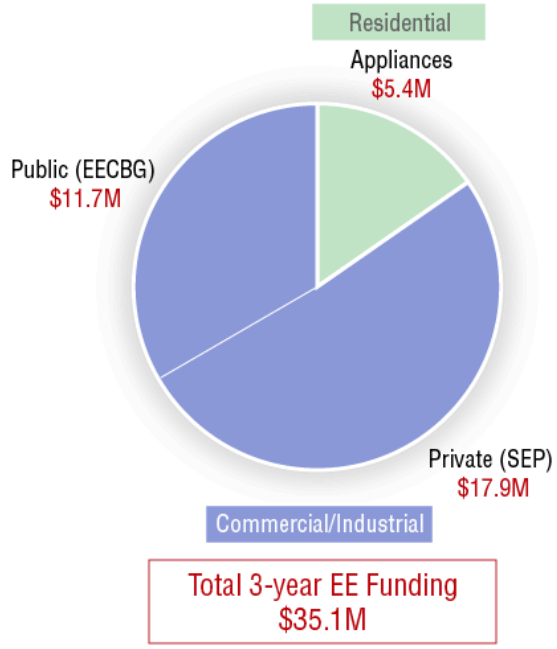

Figure 23. Wisconsin EE program funds in selected ARRA programs by program type and market sector

* Selected ARRA programs are SEP, SEEARP and EECBG funds administered by the SEO. "EE program funds" are for programs involved in implementing and promoting EE in buildings, including cross-cutting programs (e.g., building codes, workforce development) as well as programs that fund both EE and renewable energy projects, where the RE funding could not be disaggregated. “EE program funds” do not include renewable energy, transportation and other programs that are not directly related to EE in buildings.

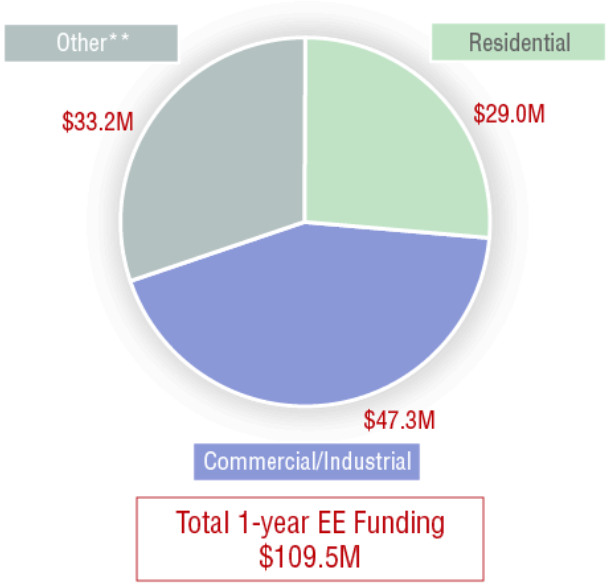

Figure 24. Wisconsin 2010 utility customer-funded EE program budget*
* Excludes load management and low income weatherization programs
** "Other" includes items not allocated by sector, e.g. administration, planning, codes, R&D, education and training, agriculture; can also include program budgets and EM&V not allocable by sector.

3.1 Program Planning Impact

Most ARRA funds directed elsewhere but appliance grant fully integrated with utility customer programs

In 2008, Wisconsin Governor Jim Doyle created a state energy and climate change executive committee that assembles secretaries or representatives from several state entities, including the departments of commerce, agriculture, finance, and administration, plus the Governor's Office of Energy Independence and the PSC. The panel drew up options for spending the ARRA grants and consulted the governor, who suggested directing the majority of state-controlled funds (the SEP grants) toward assistance to industry and the advancement of a clean tech economy. State officials saw the SEP grant as the most flexible for those purposes and reasoned that by directing the loans to in-state businesses, Wisconsin would meet federal Buy American requirements.

Although Focus on Energy offers industrial efficiency and renewable energy programs, state officials decided they wanted to drive larger projects than Focus could. The governor's state energy and climate policy panel also decided the Commerce Department, with its extensive relationships with industry, was the better choice for moving money quickly and priming the state economy. The state panel did choose to run the federal appliance funds through Focus on Energy, given program infrastructure and experience in offering appliance rebate programs.

State officials also noted that the Focus on Energy program spent about 10 percent of its budget on renewables. The SEO saw an opportunity for the state to deliver renewable energy financing for industry. In the past, state energy officials had little money of their own for renewable deployments.

Utility customer program administrator helped local governments design ARRA-funded programs

According to state officials, Focus provided free technical assistance to multiple local governments in applying for EECBG grants and then designing programs for retrofits and biopower facilities. Focus staff also supplied a series of "plug-and-play" calculations to local governments for reporting energy savings to the federal government.

3.2 Program Design and Implementation Impact

Significant boost to appliance programs

Public service commission staff urged substantial rebates (up to 125% of existing Focus rebates) for a full list of Energy Star appliances and solar hot water heaters. Focus staff recommended a smaller list and argued that past or existing rebates for several common appliances already had achieved or were approaching market "saturation." Focus staff also expressed concern about free-ridership and suggested that net incremental energy savings from the enlarged rebates would be difficult to measure. The more aggressive rebates were implemented.

In April, Focus warned retailers that the money would run out very soon and suggested scaling back their promotions. By late May, the money was exhausted, and the enhanced rebates were ended. Several retailers objected, but unlike the past, when Focus would try covering late rebate applications, the administrator had no money left for the rebates and cut them off at a firm date. In all, rebate checks were cut for 17,000 clothes washers, 11,000 refrigerators and 8,700 furnaces. Typically, Focus' Energy Star program generates 24,000 to 28,000 appliance and equipment sales annually, so in less than five months, the federal appliance money produced about a year's worth of sales. Solar hot water systems had the largest added bonus among the rebates, and over 100 systems were installed – more than Focus typically generates in a year.

Based on internal tracking, Focus staff said the program appeared to have met 80% of its annual program targets by mid-August. WECC and state officials are uncertain about the extent to which those accelerated sales impacted the efficiency market in appliances and what impact there might be on future programs. What an independent evaluator will conclude about attribution and the relative impact of the ARRA appliance funds is uncertain and will not be known until spring 2011. But there is broad consensus among all parties that the enlarged rebates produced a short-term economic boost.

Delegation of State Energy Program dollars to state economic development agency

The SEO turned responsibility for administering the industrial revolving loan fund over to the Commerce Department with a contract, avoiding the addition of any staff. The Commerce Department designed the terms for the industrial energy loans, vetted the applications and is making the awards, in consultation with the SEO.

The first industrial entities to get loans from the Commerce Department's revolving fund were in the food industry, which produces large amounts of waste. Food processors received financing

for digesters. In the retooling loan program, 200 firms were invited to an informational meeting, including firms suggested by renewable energy trade associations such as the American Wind Energy Association. About 600 people showed up and spilled out of the meeting room.

As of early September, about $6.3 million has been loaned to existing clean tech manufacturers and about $10 million loaned to firms retooling to join the clean tech supply chain. In the third industrial program, aimed at energy efficiency and renewable energy, nearly $41.6 million in loans have been contracted. To date, state officials say they are disappointed that lenders have not stepped up to assist industrial loan recipients with additional financing.

3.3 Policy Issues

Attribution

By default, the determination of energy savings associated with ARRA and utility customer funds will be made by the independent evaluator of Focus and its achievement of state targets. Preliminarily, the parties have agreed that credit for energy savings on appliances and equipment already receiving a Focus incentive will go to the Focus program. Credit for energy savings on appliances that Focus did not offer incentives will go to the SEEARP program.

4. Lasting Impacts

Wisconsin's budgeting of the majority of state SEP funds for revolving loan funds provides an opportunity for extending the impacts of the Recovery Act dollars well beyond the end of the grant period and, by requiring a substantial private-sector contribution to financed projects, leveraging significant non-federal resources.

Interviewees:
Judy Ziewacz, Director, Wisconsin Office of Energy Independence
Jolene Sheil, Wisconsin Public Service Commission
Sara van De Grift, Residential Program Manager, Wisconsin Energy Conservation Corp.
Kathy Kuntz, Program Manager (former), Wisconsin Energy Conservation Corp.

References

American Council for an Energy efficient Economy (ACEEE). 2010. State Energy Efficiency Policy Database. http://www.aceee.org/sector/state-policy

Nevius, M., Eldridge, R., and J. Krouk. 2010. "The State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts 2009." March. Boston MA: Consortium for Energy Efficiency (CEE). http://www.cee1.org/files/StateofEEIndustry2009.pdf

Oregon Department of Energy (ODOE). ARRA Energy Funding Awards. http://www.oregon.gov/ENERGY/Recovery/Funding.shtml

Regulatory Assistance Project (RAP). 2010. NAPEE Policy Grids Through 2009. http://www.raponline.org/Feature.asp?select=116

State of North Carolina Office of Governor Bev Perdue. http://www.governor.state.nc.us/

U.S. Census Bureau. 2010. United States Census 2010. Resident Population Data. http://2010.census.gov/2010census/data/apportionment-pop-text.php

U.S. Department of Energy (DOE) Weatherization and Intergovernmental Program. 2009. Projects. http://www1.eere.energy.gov/wip/project_map/

U.S. Energy Information Administration (EIA). 2010. Electric Power Annual 2008 - State Data Tables. Revenue from Retail Sales of Electricity by State by Provider, 1990-2008. Retrieved from http://www.eia.doe.gov/cneaf/electricity/epa/revenue_state.xls

Wisconsin Energy Conservation Corporation (WECC). 2010. WECC Annual Reports. http://www.weccusa.org/main/newsannualreports/title/Reports

Wisconsin Legislative Counsel. 2005 Wisconsin Act, Act 141: energy Efficiency, Renewable Resources, and Energy Policy. http://legis.wisconsin.gov/lc/publications/im/im_2006_01.pdf